



## Mt Gibson Gold Project

*Environment Protection and Biodiversity  
Conservation Act 1999 Public Environment  
Report (Reference 2023/09745)*

Prepared for  
Crimson Metals Pty Ltd  
ABN 93 169 977 155

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## Document Control

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## Authority

I hereby certify that; this document has been prepared by Tetris Environmental Pty Ltd on behalf of Crimson Metals Pty Ltd and accurately reflects the intention of the Mt Gibson Gold Project.



Signed:

Name: Wade Stephenson, Study Manager, Crimson Metals Pty Ltd

Date: 31.03.2026

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## Abbreviations

Acronym / Unit	Description
<b>AEP</b>	Annual Exceedance Probability
<b>AHD</b>	Australian Height Datum
<b>AWC</b>	Australian Wildlife Conservancy
<b>BAM Act</b>	<i>Biosecurity and Agriculture Management Act 2007</i>
<b>BC Act</b>	<i>Biodiversity Conservation Act 2016</i>
<b>Bgl</b>	Below ground level
<b>BoM</b>	Bureau of Meteorology
<b>Capricorn</b>	Capricorn Metals Ltd
<b>CIL</b>	Carbon in leach
<b>CO<sub>2</sub>-e</b>	Carbon dioxide equivalence
<b>Crimson</b>	Crimson Metals Pty Ltd
<b>DBCA</b>	Department of Biodiversity, Conservation and Attractions
<b>DCCEEW</b>	Department of Climate Change, Energy, the Environment and Water
<b>DMPE</b>	Department of Mines, Petroleum and Exploration
<b>DPIRD</b>	Department of Primary Industries and Regional Development
<b>DPLH</b>	Department of Planning, Lands and Heritage
<b>DWER</b>	Department of Water and Environmental Regulation
<b>EMP</b>	Environmental Management Plan
<b>EP Act</b>	<i>Environmental Protection Act 1986</i>
<b>EPA</b>	Environmental Protection Authority
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<b>GDE</b>	Groundwater Dependent Ecosystem
<b>GHG</b>	Greenhouse Gas
<b>ha</b>	Hectares
<b>IBRA</b>	Interim Biogeographic Regionalisation of Australia
<b>IFD</b>	Intensity-Frequency-Duration
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IWL</b>	Integrated Waste Landform
<b>Mining Act</b>	<i>Mining Act 1978</i>
<b>MCP</b>	Mine Closure Plan
<b>MGGP</b>	Mount Gibson Gold Project
<b>MP</b>	Mining Proposal
<b>mg/L</b>	milligrams per litre
<b>MNES</b>	Matters of National Environmental Significance
<b>Mtpa</b>	Million tonnes per annum
<b>NGER</b>	National Greenhouse and Energy Reporting
<b>PAF</b>	Potentially Acid Forming
<b>PEC</b>	Priority Ecological Community
<b>PER</b>	Public Environmental Report
<b>Proponent</b>	Crimson Metals Pty Ltd
<b>RIWI Act</b>	<i>Rights in Water and Irrigation Act 1914</i>
<b>SRE</b>	Short-range endemic
<b>SWIS</b>	South West Interconnected System
<b>t</b>	tonnes
<b>TEC</b>	Threatened Ecological Community
<b>TSF</b>	Tailings Storage Facility
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>WRL</b>	Waste rock landform

## Glossary of Terms

Term	Description
<b>Disturbance Footprint</b>	The total estimated extent of all temporary and permanent ground disturbance and vegetation removal associated with the construction of the Proposal. It will be a maximum of 1,612 ha.
<b>Development Envelope</b>	The Development Envelope is a buffer within the Proposal which contains all the Indicative Disturbance Footprint of the Proposal. It is estimated to be approximately 3,820 ha.
<b>Proposal</b>	The Mt Gibson Gold Project, relevant tenements and activities associated with the PER assessment.

## Table of Contents

Executive Summary .....	1
1 General Information .....	4
1.1 Title of the Action .....	4
1.2 The Proponent .....	4
1.3 Objectives of the Action .....	4
1.4 Location of the Action .....	4
1.5 Background to Development of the Action .....	6
1.6 Related Actions .....	6
1.7 Current Status .....	6
1.8 Structure of this PER .....	8
2 Description of the Action .....	10
2.1 Proposal Details .....	10
2.2 Proposal Development Stages .....	25
2.3 Feasible Alternatives .....	26
3 Description of the Environment .....	32
3.1 Bioregion .....	32
3.2 Climate .....	34
3.3 Geomorphology .....	36
3.4 Geology and soils .....	36
3.5 Hydrology .....	41
3.6 Flora .....	47
3.7 Vegetation .....	48
3.8 Terrestrial Fauna .....	62
3.9 Land Usage and Tenure .....	67
3.10 Heritage and Native Title .....	68
3.11 Conservation Reserves .....	68
3.12 Regional Community .....	68
4 Matters of National Environmental Significance (MNES) .....	71
4.1 Biological Studies Informing Relevant MNES .....	71
4.2 Eucalypt Woodlands of the Western Australian Wheatbelt .....	87
4.3 <i>Eremophila viscida</i> (Varnish Bush) .....	97
4.4 <i>Leipoa ocellata</i> (Malleefowl) .....	107
4.5 <i>Dasyurus geoffroyi</i> (Chuditch) .....	116
4.6 <i>Aphelocephala leucopsis</i> (Southern Whiteface) .....	120
4.7 Lake Goorly Shield-backed trapdoor spider ( <i>Idiosoma kopejtkaorum</i> ) listed as <i>Idiosoma nigrum</i> .....	123
5 Relevant Impacts and Management .....	139

5.1	Proposal Environmental Risk Assessment .....	139
5.2	Impact Assessment .....	149
5.3	Avoidance and Mitigation Measures .....	169
5.4	Rehabilitation .....	182
5.5	Residual Impact Assessment .....	189
6	Environmental Offsets .....	218
6.1	Environmental Offset Strategy Overview .....	218
6.2	Offset Strategy .....	225
6.3	Direct Offsets Risk Assessment .....	255
6.4	Consideration of EPBC Offset Policy Principles .....	263
6.5	Annual Compliance Reporting .....	268
7	Environmental Outcomes .....	269
7.1	Record keeping .....	269
7.2	Reporting and Audit .....	269
8	Other Approvals and Conditions .....	273
9	Consultation .....	277
9.1	Key stakeholders .....	277
9.2	Stakeholder engagement process .....	278
9.3	Stakeholder consultation .....	278
9.4	Public comments .....	278
10	Environmental Record of Person(s) Proposing to Take the Action .....	279
11	Economic and Social Matters .....	280
11.1	Economic Impact Assessment .....	280
11.2	Employment .....	282
11.3	Social Impact Assessment .....	283
12	Information sources provided in the PER .....	284
12.1	Information sources .....	284
12.2	Status of data .....	284
12.3	Information reliability .....	284
12.4	Mitigating uncertainty .....	284
13	Conclusions .....	286
14	Bibliography .....	290

## Tables

Table 1: Proponent details .....	4
Table 2: Exploration disturbance undertaken in the Proposal area .....	7
Table 3: Coordinates of Proposal infrastructure .....	15
Table 4: Estimated volumes of material to be mined .....	15
Table 5: Proposal Changes .....	26

Table 6: Environmental outcomes associated with the initial (not proposed) and revised (proposed) Disturbance Footprint .....	27
Table 7: Intensity-Frequency-Duration data for the Proposal site .....	35
Table 8: Geological units in the Proposal .....	37
Table 9: Soil landscapes in the Proposal .....	37
Table 10: Soil types identified in the Proposal .....	40
Table 11: Pre-European Vegetation Association Extents .....	48
Table 12: Vegetation types within the Development Envelope .....	51
Table 13: Habitat VSAs of the Development Envelope and Disturbance Footprint.....	63
Table 14: Proposal tenure .....	67
Table 15: Threatened flora and vegetation with potential to occur within the Development Envelope .....	72
Table 16: Threatened fauna with potential to occur within the Proposal .....	74
Table 17: Summary of detailed flora and vegetation surveys .....	77
Table 18: Additional surveys conducted for the Proposal development .....	78
Table 19: Summary of detailed terrestrial fauna surveys .....	82
Table 20: Habitat rating tool for WA Wheatbelt Woodlands .....	91
Table 21: WA Wheatbelt Woodlands condition assessment of patches within the Development Envelope .....	94
Table 22: Malleefowl mound activity classification system.....	108
Table 23: Malleefowl mounds recorded per VSA habitat .....	109
Table 24: Malleefowl VSA habitat.....	109
Table 25: Habitat quality rating tool for Malleefowl.....	110
Table 26: Habitat suitability categories for Malleefowl .....	111
Table 27: Malleefowl habitat rating tool results for Proposal Disturbance Footprint.....	112
Table 28: Chuditch VSA habitat .....	119
Table 29: Southern Whiteface VSA habitat .....	123
Table 30: Definitions of <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) burrow .....	127
Table 31: <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) burrow categories .....	128
Table 32: <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) habitat preference .....	132
Table 33: Preferred <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) Vegetation Types	133
Table 34: Habitat rating tool for <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) .....	134
Table 35: Habitat suitability categories <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) .....	135
Table 36: Likelihood of potential impact occurring .....	139
Table 37: Consequence of potential impact .....	139
Table 38: Risk rating .....	140
Table 39: Risk assessment .....	141
Table 40: Direct and cumulative impacts to fauna habitat.....	150
Table 41: Preferred Chuditch Vegetation Types.....	152
Table 42: Preferred <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) Habitat.....	153
Table 43: Direct and cumulative impacts to confirmed active <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) burrows and AOO in the Proposal .....	155
Table 44: Indicative species list for IWL rehabilitation.....	185
Table 45: Indicative species list for flat area rehabilitation .....	186
Table 46: Objectives, targets, completion criteria and monitoring for mine site rehabilitation .....	188
Table 47: Consideration of Significant Impact Guidelines – WA Wheatbelt Woodlands .....	191
Table 48: Consideration of Significant Impact Guidelines – <i>Eremophila viscida</i> .....	196
Table 49: Consideration of Significant Impact Guidelines – Malleefowl.....	201

Table 50: Consideration of Significant Impact Guidelines – Chuditch.....	207
Table 51: Consideration of Significant Impact Guidelines – Southern Whiteface .....	210
Table 52: Consideration of Significant Impact Guidelines – Lake Goorly Shield-backed Trapdoor Spider ( <i>Idiosoma kopejtkorum</i> ) listed as <i>Idiosoma nigrum</i> .....	214
Table 53: Residual Significant Impacts Requiring Offset .....	218
Table 54: Environmental Offset Strategy and Other Conservation Initiatives Cost Summary .....	220
Table 55: Environmental Offset Strategy Summary .....	221
Table 56: Alignment of offset to National Malleefowl Recovery Plan (2024).....	227
Table 57: Offset Values for the NACC NRM Revegetation Offset.....	229
Table 58: Schedule of work and budget (\$,000) NACC NRM .....	230
Table 59: Malleefowl offset site selection criteria .....	231
Table 60: Generalised Site Management Plan specifications for revegetation sites.....	233
Table 61: Indicative species list for Malleefowl offset site revegetation .....	236
Table 62: Generalised Schedule of Implementation for Revegetation and Management ...	237
Table 63: Malleefowl Habitat Revegetation high level implementation plan .....	238
Table 64: Objectives, targets, completion criteria and monitoring for Malleefowl habitat revegetation .....	241
Table 65: WA Wheatbelt Woodland TEC remaining within Mummaloo Iron Ore Project ....	242
Table 66: Offset Values for the Mummaloo Offset Site .....	243
Table 67: Management Actions for Mummaloo Offset Area .....	245
Table 68: Objectives, targets, completion criteria and monitoring for maintaining the Mummaloo offset site.....	248
Table 69: Proposed contributions to NMRG Projects over first 5 year period (\$k).....	249
Table 70: National Recovery Plan Project Implementation .....	252
Table 71: Environmental Direct Offsets Risk Assessment .....	256
Table 72: Accordance with the EPBC Act Environmental Offsets Policy.....	263
Table 73: Proposal MNES Environmental Outcomes .....	270
Table 74: Other approvals.....	274
Table 75: Key stakeholders of the Proposal.....	277
Table 76: Net Production Benefits of MGGP Proposal.....	281
Table 77: Summary of Regional and State Impacts.....	282
Table 78: Employment Impacts of Proposal.....	283
Table 79: Assessment of the Proposal compliance with the objects of the EPBC Act .....	287
Table 80: Assessment of the Proposal Compliance with the principles of ESD .....	288

## Figures

Figure 1: Regional location and Development Envelope .....	5
Figure 2: Proposal indicative site layout .....	11
Figure 3: Rendered overview of indicative mine layout .....	12
Figure 4: Rendered view of indicative mine layout (view from north) .....	13
Figure 5: Rendered view of indicative mine layout (view from west) .....	14
Figure 6: Existing site disturbance .....	17
Figure 7: Rendered overview of existing site disturbance .....	18
Figure 8: Rendered view of existing disturbance in proposed mine area (view from south).	19
Figure 9: Proposed plant process .....	21
Figure 10: Original and Revised Proposal Disturbance Footprint – flora/vegetation .....	30
Figure 11: Original and Revised Proposal Disturbance Footprint - fauna and habitat .....	31
Figure 12: IBRA regions within the area .....	33

Figure 13: Climatic data of the Proposal .....	34
Figure 14: Wind roses for 9am and 3pm observations at Paynes Find .....	35
Figure 15: Geological units of the Proposal .....	38
Figure 16: Soil landscapes of the Proposal .....	39
Figure 17: Lake systems in the Proposal .....	43
Figure 18: Surface water catchments in the Proposal .....	45
Figure 19: Pre-European Vegetation Associations .....	50
Figure 20: Vegetation types mapped in the Development Envelope .....	60
Figure 21: Vegetation condition within the Development Envelope .....	61
Figure 22: Fauna habitat of the Development Envelope and surrounds .....	65
Figure 23: Recorded cat locations (AWC, 2024).....	66
Figure 24: Recorded fox locations (AWC, 2024).....	67
Figure 25: Land tenure.....	70
Figure 26: Flora and vegetation survey tracks.....	79
Figure 27: Vertebrate fauna survey track logs across the Development Envelope .....	84
Figure 28: Invertebrate fauna (mygalomorph spider) survey areas .....	85
Figure 29: <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) EOO and AOO survey areas .....	86
Figure 30: Revised WA Wheatbelt Woodlands extent within the Development Envelope ....	89
Figure 31: WA Wheatbelt Woodlands extent within the local and regional area .....	90
Figure 32: WA Wheatbelt Woodlands patches in the Development Envelope and surrounds .....	93
Figure 33: Vegetation condition of areas important to TEC survival .....	96
Figure 34: <i>Eremophila viscida</i> recorded in the Development Envelope .....	100
Figure 35: Locations assessed for potential <i>Eremophila viscida</i> habitat .....	102
Figure 36: Vegetation with potential to support <i>Eremophila viscida</i> .....	104
Figure 37: <i>Eremophila viscida</i> critical habitat.....	106
Figure 38: Malleefowl mounds recorded in the Development Envelope and surrounds .....	113
Figure 39: Malleefowl mounds and VSAs recorded in the Development Envelope and surrounds .....	114
Figure 40: Mapped extent of preferred habitat for Malleefowl mound construction .....	115
Figure 41: Translocated Chuditch monitoring records (AWC, 2024).....	118
Figure 42: Southern Whiteface records .....	121
Figure 43: <i>Idiosoma</i> spp. distribution in WA (Rix et al., 2018) .....	126
Figure 44: Confirmed active <i>I. kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) records burrows in the Development Envelope and surrounds .....	130
Figure 45: <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) records, Extent of Occurrence (EOO) and Area of Occupancy (AOO).....	136
Figure 46: Habitat connectivity within <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) Extent of Occurrence (EOO).....	137
Figure 47: Extrapolation of potential <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) AOO .....	138
Figure 48: Surface water management measures for the Proposal .....	177
Figure 49: Gunduwa Region (GRCA 2024) .....	224
Figure 50: Priority habitats to restore and protect for Malleefowl.....	228
Figure 51: Mummaloo Iron Ore Project existing disturbance.....	246
Figure 52: Mummaloo Iron Ore Project WA Wheatbelt Woodlands TEC and offset site.....	247

## Appendices

- Appendix A: DCCEEW PER Guidelines – Mount Gibson Gold Project (Ref: 2023/09745)
- Appendix B: CMW Geosciences (2023) – Tailings Storage Facility (TSF) Design Report
- Appendix C: FVC (2023) – Detailed Flora and Vegetation Assessment
- Appendix D: Protected Matters Search Tool Results
- Appendix E: TEPL (2023) – Groundwater Dependent Vegetation Desktop Study
- Appendix F: TEPL (2025a) – Survey of *Eremophila viscida* Habitat and Eucalypt Woodlands of the Western Australian Wheatbelt
- Appendix G: Biota (2022) – Basic and Targeted Fauna Survey
- Appendix H: Biota (2023) – Extended Area Basic and Targeted Fauna Study
- Appendix I: Bamford (2024a) – Fauna Assessment
- Appendix J: Bamford (2024b) – Targeted Investigations into Significant Fauna
- Appendix K: Bennelongia (2025a) – Lake Goorly Shield-Backed Trapdoor Spider (*Idiosoma kopejtkorum*) Impact Assessment
- Appendix L: Bennelongia (2025b) – Lake Goorly Shield-Backed Trapdoor Spider (*Idiosoma kopejtkorum*) EOO and AOO expansion
- Appendix M: GHD (2025) – Acoustic Assessment
- Appendix N: GHD (2023) – Air Quality Assessment
- Appendix O: Greenbase (2023) – GHG Assessment
- Appendix P: Greenhouse Gas Environmental Management Plan
- Appendix Q: MNES Environmental Management Plan
- Appendix R: MGGP Environmental Management Plan
- Appendix S: NACC NRM (2026) Revegetation Plan
- Appendix T: Anders Environmental Consulting (2026) – MIOP Verification
- Appendix U: Stakeholder Consultation Register
- Appendix V: Public comments on PER and Proponents responses
- Appendix W: Gillespie Economics (2025) - MGGP Economic Assessment

## Executive Summary

Crimson Metals Pty Ltd (Crimson, the Proponent) is proposing to develop the Mount Gibson Gold Project (MGGP; the Proposal), located in the Shire of Yalgoo, approximately 280 kilometres (km) northeast of Perth, Western Australia. The area has been subject to significant historical disturbance from mining in the 1980s and 1990s.

The Proposal encompasses the re-opening and enlargement of existing open cut mines, utilisation of existing infrastructure where practicable, development of a new gold processing plant, extension of the existing airstrip and associated infrastructure. The Proposal is estimated to process up to six million tonnes of ore per annum (Mtpa) over a 15-year operating mine life. The Proposal will disturb up to 1,612 ha of land (the Disturbance Footprint), of which ~1,213 ha is comprised of native vegetation and ~399 ha previously disturbed, within a 3,820 ha Development Envelope.

The Proposal was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 27 February 2024 (EPBC 2023/09745). On 13 June 2024, the Minister for Climate Change, Energy, the Environment and Water determined the Proposal was a controlled action due to the potential significant impacts on the following Matters of National Environmental Significance (MNES):

- Listed Threatened Species and Ecological Communities.

A delegate of the Minister determined the Proposal would be assessed through a Public Environment Report (PER). Guidelines for the PER were developed by DCCEEW and issued on 12 July 2024. The Guidelines have been included as Appendix A.

### MNES and Assessment of Environmental Impacts

This PER contains information about the Proposal and its relevant impacts in accordance with the PER Guidelines, enabling stakeholders and the Minister to understand the environmental impacts of the Proposal to the relevant MNES.

The following MNES have been identified as occurring within the Development Envelope or surrounding area:

- Eucalypt Woodlands of the Western Australian Wheatbelt Ecological Community
- *Eremophila viscida* (Varnish Bush)
- *Leipoa ocellata* (Malleefowl)
- *Aphelocephala leucopsis* (Southern Whiteface)
- *Dasyurus geoffroii* (Chuditch)
- Lake Goorly Shield-backed trapdoor spider (*Idiosoma kopejtkaorum*) listed as *Idiosoma nigrum* (Shield Backed Trapdoor Spider). A systematic review detailing revision of the genus *Idiosoma* (*nigrum*-group) has separated *Idiosoma nigrum*, a listed MNES, into multiple species. This includes *I. kopejtkaorum* which is listed as Threatened under State (WA) legislation. However, the DCCEEW description and distribution map has not been updated to reflect the taxonomic revision. Based on this revision and DNA analysis, it is considered that any *Idiosoma* species that may occur within the Development Envelope are most likely *I. kopejtkaorum*.

The Proposal will result in direct impacts of:

- 27.5 ha of vegetation representative of the WA Wheatbelt Woodlands TEC
- Two active (during 2024) and eight inactive Malleefowl mounds
- 568.8 ha of preferred Malleefowl breeding habitat and 608 ha of potential foraging/transit habitat
- 20 confirmed active and 18 likely active Lake Goorly Shield-backed trapdoor spider (*Idiosoma kopejtkorum*) listed as *Idiosoma nigrum* burrows

Avoidance and mitigation actions outlined in Section 5.3 reduce any direct or potential indirect impacts to as low as practicable. An assessment of residual impacts to MNES known or considered likely to occur within the Development Envelope and whether those residual impacts are likely to be significant has been undertaken. The assessment determined that there could be residual significant impacts to *Leipoa ocellata* (Malleefowl) and the WA Wheatbelt Woodlands TEC and can be found at Section 5.5.

Whilst not considered a significant residual impact, it is acknowledged the potential for impacts to *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) from loss of habitat and potential genetic impacts from Proposal implementation are uncertain.

The actions proposed to Offset the possible residual significant impacts (to TEC and Malleefowl) and uncertainty of impacts to *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) habitat and genetics are outlined below and is provided in Section 6:

- 100% (direct) offset of preferred Malleefowl habitat through partnering with the Northern Agricultural Catchments Council – Natural Resource Management (NACC NRM) to restore over 700 ha of degraded habitat over the life of the Proposal. This direct offset is underway with agreement in place for the first property providing a total restoration area of 33 Ha. The estimated total cost for the life of the Proposal is \$4.75 million.
- 100% averted loss (direct) offset of WA Wheatbelt Woodlands TEC of 135.8 ha as a result of the Proponent's purchase of the Mummaloo Iron Ore Mine at a cost of \$1.6 million.
- Indirect offset resulting from a 5 year agreement with the National Malleefowl Recovery Group (NMRG) to carry out long term research into genetic health and diversity; use camera trap studies to quantify Malleefowl use of habitat links and restored habitat; and to conduct a long term feral predator control to determine the benefit of reducing the abundance of introduced predators such as foxes and cats. The NMRG program is expected to cost \$1.0 million over the 5 year agreement and is underway with the first tranche of funding to NMRG paid primarily to facilitate planning of sites, data review and purchase of trap cameras.
- Indirect offset for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) through biodiversity conservation funding and partnership of a four year ARC Linkage Project, comprised of \$400,000 direct and up to \$120,000 in-kind financial support, for research informing the conservation and impact assessment of trapdoor spiders in Western Australia; to be undertaken by research scientists from the Western Australian Museum, Department of Biodiversity, Conservation and Attractions (DBCA, State of WA) and associated research and industry partners over a four year period commencing in 2027.
- Significant long term (life of mine) ecological and environmental benefits through partnering with key experienced local environmental NGO's; Australian Wildlife

Conservancy (AWC) and the Gunduwa Regional Conservation Association (GRCA). Combined, the total life of proposal cost of these partnering initiatives is \$6.9 million.

- Total direct and indirect offsets total \$7.9 million over the life of the Proposal. When long term partnering initiatives with the AWC and GRCA are included, the total estimated cost is \$14.8 million.

Assessment of the Proposal by PER under the EPBC Act is separate from the Western Australian State government assessment process. The Proposal was referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act) on 18 July 2024. On 19 August 2024, the Minister for Environment determined the Proposal would be assessed at a 'referral information with additional information and public review' level ([referral available here](#)).

### **Economic Impacts**

The Economic Impact Assessment conducted for the Proposal estimates net production benefits to the Australian and Western Australian economy of \$1,441 M and \$304 M, respectively, in the form of royalties, company tax and residual benefits. The Proposal is expected to deliver considerable direct and indirect economic activity, including jobs, to the local, regional and Western Australian economy (Gillespie, 2025).

The Proposal will create new jobs in Western Australia of approximately 387 direct and indirect jobs during the construction phase and approximately 1,368 direct and indirect jobs over the operational phase (Gillespie, 2025). Further details of the Economic Impact Assessment are provided in Section 11.

### **Social Impacts**

The Proponent and its long term contractors, have a demonstrated successful history of community engagement and benefit sharing at its Karlawinda Gold Project in the Pilbara (WA) over the last five years, effectively managing the spectrum of stakeholders connected to the project. The management team has the experience, systems and skills to apply the same measured approach to the Proposal being considered.

The following positive social impacts in relation to the Proposal have been identified:

- Generation of long term employment opportunities through the construction and operational phases of the Proposal. These employment opportunities can take the form of direct employment with Crimson and its subcontractors, including apprenticeships, graduate programs and long term experienced roles, as well as through many indirect supply chain opportunities.
- Engagement with and support for community development activities and resources.
- Increased economic activity for local businesses and local/regional suppliers including local Traditional Owner groups that will have opportunities to participate in ongoing support in Crimson's activities in the area.

The following potential negative social impacts have also been identified:

- Deterioration of environmental values held by the community.
- Visual impacts of the Proposal resulting in a changed sense of place.

Visual, noise and air quality amenity are not anticipated social impacts given the remoteness of the Proposal (the nearest towns are approximately 60 km south west and 72 km north east of the Proposal).

# 1 General Information

## 1.1 Title of the Action

To expand and operate the Mount Gibson Gold Mine in the Shire of Yalgoo, Western Australia, 280 km north-east of Perth (See EPBC Act referral 2023/09745).

## 1.2 The Proponent

The designated Proponent details are detailed in Table 1. The Proponent, Crimson Metals Pty Ltd (Crimson), is a wholly owned subsidiary of Capricorn Metals Ltd (Capricorn).

**Table 1: Proponent details**

Proponent Details	
<b>Proponent Name</b>	Crimson Metals Pty Ltd (Crimson)
<b>Proponent ABN</b>	ABN: 93 169 977 155
<b>Proponent Contact</b>	Wade Stephenson – Study Manager
<b>Proponent Postal Address</b>	Level 3, 40 Kings Park Road West Perth WA 6005

## 1.3 Objectives of the Action

The objective of the Action is to develop, expand and operate the MGGP, encompassing the re-opening and enlargement of existing open cut mines, utilisation of existing infrastructure where practicable, and development of a new gold processing plant and associated infrastructure. The Proponent estimates processing up to six million tonnes per annum (Mtpa) of ore over an approximate 15 year operating mine life. A detailed Proposal description is provided in Section 2.

## 1.4 Location of the Action

The action is located in the Shire of Yalgoo, approximately 280 kilometres (km) northeast of Perth, Western Australia. The nearest towns are Wubin and Paynes Find, located approximately 60 km south west and 72 km north east of the Proposal respectively (Figure 1).

The Proposal area is located approximately 20 km north and 40 km east from the edge of the heavily cleared wheatbelt agricultural zone. Neighbouring properties include the privately owned ex-pastoral stations – Charles Darwin Reserve (Bush Heritage Australia) and Mount Gibson Wildlife Sanctuary (Australian Wildlife Conservancy). The area to the north of the Proposal is predominantly Unallocated Crown Land.

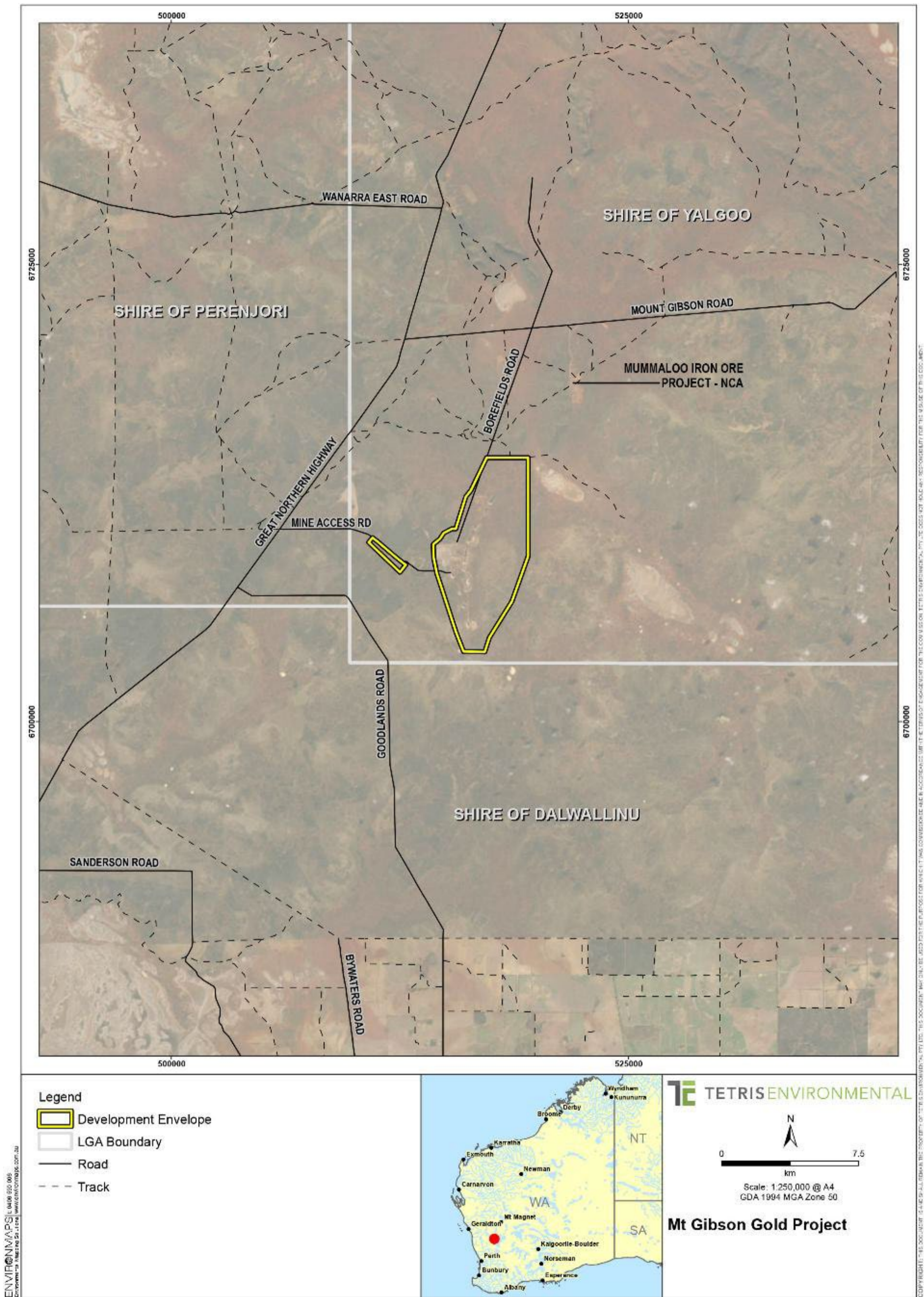


Figure 1: Regional location and Development Envelope

## 1.5 Background to Development of the Action

The action was subject to significant historical disturbance from mining in the 1980s and 1990s. By 1999, when the existing mine was placed on care and maintenance, disturbance included two tailings dams, an in-pit tailings dam, a heap leach pad, multiple in-pit and ex-pit waste rock dumps, several shallow laterite pits, 14 open pits with a maximum depth of approximately 100 metres, mining oxide, transitional and primary ore zones and an underground mine.

Within the Disturbance Footprint of the action there is approximately 399 ha of previously clearing and 35.6 ha of rehabilitated vegetation. Since historic rehabilitation was undertaken by previous tenure owners there is no information available on the rehabilitation methodology, however replanting was unlikely to have been included. It is assumed all areas of rehabilitation are natural regrowth. No active rehabilitation has been undertaken by the Proponent to historically disturbed areas during care and maintenance.

The Proponent acquired the tenure in 2021 and commenced undertaking exploration activities early in 2022. All activities have been executed in accordance with management actions and conditions outlined in each Programme of Works (PoW) approved under the *Mining Act 1978* (Mining Act). These conditions include baseline biological surveys, avoidance of Malleefowl mounds and rehabilitation on completion of works

Comprehensive baseline studies and investigations have been undertaken to understand the environmental and social values of the Proposal area and its surroundings.

The proposed action presented in this document is the result of an extensive design and review process that has optimised specific elements and balanced them with a precautionary approach to avoid, mitigate, and manage potential environmental impacts.

## 1.6 Related Actions

There are no other related actions in the region that will be affected by the Proposal. The nearest developments to the Proposal are the Mummaloo Iron Ore mine, located 8 km to the north east; and the Extension Hill Iron Ore mine, located approximately 15 km north west. No other related Actions are currently in, or proposed for, the Development Envelope and surrounds.

## 1.7 Current Status

Low-impact exploration drilling (i.e., AC, RC, Diamond drilling) for resource definition, exploration targets and groundwater have been ongoing since 2022. All exploration has been undertaken in accordance with relevant State approvals, including Programme of Work (PoW) approved by DMPE. Within the Proposal area, an aggregate of approximately 87.1 ha has been disturbed for exploration, of which 87% was undertaken using low scale disturbance methods of Reverse Circulation (RC) or Air Core (AC) drilling. This is summarised in Table 2.

**Table 2: Exploration disturbance undertaken in the Proposal area**

Drill type	Area disturbed (ha)	Percentage of exploration disturbance	Area rehabilitated (ha)
<b>Reverse Circulation</b>	40.8	47%	36.5
<b>Air Core</b>	35.0	40%	26.4
<b>Diamond</b>	4.4	5%	4.4
<b>Water bore</b>	6.9	8%	0
<b>Total</b>	<b>87.1</b>	<b>100%</b>	<b>67.3</b>

Exploration disturbance has been undertaken in accordance with the management actions listed in the PoWs (approved by DMPE), such as avoiding clearance of mature Eucalypt trees (Photograph 1).



**Photograph 1: Low impact of exploration disturbance.**

Rehabilitation has been completed on 67.3 ha of the exploration disturbed area; the remaining cleared area includes active exploration areas and open tracks which may be utilised in the future. Rehabilitation of completed drill holes and associated sumps is ongoing in these areas however is not reflected in the rehabilitation total until full rehabilitation has been completed.

The Proposal was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC Act on 27 February 2024 (EPBC 2023/09745). On 13 June 2024, the Minister for Climate Change, Energy, the Environment and Water determined the Proposal was a controlled action due to the potential significant impacts on the following Matters of National Environmental Significance (MNES):

- Listed Threatened Species and Ecological Communities.

A delegate of the Minister determined the Proposal would be assessed through a Public Environment Report (PER). Guidelines for the PER were developed by DCCEEW and issued on 12 July 2024. The Guidelines have been included as Appendix A.

This PER contains information about the Proposal and its relevant impacts in accordance with the PER Guidelines, enabling stakeholders and the Minister to understand the environmental impacts of the Proposal relevant to the above MNES.

Assessment of the Proposal by PER under the EPBC Act is separate from the State assessment process that is also under assessment. The Proposal was referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act) on 18 July 2024. On 19 August 2024, the Minister for Environment determined the Proposal would be assessed at a 'referral information with additional information and public review' level ([referral available here](#)).

## 1.8 Structure of this PER

The PER is structured in accordance with Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000* and the PER Guidelines issued by DCCEEW for the Proposal (refer to Appendix A). The structure is:

**Section 1** provides general information and background of the Proposal.

**Section 2** describes the Proposal, including precise locations of proposed infrastructure, planned timing and the activities to be undertaken during each stage (construction, operation and decommissioning). This section also discusses the feasible alternatives to the Proposal, within the context of the potential impacts of each alternative on the MNES that are controlling provisions for the Proposal.

**Section 3** provides a detailed description of the existing environmental values within the Proposal.

**Section 4** describes the MNES relevant to the Proposal, including desktop and field studies undertaken to determine the likely presence and/or habitat characteristics for each of the relevant MNES.

**Section 5** describes the direct and indirect impacts of the Proposal and measures to avoid, mitigate, manage and rehabilitate impacts of the Proposal on biodiversity values and MNES. This section also assesses the significance of residual impacts on the relevant MNES, after mitigation measures have been implemented and outlines the management plans to be prepared and implemented for the Proposal.

**Section 6** details the offsets proposed.

**Section 7** outlines the environmental outcomes expected for the Proposal.

**Section 8** lists the other approvals and conditions relevant to the Proposal.

**Section 9** describes the engagement and consultation that has taken place regarding the Proposal.

**Section 10** details of the environmental record of the proponent.

**Section 11** provides a summary of economic and social matters.

**Section 12** provides lists the information sources and references used in developing this PER.

**Section 13** provides an overall conclusion on the findings of this PER.

## 2 Description of the Action

### 2.1 Proposal Details

The Proposal is to develop, construct and operate an Open Pit Gold Mine, including Processing Plant and supporting infrastructure. The Proposal includes:

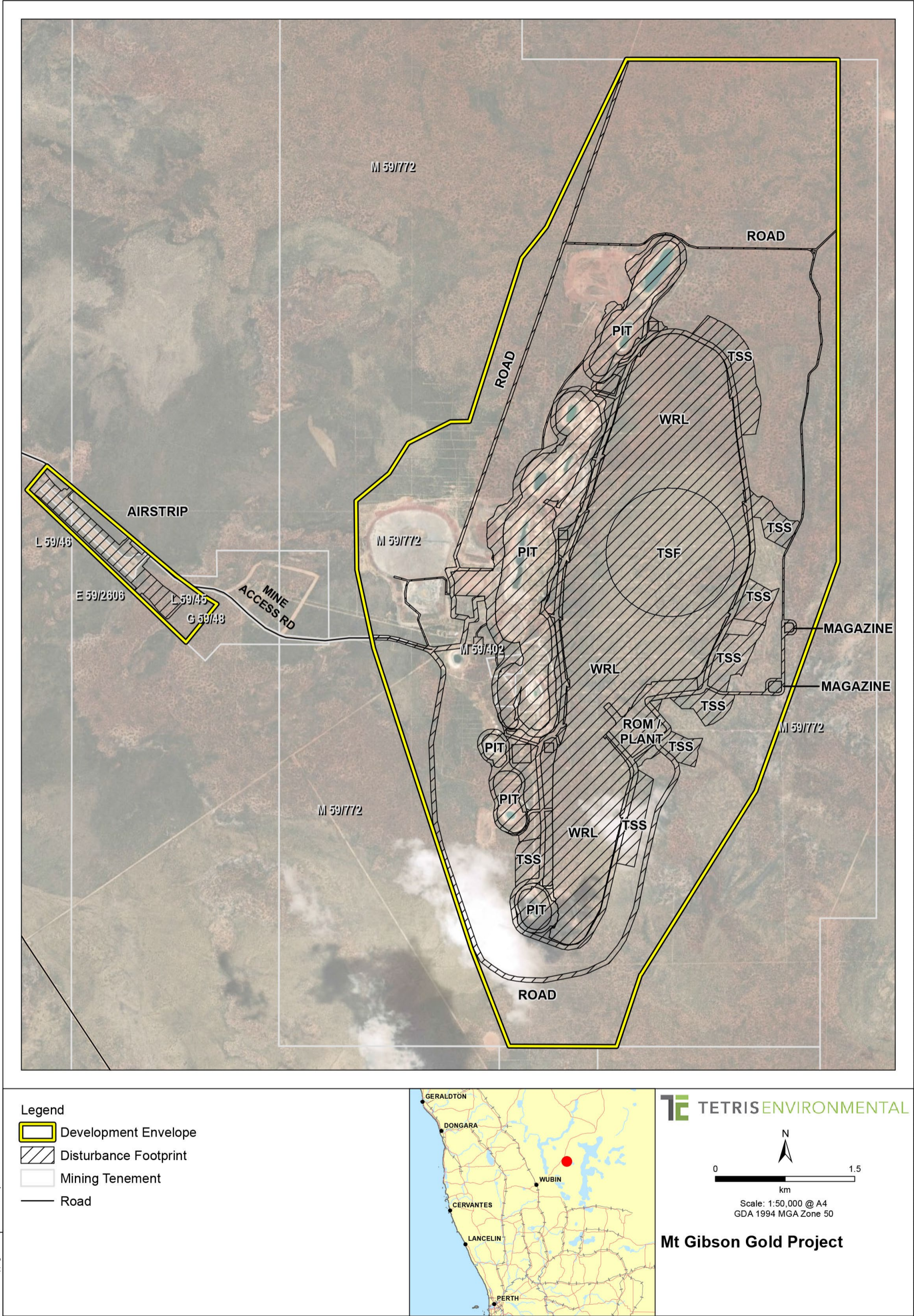
- the development of above and below water table Open Pits, via cutbacks of historically mined open pits
- ore processing facilities
- expansion of the existing airstrip (Subsequently approved by DCCEEW under s156B of the EPBC Act on 7 May 2025)
- mineral waste management (Waste Rock Landform and Tailings Storage Facility)
- associated infrastructure (Haul Roads, borefield, pipeline corridors, workshops, offices, powerhouse etc.).

The Proposal is expected to process up to six (6) million tonnes per annum (Mtpa) of ore and extract approximately 460 million tonnes (Mt) of waste over a 15-year operating mine life. Mining will occur concurrently across ore bodies as well as several open pits. Rehabilitation and closure will be progressive and in accordance with the approved Mine Closure Plan under the Mining Act.

The Proposal footprint is the maximum disturbance of the land associated with the elements of the Proposal as outlined in Section 2.1 (i.e. the maximum area of disturbance). The Proposal will disturb up to 1,612 ha of land (the Disturbance Footprint), of which ~1,213 ha is comprised of native vegetation and ~399 ha previously disturbed, within a 3,820 ha Development Envelope.

Upon completion of the Proposal, some disturbances will remain, such as the Open Pits, which cannot be rehabilitated and support infrastructure, such as strategic access roads, required for monitoring and maintenance of the Proposal after rehabilitation and transition towards mine closure. If the access roads are not required for post-closure use as agreed with stakeholders and/or regulators, these disturbed areas will also be rehabilitated.

Figure 2 shows the Development Envelope and indicative Disturbance Footprint of the Proposal and Figure 3 to Figure 5 show rendered imagery of the indicative Disturbance Footprint when the Proposal is fully developed.



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Figure 2: Proposal indicative site layout

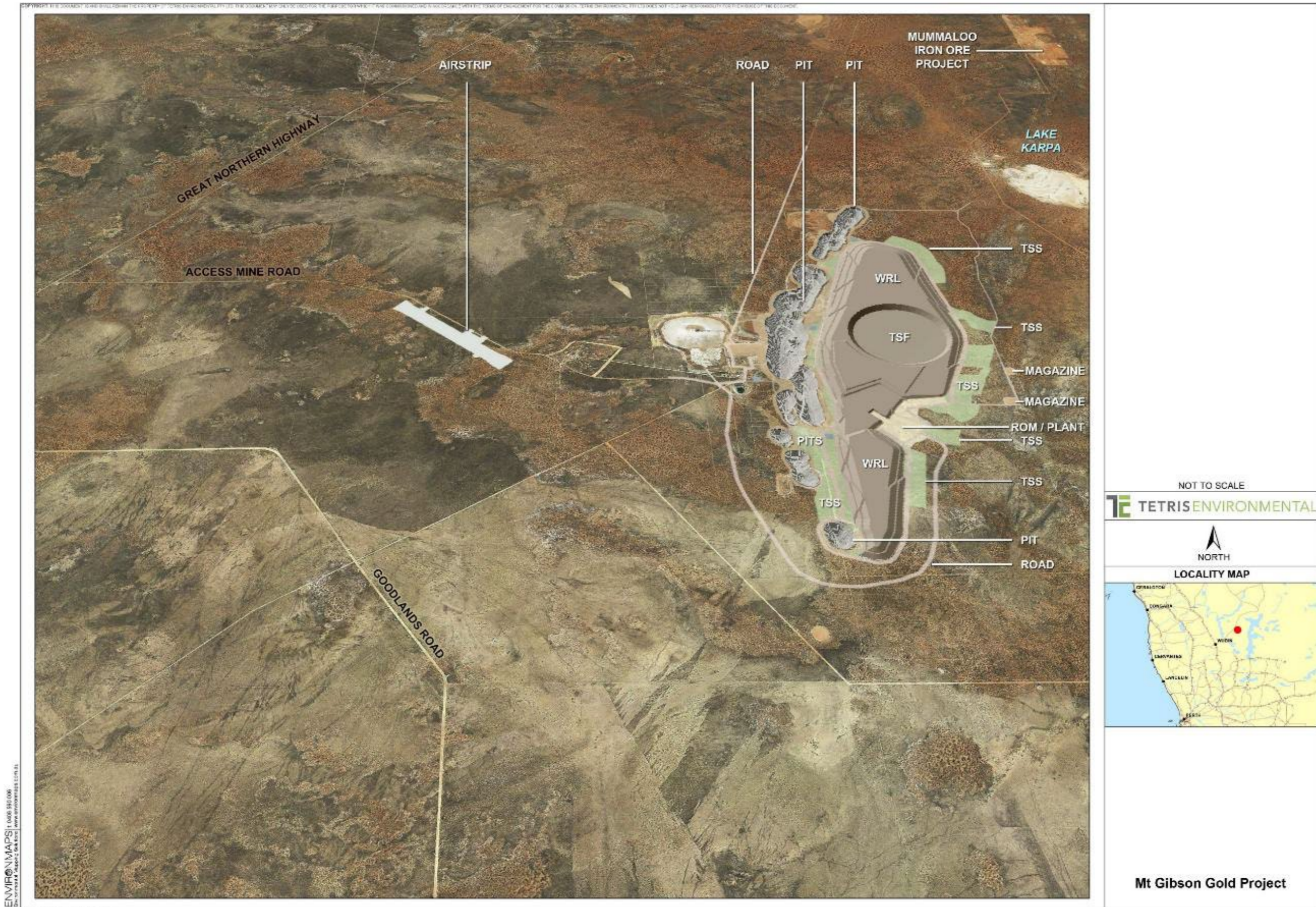


Figure 3: Rendered overview of indicative mine layout

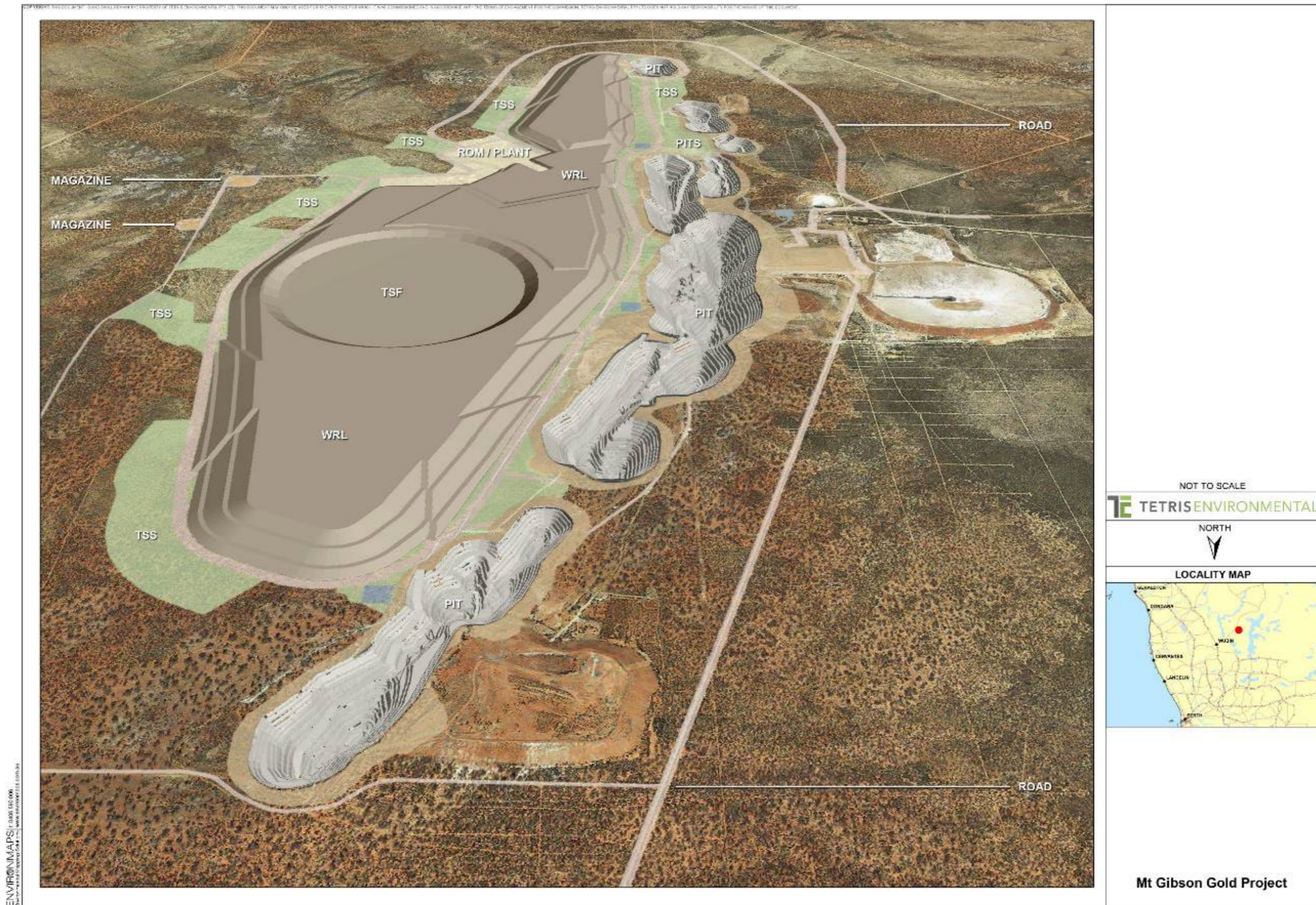


Figure 4: Rendered view of indicative mine layout (view from north)

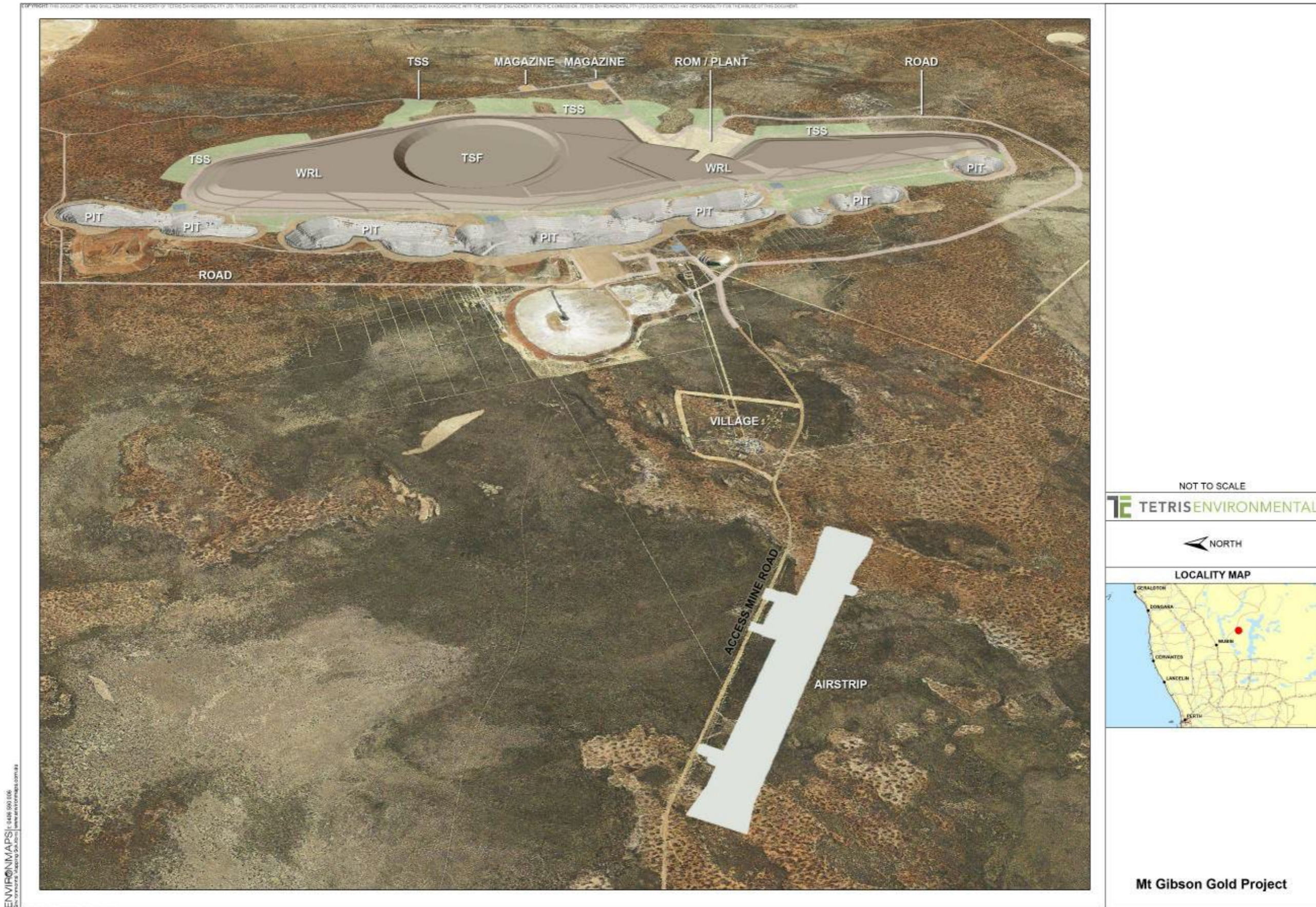


Figure 5: Rendered view of indicative mine layout (view from west)

Table 3 presents the indicative coordinates (GDA 20, Zone 50) of infrastructure shown in Figure 2. The Proposal will include construction, operation and decommissioning activities associated with the key components described in Section 2.1.1 to 2.1.5.

**Table 3: Coordinates of Proposal infrastructure**

Infrastructure	Easting	Northing	Infrastructure	Easting	Northing
ROAD	517231	6714346	PIT	515976	6706445
ROAD	516578	6712464	IWL	517735	6710548
ROAD	519290	6712397	WRL	516776	6706083
ROAD	519129	6710511	ROM/PLANT	517373	6707239
ROAD	516354	6704534	TSS	516185	6705791
ROAD	514547	6708218	TSS	517335	6706198
PIT	517195	6711500	TSS	517849	6707023
PIT	516217	6709424	TSS	518173	6707487
PIT	516243	6707779	TSS	518389	6708020
PIT	515823	6707023	TSS	518662	6708630
PIT	515976	6706445	TSS	518903	6709405
PIT	516255	6705315	TSS	518478	6711202
TSF	517703	6709125	MAGAZINE	518997	6708324
IWL	517125	6708084	MAGAZINE	518857	6707687
WRL	516776	6706083	AIRSTRIP	511518	6709310

### 2.1.1 Open Pits

The Proposal includes 11 below water table open pits, occupying a total of approximately 260 ha and mined to varying depths up to 305 m below ground level (bgl). Figure 6 to Figure 8 outline the existing (historical) disturbance, including the pits.

Estimated volumes of material to be mined are shown in Table 4.

**Table 4: Estimated volumes of material to be mined**

Pit	Pit depth (mRL)	Depth below surface (m)	Total material mined (Mt)	Ore (Mt)	Waste (Mt)
Orion North	67.5	285	149.1	25.5	123.6
Orion South	42.5	305	265.8	40.9	224.9
Enterprise	197.5	131	22.8	3.7	19.1

Pit	Pit depth (mRL)	Depth below surface (m)	Total material mined (Mt)	Ore (Mt)	Waste (Mt)
<b>S2</b>	207.5	153	37.5	6.5	30.9
<b>Sheldon</b>	257.5	91	9.7	1.4	8.2
<b>Tobias Find</b>	257.5	107	12.3	1.9	10.4
<b>Taurus</b>	272.5	94	2.6	0.4	2.2
<b>Deep South</b>	222.5	128	9.5	1.3	8.1
<b>Hornet</b>	137.5	188	24.3	2.9	21.5
<b>Commanche</b>	257.5	90	4.4	0.4	4.0
<b>Drifter</b>	287.5	66	2.3	0.2	2.0
<b>Heap leach pad</b>	-	0	6.8	3.5	3.3
<b>In-pit old tailings</b>	295	60	1.6	0	1.6
<b>Total</b>			<b>548.7</b>	<b>88.8</b>	<b>459.9</b>

### 2.1.2 Run of Mine (ROM)

Mining will be undertaken using conventional drill and blast and load and haul operations; using excavators to load material into haul trucks and deliver the ore to the ROM or waste rock dump where appropriate. The haulage trucks will utilise direct dumping into the crushing circuit ROM bin in conjunction with a front-end loader rehandling material on the ROM. The ROM and plant will occupy an area of approximately 34 ha.

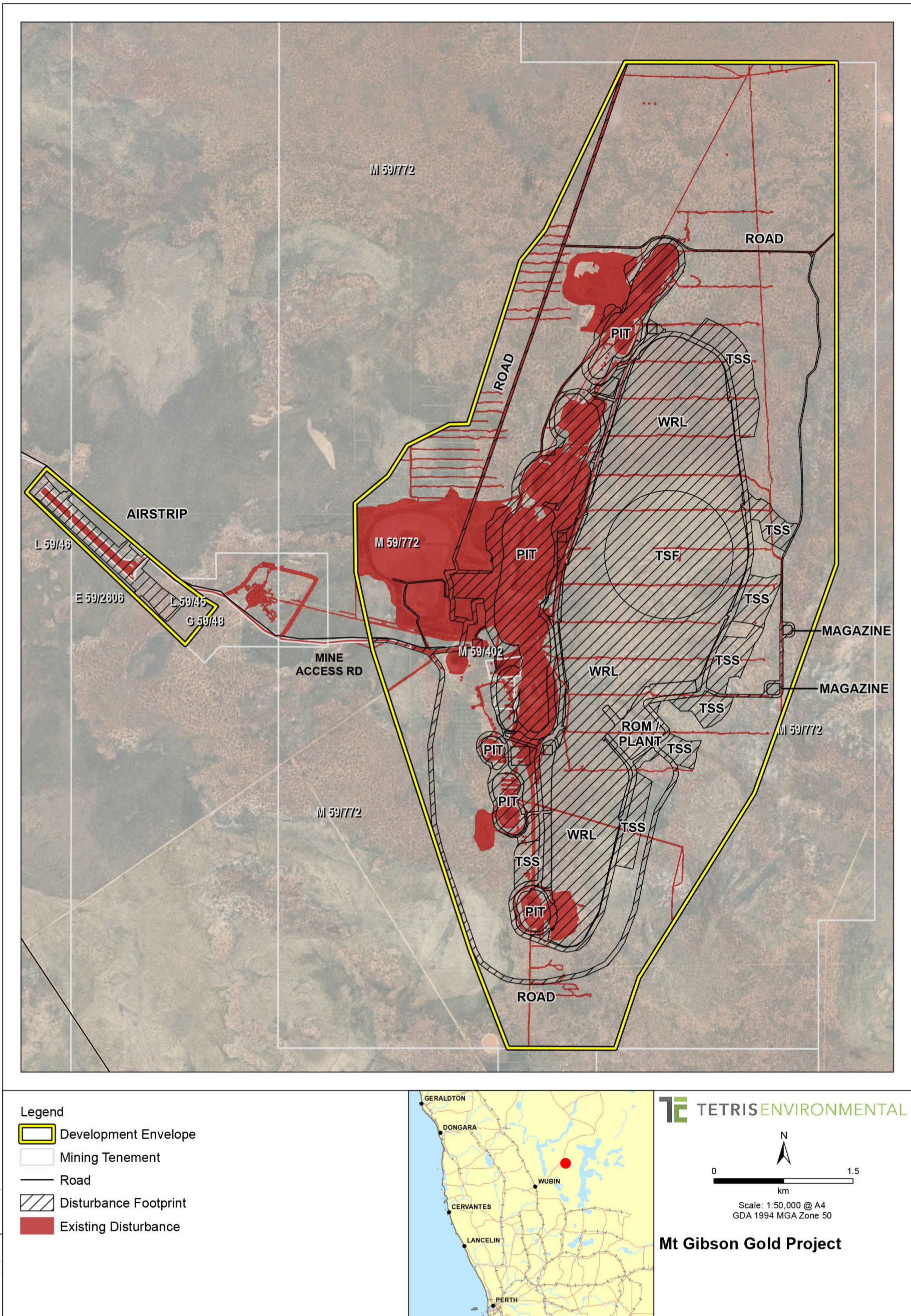


Figure 6: Existing site disturbance

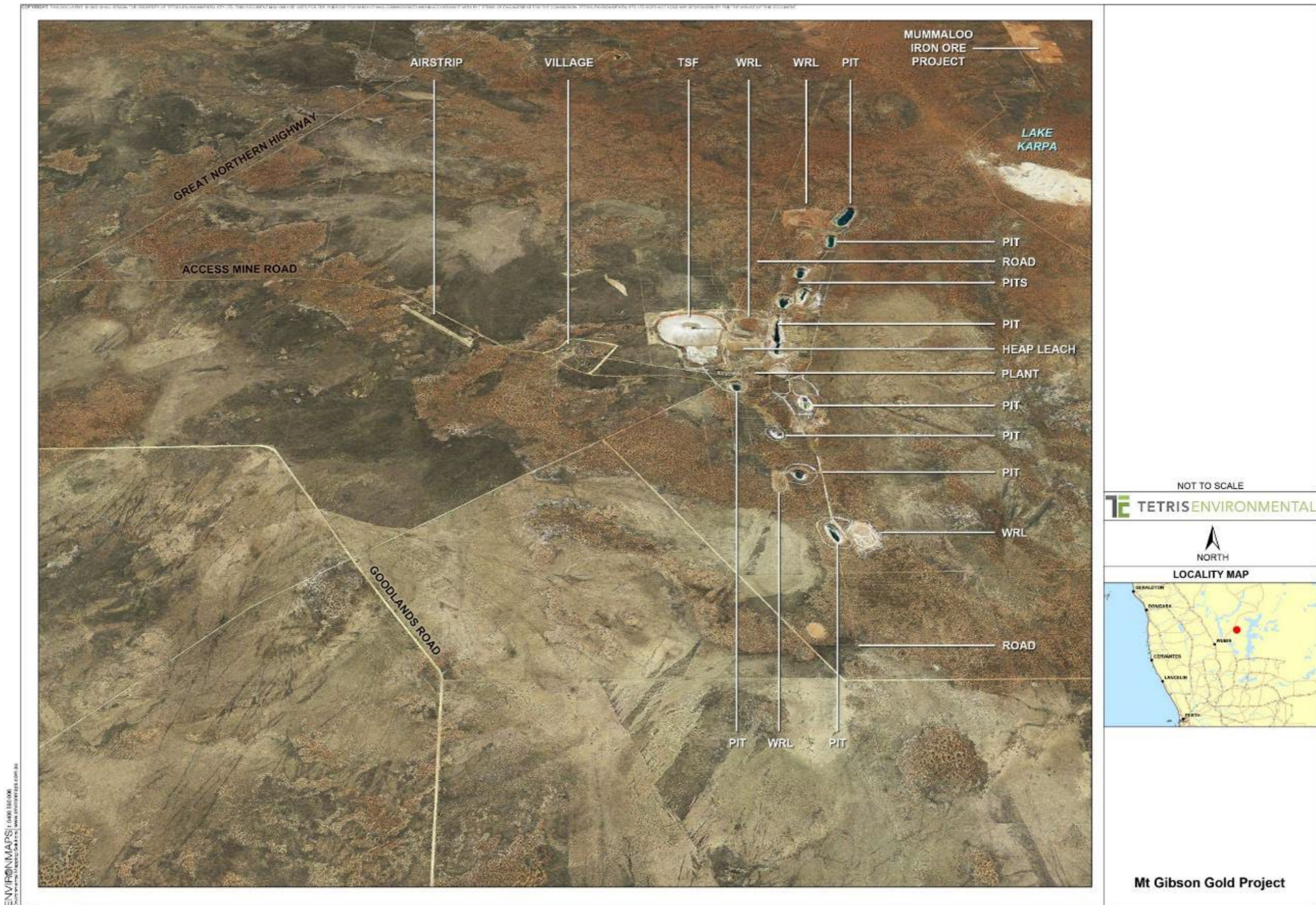


Figure 7: Rendered overview of existing site disturbance

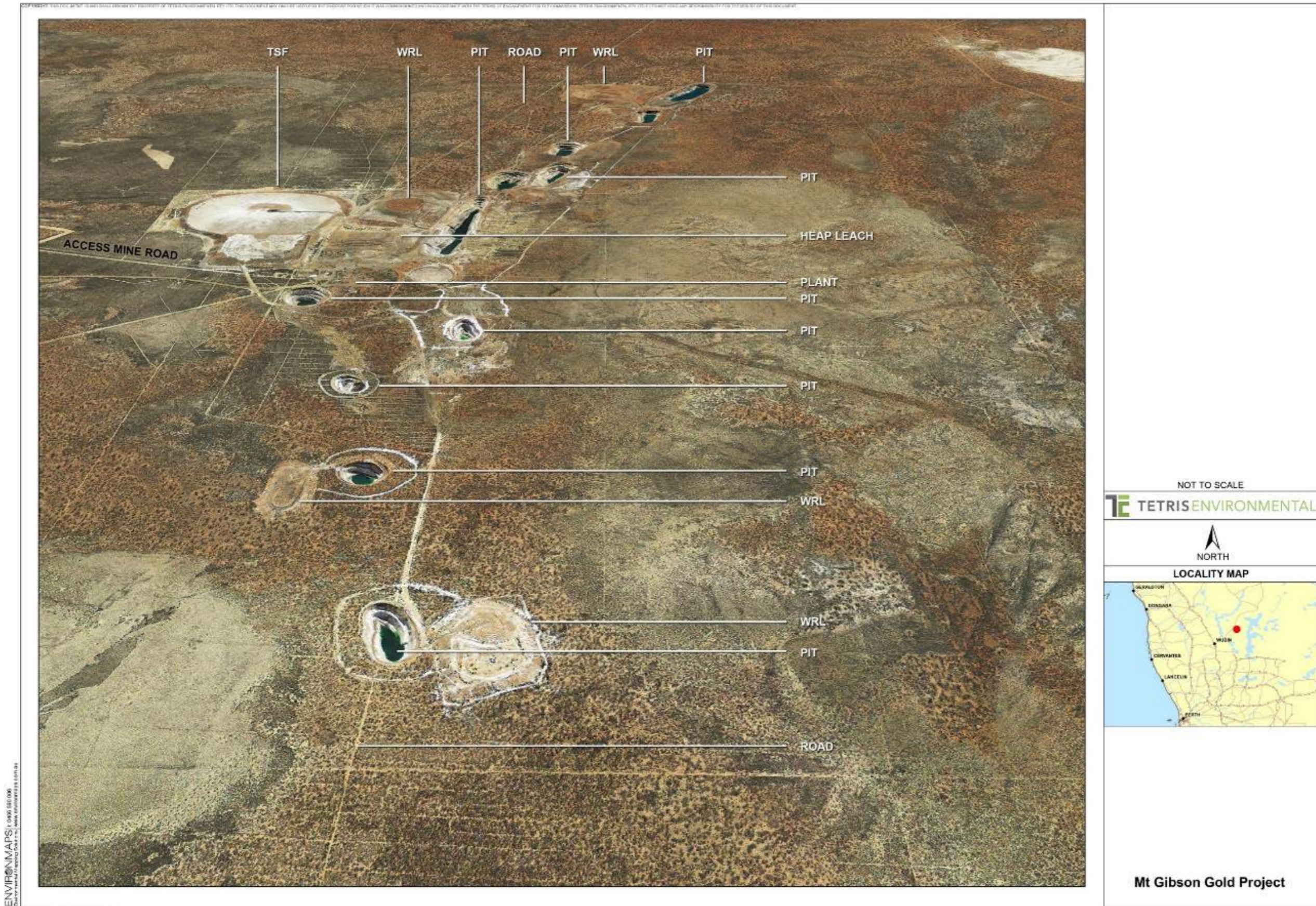


Figure 8: Rendered view of existing disturbance in proposed mine area (view from south)

### 2.1.3 Crushing and Processing Plant

The Processing Plant will consist of:

- Three stage crushing
- Grinding and classification
- Pre leach thickening
- Gravity recovery
- Leaching and adsorption
- Elution and electro-winning
- Smelting

Figure 9 shows the proposed plant process.

ROM ore will be fed to the crushing plant at a design rate of 1,000 tph and reduced to a P80 of 12 mm and then stored on the crushed ore stockpile (COS). The crushing circuit will be used on an as required basis with an expected daily usage of 14.5 hours per day. The grinding circuit will reduce the crushed material to a P80 of 125 microns.

The gravity circuit will recover approximately 15-20% of the feed gold, whilst the gold in the gravity tail will be leached using oxygen and cyanide and adsorbed onto activated carbon using conventional Carbon in Leach (CIL) technology. The gravity concentrate will be leached using a generic intensive cyanide reactor.

The CIL tailings will be pumped to the Tailings Storage Facility (TSF), with water reclaimed via a decant arrangement and returned to the process facility. Cyanide detoxification will be applied when required. Gold recovery from the activated carbon will be via an AARL stripping and electrowinning circuit, with gold doré bars then smelted and stored on site in a secure gold room.

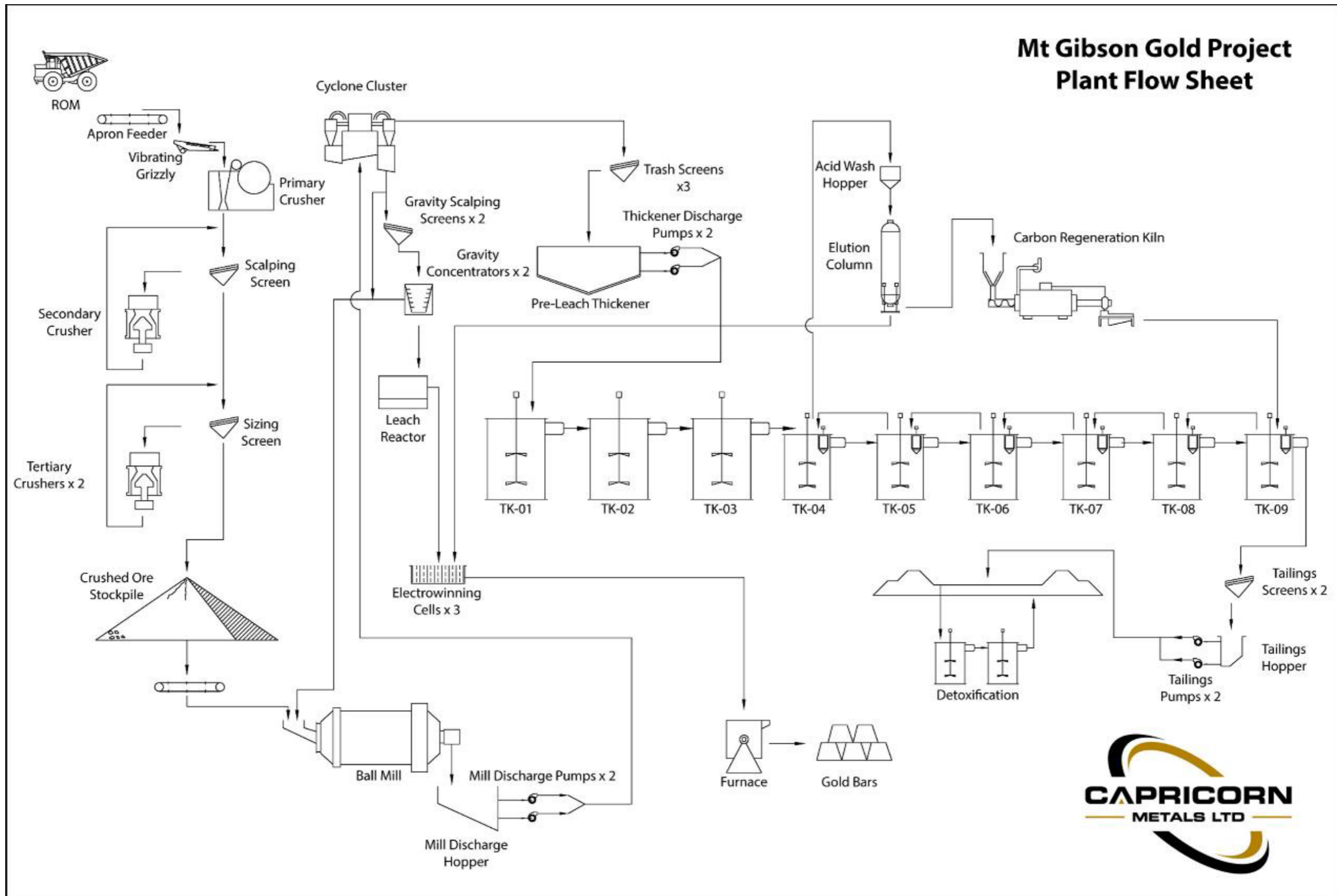


Figure 9: Proposed plant process

#### 2.1.4 Integrated Waste Landform

To minimise surface disturbance from the Proposal, the Tailings Storage Facility (TSF) and Waste Rock Landform (WRL) have been designed as an Integrated Waste Landform (IWL) incorporating tailings and mine rock waste. This is considered the most environmental and economical option for waste management as there will be upfront waste mined which can be utilised for the construction of the Stage 1 (Starter) embankment of the IWL prior to processing plant commissioning. The IWL will be situated east of the open pits.

CMW Geosciences Pty Ltd (CMW) completed the design work for the proposed TSF, to store tailings generated from the process plant during the life of mine (CWM, 2023). The CMW report is included as Appendix B.

Since the CMW TSF design report was issued in May 2023, further exploration and mine optimisation has confirmed the mineral resource will support a longer operating mine life of 15 years (approximate), not the 11 years as stated in the CMW report. CMW are currently increasing the design capacity (though not disturbance footprint) of the TSF to accommodate the additional tailings volume.

The TSF will have a capacity to store approximately 75 Mt of tailings to be generated over the operating mine life, assuming an ore processing rate of up to 6.0 Mtpa and tailings in-situ density of 1.35 t/m<sup>3</sup> (dry).

The TSF will be constructed within a clay/silt-lined perimeter embankment and raised utilising the downstream construction method. The clayey/silty (upstream) low permeability zone will have a minimum width of 6 m and be roller compacted. The WRL (downstream) zone will have a nominal width of 14.0 m and be traffic compacted. The TSF will be constructed in stages.

Tailings in the form of slurry will be discharged sub-aerially and cyclically into the TSF in layers up to 0.3 m thickness, from multipoint spigots to allow optimum density and strength gain by subjecting each layer to a drying cycle. Deposition will take place via multiple spigots located on the upstream perimeter embankment crest.

The supernatant pond will be maintained within and around the rock ring decant and away from the perimeter embankments. Water will be pumped back to the process plant via a decant pump located within the rock ring decant.

At Stage 1, construction of the upstream zone will incorporate a cutoff trench 0.5 – 1.5 m deep, founded on a cemented Ferricrete layer to reduce seepage losses. Surface water will be removed from the TSF by a pontoon-mounted decant pump located within a rock ring-type central decant structure with low fines content. The decant area will be 'lined' using up to 0.5 m thick compacted clay/silt low permeability material and return water will be pumped directly to the process plant for reuse. The water recovery system is designed to include the additional capacity to recover water from designed storm events. Access to the decant will be by a decant accessway constructed using silty/clayey and gravelly silt/clay mine waste (CWM 2023).

At the early stages of deposition, surface water will be recovered by temporary decants at two locations, which may comprise rock ring-type decant structures with low filter rock wall. A turret pump or similar will be installed behind the wall to pump return water to the process plant for reuse. Seepage is expected to be low, however the TSF will also incorporate an underdrainage system, comprising perforated pipe underdrainage lines in seepage

interception trenches grading to a concrete well tower via a seepage collection trench. These will be constructed along the northern half of the embankment alignments where the topographical levels are at or lower than the decant rock ring. Water will be pumped back from the concrete well tower to the process plant or utilised in construction (CWM 2023).

The TSF has been assigned a hazard rating of Medium, Category 1, based on classification criteria outlined in the DMP Code of Practice (2013); and a “medium” consequence category according to the Guidelines on Tailings Dams Planning, Design, Construction, Operation and Closure (ANCOLD, 2019).

The results of the stability analyses for the embankment at maximum embankment heights under ‘worst-case’ phreatic loadings, where the pond is at the embankment and extends to the embankment toe, indicated adequate factors of safety for the drained and undrained conditions when compared with the ANCOLD recommended minimum factors of safety in. There will likely be some minor movement (approximately 24 mm) during a maximum credible earthquake event, however this deformation is considered insignificant when compared with the minimum total freeboard of 0.7 m (CWM 2023).

The minimum freeboard includes an allowance for the temporary storage of the 1:100 years or 1% average exceedance probability (AEP) storm event of 72-hour duration whilst maintaining the required total freeboard.

An embankment failure under a Probable Maximum Precipitation (PMP) event would result in a tailings failure of around 15.3 Mm<sup>3</sup> (i.e., approximately 33% of the impounded storage capacity plus the PMP storm volume). Tailings would only be partially released from the TSF, as the majority of the tailings beaches would have dried back. Additionally, remobilized tailings will behave as a thickened slurry, with some shear strength and therefore will not be as free flowing as water, which has no shear strength (CWM 2023). Waste Rock Landforms

The WRL will encompass the TSF to forming the outer slopes of the IWL, with a total footprint of approximately 735 ha. It has been designed with sufficient capacity for the expected 460 Mt of waste rock generated from the pits and historical waste required to be rehandled; with an additional 15% contingency capacity. The design includes a void for the TSF and three PAF cells to encapsulate PAF waste material mined predominantly in fresh rock.

The IWL will have a maximum battered slope angle of 18° with berms 20 m wide, located at 20 m vertical intervals. The waste dump has been designed to match the natural profile of the surrounding landforms as far as possible, while still maintaining long term stability (Figure 4).

PAF waste is proposed to be contained within three designated PAF cells on the IWL. PAF cells will have a minimum 5 m base layer constructed from Oxide zone waste (NAF) to reduce the chance of any seepage into the environment. The cells will be located a minimum of 5 m from the final outer slopes of the IWL and at decommissioning, will be covered by 5 m of NAF waste on the top surface. The final top surface will be flat to slightly concave. Micro catchments will be constructed across the surface to prevent pooling of surface water in the centre of the dump, therefore limiting infiltration and promoting the wetting and drying cycle of the store and release cover system. Minimizing deep infiltration reduces the potential for mobilisation of acidic and metalliferous substances from the PAF material encapsulated within the waste dump.

### 2.1.5 Support Infrastructure

The facilities will be temporary or modular in nature to suit the expected mine life. All facilities will be constructed and installed to meet statutory building regulations and codes and be in accordance with the State and shire permitting and approval requirements. Support infrastructure includes:

#### **Road Network**

Existing roads will be utilised in their current alignment wherever possible and may be widened in some locations to enable safe passage by mine vehicles and equipment. A network of new roads will be required for access to currently undisturbed locations across the Proposal.

#### **Administration buildings**

A mine operations centre and administration facility will be established for the control of the mining operation. Buildings will be relocatable demountables (“dongas”), complexed together and will include crib and ablutions. All facilities will be constructed and installed to meet statutory building regulations and codes and be in accordance with the State and Shire permitting and approval requirements.

#### **Workshop/ fuel storage/ washdown facility**

Maintenance facilities will be constructed onsite to support the mining fleet and the processing plant. The facilities will generally consist of covered repair and servicing bays, with unsealed hardstand work areas surrounding them. The facilities will be supported with water and compressed air services and be adequately lit for night work. All diesel storage tanks will comply with statutory requirements.

Washdown facilities will be constructed for light vehicles and heavy vehicles and include drive-in areas with high pressure spray water for cleaning. Solids and dirty wash down water will drain to a primary settlement sump where the solids settle out. Oily water will be separated using an oil water separator, with the oil pumped directly to waste oil storage tank for appropriate removal and disposal off-site.

#### **Power generation**

Power will be generated by a power station located within the Processing Plant domain, built and operated by an independent power producer under a power purchase agreement. The power station is expected to be fuelled by conventional liquid natural gas (LNG). Given that the Proposal is less than 300 km from Perth and in close proximity to the Great Northern Highway, it is expected that LNG will be delivered to site in road transported ISO-container tanks.

Licensed electricians will undertake all electrical works.

#### **Explosives storage**

Explosives storage facilities to facilitate blasting activities will be constructed in a designated area in accordance with statutory requirements.

The drill and blast contractor, yet to be awarded, will be responsible for licensing, construction and day-to-day management of the facility.

## **Airstrip**

The Airstrip will occupy 50.2 ha and is an extension to the existing airstrip constructed in the 1980's, comprising up to 39 ha of native vegetation clearing and 11.2 ha of existing disturbance. Access to the airstrip from the mine site will occur via existing roads and tracks previously cleared and developed during the historical mining activities.

## **2.2 Proposal Development Stages**

### **2.2.1 Exploration**

Low impact exploration drilling (i.e., AC, RC, Diamond drilling) for resource definition, exploration targets and groundwater exploration have been ongoing since 2022 across the Proposal area, both inside and outside of the Development Envelope, and is expected to continue during the life of operations. All exploration has been undertaken in accordance with relevant State approvals, including Programme of Work (PoW) approved by DMPE. This is detailed in Section 1 and Table 2.

### **2.2.2 Construction**

Construction elements include clearing for all identified physical and operational elements and installation of processing and supporting elements. The construction phase will occur over approximately 18 months.

### **2.2.3 Operation**

The operational phase of the Proposal will utilise all physical and operational elements outlined in Section 2.1. The operating life of the Proposal is expected to be 15 years. Progressive rehabilitation will commence as soon as areas become available (e.g. areas of the IWL) or are no longer required for the operations. This is estimated to commence in year two - three of operations.

### **2.2.4 Decommissioning and Closure**

The decommissioning phase is expected to be completed within five years of cessation of operations.

Following the operation phase, all infrastructure will be removed unless ownership is transferred to a third party. The Mine Closure Plan (MCP) submitted per requirements of the State legislated Mining Act, regulated by DMPE, will outline the decommissioning plan and post-closure land use.

It is a requirement under the Mining Act that all mining activities are rehabilitated and closed in a manner to make them physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non contaminating, capable of sustaining an agreed post-mining land use, and without unacceptable liability to the State.

During the decommissioning phase, rehabilitation will be undertaken on any areas not rehabilitated progressively during the operation phase. Monitoring of rehabilitation progress will continue during the closure phase until such time completion criteria have been met and the site has been relinquished. If it appears that closure criteria will not be met, corrective actions will be undertaken, or completion criteria will be re-assessed and revised in consultation with the appropriate regulators.

### 2.2.5 Proposal Changes Since EPBC Act Referral

Since the referral of the Proposal under the EPBC Act in December 2023, the Proposal has been amended to include changes shown in Table 5, submitted as a formal variation to the action, assessed and approved under s.156 of the EPBC Act by DCCEEW on 7 May 2025.

**Table 5: Proposal Changes**

Date	Proposal Change
April 2025	Variation under s156A <ul style="list-style-type: none"> <li>• Amendment of 97 ha to the Development Envelope to include the existing Airstrip and modifications required to meet Civil Aviation Safety Authority (CASA) regulations and operating workforce requirements.</li> <li>• An additional 50 hectares (ha) of Disturbance Footprint within the Development Envelope relating to the existing Airstrip (27 ha of existing disturbance) and modifications to meet CASA regulations (23 ha of new disturbance)</li> </ul>

Additionally, during November 2024, targeted drilling identified an increase in gold reserves, increasing the operating mine life to 15 years. This increased production is within existing pits and does not require additional disturbance to vegetation or impacts to MNES. Other changes required to increase the mine life (e.g. additional TSF lift) will be addressed in the relevant state legislation under the EP Act 1986 and Mining Act.

### 2.3 Feasible Alternatives

The location of the Proposal is constrained by the location of the mineral deposits. Comprehensive baseline studies and investigations have been undertaken to understand the environmental, economic and social values of the Proposal and surrounds. This work has informed the Proposal design to avoid or minimise potential impacts as far as reasonably practicable, resulting in sub-optimal mine design and additional operational costs which Crimson accepts as its responsibility for maintaining conservation values within and surrounding the Proposal. The Proposal presented in this document is the result of an extensive design and review process that has optimised specific elements, balanced with a precautionary approach to avoid, mitigate, and manage potential environmental impacts.

Mineral resource projects and the associated benefits which flow onto the community through construction, operations, and business commerce, underpin WA's economy. The Proposal would be an important source of direct and indirect employment during both the construction and operational phases and will provide an operational revenue stream to the government through the payment of royalties and taxes.

A cost benefit analysis of the Proposal indicates that it would have net production benefits to Australia and Western Australia of \$1,379M and \$304M, respectively.

The Proposal will require a full time equivalent (FTE) workforce of approximately 300 employees during the construction phase and approximately 400 long term (+15 year) FTE roles (including contractors) during the operational phase. Additionally indirect (State and regional) jobs generated from the Proposal during operations is estimated at ~1,800 via a variety of suppliers and service providers.

The consequences of not proceeding with the Proposal are discussed in Section 2.3.4. Not proceeding with the Proposal would also mean that the environmental impacts outlined in Section 5 of this PER would not occur.

Alternatives considered for the Proposal are summarised below.

### 2.3.1 Proposal design layout

The initial Disturbance Footprint design was revised by the Proponent following extensive survey efforts, the collation of biological data and implementing the mitigation hierarchy first priority, 'avoidance'.

The impact to key environmental outcomes associated from amendments to the initial designs that are incorporated in the Proposed Disturbance Footprint outlined in Table 6 and include:

- retention of all known individuals of the Threatened Flora species *Eremophila viscida* and retention of a buffer zone containing critical habitat
- retention of 114.6 ha of Threatened Ecological Community (Eucalypt Woodlands of the West Australian Wheatbelt) vegetation (Figure 10)
- reduced impacts to conservation significant fauna and retention of ~168 ha of remnant fauna habitat (Figure 11).

**Table 6: Environmental outcomes associated with the initial (not proposed) and revised (proposed) Disturbance Footprint**

Aspect	Initial (not proposed) impacts	Revised (proposed) impacts
<b><i>Eremophila viscida</i> (T) individuals</b>	2	0
<b><i>Eremophila viscida</i> (T) critical habitat</b>	7.1 ha	0 ha
<b>Eucalypt Woodlands of the West Australian Wheatbelt TEC</b>	142.1 ha	27.5 ha
<b>Malleefowl preferred breeding/foraging habitat (VSA 1 and VSA 2)</b>	VSA 1: 559.2 ha VSA 2: 47.7 ha Total: 606.9 ha	VSA 1: 528.2 ha VSA 2: 40.6 ha Total: 568.8 ha
<b>Malleefowl potential foraging/transit habitat (VSA 3 - VSA 6)<sup>1</sup></b>	VSA 3: 156.5 ha VSA 4: 408.8 ha VSA 5: 173 ha VSA 6: 0 ha Total: 738.4	VSA 3: 138.4 ha VSA 4: 248.2 ha VSA 5: 220.8 ha VSA 6: 0.6 ha Total: 608 ha
<b>Malleefowl mounds</b>	2 active (during 2024) 10 inactive (during 2024)	2 active (during 2024) 8 inactive (during 2024)
<b>Lake Goorly Shield-backed trapdoor spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i> burrows</b>	17 confirmed active  9 likely active	20 confirmed active  18 likely active

Aspect	Initial (not proposed) impacts	Revised (proposed) impacts
Lake Goorly Shield-backed trapdoor spider ( <i>Idiosoma kopejtkorum</i> ) listed as <i>Idiosoma nigrum</i> preferred habitat (VSA 4)	408.8 ha	248.2 ha
Chuditch preferred habitat (VSA 4)	408.8 ha	248.2 ha
Southern Whiteface preferred habitat (VSA 1) <sup>2</sup>	559.2 ha	528.2 ha

1 - Historically disturbed areas (VSA 7: Rehabilitation and VSA 8: Cleared) have been excluded from the table

2-Within VSA 1, only very small patches and areas of critical habitat appear to be present within the Development Envelope, with core habitat (habitat suitable for residency and breeding) expected to be limited to a few hectares in the south-east where birds were recorded outside the Disturbance Footprint (Bamford, 2024b).

### 2.3.2 Waste Rock Landform

The WRL design has considered local topography to minimise the overall footprint required and any potential impacts from changes to hydrology. Alternatives are to build the WRL higher with steeper batter angles, which would reduce the overall footprint, however this could reduce the stability and increase the risk of long term erosion off the landform.

Gentler design angles can be expected to provide for improved rehabilitation success, however, result in a greater spatial area being required. Steeper angles reduce the spatial area required, however, may potentially result in poorer rehabilitation outcomes.

The gentler 15-18° angle design was selected to provide the Proposal with the best prospect for achieving successful rehabilitation.

The possibility of backfilling open pits has been considered; however, at this early stage of the Proposals life and given the potential for longer term gold price changes to impact any decision regarding the sterilisation of gold resources (due to an in-pit waste rock dump), the backfilling of pits has not been included.

### 2.3.3 Tailings Storage Facility

The location of the TSF has been adjusted to avoid Heritage sites identified by the Badimia. Additionally, the revised location reduces the risk of seepage from the TSF.

### 2.3.4 The No Action Alternative

The No Action alternative would see no mine development within the Proposal nor contributions to conservation initiatives in the region. The No Action alternative would result in a significant loss of benefits at the local, State and National level, including but not limited to:

- Lost contributions to conservation initiatives in the local region such as feral predator management, rangelands management and restoration
- Lost contributions to knowledge of MNES in the region from monitoring, specifically Malleefowl
- Ability to improve the condition of previously disturbed areas not required for ongoing operations through rehabilitation

- Lost opportunity for employment during the construction and operational phases
- Lost financial benefits to the Australian economy estimated at \$1,441 million present value

Not proceeding with the Proposal would also mean that the environmental impacts outlined Section 5 of this PER would not occur.



Figure 10: Original and Revised Proposal Disturbance Footprint – flora/vegetation

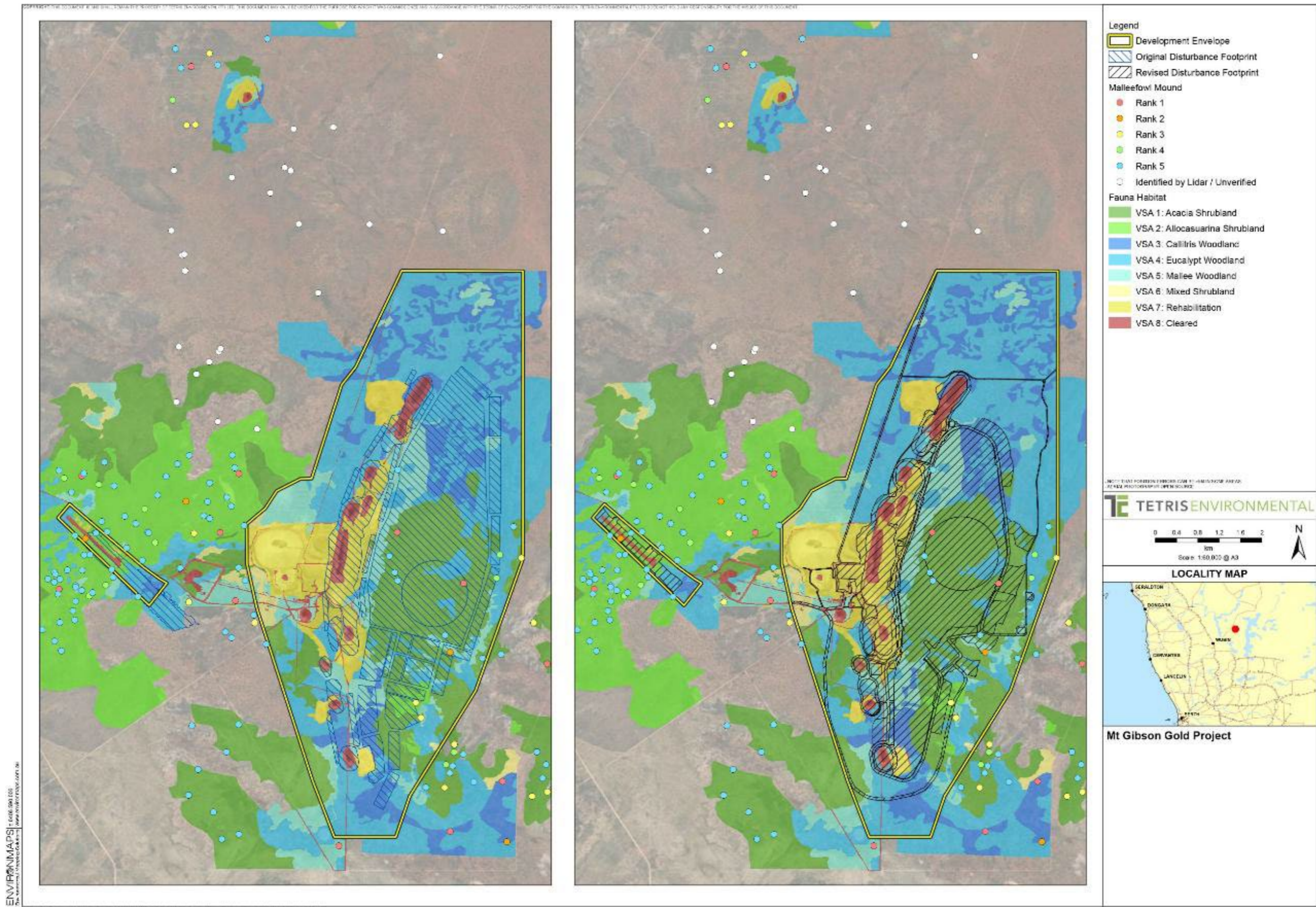


Figure 11: Original and Revised Proposal Disturbance Footprint - fauna and habitat

## 3 Description of the Environment

### 3.1 Bioregion

The Proposal is located within the upper northeastern corner of the Avon Wheatbelt Bioregion of the Interim Biogeographic Regionalisation of Australia (IBRA) and approximately 10 km southeast of the Yalgoo Bioregion (Figure 12). Within the Avon Wheatbelt Bioregion, the Proposal is specifically within the Merredin Ancient Drainage subregion (AW1), in the Shire of Yalgoo.

The Merredin subregion is described by Beecham (2001) as:

*“an area of active drainage dissecting a Tertiary plateau in the Yilgarn Craton with gently undulating landscape of low relief. Proteaceous scrubheaths, rich in endemics, on residual lateritic uplands and derived sandplains; mixed eucalypt, Allocasuarina huegeliana and Jam-York Gum woodlands on Quaternary alluvials and eluvials occur within this subregion. AW1 is an ancient peneplain with a low relief, gently undulating landscape. There is no connected drainage; salt lake chains occur as remnants of ancient drainage systems that now only function in very wet years. Lateritic uplands are dominated by yellow sandplain. The subregional area is 6,566,022 ha.”*

Due to its proximity, soils and flora/vegetation within the Development Envelope display greater similarities with the Yalgoo bioregion, described by Desmond and Chant (2001) as:

*“low woodlands to open woodlands of Eucalyptus, Acacia and Callitris on red sandy plains of the Western Yilgarn Craton and southern Carnarvon Basin. The latter has a basement of Phanerozoic sediments. Mulga, Callitris-E. salubris, and Bowgada open woodlands and scrubs on earth to sandy-earth plains in the western Yilgarn Craton. The subregion is particularly rich in ephemerals. The subregional area is 4,858,849 ha.”*

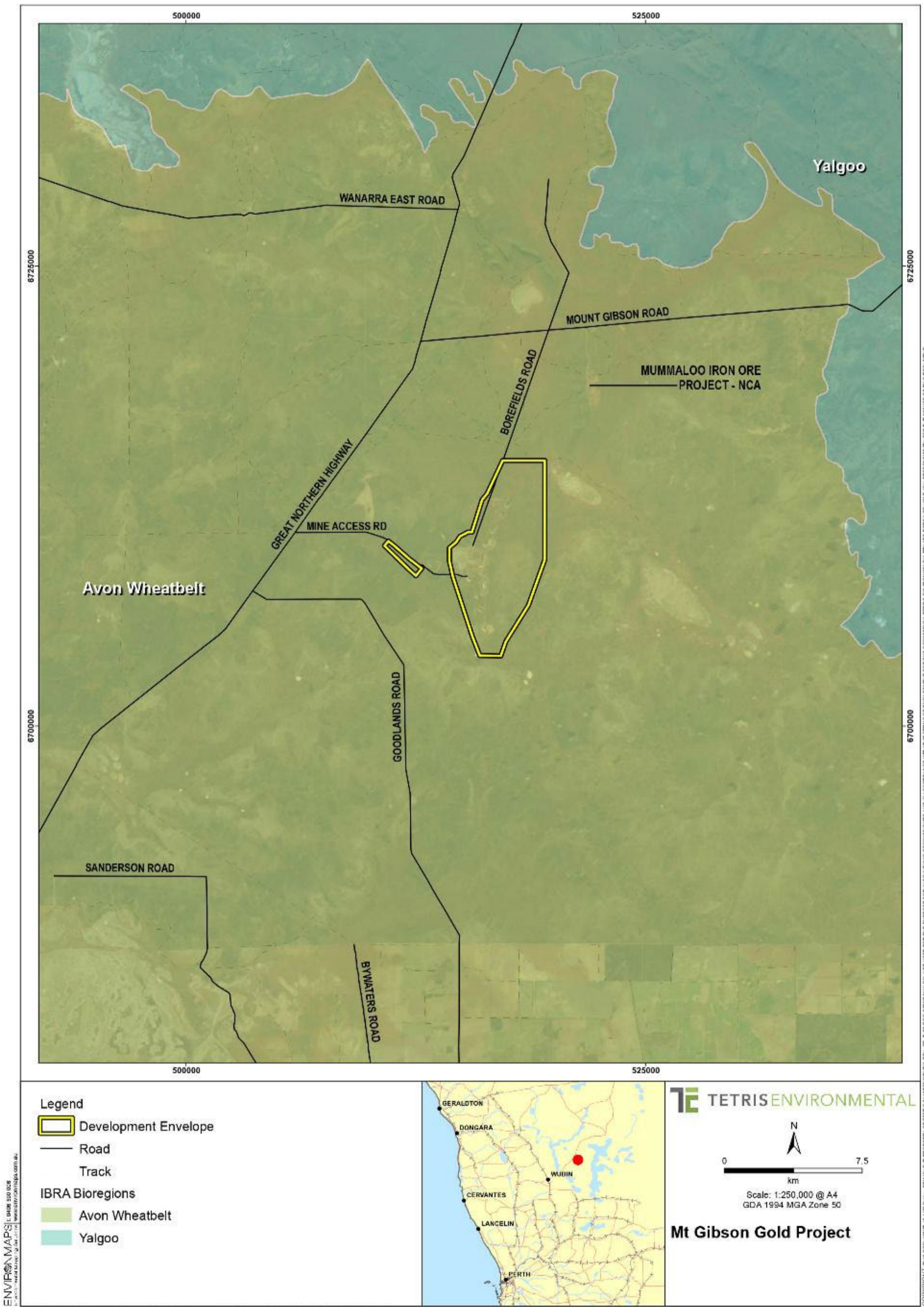
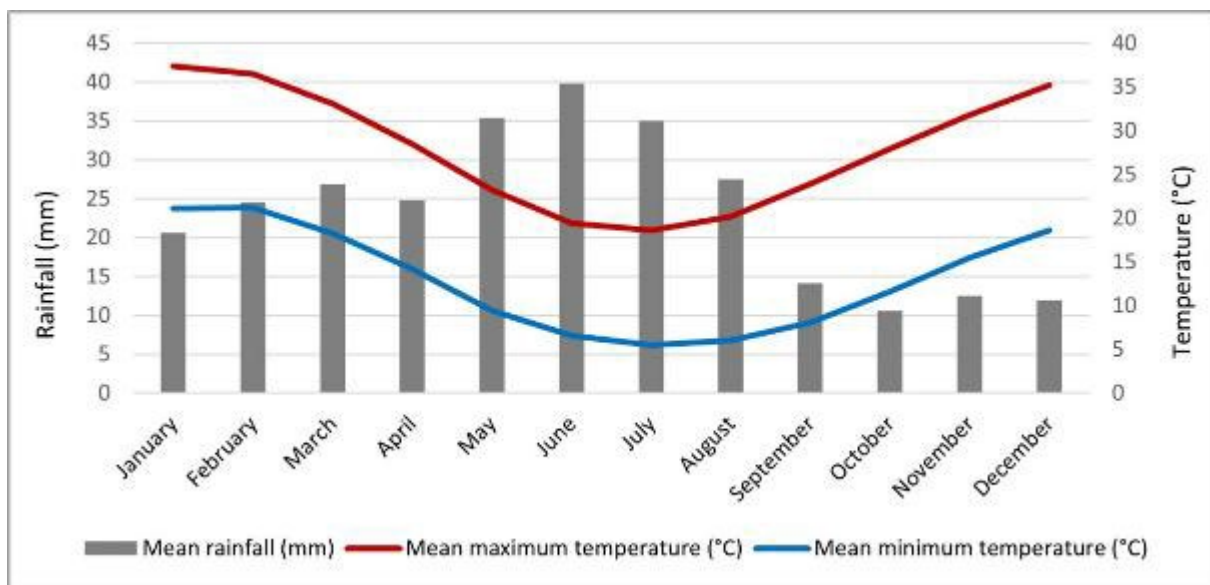


Figure 12: IBRA regions within the area

### 3.2 Climate

The region has a semi-arid, warm Mediterranean climate, experiencing hot, dry summers with mild, wet winters (Beecham 2001). According to the Bureau of Meteorology (BoM), the mean maximum daily temperature in Paynes Find (approximately 72 km north east of the Proposal, BoM weather station 007139) is 28°C, with a mean minimum daily temperature of 13°C. The hottest month is January, with a mean maximum temperature of 37.4°C. The coldest month is July, with a mean minimum temperature of 5.5°C and mean maximum of 18.6°C. Figure 13 provides climatic data relevant to the Proposal (BoM 2023a).

The mean annual rainfall from the Paynes Find weather station (operating since 1919) is 290.2 mm and the mean number of days with rainfall is 24. Average annual evaporation ranges from 2000 to 2400 mm (BoM 2023b).



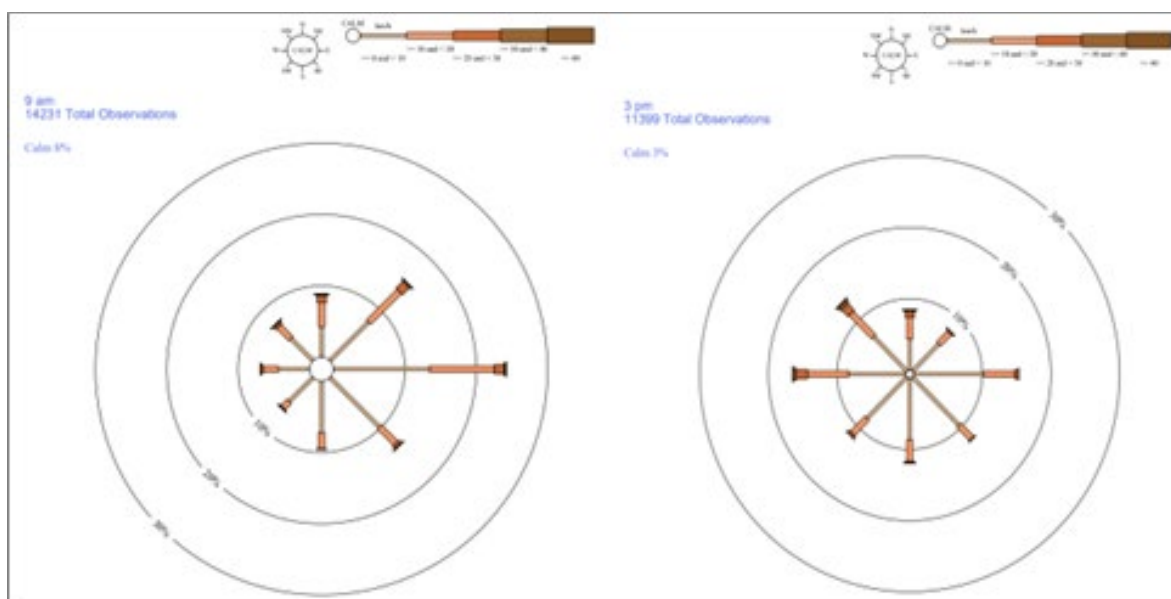
**Figure 13: Climatic data of the Proposal**

Table 7 provides the results of an Intensity-Frequency-Duration (IFD) query for the Proposal site (BOM 2023c). This table provides the expected volume of rainfall over a given period of time for a given frequency. The data set for the Proposal shows that for a 1% (1 in 100 year) Annual Exceedance Probability (AEP), 72-hour rainfall event, 178 mm could be expected.

**Table 7: Intensity-Frequency-Duration data for the Proposal site**

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 hour	12.7	15.1	23.2	29.3	35.6	44.7	52.2
1.5 hour	14.6	17.3	26.5	33.4	40.6	51.0	59.7
2 hour	16.1	19.0	29.1	36.6	44.5	55.9	65.5
3 hour	18.5	21.8	33.0	41.5	50.6	63.6	74.7
4.5 hour	21.3	24.9	37.6	47.2	57.5	72.5	85.3
6 hour	23.5	27.4	41.2	51.6	62.9	79.6	93.8
9 hour	26.8	31.2	46.7	58.6	71.5	90.7	107
12 hour	29.3	34.1	50.9	63.8	78.0	99.3	117
18 hour	32.8	38.1	56.9	71.6	87.8	112	133
24 hour	35.2	40.9	61.2	77.2	94.7	121	144
30 hour	36.9	42.9	64.4	81.3	100.0	128	152
36 hour	38.1	44.4	66.8	84.6	104	133	159
48 hour	39.9	46.6	70.3	89.2	110	141	168
72 hour	42.1	49.1	74.3	94.4	116	149	178
96 hour	43.6	50.9	76.6	96.9	119	153	183
120 hour	45.0	52.3	78.1	98.2	121	155	185
144 hour	46.5	53.8	79.2	98.8	121	155	186
168 hour	48.1	55.3	80.2	99.2	121	155	187

Wind roses for Paynes Find demonstrate that the prevailing wind direction is typically easterly to north-easterly in the morning and vary between westerly to north-westerly and easterly to south-easterly in the afternoon. Wind speeds are typically between 10 and 20 km/hr. Figure 14 provides the 9 am and 3 pm wind roses for the BoM monitoring site at Paynes Find (BoM 2023a).



**Figure 14: Wind roses for 9am and 3pm observations at Paynes Find**

### 3.3 Geomorphology

The topography of the Proposal is characterised by minor topographical relief with a grade of approximately 2%. The elevations range from approximately RL 350 m on the south to RL 326 m on the north. Surface undulation is generally minimal except at some localities of granite mounds where gradients are as steep as 5% (CMW 2023).

The Proposal is located within the Northern Zone of Ancient Drainage soil-landscape zone, described by Tille (2006) as:

*“Gently undulating terrain (with some sandplains and salt lakes chains) on deeply weathered mantle and alluvium over granitic rocks of the Yilgarn Craton. Sandy earths (mostly yellow and red), Loamy earths (often calcareous), Sandy duplexes, Loamy duplexes, Deep sands, and Ironstone gravelly soils. Salmon gum-gimlet-morrel-wandoo-York gum woodlands with mallee scrub (and some acacia-casuarina thickets, scrub-heath, and samphire flats). Located in the eastern Wheatbelt between Quairading, Hyden, Bullfinch, Bonnie Rock, Lake Moore, Carnamah and Wongan Hills”.*

### 3.4 Geology and soils

Greenstone belts comprised of mafic to ultramafic lithology are present throughout the Yilgarn. These greenstone belts are Archaean to Proterozoic in age, surrounded by granite and gneiss and typically highly deformed, faulted, and folded. The Proposal is located at the southern end of the Retaliation Greenstone Belt (Anand and Smith 2005). Much of the mineralisation for the deposit is hosted within a meta basalt sequence which has been metamorphosed to amphibolite facies conditions.

The Archaean basement is dominantly volcanic and intrusive mafic and felsic rocks and their sheared equivalents, which have been metamorphosed to the mid-amphibolite facies. Rare metasedimentary rocks consist of thin, discontinuous, interflow ferruginous cherts.

The basement is overlain by a deep regolith dominated by differential erosion. Saprolite thickness depends on the lithology, the intensity of shearing and the degree of truncation of the weathered profile. The Proposal is weathered to about 60 m, whereas mafic volcanics to the east are weathered to about 20 m. Foliated metasedimentary or metavolcanic rocks are strongly mottled (EMM 2022).

The saprolite is overlain by discontinuous alluvium, colluvium, lake sediments, lateritic residuum (an eroding basement palaeosurface), ferricrete of pisolitic nature and calcrete within Paleogene-Neogene sediments. The Paleogene-Neogene sediments are covered with a veneer of alluvial quartz sands with sporadic granite-greenstone subcrop and outcrop being increasingly exposed in the south of the Proposal (EMM 2022).

The Proposal encompasses 15 geological units as mapped by the Geological Survey of Western Australia (Table 8 and Figure 15). Yellow sand sandplains (Czs) and sand and clay deposited in channels and flood plains (Cza) are the dominant geological units within the Development Envelope.

**Table 8: Geological units in the Proposal**

Age	Unit Code	Description
<b>Cenozoic</b>	Cza	Sand and clay deposited in channels and adjacent flood plains; may occur in broad valleys with no defined drainage.
	Czf	Quartz-feldspar sand and lithic fragments from granitoid rocks.
	Czg	Lateritic gravel, sand, and minor clay.
	Czl	Laterite - commonly on top of breakaways; may include consolidated grit on stripped surface
	Czr	Residual deposits - sand, clay, duricrust.
	Czs	Sandplain - yellow sand; commonly reworked by wind; includes red colluvial sand on plateau remnants.
<b>Archean</b>	Ab	Mafic rocks unassigned - may include minor felsic and ultramafic rocks
	Aba/Dwr	Overprint indicating deeply weathered or soil covered rock, on Aba.
	Afc	Felsic tuff and agglomerate - banded and crystal tuffs
	Afq	Quartz-muscovite schist - fine to medium-grained; occurs mainly in contact zones adjacent to granitoids; local biotite-hornblende tonalite gneiss
	Ag	Granitoid rock unassigned - most is variably recrystallized, and some is deformed
	Age	Adamellite to granodiorite – medium even-grained; includes minor xenoliths
	Age/Dwr	Overprint indicating deeply weathered or soil covered rock, on Age
	Age/Grs/Dwr	Overprint indicating granitoid rocks strongly foliated, lineated and/or recrystallized, on overprint indicating deeply weathered or soil covered rock, on Age
	Age/Grs	Overprint indicating granitoid rocks strongly foliated, lineated and/or recrystallized, on Age

The Proposal intersects three soil landscapes as defined by the Department of Primary Industries and Regional Development (DPIRD 2023a), listed in Table 9 and shown in Figure 16.

**Table 9: Soil landscapes in the Proposal**

Soil Landscape	Description	Total area in the Avon Wheatbelt Bioregion (ha)
<b>Pindar (258Pd)</b>	Loamy plains surrounded by sandplain supporting York Gum woodlands and Acacia shrublands.	29,432
<b>Joseph (258Jo)</b>	Undulating yellow sandplain supporting dense mixed shrublands with patchy mallees.	143,797
<b>Euchre (258Eu)</b>	Low granite breakaways with alluvial plains and sandy tracts supporting eucalypt woodlands and Acacia shrublands.	24,613

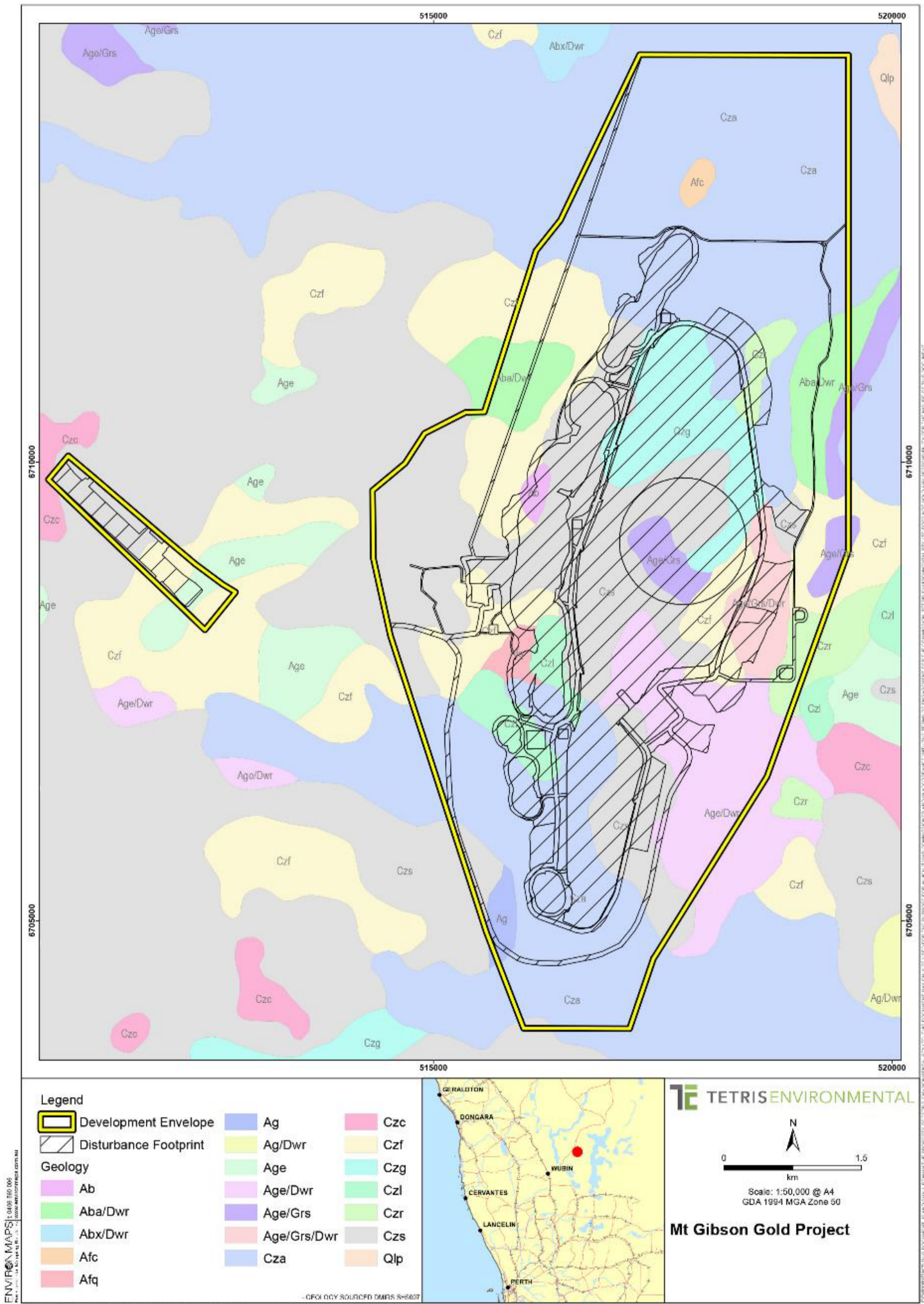


Figure 15: Geological units of the Proposal

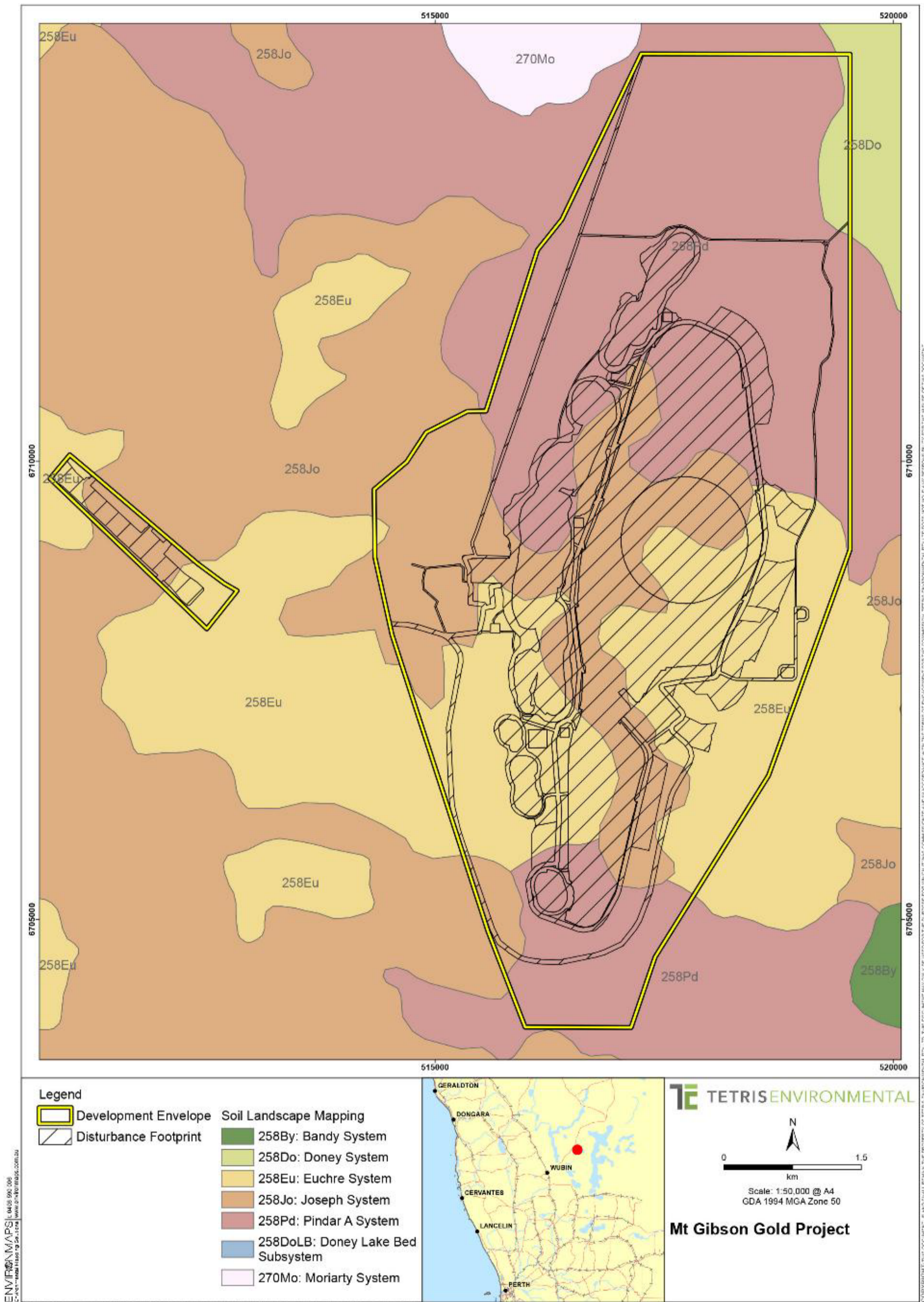


Figure 16: Soil landscapes of the Proposal

MBS Environmental (2023) undertook a soil assessment, identifying six soil types within the Development Envelope, as summarised in Table 10.

**Table 10: Soil types identified in the Proposal**

Soil types	Key Characteristics
<b>Red loamy earth</b>	<ul style="list-style-type: none"> <li>• Red loam topsoil to at least 30 cm.</li> <li>• Often grades into clay or red-brown hardpan at depths below 50 cm.</li> <li>• Typically, particles are poorly structured, porous, often hard setting and may contain gravels both on the surface and within the profile.</li> <li>• Generally in the neutral to acidic range but can be alkaline (calcareous) at depth.</li> </ul>
<b>Red shallow loam</b>	<ul style="list-style-type: none"> <li>• Red loam topsoil at most 80 cm in depth.</li> <li>• Overlies rock and/or hardpan</li> <li>• Typically contains gravels both on the surface and within the profile.</li> <li>• Generally in the neutral to acidic range.</li> </ul>
<b>Red shallow/ deep sand</b>	<ul style="list-style-type: none"> <li>• Red sand topsoil which is typically &lt;30 cm in depth.</li> <li>• Overlies rock, hardpan or other cemented layers.</li> <li>• Typically contains gravels both on the surface and within the profile.</li> <li>• Generally in the neutral to acidic range.</li> </ul>
<b>Yellow deep sand</b>	<ul style="list-style-type: none"> <li>• Yellow top and subsoil sandy layers to at least 80 cm depth.</li> <li>• Ironstone gravel common, often increasing in proportion at depths below 15 cm, limestone or ferricrete often present at depths &gt;80 cm.</li> <li>• Generally in the neutral to acidic range.</li> </ul>
<b>Yellow/ brown shallow sand</b>	<ul style="list-style-type: none"> <li>• Yellow or brown sandy topsoil to a typical depth of 30 cm.</li> <li>• Overlies rock, hardpan or other cemented layers usually around 80 cm.</li> <li>• Generally in the neutral to acidic range.</li> </ul>
<b>Red shallow sandy duplex</b>	<ul style="list-style-type: none"> <li>• Red sand over sandy clay loam to clay at &lt;30 cm.</li> <li>• Neutral to alkaline pH subsoil.</li> <li>• Usually hard setting surface.</li> <li>• Clays may be underlain by rock or hardpan.</li> <li>• Stony or gravelly surface mantle common.</li> </ul>

These main soil types were consistent with MBS (2023) expectations based on the identified soil landscapes (DPIRD, 2018). Soils across the Development Envelope vary in gravel content, which is generally higher in subsoils than surface soils. Potentially dispersive subsoils occur in all soil groups, although several areas of red loamy earths and red shallow/deep sands are considered unlikely to be dispersion prone (MBS Environmental 2023).

There is high variability in pH across the Development Envelope (ranging from 3.8-9.9). Generally, pH values in subsoils are slightly less acidic than surface soils, with the exception of red shallow loams which contain much more acidic topsoils.

The majority of the Development Envelope contains non-saline soils, although subsoils adjacent to historic mining pits are highly to extremely saline. Most surface soils are unlikely to be sodic, with the exception of the subsoils of red shallow loams, red loamy earths and red sands which are more likely to be sodic and thus erosion prone if exposed.

Plant available concentrations of the vast majority of elements are within the typical ranges and should be sufficient to support endemic plant growth. Total concentrations of selected metals and metalloids are well below relevant environmental criteria (MBS Environmental 2023).

### 3.5 Hydrology

The Proposal is outside of any *Rights in Water and Irrigation Act 1914* (RIWI Act) Proclaimed Surface Water or Public Drinking Water Source Areas; and within the Meekatharra area of East Murchison proclaimed Groundwater Water Management Area (EMM, 2024).

There are no wetlands of national importance or significant surface water drainage features in the vicinity of the Proposal. The closest wetland listed in the Directory of Important Wetlands (DCCEEW, 2019) is the Thundelarra Lignum Swamp (100 km north of Proposal).

The Proposal is located in the Moore-Hill Rivers drainage basin between the extensive playa systems of Lake Monger and Lake Moore, approximately 25 km west of Lake Moore (Figure 17). The Proposal infrastructure is within the Lake Moore catchment, along or close to the ridgeline separating the Lake Monger and Lake Moore surface water systems. Two smaller playa features are located approximately 3.5 km and 9 km to the east of the Proposal, the larger of which is Lake Karpa (Figure 17). These and other smaller playa systems located to the east of the Proposal are likely to represent receptors for any surface water impacts. Lake Karpa is the terminus of a surface water catchment of about 500 km<sup>2</sup>.

The regional topography comprises gently undulating plains with flat valleys marked with playas and large salt lakes of the Moore-Monger drainage system. The predominant low gradient and high storage capacity within the landscape and drainage system means that surface water features do not exhibit a clear or connected hydrological response unless major summer rainfall events or a prolonged wet winter occurs. Surface water drainage systems of this nature are characterised by sluggish and predominantly internal drainage (EMM, 2024).

A Moore – Monger palaeovalley system (Figure 17) exists within the greater Proposal region however there are sparse data regarding its stratigraphy and lithological sequence. It is estimated that up to 100 m of basal Eocene fluvial sand is overlain by up to 40 m of lacustrine, kaolinitic clay units, which in turn is overlain by up to 20 m of slope wash alluvium and valley calcrete. The palaeovalley sediment infill comprises 10–40 m of basal fine-to coarse-grained sand which increases in thickness, width, and grain size downstream (EMM, 2024).

Part of the palaeovalley is about 60–80 m deep and of variable width (average of 600 m wide), with a low gradient of 0.004. The palaeovalley sediments are heterogenous and consist of sand, silt, and clay layers; sandy aquifers are discontinuous but commonly hydraulically connected. However, the basal channel sediments are mostly clay rich. Dark grey-brown aquifer sands with magnetite, gravel and secondary silcrete and calcrete occur

mainly in the central and upper parts of the infill profile. The aquifer sands are generally confined by upper clays and silts which extend 5–10 m below the water table. A palaeovalley appears to exist along the northern extension of the Mt Gibson mineralisation corridor (EMM, 2024).

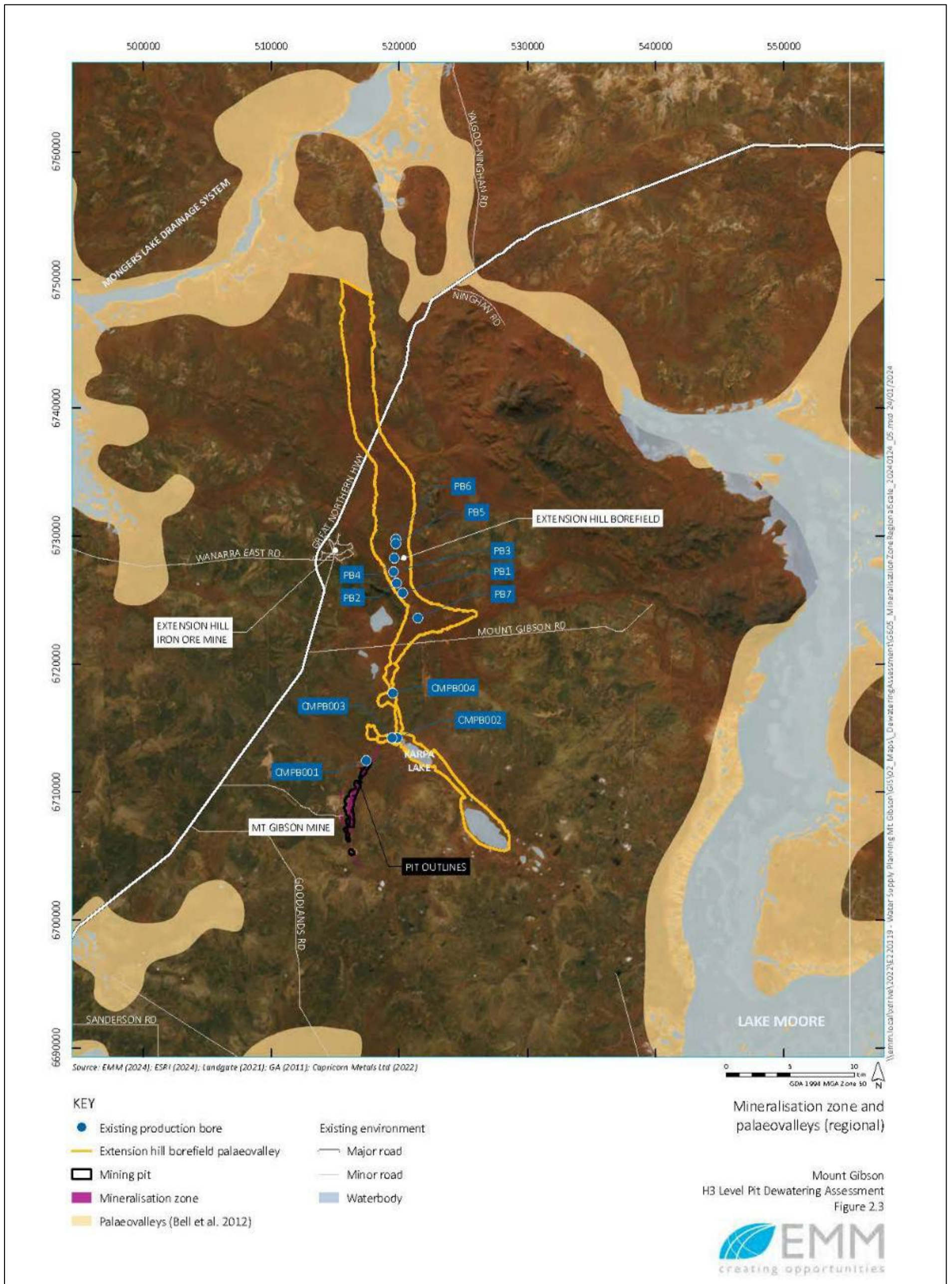


Figure 17: Lake systems in the Proposal

### 3.5.1 Surface water

At a local scale, intermittent and short duration runoff can be expected following large rainfall events. The absence of defined drainage channels in the area indicates sheet flows are the dominant hydrological flow response. High evaporation and low relief play a major role in the local hydrological response, limiting opportunities for the concentration of surface flows. High evaporation rates and low rainfall-recharge rates support the formation of salt lakes and saline groundwater within the wider area (EMM, 2024).

Four main catchments contributing to runoff at the Proposal have been identified (Advisian, 2022), described below and shown in Figure 18.

- CAT-A: Largest catchment flowing to the site, with an approximate area of 67 km<sup>2</sup>. The waterways in this catchment can be described as wide floodplains, with low to moderate vegetation and poorly defined banks. The main waterway flows along the northern edge of the site from west to east, towards the topographical depression to the north-east before draining to the lake further north-east.
- CAT-B: Approximately 17 km<sup>2</sup> with similar characteristics to CAT-A. The waterways in this catchment flow in a south-easterly direction, intersecting the southern part of the site.
- CAT-C and CAT-D: Gently graded and drain floodwater to the salt lake located north-east of the site.
- CAT-E: Internally draining due to the presence of existing mining infrastructure.

Peak flood depth for the 1% Annual Exceedance Probability (AEP) event was approximately 0.2 m in sheet flow and floodplain areas and 0.5 m - 0.75 m in the main creek channels. Peak flow velocities were estimated to be 0.3 m/s - 0.4 m/s in the floodplains and 0.4 m/s and 1.0 m/s in the creeks. Velocities exceed 2 m/s at locations where the roads are overtopped and where the water flows into the depression north-east of the site.

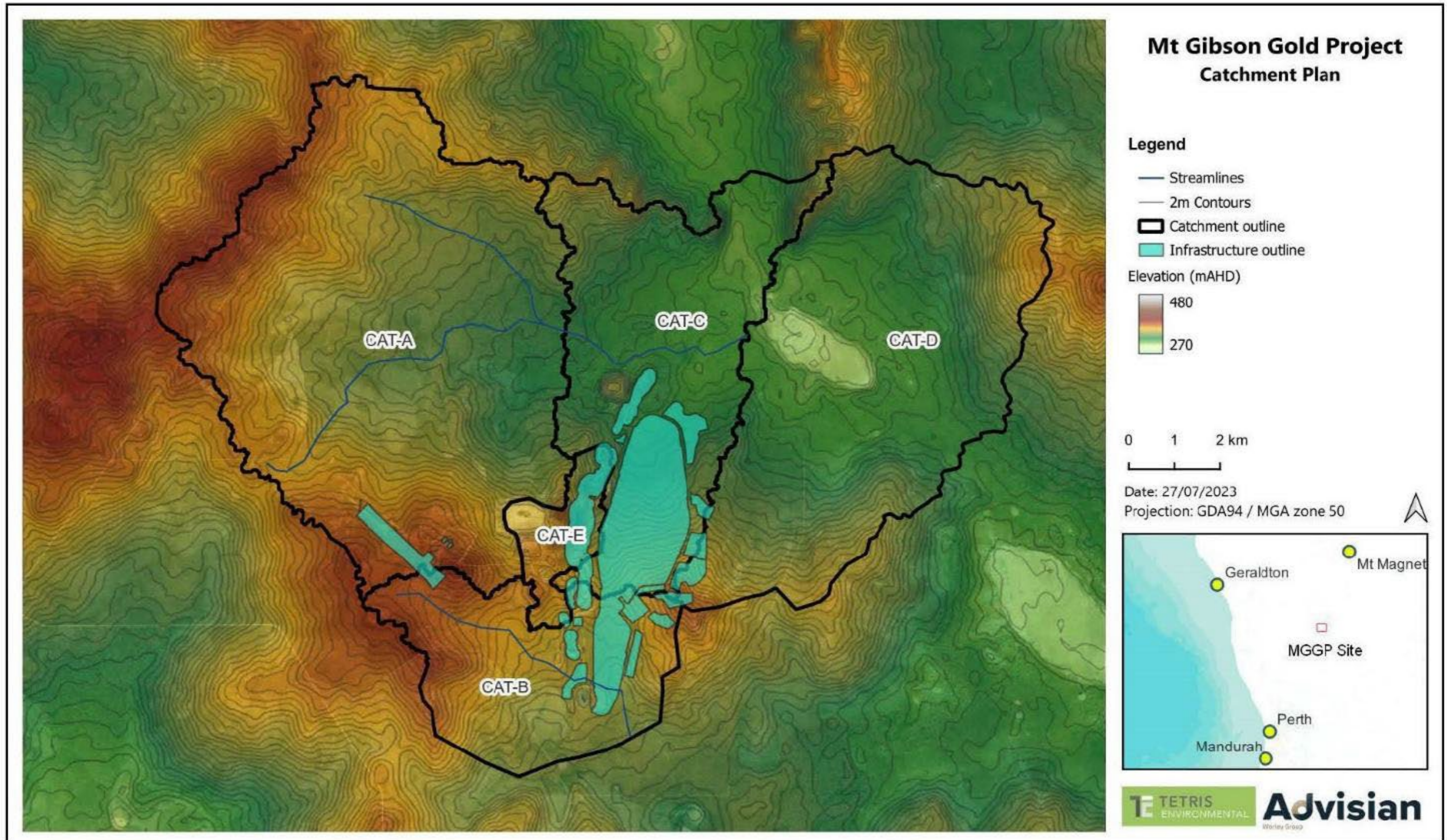


Figure 18: Surface water catchments in the Proposal

### 3.5.2 Ground water

Four aquifer types have been identified in the Proposal (EMM, 2024):

- Aquifer Type A – weathered saprolite and basal transition zone above fresh bedrock. The aquifer is somewhat discontinuous owing to erosional surfaces and preferential weathering of host volcanic rocks.
- Aquifer Type B – main ore body shear zone, a highly heterogeneous aquifer, somewhat continuous along strike.
- Aquifer Type C – comprising of deep fractures found within the fresh bedrock at depths greater 90 m below ground level (bgl). The fractures have no predictable trend and are generally of low permeability and likely low storage.
- Aquifer Type D – fracture pattern associated with south dipping faults that are infilled with pegmatites and potentially dolerite dykes, the fault width being limited to 3 m.

Groundwater occurs within the fractured and weathered bedrock, the palaeodrainage valley sediments and overlying surficial cover. Groundwater flow is likely very slow given the subdued topography and flat hydraulic gradients within nearby palaeovalleys. The fresh bedrock contains relatively low volumes of stored groundwater, except within open fractures.

The basal aquifer within the palaeochannel of Moore – Monger palaeodrainage and tributaries is thought to be the most permeable aquifer in the area. It is incised through the weathered bedrock and thus forms a continuous, narrow strip aquifer. The direction of hydraulic gradient (indicative of groundwater flow) closely mimics surface topography. Hence groundwater passes from areas of high relief comprising fresh to weathered bedrock down to valley floors and palaeodrainage associated with salt lake systems (EMM, 2024).

Groundwater flow systems in the palaeovalleys are maintained by rainfall recharge, especially during high-magnitude recharge events enhanced by surface runoff and local flooding. It is likely that only high intensity/duration rainfall events that result in surface ponding or sheet flow will induce infiltration recharge, with rainfall from lesser events evaporating prior to infiltration. Minimal pre-mining groundwater throughflow occurs (Johnson and Commander 2006). Groundwater flows from areas of high relief (fresh to weathered bedrock) to valley floors and palaeovalleys associated with salt lake systems, with groundwater discharge dominated by playa evaporation.

Magee (2009, in EMM 2024) suggests that the basal clay unit within the palaeovalley limits the amount of lateral and vertical connection between the Cenozoic aquifer and the underlying or adjacent weathered bedrock aquifer; or that local pastoral bores are associated with discrete fracture systems disconnected from drawdown within the palaeovalley.

The hydraulic gradient within the bedrock is likely to broadly mimic the surface topography gradient. However, local variations in the hydraulic gradient are likely to be present due to local variations in the paleo-surface; and the presence of dolerite dykes and deeply weathered, clay rich volcanics and metasediments, pegmatite dykes and fresh bedrock that can form barriers to and/or impede groundwater flow.

Groundwater quality in the Proposal is saline to hypersaline. Groundwater in the palaeochannel aquifer is predominantly saline (4,000–36,000 milligrams per litre (mg/L)) in bores and hypothesised to be hypersaline (>200,000 mg/L) near Lake Monger at the downstream end of the palaeovalley. Groundwater salinity varies irregularly rather than

increasing progressively downstream (Magee 2009, in EMM 2024) and the northern most pit appears to be connected to the hypersaline palaeovalley aquifer system.

Karpa Springs (a subtle, minor topographic depression at the northern end of Lake Karpa) contains shallow, lower-salinity groundwater, likely due to surface water runoff effects during major rainfall events, as it is the surface water terminus of a western surface water sub-catchment of about 70 km<sup>2</sup>.

Due to the historical mining of the Proposal, pre-mining groundwater levels are not available. Current groundwater levels are estimated to be 46 – 51 m bgl. EMM (2024) estimated that pit lake evaporation in the order of 240 ML/year currently occurs.

EMM (2024) undertook an assessment and detailed numerical modelling of dewatering requirements for the Proposal based on historical data (from operations in the 1980's and 90's), bore testing and knowledge of the area. The water supply requirements of the Proposal are estimated to be 5 GL/year, although demand in year one will be approximately 1 GL. There is an estimated 3.4 GL contained within the existing pit void lakes at the Proposal, which is anticipated to be stored in one of the existing pit voids until required. Including rainfall inflow to the pits, an average 2.8 GL/year of pit dewatering is expected over the life of the Proposal, with peaks of up to 4.5 GL/year (EMM, 2024).

The overall site water balance modelling concludes that for the first five years, the Proposal water demand can be met via the existing 3.4 GL of pit lake water, additional pit dewatering and existing production bores. From Year six, an additional approximate average 2.4 GL/year will be required from an external water source, with peak requirements of up to 3.5 GL/year (EMM, 2024). Hydrogeological exploration activities have commenced to define alternative water sources in the vicinity of the Proposal with a view to supporting water demands for the life of the Proposal.

## 3.6 Flora

### 3.6.1 Local Flora

A total of 491 flora taxa from 57 families and 185 genera were recorded in the Development Envelope and surrounds by FVC (2023), including 19 introduced (weed) species (refer to Section 3.6.2) and one MNES – *Eremophila viscida* (Endangered). This species is discussed further in Section 4.3.

A total of 74 species of native flora from 16 families and 32 genera were recorded in the alternative Airstrip and surrounding area (Ecotec 2023).

### 3.6.2 Invasive Flora Species

A total of 19 introduced flora species have been recorded in the Development Envelope and surrounds, all of which are known to occur in the surrounding region (FVC, 2023). None of the weed species recorded are Weeds of National Significance (Centre for Invasive Species Solutions 2023) or listed as a Declared Pest on the Western Australian Organism List (DPIRD, 2023b). However, *Rumex vesicarius* (Ruby Dock) is an invasive species that can rapidly colonise disturbed areas. The seeds are salt tolerant and form a persistent seed bank within the soil that can last for many years (Schatral and Osborne, in FVC 2023).

Weeds such as *Rumex vesicarius*, *Cleretum papulosum*, *Carrichtera annua* and *Mesembryanthemum* spp., are known to occur in areas of the Eucalypt Woodlands of the West Australian Wheatbelt TEC, particularly adjacent to disturbances where edge effects are apparent (FVC, 2023).

### 3.7 Vegetation

The Proposal is located within the upper northeastern corner of the Avon Wheatbelt Bioregion and approximately 10 km southeast of the Yalgoo Bioregion (Figure 12). As a result of this proximity, vegetation within the Development Envelope shares extensive characteristics with the Yalgoo bioregion.

#### 3.7.1 Regional Vegetation

Vegetation presumed to have existed prior to European settlement has been mapped at a scale of 1:250,000 as vegetation system associations (Beard 2013, in FVC 2023), with three vegetation associations (141, 352 and 437) occurring within the Proposal (Table 11 and Figure 19).

Pre-European vegetation associations represented within the Development Envelope are not limited in either regional representation or distribution within the Avon Wheatbelt IBRA Region and, therefore, are not considered to be regionally significant (FVC 2023).

**Table 11: Pre-European Vegetation Association Extents**

Vegetation System Association	141	352	437
<b>Description</b>	Medium woodland; York gum, salmon gum & gimlet	Medium woodland; York gum	Shrublands; Mixed acacia thicket on sandplain
<b>Area Relevant to the Avon Wheatbelt Bioregion</b>			
<b>Pre-European Extent (ha)</b>	250,614.9	630,577.6	174,686.5
<b>Current Extent (ha)</b>	77,320.4	108,887.5	144,425.9
<b>Pre-European Extent Remaining (%)</b>	30.9%	17.3%	82.7%
<b>Current Extent held in IUCN Class I-IV Reserves (ha)</b>	1,134.1	1,552.2	2,226.1
<b>Area Relevant to the Proposal</b>			
<b>Disturbance Footprint (ha)</b>	573.2	2.8	637.7
<b>Reduction in current extent following Proposal implementation (%)</b>	0.7%	0.002%	0.4%

(Source: Govt. of WA – 2018 Statewide Veg Statistics)

#### 3.7.2 Local Vegetation

Detailed flora and vegetation assessments undertaken by Focused Vision Consulting (FVC) in Spring 2021 and 2022, and a reconnaissance infill survey undertaken by Ecotec (2023) and Tetris Environmental (TEPL) identified 32 vegetation types (27 identified by FVC (2023) and five identified by Ecotec (2023)) within the Development Envelope based on floristic classification analysis, as well as detailed investigation of species composition, topography, soils, and geographic location. These are summarised in Table 12 and presented in Figure 20.

The number of vegetation types identified reflects the complex local geology and the majority of the local vegetation units are likely to be broadly represented within the region (FVC 2023, Appendix C).

Vegetation condition within the Development Envelope ranged from 'Excellent' to 'Completely Degraded', as shown in Figure 21.

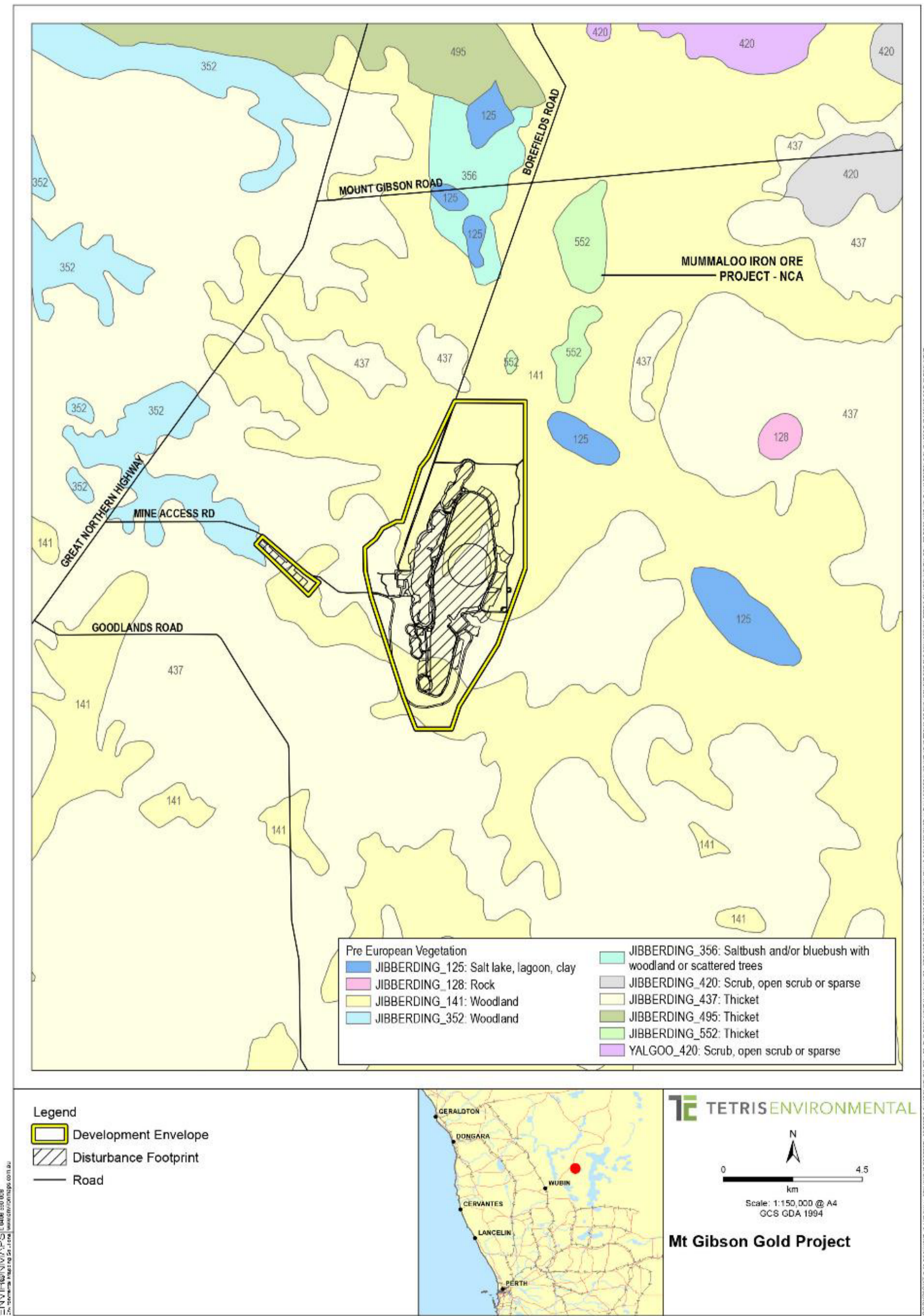


















Figure 19: Pre-European Vegetation Associations





**Table 12: Vegetation types within the Development Envelope**





Vegetation type	Description	Photo of vegetation type
VT1	<i>Callitris columellaris</i> low woodland over <i>Acacia acuminata</i> and <i>Acacia obtecta</i> tall sparse shrubland over <i>Olearia pimeleoides</i> low sparse shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> low isolated tussock grasses	
VT2	<i>Eucalyptus horistes</i> mallee woodland over <i>Acacia effusifolia</i> , <i>Acacia longisperma</i> and <i>Acacia prainii</i> tall closed shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> low sparse grassland	
VT3	<i>Eucalyptus loxophleba</i> subsp. <i>supraevis</i> and <i>Callitris columellaris</i> open woodland over <i>Acacia acuminata</i> and <i>Santalum acuminatum</i> tall open shrubland over <i>Microcorys</i> sp. Mt Gibson, <i>Alyxia buxifolia</i> and <i>Olearia muelerii</i> open shrubland over <i>Austrostipa</i> spp. and <i>Monochather paradoxus</i> sparse grassland	
VT4	<i>Eucalyptus kochii</i> , <i>Eucalyptus capillosa</i> , <i>Eucalyptus horistes</i> and <i>Callitris columellaris</i> woodland over <i>Melaleuca stereophloia</i> and <i>Alyxia buxifolia</i> tall shrubland over <i>Monachather paradoxus</i> , <i>Amphipogon caricinus</i> var. <i>caricinus</i> and <i>Austrostipa elegantissima</i> sparse grassland	





Vegetation type	Description	Photo of vegetation type
VT5	<i>Callitris columellaris</i> , <i>Eucalyptus ?kochii</i> and <i>Eucalyptus ?ceratocorys</i> woodland over <i>Acacia effusifolia</i> and <i>Alyxia buxifolia</i> tall open shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> low sparse tussock grassland	
VT6	<i>Eucalyptus capillosa</i> low mallee woodland over <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> , <i>Hakea francisiana</i> and <i>Acacia coolgardiensis</i> tall shrubland over <i>Phebalium canaliculatum</i> and <i>Hibbertia arcuata</i> low sparse shrubland over <i>Dianella revoluta</i> var. <i>divaricata</i> rushland	
VT7	<i>Eucalyptus subangusta</i> and <i>Eucalyptus ewartiana</i> open mallee woodland over <i>Acacia anthochaera</i> and <i>Acacia effusifolia</i> shrubland over <i>Melaleuca leiocarpa</i> , <i>Microcorys</i> sp. Mt Gibson, <i>Philotheca nutans</i> and <i>Hakea scoparia</i> low open shrubland over <i>Amphipogon caricinus</i> isolated tussock grassland	
VT8	<i>Eucalyptus kochii</i> open mallee woodland over <i>Melaleuca stereophloia</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> and <i>Acacia acuminata</i> tall shrubland over <i>Philotheca brucei</i> low sparse shrubland over <i>Austrostipa trichophylla</i> and <i>Dianella revoluta</i> var. <i>divaricata</i> isolated sedges and grasses and <i>Waitzia acuminata</i> sparse herbland	





Vegetation type	Description	Photo of vegetation type
VT9	<i>Eucalyptus leptopoda</i> subsp. <i>arctata</i> mallee woodland over <i>Allocasuarina corniculata</i> , <i>Acacia effusifolia</i> and <i>Melaleuca hamata</i> tall open shrubland over <i>Acacia longispinea</i> , <i>Hakea invaginata</i> and <i>Hysterobaeckea setifera</i> open shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> low sparse shrubland over <i>Ecdeiocolea monostachya</i> open rushland	
VT10	<i>Eucalyptus leptopoda</i> subsp. <i>arctata</i> isolated mallee trees over <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> tall shrubland	
VT11	<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> woodland over <i>Acacia acuminata</i> , <i>Eremophila oldfieldii</i> and <i>Acacia tetragonophylla</i> tall open shrubland over <i>Olearia muelleri</i> , <i>Ptilotus obovatus</i> and <i>Scaevola spinescens</i> low open shrubland over <i>Waitzia acuminata</i> low isolated forbs	
VT12	<i>Eucalyptus salubris</i> or <i>E. salmonophloia</i> woodland to tall woodland over <i>Acacia</i> spp., <i>Eremophila</i> spp. tall sparse shrubland over <i>Olearia muelleri</i> , <i>Maireana</i> spp., <i>Sclerolaena</i> spp., <i>Ptilotus</i> spp. low open shrubland over <i>Austrostipa</i> spp. isolated tussock grassland <u>Supports vegetation characteristic of the WA Wheatbelt Woodlands</u>	


Vegetation type	Description	Photo of vegetation type
VT13	<p><i>Eucalyptus salubris</i> woodland over <i>Exocarpos aphyllus</i> and <i>Eremophila</i> spp. isolated shrubs over <i>Tecticornia disarticulata</i>, <i>Frankenia setosa</i> and <i>Maireana</i> spp. low shrubland.  <u>Supports vegetation characteristic of the WA Wheatbelt Woodlands</u></p>	
VT16	<p><i>Eucalyptus stowardii</i> low open mallee woodland over <i>Allocasuarina acutivalvis</i>, <i>Acacia assimilis</i> subsp. <i>assimilis</i> and <i>Acacia burkittii</i> tall shrubland over <i>Dodonaea inaequifolia</i> and <i>Melaleuca nematophylla</i> shrubland over <i>Hibbertia arcuata</i> and <i>Hemigenia ciliata</i> low sparse shrubland over <i>Xanthosia kochii</i> open herbland</p>	
VT17	<p><i>Acacia burkittii</i>, <i>Acacia duriuscula</i> and <i>Allocasuarina acutivalvis</i> tall shrubland over <i>Grevillea levis</i> and <i>Acacia synoria</i> sparse shrubland over <i>Hemigenia ciliata</i> and <i>Hibbertia glomerata</i> low sparse shrubland over <i>Ecdeiocolea monostachya</i>, <i>Dianella revoluta</i> var. <i>divaricata</i>, <i>Amphipogon caricinus</i> and <i>Borya sphaerocephala</i> sparse grassland</p>	
VT18	<p><i>Allocasuarina acutivalvis</i>, <i>Acacia effusifolia</i> and <i>Acacia longispinea</i> tall shrubland over <i>Calothamnus gilesii</i> and <i>Aluta aspera</i> low isolated shrubs over <i>Amphipogon caricinus</i> sparse tussock grassland.</p>	

Vegetation type	Description	Photo of vegetation type
VT19	<i>Acacia effusifolia</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> tall shrubland over <i>Enekbatus stowardii</i> , <i>Philotheca deserti</i> subsp. <i>deserti</i> low open shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> sparse tussock grassland	
VT20	<i>Acacia sibina</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> and <i>Hakea invaginata</i> open shrubland over <i>Baeckea elderiana</i> , <i>Grevillea yorkrakinensis</i> and <i>Grevillea acacioides</i> low sparse shrubland over <i>Ecdeiocolea monostachya</i> , <i>Borya sphaerocephala</i> and <i>Stylidium limbatum</i> open rushland	
VT21	<i>Acacia effusifolia</i> and <i>Acacia longispinea</i> tall closed shrubland over <i>Enekbatus stowardii</i> , <i>Olearia humilis</i> and <i>Gilberta tenuifolia</i> low sparse shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> sparse tussock grassland	
VT22	<i>Acacia acuminata</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> , <i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i> and <i>Melaleuca atroviridis</i> tall shrubland over <i>Dodonaea inaequifolia</i> low sparse shrubland over <i>Austrostipa elegantissima</i> isolated tussock grasses	

Vegetation type	Description	Photo of vegetation type
VT23	<i>Acacia effusifolia</i> , <i>Acacia resinimarginea</i> and <i>Hysterobaeckea setifera</i> subsp. <i>setifera</i> shrubland over <i>Hemigenia ciliata</i> low sparse shrubland over <i>Ecdeiocolea monostachya</i> and <i>Dianella revoluta</i> var. <i>divaricata</i> sparse rushland	
VT24	<i>Acacia duriuscula</i> , <i>Acacia acuminata</i> and <i>Melaleuca hamata</i> tall shrubland over <i>Mallestemon tuberculatus</i> and <i>Calycopeplus pauciflorus</i> open shrubland over <i>Hemigenia ciliata</i> low sparse shrubland over <i>Borya sphaerocephala</i> and <i>Dianella revoluta</i> sparse rushland	
VT26	<i>Acacia effusifolia</i> , <i>Acacia resinimarginea</i> and <i>Hysterobaeckea setifera</i> subsp. <i>setifera</i> shrubland over <i>Hemigenia ciliata</i> low sparse shrubland over <i>Ecdeiocolea monostachya</i> and <i>Dianella revoluta</i> var. <i>divaricata</i> sparse rushland	
VT27	<i>Acacia duriuscula</i> , <i>Acacia acuminata</i> and <i>Melaleuca hamata</i> tall shrubland over <i>Mallestemon tuberculatus</i> and <i>Calycopeplus pauciflorus</i> open shrubland over <i>Hemigenia ciliata</i> low sparse shrubland over <i>Borya sphaerocephala</i> and <i>Dianella revoluta</i> sparse rushland	

Vegetation type	Description	Photo of vegetation type
VT28	<i>Melaleuca nematophylla</i> , <i>Acacia stereophylla</i> var. <i>stereophylla</i> tall closed shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> sparse tussock grassland	
VT29	<i>Acacia effusifolia</i> , <i>Melaleuca</i> sp. 1 and <i>Melaleuca leiocarpa</i> tall closed shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> open shrubland over <i>Amphipogon caricinus</i> var. <i>caricinus</i> open tussock grassland	
VT30	<i>Melaleuca hamata</i> , <i>Acacia resinimarginea</i> and <i>Allocasuarina tessellata</i> tall closed shrubland over <i>Phebalium tuberosum</i> and <i>Hibbertia arcuata</i> low open shrubland over mixed species sparse herbland	
VT31	<i>Exocarpos aphyllus</i> and <i>Eremophila</i> spp. isolated shrubs over <i>Tecticornia disarticulata</i> , <i>Frankenia setosa</i> and <i>Maireana</i> spp. low shrubland	

Vegetation type	Description	Photo of vegetation type
<p><b>1 (Ecotec)</b></p>	<p><i>Allocasuarina acutivalvis</i>, <i>Melaleuca nematophylla</i>, <i>Melaleuca leiocarpa</i>, <i>Acacia effusifolia</i> tall shrubland over <i>Aluta aspera</i>, <i>Hysterobaeckea setifera</i>, <i>Phebalium tuberosum</i> shrubland on elevated sandplain with minor granite outcrop.</p> <p>Aligns with FVC Vegetation Unit 20/29</p>	
<p><b>3 (Ecotec)</b></p>	<p><i>Eucalyptus moderata</i>, <i>Eucalyptus . wubinensis</i>, <i>Eucalyptus salmonophloia</i> woodland over <i>Acacia mackeyana</i>, <i>Melaleuca eleuterostachya</i>, <i>Acacia anthochaera</i> open shrubland over <i>Acacia andrewsii</i>, <i>Maireana georgei</i> low sparse shrubland on plains</p> <p>Aligns with FVC Vegetation Unit 6</p>	
<p><b>4 (Ecotec)</b></p>	<p><i>Eucalyptus moderata</i>, <i>Eucalyptus . capillosa</i>, <i>Eucalyptus wubinensis</i> woodland over <i>Acacia mackeyana</i> isolated shrubs over <i>Olearia muelleri</i>, <i>Atriplex vesicaria</i>, <i>Maireana georgei</i> low open shrubland over <i>Sclerolaena diacantha</i>, <i>S. fusiformis</i> low open forbland on plains</p> <p>Aligns with FVC Vegetation Unit 6</p>	
<p><b>5 (Ecotec)</b></p>	<p><i>Eucalyptus moderata</i>, <i>Eucalyptus wubinensis</i>, <i>Eucalyptus celastroides</i>, <i>E. kochii</i> mallee woodland over <i>Tecticornia disarticulata</i>, <i>Olearia muelleri</i>, <i>Eremophila oppositifolia</i> low chenopod shrubland on elevated plains</p> <p>Aligns with FVC Vegetation Unit 4</p>	

Vegetation type	Description	Photo of vegetation type
7 (Ecotec)	<p><i>Eucalyptus moderata</i>, <i>Eucalyptus kochii</i> open mallee woodland over <i>Acacia effusifolia</i>, <i>Allocasuarina acutivalvis</i>, <i>A. anthochaera</i>, <i>Melaleuca leiocarpa</i>, <i>M. hamata</i>, <i>Hakea minyma</i> closed tall shrubland over <i>Enekbatus stowardii</i>, <i>Homalocalyx thryptomenoides</i>, <i>Hysterobaeckea setifera</i> low open shrubland on sandplain Aligns with FVC Vegetation Unit 4/5</p>	

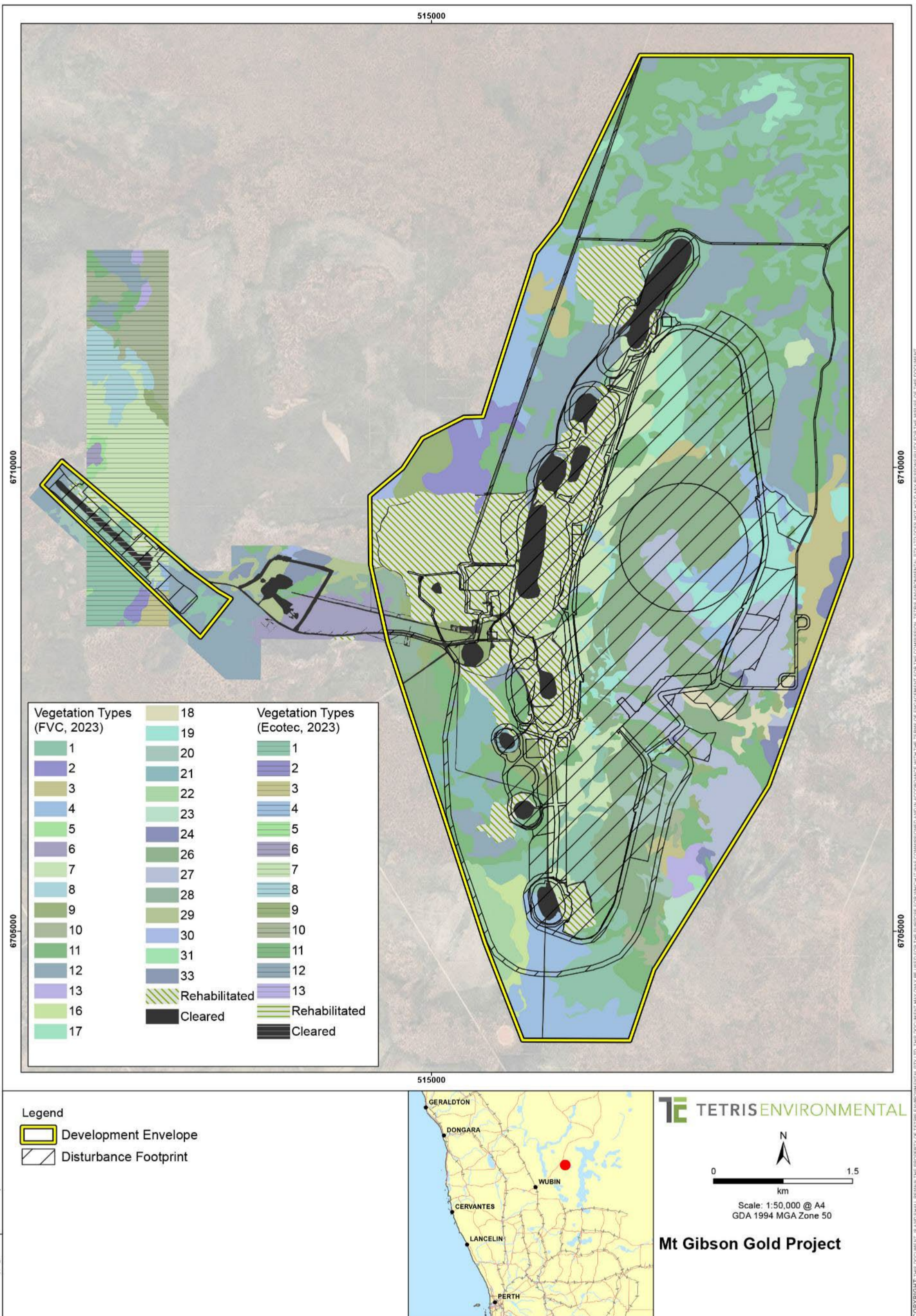


Figure 20: Vegetation types mapped in the Development Envelope

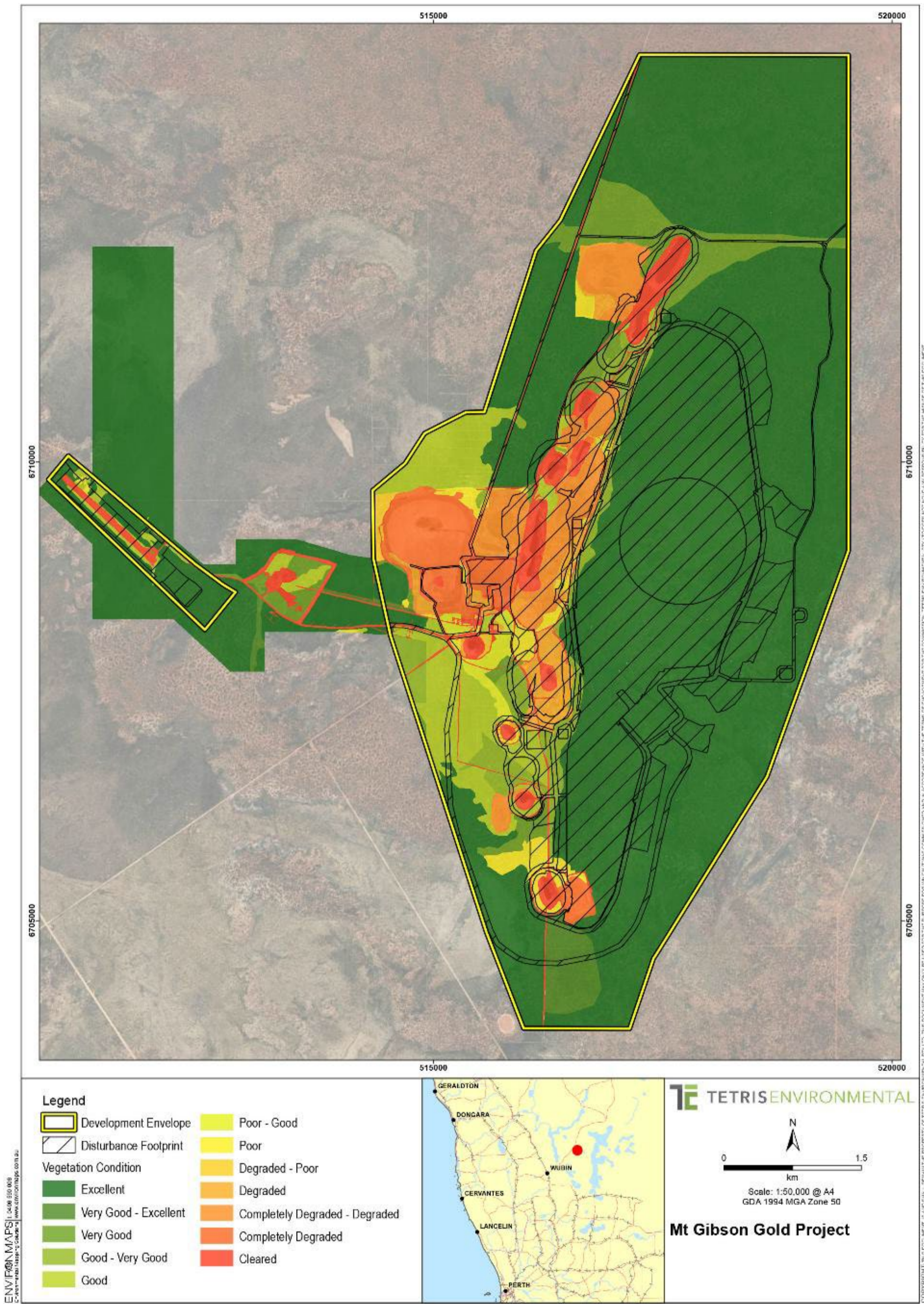


Figure 21: Vegetation condition within the Development Envelope

### 3.7.3 Groundwater Dependent Vegetation

The Groundwater Dependent Ecosystem (GDE) Atlas (BoM 2023d) showed there is a high potential for a terrestrial GDE to occur adjacent to the Development Envelope within the extent of the proposed drawdown (refer to Section 3.5.2 for further discussion on groundwater drawdown). It should be noted that the National Assessment is based on coarse resolution satellite and remote sensing data and has not been ground-truthed or confirmed with field assessment.

TEPL (2023, Appendix E) undertook a groundwater-dependent vegetation desktop study with support from Jenny Borger (JBBC), a botanist experienced in the mid-west area of Western Australia. The desktop study determined that it is unlikely that any groundwater-dependent vegetation would be impacted by the Proposal. TEPL (2023) found that groundwater in the Development Envelope is typically deep and likely outside the vegetation root zone.

Additionally, the depth to groundwater is approximately 4 m or greater and the groundwater is highly saline (typically over 10,000 mg/L). Therefore, it is unlikely to support large vegetation such as Eucalypt trees, which have a shallow lateral root system and are typically susceptible to water logging and saline conditions.

Considering this, it is highly unlikely the WA Wheatbelt Woodlands TEC in the local area is groundwater dependent. The two key indicator Eucalypt species of the TEC, *Eucalyptus salmonophloia* and *Eucalyptus salubris*, are not groundwater dependent due to shallow arterial root systems and are susceptible to salinities >2500 mg/L, which is characteristic of the groundwater quality in the drawdown area (TEPL, 2023).

## 3.8 Terrestrial Fauna

### 3.8.1 Vertebrate Fauna

Detailed terrestrial fauna investigations were conducted throughout the Development Envelope and surrounds between 2021 and 2023 (Biota, 2022 and 2023; Bamford, 2024a). Surveys were undertaken in accordance with relevant State and Federal technical guidance.

Fauna surveys of the Development Envelope and surrounding areas recorded 90 vertebrate species, 24 of which were reptiles, 59 of which were birds, and seven of which were mammals. An additional five species were recorded opportunistically outside in the wider Proposal (Bamford, 2024a).

One fauna taxon listed under the EPBC Act, Malleefowl (*Leipoa ocellata*), was recorded within the Development Envelope during these field assessments. This species is further described in Section 4.4.

Feral cats, rabbits, foxes and dogs have been recorded in the surrounding region.

### 3.8.2 Invertebrate Fauna

Mygalomorph spiders, millipedes and land snails have been recorded in the Development Envelope and surrounds (Biota, 2022). The Lake Goorly Shield-backed trapdoor spider (*Idiosoma kopejtkorum*) listed as *Idiosoma nigrum* occurs, while the Ornate Shield-backed Trapdoor Spider (*Idiosoma formosum*, (Endangered – BC Act)) and the DBCA listed Priority 4 Tree Stem Trapdoor Spider (*Aganippe castellum*) were considered potentially occurring.

A systematics review detailing revision of the genus *Idiosoma* (nigrum-group) (Rix, Huey, Cooper, Austin, & Harvey, 2018) has separated *Idiosoma nigrum*, a listed MNES, into multiple species. These species include *I. kopejtkaurum* and *I. formosum*. The DCCEEW description and distribution map has not been updated to reflect the taxonomic revision.

Based on this revision and DNA analysis, it is considered that any *Idiosoma* species that may occur within the Development Envelope are most likely *I. kopejtkaurum*. This is supported by survey evidence and known records. *Idiosoma nigrum* has not been identified, nor is considered to occur within the Development Envelope. *Idiosoma* species are discussed further in Section 4.7.

### 3.8.3 Fauna Habitat

The Proposal lies within a well-connected and largely undisturbed landscape and has no obvious restrictions to landscape permeability. Biota (2022, 2023) identified three broad fauna habitat types within the Development Envelope, which were further refined by Bamford (2024a, 2024b) into eight Vegetation and Substrate Associations (VSAs), described in Table 13 and shown in Figure 22. The most abundant VSA within the Disturbance Footprint (Table 13) was VSA 1: Acacia Shrublands (528.2 ha), followed by VSA 4: Eucalypt Woodland (248.2 ha) and VSA 5: Mallee Woodland (220.8 ha).

The non-disturbance VSAs (VSAs 1 to 6) are extensively represented outside of the Development Envelope and proposed Disturbance Footprint, with a large proportion of surrounding lands vested in conservation estate (Bamford, 2024a). This was supported by Biota (2022), who found that based on examination of aerial imagery, soil landscapes mapping and vegetation mapping, habitats recorded in the Proposal are not restricted and their attributes are typical of habitat types occurring more widely in the region.

**Table 13: Habitat VSAs of the Development Envelope and Disturbance Footprint**

Vegetation and Substrate Associations (VSAs)	Description	Total mapped (ha)	Total within Development Envelope	Total within Disturbance Footprint (ha)
<b>VSA 1: Acacia Shrubland</b>	Shrublands (or tall shrublands) dominated by <i>Acacia</i> spp. (e.g. <i>A. acuminata</i> , <i>A. effusifolia</i> ) with occasional <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> on pale brown/raw umber sandy loam with some gravel. Gravel forms a hard layer at a depth of about 30cm.	1,329	823.5	528.2
<b>VSA 2: Allocasuarina Shrubland</b>	Tall shrubland dominated by <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> with some <i>Acacia</i> spp. (e.g. <i>A. effusifolia</i> , <i>A. longispinea</i> ) on pale yellowish sands and sandy loam.	605	73.1	40.6
<b>VSA 3: Callitris Woodland</b>	Low woodland of <i>Callitris columellaris</i> with occasional eucalypts over a diverse and varied shrub storey on red-brown/burnt umber loam.	636	462.6	138.4

Vegetation and Substrate Associations (VSAs)	Description	Total mapped (ha)	Total within Development Envelope	Total within Disturbance Footprint (ha)
<b>VSA 4: Eucalypt Woodland</b>	Open woodland dominated by <i>Eucalyptus</i> spp. (e.g. <i>E. loxophleba</i> subsp. <i>supralaevis</i> , <i>E. salmonophloia</i> , <i>E. salubris</i> ) over a low, mid-open chenopod shrubland (including <i>Olearia muellerii</i> , and <i>Maireana</i> spp.) on red-brown/burnt umber clay or clayey loam. Considerable number of dead fallen trees and branches.	2,467	1,313.6	248.2
<b>VSA 5: Mallee Woodland</b>	Open woodland dominated by <i>Eucalyptus</i> spp. (e.g. <i>E. capillosa</i> , <i>E. horistes</i> , <i>E. kochii</i> , <i>E. leptopoda</i> subsp. <i>arctata</i> ) over <i>Acacia</i> spp. shrubland on red-brown/burnt umber loam or red sandy loam.	613	394.6	220.8
<b>VSA 6: Mixed Shrubland</b>	Complex shrubland often with dominant <i>Melaleuca</i> spp.	124	32.8	0.6
<b>VSA 7: Rehabilitation</b>	Previously mined or disturbed areas that have been rehabilitated. Historic rehabilitation was undertaken by previous site owners and there is no information available on the methodology, however replanting was unlikely to have been included. It is assumed all areas of rehabilitation are natural regrowth.	477	75.1	35.6
<b>VSA 8: Cleared</b>	Cleared or disturbed areas.	203	645.0	399.2
<b>Total</b>		<b>6,454</b>	<b>3,820.2</b>	<b>1,611.6</b>

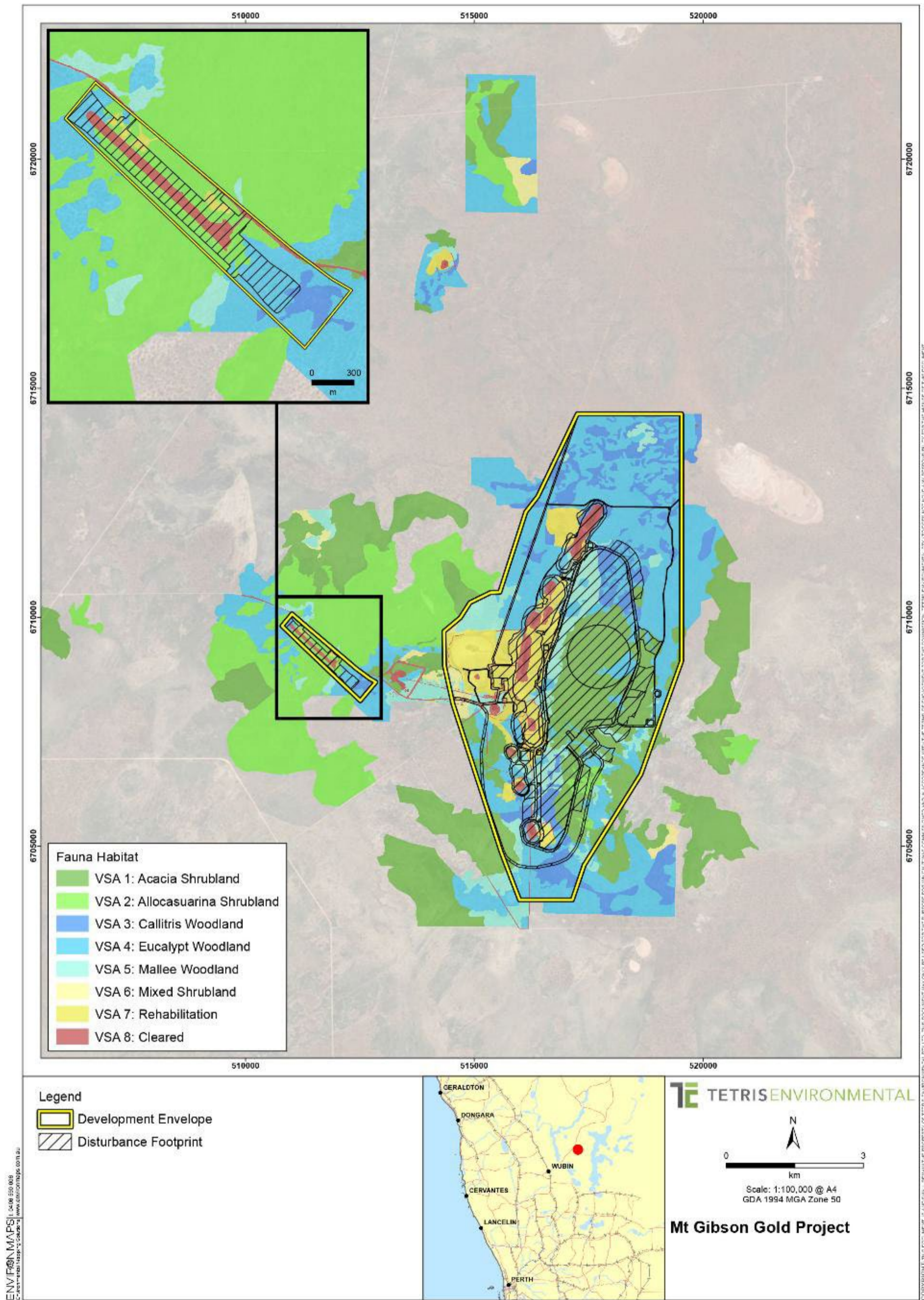
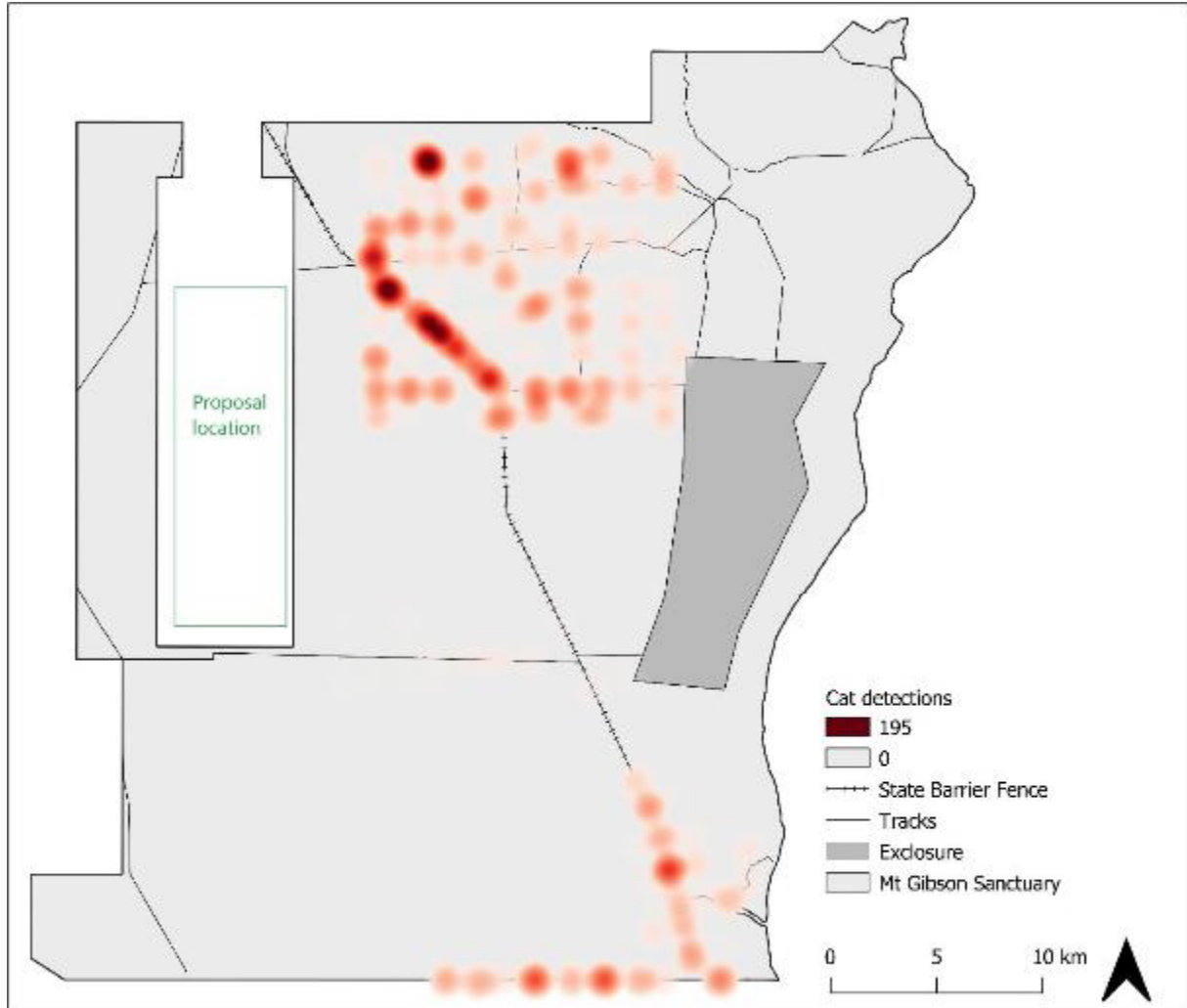


Figure 22: Fauna habitat of the Development Envelope and surrounds

### 3.8.4 Invasive Fauna Species

The introduced cat, red fox and rabbit have been recorded in the Development Envelope and surrounds (Bamford 2024a). The locations of cats and foxes recorded as part of AWC’s feral predator control program are presented in Figure 23 and Figure 24 respectively.



**Figure 23: Recorded cat locations (AWC, 2024)**

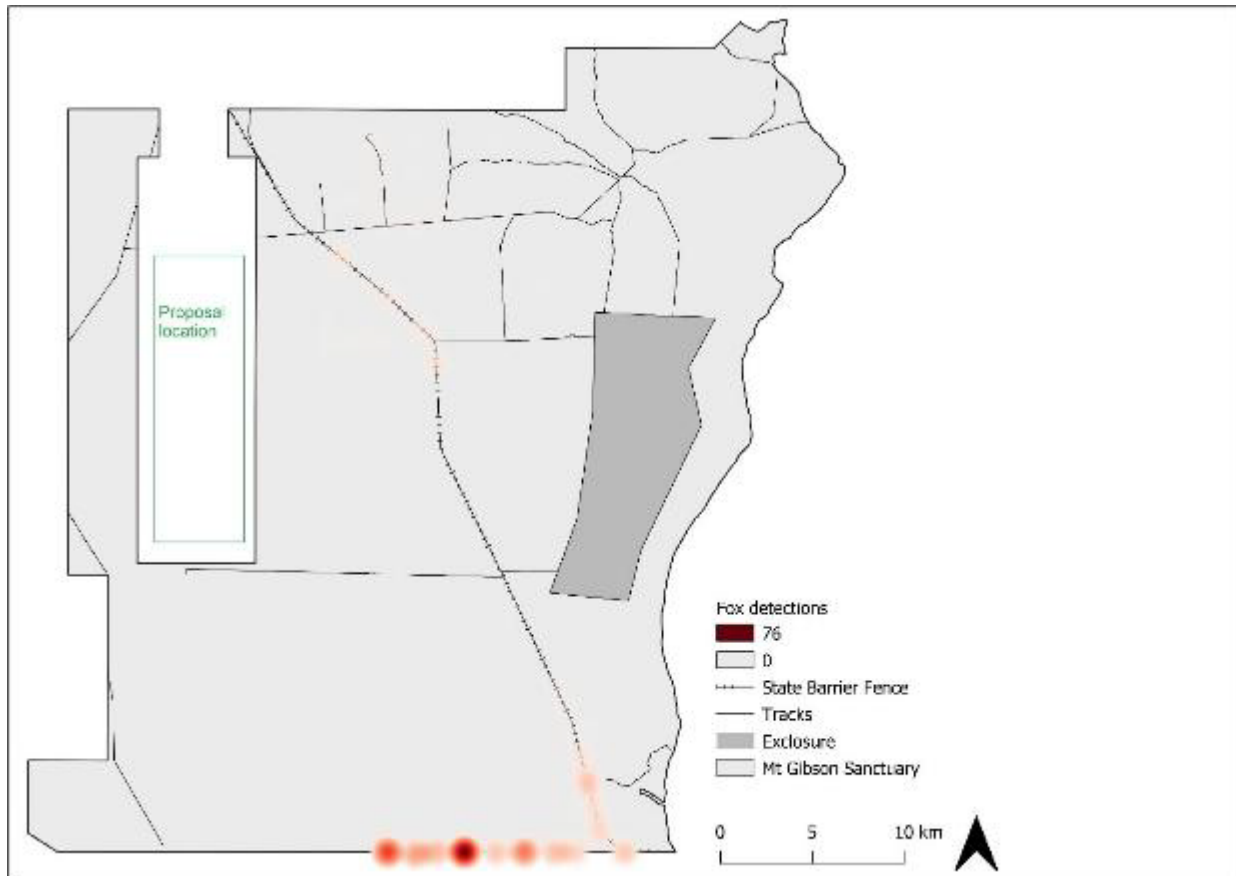


Figure 24: Recorded fox locations (AWC, 2024)

### 3.9 Land Usage and Tenure

The Proposal is located on Unallocated Crown Land under the *Land Administration Act 1997 (WA)*, underlying Mining Tenements granted under the Mining Act. The Proposal is located within the tenements listed in Table 14, granted to the Proponent. All tenements are currently active and will be renewed prior to their expiry dates.

Table 14: Proposal tenure

Tenement	Tenement Holder	Expiry Date
M 59/772	Crimson Metals Pty Ltd	08/06/2043
M 59/402	Crimson Metals Pty Ltd	24/08/2042
M 59/403	Crimson Metals Pty Ltd	24/08/2042
L 59/46	Crimson Metals Pty Ltd	06/08/2027
G 59/48	Crimson Metals Pty Ltd	20/02/2034
E 59/2606	Crimson Metals Pty Ltd	12/12/2026

### 3.10 Heritage and Native Title

The Proposal is not located within any Native Title application or granted Native Title.

A search of the Aboriginal Sites or Heritage places (AHIS) Register identified two registered sites (Artefacts/scatter, site ID 39698 and 39699) within the proposed Development Envelope. An 'Other' Aboriginal heritage site (Stored Data/Not a Site) is also located with the Proposal (Site ID 4655).

A rock hole (Registered site 39672) is located approximately 240m to the east of the Proposal.

Archaeological and Ethnographic heritage surveys within the Development Envelope were undertaken throughout 2022 and 2023 by the Badimia people (Badimia Land Aboriginal Corporation and Badimia Bandi Barna Aboriginal Corporation) and a number of culturally significant locations were identified. The site layout has been designed to avoid these locations, which cannot be shown on the site plans due to cultural sensitivities. The survey reports are available on request but are not for public distribution.

The Proposal will unavoidably impact two Artefact Scatter sites. Badimia has agreed to and granted approval to impact these two sites under Section 18 of the *Aboriginal Heritage Act 1972*. Scatter items at these sites have been relocated by Badimia to a culturally acceptable alternative location.

A Heritage Agreement was signed with Badimia in June 2023, and Badimia has also provided a letter of support for the Proposal.

There are no known European heritage sites located within the Development Envelope.

### 3.11 Conservation Reserves

Conservation Reserves (including National Parks, Conservation Parks and Nature Reserves) are lands managed by the Department of Biodiversity, Conservation and Attractions (DBCA) for the preservation of wildlife and ecological values. National Parks often also represent Environmentally Sensitive Areas (ESA). No Conservation Reserves (as listed under the *Conservation and Land Management Act 1984* (CALM Act)) exist within the Proposal, with the nearest being Biluny Wells Nature Reserve, located approximately 4 km to the south west of the Development Envelope (Figure 25). Other conservation estates in the region include the Goodlands Nature Reserve (25 km south east) and Carlyarn Nature Reserve (29 km south east).

The privately owned Charles Darwin Reserve (Bush Heritage Australia) is located 1 km west of the Development Envelope and the Mount Gibson Wildlife Sanctuary (Australian Wildlife Conservancy) is adjacent to the Development Envelope to the east, west and south (Figure 25).

### 3.12 Regional Community

The Proposal is located within the Shire of Yalgoo. The Wheatbelt region has a diversified economy dominated by mining, (iron ore, gold etc.), agriculture, renewable energy and tourism. The Shire of Yalgoo population is 340. The Proposal is located approximately 20 km north and 40 km east from the edge of the heavily cleared wheatbelt agricultural zone.

The location of the Proposal is relatively remote. Neighbouring properties include the privately owned ex pastoral stations – Charles Darwin Reserve and Mount Gibson Wildlife

Sanctuary. The area to the north of the Proposal is predominantly Unallocated Crown Land. The nearest human receptors to the Proposal are a prospector camp, approximately 3.75 km to the north west, and the Mummaloo mine site (currently in care and maintenance), over 8 km to the north east. The nearest towns are Wubin and Paynes Find, located approximately 60 km south west and 72 km north east of the Proposal respectively.

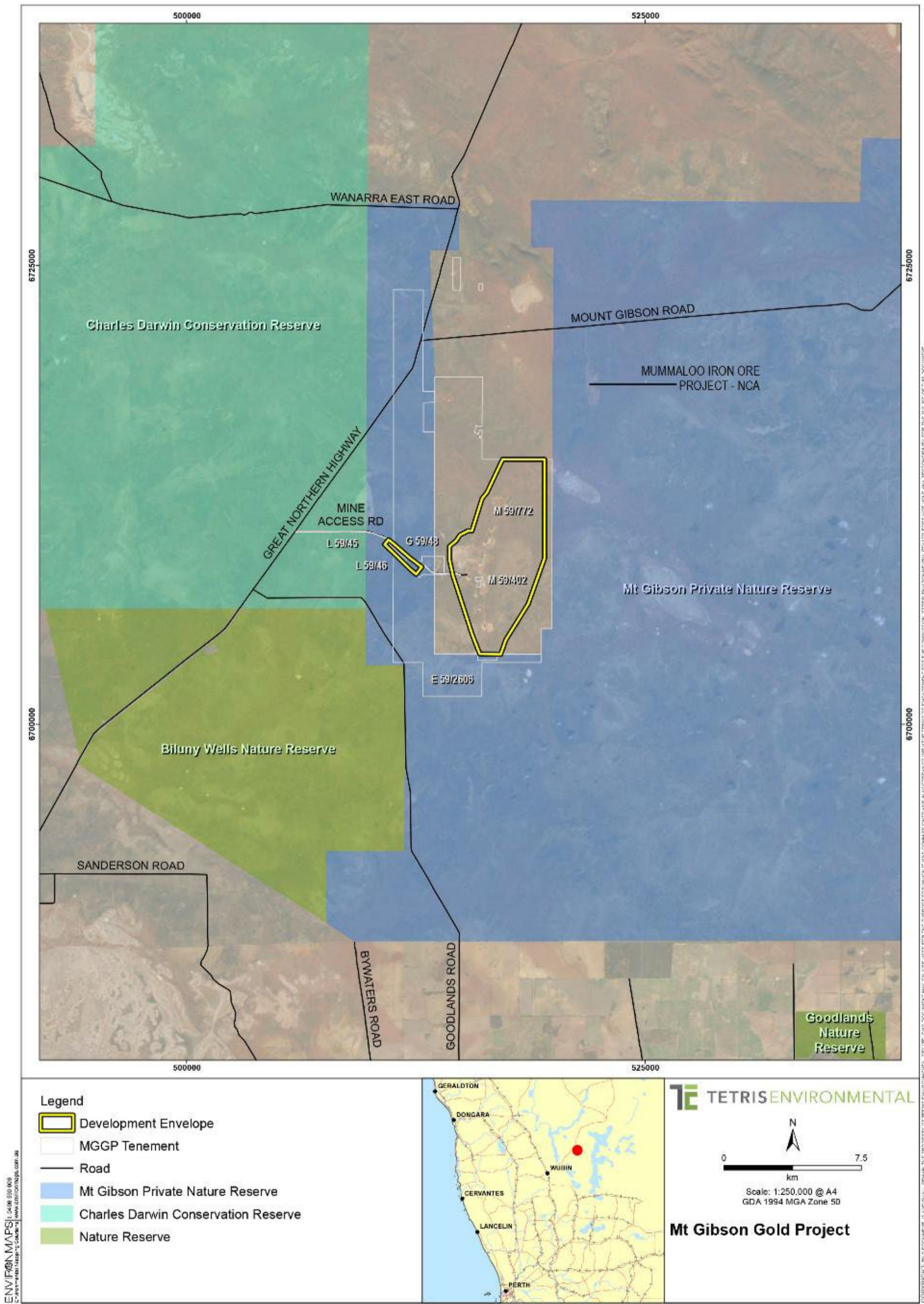


Figure 25: Land tenure

## 4 Matters of National Environmental Significance (MNES)

### 4.1 Biological Studies Informing Relevant MNES

#### 4.1.1 Desktop analysis

##### Flora and Ecological Communities

A desktop assessment was undertaken to develop an understanding of the environmental values present and identify threatened species and their likelihood of occurrence within the Development Envelope. The desktop assessment included:

- A review of 17 previous flora and vegetation survey documents and reports (FVC 2023) relevant to the Proposal
- A review of 15 previous fauna survey documents and reports (Biota 2022) relevant to the Proposal
- Database searches were completed with a 20 km buffer area surrounding the Proposal and included State (DBCA managed) Threatened and priority flora and ecological communities and threatened fauna databases and the Protected Matters Search Tool (PMST) for MNES. The results of the PMST is provided in Appendix D.

The desktop assessment identified the following values, listed under the EPBC Act, as potentially occurring within the Proposal:

- 12 Threatened flora species
- One TEC (Eucalypt Woodlands of the Western Australian Wheatbelt)
- 16 Threatened fauna species

A likelihood of occurrence assessment was undertaken on these values and is presented in Table 15 and Table 16.

The desktop assessment for flora and vegetation included a review of 17 previous documents and reports (FVC 2023) relevant to the Proposal and a review of relevant publicly available databases, including State (DBCA managed) Threatened and priority flora and ecological community's databases and the Protected Matters Search Tool (PMST) for MNES. Database searches were completed with a 20 km buffer area surrounding the Proposal. The results of the PMST is provided in Appendix D.

The desktop assessment identified 12 Threatened flora species (Table 15) and one TEC (Eucalypt Woodlands of the Western Australian Wheatbelt) listed under the EPBC Act as potentially occurring in the Proposal.

**Table 15: Threatened flora and vegetation with potential to occur within the Development Envelope**

Species	EPBC Act Status	BC Act Status	Description	Preferred Habitat	Likelihood of Occurrence prior to surveys listed in Table 17	Likelihood of Occurrence following surveys listed in Table 17
<i>Dasymalla axillaris</i>	Critically Endangered	Critically Endangered	Perennial, low, diffuse shrub growing to 0.3 m high. The flowers are red to yellowish scarlet, vivid in appearance, produced from July to December. Disturbance opportunist.	Sandy soils.	Unlikely - survey area is outside known range. Nearest record (approximately 30 km north west) is from 1966.	Unlikely.
<i>Gyrostemon reticulatus</i>	Critically Endangered	Critically Endangered	Perennial, erect, and compact shrub growing to 0.4 m high. Produces male (golden yellow) and female (white yellow) flowers.	Yellow wet sand plain.	Unlikely - suitable habitat is not known to be present within survey area. Survey area is outside known range.	Unlikely
<i>Hybanthus cymulosus</i> ( <i>Pigea cymulosa</i> )	Critically Endangered	Critically Endangered	Erect, perennial herb growing to 0.9 m high.	Drainage lines and gullies in red clay loam in rocky doleritic areas.	Unlikely - suitable habitat is not known to be present within survey area. Nearest known location approximately 20 km north of the survey area.	Unlikely
<i>Acacia imitans</i>	Endangered	Priority 4	Low, dense, spreading, intricate and prickly shrub. Growing to 0.2 to 1 m high and 2 m wide. Produces yellow flowers between August and September.	Rocky red loam. Rocky hills.	May occur – suitable habitat may occur in the survey area. Nearest known location is 8 km from the northern section of the survey area.	Unlikely
<i>Caladenia drakeoides</i>	Endangered	Critically Endangered	Tuberous, perennial, herb growing to 0.3 m high. Green flowers produced from September to October.	Grey clayey sand, red sandy loam, in damp situations. Margins of salt lakes.	Unlikely - suitable habitat is not known to be present within survey area. Survey area is outside known range. Nearest known location is approximately 75 km south-west of the survey area.	Unlikely
<i>Eremophila nivea</i>	Endangered	Critically Endangered	Erect compact shrub growing 1 m tall and 1 m wide, with spreading branches. Branches and leaves covered with woolly silvery coloured hairs.	Moist grey-brown clay loam over granite boulders or drainage line with inclination.	Unlikely - suitable habitat is not known to be present within survey area. Nearest known location is approximately 42 km north-west of the survey area.	Unlikely
<i>Eremophila resinosa</i>	Endangered	Endangered	Spreading shrub growing to 0.8 m high and 1 m wide with blue/purple/white flowers growing from April to November.	Clay loam, gravelly sandy clay. Road verges.	Unlikely - survey area is outside known range. Nearest known location is over 60 km south-west of the survey area.	Unlikely
<i>Eremophila viscida</i>	Endangered	Endangered	Shrub growing 1.2 to 4 m high. Produces green, white, and yellow flowers between September and November.	Granitic soils, sandy loam. Stony gullies, sandplains.	May occur - suitable habitat present within survey area.	Occurs. Two individuals were recorded within the eastern portion of the survey area on sandy loam soil on granite.
<i>Frankenia conferta</i>	Endangered	Vulnerable	Perennial compact shrub growing to 0.2 m high. Produces white flowers.	Salt Lake. Coarse white sand over clay.	Unlikely - suitable habitat is not known to be present within survey area. Survey area is outside known range.	Unlikely
<i>Roycea pycnophylloides</i>	Endangered	Vulnerable	Perennial herb forming densely branched, silvery mats growing 1 m wide. Produces flowers in September.	Sandy soils, clay and saline flats.	Unlikely - suitable habitat is not known to be present within survey area. Survey area is outside known range.	Unlikely
<i>Darwinia masonii</i>	Vulnerable	Critically Endangered	Erect shrub growing 1 to 2 metres (m) high. Produces red flowers between July to November.	Sandy soils over laterite, often soils. Hillsides, laterite outcrops.	Unlikely - suitable habitat is not known to be present within survey area. Survey area is outside known range.	Unlikely
<i>Eucalyptus synandra</i>	Vulnerable	Vulnerable	Mallee with smooth bark growing to 3.5 to 10 m high. Produces cream and pink flowers in August, December, or January to March.	Sandy and lateritic soils.	May occur - suitable habitat may occur in the survey area. Nearest known location is 2.8 km from the survey area.	Unlikely

1 – All surveys listed in Table 17 included a general survey for all MNES species in relevant habitat, with no evidence of occurrence recorded unless otherwise described within this PER. Therefore, the likelihood of these species occurring, following field surveys, is considered unlikely.

**Threatened Fauna**

The desktop assessment for fauna included a review of 15 previous documents and reports (Biota 2022) relevant to the Proposal and a review of relevant publicly available databases, including State (DBCA managed) Threatened and priority fauna databases and the Protected Matters Search Tool (PMST) for MNES. Database searches were completed with a 20 km buffer area surrounding the Proposal. The results of the PMST is provided in Appendix D.

The desktop assessment identified 16 Threatened fauna species listed under the EPBC Act as potentially occurring in the Development Envelope and surrounds (Table 16).

**Table 16: Threatened fauna with potential to occur within the Proposal**

Species	Common Name	EPBC Act Status	BC Act Status	Preferred Habitat	Likelihood of Occurrence prior to surveys in Table 19	Likelihood of Occurrence following surveys in Table 19
<b>Reptiles</b>						
<i>Egernia stokesii badia</i>	Western Spiny-tailed Skink	Endangered	Vulnerable	Fallen and hollow log piles, York Gum, Gimlet and Salmon Gum woodlands.	Likely – suitable habitat in Proposal. Nearest record approximately 13 km North of the Proposal.	Unlikely
<b>Birds</b>						
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered	Critically Endangered	Beaches and inland mudflats and lakes.	Unlikely – no suitable habitat in the Proposal. Nearest record located approximately 28 km SW of the Proposal.	Unlikely
<i>Pezoporus occidentalis</i>	Night Parrot	Endangered	Critically Endangered	Arid or semi-arid spinifex grasslands with large, established, and unburnt hummocks. Foraging habitat includes areas of samphire, bluebush, and saltbush.	Unlikely – no known records from the locality.	Unlikely
<i>Rostratula australis</i>	Australian Painted-snipe	Endangered	Endangered	Shallow, brackish, or freshwater terrestrial wetlands.	Unlikely – no known records from the locality.	Unlikely
<i>Zanda latirostris (listed as Calyptorhynchus latirostris)</i>	Carnaby's Black Cockatoo	Endangered	Endangered	Eucalypt woodlands, especially those that contain salmon gum and wandoo. Shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species.	Unlikely – no known records from the locality.	Unlikely
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Vulnerable	-	Open woodlands and shrublands in a range of landscape positions. In the Murchison and Yilgarn, it favours loam to clayey-loam flats that support scattered eucalypts and widely-spaced mounded shrubs, with open ground supporting low shrubs and herbs between.	Likely - Multiple records within the locality, predominantly to the east.	Occurs – recorded within Development Envelope and to the north of the Proposal
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Vulnerable	Migratory	Muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation	Unlikely – no known records from the locality. Possible infrequent visitor to salt lakes surrounding the Proposal.	Unlikely
<i>Leipoa ocellata</i>	Malleefowl	Vulnerable	Vulnerable	Dry inland scrub and mallee; occasionally in adjacent eucalypt woodland.	Likely - closest previous record located approximately 2 km W of the Proposal. Multiple records within the locality, predominantly to the north.	Occurs – active and inactive mounds recorded in the Disturbance Footprint, Development Envelope and surrounding local area.
<i>Falco hypoleucos</i>	Grey Falcon	Vulnerable	Vulnerable	Wide range of habitats in the arid zone but appears to be least rare in lightly wooded coastal and riverine plains.	Unlikely – no known records from the locality.	
<b>Invertebrates</b>						
<i>Idiosoma nigrum</i>	Shield-backed trapdoor spider	Vulnerable	Endangered	Eucalypt Woodland and Acacia Shrubland.	Unlikely – known records from the locality are historical and species in the Proposal are now known as <i>I. kopejtkaorum</i> and <i>I. formosum</i> .	Unlikely
<i>Idiosoma kopejtkaorum</i> listed as <i>Idiosoma nigrum</i>	Lake Goorly shield-backed trapdoor spider	-	Endangered	Eucalypt Woodland and Acacia shrubland.	Likely – suitable habitat in Proposal. Closest previous record approximately 5km from the Proposal.	Occurs – recorded in the Disturbance Footprint, Development Envelope and surrounding local area.
<i>Idiosoma formosum</i>	Ornate shield-backed trapdoor spider	-	Endangered	Eucalypt Woodland and Acacia shrubland.	Possible – suitable habitat in Proposal. Closest previous record approximately 5km NE of the Proposal.	Unlikely

Species	Common Name	EPBC Act Status	BC Act Status	Preferred Habitat	Likelihood of Occurrence prior to surveys in Table 19	Likelihood of Occurrence following surveys in Table 19
<b>Mammals</b>						
<i>Dasyurus geoffroii</i>	Chuditch	Vulnerable	Vulnerable	Forest, mallee shrublands, woodland and desert habitats with adequate den and refuge sites (horizontal hollow logs or earth burrows).	Possible – known translocated population approximately 15 km east of the Proposal.	May occur – all known translocated records occur mainly to the north-east of the Development Envelope, but species may move through or reside in the Proposal
<i>Lagostrophus fasciatus</i>	Banded Hare-wallaby	Vulnerable	Vulnerable	Dense thickets of vegetation.	Unlikely – known translocated population within fenced area approximately 15 km east of the Proposal.	Unlikely
<i>Leporillus conditor</i>	Greater Stick-nest rat	Vulnerable	Conservation Dependent	Shrublands, especially of succulent and semi-succulent plant species including the chenopod genera.	Unlikely – known translocated population within fenced area approximately 15 km east of the Proposal.	Unlikely
<i>Macrotis lagotis</i>	Greater bilby	Vulnerable	Vulnerable	Open tussock grassland on uplands and hills; mulga woodland/shrubland growing on ridges and rises; and hummock grassland on plains and in alluvial areas.	Unlikely – known translocated population within fenced area approximately 15 km east of the Proposal.	Unlikely
<i>Myrmecobius fasciatus</i>	Numbat	Endangered	Endangered	Eucalypt woodlands with high presence of termites.	Unlikely – known translocated population within fenced area approximately 15 km east of the Proposal.	Unlikely
<i>Perameles bougainville</i>	Shark Bay bandicoot	Endangered	Vulnerable	Base of elevated dunes, dense scrub including thickets of Allocasuarina, Open bluebush and saltbush plains and stony hills bordering scrub.	Unlikely – known translocated population within fenced area approximately 15 km east of the Proposal.	Unlikely

<sup>1</sup> –All field surveys listed in Table 19 included a general survey for all MNES species in relevant habitat, with no evidence of occurrence recorded unless otherwise described within this PER. Therefore the likelihood of these species occurring, following field surveys, is considered unlikely.

#### 4.1.2 Survey effort

##### Flora and Ecological Communities

Detailed flora and vegetation assessments of the Proposal were undertaken by Focused Vision Consulting (FVC) in Spring 2021 and 2022 (included as Appendix C). Collectively, a total of 85 quadrats (20 x 20 m) and 14 relevés were recorded within the survey area in accordance with the Technical Guidance for Flora and Vegetation Surveys for Environmental Impact (EPA 2016b). Targeted traverses dedicated to searching for conservation significant flora, and to map the extent of the WA Wheatbelt Woodlands were carried out as a series of parallel transects spaced between 20 and 200 m apart in areas where the desktop assessment identified potential occurrence of conservation significant flora vegetation.

A targeted survey for *Eremophila viscida* and its suitable habitat, and the WA Wheatbelt Woodlands (as required in Table 2 of the PER guidelines (Appendix A) was undertaken by Ecotec and TEPL in 2024 (TEPL, 2025a, Appendix F). A 20 x 20 m quadrat was established at the site of the known *E. viscida* individuals, to describe the habitat of the known population. Vegetation units (as mapped by FVC, 2023) expected to provide suitable habitat for *Eremophila viscida* were traversed on foot, with sites chosen for investigation based on the following criteria:

- near granitic areas or water gaining sites, with presence of species such as *A. acuminata*, *A. burkittii*, *A. obtecta*, *Borya sphaerocephala*, *Melaleuca hamata* or *Malleostemon tuberculatus* (potential indicator species)
- predominantly within Vegetation Type (VT) 19 and VT 27 as mapped by FVC (2023).

Known patches of the WA Wheatbelt Woodlands (as defined by FVC, 2023) and vegetation characteristic of the TEC were surveyed on foot within the Development Envelope, with the condition of each patch assessed in accordance with the thresholds in the approved conservation advice (DoE, 2015). The eligibility of recorded patches was also assessed based on the presence of key eucalypt species for the WA Wheatbelt Woodlands, as outlined in Table 2 of the approved conservation advice (DoE, 2015).

Table 17 outlines the details of these assessments, their limitations and consistency with State (EPA) guidance. It should be noted that these documents are generic and effective field investigations should be (and were for the Proposal) site specific and guided by the experience of the field personnel. Additional surveys were conducted in the local area (refer Table 18) to support exploration programmes for the Proposal and to search for conservation significant flora species and vegetation communities. Figure 26 shows the track logs to demonstrate the extensive flora and vegetation survey effort.

Historically, a number of floristic studies have been completed within the Mt Gibson region for other projects, including:

- Vegetation Assessment and Rare Flora Search between Perenjori and Mt Gibson (Paul Armstrong 2004)
- Flora and Vegetation Assessment, Proposed Slurry Pipeline Mount Gibson to Geraldton Port (ATA Environmental 2006)
- Flora, Vegetation and Fauna Assessment, Proposed Haul Road along Wanarra Road and Perenjori Rothsay Road (ATA Environmental 2007).
- Flora and Vegetation Assessment, Proposed Three Springs to Mount Gibson Ranges 330kV Transmission Line (Coffey Environments 2009).
- Level 2 Flora and Vegetation Survey – Mummaloo (EnviroWorks 2013).

**Table 17: Summary of detailed flora and vegetation surveys**

Survey	Study Area, Type and Timing	Consistency with Guidance
<p><b>Detailed Flora and Vegetation Assessment. Mount Gibson Gold Project (FVC, 2023)</b></p>	<p>Survey area: Development Envelope and broader area (Figure 26)</p> <p>Type: Two-phase detailed flora and vegetation assessment</p> <p>Timing: 27-30 September 2021 (Phase 1); 12-17 September 2022 (Phase 2)</p>	<p>The survey meets relevant EPA Act policy and guidance for the survey area for survey type, sampling techniques, survey design, collection and identification of flora, classification of vegetation (including definition of TEC/PEC), mapping and reporting. Survey approach and method undertaken with consideration of the following:</p> <p>Technical Guidance – Flora and Vegetation Surveys for Environmental Impact (EPA 2016a)</p> <p>Position Statement No. 3 (EPA 2002)</p> <p>Environmental Factor Guideline - Flora and Vegetation (EPA 2016a)</p> <p>No limitations or constraints were associated with this report.</p> <p>Climatic conditions: Phase 1 - Rainfall in August and September 2021 was below average, however rainfall in March, May and July 2021 was above the average. The lower-than-average rainfall during August is considered unlikely to have resulted in a limitation for the survey area due to the exceptionally high rainfall received in the preceding months; Phase 2 - August experienced above average rainfall in the region. Rainfall in May, June and July 2022 was below average, however this is considered unlikely that this would have presented a limitation to the 2022 spring survey, since flowering conditions were observed to be very good.</p>
<p><b>Mount Gibson Gold Project. Flora and Vegetation Survey of the Proposed Airstrip (Ecotec, 2023)</b></p>	<p>Survey area: Airstrip Development Envelope and broader area (Figure 26)</p> <p>Type: Single phase reconnaissance flora and vegetation assessment and utilisation of high resolution drone footage</p> <p>Timing: 19th October and 1 November 2023</p>	<p>The survey meets relevant EP Act policy and guidance for the survey area. Survey approach and method undertaken with consideration of the following:</p> <p>Technical Guidance – Flora and Vegetation Surveys for Environmental Impact (EPA 2016a)</p> <p>Position Statement No. 3 (EPA 2002)</p> <p>Environmental Factor Guideline - Flora and Vegetation (EPA 2016a).</p> <p>The following limitations and constraints associated with this report are detailed below:</p> <p>Climatic conditions prior to the survey were hotter and drier than average, resulting in many plants senescing with very little reproductive material (flowers, fruit) present. This had some impact on identification to species level for some specimens; however, this is unlikely to have had any significant impact on the classification of vegetation communities, and none of the specimens were believed to correspond to any conservation significant species.</p> <p>Due to difficult access and very high temperatures, vegetation in the northern section of the survey area was assessed from drone footage and supporting photographs. Broad vegetation mapping was completed based on aerial imagery and prior detailed vegetation mapping undertaken by FVC (Note the northern portion of this survey area is not proposed for disturbance).</p>
<p><b>Survey of <i>Eremophila viscida</i> Habitat and Eucalypt Woodlands of the Western Australian Wheatbelt (TEPL, 2025a)</b></p>	<p>Survey area: Development Envelope and broader area (Figure 26)</p> <p>Type: Single phase targeted <i>Eremophila viscida</i> and Threatened Ecological Community assessment</p> <p>Timing: 7-11 August 2024</p>	<p>The survey meets relevant EPA Act policy and guidance for the survey area for survey type, sampling techniques, survey design, collection and identification of flora and reporting. Survey approach and method undertaken with consideration of the following:</p> <p>Technical Guidance – Flora and Vegetation Surveys for Environmental Impact (EPA 2016a)</p> <p>Position Statement No. 3 (EPA 2002)</p> <p>Environmental Factor Guideline - Flora and Vegetation (EPA 2016a)</p> <p>PER guidelines (Appendix A)</p>

Survey	Study Area, Type and Timing	Consistency with Guidance
		<p>Approved Conservation Advice – Eucalypt Woodlands of WA (DoE, 2015)</p> <p><i>Eremophila viscida</i> Interim Recovery Plan (CALM, 2003)</p> <p>No limitations or constraints were associated with this report.</p> <p>Climatic conditions: Rainfall for the year up to the time of the survey was above average (248.2 mm compared with the long term average of 206.4 mm), resulting in many plants and vegetation in healthy condition with reproductive material (flowers, fruit) present.</p>

**Table 18: Additional surveys conducted for the Proposal development**

Year	Date	Survey Area	Survey Scope	Company	Survey Effort
2022	February	Eastern Hydrogeological exploration	Targeted TEC/PEC survey	FVC	Targeted traverses
	February	Southern RC exploration	Targeted conservation significant flora and TEC/PEC survey	JBBC/TEPL	Targeted traverses
	May	Northern Hydrogeological exploration	Targeted conservation significant flora and TEC/PEC survey	JBBC/Ecotec	Targeted traverses
	May/June	Resource sterilisation drill lines	Targeted conservation significant flora and TEC/PEC survey	JBBC/FVC	Targeted traverses
	June	Northern RC drilling	Sterilisation Lines, North RD Drilling targeted conservation significant and TEC/PEC survey	FVC	Targeted traverses
	July	Regional	Regional targeted <i>Philotheca nutans</i> and TEC/PEC survey	JBBC/TEPL	Targeted traverses
	September	Existing Airstrip	Targeted conservation significant flora and TEC/PEC survey	FVC	Targeted traverses
2023	March	2022 phase 2 survey area	Targeted <i>Eremophila viscida</i> , <i>Philotheca nutans</i> , <i>Lepidosperma</i> sp. Blue Hills and <i>Acacia synoria</i> survey	FVC/TEPL	Targeted traverses
	June	Northern RC and Hydrogeological exploration	Targeted conservation significant flora and TEC/PEC survey	FVC	Targeted traverses
	June	Existing Mine Disturbance	Targeted weed survey	TEPL	Targeted traverses
	October	Regional	Desktop groundwater dependent vegetation (GDV) survey to determine the likelihood of GDV within the predicted zone of groundwater drawdown, follow up field survey to confirm the predictions of the desktop GDV survey	Ecotec/TEPL	Targeted relevés
	October	Proposal	Refine previous vegetation mapping, additional targeted <i>Philotheca nutans</i> survey	Ecotec/TEPL	Quadrats and relevés
	October	Potential Airstrip	Single phase reconnaissance flora and vegetation assessment and utilisation of high resolution drone footage	Ecotec/TEPL	Quadrats and relevés
2024	March	Bungeye Hydrogeological exploration	Targeted conservation significant flora and TEC/PEC survey, approximately 30 km north west of Proposal	JBBC/TEPL	Targeted traverses
	September	Existing Mine Disturbance	Targeted weed spraying and mapping	Ecotec/TEPL	Targeted traverses
2025	August	Mummaloo Iron Ore Development Envelope	Verification of TEC mapping	Anders/TEPL	Targeted quadrats and relevés

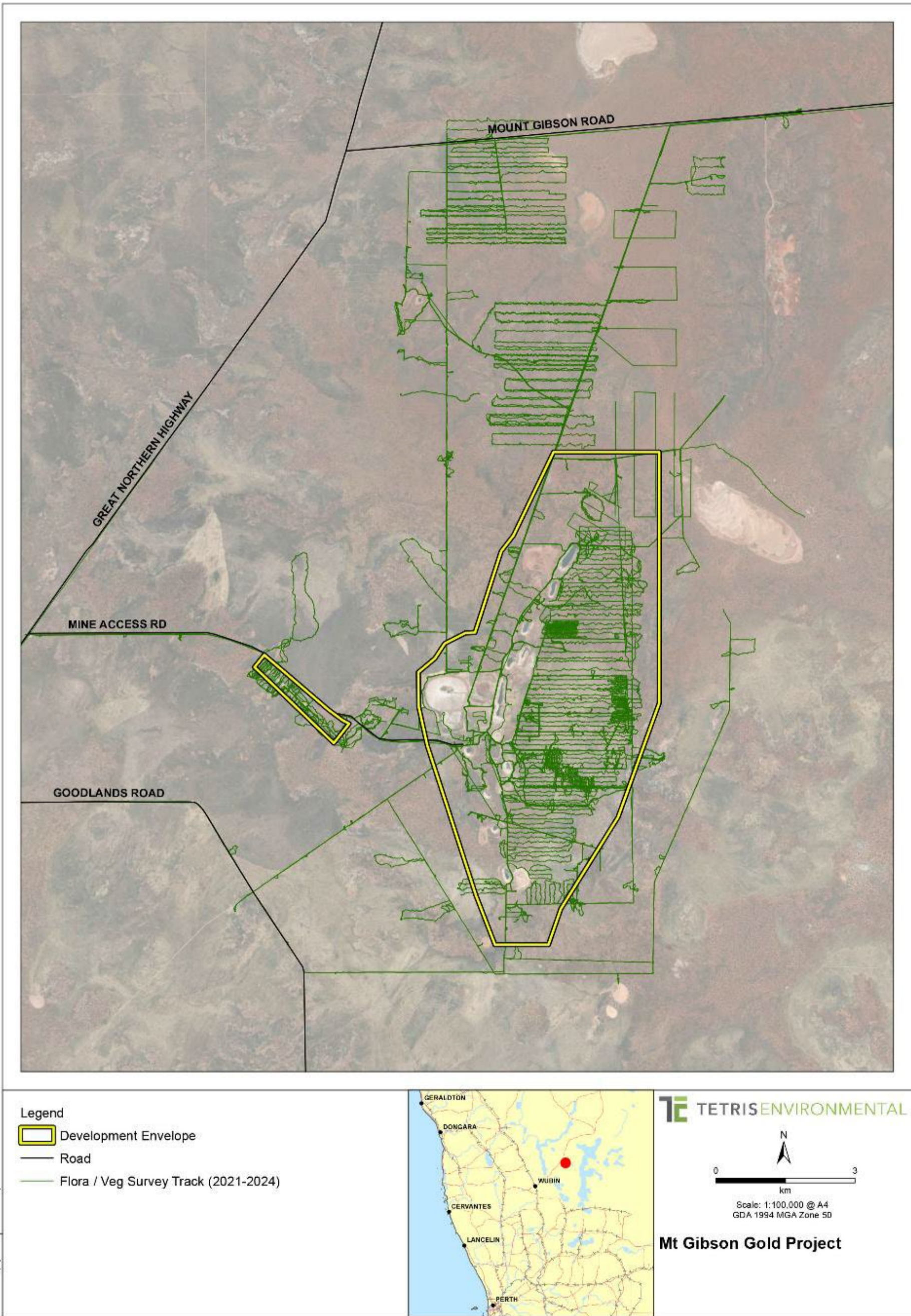


Figure 26: Flora and vegetation survey tracks

## Threatened Fauna

Biota Environmental Sciences (Biota) undertook basic (low intensity sampling on general faunal values) and targeted fauna (Western Spiny-tailed Skink, Common Slender Bluetongue, *Idiosoma formosum* and *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) surveys of the Development Envelope and surrounds in November 2021 and September 2022 (Biota 2022 and 2023). Habitat descriptions were conducted in the field, then mapped and assessed based primarily on identified vegetation units. Digital aerial imagery was also considered in combination with regional soil landscape mapping and geology, to inform the extent of identified habitats. Assessments of SRE habitat were undertaken in the same manner as the vertebrate fauna habitat mapping, but with consideration of the EPA (2016a) guidance, which identifies sheltered and isolated habitats as well as microhabitats. In addition, areas in which deep soil profiles can accumulate (such as alluvial plains) were considered likely to support mygalomorph spiders.

Bamford Consulting Ecologists (Bamford) undertook a detailed (including spotlighting, 420 pitfall trap nights and 210 funnel trap nights, 42 bird censusing transects and 364 motion-sensitive camera) and targeted (conservation significant) vertebrate fauna assessment of the Development Envelope and surrounds in November 2023 (Bamford 2024a). Fauna habitat was refined based on the work undertaken by Biota (2022 and 2023) and observations made during the field survey.

A supplementary targeted survey for MNES was undertaken in September 2024 (Bamford, 2024b), including further survey for the Southern Whiteface and habitat suitability for the Chuditch as required in Table 2 of the PER guidelines (Appendix A). Known Malleefowl mounds were visited and examined (for signs of activity) and scored for mound profile, age and breeding activity. Surveyors also searched for direct (e.g. sighting, calls) or secondary evidence (feathers, tracks, droppings) of Malleefowl presence. A total of 51 km of transects were traversed during searches for Southern Whiteface. 11 motion sensitive cameras were deployed across the Proposal, giving a total camera effort of 627 days.

Bennelongia undertook an impact assessment of the Proposal on the Lake Goorly shield-backed trapdoor spider (*Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*); collating density, distribution, habitat preference, and molecular data generated by Bennelongia (2024, 2025a & 2025b), Biota (2022 & 2023) and Rix et al. (2018a) to assess the impacts of Proposal on populations of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*). This included a reconnaissance survey and three rounds of targeted surveys, involving linear transects, endoscope camera burrow inspection and non-lethal techniques to confirm the identity of spiders. Results from the endoscope were used to record presence/absence of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and its habitat characteristics.

A further targeted survey for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) was undertaken by Bennelongia and Tetris Environmental (2025b) over five days in April/May 2025, to expand the species known Extent of Occurrence (EOO) and Area of Occupancy (AOO) and to provide relevant information about habitat preferences. The survey assessed 39 AOO cells (2 x 2 km) within and outside the known EOO that lacked previous records of the target species (“unpopulated grids”) and contained suitable Eucalypt Woodland habitat. The species was confirmed in 32 of the 39 cells surveyed.

Table 19 outlines the details of these assessments, their limitations and consistency with EPA and DCCEEW guidance. It should be noted that these documents are generic and effective field investigations should be (and were for the Proposal) site specific and guided by the experience of the field personnel. Figure 27 and Figure 28 show the track logs to

demonstrate the fauna survey effort for the Proposal. The fauna reports are included as Appendix G, H, I, J, K and L respectively.

Historically, several fauna studies have been completed within the Mt Gibson region for other projects, including:

- Targeted survey for conservation listed fauna species in the Mount Gibson area (Ecological 2020)
- Vertebrate fauna survey of the Mummaloo Project (Phoenix 2012)
- Flora, Vegetation and Fauna Assessment, Proposed Haul Road along Wanarra Road and Perenjori Rothsay Road (ATA Environmental 2007).
- Targeted Malleefowl Survey – Mummaloo (Enviroworks 2012)
- Significant Fauna Habitat Assessment Mummaloo (EnviroWorks 2013)
- Targeted Fauna Assessment – Mummaloo (Bamford 2013).
- Short Range Endemic Invertebrates targeted field survey of Mummaloo (Bennelongia 2012a).
- Subterranean fauna survey of Mummaloo (Bennelongia 2012b).

**Table 19: Summary of detailed terrestrial fauna surveys**

Survey	Study Area, Type and Timing	Consistency with Guidance
<b>Mount Gibson Gold Project Basic and Targeted Fauna Survey (Biota 2022)</b>	<p>Survey area: Development Envelope and broader area (Figure 27)</p> <p>Type: Basic and targeted terrestrial fauna assessment</p> <p>Timing: 8-12 November 2021; 29 November – 3 December 2021</p>	<p>The survey meets relevant EP Act policy and guidance for the survey area for survey type, survey techniques, survey design, habitat assessment, data analysis, mapping and reporting. Survey approach and method undertaken with consideration of the following:</p> <ul style="list-style-type: none"> <li>• Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020a).</li> <li>• Technical Guidance: Sampling of short range endemic invertebrate fauna (EPA 2016e).</li> <li>• Environmental Factor Guideline: Terrestrial Fauna (EPA 2016f).</li> <li>• Survey guidelines for Australia’s threatened mammals (DSEWPaC, 2011a)</li> <li>• Survey guidelines for Australia’s threatened birds (DSEWPaC, 2010)</li> <li>• Survey Guidelines for Threatened Reptiles (DSEWPaC, 2011b)</li> </ul> <p>The following limitations and constraints associated with this report are detailed below:</p> <ul style="list-style-type: none"> <li>• Not every section of the survey area was ground-truthed or sampled, as parts of the survey area were inaccessible by vehicle. Fauna sampling was, however, completed at locations considered to represent the range of habitats present in the survey area.</li> <li>• Many SRE taxa are difficult to sample adequately. For example, mygalomorph spiders are time-consuming to locate, and morphological identification requires adult male specimens, which are often in low abundance and only emerge from their burrow during selective, specific conditions such as following rain or during humid nights.</li> <li>• Significant rainfall (85.4mm) occurred on 10 November, resulting in limited access and suboptimal conditions. The survey was postponed for three weeks, re-commencing 29 November 2021 following improvement in conditions. Maximum temperatures across the survey dates ranged from 15.3°C – 38.5°C.</li> </ul>
<b>Mount Gibson Gold Project Extended Area Basic and Targeted Fauna Survey (Biota 2023)</b>	<p>Survey area: Development Envelope and broader area (Figure 27)</p> <p>Type: Basic and targeted terrestrial fauna assessment</p> <p>Timing: 19-23 September 2022</p>	<p>The survey meets relevant EP Act policy and guidance for the survey area for survey type, survey techniques, survey design, habitat assessment, data analysis, mapping and reporting. Survey approach and method undertaken with consideration of the following:</p> <ul style="list-style-type: none"> <li>• Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020a).</li> <li>• Technical Guidance: Sampling of short range endemic invertebrate fauna (EPA 2016e).</li> <li>• Environmental Factor Guideline: Terrestrial Fauna (EPA 2016f).</li> </ul> <p>Climatic conditions were cool and wet (17°C -20.3°C, 5mm of rainfall) during the initial two days and warmer for the following three days (23.4°C – 27°C).</p> <p>The following limitations and constraints associated with this report are detailed below:</p> <ul style="list-style-type: none"> <li>• Not every section of the survey area was ground-truthed or sampled, as parts of the survey area were inaccessible by vehicle. Fauna sampling was, however, completed at locations considered to represent the range of habitats present in the survey area.</li> <li>• The Song Meter configurator application malfunctioned in the field, rendering all bat recordings invalid.</li> </ul>
<b>Mount Gibson Gold Project Assessment of Fauna Values (Bamford 2024a)</b>	<p>Survey area: Development Envelope and broader area (Figure 27)</p> <p>Type: Detailed and targeted terrestrial fauna assessment</p> <p>Timing: 30 October - 7 November 2023</p>	<p>The survey meets relevant EP Act policy and guidance for the survey area for survey type, survey techniques, survey design, habitat assessment, data analysis, mapping and reporting. Survey approach and method undertaken with consideration of the following:</p> <ul style="list-style-type: none"> <li>• Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020a).</li> <li>• Environmental Factor Guideline: Terrestrial Fauna (EPA 2016f).</li> </ul> <p>State guidance was used due to the suitability in WA context, with review of the following Federal guidelines where necessary:</p> <ul style="list-style-type: none"> <li>• Survey guidelines for Australia’s threatened mammals (DSEWPaC, 2011a)</li> <li>• Survey guidelines for Australia’s threatened birds (DSEWPaC, 2010)</li> </ul> <p>No limitations or constraints were associated with this report.</p>

Survey	Study Area, Type and Timing	Consistency with Guidance
		Climatic conditions: Daily maxima were very high through some of the survey period and the region appears to have had below-average rainfall for 2023. The results of the field investigations reflect this, however, was not a limitation.
<b>Mount Gibson Gold Project Targeted Investigations into Significant Fauna (Bamford 2024b)</b>	Survey area: Development Envelope and broader area (Figure 27)  Type: Targeted terrestrial fauna assessment  Timing: 16 – 24 September 2024	The survey meets relevant EP Act policy and guidance for the survey area for survey type, survey techniques, survey design, habitat assessment, data analysis, mapping and reporting. Survey approach and method undertaken with consideration of the following: <ul style="list-style-type: none"> <li>• Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020a).</li> <li>• Environmental Factor Guideline: Terrestrial Fauna (EPA 2016f).</li> <li>• PER guidelines (Appendix A)</li> <li>• Malleefowl National Recovery Plan (Benshemesh, 2007)</li> <li>• National Malleefowl Recovery Plan (DCCEEW, 2024d)</li> <li>• Approved Conservation Advice – Southern Whiteface (DCCEEW, 2023a)</li> <li>• National Recovery Plan – Chuditch (DEC, 2012)</li> </ul> <p>State guidance was used due to the suitability in WA context, with review of the following Federal guidelines where necessary:</p> <ul style="list-style-type: none"> <li>• Survey guidelines for Australia’s threatened mammals (DSEWPaC, 2011a)</li> <li>• Survey guidelines for Australia’s threatened birds (DSEWPaC, 2010)</li> </ul> <p>No limitations or constraints were associated with this report.</p> <p>Climatic conditions: Daily maxima were moderate through the survey period and the region appears to have had above average rainfall for 2024.</p>
<b>Impact assessment of the Mt. Gibson Gold Project in relation to the Lake Goorly Shield-Backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) (Bennelongia 2025a)</b>	Survey area: Development Envelope and broader area (Figure 28)  Timing: 2 – 6 September 2024  Type: Targeted <i>Idiosoma</i> impact assessment	The survey meets relevant EP Act policy and guidance for the survey area for survey design, sampling considerations, specimen identification and reporting. Survey approach and method undertaken with consideration of the following: <ul style="list-style-type: none"> <li>• Technical Guidance: Sampling of short range endemic invertebrate fauna (EPA 2016e).</li> <li>• Environmental Factor Guideline: Terrestrial Fauna (EPA 2016f).</li> <li>• PER guidelines (Appendix A)</li> <li>• Approved Conservation Advice – <i>Idiosoma nigrum</i> (DSEWPaC, 2013)</li> </ul> <p>No limitations or constraints were associated with this report.</p> <p>Climatic conditions: Daily maxima were moderate through the survey period and the region appears to have had above average rainfall for 2024.</p>
<b>Targeted Survey for Extent of Occurrence (EOO) and Area of Occupancy (AOO) Expansion of the Lake Goorly Shield-Backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) (Bennelongia 2025b)</b>	Survey area: Broader area (Figure 29)  Timing: 28 April – 2 May 2025  Type: Targeted <i>Idiosoma</i> EOO and AOO expansion.	The survey meets relevant EP Act policy and guidance for the survey area for survey design, sampling considerations, specimen identification and reporting. Survey approach and method undertaken with consideration of the following: <ul style="list-style-type: none"> <li>• Technical Guidance: Sampling of short range endemic invertebrate fauna (EPA 2016e).</li> <li>• Environmental Factor Guideline: Terrestrial Fauna (EPA 2016f).</li> <li>• PER guidelines (Appendix A)</li> <li>• Approved Conservation Advice – <i>Idiosoma nigrum</i> (DSEWPaC, 2013)</li> <li>• IUCN Standards and Petitions Committee (2024) recommendation of adequate survey effort when estimating a species’ AOO</li> </ul> <p>No limitations or constraints were associated with this report.</p>

<sup>1</sup> – The Southern Whiteface is not currently listed in the Survey guidelines for Australia’s threatened birds (DSEWPaC, 2010). From previous Bamford experience with the Southern Whiteface, it has been observed to have a very patchy distribution which can lead to great inconsistencies in recording rates depending on site selection and sampling approach. To allow for this, the approach taken by Bamford was to traverse transects that avoided sampling specific and pre-determined habitat types and covered as much area as possible without making assumptions on where the species might occur.

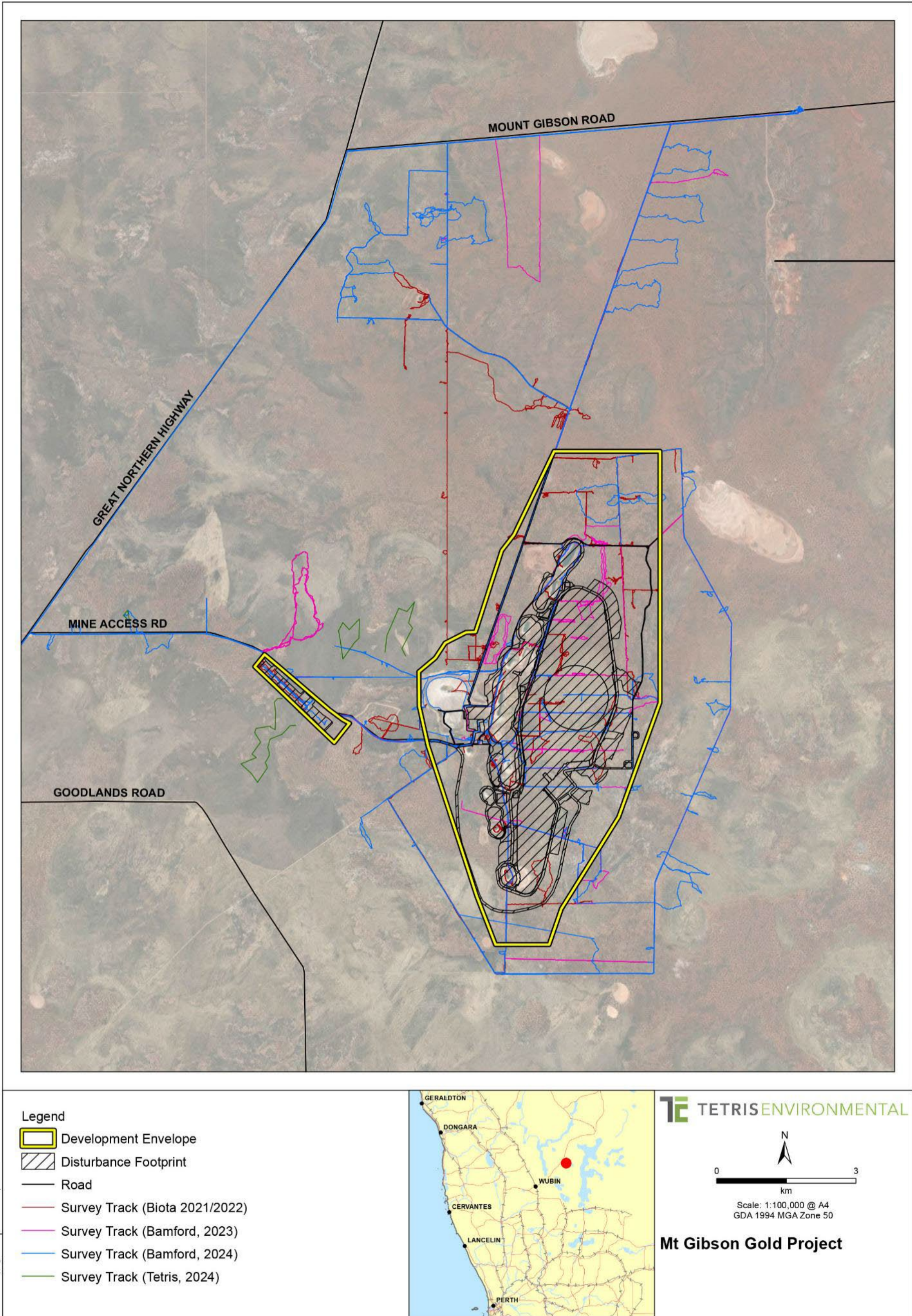


Figure 27: Vertebrate fauna survey track logs across the Development Envelope

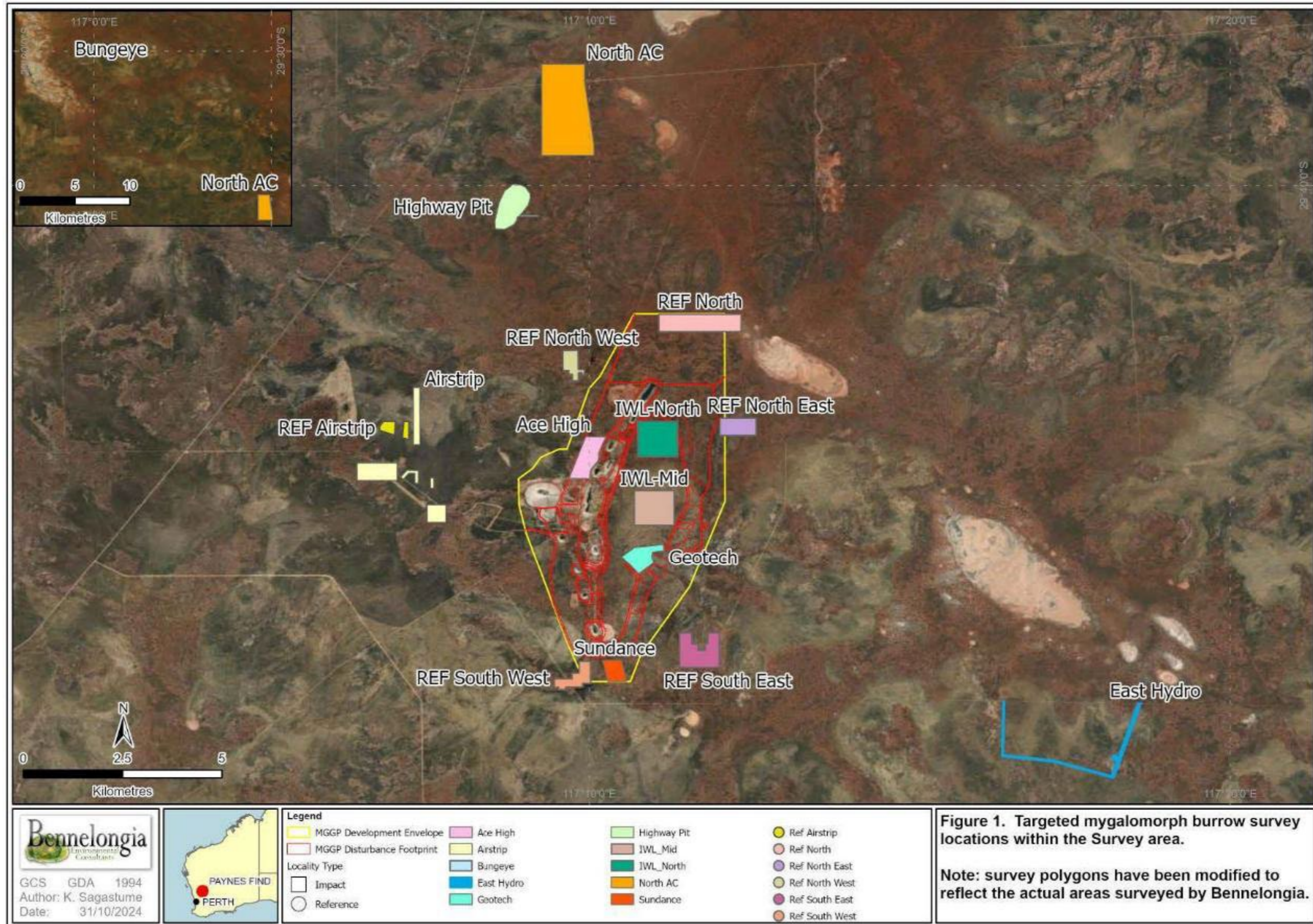


Figure 28: Invertebrate fauna (mygalomorph spider) survey areas

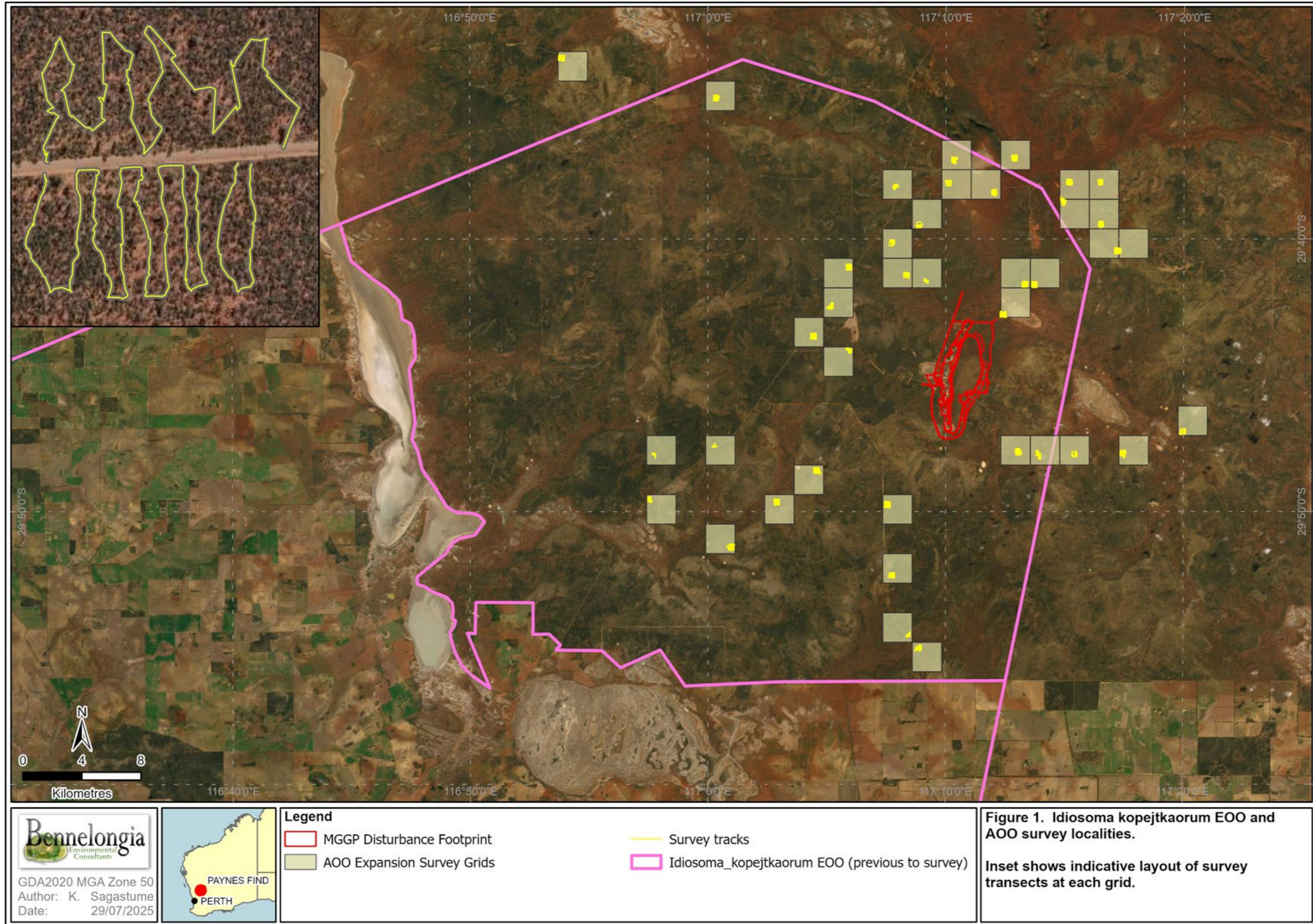


Figure 29: *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) EOO and AOO survey areas

## 4.2 Eucalypt Woodlands of the Western Australian Wheatbelt

### 4.2.1 Species description

The Eucalypt Woodlands of the West Australian Wheatbelt Ecological Community (herein referred to as WA Wheatbelt Woodlands) occurs within the Development Envelope and surrounds. This Ecological Community is listed as a Priority 3 Priority Ecological Community (PEC) under State legislation (BC Act) and as a Critically Endangered Threatened Ecological Community (TEC) under Federal legislation (EPBC Act).

The TEC is endemic to south western WA and is located in the zone between the wetter forests of the south west coast and the low woodlands, mallee and shrublands of the semi-arid to arid interior (DoE 2015). The WA Wheatbelt Woodlands is dominated by a complex mosaic of Eucalypt species over an understorey that is highly variable in structure and composition. The approved conservation advice for the WA Wheatbelt Woodlands details the diverse range of key native plant species that may be observed within the ecological community (DoE 2015).

The WA Wheatbelt Woodlands has been subject to extensive clearing and fragmentation within the wheatbelt region as a result of large-scale native vegetation clearing for agriculture development. The Proposal is located approximately 20 km north and 40 km east from the edge of the heavily cleared wheatbelt agricultural zone. The WA Wheatbelt Woodlands provides habitat and resources for the large number of fauna species due to the highly diverse and complex nature of the TEC (DoE 2015). Woodlands provide suitable habitat for a range of bird species, including the Threatened Malleefowl (DoE 2015).

The WA Wheatbelt Woodlands occupies a regional area of approximately 939,470 ha (MBS 2020), ranging from Mullewa in the north to Cranbrook, 700 km to the south.

### 4.2.2 Survey outcomes

Table 17 (refer to Section 4.1.2) validates the adequacy of surveys undertaken.

FVC (2023) identified two local vegetation types within the Development Envelope as likely to support occurrences of the WA Wheatbelt Woodlands TEC. These vegetation types are:

- VT12 - *Eucalyptus salubris* or *E. salmonophloia* woodland to tall woodland over *Acacia spp.*, *Eremophila spp.* tall sparse shrubland over *Olearia muelleri*, *Maireana spp.*, *Sclerolaena spp.*, *Ptilotus spp.* low open shrubland over *Austrostipa spp.* isolated tussock grassland
- VT13 - *Eucalyptus salubris* woodland over *Exocarpos aphyllus* and *Eremophila spp.* isolated shrubs over *Tecticornia disarticulata*, *Frankenia setosa* and *Maireana spp.* low shrubland.

The extent of the community's occurrence within the Development Envelope and surrounds has been mapped at a finer scale than DBCA data, based on a combination of quadrats, relevés, ground-truthing, and aerial imagery analysis. Therefore, there is a relatively high degree of confidence in the mapped extent of vegetation characteristic of the WA Wheatbelt Woodlands (FVC 2023).

The condition of each known patch of the WA Wheatbelt Woodlands (as defined by FVC, 2023) and vegetation characteristic of the TEC within the Development Envelope was re-assessed by Tetris Environmental at a finer scale in 2024 (TEPL, 2025a) in accordance with the thresholds in the approved conservation advice (DoE, 2015). The eligibility of recorded

patches was also assessed based on the presence of key eucalypt species for the WA Wheatbelt Woodlands, as outlined in the approved conservation advice.

As outlined in the Approved Conservation Advice (DoE, 2015) there is a lack of specific information about the ecological functional roles for most species that occur in the WA Wheatbelt Woodland TEC. The reductions in patch sizes recorded during the assessment (TEPL, 2025a) are not expected to significantly alter any patch's functionality or conservation status, due to patch residual size (small and isolated patches are less resilient to disturbances and less likely to recover lost diversity and functions (DoE, 2015)) and presence of the eucalypt canopy (tree canopy eucalypts are considered functionally important to the TEC (DoE, 2015)). *Individual patch reductions were on the edges of patches and not within the middle, except for a small area of rehabilitation located east of and parallel to the access road in Patch 1 (Figure 30, refer to Figure 32 for patch locations).* A comparison of the original and revised WA Wheatbelt Woodlands distribution in the Development Envelope is presented in Figure 30.

The 20 defined patches of WA Wheatbelt Woodlands TEC surveyed (TEPL, 2025a) occupy a total mapped extent of 455.3 ha, of which 350.3 ha occurs within the Development Envelope and 27.5 ha within the Disturbance Footprint.

Within the local area surrounding the Development Envelope (7 km radius), flora and vegetation assessments undertaken to support activities such as resource exploration have delineated additional eligible patches of the WA Wheatbelt Woodlands TEC, totalling ~2,050 ha outside of the Development Envelope (Figure 31). Proportionally, the mapped extent of the WA Wheatbelt Woodlands TEC within the Development Envelope and Disturbance Footprint represents ~14.6% and 1.1% of the total mapped local extent (2,394.3 ha), respectively.

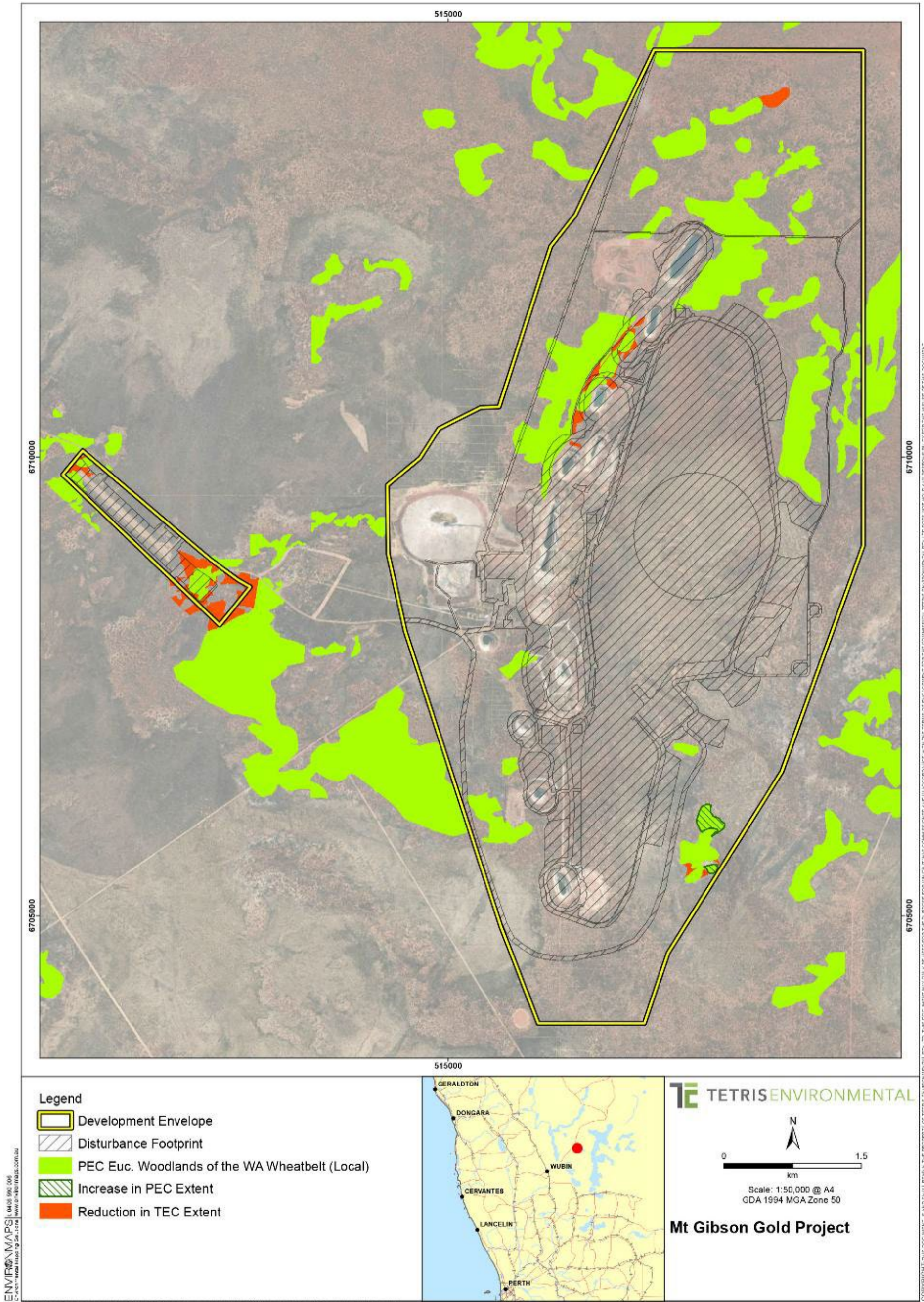


Figure 30: Revised WA Wheatbelt Woodlands extent within the Development Envelope

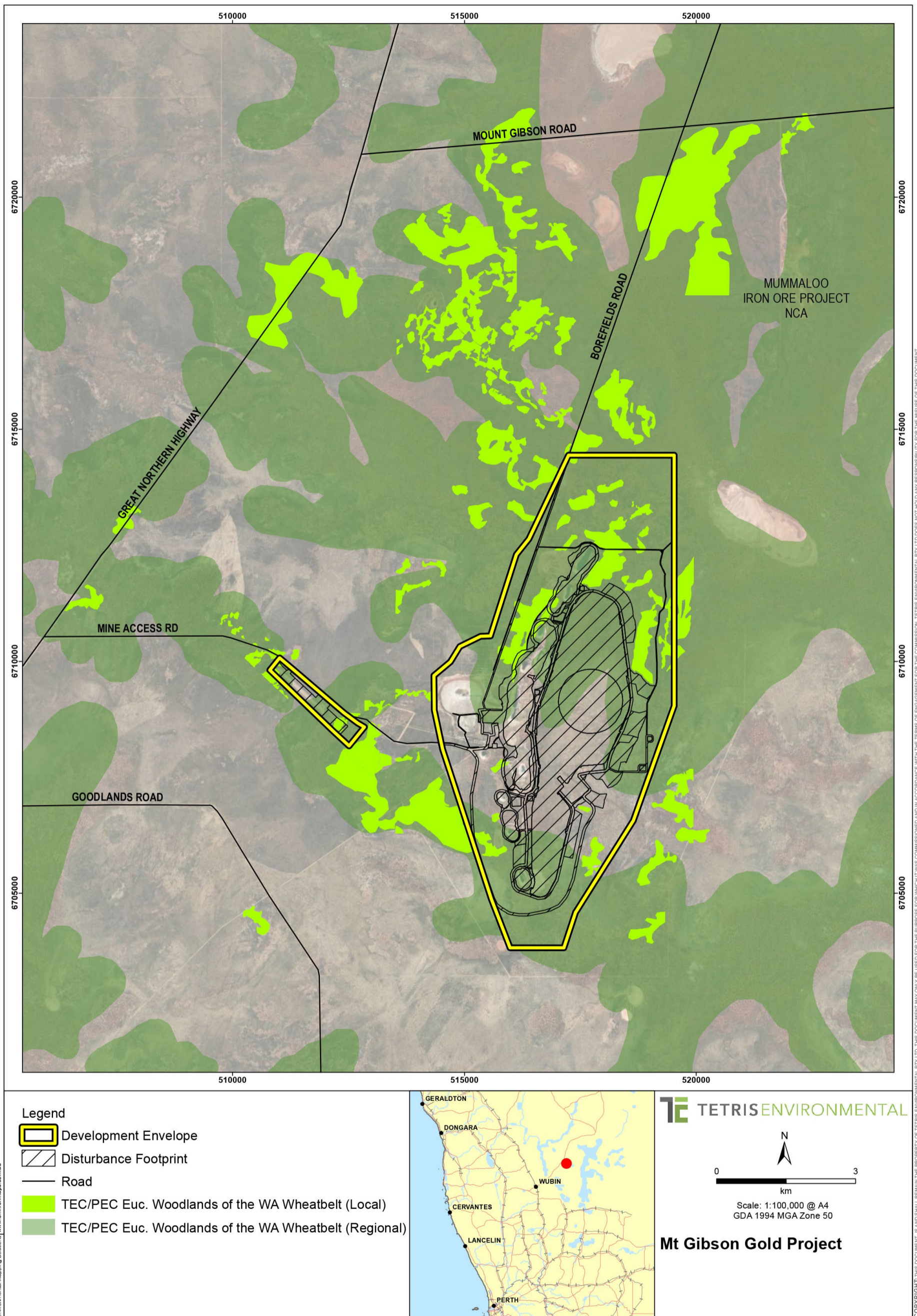


Figure 31: WA Wheatbelt Woodlands extent within the local and regional area

### 4.2.3 Habitat assessment

As outlined in Section 4.2.2, there is ~2,394.3 ha of WA Wheatbelt Woodlands within the local area surrounding the Development Envelope (7 km radius). Of this, 350.3 ha occurs within the Development Envelope, including 27.5 ha within the Disturbance Footprint.

Currently, DCCEE do not have a Habitat Quality Score (HQS) tool available to assist with assessing the quality of patches that will be impacted by the Proposal with patches in proposed Offset sites to ensure there is a 'like for like' conservation outcome. On this basis, a HQS has been developed by Tetris Environmental for the Proposal to assess the recorded patches of WA Wheatbelt Woodlands (Table 20), using the definitions developed by Keighery (as recommended in the Approved Conservation Advice (DoE, 2015)).

**Table 20: Habitat rating tool for WA Wheatbelt Woodlands**

Vegetation Condition	Definition	Quality Score
<b>Excellent</b>	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.	9-10
<b>Very Good</b>	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.	7-8
<b>Good</b>	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	5-6
<b>Degraded</b>	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.	3-4
<b>Completely Degraded</b>	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.	1-2

Figure 32 shows the recorded patches of WA Wheatbelt Woodlands within the Development Envelope, whilst Table 21 summarises the results of the condition assessment on each patch. The detailed assessment report (TEPL, 2025a) is included as Appendix F.

All TEC patches in the proposed Development Envelope meet the eligibility criteria for TEC, except for minor areas in patches 1 and 6, which occur within the proposed Disturbance Footprint. These minor patches are not large enough to define the whole patch as ineligible of TEC status. The condition of patches within the Development Envelope ranged from Good to Excellent, with patches inside the proposed Disturbance Footprint in Good to Very Good condition (TEPL, 2025a). Applying the HQS tool to the patches within the Disturbance Footprint, an average quality score of 7 across all patches has been calculated.

The approved conservation advice (DoE 2015) defines areas considered important to the survival of the WA Wheatbelt Woodlands as all patches that meet the key diagnostic characteristics and condition thresholds for the ecological community, plus the buffer zones

(40 m), particularly where this comprises surrounding native vegetation. Therefore, within the Development Envelope, areas considered important to the survival of the WA Wheatbelt Woodlands are defined as all vegetation adjacent to each WA Wheatbelt Woodlands patch within the 40 m buffer zone, as shown in Figure 33. There are no areas important to survival of the TEC that do not meet condition thresholds.

Native vegetation (not TEC) adjacent to TEC patches are considered important to the survival of WA Wheatbelt Woodlands, as they would provide some protection from risk factors such as strong winds, weed encroachment and loss of habitat for key native species (TEPL, 2025a). The vegetation surrounding the WA Wheatbelt Woodlands in the Development Envelope is largely continuous and occurs extensively outside the Development Envelope, as opposed to the actual WA Wheatbelt region (where most of the known TEC occurs) which has been heavily fragmented by agriculture (TEPL, 2025a).

Figure 33 shows the areas important to the survival of the WA Wheatbelt Woodlands within the Development Envelope, that have been assessed (FVC, 2023) to be in Good - Excellent condition.

Proposal implementation will result in clearing up to 20.2 ha of vegetation in the 40 m buffer zone for roads, pits, and topsoil storage.

Within the Development Envelope, ~510.4 ha of native vegetation in Good - Excellent condition considered critical to the survival of the WA Wheatbelt Woodlands will be retained, of which 322.8 ha occurs within eligible WA Wheatbelt Woodlands patches and 187.6 ha occurs within the 40 m buffer zone around WA Wheatbelt Woodlands patches.

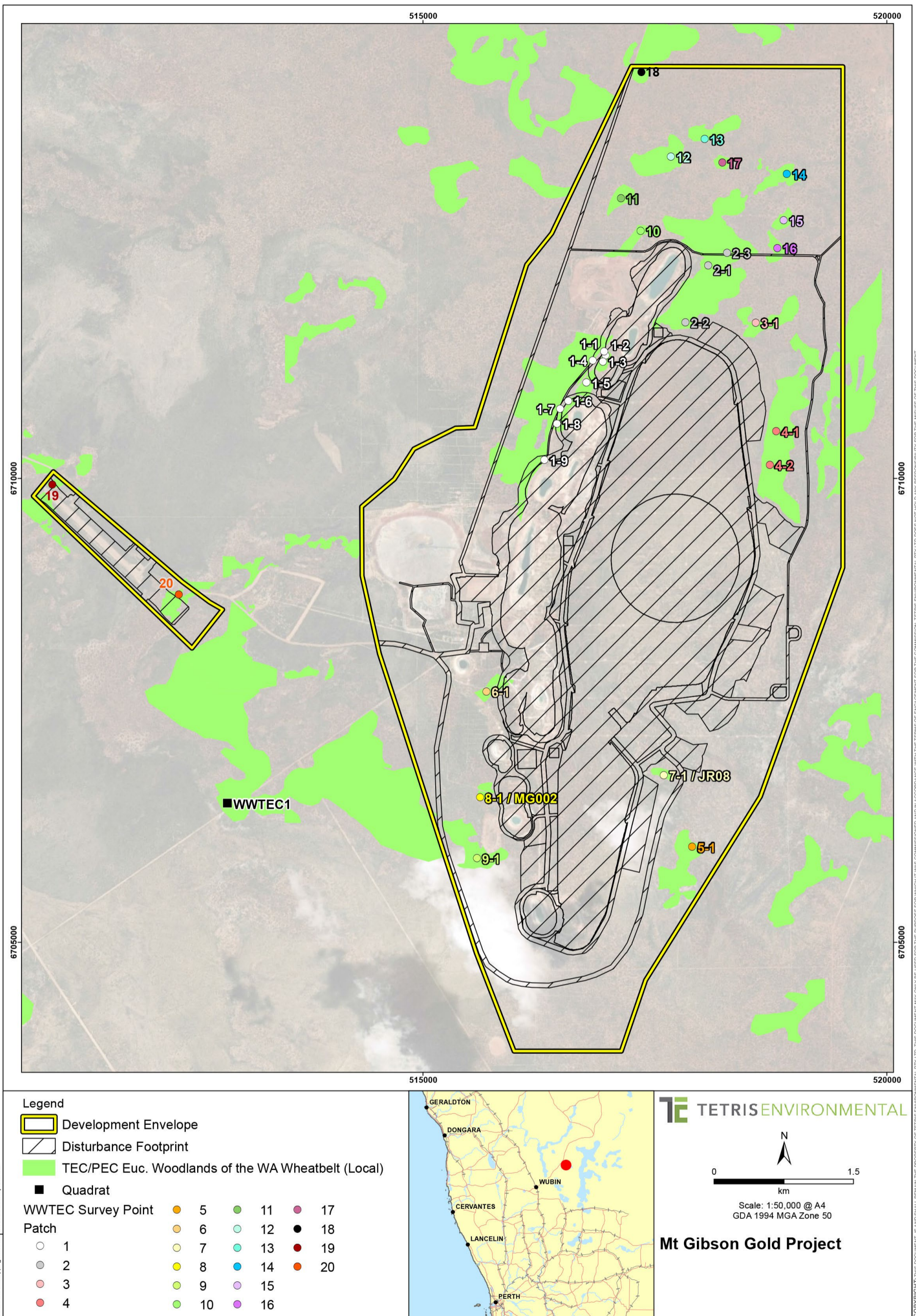


Figure 32: WA Wheatbelt Woodlands patches in the Development Envelope and surrounds

**Table 21: WA Wheatbelt Woodlands condition assessment of patches within the Development Envelope**

Patch number	Patch condition	Patch size defined by FVC (ha)	Total Patch size defined by detailed survey (TEPL, 2025a) (ha)	Information that informed condition	Habitat Quality Score (Table 20)	Area of Patch within the Development Envelope (ha)	Area of Patch within the Disturbance Footprint (ha)	Reduction in critical habitat within 40 m buffer zone of TEC (ha)	Proposal activity requiring clearing of TEC and patch threats
1	Good to Very Good east of access track, Good to Very Good west of access track, Minor degraded areas	92.3	83.0	<i>Eucalyptus salmonophloia</i> . Upper stratum intact; variable levels of disturbance to mid strata; weeds dominant in groundcover in much of the area; a long narrow area of rehabilitation is located east of and parallel to access road	7	83.0	17.2	8.6	Pit and road development – dust, saline water, surface water conditions
2	Very Good	81.9	74.6	<i>Eucalyptus salmonophloia</i> . Structure mostly intact; weeds low	8	74.6	1.6	3.1	Pit and road development - weeds, dust, saline water, surface water conditions
3	Excellent	11.3	11.3	<i>Eucalyptus salmonophloia</i> . Structure intact; no weeds	10	11.3	0	>0.01	-
4	Excellent	125.6	125.5	<i>Eucalyptus salmonophloia</i> . Structure intact; no weeds	10	72.8	0	0.4	Topsoil stockpiles - dust (during topsoil deposition), surface water conditions
5	Very Good – Excellent	14.3	19.0	<i>Eucalyptus salubris</i> , <i>E. salmonophloia</i> . Structure intact; historic disturbances (old); weeds <1%. Areas were excluded based on species composition.	9	19.0	0	0	-
6	Good (Degraded to Very Good patches within area)	4.7	4.7	<i>Eucalyptus salubris</i> . Impacts to structure; many tracks; weeds; drainage changes	6	4.7	1.3	1.4	Pit development – weeds, dust, surface water conditions
7	Very Good	2.3	2.3	<i>Eucalyptus salmonophloia</i> . Structure intact, historic pastoral impacts and access tracks. No weeds	7	2.3	0	>0.01	Processing plant - weeds, dust, saline water, surface water, conditions, fire
8	Good – Very Good	2.3	2.3	<i>Eucalyptus salubris</i> . Structure intact, historic tracks (now overgrown)	8	2.3	0	0.4	Pit development – weeds, dust, surface water conditions
9	Very Good	16.1	16.1	<i>Eucalyptus salubris</i> . Low historical impacts (mining, powerline and access tracks)	8	16.1	0	0.02	Road development - weeds, dust, saline water
10	Very Good	5.2	5.2	<i>Eucalyptus salmonophloia</i> , minor clearing	8	5.2	0.3	0.2	Road development - weeds, dust, saline water
11	Very Good	5.0	5.0	<i>Eucalyptus salmonophloia</i> , structure intact	8	5.0	0	0	-
12	Excellent	15.3	15.3	<i>Eucalyptus salmonophloia</i> , structure intact	10	15.3	0	0	-
13	Excellent	12.4	8.2	<i>Eucalyptus salmonophloia</i> , minor track present, no weeds. Eastern portion of original mapping is <i>E. loxophleba</i> .	9	8.2	0	0	-
14	Very Good	Included as patch 2	7.4	<i>Eucalyptus salmonophloia</i> , pastoral impacts, tracks present in area, narrow patch	7	7.4	0	0	-

Patch number	Patch condition	Patch size defined by FVC (ha)	Total Patch size defined by detailed survey (TEPL, 2025a) (ha)	Information that informed condition	Habitat Quality Score (Table 20)	Area of Patch within the Development Envelope (ha)	Area of Patch within the Disturbance Footprint (ha)	Reduction in critical habitat within 40 m buffer zone of TEC (ha)	Proposal activity requiring clearing of TEC and patch threats
15	Very Good	6.8	3.0	<i>Eucalyptus salmonophloia</i> , structure intact	8	3.0	0	0	-
16	Good	Included as patch 15	3.8	<i>Eucalyptus salubris</i> , historic and current tracks; weeds present; semi-mature regrowth	6	3.8	0.2	0.2	Road development - weeds, dust, saline water
17	Excellent	2.0	2.0	<i>Eucalyptus salmonophloia</i> , structure intact	10	2.0	0	0	-
18	Very Good	24.9	24.9	<i>Eucalyptus salmonophloia</i> , small patch adjacent to road and minor access track; weeds at edges	7	3.7	0	0.4	Road development - weeds, dust, saline water
19	Very Good	14.1 <sup>1</sup>	26.0	<i>Eucalyptus salubris</i> , historic pastoral impacts and minor tracks	8	4.0	2.2	2.9	Airstrip development - weeds, dust, saline water
20	Very Good	84.8 <sup>2</sup>	15.7 <sup>3</sup>	<i>Eucalyptus salubris</i> , historic pastoral impacts and mining, historical clearing and tracks, historic timber cutting resulting in coppicing regrowth	8	6.6	4.7	2.6	Airstrip development - weeds, dust, saline water
<b>Total</b>						<b>350.3</b>	<b>27.5</b>	<b>20.2</b>	

1- Full extent of patch not mapped by FVC

2- Assessed by FVC as patch 29 and 30

3- Assessment by TEPL (2025a) resulted in two distinct patches, the larger which occurs outside the Development Envelope (Figure 30)

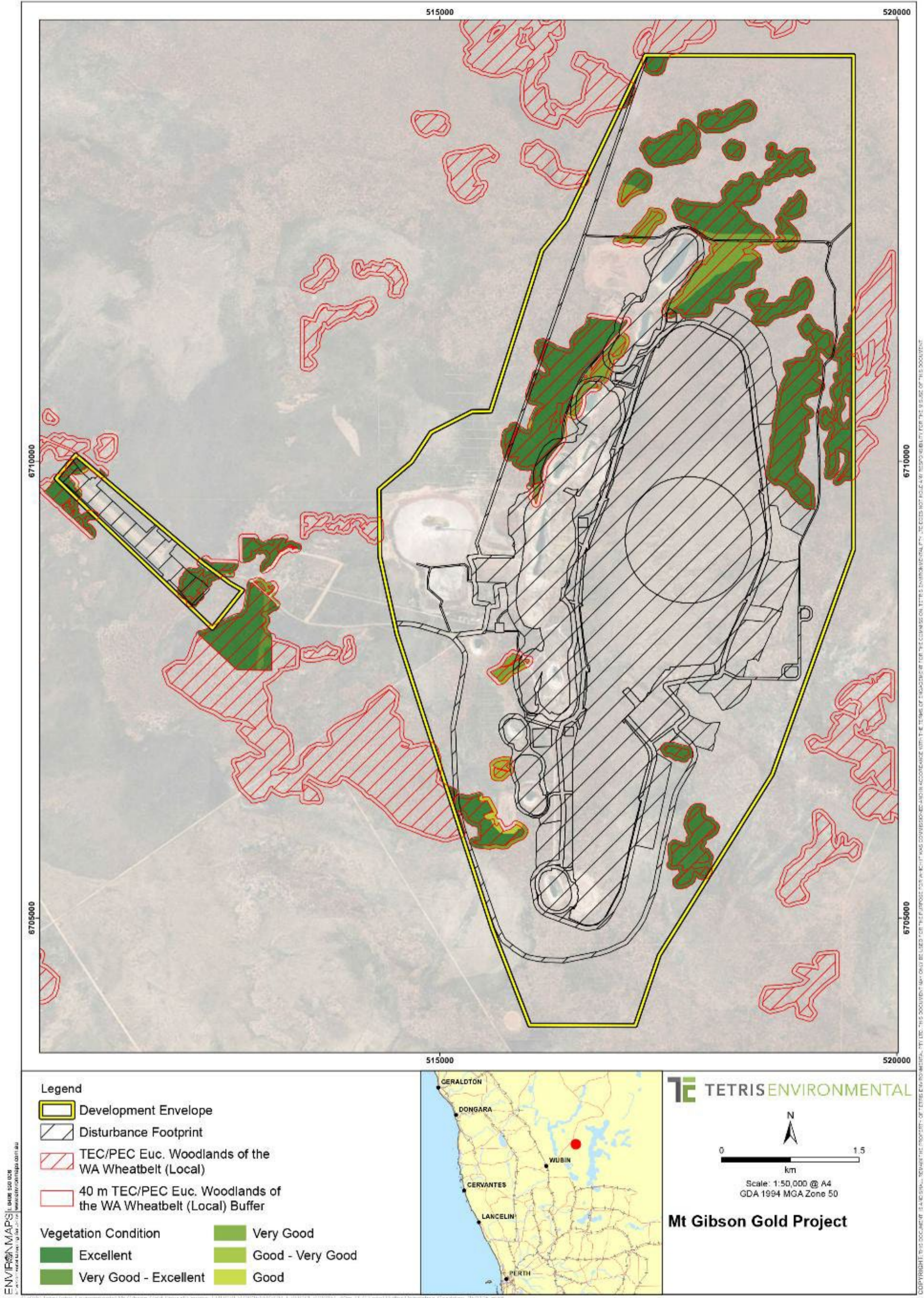


Figure 33: Vegetation condition of areas important to TEC survival

Key threats (as defined by DoE, 2015) to the WA Wheatbelt Woodlands relevant to the Proposal include:

- Clearance of native vegetation
- Loss of habitat for key native species
- Fragmentation into smaller, disconnected patches
- Impacts from invasive flora and fauna species
- Grazing pressure: including inappropriate grazing regimes by domestic stock and grazing of regrowth by native fauna
- Increased salinity and waterlogging of the landscape largely due to modification of the landscape and hydrology through over clearing
- Soil acidification
- Altered fire regimes
- Potential impacts of climate change, including altered fire and flooding regimes, decline in tree health due to prolonged drought and heat stress, and poor regeneration and recruitment.

Further discussion on potential threats and impacts as a result of the Proposal are discussed in Section 5.

### **4.3 *Eremophila viscida* (Varnish Bush)**

#### **4.3.1 Species description**

*Eremophila viscida* (Photograph 2) is a large, erect shrub 2 – 6 m tall with sticky, shiny, brown hairless branches, and hairless to finely glandular-hairy leaves 5 – 10 cm long by 1 cm wide. The flowers are tubular, about 2 cm long, and are solitary or sometimes in twos. The calyces are greyish-blue or reddish in colour and strongly veined. The corolla is white to pale yellow with purple spots (CALM, 2003). This species is listed as Threatened under both State (*Biodiversity Conservation Act 2016* (BC Act)) and Commonwealth (EPBC Act) legislation.

*Eremophila viscida* has a historical range of 574 km between Warralakin and Mullewa in Western Australia. It appears to prefer areas associated with granite and salt lake systems and plants are more frequently found in runoff areas, including drainage lines or ephemeral creeks connected to granite outcrops. Little is known about the biology and ecology of the species, aside from its ability to resprout after fire. It is thought that fire may be necessary for recruitment of new individuals. From surveys conducted prior to 2003, *Eremophila viscida* was known from 16 populations and approximately 816 individuals (FVC, 2023). Associated species include *Melaleuca lateriflora*, *Acacia acuminata*, *Scaevola spinescens*, *Eucalyptus longicornis*, *Allocasuarina* sp., *Acacia coolgardiensis* and *Eremophila serrulata* (TEPL, 2025a).



**Photograph 2: *Eremophila viscida* in November 2022 (Jenny Borger)**

#### 4.3.2 Survey outcomes

Table 17 (refer to Section 4.1.2) validates the adequacy of surveys undertaken.

Extensive surveys within the Development Envelope, including targeted searching, recorded two individuals of *Eremophila viscida* within the eastern portion of the Development Envelope (Figure 34) on sandy loam over granite (FVC, 2023). These plants are mature and were in poor condition (Photograph 2). It is possible that these plants are remnants of a small population that flourished after fire approximately 20 years ago in 2002 (TEPL, 2025a).

The two individuals were revisited in August 2024 and were found to be dead (Photograph 3). The monitoring quadrat established in the area of known *Eremophila viscida* individuals found the vegetation to be in Excellent condition and described as:

*Acacia burkittii*, *A. obtecta*, *Melaleuca hamata* tall shrubland over *Acacia burkittii*, *Malleostemon tuberculatus*, *Melaleuca hamata* open shrubland over *Ecdeiocolea monostachya*, *Dianella revoluta* var. *divaricata*, *Hemigenia ciliata* open rushland over *Borya sphaerocephala*, *Amphipogon caricinus*, *Hemigenia ciliata* low open forbland (TEPL, 2025a).



**Photograph 3: *Eremophila viscida* senescing in March 2024 (TEPL, 2025a)**



**Photograph 4: Dead *Eremophila viscida*, August 2024 (TEPL, 2025a)**

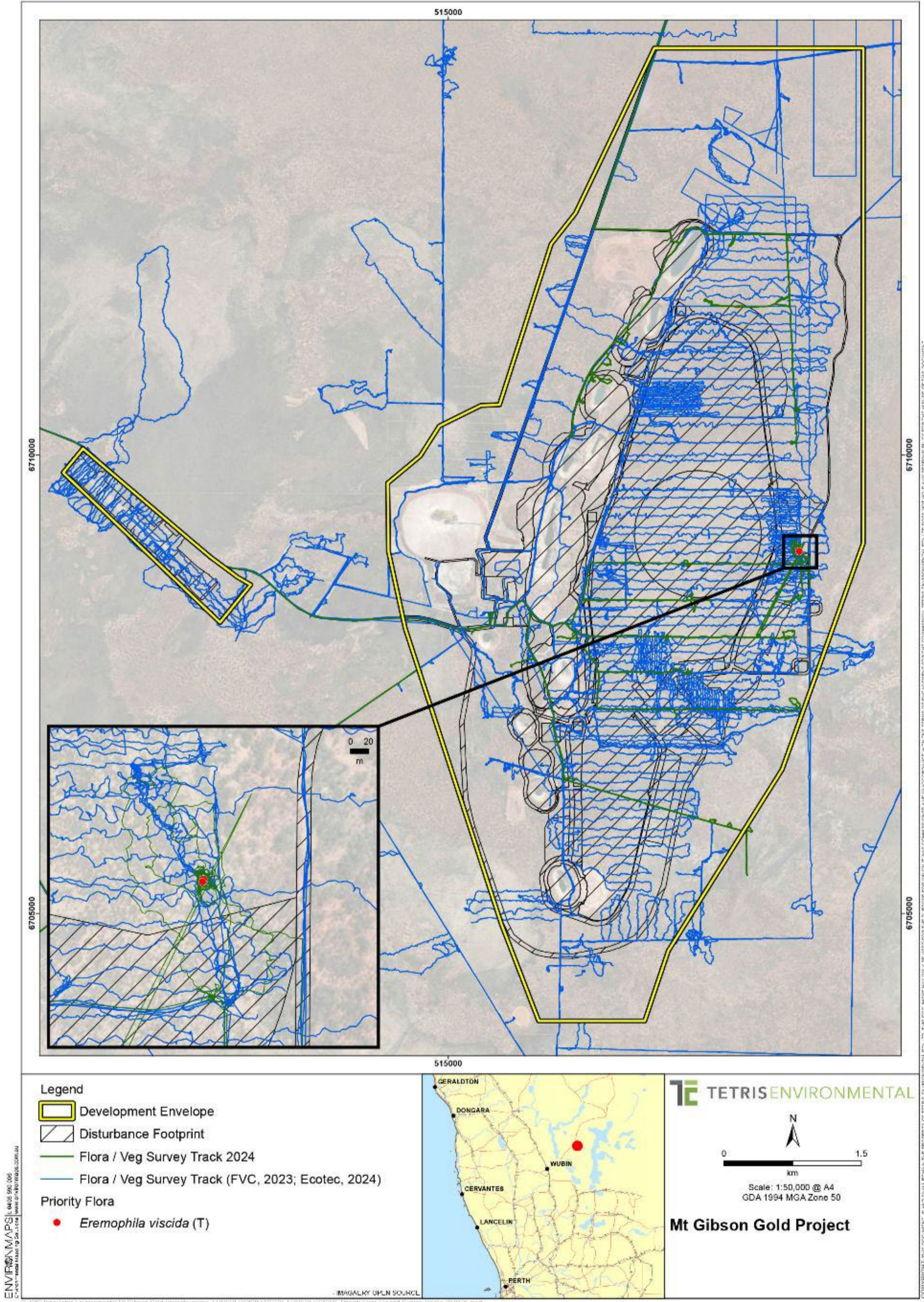


Figure 34: *Eremophila viscida* recorded in the Development Envelope

Potentially suitable habitat for *Eremophila viscida* was assessed in 25 locations inside and outside the Development Envelope, as shown in (TEPL, 2025a). Each location was given a likelihood of being suitable habitat:

- High potential (two locations)
- Moderate-high potential (two locations)
- Moderate potential (eight locations)
- Moderate-low potential (five locations)
- Low potential (seven locations)
- Unlikely to be suitable habitat (one location).

The assessment of potential habitat in the Development Envelope and surrounds can only be based on the one known location of *Eremophila viscida* in the area and the habitat present there. The vegetation type within this habitat varies from other known locations of the species. Additionally, there is limited information available of vegetation types of the other known locations, with most known populations occurring in small pockets of remnant vegetation (CALM, 2003). The population at Mount Gibson is in one of the largest patches of contiguous bushland in which the species occurs (TEPL, 2025a).

The *Eremophila viscida* within the Development Envelope occurred within *Acacia burkittii* and *Melaleuca hamata* tall shrubland. *Acacia acuminata*, which occurs within the potential habitat sites identified in Figure 35 is closely related to *A. burkittii*, however it is unknown whether this is a defining feature for *Eremophila viscida* occurrence. The soil and geology of the potential habitat sites identified in Figure 35 are very similar to that where the known records of *Eremophila viscida* occur within the Development Envelope (TEPL, 2025a).

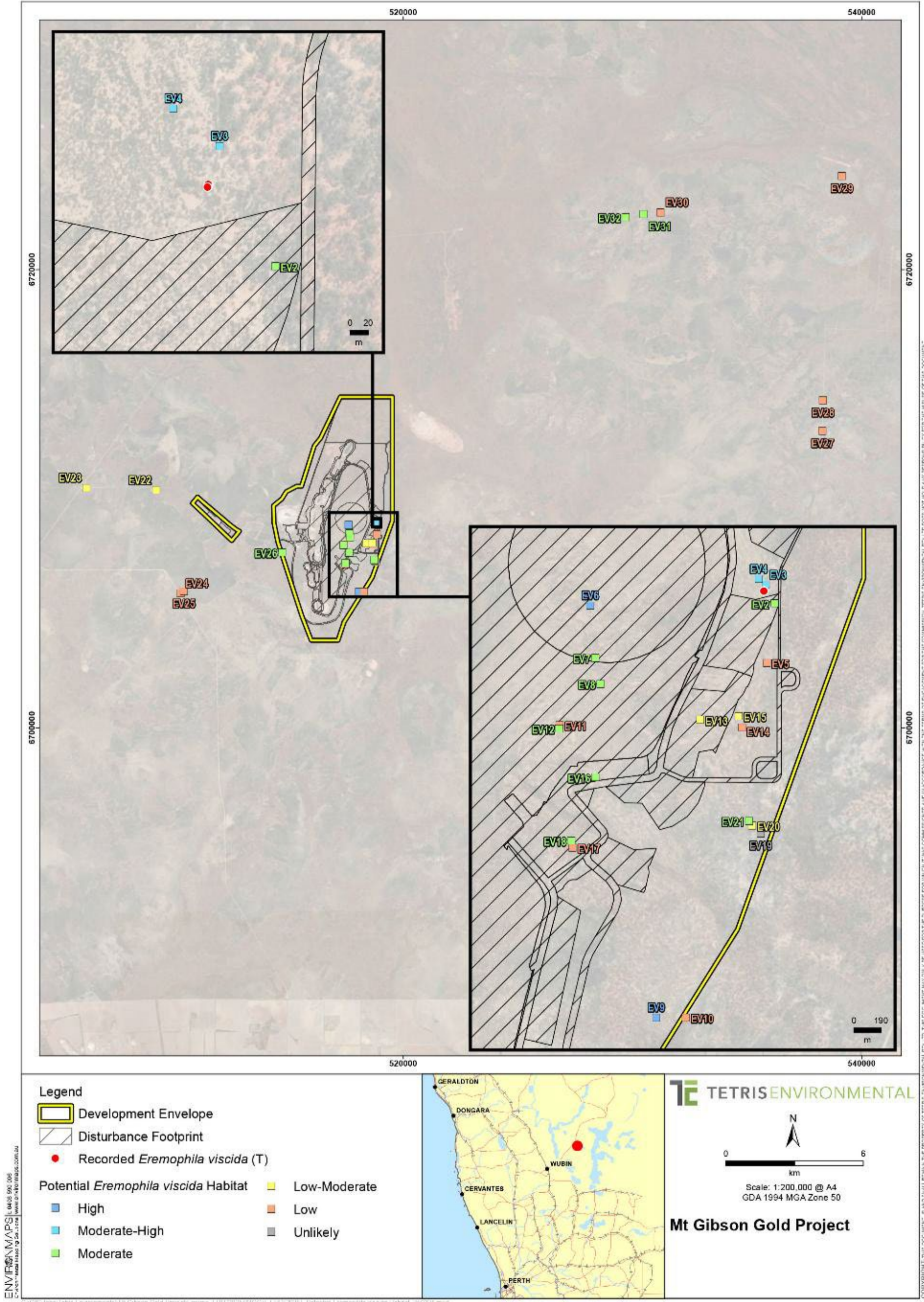


Figure 35: Locations assessed for potential *Eremophila viscida* habitat

### 4.3.3 Habitat assessment

Vegetation Types (VTs):

- 19 (*Acacia effusifolia*, *Allocasuarina acutivalvis* subsp. *acutivalvis* tall shrubland over *Enekbatus stowardii*, *Philotheca deserti* subsp. *deserti* low open shrubland over *Amphipogon caricinus* var. *caricinus* sparse tussock grassland) and
- 27 (*Acacia duriuscula*, *Acacia acuminata* and *Melaleuca hamata* tall shrubland over *Malleostemon tuberculatus* and *Calycopeplus paucifolius* open shrubland over *Hemigenia ciliata* low sparse shrubland over *Borya sphaerocephala* and *Dianella revoluta* sparse rushland)

as described by FVC (2023) have the highest potential to support *Eremophila viscida*, with deeper patches of sandy loams on upper mid to lower mid slopes of Vegetation Type 27 closest to the known habitat, which covers approximately 192.7 ha within the Development Envelope (Figure 36). The species is likely to require run-off from upper areas to support growth, with shallower soils on upper slopes and crests with granite at or close to the surface less likely to support *E. viscida*.

The boundaries of VTs 19 and 27 were based on limited field site descriptions and aerial imagery. Further survey was conducted within these areas in 2023 which found that some VT19 vegetation is more representative of VT 27 and vice versa. Both VTs include a mosaic of landforms with VT 19 mostly occurring on areas with deeper soils, while VT 27 has more areas of granite outcrop and shallower soils. Whilst no additional plants have been found, potential habitat for *Eremophila viscida* could occur in both Vegetation Types as they are currently mapped (Figure 36, TEPL, 2025a).

Potential habitat is likely to be extensive in the area outside the Development Envelope, particularly within vegetation similar to Vegetation Communities 19 and 27 (as described by FVC, 2023), which contain habitat most likely to support the species. There may be potential habitat within Biluny Wells Nature Reserve (Ex White Wells Station), managed by DBCA, which is located to the south of the Proposal and closer to previously recorded populations of *Eremophila viscida*. Whilst habitat has the potential to support *Eremophila viscida*, there is no certainty that any of the areas would successfully support the species, particularly without assistance from fire (TEPL, 2025a).

It is highly unlikely the *Eremophila viscida* in the survey area interact with the groundwater as they are located near the top of a rise with granite near the surface. There are no ephemeral creeks in the Development Envelope that could provide potential habitat (TEPL, 2025a).

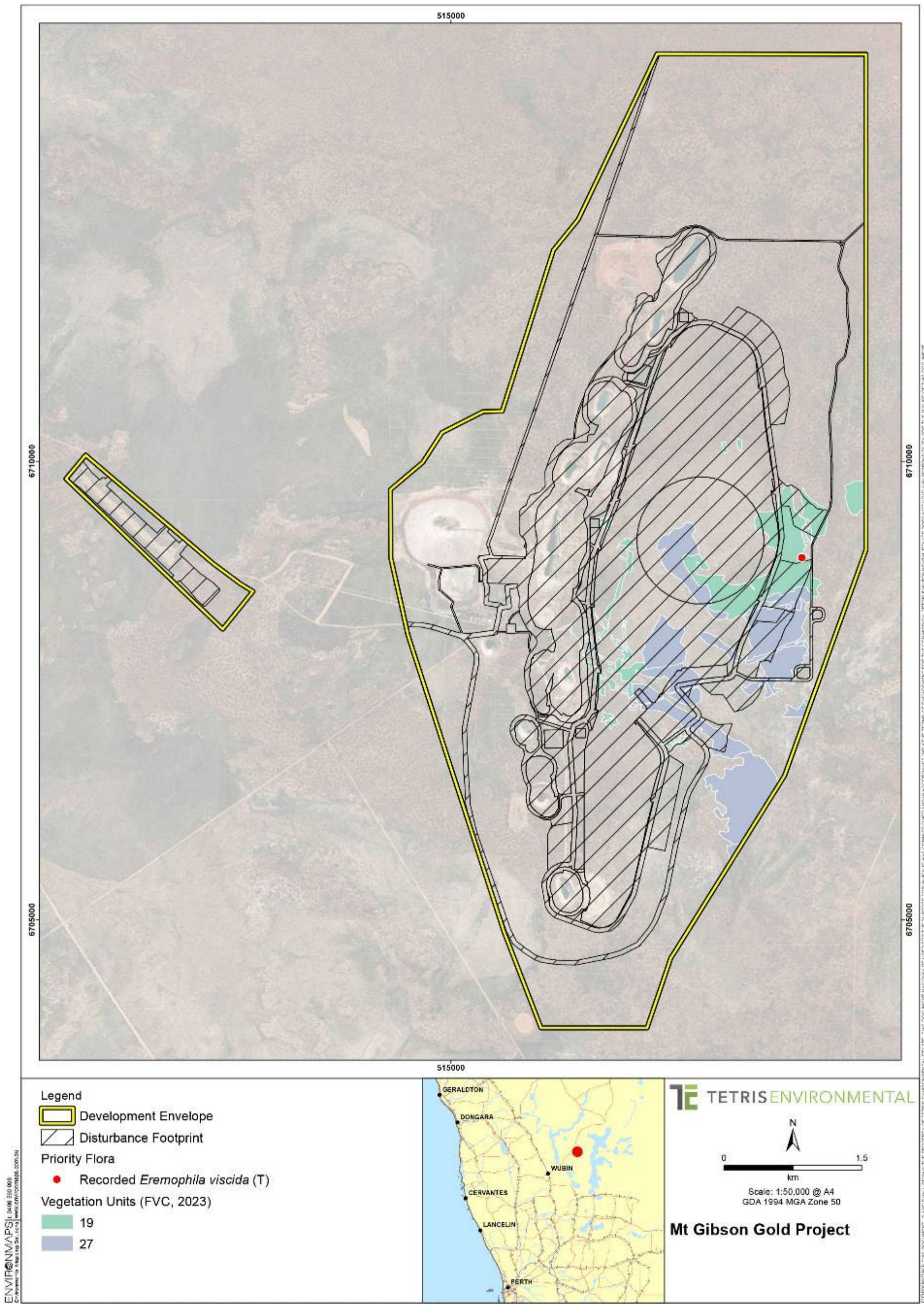


Figure 36: Vegetation with potential to support *Eremophila viscida*

The approved recovery plan (CALM 2003) defines critical habitat for *Eremophila viscida* as:

- the area of occupancy of known populations
- areas of similar habitat within 200 meters of known populations (brown, sandy loam or red brown clay loam soils, in open woodland in association with *Eucalyptus loxophleba* and scrub vegetation) that provide potential habitat for natural recruitment
- remnant vegetation that surrounds and links populations
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past
- the local catchment for the surface and ground waters that provide the ephemeral creekline habitat of the species (the species occurs in areas that are seasonally inundated and depend on the local hydrology).

Critical habitat for *Eremophila viscida* in the Development Envelope was determined to be 8.96 ha of similar habitat within 200 m of the known individuals, as shown in Figure 37.

Critical habitat is present up to the change in vegetation from Acacia/ Melaleuca tall open shrubland to Eucalypt woodlands to the east; which generally aligns with the catchment boundary and 200 metres to the north, west and south, on mid to upper slopes in FVC vegetation communities 19 and 27 (Figure 37). It is assumed that *E. viscida* requires areas of deeper soils receiving adequate inflows from the surrounding catchment to persist. Significant areas of granite outcrop occur 300 m south of the known location and runoff from this area may be important for growth; however, soils in this area would likely be too shallow to support the species (TEPL, 2025a).

*Eucalyptus loxophleba* in the Development Envelope is located east of the known *Eremophila viscida* habitat, in a different surface water catchment and significantly different vegetation type to the recorded *Eremophila viscida* habitat. *Eucalyptus loxophleba* (and *Eucalyptus kochii*) presence have not been included in critical habitat of *Eremophila viscida* in the Development Envelope as neither species are within catchment positions which would contribute water. Additionally, very few of the known records of *Eremophila viscida* occur with *E. loxophleba*, with Chinnock (2007) finding that it grows on light brown sandy and clay loams over granites or red-brown clay loams in the north-western part of its range; and is usually associated with Acacia species. Therefore, *Eucalyptus loxophleba* habitat is unlikely to be critical habitat for *Eremophila viscida* in the Development Envelope (TEPL, 2025a).

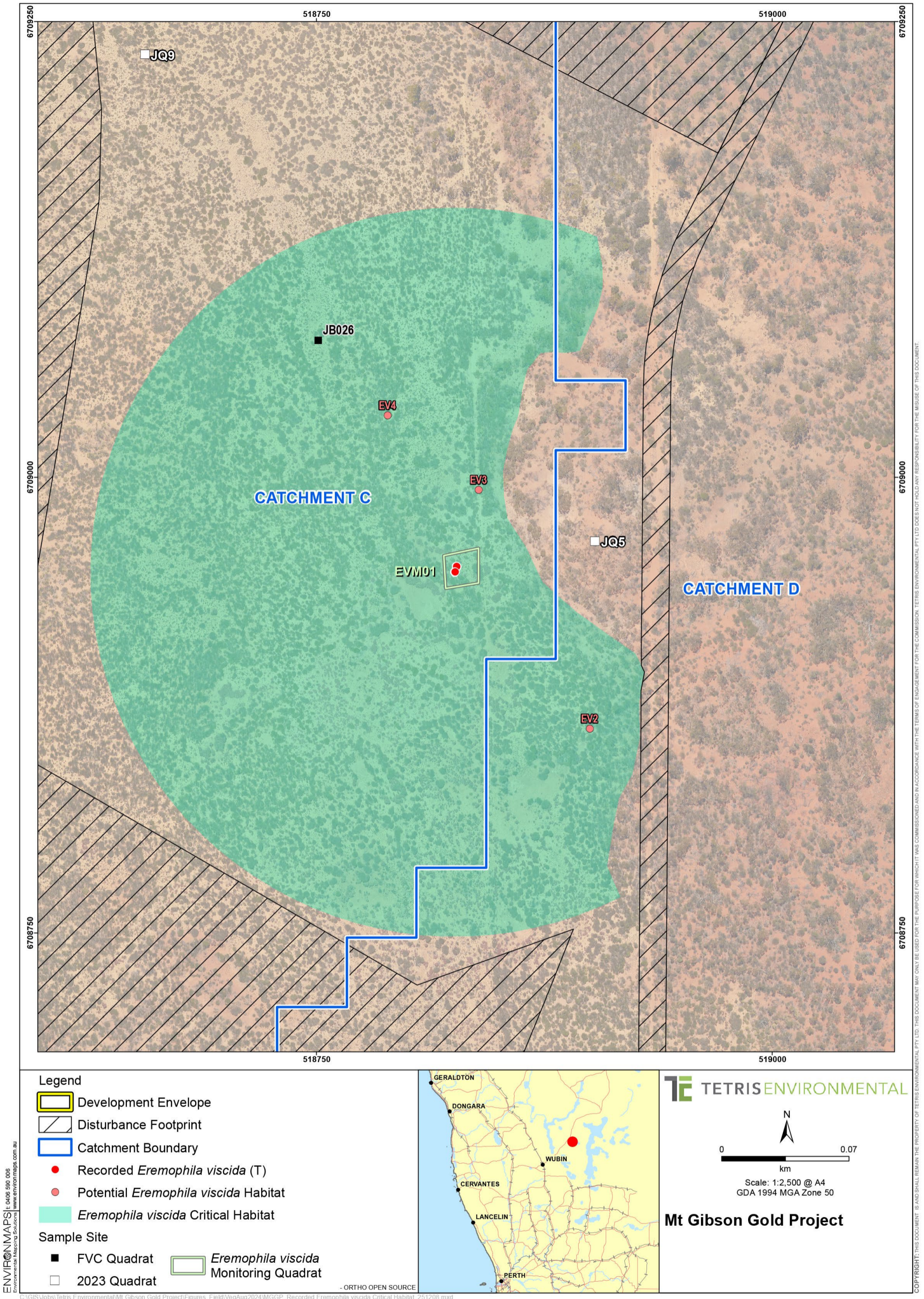


Figure 37: *Eremophila viscida* critical habitat

Key threats to *Eremophila viscida* (CALM, 2003) relevant to the Proposal have been identified as:

- Poor recruitment due to lack of appropriate disturbance (fire)
- Weed invasion
- Inappropriate fire regimes (lack of fire)
- Grazing and trampling by feral animals

The species is thought to have a life expectancy of approximately 20 years with fire or other disturbance being required for germination. The time since fire at the current known location is just over 20 years, and there have been no known fires within the last 20 years recorded in the Development Envelope area. It is possible other occurrences of *E. viscida* occurred in the area historically which have since matured and senesced (TEPL, 2025a).

The two known plants died during 2024 following very dry conditions in 2023 until May 2024. Seed that may be present within the area is likely to need similar moisture regimes to germinate and grow if suitable conditions (i.e. suitable disturbance type/s) occur in the future with assistance from fire (TEPL, 2025a). Further discussion on potential threats and impacts as a result of the Proposal are discussed in Section 5.

#### **4.4 *Leipoa ocellata* (Malleefowl)**

##### **4.4.1 Species description**

*Leipoa ocellata* (Malleefowl) are listed as Threatened (Vulnerable) species under both State (BC Act) and Commonwealth legislation (EPBC Act 1999). Malleefowl are listed as Matters of National Environmental Significance (MNES) under the EPBC Act, and a National Recovery Plan (DCCEEW, 2024d) is in place. However, there is no approved Conservation Advice or Listing Advice for the species (DCCEEW, 2024b). The National Recovery Plan describes the species' distribution, habitat and population, and identifies known threats to the species.

The Malleefowl is found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding. Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants. Across Australia, Malleefowl have a huge potential range and occur on a variety of land tenures primarily comprising Aboriginal land, State and Federal Government controlled land (in the form of national parks, reserves and unallocated Crown Land), pastoral leases and private land (DCCEEW, 2024d). As of December 2018, the estimated population size across Australia was 18,700 mature individuals (DCCEEW, 2018).

##### **4.4.2 Survey outcomes**

Table 19 (refer to Section 4.1.2) validates the adequacy of surveys undertaken.

240 Malleefowl mounds have been recorded in the Development Envelope and surrounds (Figure 38), of which 169 are confirmed mounds and 71 were identified by Lidar (outside the Development Envelope) and have not yet been verified. In September 2024, 212 potential mounds were assessed, 149 were visited on foot and another 63 were inspected by drone (Bamford 2024b). Of these, 25 were determined not to be mounds and another 18 were not visible to the drone, resulting in 169 confirmed mounds assessed and ranked in accordance

with a classification system intended to identify the level of breeding activity of mounds in the current breeding season. The system is based upon a detailed examination and interpretation of mound profile and mound age as defined in Bamford (2024b) and summarised below in Table 22.

**Table 22: Malleefowl mound activity classification system**

Rank	Description
1	Mound used for breeding in the current breeding season with signs of being worked. Contains, or highly likely to contain or have contained, eggs. Determined by mound structure; fully mounded and crater with peak in centre.
2	Mound with signs of major activity in the current breeding season, but judged not used for breeding.
3	Mound with no signs of activity in the current breeding season, but with evidence of breeding activity in the previous few years such as eggshell fragments and plant material that form an integral part of the mound
4	Mound with no sign of current or recent activity
5	Mound with no signs of activity or use and heavily weathered

The most recent survey in 2024 (Bamford 2024b) recorded 16 active mounds, with two of these occurring within the Disturbance Footprint (Figure 38). This indicates at least 16 pairs of Malleefowl in the local area, with an estimated density of occurrence at 0.09 pairs/1 km<sup>2</sup>. Typical breeding density is in the range from 0.04 to 5.5/ km<sup>2</sup>, but commonly around 1/ km<sup>2</sup> (Bamford, 2024b). Eight inactive mounds occur within the Disturbance Footprint.

The extent of Lidar mounds including those that have not been verified as Malleefowl mounds demonstrates that breeding by Malleefowl is widespread in the local area but is not evenly distributed. Bamford (2024a) noted that while Malleefowl may utilise all habitats within the survey area (for foraging, movement through the landscape, etc.), two VSAs appear to be strongly favoured for the construction of nest mounds: VSA 1 Acacia Shrubland and VSA 2 Allocasuarina Shrubland, particularly VSA 2 (Figure 39).

#### 4.4.3 Habitat assessment

Malleefowl occur in a wide range of habitat types and habitat critical to the survival of the species is known only in broad terms (Benshemesh, 2007).

The Development Envelope and surrounds, supports a resident population of the Malleefowl, with the birds foraging widely across the landscape, but with breeding occurring mainly in dense, low vegetation on sandy loam to gravelly loam soils. The almost continuous nature of vegetation across the study area, and across the greater region, means it is unlikely there are particular movement pathways or corridors (Bamford 2024b).

Except for rehabilitated and cleared areas, habitat within the Development Envelope and surrounds is predominantly high quality. Minor disturbances occur in some areas throughout VSA 1 - 6, however do not affect the overall quality of the habitat. Based on vegetation condition mapped during flora surveys, ecologist (Bamford Consulting Ecologist) observations during the field surveys and their extensive knowledge on Malleefowl habitat preferences, VSA 1 Acacia Shrubland and VSA 2 Allocasuarina Shrubland provide the highest quality breeding and foraging habitat for Malleefowl due to having excellent structural integrity, ideal habitat type and adequate resources available for mound construction. Based on habitat mapping at 135 mounds in the Proposal area, VSA 1 and VSA 2 also provided the

greatest density of mounds (Table 23 and Bamford 2024b), VSA 3 – 6 could provide habitat for movement and foraging but are generally not suitable for mound construction due to a lack of adequate resources (Figure 39 and Figure 40). Refer to Table 24 for hectares of these VSAs recorded in the Development Envelope and Disturbance Footprint.

**Table 23: Malleefowl mounds recorded per VSA habitat**

VSA group	VSA	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Total
<b>Preferred breeding/ foraging habitat</b>	VSA 1: Acacia Shrubland	4	1	9	5	30	49
	VSA 2: Allocasuarina Shrubland	6	2	3	7	52	70
	<b>Sub total</b>	<b>10</b>	<b>3</b>	<b>12</b>	<b>12</b>	<b>82</b>	<b>119</b>
<b>Potential foraging/transit habitat</b>	VSA 3: Callitris Woodland	1	1	0	0	0	2
	VSA 4: Eucalypt Woodland	1	0	0	1	4	6
	VSA 5: Mallee Woodland	2	1	1	0	4	8
	VSA 6: Mixed Shrubland	0	0	0	0	0	0
	<b>Sub total</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>16</b>
<b>Total<sup>1,2</sup></b>		<b>14</b>	<b>5</b>	<b>13</b>	<b>13</b>	<b>90</b>	<b>135</b>

1- Lidar identified and not verified (outside Development Envelope) have been excluded from the table

2- 34 mounds (outside Development Envelope) in unmapped habitat have been excluded from the table

**Table 24: Malleefowl VSA habitat**

VSA group	VSA <sup>1</sup>	Total mapped (ha)	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
<b>Preferred breeding/ foraging habitat</b>	VSA 1: Acacia Shrubland	1,329	823.5	528.2
	VSA 2: Allocasuarina Shrubland	605	73.1	40.6
	<b>Sub total</b>	<b>1,934</b>	<b>896.6</b>	<b>568.8</b>
<b>Potential foraging/transit habitat</b>	VSA 3: Callitris Woodland	636	462.6	138.4
	VSA 4: Eucalypt Woodland	2,467	1,313.6	248.2
	VSA 5: Mallee Woodland	613	394.6	220.8
	VSA 6: Mixed Shrubland	124	32.8	0.6
	<b>Sub total</b>	<b>3,840</b>	<b>2,203.6</b>	<b>608</b>
<b>Total<sup>1</sup></b>		<b>5,774</b>	<b>3,100.2</b>	<b>1,176.8</b>

1- Historically disturbed areas (VSA 7: Rehabilitation and VSA 8: Cleared) have been excluded from the table

Whilst DCCEEW have developed a Habitat Quality Scoring system (HQS) for Malleefowl, this framework has been modified to be applicable to the Proposal region. For example, Malleefowl across most of their distribution in WA nest in gravelly loam soils (as is the case at the Proposal); apart from the mention of sand, there is no other description of substrate in the HQS, whereas that is a key determining factor in much of the species' range in WA (M. Bamford pers. comm., January 2025). A modified HQS for Malleefowl has been developed by Tetris Environmental for the Proposal (Table 25), incorporating site specific characteristics of preferred Malleefowl habitat, as observed during field surveys and based on extensive knowledge of Malleefowl in Western Australia by qualified ecologists.

**Table 25: Habitat quality rating tool for Malleefowl**

Indicator	Score	Site Condition
<b>Vegetation condition and structure.</b>  <b>Diversity of habitat species present.</b>  <b>Habitat features</b>	3	<b>Habitat quality:</b> Very High - Suitable substrate with leaf litter, intact habitat structure (groundcover, mid-storey, trees for roosting), no habitat damage by herbivores, no fire for at least 20 years
	2.5	<b>Habitat quality:</b> High - Suitable substrate with leaf litter, largely intact habitat structure (groundcover, mid-storey, trees for roosting), foraging available (seeds, insects), little evidence of habitat damage by herbivores (e.g. rabbits, goats, stock), no fire for at least 15 years
	2	<b>Habitat quality:</b> Medium - Suitable substrate with leaf litter, largely intact habitat structure (groundcover, mid-storey, trees for roosting), some evidence of habitat damage by herbivores (e.g. rabbits, goats, stock), no fire for at least 10 years
	1.5	<b>Habitat quality:</b> Low – little substrate with leaf litter, some gaps in habitat structure (groundcover, mid-storey, trees for roosting), evidence of habitat damage by herbivores (e.g. rabbits, goats, stock), fire within last 10 years
	1.0	<b>Habitat quality:</b> Very Low - little substrate with leaf litter, large gaps in habitat structure (groundcover, mid-storey, trees for roosting), considerable habitat damage by herbivores (e.g. rabbits, goats, stock), fire within last 5 years
	0.5	<b>Habitat quality:</b> Marginal - no substrate/ leaf litter, missing habitat structure (groundcover, mid-storey and trees for roosting), severe habitat damage by herbivores (e.g. rabbits, goats, stock), fire within last 5 years
	0	<b>Habitat quality:</b> Absent , no vegetation and/or suitable habitat on site - no leaf litter, no habitat structure
<b>Site context</b>	3	Remnant vegetation/baseline offset site: Site is connected by suitable vegetation to more than one area of contiguous preferred breeding habitat.  Revegetation/Rehabilitation sites: Sub-project site is connected by dispersal to at least one area of contiguous preferred breeding habitat.
	2	Remnant vegetation/baseline offset site: Site is connected by suitable vegetation to at least one area of contiguous preferred breeding habitat.  Revegetation/Rehabilitation sites: Sub-project site is connected by dispersal to at least one patch of preferred breeding habitat.

Indicator	Score	Site Condition
	1	Remnant vegetation/baseline offset site: Site is connected by suitable vegetation to at least one patch of preferred breeding habitat. Revegetation/Rehabilitation sites: Sub-project site is connected by dispersal to at least one patch of known habitat.
	0	Remnant vegetation/baseline offset site: Sub-project site is separated from other suitable habitat by cleared areas of up to 5 km. Revegetation/Rehabilitation sites: Sub-project site is separated from other suitable habitat by cleared areas of up to 5 km.
<b>Usage and/or density of a species.</b>  <b>Role of the site population in regard to overall species population viability.</b>	4	Remnant vegetation/Baseline offset site: Over 25% of active mounds in last breeding season recorded in VSA. Revegetation/Rehabilitation sites: Malleefowl mound/s present and used for breeding (Rank 1 or 2)
	3	Remnant vegetation/Baseline offset site: 16-25% of active mounds in last breeding season recorded in VSA. Revegetation/Rehabilitation sites: Malleefowl mound/s present (may or may not be used for breeding)
	2	Remnant vegetation/Baseline offset site: 6-15% of active mounds in last breeding season recorded in VSA. Revegetation/Rehabilitation sites: Malleefowl activity at revegetated site for transit/ foraging
	1	Remnant vegetation/Baseline offset site: Up to 5% of active mounds in last breeding season recorded in VSA Revegetation/Rehabilitation sites: Malleefowl using areas immediately adjacent to revegetated site/ connected corridors
	0	Remnant vegetation/Baseline offset site: No record of species presence on site. Revegetation/Rehabilitation sites: No evidence of Malleefowl at revegetated site or immediately adjacent/ connected corridors

**Table 26: Habitat suitability categories for Malleefowl**

Total Score (Max 10)	Habitat Class	Comments
0-2	Limited to Unsuitable	Little to no mound construction resources available, non-preferred habitat type that may be utilised for foraging during transit, mounds with no signs of activity/use.
3-6	Marginal	Limited/infrequent mound construction resources available, non-preferred habitat type that may be utilised for foraging during transit, mounds with no signs of activity/use in the last 1-2 breeding seasons.
7-10	Optimal	High mound construction resources available, preferred habitat type (VSA 1 or VSA 2), Rank 1 or 2 mounds recorded during last breeding season.

Based on Table 25 and Table 26, VSA 1 and VSA 2 within the Disturbance Footprint has been scored an averaged 8/10 (Optimal), whilst VSA 3 to VSA 6 have been scored an averaged 3.75 (Marginal) and VSA 7 and VSA 8 considered Limited to Unsuitable (Table 27). Based on aerial photography and recorded active mound locations outside the Development Envelope, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b).

**Table 27: Malleefowl habitat rating tool results for Proposal Disturbance Footprint**

Indicator (Table 25)	VSA 1	VSA 2	VSA 3	VSA 4	VSA 5	VSA 6	VSA 7	VSA 8
<b>Vegetation condition and structure</b>								
<b>Diversity of habitat species present</b>	2.5	2.5	1	1	1	1	0.5	0
<b>Habitat features</b>								
<b>Site context</b>	2	2	1	1	1	1	1	0
<b>Usage and/or density of a species</b>								
<b>Role of the site population in regard to overall species population viability</b>	3	4	2	2	2	1	0	0
<b>Total score</b>	<b>7.5</b>	<b>8.5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>2.5</b>	<b>0</b>

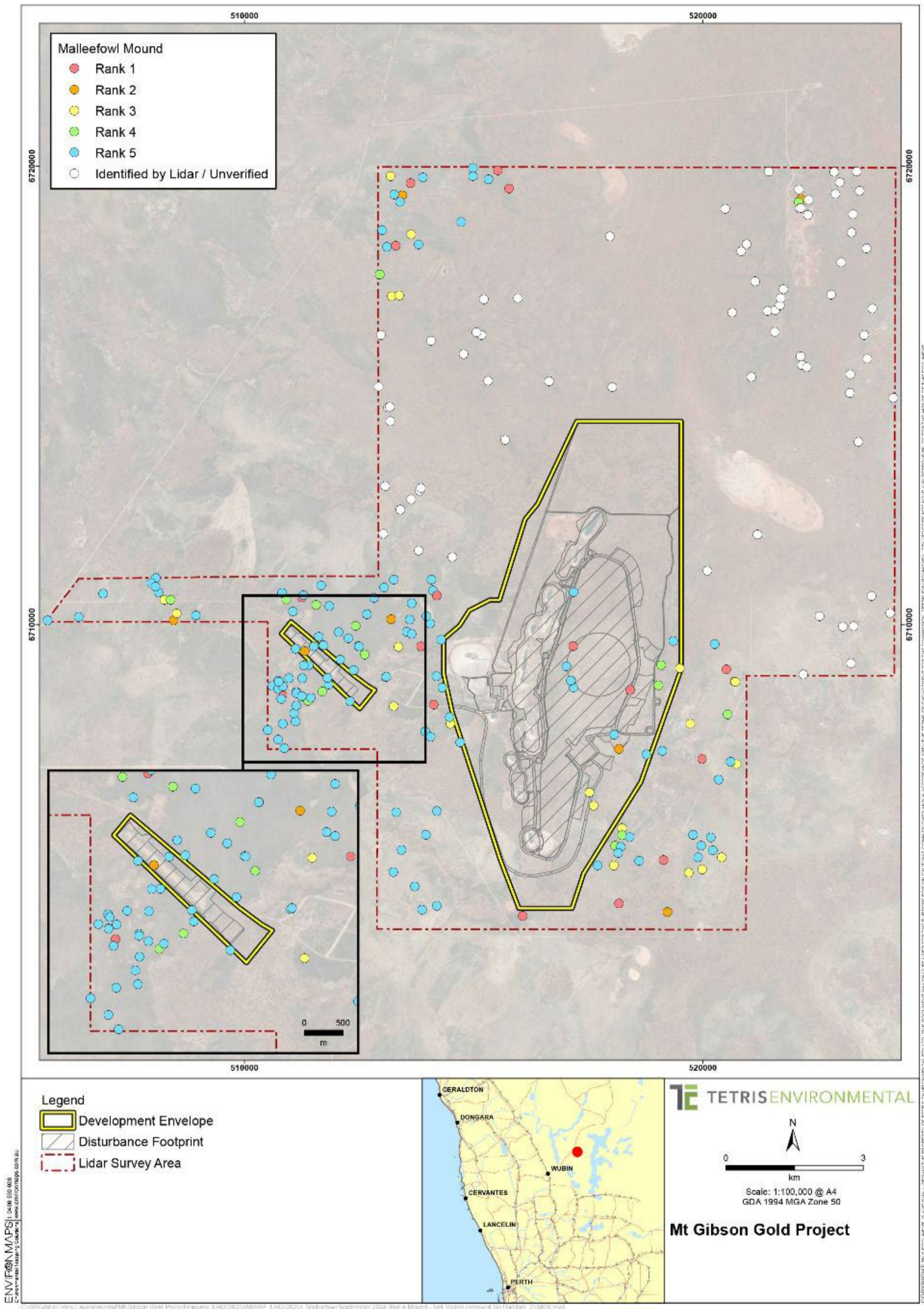


Figure 38: Malleefowl mounds recorded in the Development Envelope and surrounds

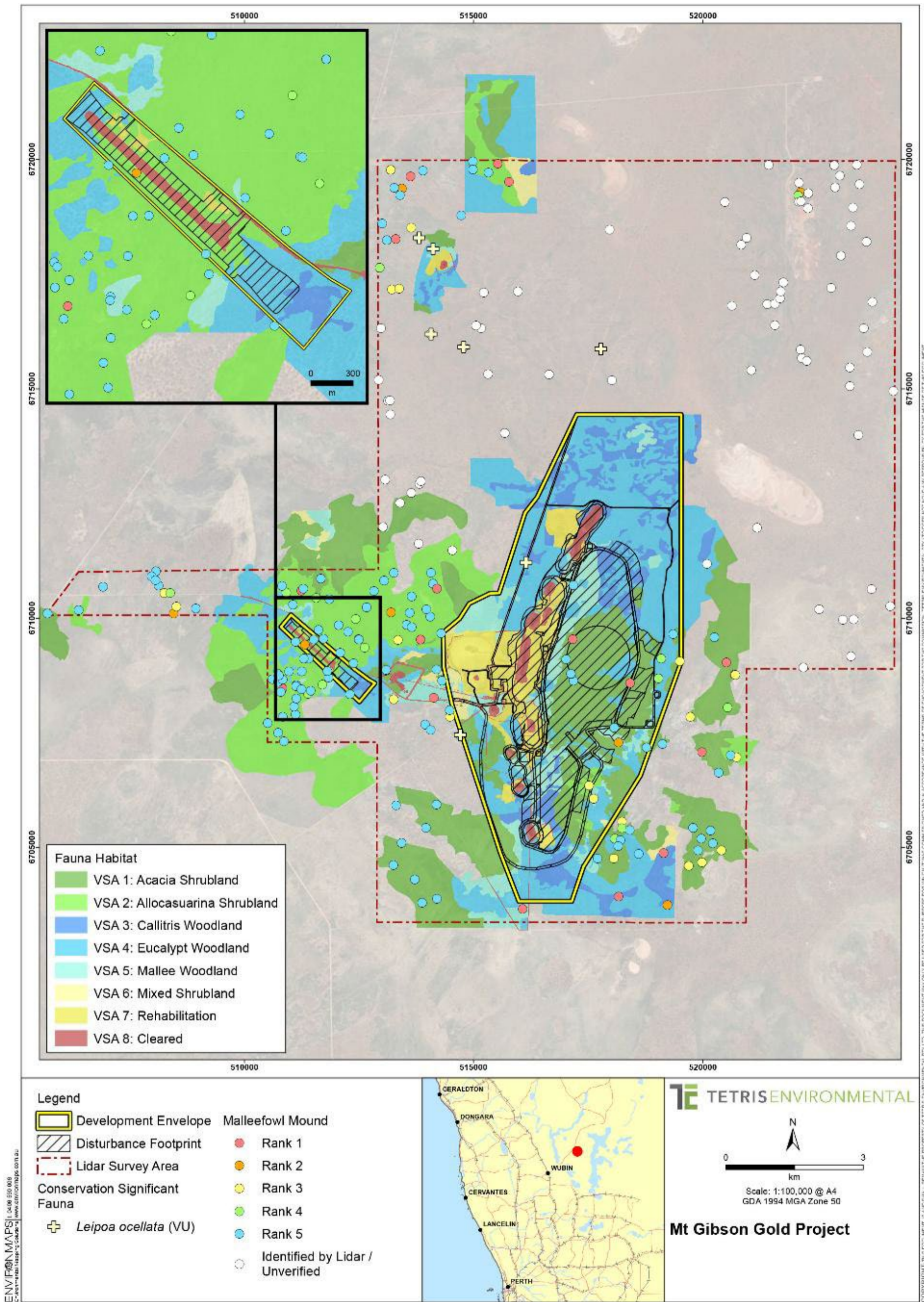


Figure 39: Malleefowl mounds and VSAs recorded in the Development Envelope and surrounds

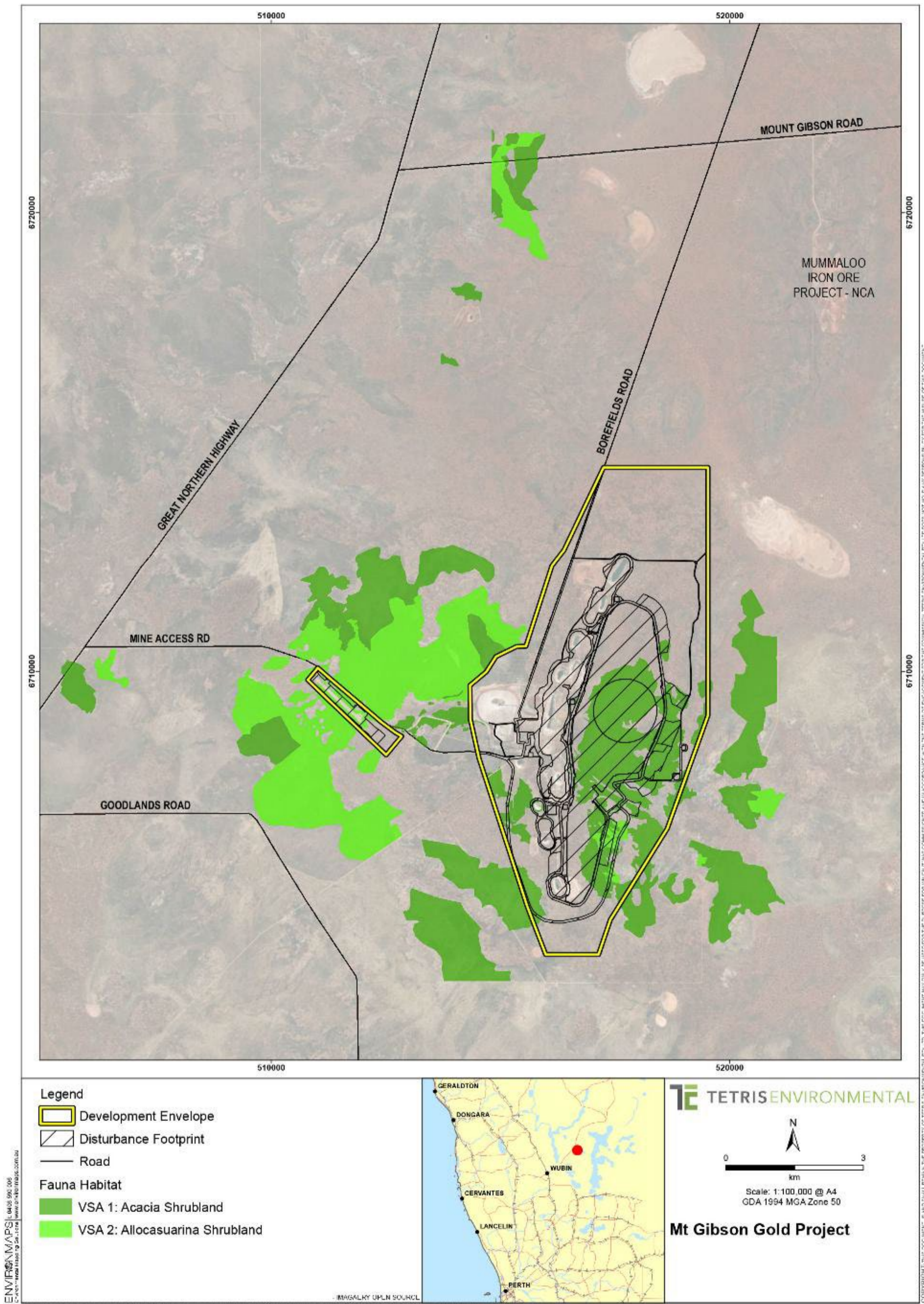


Figure 40: Mapped extent of preferred habitat for Malleefowl mound construction

An ‘important population’ is defined as a “population that is necessary for a species’ long-term survival and recovery, and may include populations identified as such in recovery plans, and/or that are:

- Key source populations for either breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species’ range.” (Bamford, 2024b).

The Malleefowl in the Development Envelope and surrounds are none of these, however, are a small part of a larger, important regional population which is extensive in the region, extending more or less continuously across similar landscapes that provide adequate habitat well to the north and east (but truncated 30 km to the west and about 10 km to the south where extensive agricultural clearing has occurred). Bamford (2024b) estimated the two pairs that may be displaced by the Disturbance Footprint represent <1% of the regional population within 9 km.

Additionally, no particular populations or general areas can be described as being of greater importance for the long-term survival of Malleefowl than any other. Malleefowl still occur over most of their range, and although populations tend to be sparser in areas with low or highly variable winter rainfall, this is compensated by these areas being extensive (DCCEEW, 2024d).

Key threats to Malleefowl relevant to the Proposal have been identified as:

- clearance and degradation of habitat
- fragmentation and isolation
- mortality on roads
- predation by the introduced fox, and to a lesser extent by cats
- fire

Further discussion on potential threats and impacts as a result of the Proposal are discussed in Section 5.

## **4.5 *Dasyurus geoffroii* (Chuditch)**

### **4.5.1 Species description**

*Dasyurus geoffroii* (Chuditch) is listed as Vulnerable under the EPBC Act. There is no approved Conservation Advice or Listing Advice for the species (DCCEEW, 2024c), however, the Western Australia Recovery Plan (DEC, 2012) has been adopted at the national scale.

The Chuditch is the largest carnivorous marsupial in Western Australia. At maturity it is about the size of a small domestic cat, with males weighing around 1.3 kg and females around 0.9 kg. The Chuditch is distinguishable from other mammals by its brown hair with white spots, large, rounded ears, pointed muzzle and non-hopping gait. The tail is about three quarters of the head and body length (DEC, 2012).

Chuditch are opportunistic feeders, foraging primarily on the ground at night. They may climb trees to obtain prey or to escape from predators. In the arid zone, their diet consists of live mammals, carrion, lizards, frogs and invertebrates and will also scavenge for food scraps around campsites and consume the remains of animals killed on roads. Wild Chuditch usually die before their fourth year; the average life span for established adults is two years (DEC, 2012).

This species previously occurred throughout arid and semi-arid Australia but is now restricted to south-west Western Australia (DCCEEW, 2024c) with a population size estimated to be up to 15,000 individuals (AWC, 2024). The major portion of the remaining natural populations occur in varying densities in jarrah (*Eucalyptus marginata*) forests and woodlands in the south-west corner of WA, and in woodlands, mallee shrublands and heaths along the south coast. There are also occasional records from drier woodland and mallee shrubland in the Wheatbelt and Goldfield Regions (DEC, 2012).

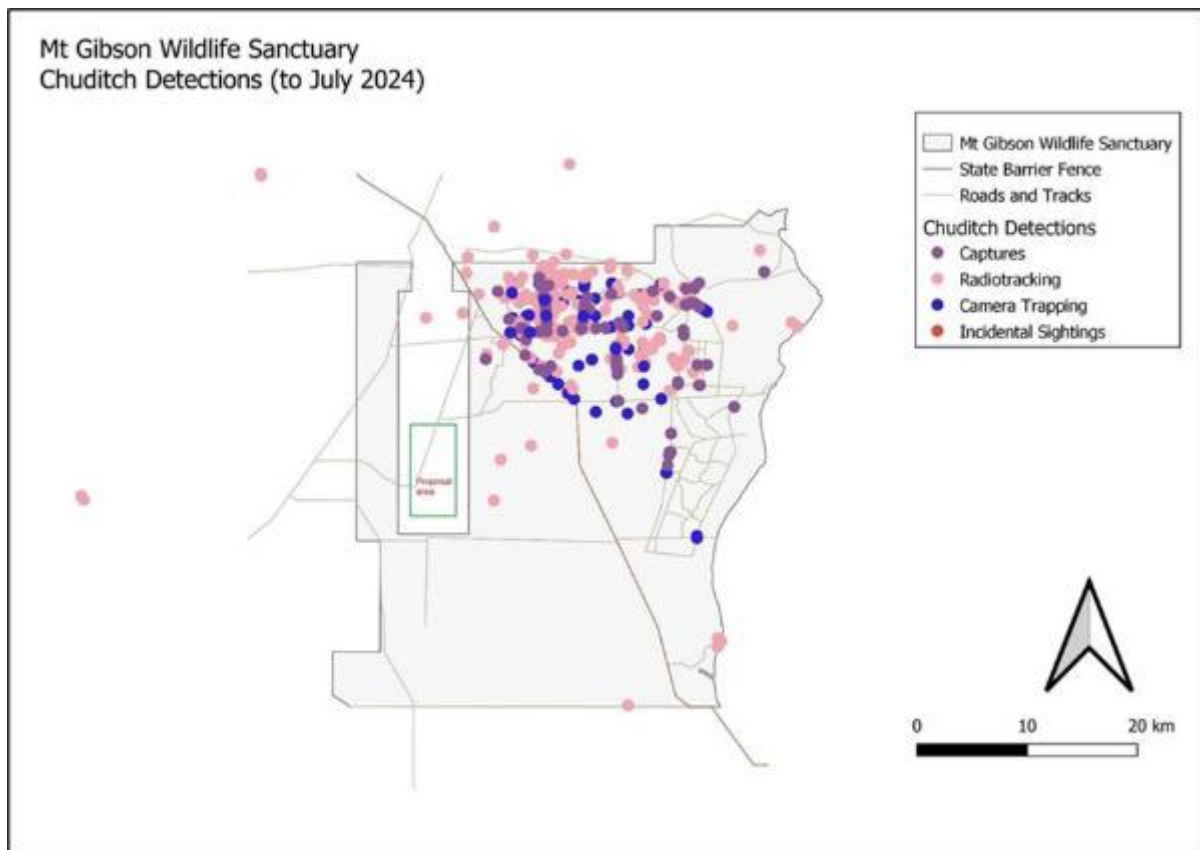
Until recently, the Chuditch was locally extinct in the Proposal region, but it has been the subject of a reintroduction programme by the AWC, with 44 individuals translocated within the privately owned Mount Gibson Wildlife Sanctuary during 2023 (AWC, 2024). This conservation area, located east of the Proposal, is owned by the Australian Wildlife Conservancy (AWC) and covers over 130,000 ha, including a 7,800 ha predator free, fenced area.

Chuditch have a large home range, with females in the deeper south-west occupying 55-120 ha and males ranging over 400 ha or more. In semi-arid woodland Chuditch occurred at an average density of 0.039 individuals/ km<sup>2</sup>, with home ranges as small as 189 ha (a female) and as large as 2,125 ha (a male) (Bamford, 2024b).

#### 4.5.2 Survey outcomes

Table 19 (refer to Section 4.1.2) validates the adequacy of surveys undertaken.

No evidence of Chuditch in the Development Envelope has been recorded, including on motion sensitive camera traps (Bamford, 2024a & b). Figure 41 shows the recent records of Chuditch translocated by AWC. The animals have dispersed widely, with most records to the north-east of the Development Envelope, where releases were made. There are no records within the Development Envelope, likely because camera survey carried out in 2023 occurred only over a short period and very early in the release programme (Bamford, 2024b). It is highly likely that Chuditch have moved through the Development Envelope and it is possible that one or two animals are resident in the area.



**Figure 41: Translocated Chuditch monitoring records (AWC, 2024)**

#### 4.5.3 Habitat assessment

The Chuditch was formerly very widespread and occurred in a range of environments from tall forests to desert shrublands. During the day, Chuditch shelter in dens; predominantly hollow logs and earth burrows but individuals can range over large areas, with individual home ranges potentially bigger than the size of the Development Envelope. Therefore, the Development Envelope could support resident individuals that may range inside and outside the boundary and could also support dispersal.

Habitat critical to Chuditch survival and maintenance of important populations have been defined (DEC, 2012) as:

- areas currently occupied by Chuditch
- areas of natural vegetation used for breeding, foraging, or movement between areas
- areas of suitable vegetation within the recorded range in which undiscovered Chuditch populations may exist
- areas not currently occupied by Chuditch due to recent fire but are capable of supporting Chuditch populations when sufficiently recovered
- areas previously occupied and that still provide suitable habitat and into which Chuditch can be reintroduced.

There are no defined habitat characteristics that should be preserved for Chuditch; however, some key aspects are required for Chuditch survival:

- adequate den resources (e.g. hollow logs, burrows or rock crevices)
- adequate prey resources (particularly large invertebrates)
- sizeable areas (>20,000 ha).

Bamford (2024b) determined that the availability of dens is an important habitat feature, therefore VSA 4 (Eucalypt Woodland) may provide abundant shelter in the form of hollow logs (both on the ground and in standing trees), although the Chuditch will probably forage throughout all VSAs. VSA 1-3 and 5-6 could provide habitat for movement and likely foraging but generally lack the availability of nesting hollows/refuges. Suitable area to provide dens and foraging are very widespread across the landscape, and such suitable habitat is continuous (Bamford, 2024b).

A critical feature of the habitat is the low abundance of the red fox (Bamford, 2024b). In the context of the Proposal, a total of 2,467 ha of VSA 4 has been mapped in the Development Envelope and surrounds, including 1,313.6 ha within the Development Envelope and 248.2 ha within the Disturbance Footprint (Table 28, Figure 22).

**Table 28: Chuditch VSA habitat**

VSA group	VSA	Total mapped (ha)	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
Denning habitat	VSA 4: Eucalypt Woodlands	2,467	1,313.6	248.2
	<b>Sub total</b>	<b>2,467</b>	<b>1,313.6</b>	<b>248.2</b>
Potential foraging/transit habitat <sup>1</sup>	VSA 1: Acacia Shrubland	1,329	823.5	528.2
	VSA 2: Allocasuarina Shrubland	605	73.1	40.6
	VSA 3: Callitris Woodland	636	462.6	138.4
	VSA 5: Mallee Woodland	613	394.6	220.8
	VSA 6: Mixed Shrubland	124	32.8	0.6
	<b>Sub total</b>	<b>3,307</b>	<b>1,786.50</b>	<b>928.6</b>
<b>Total</b>		<b>5,774</b>	<b>3,100</b>	<b>1,176.8</b>

1- Historically disturbed areas (VSA 7: Rehabilitation and VSA 8: Cleared) have been excluded from the table

Whilst DCCEE have developed a Habitat Scoring System (HQS) for Chuditch, this framework cannot be applied to the Proposal region. For example, Chuditch formerly had an extensive range across much of semi-arid Australia and its persistence in the moist forests of the southwest WA is an artefact of interaction with feral species. The key factor for the suitability of an area for the Chuditch is likely the suppression or absence of introduced predators and not structural characteristics (Bamford personal communication). Habitat across the landscape is continuous and Chuditch are likely to occupy the entire area as the reintroduction population expands, and the animals are likely to be resident in and disperse across the entire landscape (Bamford, 2024b).

An 'important population' is defined as a "population that is necessary for a species' long-term survival and recovery, and may include populations identified as such in recovery plans, and/or that are:

- key source populations for either breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species' range.

The Chuditch in the broader region occurs as a discrete (reintroduced) population and therefore meets all these criteria as an important population, effectively being a founder population for the return of the species to the region (Bamford, 2024b). Whilst there is some habitat within the Development Envelope that could support members of this important population, Eucalypt Woodlands are extensive throughout the region.

Key threats to Chuditch relevant to the Proposal have been identified as:

- land clearing and the removal of suitable den logs and den sites from Chuditch habitat
- predation by feral fauna, particularly foxes and cats
- mortality from road kills

Further discussion on potential threats and impacts as a result of the Proposal are discussed in Section 5.

## **4.6 *Aphelocephala leucopsis* (Southern Whiteface)**

### **4.6.1 Species description**

The *Aphelocephala leucopsis* (Southern Whiteface) is a small stocky thornbill-like bird with a brown dorsum, white belly, dark brown wings and a black tail with narrow white tip. Adult birds are approximately 11.5 cm in length with a cream-coloured eye, grey legs and a stubby dark grey bill of finch-like appearance (DCCEEW, 2023a). This species is listed as Vulnerable under the EPBC Act and in 2021 there was an estimated 477,000 mature individuals in the wild.

Southern Whiteface occur across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range (DCCEEW, 2023a). Preferred habitat for this species is described broadly as open woodlands and shrublands in a range of landscape positions, from ranges to plains (Bamford, 2024a). In the Murchison and Yilgarn, it favours loam to clayey-loam flats that support scattered eucalypts and widely spaced mounded shrubs (including species of acacia, chenopods and saltbush), with open ground supporting low shrubs and herbs between. The mixture of dense shrubs and open spaces supporting low shrubs and herbs appears to be important (Bamford, 2024a).

### **4.6.2 Survey outcomes**

Table 19 (refer to Section 4.1.2) validates the adequacy of surveys undertaken.

No Southern Whiteface have been identified within the Disturbance Footprint (Bamford 2024a & b).

Surveys for the Southern Whiteface, including opportunistic observations, yielded six observations during 2024 (each observation a party of two to six birds), one within the Development Envelope and five outside (Figure 42). Additionally, during 2023 a flock of up to three birds were opportunistically observed on several occasions in the area surrounding the Mummaloo Iron Ore Mine (approximately eight km to the north-west of the Proposal).

These records indicate a very patchy distribution and Bamford (2024b) determined vegetation structure rather than floristics appears to be important for the species. The density of Southern Whiteface in the local area has been estimated at 1.3 birds/ ha; however each group of birds were widely-spaced (Bamford, 2024b).

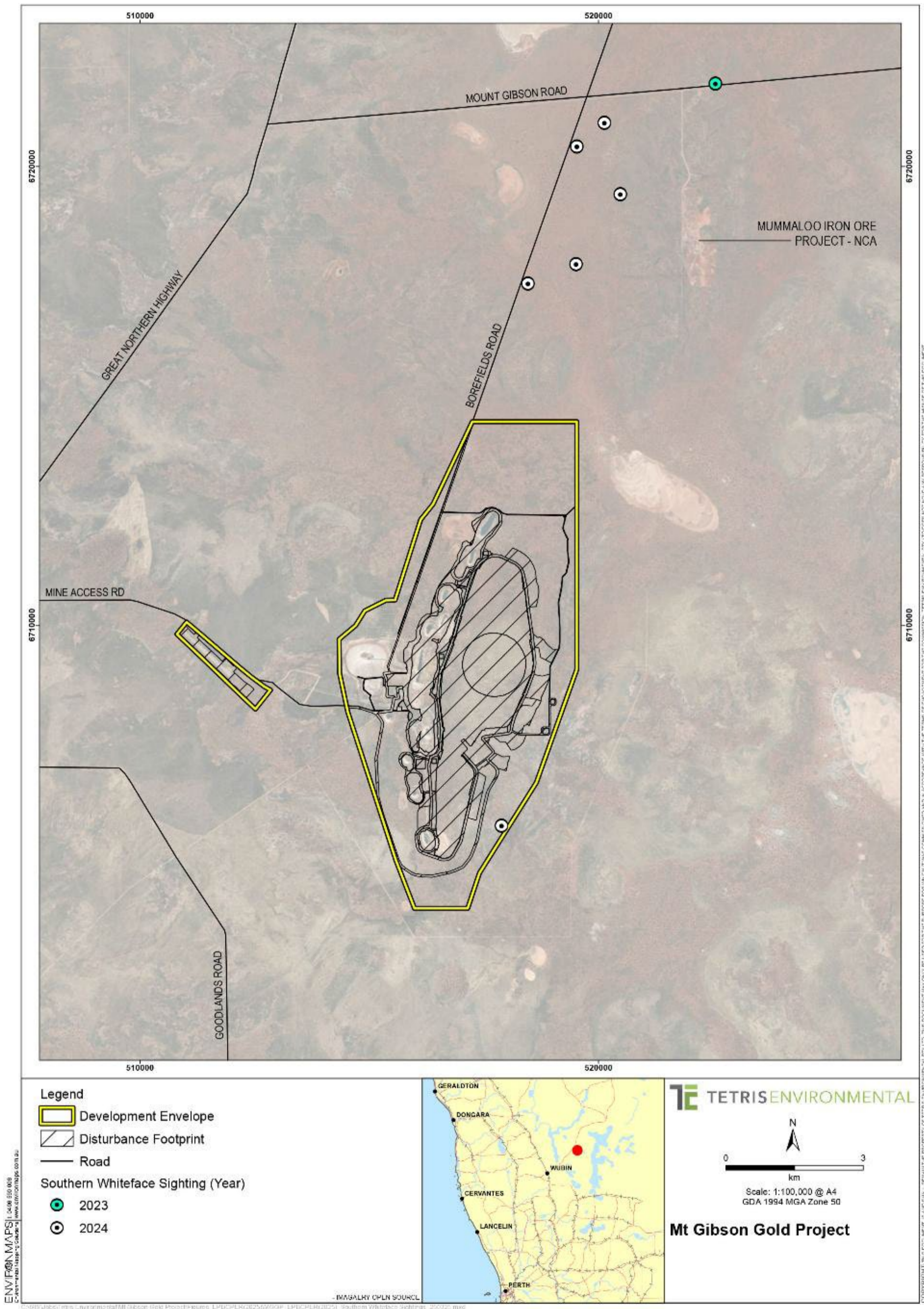


Figure 42: Southern Whiteface records

### 4.6.3 Habitat assessment

Southern Whiteface habitat is broadly described as semi-arid woodlands particularly of Mulga, with the presence of understorey shrubs such as bluebush often mentioned in habitat descriptions accompanying sight records (Bamford, 2024b). DCCEEW (2023a) state that the Southern Whiteface inhabits "... a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains."

The approved conservation advice (DCCEEW, 2023a) for the Southern Whiteface defines critical habitat as areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development
- for the reintroduction of populations or recovery of the species or ecological community.

Habitat critical to the survival of the Southern Whiteface includes areas of:

- relatively undisturbed open woodlands and shrublands with an understorey of grasses and/or shrubs
- habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat
- living and dead trees with hollows and crevices which are essential for roosting and nesting.

No Critical Habitat defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat (DCCEEW, 2023a).

These descriptions are general in nature, probably due to the wide geographic range of this species. Most of these 'habitat' descriptions are also vegetation descriptions and make little, if any, reference to structure. Targeted surveys for the Southern Whiteface at a location south of Yalgoo and about 100km south-west of the Development Envelope found Southern Whiteface to be moderately common and had a clear association with vegetation structure, occurring where dense acacia thickets were juxtaposed with open, low shrubland (often sparse bluebush) and bare ground. Suitable habitat was therefore very patchy and the habitat suitable for Southern Whiteface would normally be included in a broad habitat description. It also has some ecotonal characteristics (Bamford, 2024b).

All Southern Whiteface records made in the Development Envelope and surrounds were in habitat consistent with these previous observations. They were in vegetation that did not align well with any of the VSAs described for the Proposal, but at locations where the density of shrubs was low so that the structure consisted of dense shrubs and large open areas, often with VSA 4 (Eucalypt Woodland) nearby. Vegetation with these structural characteristics appears to be extensive (based upon aerial imagery) to the north of the Proposal but is very limited within the Development Envelope and Disturbance Footprint (Figure 22). VSA 4 is extensive in the Development Envelope, particularly in the north, but no Southern Whiteface were recorded in this northern part of the Development Envelope (Bamford, 2024b).

The Southern Whiteface is typically sedentary and occurs in small family parties but occasionally forms flocks and will also occasionally disperse (Bamford, 2024b). The entire Development Envelope and surrounds therefore supports a resident, breeding but highly scattered population, probably with most birds towards the north (outside the Development Envelope) where there appears to be more extensive suitable habitat. Dispersing birds are likely to occur anywhere but may favour the preferred habitat (open VSA 1, often close to VSA 4) which appears to be critical habitat for resident breeding birds.

In the context of the Proposal, there is 1,329 of VSA 1 habitat mapped in the local area, including 823.5 ha within the Development Envelope and 528.2 ha within the Disturbance Footprint (Table 29). However, within VSA 1, only very small patches and areas of critical habitat appear to be present within the Development Envelope, with more extensive habitat occurring to the north of the Development Envelope. Within the Development Envelope, core habitat (habitat suitable for residency and breeding) may be limited to a few hectares in the south-east where birds were recorded (Bamford, 2024b). This habitat occurs outside the Disturbance Footprint (Figure 42) and will not be impacted by the Proposal.

**Table 29: Southern Whiteface VSA habitat**

VSA	Total mapped (ha)	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
<b>VSA 1: Acacia Shrubland</b>	1,329	823.5	528.2

The Southern Whiteface occurs across the adjacent AWC Mount Gibson Wildlife Sanctuary, predominantly in woodlands with open ground patches for foraging. They have not been recorded in the dense Acacia shrublands within the Sanctuary (Dr Louis O’Neil, personal communication, 23 August 2024).

A resident population occurs in the local area but with few birds and little habitat suitable for resident or breeding birds within the Development Envelope. Given the small number of birds present and the extensive population more regionally, the birds in the Development Envelope do not represent an important population (Bamford, 2024b).

Key threats (as defined by DCCEE, 2023a) to Southern Whiteface relevant to the Proposal include:

- Clearance and degradation of native vegetation
- Fragmentation and isolation
- Fire.

Further discussion on potential threats and impacts as a result of the Proposal are discussed in Section 5.

#### **4.7 Lake Goorly Shield-backed trapdoor spider (*Idiosoma kopejtkorum*) listed as *Idiosoma nigrum***

##### **4.7.1 Species description**

The shield-backed trapdoor spiders of the genus *Idiosoma*, otherwise known as the nigrum-group, are an iconic and threatened component of the Australian mygalomorph spider fauna, renowned for their unusual morphology and biology (Rix et al., 2018). Shield-backed trapdoor spiders are unique in possessing an enlarged and highly sclerotised abdominal

'shield', which can be wedged midway down a burrow shaft upon disturbance and protect the spider from predatory attack (e.g., by wasps, ants and centipedes) (Rix et al., 2018).

*Idiosoma nigrum* is a large spider with females up to 30 mm in body length. Species of *Idiosoma* in the nigrum-group are unusual in building a 'moustache-like' arrangement of twig-lines at the burrow entrance and thin flap-type or wafer-type doors which are adorned with leaf litter debris' a feature which aids enormously in field recognition (Rix et al., 2018). While numerous other species of spider also adorn their burrows with twig-lines, most of these are characterised by radial arrangements.

Females spend their entire life in the burrow or within its proximity. Gene flow is therefore facilitated by male biased dispersal, with the reproductive season expected to occur between September and November (Bennelongia, 2025a). The species becomes dormant during the drier months of the year from November to February (DSEWPaC, 2013).

Listed as Endangered under the EPBC Act, *Idiosoma nigrum* is endemic to central and central-western Wheatbelt bioregion of south-west Western Australia (DCCEEW, 2024a). The distribution of *I. nigrum* closely abuts those of three other species in the 'sigillate complex'; at its northern extent it nears the southern limit of the range of the distantly related *I. kopejtkaorum* (Figure 43). Preferred habitat for this species is Eucalypt Woodland and Acacia Shrubland in the Wheatbelt, and Acacia Shrubland in the arid Midwest (DCCEEW, 2024a).

Burrows of spider species in the nigrum-group are characterised by the presence of a 'moustache-like' arrangement of twig lines and thin flap-type or wafer-type doors which are adorned with leaf litter debris (Rix et al. 2018). Adorned burrows are not exclusive to species of the nigrum-group and numerous species of *Idiosoma* outside of the nigrum-group, along with species of *Gaius* and *Blakistonia*, often adorn their burrows with twig lines (Bennelongia, 2025a). However, species of *Idiosoma* in the nigrum-group are usually differentiated by building a 'moustache-like' arrangement of twig-lines at the burrow entrance (Rix et al. 2018). Burrows of *Gaius* differ from species in the nigrum-group by having burrow entrances adorned by radial 'fan' twig lines which can or cannot have flappy doors and much larger size of the door (Bennelongia, 2025a).

In the last few decades, it became apparent that the nigrum-group included more than just two species of *Idiosoma*, however, the identifications of some of these species were for a long time conflated, and *I. nigrum* was formally assessed under the EPBC Act in 2013 as what is now known to be five separate species (Rix et al., 2018). Detailed morphological and molecular analysis (Rix et al., 2018) of the nigrum-group resulted in 15 new species being described, increasing the total number of species in the nigrum-group to 17, all except one of which are endemic to Western Australia. The sole species found outside of south-western Australia, *I. corrugatum*, is of uncertain affinity, due to a slightly unusual morphology and lack of sequence data (Rix et al., 2018). Most species have fairly restricted short-range endemic distributions which are sometimes overlapping or closely adjacent, however direct coexistence of multiple nigrum-group taxa in the field is rare (Rix et al., 2018).

The analysis separated *Idiosoma nigrum* in the Proposal local area into *Idiosoma kopejtkaorum* and *Idiosoma formosum*. Neither *I. kopejtkaorum* or *I. formosum* are currently listed under the EPBC Act, however are listed as Endangered under State (WA) legislation (BC Act). Only *Idiosoma kopejtkaorum* has been recorded in the Development Envelope.

As advised by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), any of the novel or split taxa derived from *Idiosoma nigrum* located at the

Proposals are considered to be and are protected under the EPBC Act as the Shield-backed Trapdoor Spider (*Idiosoma nigrum*) until formal listing assessment has been completed.

*Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) is a member of the northern clypeatum-clade with a restricted distribution in the north-eastern Wheatbelt bioregion and is only found in a small area surrounding Lake Goorly (Rix et al. 2018), in Eucalypt Woodland and Acacia Shrubland. First collected near Mount Gibson in the 1950s and subsequently collected from a handful of nature reserves during the late 1990s, this species came to prominence during environmental impact assessment surveys conducted in the Mummaloo region in 2012. Although it was originally confused with *I. nigrum*, morphological and molecular data were consistent in denoting two nigrum-group species in the Mummaloo/ Mount Gibson area (Rix et al. 2018).

*Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) distribution extends from Charles Darwin Nature Reserve, Mount Gibson, and Mummaloo-Wyebubba Hill in the north, south-west to near Coorow, and south to near Goodlands and the Maya, Buntine and Snake Gully Nature Reserves, all north of Dalwallinu. South of Dalwallinu it is replaced by *I. nigrum*, to the west it is replaced by *I. dandaragan*, and to the north it is replaced by *I. clypeatum*; all four species have a strongly sigillate (sclerotised) abdominal morphology (Rix et al., 2018). This distribution appears to be strongly correlated with annual rainfall of 250–300 mm, and red clay soils in the Lake Goorly and southern Lake Moore catchments (Rix et al. 2018). Current data shows the species has an estimated extent of occurrence of 4,930 km<sup>2</sup> and an area of occupancy of 300 km<sup>2</sup> (Bennelongia 2025b), however, the AOO is a result of current survey effort and the species is expected to occur elsewhere in the region.

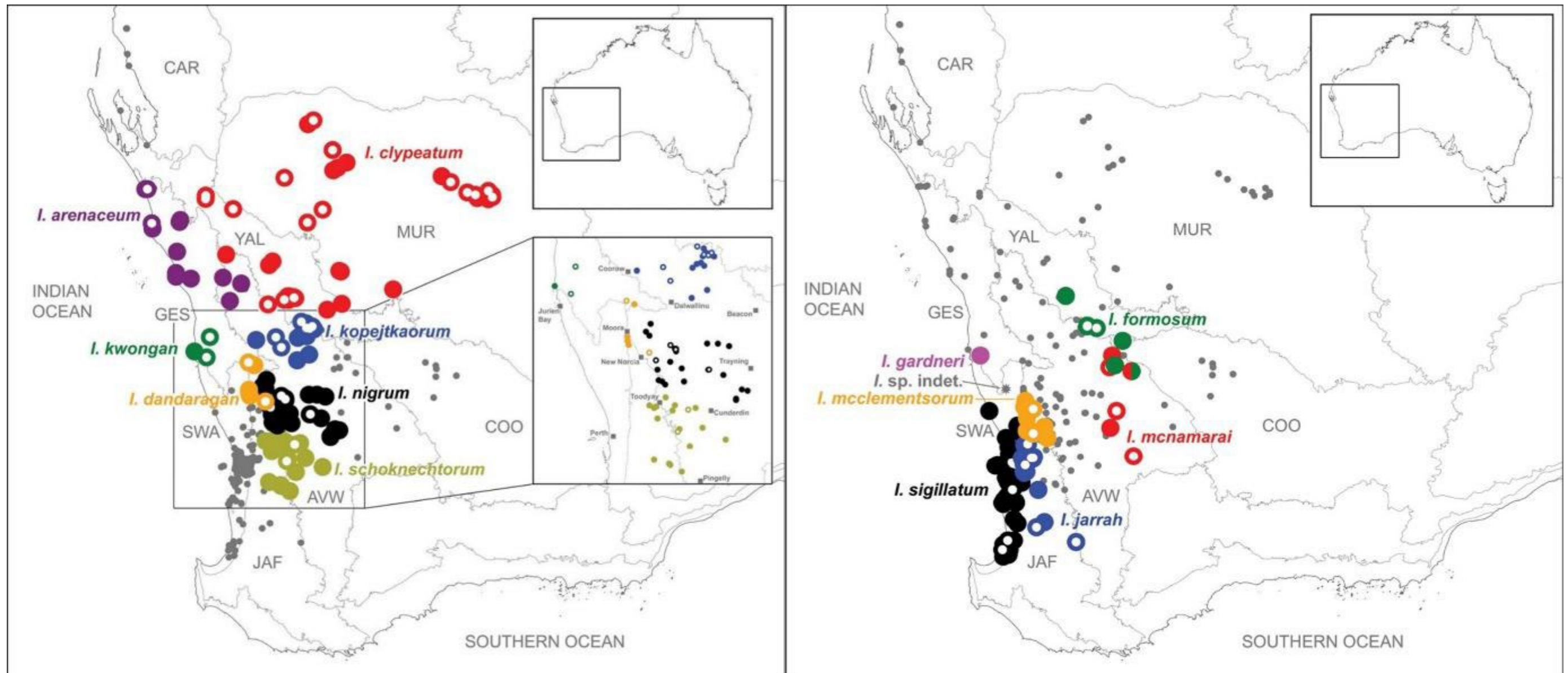


Figure 43: *Idiosoma* spp. distribution in WA (Rix et al., 2018)

#### 4.7.2 Survey outcomes

Table 19 (refer to Section 4.1.2) validates the adequacy of surveys undertaken.

Bennelongia (2026) refined the mygalomorph dataset to improve the categorisation of burrows and their probability of being *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*). Table 30 provides the likelihood and activity definitions used and Table 31 presents the results of all surveys.

The total dataset of 810 mygalomorph spider burrows is determined from surveys by Bennelongia, Tetris Environmental and other sources, particularly Rix et al.. Of the 810 mygalomorph spider burrows recorded, 250 are confirmed active *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrows. Of these 250 confirmed active burrows, 42 occur within the Development Envelope, of which 20 occur within the Disturbance Footprint (Table 31).

Applying the precautionary principle, there are also 55 active burrows that are likely *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) within the Development Envelope, of which 18 occur within the Disturbance Footprint.

Current data suggest that the *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) occurs extensively outside the Development Envelope. It should be noted that known population records are a result of current survey effort (to December 2025) and the species is expected to occur elsewhere in the region.

**Table 30: Definitions of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrow**

Burrow	Definition
<b>Likelihood</b>	
<b>Confirmed (known) <i>Idiosoma kopejtkorum</i></b>	Specimens confirmed to be the target species by either burrow dig, non-lethal DNA sampling, endoscope, or have been referenced on the literature (Rix et al 2018; Biota 2021).
<b>Likely <i>Idiosoma kopejtkorum</i></b>	Specimens without direct confirmation of being <i>Idiosoma kopejtkorum</i> but with a burrow morphology indicative of <i>Idiosoma kopejtkorum</i> and where endoscope inspection failed to confirm the specimen was <i>Idiosoma kopejtkorum</i> (i.e., no direct confirmation but all signs point to the specimen being true <i>Idiosoma kopejtkorum</i> , nearby confirmed records).
<b>Probable <i>Idiosoma kopejtkorum</i></b>	Specimens where there are sufficient reasons to believe they belong to the genus <i>Idiosoma</i> , however, there is not enough data to suggest they are <i>Idiosoma kopejtkorum</i> (broken lids, empty/old burrows, twigline burrow not in moustache arrangement, no nearby confirmed records).
<b>Confirmed <u>not</u> <i>Idiosoma kopejtkorum</i></b>	Specimens that burrow morphology was conclusive enough to suggest they did not belong to the genus <i>Idiosoma</i> or when burrows were inspected via burrow dig/endoscope and evidence suggested they belong to taxa other than <i>Idiosoma kopejtkorum</i> .
<b>Activity</b>	
<b>Active</b>	Burrow appears to be maintained/structurally sound, animal present
<b>Inactive</b>	Burrow appears to be old, damaged or occupied by another animal

**Table 31: *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrow categories**

Category	Active Burrows				Inactive Burrows				Total all burrows
	Outside DE <sup>1</sup>	Inside DE <sup>1</sup>	Total Active	Within DF <sup>1</sup>	Outside DE <sup>1</sup>	Inside DE <sup>1</sup>	Total Inactive	Within DF <sup>1</sup>	
<b>Confirmed (known) <i>Idiosoma kopejtkorum</i></b>	208	42	250	20	31	2	33	0	<b>283</b>
<b>Likely <i>Idiosoma kopejtkorum</i></b>	24	55	79	18	9	4	13	0	<b>92</b>
<b>Probable <i>Idiosoma kopejtkorum</i></b>	64	61	125	22	34	19	53	7	<b>178</b>
<b>Confirmed <u>not</u> <i>Idiosoma kopejtkorum</i></b>	83	65	148	46	39	70	109	25	<b>257</b>
<b>Total all burrows</b>	<b>379</b>	<b>223</b>	<b>602</b>	<b>106</b>	<b>113</b>	<b>95</b>	<b>208</b>	<b>32</b>	<b>810</b>

1- DE = Development Envelope, DF = Disturbance Footprint

Molecular analysis and morphological inspection of reference specimens collected across different localities identified *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and four other *Idiosoma* species in the area: the undescribed species *Idiosoma* 'MYG222' and *Idiosoma* 'BMYG238', the Coolgardie shield-backed trapdoor spider *Idiosoma intermedium*, and an undescribed species from the nigrum-group and part of the *Idiosoma formosum* complex, namely *Idiosoma* 'BMYG229' (formosum-complex).

In response to a request by DCCEEW (February, 2025) to undertake an *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) population estimate, Bennelongia (2025a, Appendix K) calculated the potential burrow density per hectare within the Development Envelope and Disturbance Footprint using the following formulas :

#### Development Envelope

1. Probability burrows belong to *Idiosoma kopejtkorum*: (30 *Idiosoma kopejtkorum* burrows / 40 inspected burrows) x 100 = 75% probability burrows within the Development Envelope belong to *Idiosoma kopejtkorum*.
2. *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrow density: (158 active (likely or probable) burrows / 25.84 ha within Development Envelope) x 75% = density of 4.6 *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrows per ha within the Development Envelope.

#### Disturbance Footprint

1. Probability burrows belong to *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*): (20 *Idiosoma kopejtkorum* burrows / 31 inspected burrows) x 100 = 65% probability burrows within the Disturbance Footprint belonging to *Idiosoma kopejtkorum*.
2. *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrow density: (61 likely or probable active burrows / 14.04 ha within Disturbance Footprint) x 65% = density of 2.8 *Idiosoma kopejtkorum* burrows per ha within the Disturbance Footprint.

Using the above densities and hectares of preferred habitat (VSA 4 Eucalypt Woodland) within the Development Envelope (1,313.6 ha) and Disturbance Footprint (248.2 ha), there are an estimated:

- 6,042 individuals within the Development Envelope (1,313.6 ha x 4.6 density = 6,042)
- 695 individuals within the Disturbance Footprint (248.2 ha x 2.8 density = 695)

Applying the precautionary principle and estimating population size across all remnant habitats (VSA 1-6) of the Development Envelope (3,100.2 ha) and Disturbance Footprint (1,176.8 ha), noting the estimation does not take into account habitat preferences and applies density equally across all remnant VSA's therefore the estimation will be exaggerated, there could be up to:

- 14,261 individuals within the Development Envelope (3,100.2 ha x 4.6 density = 14,261)
- 3,295 individuals within the Disturbance Footprint (1,176.8 ha x 2.8 density = 3,295).

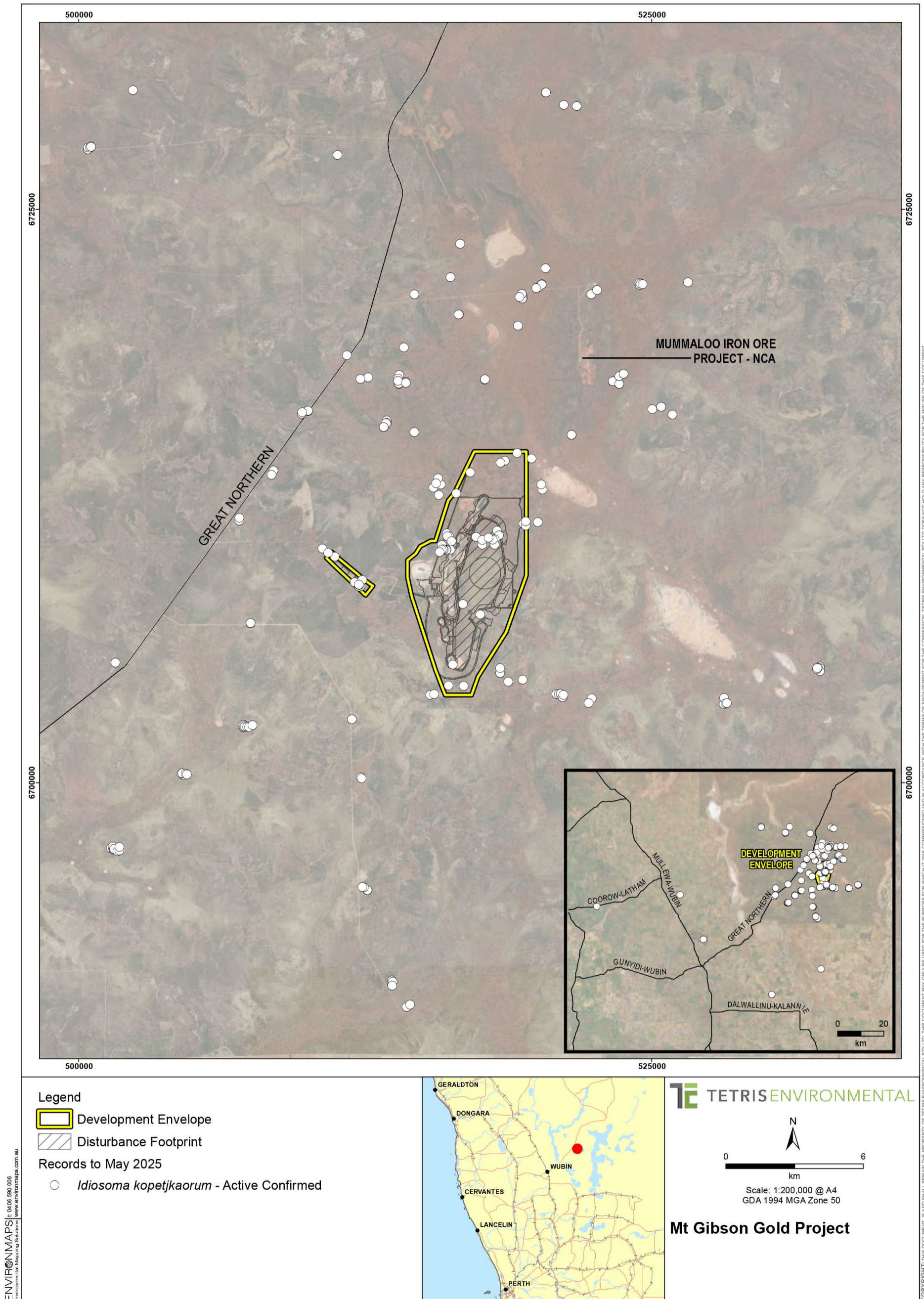


Figure 44: Confirmed active *I. kopejkaorum* (listed as *Idiosoma nigrum*) records burrows in the Development Envelope and surrounds

### 4.7.3 Habitat assessment

Extent of Occurrence (EOO) is defined as “the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred, or projected sites of present occurrence of a taxon, excluding cases of vagrancy”. This parameter measures the spatial spread of the areas currently occupied by a taxon and it is used to measure the degree to which risks from threatening factors are spread spatially across the taxon’s geographical distribution. Extent of occurrence is not intended to be an estimate of the amount of occupied or potential habitat, or a general measure of the taxon’s range (Bennelongia, 2025a).

Area of occupancy (AOO) is a scaled metric that represents the area of suitable habitat currently occupied by the taxon and reflects the fact that a taxon will usually not occur throughout its entire EOO. AOO is inversely related to extinction risk, with species at high risk of extinction because of their small AOO often being habitat specialists (Bennelongia, 2025a). Estimates of AOO are highly sensitive to the spatial scale at which AOO is measured, which is closely related to survey effort within the species’ EOO and likely to be downwards biased because of greater emphasis on, and access to, areas in an around development projects rather than ‘regional’ surveys across the extent of the species EOO.

To ensure valid use of the criterion and maintain consistency of Red List assessments across taxa, it is essential to scale estimates of AOO using 2 x 2 km (4 km<sup>2</sup>) grid cells in accordance with IUCN Guidelines (IUCN, 2024). Estimating AOO is done by counting the number of occupied cells in a uniform grid that covers the entire range of a taxon (EOO), then tallying the total of occupied cells:

$$AOO = no. \text{ occupied cells} \times \text{area of an individual cell}$$

$$(e.g. 63 \text{ occupied cells} \times 4 \text{ km}^2 = 252 \text{ km}^2)$$

Data from several sources have been consolidated (Bennelongia records, Biota records, Tetris Environmental and Rix et al. 2018 records) to provide 250 confirmed active records for this species (Bennelongia, 2025a and b), presented in Figure 45. The consolidated data set determined *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) Extent of Occurrence (EOO) to be 4,930 km<sup>2</sup> and Area of Occupancy (AOO) approximately 300 km<sup>2</sup> (Bennelongia, 2025b). The known AOO results from the current survey effort, and the species is expected to occur elsewhere in the region.

The EOO of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) can be divided into two broad categories based on habitat connectivity: discontinuous habitat and continuous intact habitat (Figure 46). Discontinuous habitat is defined by fragmented and generally poor-quality habitat within the species EOO. It represents habitat that lacks connectivity between populations (i.e. discontinuous habitat is associated with the cleared agricultural zone of the Avon Wheatbelt Bioregion). Continuous habitat is defined by good quality, unfragmented habitat which has the potential to provide connectivity between populations. The EOO shows two distinct sections based on habitat connectivity (Figure 46), continuous habitat (2,139 km<sup>2</sup>/ 43.4% of EOO) and discontinuous habitat (2,791 km<sup>2</sup>/ 56.6% of EOO). The Development Envelope is located within the continuous habitat portion (Bennelongia, 2025a) and is not near the limit of the species range (Figure 45).

It should be noted that at the time of the draft PER submission to DCCEE in December 2024, known AOO and EOO were 172 km<sup>2</sup> and 4,444 km<sup>2</sup>, respectively, with the Proposal’s impact to the species’ AOO being 6.97%. AOO is a result of survey effort and additional

survey work undertaken in April 2025 (Bennelongia, 2025b) has resulted in an increase to the AOO and EOO to 300 km<sup>2</sup> and 4,930 km<sup>2</sup> (respectively) thus reducing the Proposal impact to AOO to 3.65%. Therefore, it is highly likely that AOO and EOO will continue to increase (and Proposal AOO impact will decrease) with additional surveys throughout the region.

After the numerous rounds of survey conducted, habitat preference was deduced via direct observations during the field surveys (Bennelongia 2025b) utilising the VSA categories defined by Bamford (2024a) and provided earlier in Table 13. Detailed habitat, microhabitat and soil term data was recorded for 158 of the 250 confirmed active *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) burrows. Of these, 82% were recorded from VSA 4 Eucalypt Woodlands, 66% were recorded from the base of trees, and 54% were recorded from sandy soils (Table 32).

Based on the results of Rix et al. (2018) and Proposal specific surveys for *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*), the species has a strong preference for Eucalypt Woodlands (Table 32), and when targeting Eucalypt Woodland habitat during field surveys, there has been a success rate (confirmed *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) presence) of ~90%. Based on broadscale publicly available mapping of regional Eucalypt Woodland vegetation by DBCA (Figure 47) as a proxy for high likelihood of occurrence of *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*), AOO increases from 30,000 ha to an extrapolated AOO of 132,512 ha within the known EOO. Noting ground truthing would be required to confirm *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) presence in these areas, Proposal impact on AOO could be as low as 0.8% (0.82 x 404 unsurveyed Eucalypt Woodland cells = 331.28 x 400 ha = 132,512 ha), or potentially lower given some *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) has also been recorded in non-Eucalypt Woodlands (at a lower rate).

**Table 32: *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) habitat preference**

Habitat	No. (%)	Microhabitat	No. (%)	Soil type	No. (%)
VSA1: Acacia shrubland	8 (5%)	Base of tree	105 (66%)	Clay	68 (43%)
VSA2: Allocasuarina shrubland	2 (1%)	Leaf litter	53 (34%)	Loam	4 (3%)
VSA 3: Callitris woodland	3 (2%)			Sand	86 (54%)
VSA 4: Eucalypt woodland	130 (82%)				
VSA 5: Mallee woodland	8 (5%)				
VSA 6: Mixed shrubland	7 (4%)				
<b>Total</b>	<b>158 (100%)</b>		<b>158 (100%)</b>		<b>158 (100%)</b>

These findings align with the SPRAT profile for *Idiosoma nigrum* (subsequently divided into numerous species, including *I. kopejtkaorum*) which suggests that populations of the species are predominantly associated with eucalypt woodlands with a preference for York Gum

(*Eucalyptus loxophleba*) woodlands that provide adequate substrate and shade for burrow temperature control, and has a higher proportion of the understorey species that provide leaf matter of suitable structure and size for burrow lid and entrance construction, such as *Acacia acuminata* and *Exocarpus aphyllus* (Bennelongia, 2025a). At the Proposal, the preferred substrate for burrow construction within the VSA's was red to reddish brown sandy loam characteristic of the York gum and Salmon Gum woodlands, whilst the soil type in the Acacia Shrubland is typically yellow sands which do not provide appropriate stability for effective burrow construction. Of all the *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) records within the species' EOO, 45% (n= 114) were found over loamy plains surrounded by sandplains supporting York gum woodlands and acacia shrublands, with the second highest habitat type being calcareous alluvial plains with eucalypt woodland adjacent to salt-lake systems with 18% (n = 46) of the records (Bennelongia 2025b).

When assessing habitat using the VSA criteria, 248.2 ha of VSA 4 Eucalypt Woodlands occurs within the Disturbance Footprint, which is considered to be the species preferred habitat type.

When analysing the habitat preferences using the field records and aligning this information with the floristic vegetation communities (Table 12), within VSA 4 Eucalypt Woodlands, spiders preferred York Gum (*Eucalyptus loxophleba* subsp. *supralaevis*) and Salmon Gum (*Eucalyptus salmonophloia*) Woodlands, representative of VT3, VT11 and VT12 and totalling 203.1 ha within the Development Envelope (Table 33); however when considering *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) habitat preference for York Gum dominant woodlands representative of VT11, 151.7 ha occurs within the Disturbance Footprint.

**Table 33: Preferred *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) Vegetation Types**

Vegetation Type	Habitat Preference Rank	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
<b>VT11 - <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> woodland over <i>Acacia acuminata</i> shrubland</b>	1	668.2	151.7
<b>VT3 - <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> and <i>Callitris columellaris</i> open woodland over <i>Acacia acuminata</i></b>	2	97.5	13.0
<b>VT12 - <i>Eucalyptus salmonophloia</i> Woodland over <i>Acacia</i> spp.</b>	3	364.3	38.4
<b>Total</b>		<b>1,130.0</b>	<b>203.1</b>

Considering the above and acknowledging that 28 (18%) of the 158 confirmed active *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) assessed for habitat preference were recorded outside VSA 4 (Table 32), there is also ~890.9 ha of vegetation within the Disturbance Footprint and the species AOO that could be utilised as habitat (1,094 ha of Disturbance Footprint remnant vegetation overlaps AOO (Bennelongia 2025b) minus 203.1 ha of preferred habitat type in Table 33 = 890.9 ha), and a further ~1,786 ha mapped outside the Development Envelope. However, it is important to note that habitat and soil types listed in Table 32 refer to broad characteristics and there is noticeable variation within categories.

For example, Eucalypt woodlands include multiple species such as York gum (*Eucalyptus loxophleba*), Salmon gum (*E. salmonophloia*), Wandoo (*E. capillosa*), Mallee (*E. kochii*) and

Gimlet (*E. salubris*). Field observations recorded the presence of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) in eucalypt woodlands dominated by York and/or Salmon gum, with no records found in eucalypt woodlands dominated by gimlet. Similarly, although most records were found on sand or clay soil type, field observations suggest the species is mainly associated with red soils ranging in consistency between sandy-clay to clayey-sandy soils (Bennelongia, 2025b). Therefore, it is highly unlikely all the 890.9 ha within the AOO and VSA 1-3, 5 and 6 would be suitable habitat for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*).

Bennelongia (2025b) developed a habitat rating tool (Table 34) to provide more granular information and better habitat preference context elsewhere in the EOO. This habitat rating tool outlines the preferred criteria used to assess habitat suitability for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) to assist with survey design and should not be used in isolation of detailed field survey results to confirm habitat suitability for impact assessment. Nine key variables across three categories were identified, with each variable scored from 0 (unsuitable) to 2 (optimal). The sum of all scores provides a habitat suitability index (max score = 18), which is then classified into one of four habitat suitability categories (Table 35).

**Table 34: Habitat rating tool for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*)**

Category	Habitat Variable	Scoring Criteria	Score Range
<b>1. Broad Environmental Features</b>	Soil Type	0 = Gravel, heavy clay, or shallow soils 1 = Loamy yellow sands or sandy earths 2 = Deep, red sandy to clayey soils	0-2
	Vegetation Type	0 = Cleared or non-native vegetation 1 = Sparse native mixed (Allocasuarina or Callitris) shrublands 2 = Eucalypt woodlands with Acacia shrubland understory	0-2
	Topography	0 = Major drainage lines, wet depressions, rocky slopes or outcrops 1 = Gently undulating to undulating rises 2 = Broad floodplains or lower slopes	0-2
	Disturbance Level	0 = Heavily disturbed (e.g. grazing, clearing, mining) 1 = Moderately disturbed (young secondary growth woodlands) 2 = Minimal or no disturbance (pristine or old secondary growth woodlands)	0-2
<b>2. Microhabitat Features</b>	Ground Cover	0 = Bare or compacted surface 1 = Patchy logs, leaf litter, or grass covered floors 2 = Dense litter and abundant logs, minor to no grass coverage	0-2
	Surface Condition	0 = Waterlogged, compacted, or crusted soil 1 = Neutral or variable 2 = Friable or minimally cracked soils (suitable for burrows construction)	0-2
	Burrow Presence	0 = No burrows observed 1 = Possible burrows (uncertain ID)	0-2

Category	Habitat Variable	Scoring Criteria	Score Range
		2 = Confirmed target species trapdoor-style burrows	
3. Spatial Context	Proximity to Known Records	0 = >5 km from any known locality 1 = 2–5 km from known records 2 = <2 km or within same grid cell	0-2
	Habitat Connectivity	0 = Isolated or fragmented unsuitable habitat patch 1 = Moderately connected corridor 2 = Large, continuous tract of suitable habitat	0-2

**Table 35: Habitat suitability categories *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*)**

Total Score (Max 18)	Habitat Class	Comments
0–5	Unsuitable	Highly disturbed; no native vegetation remains; compacted, weedy ground with no surface structure.
6–10	Marginal	Some native vegetation persists, soils too shallow or disturbed; non-suitable habitats present; leaf litter sparse; minor surface cracking observed.
11–15	Suitable	Soil, vegetation, and habitat structure are suitable; burrows are likely but not detected yet despite appropriate conditions.
16–18	Optimal	Excellent structural integrity, ideal habitat type (eucalypt woodland with acacia understory) with dense litter and stable soils; confirmed <i>I. kopejtkorum</i> (listed as <i>Idiosoma nigrum</i> ) burrows at site or in near vicinity.

The key threat to *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) in the region has been identified as mining and minerals resource development (Rix et al., 2018). Key threats identified for *Idiosoma nigrum* (DSEWPaC, 2013) that may also be relevant to the Proposal and *Idiosoma kopejtkorum* are:

- land clearance and habitat fragmentation
- salinity
- grazing of habitat by feral animals
- dust pollution
- vibration from mining activities
- inappropriate fire regimes.

Further discussion on potential threats and impacts as a result of the Proposal are discussed in Section 5.

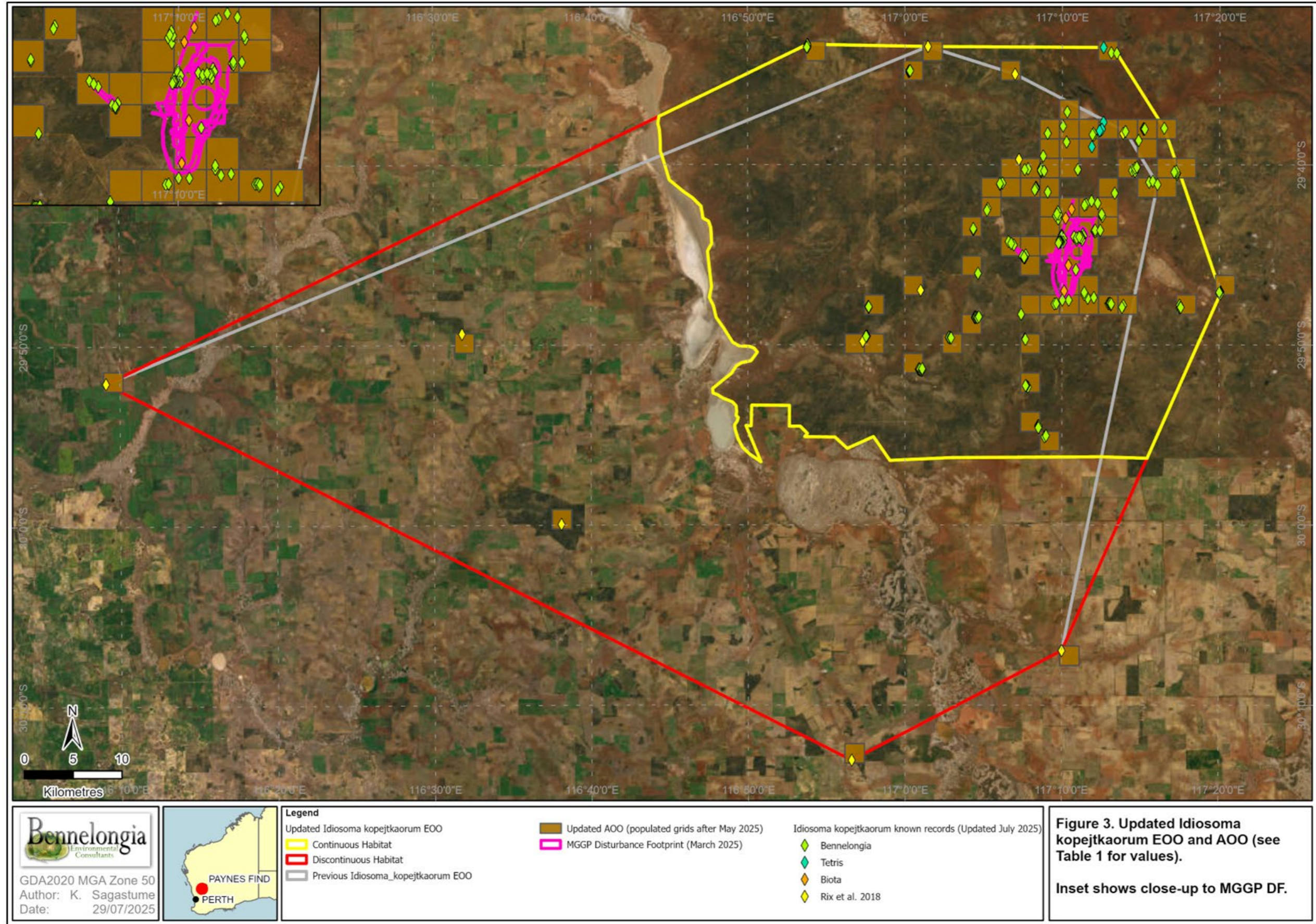


Figure 45: *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) records, Extent of Occurrence (EOO) and Area of Occupancy (AOO)

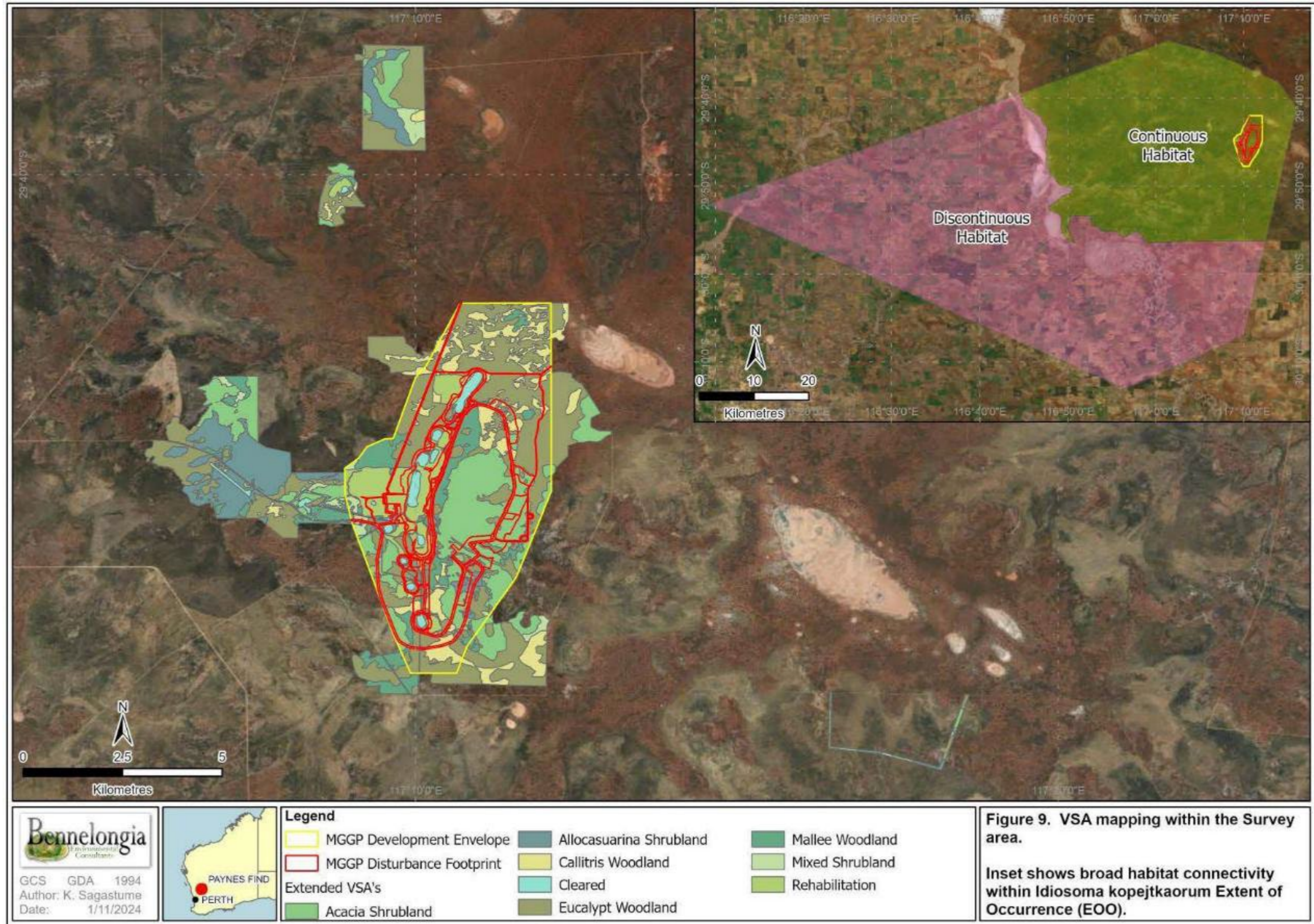


Figure 46: Habitat connectivity within *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) Extent of Occurrence (EOO)

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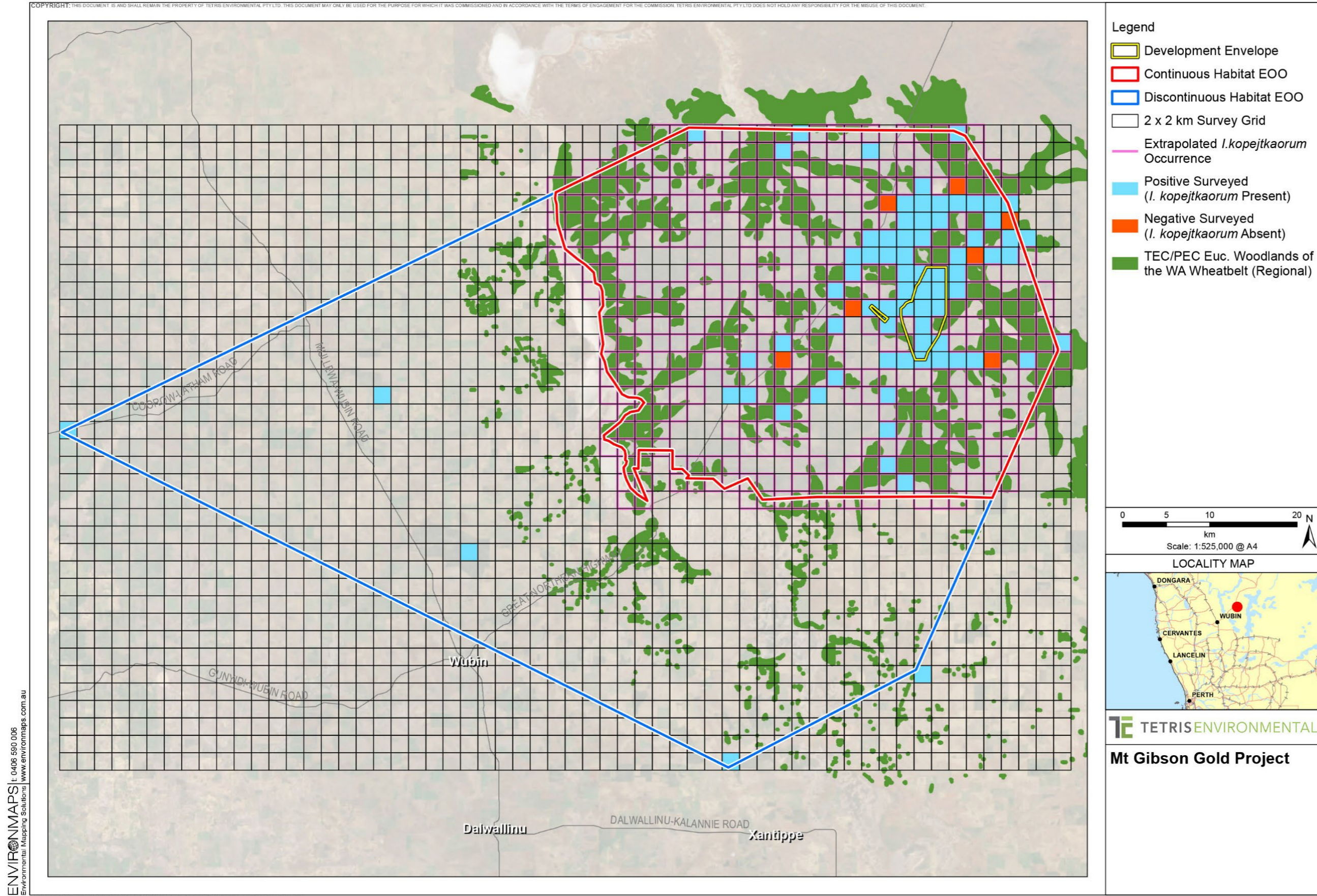


Figure 47: Extrapolation of potential *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) AOO.

## 5 Relevant Impacts and Management

### 5.1 Proposal Environmental Risk Assessment

A risk assessment was undertaken for the Proposal, summarising the impact assessment and avoidance and mitigation measures detailed in Sections 5.2 and 5.3.

The risk assessment and analysis process assessed the likelihood of the potential impacts occurring and the consequences of the event prior to and after management controls have been implemented. Likelihood and consequence definitions are provided in Table 36 and Table 37.

A quantitative approach has been used whereby values are assigned to the likelihood and consequence rankings. These values are used to determine the risk ranking from the risk matrix, provided as Table 38.

**Table 36: Likelihood of potential impact occurring**

Measure of likelihood	How likely is it that this event/issue will occur after control strategies have been put in place
<b>Highly likely</b>	Is expected to occur in most circumstances
<b>Likely</b>	Will probably occur during the life of the Proposal
<b>Possible</b>	Might occur during the life of the Proposal
<b>Unlikely</b>	Could occur but considered unlikely or doubtful
<b>Rare</b>	May occur in exceptional circumstances

**Table 37: Consequence of potential impact**

Measure of consequence	What will be the consequence/result if this issue does occur
<b>Minor</b>	Minor incident of environmental damage that can be reversed
<b>Moderate</b>	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
<b>High</b>	Substantial instances of environmental damage that could be reversed with intensive efforts
<b>Major</b>	Major loss of environmental amenity and real danger of continuing
<b>Critical</b>	Severe widespread loss of environmental amenity and irrecoverable environmental damage

**Table 38: Risk rating**

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

**Table 39: Risk assessment**

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Habitat loss and fragmentation</b>  <b>Unauthorised clearing of vegetation outside approved boundaries results in impact to MNES or their habitat</b>	Likely	High	High	Clearing kept to the minimum required for the Proposal (maximum Disturbance Footprint of 1,612 ha)	Rare	High	Low	No clearing of vegetation occurs outside the approved areas of disturbance.	Vegetation clearing extends beyond the approved Disturbance Footprint.	Stop work at that location	Pre and post-clearing survey  Quarterly drone aerial imagery  Quarterly reconciliation of the Site Disturbance Permits issued vs. the actual area of disturbance.
				Clearing undertaken progressively and only when necessary				No exceedance of approved area of disturbance.	Physically mark the intended clearing extent		
				Site Disturbance Permit system with strict survey controls and sign off by the Registered Manager prior to clearing				No clearing of MNES outside the approved Disturbance Footprint	Immediately stabilise disturbed soils		
				GIS records and demarcation of MNES outside the Disturbance Footprint and inside the Development Envelope.				The induction program will be completed for all onsite personnel and contractors.	Rehabilitate the disturbed area	Report to relevant authorities	
				Induction and specific training where necessary highlights the importance of clearing protocols				All clearing personnel have signed off that they have read and understood the Site Disturbance Permit conditions prior to clearing.	Undertake internal investigation and implement relevant corrective actions to reduce recurrence		
				Demarcation of <i>Eremophila viscida</i> exclusion area					Vegetation clearing does not proceed progressively or beyond that immediately required	Adjust vegetation clearing processes and timing to align with the proposed sequential and progressive clearing practices.	
								Clearing not undertaken in accordance with approved internal Site Disturbance Permit	Stop work at that location	Review unauthorised clearing against approved Disturbance Footprint	
									If clearing occurs outside the approved Disturbance Footprint – rehabilitate the disturbed area and report to relevant authorities	Undertake internal investigation and implement relevant corrective actions to reduce recurrence	

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<p><b>Weeds</b></p> <p><b>Spread of existing weeds or introduction of new weeds results in adverse impacts to WA Wheatbelt Woodlands or MNES fauna habitat</b></p>	Likely	Moderate	Medium	<p>Machinery and equipment are cleaned prior to being mobilised to site and inspected on arrival (not permitted to work until appropriately cleaned)</p> <p>Weed surveys and control using herbicide or manual removal.</p> <p>Annual targeted control <i>Rumex vesicarius</i> (Ruby Dock), already present in the Development Envelope.</p> <p>Vegetation and topsoil stripped from areas containing Ruby Dock stockpiled separately, treated for physical signs of weed growth before being reused in rehabilitation and closely monitored after use in rehabilitation with residual weeds treated as appropriate</p>	Unlikely	Moderate	Low	<p>Machinery and equipment have passed a weed &amp; hygiene inspection</p> <p>No increase in diversity of Declared Plants or Weeds of National Significance.</p> <p>No increase in the distribution of existing weeds at site from baseline data.</p> <p>No increase in the distribution of Ruby Dock at site from baseline data.</p>	<p>Machinery or equipment commences work prior to site inspection for cleanliness</p> <p>Weed survey determines increase in diversity of Declared Plants/ Weeds National Significance, or increase in distribution from baseline data</p>	<p>Stop work at that location</p> <p>Machinery moved to designated area (e.g. wash pad) for cleaning</p> <p>Undertake quarterly monitoring for one year at all locations machinery has worked, for presence of weeds</p> <p>Increase weed control frequency/intensity</p>	<p>Annual weed survey</p>
<p><b>Introduced fauna</b></p> <p><b>Feral predators, (predominately cats and foxes which are found throughout the region) are attracted to Proposal rubbish and waste, leading to increased populations of the feral predators and subsequent impact to MNES fauna.</b></p>	Possible	Moderate	Medium	<p>Putrescible landfill managed in accordance with the <i>Environmental Protection (Rural Landfill) Regulations 2002</i></p> <p>Domestic waste securely stored to minimise access by feral animals.</p> <p>Feral fauna eradication programs undertaken as required using licenced service providers.</p> <p>Implement animal sightings register and encourage site personnel to report sightings of feral fauna (cats, dogs, foxes)</p> <p>Ongoing funding provided to key regional NGO stakeholders (e.g. AWC) for regional feral animal management</p>	Unlikely	Moderate	Low	<p>No reduction in Malleefowl population size (number of active mounds as an indicator) as a result of Proposal implementation.</p> <p>No clearing of active Malleefowl mounds during breeding season.</p> <p>No reduction in Chuditch population size (radio-tracked individuals as an indicator) as a result of Proposal implementation</p>	<p>Malleefowl mound monitoring indicates a reduction in population size not attributable to natural factors (e.g. climatic conditions)</p> <p>AWC Chuditch monitoring data indicates a reduction in population size not attributable to natural factors (e.g. climatic conditions), or identifies deaths within the Disturbance Footprint</p>	<p>Commence internal investigation</p> <p>Increase feral predator eradication frequency/intensity</p> <p>Commence internal investigation in collaboration with AWC</p> <p>Increase feral predator eradication frequency /intensity, review site clearing procedures and speed limits as relevant to cause of decline</p>	<p>Annual Malleefowl mound monitoring</p> <p>Annual review of AWC Chuditch radio-tracking data</p> <p>Environmental Personnel will monitor and record reported observations of feral animals</p>

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Fauna mortality</b>  <b>Increased road traffic, open trenches or vegetation clearing, results in mortality of MNES fauna.</b>	Likely	High	High	Implement an animal sightings register and encourage site personnel to report sightings of MNES fauna.	Possible	High	Medium	No reduction in Malleefowl population size (number of active mounds as an indicator) due to Proposal implementation.	Malleefowl mound monitoring indicates a reduction in population size not attributable to natural factors (e.g. climatic conditions)	Commence internal investigation	Annual Malleefowl mound monitoring
				All incidences of harm to MNES fauna are investigated, and measures are adopted to prevent the reoccurrence of similar events				No clearing of active Malleefowl mounds during the breeding season.	Undertake internal investigation and implement relevant corrective actions to reduce recurrence	Pre-clearing survey (as required during breeding season)	
				Suitably trained personnel on-site to handle injured fauna				No reduction in Chuditch population size (radio-tracked individuals as an indicator) as a result of Proposal implementation	Increase feral predator eradication frequency/intensity if required	Annual review of AWC Chuditch radio-tracking data	
				Fauna inspections for MNES undertaken in areas immediately prior to clearing commencing. Should any MNES fauna be identified, clearing activities will be postponed until the fauna have moved (or been moved by suitably qualified personnel) from the area.				Injury or death of MNES or other fauna is minimised or avoided	Stop work at that location	Environmental Personnel will monitor and record total number of vehicle strikes	
				No Malleefowl mounds cleared during the breeding season without prior assessment of mound activity (in accordance with the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team 2020)). Active mounds (as determined by the National Malleefowl Monitoring Manual) will not be cleared during Malleefowl breeding season.				No evidence of MNES fauna being trapped within the mining Proposal area	Report to relevant authorities	Environmental Personnel will monitor and report on incidents of fauna entrapment	
				Where the mine development schedule permits, clearing adjacent to likely or probable active burrows will be avoided during <i>Idiosoma kopejtkorum</i> reproductive season (Sept.-Nov) to reduce impact on				AWC Chuditch monitoring data indicates a reduction in population size not attributable to natural factors (e.g. climatic conditions), or identifies deaths within the Disturbance Footprint	Undertake internal investigation and implement relevant corrective actions to reduce recurrence	Field monitoring for MNES presence within the Development Envelope	
								Increase feral predator eradication frequency/intensity, review site clearing procedures and speed limits as relevant to cause of decline			

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
				<p>active populations and mortality of wandering males or settling juveniles</p> <p>Prior to clearing a local area of Disturbance Footprint, AWC radio tracking records will be reviewed to determine confirmed Chuditch denning habitat/ possible Chuditch presence within clearing area. . If found to be present, particularly during the breeding season (roughly August to November/December), individual tree hollows will be checked, and clearing of these will be supervised by a zoologist.</p> <p>All excavations or trenches &gt;1 m deep will be secured against animal entry or have egress provided</p> <p>Progressive clearing in one direction to allow fauna to escape</p> <p>All road kill to be moved a minimum of 20 m from the road to reduce the risk of further mortality on carrion species feeding on road kill.</p> <p>Potential fauna water resources minimised and permanent water sources contained through fencing where appropriate.</p> <p>Induction and specific training where necessary highlights the importance of clearing protocols.</p>					<p>Fauna are injured or killed during vegetation clearing or by vehicles</p> <p>MNES fauna are being trapped within the mining Proposal</p>	<p>Personnel trained in fauna handling assesses animal and arranges transfer to a wildlife carer or vet</p> <p>Dead MNES fauna are collected and preserved before donating to approved collectors (e.g. WA Museum)</p> <p>Roadkill too damaged for preservation will be moved at least 20 m off the road</p> <p>Report to relevant authorities</p> <p>Undertake internal investigation and implement relevant corrective actions to reduce recurrence</p> <p>An investigation will be undertaken to determine the cause of MNES fauna being trapped in the mining Proposal area.</p>	
<p><b>Light</b></p> <p><b>Excessive light interrupts MNES fauna communication or displaces fauna of MNES</b></p>	Possible	Minor	Low	Implement best practice lighting design in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b)	Unlikely	Minor	Low	<p>Light spill is limited in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b)</p> <p>Lighting will be checked quarterly for compliance with National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b)</p>	<p>Lighting does not comply with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b)</p>	<p>Redirect lights or install light shields as appropriate to limit light to required areas</p>	<p>Report observations of fauna attraction to artificial lighting. Environmental Personnel to record all reports and investigate</p>

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Dust</b>  <b>Dust emanating from mining related activities causes adverse impact to adjacent vegetation, including to MNES flora or vegetation.</b>	Possible	Minor	Low	Dust suppression using water trucks will be continuous on unsealed roads, in the pit and other open areas.	Unlikely	Minor	Low	No reduction in patch size and quality of the WA Wheatbelt Woodlands TEC outside the Development Envelope as a result of Proposal implementation.	Monitoring identifies a reduction in quality of fauna habitat outside the Development Envelope not attributable to natural factors (e.g. climatic conditions)	Increase use of dust suppression in that area	Bi-annual passive dust sampling
				Dust suppression using water trucks undertaken on the ROM and during materials handling activities. Strict traffic management rules implemented (e.g., keeping to designated tracks, maximum vehicle speed limit of 60 km/hr).				No reduction in quality fauna habitat outside the Development Envelope as a result of Proposal implementation.	Review/reduce speed limits in that area	Annual vegetation health monitoring	
				Disturbed areas progressively rehabilitated as they become available and are no longer required for ongoing operations.				No reduction in the quality and quantity of <i>Eremophila viscida</i> populations or habitat outside the Development Envelope as a result of Proposal implementation.	Report to relevant authorities	Bi-annual drone survey/multispectral imaging	
				In excessively windy conditions when dust emissions cannot be adequately controlled, operations adjacent to MNES (e.g. TEC, <i>Eremophila</i> critical habitat) will be postponed until dust suppression can abate dust emissions.				Monitoring identifies a reduction in quality or patch size of WA Wheatbelt Woodland TEC (e.g. climatic conditions)	Undertake internal investigation and implement relevant corrective actions to reduce recurrence	<i>Eremophila viscida</i>  Bi-annual passive dust sampling  Quarterly vegetation/flora health monitoring of <i>Eremophila viscida</i> critical habitat	
								Monitoring identifies a reduction in the quality or quantity of <i>Eremophila viscida</i> populations or critical habitat outside the Development Envelope	Stabilise disturbed soils and increase weed control effort within rehabilitation areas in the short term.		
								Rehabilitation is not undertaken progressively	Increase rehabilitation effort to meet the schedule.		

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<p><b>Contamination of soil or water resources</b></p> <p><b>Saline water enters drainage lines, resulting in MNES flora or vegetation death, or changes in soil quality inhibiting MNES vegetation growth</b></p> <p><b>Spills of hydrocarbons or chemicals contaminate soils or water resources</b></p>	Likely	Minor	Low	Unsealed roads will be designed and constructed to minimise saline water runoff into undisturbed areas.	Unlikely	Minor	Low	Saline Water	Saline or tailings water enters undisturbed areas through pipeline failure	Immediately turn off pipeline and contain spill	Saline Water
				Tailings and saline water pipelines occurring adjacent to native remnant vegetation will be located within bunded corridors, inspected daily and may be installed with telemetry systems and pressure sensors.				No reduction in patch size and quality of the WA Wheatbelt Woodlands TEC outside the Development Envelope as a result of Proposal implementation.	Implement spill response procedure	Annual vegetation health monitoring	
				Water trucks will be fitted with dribble bars to minimise spray drift near vegetation.				No reduction in quality fauna habitat outside the Development Envelope as a result of Proposal implementation.	Report to relevant authorities	Bi-annual drone survey/multispectral imaging	
				Spills will be contained and cleaned up promptly and disposed of correctly (e.g., to the approved bioremediation facility). Equipment for containing and cleaning up spills will be provided in readily accessible areas where the risk of spills is high. Spill training will be provided to all relevant personnel.				No reduction in the quality and quantity of <i>Eremophila viscida</i> populations or habitat outside the Development Envelope because of Proposal implementation.	Undertake internal investigation and implement relevant corrective actions to reduce recurrence	Hydrocarbon Spills	
Control of contamination will be managed through other State environmental approvals including a Mining Proposal (under the Mining Act) and Works Approval (under the EP Act Part V).	Hydrocarbon Spills	Stop work in that location	Quarterly review and analysis of spill reporting data, including confirmation of appropriate clean up as soon as practicable.								
Hydrocarbons and chemical reagents will be stored in accordance with <i>Dangerous Goods Safety Act 2004</i> to ensure the safety of personnel and protection of the environment.	All spills are cleaned up and remediation is carried out in accordance with the site procedure.	Contain spill to approved disturbance areas	Weekly inspections of work areas to ensure spills and contaminated soil are addressed.								
	No contamination occurs outside approved disturbance areas.	Report to relevant authorities									
	No contamination remains post-closure	Undertake internal investigation and implement relevant corrective actions to reduce recurrence									
		Immediately clean up the spill and remediate the area									
		Undertake internal investigation and implement relevant corrective actions to reduce recurrence									
		Development and implement a remediation plan for areas of contamination.									

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<p><b>Surface water quality/quantity</b></p> <p><b>Mining activity and infrastructure placement results in changes to surface hydrology patterns and quality, subsequently resulting in indirect loss of MNES and/or habitat.</b></p>	Likely	Minor	Low	<p>Existing surface water flow regimes maintained with the installation and maintenance of surface water/drainage infrastructure.</p> <p>Drainage management infrastructure will be installed to maintain surface water flows across the Proposal.</p> <p>In the event of care and maintenance, water management structures will be inspected and remediated prior to and during the cessation of work.</p>	Unlikely	Minor	Low	<p>No reduction in the health of vegetation associated with downstream drainage channels, as a result of proposal implementation.</p> <p>No evidence of sediment deposition outside of the Disturbance Footprint.</p> <p>Drainage management infrastructure inspected following heavy rain events to identify and remediate any sedimentation built up within the diversions and/or erosion damage.</p>	Monitoring identifies a reduction in health of vegetation associated with downstream drainage channels	<p>Report to relevant authorities</p> <p>Undertake internal investigation and implement relevant corrective actions to reduce recurrence</p>	<p>Annual vegetation health monitoring</p> <p>Bi-annual drone survey/multispectral imaging</p> <p>Surface water monitoring utilising data loggers to capture baseline and operational flows (periodically after rainfall events)</p>
<p><b>Fire</b></p> <p><b>Hot work use or vehicle movement results in unplanned fires, altering natural fire regime and impacting MNES or habitat.</b></p>	Highly Likely	Major	Severe	<p>Appropriate fire suppression appliances and equipment will be maintained on site and employees trained in their use.</p> <p>Flammable materials will be stored onsite and handled in accordance with the applicable safety standards.</p> <p>During the bushfire season, the fire danger status will be monitored daily through the State managed (DFES) website.</p> <p>For “hot-work” activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions.</p> <p>Access tracks and fence lines used as firebreaks within the Proposal regularly maintained.</p> <p>Smoking only be permitted in designated areas</p>	Rare	Major	Medium	<p>No uncontrolled or unplanned fires occur.</p> <p>Vegetation fuel loads are maintained at sustainable levels.</p> <p>Flammable materials are stored onsite in accordance with the applicable safety standards.</p>	<p>Fires from the Proposal reach vegetation outside the Development Envelope</p>	<p>Small fires – extinguish using onsite firefighting equipment in accordance with safety procedures.</p> <p>Larger fires – initiate emergency response procedures and engage external emergency services.</p> <p>Report to relevant authorities</p> <p>Undertake internal investigation and implement relevant corrective actions to reduce recurrence</p>	<p>Bi-annual drone survey/multispectral imaging</p> <p>Environmental Personnel will monitor and record all fire events reported</p> <p>Field monitoring, undertaken by Environmental Personnel or Staff and contractors during operations</p>

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<p><b>Ineffective rehabilitation</b></p> <p><b>Poor planning and ineffective methods of conducting rehabilitation work can result in unstable, poorly performing landforms, including poor vegetation cover which can subsequently result in slope instability and ongoing erosion issues.</b></p> <p><b>Inappropriate storage of topsoil can result in sterilisation of the soil and subsequent poor performance in rehabilitation.</b></p> <p><b>Habitat values are not returned following rehabilitation</b></p>	Likely	High	High	<p>undertake rehabilitation, decommissioning, monitoring and contingencies as described in the approved MCP, submitted per requirements of the State legislated Mining Act.</p> <p>rehabilitation will be undertaken progressively</p> <p>topsoil will not be stripped or handled in wet or dusty conditions</p> <p>store topsoil in stockpiles of no more than 2m vertical height to reduce the loss of seed viability and biotic activity</p> <p>stockpiles located away from drainage lines and active areas</p> <p>clearly signpost stockpiles to deter traffic and inadvertent removal</p> <p>Any seeding or planting undertaken during rehabilitation will use species of local provenance</p>	Unlikely	High	Medium	<p>Rehabilitation activities undertaken as described in the approved MCP, submitted per requirements of the State legislated Mining Act.</p> <p>Rehabilitation completion criteria have been met as described in the approved MCP, submitted per requirements of the State legislated Mining Act.</p> <p>Stockpiles monitored annually for weeds and control measures implemented</p>	Monitoring identifies rehabilitation is not progressing towards completion criteria	<p>Review rehabilitation activities against the design/schedule in the approved MCP.</p> <p>If necessary, undertake rectification works of rehabilitated areas (e.g. erosion control, additional seeding/planting/weed control)</p> <p>Rehabilitation monitoring and remedial actions (as required) will continue until agreed completion criteria are met</p>	Rehabilitation monitoring undertaken as described in the approved MCP, submitted per requirements of the State legislated Mining Act

## 5.2 Impact Assessment

This section outlines the potential impacts associated with the Proposal. Proposed avoidance and mitigation measures are described in Section 5.3.

The following factors were considered when assessing potential impacts:

- the magnitude of the impact, taking into account the severity and scale of the impact when compared with baseline conditions
- the timing, duration and frequency of the impact
- the likelihood that any given impact would occur
- whether any impacts are unknown, unpredictable or irreversible
- the relevant component and stage of the Proposal
- benchmarks and requirements set by statutory requirements, policies and guidelines
- the principles of Ecologically Sustainable Development, and the objects and requirements of the EPBC Act.

### 5.2.1 Habitat clearing and degradation

Clearing of vegetation will be required for development of the Proposal during the construction and operational phases and will occur spatially depending on the Proposal development schedule. If not adequately managed there is a risk that clearing could occur outside the Disturbance Footprint or indirectly impact MNES. Clearing of vegetation/habitat loss is a key threat (as outlined in the relevant Conservation Advice/ Recovery Plan) to the WA Wheatbelt Woodlands TEC (DoE, 2015), Malleefowl (DCCEEW, 2024d), Chuditch (DEC, 2012), Southern Whiteface (DCCEEW, 2023a) and *Idiosoma nigrum* (DSEWPaC, 2013). This section considers the impacts to MNES associated with the Proposal from habitat clearing and degradation, including the direct impacts to extent, individuals and/or populations.

#### WA Wheatbelt Woodlands TEC

In the Proposal context, clearing up to 27.5 ha of vegetation representative of the WA Wheatbelt Woodlands TEC is required (Figure 30), of which 20 ha will be permanent loss from pit clearing. Clearing will be isolated to the edges of existing patches within the Development Envelope (Figure 31) and managed through the implementation of the site Environmental Management Plan. No entire patch will be removed, nor will any become ineligible for TEC status (TEPL, 2025a). Clearing for the Proposal represents 7.8% of the mapped WA Wheatbelt Woodlands TEC extent within the Development Envelope (350.3 ha). Clearing for the Proposal represents a decrease in the known local extent (2,394.3 ha) by 1.1%.

Clearing may also result in indirect impacts such as degradation via edge effects (such as weed invasion), which would likely occur slowly over several years. Patches with larger areas/boundaries are less exposed and more resilient to edge effect disturbances such as weed invasion (DoE, 2015). Therefore, patches 6, 7, 8 and 10 (Figure 32), have the greatest potential risk of edge effects due to their size after Proposal implementation (less than 4 ha) and being adjacent to the Disturbance Footprint.

After removal of 27.5 ha of TEC within the Disturbance Footprint, ~510.4 ha of native vegetation is considered critical to the survival of the TEC (refer to Section 4.2.3) will remain undisturbed in the Development Envelope; of which ~322.8 ha will be retained in eligible

TEC patches and ~187.6 ha will be retained in the 40 m buffer zone around TEC patches (TEPL, 2025a).

A regional vegetation assessment, undertaken by van Etten (2013), assessed the vegetation in the Mount Gibson area in support of the Mummaloo Iron Ore Project, located approximately 5 km northeast of the Proposal. van Etten (2013) highlights that while salmon gum woodlands have experienced significant decline, this has occurred in the northern and eastern wheatbelt, with 96% of its distribution within the semi-arid and arid zone, which includes the Proposal, remaining uncleared (Elith and Bidwell 2004). van Etten (2013) concluded that there was no evidence to indicate that the vegetation types in the Mummaloo area are rare or restricted in their distribution or likely to be threatened by the mining development. Whilst the vegetation within this regional assessment is not considered TEC due to being in the Yalgoo Bioregion rather than the Avon Wheatbelt region, the assessment highlights that vegetation characteristic of WA Wheatbelt Woodlands TEC is abundant throughout the local region to the north of the Proposal.

### Cumulative impacts to TEC

There are no known cumulative impacts relevant to the WA Wheatbelt Woodlands TEC in the region.

#### *Eremophila viscida* (Varnish Bush)

No *Eremophila viscida* or habitat critical for the survival of the species will be cleared for the Proposal (the topsoil storage area in the Disturbance Footprint in Figure 37 will be relocated). Clearing may result in indirect impacts such as degradation of critical habitat via edge effects, which would likely occur slowly over several years.

### Cumulative impacts to terrestrial fauna habitat

Two projects were reviewed for cumulative impacts on fauna habitat in the local area:

- Mummaloo Iron Ore Project, approximately 8 km northeast of the Proposal
- Mount Gibson Mining Iron Hill Deposit, approximately 18 km north of the Proposal.

Table 40 outlines cumulative impacts to fauna habitat in the Proposal. Fauna habitat types are common in the locality and exist contiguously with surrounding the Development Envelope, which will continue to provide habitat for displaced fauna. Cumulative impacts associated with the Proposal are unlikely to significantly reduce the overall species available distribution.

**Table 40: Direct and cumulative impacts to fauna habitat**

Project	Shrublands extent recorded in regional mapping area (ha)	Total approximate clearing (ha)	Loss of known extent (%)	Eucalypt woodlands extent recorded in regional mapping area (ha)	Total approximate clearing (ha)	Loss of known extent (%)
<b>Mt Gibson Gold (the Proposal)</b>	13,090 <sup>2</sup>	569.4 (VSA 1, 2 and 6)	4.3	4,140.6 <sup>1</sup>	469.0 (VSA 4 and 5)	11.3

Project	Shrublands extent recorded in regional mapping area (ha)	Total approximate clearing (ha)	Loss of known extent (%)	Eucalypt woodlands extent recorded in regional mapping area (ha)	Total approximate clearing (ha)	Loss of known extent (%)
<b>Mummaloo Iron Ore Project<sup>2</sup></b>		118	0.9	1,075 <sup>2</sup>	61.1	5.7
<b>Iron Hill<sup>3</sup></b>	400	15.9	0.1	1,270	34.3	2.7
<b>Cumulative Total</b>	<b>13,490</b>	<b>703.3</b>	<b>5.2</b>	<b>6,485.6</b>	<b>564.4</b>	<b>8.7</b>

1 Biota (2023)

2 Enviroworks (2013)

3 Mount Gibson Mining (2015)

### ***Leipoa ocellata* (Malleefowl)**

Clearing for the Proposal will result in the removal of two active (2024) and eight inactive *Leipoa ocellata* (Malleefowl) mounds. There are nine mounds within the Development Envelope (outside the Disturbance Footprint) none of which have been assessed as active during monitoring. There are 150 mounds and an additional 71 potential mounds (identified by Lidar and not yet verified) that occur outside the Development Envelope, including 14 recorded as active at during 2024.

It is expected that Malleefowl utilising the mounds within the Disturbance Footprint will disperse to nearby areas of habitat. The Proposal is relatively short-lived (~15 years) and any potential impacts to the area of occupancy are expected to be reversible, with Malleefowl returning to previous levels following closure and implementation of rehabilitation actions. Rehabilitation areas often contain high densities of *Acacia* spp. that provide seeds suitable for Malleefowl foraging (Bamford, 2025). Malleefowl are generalist feeders with variable diets, however, have been observed with diets consisting mostly of seeds and fruits of shrubs, particularly acacias (DCCEEW, 2024d). Malleefowl returning to areas following rehabilitation has been recorded during monitoring at Mt Jackson (MRL, 2022), where active mounds have been recorded surrounding rehabilitated operations (J2 and J3).

Malleefowl have relatively large territories and maintain more than one mound at any one time (although only one mound is generally used for nesting) (Biostat, 2018). Therefore, it is expected that the breeding pairs of Malleefowl associated with the two active mounds to be cleared, will select alternatively maintained mounds during subsequent breeding seasons. One of the active mounds is close to the boundary of the Disturbance Footprint (Figure 38), therefore that male probably has alternative mounds that will not be cleared. Observations at other projects (Bamford, 2024b) indicate that Malleefowl will be displaced by clearing and will construct new mounds if suitable nearby habitat is available; of which there is extensive suitable habitat outside the Disturbance Footprint and Development Envelope. The high number of usable mounds in the local area and contiguous habitat provides ample opportunity for dispersal and ongoing breeding. Bamford (2024a) concluded that given the expansive areas of suitable surrounding Malleefowl breeding habitat, it is highly unlikely that this will lead to population decline for this species (even at the local scale).

Furthermore, AWC mound monitoring during 2024 recorded 71% of mounds (20/28) inside the fenced area as active in 2024, compared with 37% (9/24) active outside the fenced area. Therefore, the status of mounds to be cleared (active or inactive) is not a significant impact to Malleefowl.

Bamford (2024b) noted that while Malleefowl may utilise all habitats within the survey area (for foraging, movement through the landscape, etc.), two VSAs appear to be strongly favoured for the construction of nest mounds: VSA 1 Acacia Shrubland and VSA 2 Allocasuarina Shrubland, particularly VSA 2 (Figure 39). The implementation of the Proposal would result in clearing of up to ~528 ha of VSA 1 and ~41 ha of VSA 2 habitat type (refer to Table 24). Bamford (2024b) determined that the impact to Malleefowl from habitat clearing and degradation would be negligible.

Review of project hi resolution aerial imagery and publicly available imagery shows that these habitat types are well represented throughout the region and extend well beyond the Development Envelope. This is supported by studies undertaken for the nearby Mummaloo Iron Ore project in 2013, which found Malleefowl habitat surrounding the Mummaloo project area to be locally extensive (EnviroWorks Consulting 2013); and the environmental impact assessment undertaken for the Iron Hill Deposit in 2015, which found suitable habitat in the surrounding area and a wide distribution across the Mt Gibson Ranges and broader region (Mount Gibson Mining 2015).

The Proposal will result in the direct impact of up to 568.8 ha of preferred breeding and foraging habitat (VSA1 and VSA2). Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b). The Proposal will also result in the loss of up to 608 ha of fauna habitat (VSA 3 – VSA 6) that may be utilised for movement and foraging during transit; however this impact will be temporary due to progressive rehabilitation of the Disturbance Footprint, returning foraging sources to the area, particularly given early stage rehabilitation areas providing food sources (e.g. Acacia seeds) for Malleefowl (Bamford 2024b).

### ***Dasyurus geoffroii* (Chuditch)**

The Proposal will result in the direct impact of up to 248.2 ha of preferred Chuditch habitat (VSA 4); however there is negligible impact expected to occur on the Chuditch from habitat clearing or degradation as the Disturbance Footprint is small across a broad and continuous landscape (Bamford, 2024b). There is over 5 km of continuous habitat north-east of the Proposal Development Envelope, 15 km of continuous habitat north of the Proposal and unrestricted habitat to the south for 15 km (linear), in which Chuditch can move through.

When analysing habitat preferences using field records and aligning this information with the floristic vegetation communities (Table 12), within VSA 4 Eucalypt Woodlands, Chuditch prefer York Gum (*Eucalyptus loxophleba* subsp. *supralaevis*) Woodlands, representative of VT11 and VT3. Clearing for the Proposal will remove a total of 164.7 ha of these vegetation types (Table 41).

**Table 41: Preferred Chuditch Vegetation Types**

Vegetation Type	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
<b>VT11 - <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> woodland over <i>Acacia acuminata</i> shrubland</b>	668.2	151.7

Vegetation Type	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
<b>VT3 - <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> and <i>Callitris columellaris</i> open woodland over <i>Acacia acuminata</i></b>	97.5	13.0
<b>Total</b>	<b>765.7</b>	<b>164.7</b>

The Proposal will result in the loss of up to 928 ha of fauna habitat (VSA 1 – VSA 3 and VSA 5; noting 568.8 ha of this has been included as preferred Malleefowl breeding habitat) that may be utilised for movement and foraging during transit; however, this impact will be temporary due to progressive rehabilitation of the Disturbance Footprint returning foraging sources to the area. .

#### ***Aphelocephala leucopsis* (Southern Whiteface)**

There is negligible impact expected to occur on the Southern Whiteface from habitat clearing or degradation, as no records occurred within the Disturbance Footprint and there is little if any core habitat (suitable for residency and breeding) present (Bamford, 2024b). Vegetation in the Disturbance Footprint may have a dispersal function but the species appears to be very patchily distributed in that area.

#### ***Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*)**

When analysing the habitat preferences using the field records and aligning this information with the floristic vegetation communities (Table 12), within VSA 4 Eucalypt Woodlands, spiders preferred York Gum (*Eucalyptus loxophleba* subsp. *supralaevis*) and Salmon Gum (*Eucalyptus salmonophloia*) Woodlands, representative of VT3, VT11 and VT12 and totalling 203.1 ha within the Disturbance Footprint (Table 33); however when considering *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) habitat preference for York Gum dominant woodlands representative of VT11, 151.7 ha occurs within the Disturbance Footprint. A further 516.5 ha of VT11 occurs in the Development Envelope outside of the Disturbance Footprint.

**Table 42: Preferred *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) Habitat**

Vegetation Type	Habitat Preference Rank	Total within Development Envelope (ha)	Total within Disturbance Footprint (ha)
<b>VT11 - <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> woodland over <i>Acacia acuminata</i> shrubland</b>	1	668.2	151.7
<b>VT3 - <i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i> and <i>Callitris columellaris</i> open woodland over <i>Acacia acuminata</i></b>	2	97.5	13.0
<b>VT12 - <i>Eucalyptus salmonophloia</i> Woodland over <i>Acacia</i> spp.</b>	3	364.3	38.4
<b>Total</b>		<b>1,130.0</b>	<b>203.1</b>

*Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) Extent of Occurrence (EOO) is estimated to be 4,930 km<sup>2</sup> and Area of Occupancy (AOO) approximately 300 km<sup>2</sup>. Approximately 90% of the Proposal's Disturbance Footprint (1,452 ha) overlaps with the species' current AOO. However, only 1,094 ha of this corresponds to native vegetation and will be subject to clearing (the remaining 358 ha corresponds to cleared or recently rehabbed areas). Based on this, the Disturbance Footprint is expected to impact up to 3.65% of the species' AOO (Bennelongia, 2025b).

The EOO of *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) can be divided into two broad categories based on habitat connectivity: discontinuous habitat and continuous intact habitat (Figure 45). The Development Envelope is located within the continuous habitat portion, which totals 2,139 km<sup>2</sup>/ 43.4% of EOO (Bennelongia, 2025a).

Based on the removal of up to 3.65% (possibly 0.8% extrapolated) of the species' AOO, the Proposal is expected to have a low potential risk to *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) populations; however, the AOO is a result of current survey effort and, given the survey experience to date, the species is expected to occur abundantly elsewhere in the unsurveyed Eucalypt Woodlands of the current EOO.

Clearing for the Proposal will result in the removal of 20 confirmed active *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) burrows in the Disturbance Footprint. An additional 22 burrows occur in the Development Envelope (outside the Disturbance Footprint) and a further 208 occur outside the Development Envelope. It should be noted that known population records are a result of current survey effort (to December 2025) and the species is expected to occur abundantly elsewhere in the region, particularly amongst unsurveyed York Gum woodlands within the EOO.

Applying the precautionary principle, there are also 55 active burrows (Table 33) that are likely (Table 32) *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) within the Development Envelope, of which 18 occur within the Disturbance Footprint. An additional 24 likely active burrows have been recorded outside the Development Envelope. Population estimates (refer to Section 4.7.2) suggest there could be approximately 6,042 *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) spiders within the Development Envelope, out of which 695 are expected to occur within the Disturbance Footprint. A 50 m avoidance buffer to mitigate potential indirect impacts is a requirement for exploration surveys under WA State legislation (BC Act). Applying this to the Proposal, there could be approximately 472 individuals estimated to occur in suitable habitat (VSA 4) within 50 m of the Disturbance Footprint.

Increased exposure to sunlight, which results from vegetation removal may alter soil moisture levels or increase internal burrow temperatures, making the environment unsuitable for survival, burrow maintenance, or creation of new burrows by younger (spiderlings) life stages (Bennelongia, 2025a). As a result of habitat degradation, increased reduction of prey availability (small insects) on which the species rely on may occur.

Dispersal is another critical phase for trapdoor spiders which may be affected due to habitat clearing and fragmentation; particularly juvenile specimens who leave maternal burrows may have difficulties finding suitable areas to establish their own burrows.

Burrow construction is a crucial part of trapdoor spiders' ambush strategy. However, habitat degradation can alter soil quality, making it harder for spiders to build and/or maintain their burrows. Soil compaction and loss of vegetation cover can change the structure and moisture of the soil, reducing its suitability for burrow construction, which would lead to spiders losing their primary method of securing food and refuge. These changes will usually

be accompanied by microclimate alterations and changes in water retention which will lead to burrows becoming too dry and result in the spiders' desiccation (particularly for juveniles) (Bennelongia, 2025a).

Bennelongia (2025a) determined that habitat clearing and degradation is a minor impact to populations of *I. kopejtkorum* (listed as *Idiosoma nigrum*). Although adverse impacts can occur to local populations, the species is known to occur outside of the proposed impact area, and preferred habitat for the species is intact in the local region and not restricted to the Disturbance Footprint (Bennelongia, 2025a).

Table 43 outlines cumulative impacts to *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrows considering impacts from the Proposal in addition to the Mummaloo Iron Ore Project and Iron Hill Project. At the time of the Mummaloo (Enviroworks, 2013) and Iron Hill (Mount Gibson Mining, 2015) Proposal assessments, this species was known as *Idiosoma nigrum* and has been described as such in those documents however, for the purposes of the cumulative impact assessment and based on their close proximity to recent confirmed active records (Table 31), they will be considered as confirmed active *Idiosoma kopejtkorum*.

**Table 43: Direct and cumulative impacts to confirmed active *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrows and AOO in the Proposal**

Project	Confirmed regional recorded burrows	Confirmed burrows in Development Envelope	Confirmed burrows in Disturbance Footprint	Burrows remaining after Proposal implementation	Reduction in known records (%)	Loss of AOO (%) <sup>1</sup>
<b>Mt Gibson Gold (the Proposal)</b> <sup>1</sup>	250	42 <sup>5</sup>	20 <sup>5</sup>	230	8.0	3.6
<b>Mummaloo Iron Ore Project</b> <sup>2, 3</sup>	159 <sup>6</sup>	13 <sup>6</sup>	2 <sup>6</sup>	157	1.3	1.9
<b>Iron Hill</b> <sup>4</sup>	92 <sup>6</sup>	-	22 <sup>6</sup>	70 <sup>6</sup>	23.9	-
<b>Cumulative Total</b>	<b>501</b>	<b>55</b>	<b>44</b>	<b>457</b>	<b>8.8</b>	<b>5.5</b>

1 Bennelongia (2025b, 2026)

2 Enviroworks (2013)

3 Bennelongia (2012a)

4 Mount Gibson Mining (2015)

5 Confirmed, active burrows

6 Activity status not recorded

## 5.2.2 Fragmentation

Fragmentation is a key threat (as outlined in the relevant Conservation Advice/ Recovery Plan) to the WA Wheatbelt Woodlands TEC (DoE, 2015), Malleefowl (DCCEEW, 2024d), Chuditch (DEC, 2012), Southern Whiteface (DCCEEW, 2023a) and *Idiosoma nigrum* (DSEWPac, 2013). The highly diverse and complex nature of the vegetation within the WA Wheatbelt Woodlands provides habitat and resources to many fauna species, including Malleefowl and *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) (DoE, 2015).

The risk of fragmentation is greatest during the construction phase of the Proposal, when most clearing of native vegetation occurs. Whilst the Proposal occurs within a landscape fragmented by previous mining operations (open pits, TSF and WRL), the Disturbance Footprint has been designed to minimise new disturbance by undertaking cutbacks of the existing pits and utilising areas of historical disturbance. The Proposal will be subject to rehabilitation following the cessation of mining, approximately after 15 years. Rehabilitation will be progressive and will limit the total area of permanent habitat loss that will be inevitable through pit voids etc. Rehabilitation of the Proposal will continue until the agreed (under the Mining Act) completion criteria are met. The general objective for closure of the site is to reinstate the pre-mining land use as far as practical. This will involve rehabilitation of all disturbed areas, except the open pits, to achieve stable landforms with vegetation in rehabilitated areas having values equivalent to surrounding ecosystems not impacted by mining activity.

A MCP will be developed in accordance with relevant State guidance and approved under the Mining Act. The MCP will detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes. The Proposal will be obligated to meet closure criteria as approved by DMPE in the MCP approved under the Mining Act. Initial rehabilitation targets will be 60% comparison to native vegetation for species richness, density and cover. Based on rehabilitation at similar projects throughout WA, rehabilitation quality is expected to be high, particularly for foraging and areas of low disturbance (roads, laydowns etc.).

Monitoring programs will be implemented to track rehabilitation progress. Where monitoring indicates that progress towards meeting the completion criteria is not progressing as necessary, contingency actions will be implemented, which may include additional earthworks, additional removal of infrastructure, and/or additional revegetation works, with subsequent additional monitoring to then also be implemented.

### **WA Wheatbelt Woodlands**

The Proposal will not fragment or significantly increase fragmentation of any known occurrences of the WA Wheatbelt Woodlands. Patch 7 (Figure 32) will be temporarily fragmented by a minor road (for light vehicles), however this will not provide a barrier for affecting functionality of the patch or preventing fauna from using the TEC for foraging or habitat. Clearing for the Proposal will not remove any whole patch of the WA Wheatbelt Woodlands mapped within the Development Envelope. Clearing will be isolated to the edges of existing patches within the Development Envelope (Figure 32) and managed through the implementation of the MNES EMP (refer to Section 5.3.13). All of the patches within the Disturbance Footprint will continue to meet the Approved Conservation Advice criteria and retain TEC status after clearing.

The WA Wheatbelt Woodlands has been subject to extensive clearing and fragmentation within the wheatbelt agricultural zone, particularly the eastern wheatbelt. The Proposal is located within the Mount Gibson area, considered to be within the arid zone of Western Australia (van Etten, 2013). van Etten (2013) outlines that within the arid zone, 96% of the salmon gum woodlands distribution remains uncleared, highlighting low occurrences of fragmentation and the contiguous nature of the salmon gum woodlands (representative of the WA Wheatbelt Woodlands) extending into the Goldfields region.

The establishment of vehicle access may result in minor fragmentation however; this will be limited in extent and will not inhibit the natural processes of the existing community. Existing roads will be used and widened only where required. If additional clearing is required for new

roads, these have been designed to avoid the WA Wheatbelt Woodlands patches and where this is not possible, disturbance to large trees will be kept to the minimum necessary to ensure safe access.

Management measures (Section 5.3) will be implemented to minimise or prevent increased fragmentation. Disturbance from roads, tracks and historic mining activities exist in the proposed clearing area, which will be utilised to prevent increased fragmentation of the WA Wheatbelt Woodlands.

Noting the above, it is unlikely that the Proposal will significantly fragment or increase the fragmentation of the WA Wheatbelt Woodlands.

## **Fauna**

Due to the existing disturbance from mining in the 1980's and 1990's covering a length of ~7.5 km north to south and ~6 km east to west (does not include historical exploration drilling disturbances), the Development Envelope is currently considered to be a significantly fragmented landscape. Additional clearing of 1,213 ha for the Disturbance Footprint will only increase the current fragmentation by ~2 km to the east contiguously from the existing disturbance boundary and is therefore not expected to cause an appreciable increase in impacts to the reproduction, foraging and movement of the MNES species relevant to this Proposal. This is evidenced by examining the fauna survey data collated for the Proposal which suggests that the abundant breeding populations within and adjacent to the Development Envelope have adapted to a fragmented landscape and their survival has not been impeded by it. However, it is important to consider the potential impacts from fragmentation that may occur through additional clearing.

Fragmentation can indirectly impact Southern Whiteface and Malleefowl by increasing their vulnerability to predation by feral species and destructive fires and increasing the risk of weed encroachment (DCCEEW, 2024d). Highly fragmented habitats also have reduced immigration rates, limiting the ability of populations to recolonise (DCCEEW, 2023a).

The Proposal will not result in the fragmentation of any population of Malleefowl, Southern Whiteface, *Idiosoma* sp. or Chuditch. No isolated population of fauna MNES occur or are known to occur within the Development Envelope. Furthermore, suitable habitat is well represented within the regional area and is contiguous in nature. Implementing the Proposal will not split a population into two or more populations or impede movement within the landscape.

The Disturbance Footprint will increase the boundary of an 'island' of disturbed land within the surrounding, continuous native vegetation and is not expected to pose any change to the landscape permeability for fauna, including Malleefowl. Linear infrastructure (such as roads, pipelines, bunds etc.) have the potential to pose a barrier to fauna movement for some smaller, ground-dwelling, non-volant fauna but, given the scale of the Proposal, and the vast areas of surrounding native vegetation, this is expected to have negligible impact on the connectivity of MNES fauna populations. The risk to this species is considered negligible (Bamford, 2024b).

The Disturbance Footprint is expected to be of limited value for Southern Whiteface dispersal as there is little core habitat (suitable for residency and breeding) for the species in the Development Envelope (Bamford, 2024b). The risk to this species is considered negligible (Bamford, 2024b).

There is negligible impact expected to occur on the Chuditch from fragmentation as the Disturbance Footprint is small in comparison with the mobility of the Chuditch, so individuals should readily be able to move around and even through the Development Envelope (Bamford, 2024b).

Given that *Idiosoma* species are sedentary and have limited dispersal abilities, fragmentation poses some challenges as they rely on specific microhabitat conditions and rarely venture far from their burrow locations (except reproductive males, which often travel under 100 m per day and up to 500 m in search of females for mating) (Bennelongia, 2025a). Overall, fragmentation can lead to reduced population viability which results in vulnerable populations. When populations become too small and genetically homogeneous, they become more vulnerable to be wiped out by catastrophic events such as drought, wildfires, or diseases. Without gene flow from nearby populations which can recolonise and/or reproduce with the isolated populations, local extinctions and permanent loss of populations can occur, reducing the overall range of the species.

The *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) haplotype analysis suggests that genetic variation is high even within geographically close localities. Fragmentation could affect unique mitochondrial variation even if habitat connectivity is not completely interrupted. The importance of this loss to the species' genetic robustness is currently unclear.

Fragmentation of habitat and interruption to genetic connectivity is considered a moderate impact (refer to Bennelongia, 2025a for definition of moderate) to *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*). This is because, even though gene flow will not completely stop between populations outside of the Development Envelope, clearing and fragmentation will result in removal of an important part of the known gene pool for the species (Bennelongia, 2025a).

### 5.2.3 Invasive species including feral predators

Invasive species are a key threat (as outlined in the relevant Conservation Advice/ Recovery Plan) to the WA Wheatbelt Woodlands TEC (DoE, 2015), *Eremophila viscida* (CALM, 2003), Malleefowl (DCCEEW, 2024d) and Chuditch (DEC, 2012). Impacts from invasive species have potential to occur over all phases of the Proposal, particularly the construction and operation phases.

Weeds have the potential to outcompete native species, reducing quantity of food or nesting material available to fauna. Movement of vehicles and machinery, ground disturbance, vegetation clearing, soil handling and storage can introduce, transport and promote establishment of weeds in the Proposal. Weeds in the Proposal predominately occur on previously disturbed land; however, are not currently degrading the structure and composition of native vegetation communities and are symptomatic of disturbance (i.e. from historical mine activities).

None of the weed species recorded in the Development Envelope are Weeds of National Significance (Centre for Invasive Species Solutions, 2023) or Declared Pests on the Western Australian Organism List (DPIRD, 2023b). However, Ruby Dock is an invasive species that can rapidly colonise disturbed areas. The seeds are salt tolerant and form a persistent seed bank within the soil that can last for many years (Schatral and Osborne, in FVC 2023).

Weeds such as *Rumex vesicarius*, *Cleretum papulosum*, *Carrichtera annua* and *Mesembryanthemum* spp., are known to occur in areas of the Eucalypt Woodlands of the West Australian Wheatbelt TEC, particularly adjacent to disturbances where edge effects are

apparent. Weeds are identified as a key threat to the TEC (Department of the Environment 2015).

Feral predators, predominantly cats and foxes, are found throughout the region and can be attracted to rubbish tips and domestic waste storage. This can lead to increased populations of feral predators and subsequent impact on native fauna in the area. Grazing by introduced fauna such as rabbits has the potential to lower WA Wheatbelt Woodlands TEC resilience by grazing on new germinants and preventing growth of key species. When rabbit numbers are greater than 0.5 rabbits per hectare, the recruitment and regeneration of plants are inhibited, which may cause many species to become locally extinct (DEE, 2016).

The Proposal is not likely to increase the occurrence of feral fauna or their potential threat to fauna species. Feral fauna control measures, such as baiting, trapping, and shooting, will be implemented, and it is predicted that feral fauna occurrence in the Proposal area will decrease as a result. Feral fauna controls will align with relevant actions and objectives listed within the fox, cat and rabbit threat abatement plans (DEWA, 2008; DCCEEW, 2024e; DEE, 2016).

The impact of introduced predators on the Malleefowl is uncertain, but in some situations the red fox and cat have adverse impacts on populations. The risk to Malleefowl from invasive species is considered moderate (Bamford, 2024b). Camera monitoring by AWC at the Mount Gibson Wildlife Sanctuary has recorded feral cats preying on adult Malleefowl (Photograph 5) illustrating the predation threat to all Malleefowl and not just chicks or young adults, thought to be the main target for feral cats.



**Photograph 5: Adult Malleefowl predation by feral cat (AWC, 2024)**

A possible minor impact on the Southern Whiteface from invasive species could occur. Within the local area, the species is present (in suitable habitat) at densities comparable with other studies, which suggests the local population is stable and tolerating current densities of introduced predators. However, a decline in small, sedentary birds can occur around mine sites, apparently due to an increase in the abundance of predatory birds attracted to the site as a result of an increase in food supply (Bamford, 2024b).

Feral predators have the potential to have a major impact on Chuditch. The red fox has been implicated in the decline of Chuditch across much of its range, so the reintroduced population is likely to be vulnerable to this predator and to any increase in its abundance. Such changes in the abundance of introduced species can occur in association with disturbance during mining and an increase in food supply from inappropriately stored food waste (Bamford, 2024b).

Predators and invasive species are likely to affect spider populations mainly at a local scale; however, it is possible that invasive species will incur in undisturbed habitats outside of the Development Envelope. Bennelongia (2024b) determined that the potential impact of invasive species on *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) is moderate (refer to Bennelongia, 2025a for definition of moderate); given that any individuals remaining within the Development Envelope after habitat clearing has occurred may be at risk of being predated or outcompeted for resources by invasive species, which could also affect and reduce reproductive success in the local area.

#### 5.2.4 Noise and vibration

Impacts from noise and vibration could occur predominantly over the construction and operation phases and would be restricted spatially based on progressive development and pit mining schedule. GHD (2025) undertook a noise emissions assessment for the Proposal, modelled in Computer Aided Noise Abatement (CadnaA) noise modelling software. CadnaA is an environmental noise modelling package for the calculation, assessment and prognosis of noise propagation. Noise propagation calculations consider sound intensity losses due to distance attenuation, atmospheric absorption, ground absorption and shielding provided by solid structures or terrain. The noise assessment was an initial assessment based on human health and some assumptions made on the potential extent of noise and vibration effects on fauna beyond the Disturbance Footprint. This was completed in the absence (at the time of GHD's assessment) of detailed data and fauna impact assessment later undertaken by fauna specialists, Bamford Consulting Ecologists and Bennelongia Environmental Consultants.

Noise emissions from plant and equipment proposed for the mine have been modelled as continuous sources at maximum sound power levels. Noise contour maps of the worst-case mining locations to the nearest noise sensitive receiver are presented in GHD (2025, Appendix L).

Noise modelling demonstrated that under worst case meteorological conditions, there is regulatory compliance of assigned day and night LA10 noise levels at all sensitive receptors that fall under regulatory guidelines.

Assessment of blasting noise and vibration levels indicated that levels are below the relevant blasting noise and vibration criteria.

If disturbed, Malleefowl are known to be able to move and relocate mounds often. It is expected that they will utilise the large land area outside the mining area when the clearing of the proposed area takes place. This is evidenced by behaviour in Malleefowl moving

breeding areas by as much as several square kilometres when disturbed (Benshemesh, 2007).

Annual Malleefowl mound monitoring has been undertaken at Mt Jackson (approximately 200 km east of the Proposal) since 2013, to determine if any spatial trend of declining breeding activity exists that may be related to being in close proximity to mining operations. The 2018 monitoring found that the data consistently showed no relationship between distance from mining and mound activity. This is likely because Malleefowl males (the primary creator of mounds) have relatively large territories, are mobile and maintain more than one mound at any one time (although only one mound is generally used for nesting) (MRL, 2019). More recent monitoring in 2021 recorded the same result, with no apparent spatial pattern of decreased breeding activity closer to mining operations (MRL, 2022). Additionally, environmental factors such as rainfall, fire and predation appear to be the most important factors affecting successful Malleefowl breeding (Benshemesh, 2007).

Malleefowl at other mine sites suggest the species is very tolerant of noise, having been observed to continue working on a mound, and subsequently returning to a mound <50m from a major haul road. One male continued to work a mound within <50m of clearing being carried out and continued to maintain that mound until the end of the season (Bamford, 2024b). The risk of impact to Malleefowl from noise is considered negligible.

There is no public information on the tolerance of Southern Whiteface to noise available; however, the species has been recorded foraging within 25 m of the Mummaloo accommodation camp and therefore would have been regularly exposed to noise, light, and movement of vehicles and people. The risk of impact to this species from noise is considered negligible (Bamford, 2024b).

The effect of disturbance (noise, vibration or lighting) on Chuditch is uncertain, however there are records of them entering suburban gardens (e.g. to prey on domestic chickens), suggesting the species is tolerant of disturbance (Bamford, 2024b).

Disturbances such as noise, and vibration may impact populations of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) by affecting their biological processes. Given that prey capture by *Idiosoma* species is often based on vibration cues generated by the prey, noise pollution from heavy machinery or vehicles can generate vibrations or ambient noise that mask or confuse the natural important vibratory signals. Additionally, whilst unlikely, excessive vibration from machinery operation or vehicle traffic could cause sensory overload, creating misleading and/or missed hunting opportunities, or false defensive responses to non-threatening vibrations Bennelongia (2025a). It has been suggested that vibrations from vehicles and exploration drilling have the potential to affect nearby trapdoor spider populations (DCCEEW 2024b), however, no immediate or short term effects of vibrations on the survival of *Idiosoma nigrum* have been found (Bennelongia 2025a).

A three year *Idiosoma nigrum* monitoring program was undertaken at the Jack Hills and Weld Range in the Midwest region of WA (approximately 400 and 260 km north of the Proposal respectively) with the aim of determining whether spider populations are impacted by vibrations from exploration activities. The research program concluded vibrations were not a factor affecting survival of the *Idiosoma nigrum* (Phoenix, undated a & b). Additionally, the significant survey effort undertaken at the Proposal in 2024 for *Idiosoma* spp., recorded evidence of a reproducing female within 15 m of a drill pad (Photograph 6), and active burrows next to heavily used access tracks and other historical disturbances.



**Photograph 6: Female *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) at the Proposal within 15 m of previously drilled/disturbed pad and track**

Based on the above, vibrations are unlikely to affect genetic diversity or ecological connectivity given they will occur ad-hoc (e.g. drilling, blasting) and be localised based on pit development vibrations. Monitoring of the species adjacent to exploration disturbance is an existing requirement under the BC Act (section 40) and the results will be provided to DCCEEW in the annual compliance report post approval of the Proposal. Bennelongia (2025a) concluded the potential impact for this component to be minor. At a local scale, impacts are expected to be moderate (refer to Bennelongia, 2025a for definition of moderate) and affecting those individuals in the Development Envelope but outside the Disturbance Footprint. At a regional scale, impacts are likely to be minor, with noise and vibration not expected to have impacts at a regional scale.

### 5.2.5 Lighting

Impacts from lighting could occur predominantly during the construction and operation phases. Artificial lighting from infrastructure and machinery may impact fauna within the Proposal area during the construction and operational phases. Lighting has the potential to disrupt native fauna by attracting predators and making it easier to locate prey, delaying the onset of activity in nocturnal species and reducing the available time for foraging or commuting (DCCEEW, 2023b), or attracting nocturnal species to feed on food sources attracted to light (e.g. insects, or frogs and reptiles congregating to feed on the insects attracted to the light).

The Proposal will implement best practice lighting design in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b). This includes lights being strategically placed and designed to shine towards operations to minimise light spill to the surrounding environment and using the lowest intensity appropriate to the task.

Based on observations of Malleefowl at other mine sites, the birds are very tolerant of light. They have been observed to continue working on a mound and subsequently returning to a

mound <50m from a major haul road, with one male working a mound within <50m of clearing being carried out and continued to maintain that mound until the end of the season (Bamford, 2024b). If the Development Envelope is assumed to be the area over which Malleefowl may be subject to some disturbance (Figure 38), there are nine mounds that may be affected by disturbance, none of which have been assessed as active during 2022 – 2024 monitoring. The risk of impact to Malleefowl from lighting is considered negligible.

There is no information available on the tolerance of Southern Whiteface to disturbance (dust, noise, vibration or lighting), however a party foraging within 25 m of the Mummaloo accommodation camp was recorded in 2023 (Figure 42); therefore these birds would have been regularly exposed to noise, light, and movement of vehicles and people. The risk of impact to this species from lighting is considered negligible (Bamford, 2024b).

The effect of disturbance (noise, vibration or lighting) on Chuditch is uncertain, however there are records of them entering suburban gardens (e.g. to prey on domestic chickens), suggesting the species is tolerant of disturbance (Bamford, 2024b). The risk of impact to this species from lighting is considered negligible (Bamford, 2024b).

Light pollution could affect *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) as they are nocturnal hunters that rely on darkness and camouflage (burrow) to effectively capture their prey. Artificial lighting can affect prey's natural (nocturnal) activity patterns, reducing the spiders' ability to catch prey. Additionally, it may increase the risk of predators within well-lit areas as wandering males and dispersing juveniles will become easier to detect under artificial lighting Bennelongia (2025a).

Bennelongia (2025a) concluded the potential impact for this component to be minor. At a local scale, impacts are expected to be moderate (refer to Bennelongia, 2025a for definition of moderate) and affecting those individuals in the Development Envelope but outside the Disturbance Footprint. At a regional scale, impacts are likely to be minor, with light not expected to have impacts at a regional scale as lighting will not extend outside the Development Envelope.

### 5.2.6 Dust

Dust generation is expected to occur over the construction and operation phases, however dust deposition levels at the Proposal are predicted to be low. GHD (2023, Appendix N) undertook an air quality assessment for the Proposal, including a qualitative construction dust assessment, determination of source emissions of the Proposal and subsequent air dispersion modelling for dust and gaseous emissions.

Results of the air quality impact assessment indicated that with appropriate dust control measures in place there will be limited negative air quality impacts.

Model outputs showed significant contributions to the emissions of particulate matter from wheel generated dust, which will be managed with standard mining control measures such as dust suppression of unsealed surfaces using saline water.

Providing vehicles are well maintained, emissions from construction vehicles on-site are not considered to significantly impact air quality (GHD, 2023).

Runoff or spray of saline ground water from dust suppression activities has the potential to result in the loss or reduced health of flora and vegetation. Dust suppression with saline water on unsealed roads appears to have a limited impact on surrounding vegetation (Loch

& Squires 2010), providing that saline water application is limited to the road surface and appropriate runoff capture measure (such a table drains) are used.

### **WA Wheatbelt Woodlands**

Due to the low rates of dust deposition (no exceedances to the human health criterion) the Proposal is considered unlikely to cause damage to the WA Wheatbelt Woodlands TEC (GHD, 2023).

The impact of airborne pollutants on native vegetation surrounding the Proposal was also considered. GLCs of NO<sub>2</sub> and SO<sub>2</sub> were compared with criteria for the annual average concentration set out in AQ Guidelines Europe. The GLCs were significantly below the criteria across the model domain (<10%).

Matsuki et.al (2016) found no evidence of negative impacts on plant health due to dust deposition in semi-arid environments. Plants in semi-arid environments are exposed to dust naturally and may be less likely than plants in more mesic landscapes to suffer from short-term impacts of dust. These plants often have morphological adaptations that capture and retain moisture (Matsuki 2016).

Studies investigating impacts of dust deposition on various species of Eucalyptus have shown that while some negative impacts on physiological process may be observed, overall, they are resistant to high levels of dust deposition (GHD 2023). Due to the low rates of deposition, dust is considered unlikely to cause damage to native vegetation, including the WA Wheatbelt Woodlands TEC.

### ***Leipoa ocellata* (Malleefowl)**

Due to the low rates of dust deposition (no exceedances to the human health criterion) the Proposal is considered unlikely to cause damage to the native vegetation that the Malleefowl rely on (GHD, 2023).

Without relevant criteria for the impact of NO<sub>2</sub>, SO<sub>2</sub>, CO, and VOCs on the Malleefowl the GLCs of these pollutants were compared with criteria for human health at the Malleefowl mound sensitive receptors. The GLCs were significantly less than the relevant criteria at all sensitive receptors (GHD, 2023).

Based on observations of Malleefowl at other mine sites, the birds are very tolerant of dust. They have been observed to continue working on a mound and subsequently returning to a mound <50m from a major haul road. One male continued to work a mound within <50m of clearing being carried out and continued to maintain that mound until the end of the season (Bamford, 2024b). The risk of impact to Malleefowl from dust is considered negligible.

### ***Dasyurus geoffroyi* (Chuditch)**

The effect of disturbance on Chuditch is uncertain, however there are records of them entering suburban gardens (e.g. to prey on domestic chickens), suggesting the species is tolerant of disturbance (Bamford, 2024b).

### ***Aphelocephala leucopsis* (Southern Whiteface)**

There is no information available on the tolerance of Southern Whiteface to disturbance (dust, noise, vibration or lighting), however a party foraging within 25m of the Mummaloo accommodation camp was recorded in 2023 (Figure 42); therefore these birds would have been regularly exposed to noise, light, and movement of vehicles and people. Impact to this species is expected to be negligible.

***Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*)**

Uncontrolled dust emissions have the potential to affect *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrow construction and operation by clogging burrow entrances and trapdoors which the spiders rely on to ambush prey. It consequently affects the spider's ability to hunt and could force them to spend more energy on cleaning and maintaining duties. Dust could potentially seep into the burrow itself, clogging air passages and altering microclimate within the burrow. If dust enters the burrows, the spiders' respiratory structures (book lungs) could be compromised, particularly in juvenile stages.

Bennelongia (2025a) concluded the potential impact for this component to be minor. At a local scale, impacts are expected to be moderate (refer to Bennelongia, 2025a for definition of moderate) and affecting those individuals in the Development Envelope but outside the Disturbance Footprint. At a regional scale, impacts are likely to be minor, given dust can reach populations even outside of the Development Envelope if not managed.

**5.2.7 Mortality during construction and life of mine**

Mortality is a key threat (as outlined in the relevant Conservation Advice/ Recovery Plan) to Malleefowl (DCCEEW, 2024d) and Chuditch (DEC, 2012) that may occur over the construction and operation phases of the Proposal. The loss of native fauna individuals due to vegetation clearing and/or vehicle strikes will be unavoidable and may include individuals of conservation significance. However, the MNES fauna species recorded or considered likely to occur within the Proposal are mobile and can move to adjacent habitats. Fauna habitat types are common in the locality and exist contiguously with the Proposal, which will continue to provide habitat for displaced fauna species. The Proposal is not expected to result in a loss or long-term decline of significant fauna species populations.

Malleefowl are vulnerable to roadkill (Garnett and Baker 2021) and as it is a long-lived species with low recruitment, even deaths of a few birds can impact a local population. This potential impact to this species is considered minor to moderate.

Southern Whiteface mortality during clearing is unlikely due to the scarcity of the species in the Development Envelope. There is a minor to negligible risk of vehicle strikes to this species as most birds do not occur close to roads (Bamford, 2024b).

There is a negligible to minor risk to Chuditch from vehicle strikes. Mortality during clearing is unlikely but possible, particularly when large fallen and standing tree hollows are impacted, since these are potential denning sites (Bamford, 2024b).

As *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) have sedentary habits and live in permanent burrows, land clearing activities such as bulldozing or vegetation removal often result in complete destruction of burrows, and given that spiders cannot flee from disturbances quickly, any individuals which are not directly killed by burrow destruction are likely to perish by other causes (predators, crushed by driving, desiccation). Therefore, in applying the precautionary principle, it is assumed that individuals within the Disturbance Footprint are unlikely to survive, however this will not have a long term impact on the survival of the species more broadly.

Even if a burrow is not directly destroyed, the surrounding habitat which provides cover such as leaf litter, branches, or shade, will be removed. The loss of shelter will likely expose the burrow to physical damage and harsh environmental conditions such as temperature fluctuations and desiccation, leading to increased spider mortality. Additionally, the trapdoor spiders' poor dispersing abilities will likely result in an inability to relocate and establish new

burrows. Mortality during construction and life of mine is considered as a moderate impact based on the potential impacts to individuals that may remain after land clearing, and the potential risk of completely extirpating the local population, and potential risks of failed recolonisation after the mine has closed (Bennelongia, 2025a).

### 5.2.8 Changes to surface and groundwater conditions

Potential impacts from the Proposal on surface and hydrology conditions have been identified as:

- Removal of, and placement of infrastructure over, catchment areas can result in alteration of runoff volumes, potentially impacting downstream environments such as sheet flow dependent vegetation.
- Placement of infrastructure or materials across drainage lines without diversion or maintaining flows may result in ponding upstream and subsequent soil water logging resulting in vegetation deaths.
- Leaching and deposition of mine waste material or runoff containing sediment and other contaminants has potential to adversely impact the quality of surface water and groundwater. Impacts to the downstream environment may occur as a result.
- Flooding of infrastructure due to inappropriate surface water management or failure of diversion structures or bunding, leads to infrastructure damage or bund overtopping and discharge of stored chemicals and hydrocarbons resulting in soil contamination and potential vegetation deaths.
- Use of saline water for dust suppression results in excess saline water runoff into drainage lines resulting in a reduction in water quality, vegetation death, or changes in soil quality inhibiting vegetation growth.

Any impacts from changes to surface and groundwater conditions are expected to occur over the construction and operations phases. Advisian (2023) completed a detailed hydrology study for the Proposal, investigating water-related impacts and assessing the proposed surface water management measures, including diversions and drain installation. The assessment determined a negligible difference in surface water quantity at identified hydrograph comparison locations and, therefore a negligible impact from the Proposal to surface water flows reporting to downstream receptors. Appropriate drainage and containment infrastructure will be installed to control runoff from hardstand areas, roads and other cleared surfaces. Based on the surface water assessment by Advisian (2023), no changes are expected to the surrounding surface water drainage patterns or nutrient cycles.

As outlined in Section 3.5.2, the Proposal will require up to five GL per annum of groundwater, although demand in the first year during construction is anticipated to be approximately 1 GL. Water will be supplied via bores and pit dewatering. There is an estimated 3.4 GL contained within the existing pit void lakes at the Proposal.

### Flora and Vegetation

The installation of drainage features within the Development Envelope will ensure surface water flows continue to support occurrences of the WA Wheatbelt Woodlands immediately adjacent to the Disturbance Footprint.

Installation of appropriate containment infrastructure (e.g. bunding) for the Proposal will reduce the risk of significant volumes of sediment or other material inundating the area of critical habitat for *Eremophila viscida*. Maintaining the vegetation structure in this area will also reduce the risk of erosion (TEPL, 2025a).

There is unlikely to be a threat to the WA Wheatbelt Woodlands from rising groundwater tables which are saline as the Proposal will be accessing groundwater for pit access and processing of ore. WA Wheatbelt Woodlands Patch 2 (Figure 32) may be at risk from inundation as it is located lower in the landscape, however, this risk can be managed with appropriate controls such as bunding or diversion channels. All other patches are located higher in the landscape or within separate sub-catchments (TEPL, 2025a).

Groundwater abstraction for mining purposes is unlikely to impact the WA Wheatbelt Woodlands TEC. The Groundwater Dependent Vegetation Desktop Study determined that groundwater in the Development Envelope is typically deep and most likely outside the vegetation root zone. Additionally, the depth to groundwater is approximately 4 m or greater and the groundwater is highly saline (typically over 10,000 mg/L) and therefore unlikely to support large vegetation such as Eucalypt trees, which have a shallow lateral root system and are typically susceptible to water logging and saline conditions (Section 3.7.3 and TEPL, 2023).

### **Fauna**

Groundwater changes such as secondary salinisation is not expected to impact populations of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*), Malleefowl, Chuditch or Southern Whiteface as it requires region-sized clearing to produce noticeable effects, and the level of clearing proposed by the Proposal is much smaller than this (Bennelongia, 2025a). Additionally, the landscape has low relief and thus little surface flow that could be altered (Bamford, 2024b). For such reasons, the impact on fauna MNES for this component is considered negligible.

### **5.2.9 Greenhouse gas emissions**

Greenhouse gas emissions will occur over all phases of the Proposal, however, are expected to be highest during the operations phase. Climate change is a key threat (as outlined in the relevant Conservation Advice/ Recovery Plan) to the WA Wheatbelt Woodlands TEC (DoE, 2015), Malleefowl (DCCEEW, 2024d) and Southern Whiteface (DCCEEW, 2023a). Long-term changes in rainfall such as drought and availability of food supply, may have implications for Malleefowl clutch size and breeding success (DCCEEW, 2024d).

Climate change and its resulting impacts, such as higher temperatures, desertification, ecosystem change, and more frequent and more intense natural disasters, pose a significant global threat to biodiversity, ecosystem function and overall ecosystem health. Climate change predictions are subjective and difficult to anticipate; however, it is considered likely that the change will be a drying climate (more hot days and fewer cold days) with more intense rainfall events (IPCC, 2022). A review of long term rainfall data at BoM's Goodlands weather station (# 10026) from 1924 – 2024 and mean maximum temperature data at BoM's Dalwallinu weather station (# 8297) from 1998 – 2024 found no evidence to suggest long term drying is occurring (BoM, 2023a). Higher summer rainfall will likely result in higher evaporation rates; however long term trends of this nature are difficult to define as summer rainfall in the Proposal area can also be influenced by tropical cyclones to the North.

The Proposal will contribute to greenhouse gas emissions and has potential to contribute to a drying climate and increase the vulnerability of flora and vegetation to drought affects. Heatwaves can also exacerbate drought, which in turn can also increase bushfire risk and adversely impact resource availability for fauna. It is unknown how weather events, or the

cumulative effect of these weather events, affect southern whiteface survival and reproduction (DCCEEW, 2023a).

Under the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (entered into force on 4 November 2016), Australia has committed to reducing GHG emissions by 43% below 2005 levels by 2030 and a target to be net zero by 2050. The Intergovernmental Panel on Climate Change (IPCC's) also indicated that global emissions need to fall by about 45% from 2010 levels by 2030, reaching net zero around 2050, to limit global warming to 1.5°C (EPA 2023a). Western Australia is committed to achieving net-zero emissions by 2050 as outlined in the Western Australian Climate Policy (DWER, 2020).

GHG emissions estimates were prepared using methods and emission factors from the NGER (Measurement) Determination 2008. GHG emissions associated with land clearing were estimated using the Full Carbon Accounting Model (FullCAM) guidelines by DCCEEW and the method outlined in Carbon Credits (Carbon Farming Initiative–Avoided Clearing of Native Regrowth) Methodology Determination 2015 (Greenbase, 2023). The GHG Assessment is included as Appendix O.

The Proposal will add to WA's contribution to GHG emissions; however, this contribution will decrease over time, projecting to net zero by 2050 (although the Proposal will not be operating in 2050). The Scope 1 GHG emissions from the Proposal are estimated to be highest in 2026 (year two) of implementation, when approximately 131 kt CO<sub>2</sub>-e per annum would be created. These emissions represent a maximum of 0.16% of the total emissions determined for WA in 2021 (DCCEEW 2023c) or 0.02% of the total emissions for Australia in 2022 (DCCEEW 2023d).

The GHG emissions associated with the Proposal will contribute to the global impact of climate change along with other projects previously approved in the area. In accordance with the GHG EMP and mitigation strategy prepared for the Proposal, emissions reductions have been implemented and will continue to be reviewed for the life of the Proposal, to assist in the attainment of net zero Scope 1 GHG emissions by 2050.

Progressive rehabilitation will commence early in the operational phase and regrowth is expected to reach maturity in 10-20 years, which is considered a very short time period in the context of climate change. Considering this, if regrowth vegetation is affected by climate change, so will the surrounding remnant vegetation, fauna and their habitat.

### 5.2.10 Bushfire risk

Altered fire regimes are a key threat (as outlined in the relevant Conservation Advice/ Recovery Plan) to the WA Wheatbelt Woodlands TEC (DoE, 2015), *Eremophila viscida* (CALM, 2003), Malleefowl (DCCEEW, 2024d) and *Idiosoma nigrum* (DSEWPaC, 2013). The Proposal may inadvertently cause fires through use of machinery on dry vegetation during clearing, use and storage of flammable materials or undertaking hot works (grinding, welding etc). Bushfire risk is greatest during the construction and operations phases of the Proposal.

Inappropriate fire regime has the potential to lower WA Wheatbelt Woodlands TEC resilience by destroying growth of germinants or preventing vegetation reaching maturity.

Fire may have the same medium term impact to Chuditch as habitat clearing due to its destructive nature (DEC, 2012). Broad scale, high intensity fires destroy den logs, protective cover and remove prey biomass (particularly large invertebrates) and homogenise large areas of habitat.

Large fires are a major threat to the conservation of Malleefowl and whole populations may suddenly be eliminated from vast areas that are burnt, and even if there are nearby sources for recolonisation, recovery in the burnt area to densities that occurred before the fire appears to be very slow, requiring 30 to 60 years (DCCEEW, 2024d).

Fire is a natural part of the Australian landscape, and most vegetation communities are adapted to periodic fires. However, changes in the natural fire regime may result in changes in the species composition and/or structure of the vegetation. The Proposal may increase the risk of bushfire through use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation. Alternatively, naturally occurring bushfires could be reduced in extent through the landscape if they are controlled by the Proposal to prevent loss of human life and infrastructure. In both circumstances, potential impacts to local biodiversity could include direct loss of fauna, flora and vegetation, prevention of natural ecosystem function (habitat loss, food sources) and germination of fire dependent flora species.

### 5.2.11 Ineffective rehabilitation

Soil compaction during clearing and infrastructure development in the construction and operation phases, has potential to limit rehabilitation success such as by restricting root growth of flora, decreasing water infiltration or increasing runoff and erosion. This is considered a low impact as standard rehabilitation practices, including ripping to break up compacted soil, is undertaken as required by the Mining Act.

Poor planning and ineffective methods of conducting rehabilitation work can result in unstable, poorly performing landforms, including poor vegetation cover which can subsequently result in slope instability and ongoing erosion issues. Additionally, inappropriate storage of topsoil can result in sterilisation of the soil and subsequent poor performance in rehabilitation.

## 5.3 Avoidance and Mitigation Measures

This section outlines the avoidance and mitigation steps the Proponent will commit to following approval of the Proposal. There are no specific costs attributed to each measure as they are incorporated into the day-to-day cost of implementing the Proposal and/or undertaken on an as needed basis (e.g. feral fauna control). Expected outcomes for the Proposal are outlined in Section 7 and Table 73.

### 5.3.1 Habitat clearing and degradation

#### Avoid

The following measures have been implemented to avoid potential impacts from habitat clearing and degradation:

- The initial Proposal Disturbance Footprint has been revised subsequent to collating finalised biological data and implementing the mitigation hierarchy first priority, 'avoidance'. The location and design of the Disturbance Footprint have been selected to avoid direct impacts and minimise indirect impacts to significant flora and vegetation types as far as possible. This includes adjusting the location of topsoil stockpiles to avoid direct impacts to the Threatened flora *Eremophila viscida* and adjusting the site footprint to avoid direct impacts to an additional 114.6 ha of WA

Wheatbelt Woodlands TEC and an additional ~168 ha of fauna habitat of varying suitability for Southern Whiteface, Malleefowl, Chuditch and *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) refer to Table 6).

- The Disturbance Footprint has been designed to avoid recorded locations of conservation significant fauna as far as practicable.
- The area has been subject to historical disturbance from previous mining in the 1980's and 1990's. The Disturbance Footprint has been designed to avoid unnecessary additional clearing by undertaking cutbacks of the existing pits and utilising areas of historical disturbance.
- Avoid clearing outside of the approved areas by clearly demarcating authorised clearing boundaries and communicating all stages of disturbance to all site personnel.
- Where the mine development schedule permits, clearing adjacent to likely or probable active *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) burrows will be avoided during the reproductive season (Sept.-Nov) to reduce impact on active populations and mortality of wandering males or settling juveniles (Bennelongia, 2025a).

### Minimise

The following measures will be implemented to minimise potential impacts from habitat clearing and degradation:

- Clearing will be kept to the minimum required for the Proposal (maximum Disturbance Footprint of 1,612 ha, of which 1,176.8 ha is remnant vegetation) and undertaken in accordance with relevant approval conditions.
- Clearing will be undertaken progressively and only when necessary. A Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing will be implemented.
- GIS records and demarcation of MNES (*Eremophila viscida*, WA Wheatbelt Woodlands, Malleefowl mounds) outside the Disturbance Footprint and inside the Development Envelope.
- Fence the area of known *Eremophila viscida* and its critical habitat to protect the area from indirect impacts (such as unauthorised access causing degradation or the introduction of weeds).
- Information will be provided to site personnel by way of induction and specific training where necessary to identify conservation significant flora and vegetation and highlight the importance of clearing protocols.
- Vegetation and topsoil stripped from areas containing Ruby Dock will be stockpiled separately, treated for physical signs of weed growth before being reused in rehabilitation and closely monitored after use in rehabilitation with residual weeds treated as appropriate.
- Drainage management infrastructure will be installed to maintain surface water flows across the Proposal. Management of surface water is discussed in Section 5.3.8.
- In the event of care and maintenance, water management structures will be inspected and remediated prior to and during the cessation of work.
- Unsealed roads will be designed and constructed to minimise saline water runoff into undisturbed areas.
- Spills will be contained and cleaned up promptly and disposed of correctly (e.g., to the approved bioremediation facility). Equipment for containing and cleaning up spills

will be provided in readily accessible areas where the risk of spills is high. Spill training will be provided to all relevant personnel.

- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented
- Control of contamination will be managed through other State environmental approvals including a Mining Proposal (under the Mining Act) and Works Approval (under the EP Act Part V).
- Hydrocarbons and chemical reagents will be stored in accordance with the *Dangerous Goods Safety Act 2004* to ensure the safety of personnel and protection of the environment.
- Where tailings and saline water pipelines occur adjacent to native remnant vegetation, they will be located within bunded corridors, inspected daily and may be installed with telemetry systems and pressure sensors to allow detection of leaks and failures.

### Rehabilitate

The following measures will be implemented to rehabilitate significant vegetation impacted by the Proposal:

- Vegetation and topsoil from locations of WA Wheatbelt Woodlands will be stripped together, stockpiled separately and sign posted for re-use in rehabilitation.
- Disturbed areas will be progressively rehabilitated as they become available and are no longer required for ongoing operations.
- Investigate rehabilitation methods that could enable the return of conservation significant flora and/or vegetation.
- Rehabilitation and closure planning will include objectives for re-establishment of fauna habitat determined in consultation with specialist restoration practitioners, conducting rehabilitation trials and bench marking with similar mining operations.
- Rehabilitation will utilise key Malleefowl foraging species (from VSA 1 and VSA 2) such as Acacia seeds.
- A MCP will be developed in accordance with relevant State guidance and approved under the Mining Act. The MCP will detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes. The Proposal will be obligated to meet closure criteria as approved by DMPE in the MCP approved under the Mining Act. Initial rehabilitation targets will be 60% comparison to native vegetation for species richness, density and cover. Based on rehabilitation at similar projects throughout WA, rehabilitation quality is expected to be high, particularly for foraging and areas of low disturbance (roads, laydowns etc.).
- The majority of the Disturbance Footprint (except pit areas) will be rehabilitated with native vegetation species endemic to the Proposal.

Vegetation clearing and subsequent rehabilitation of the Proposal Disturbance Footprint will be progressive and continue until the agreed (under the Mining Act) completion criteria are met. The general objective for closure of the site is to reinstate the pre-mining land use as far as practical. This will involve rehabilitation of all disturbed areas, except the open pits, to achieve stable landforms with vegetation in rehabilitated areas having values equivalent to surrounding ecosystems not impacted by mining activity. Initial rehabilitation targets will be 60% comparison to native vegetation for species richness, density and cover. Based on rehabilitation at similar projects throughout WA, rehabilitation quality is expected to be high, particularly for foraging and areas of low disturbance (roads, laydowns etc.). Further detail on mine site rehabilitation is included in Section 5.4.

### 5.3.2 Fragmentation

#### **Avoid**

The following measures will be implemented to avoid potential impacts from fragmentation:

- Clearing for the Proposal will not remove any whole patch of the WA Wheatbelt Woodlands mapped within the Development Envelope. Clearing associated with the Proposal will be isolated to the edges of existing patches within the Development Envelope
- The Proposal will not fragment or significantly increase fragmentation of any known occurrences of the WA Wheatbelt Woodlands. All patches within the Disturbance Footprint will continue to meet the Approved Conservation Advice criteria and retain TEC status after clearing.
- The Proposal will not result in the fragmentation of any population of Malleefowl, Southern Whiteface, *Idiosoma* sp. or Chuditch. The Proposal will not split a population into two or more populations or impede movement within the landscape.
- The area has been subject to historical disturbance from previous mining in the 1980's and 1990's. The Disturbance Footprint has been designed to avoid unnecessary additional clearing by undertaking cutbacks of the existing pits and utilising areas of historical disturbance.
- Avoid clearing outside of the approved areas by clearly demarcating authorised clearing boundaries and communicating all stages of disturbance to all site personnel.

#### **Minimise**

The following measures will be implemented to minimise potential impacts from fragmentation:

- Clearing will be kept to the minimum required for the Proposal (maximum Disturbance Footprint of 1,612 ha) and undertaken in accordance with relevant approval conditions.
- Clearing will be undertaken progressively and only when necessary. A Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing will be implemented.
- Existing roads will be used and widened only where required.
- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented
- If additional clearing is required for new roads, these have been designed to avoid the WA Wheatbelt Woodlands patches and where this is not possible, disturbance to large trees will be kept to the minimum necessary to ensure safe access.

#### **Rehabilitate**

The following measures will be implemented to rehabilitate vegetation impacted by the Proposal:

- Disturbed areas will be progressively rehabilitated as they become available and are no longer required for ongoing operations.
- Rehabilitation will limit the total area of permanent habitat loss that will be inevitable through pit voids etc.
- The majority of the Disturbance Footprint (except pit areas) will be rehabilitated with native vegetation species endemic to the Proposal. The Proposal will be obligated to

meet closure criteria as approved by DMPE in the MCP approved under the Mining Act. Initial rehabilitation targets will be 60% comparison to native vegetation for species richness, density and cover. Based on rehabilitation at similar projects throughout WA, rehabilitation quality is expected to be high, particularly for foraging and areas of low disturbance (roads, laydowns etc.).

### 5.3.3 Invasive species including feral predators

#### Avoid

The following measures will be implemented to avoid potential impacts from weeds:

- Prevent the introduction of new weeds to the site by ensuring machinery and equipment are cleaned prior to being mobilised to site and inspected on arrival (not permitted to work until appropriately cleaned).

#### Minimise

The following measures will be implemented to minimise potential impacts from invasive species:

- Weed surveys and control using herbicide or manual removal will be undertaken annually.
- Undertake annual targeted control of the invasive species *Rumex vesicarius* (Ruby Dock), already present in the Development Envelope, to avoid spreading this existing weed into new and uninfested areas.
- Vegetation and topsoil stripped from areas containing Ruby Dock will be stockpiled separately, treated for physical signs of weed growth before being reused in rehabilitation and closely monitored after use in rehabilitation with residual weeds treated as appropriate.
- To minimise attraction of non-native fauna, the putrescible landfill will be managed in accordance with the Environmental Protection (Rural Landfill) Regulations 2002 requirements for covering of waste, fencing of the landfill site, containing waste within the landfill site, and separation of the landfill site from water, or any more stringent conditions that may be applied on a licence issued under Part V of the EP Act.
- Domestic waste will be securely stored to minimise access by feral animals.
- Feral fauna eradication programs undertaken in partnership with AWC using licenced service providers.
- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented
- Implement an animal sightings register and encourage site personnel to report sightings of conservation significant and feral fauna (cats, dogs, foxes)

### 5.3.4 Noise and vibration

#### Minimise

The following measures will be implemented to minimise potential impacts from noise and vibration:

- Progressive clearing in one direction to allow fauna to escape noise and vibrations.
- Strict traffic management rules will be implemented (e.g., keeping to designated tracks, maximum vehicle speed limit of 60 km/hr).

- The speed limit on site (60km per hour) will assist in the reduction of vehicle noise.
- Noise will be minimised through equipment selection and shielding of equipment.
- Equipment design will specify compliance with Australian Standard noise limits

### 5.3.5 Lighting

#### Minimise

The following measures will be implemented to minimise potential impacts from lighting:

- The use of artificial lighting will only be used where necessary for the safe conduct of mining activities
- implement best practice lighting design in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b). This includes lights being strategically placed and designed to shine towards operations to minimise light spill to the surrounding environment and using the lowest intensity appropriate to the task.

### 5.3.6 Dust

#### Avoid

The following measures will be implemented to avoid potential impacts from dust:

- In excessively windy conditions when dust emissions cannot be adequately controlled, operations in the vicinity of MNES will be postponed until weather conditions change or dust suppression can abate dust emissions.

#### Minimise

The following measures will be implemented to minimise potential impacts from dust:

- Dust suppression using water trucks will be continuous on unsealed roads, in the pit, during WRL development and other open areas to minimise dust generation. Dust suppression using water trucks will be undertaken on the ROM and during materials handling activities.
- Strict traffic management rules will be implemented (e.g., keeping to designated tracks, maximum vehicle speed limit of 60 km/hr).
- Disturbed areas will be progressively rehabilitated as they become available and are no longer required for ongoing operations.
- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented.

### 5.3.7 Mortality

#### Avoid

The following measures will be implemented to avoid potential impacts from mortality:

- To avoid entrapment of animals, all excavations or trenches more than one meter deep will be secured against animal entry or have egress provided.

#### Minimise

The following measures will be implemented to minimise potential impacts from mortality:

- Progressive clearing in one direction to allow fauna to escape.

- Strict traffic management rules will be implemented (e.g., keeping to designated tracks, maximum vehicle speed limit of 60 km/hr).
- Install caution signage on roadways traversing Malleefowl habitat to alert drivers and reduce the risk of vehicle strike
- Prior to clearing *Eucalyptus* spp. Woodland areas, source current radio tracking data from AWC and consult on clearing activities.
- The majority of vehicle movement will be during daylight hours.
- Road kills of MNES fauna will be reported as an environmental incident and State departments (DBCA) and Federal (as required) will be notified.
- Implement an animal sightings register and encourage site personnel to report sightings of conservation significant fauna.
- Relevant site personnel to be trained in injured fauna handling and care.
- All roadkill to be moved a minimum of 20 m from the road to reduce the risk of further mortality on carrion species feeding on roadkill.
- Potential fauna water resources will be minimised and permanent water sources are to be contained through fencing where appropriate.
- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented.

### 5.3.8 Changes to surface and groundwater conditions

#### Avoid

The following measures will be implemented to avoid potential impacts to surface and groundwater conditions:

- Based on the 1% AEP flood modelling, several surface water management measures will be required to protect the Proposal infrastructure (Figure 48). An increase in peak flows and runoff volume will occur, due to the introduction of the recommended surface water management measures (i.e., diversion drain around the western side of the WRL and TSS) which prevents capture and ponding of water observed in existing conditions. The diversions reinstate flows to the creek, prevent ponding and reinstate flows to downstream receptors minimising impacts.
- There will be no discharge of pit dewater or potentially contaminated surface water to the environment. Surface water generated within processing and infrastructure areas that could become contaminated will be retained on site through the utilisation of bunding, diversion drains and sumps.

#### Minimise

The following measures will be implemented to minimise potential impacts to surface and groundwater conditions:

- Existing surface water flow regimes will be maintained with the installation and maintenance of surface water/drainage infrastructure across the Proposal site.
- Where disturbance is unavoidable (such as roads crossing drainage lines), flow will not be impeded and potential for erosion will be managed using engineering solutions outlined in Advisian (2023).
- Appropriate drainage and containment infrastructure will be installed to control runoff from hardstand areas, roads and other cleared surfaces.
- In the event of care and maintenance, water management structures will be inspected and remediated prior to and during the cessation of work.

- Hydrocarbons and chemical reagents will be stored in accordance with the Dangerous Goods Safety Act 2004 to ensure the safety of personnel and protection of the environment.
- Control of contamination will be managed through other State environmental approvals including a Mining Proposal (under the Mining Act) and Works Approval (under the EP Act Part V).
- Spills will be contained and cleaned up promptly and disposed of correctly (e.g., to the approved bioremediation facility). Equipment for containing and cleaning up spills will be provided in readily accessible areas where the risk of spills is high. Spill training will be provided to all relevant personnel.
- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented
- Dewatering will be minimised to only the extent required and re-use of mine dewater will be maximised to reduce the need to abstract groundwater from other sources
- Groundwater abstraction will be undertaken in accordance with an approved Prescribed Premise Licence and associated Groundwater Licence Operating Strategy, including water quality monitoring requirements.
- Where tailings and saline water pipelines occur adjacent to native remnant vegetation, they will be located within bunded corridors, inspected daily and may be installed with telemetry systems and pressure sensors to allow detection of leaks and failures.

### **Rehabilitate**

The following measures will be implemented to rehabilitate surface and groundwater conditions:

- Landforms such as the WRL have been designed so that they are water harvesting with high stability and low risk of erosion and sedimentation.
- Upon closure groundwater recovery is expected to occur
- The MCP will be developed in accordance with relevant DMPE guidance and approved under the Mining Act, including Closure Outcomes and Performance Criteria specific to the management of Inland Waters quality and quantity.

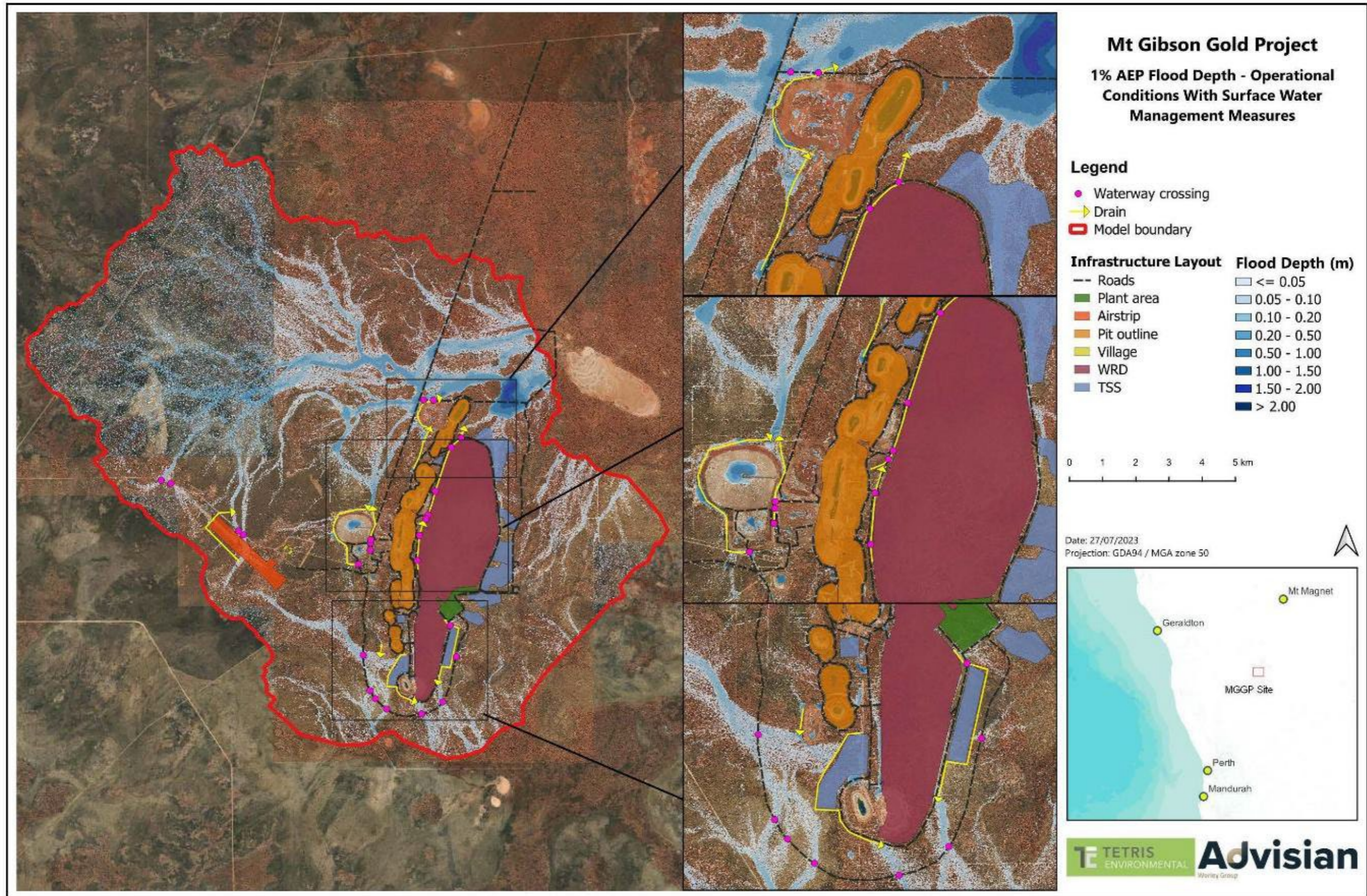


Figure 48: Surface water management measures for the Proposal

### 5.3.9 Greenhouse gas emissions

#### Minimise

The following measures will be implemented to minimise potential impacts to GHG emissions:

- Use of LNG-fired power station instead of diesel (reduction of 214,017 tCO<sub>2</sub>-e scope 1 emissions over life of mine)
- Use of ball mill processing plant rather than semi-autogenous (SAG) (reduction of 63,000 tCO<sub>2</sub>-e scope 1 emissions over life of mine)
- Optimisation of haulage distances for waste and ore to reduce fuel consumption
- Use of technology and equipment that is energy efficient and well-maintained to minimise emissions
- Reuse of decant TSF water for processing
- Undertake progressive clearing and rehabilitation where practicable, to facilitate carbon uptake by revegetation
- Implement the GHG EMP (Appendix P), including interim reduction targets to be implemented across the lifetime of the Proposal to meet the objective of net-zero Scope 1 emissions by 2050. In applying mitigation measures to achieve these targets, all reasonable and practicable GHG emissions reduction, management equipment and technologies will be evaluated through the life of the Proposal.
- Options for increasing the proportion of electricity drawn from the grid (and reducing the proportion of electricity generated from the power station) will be continued to be assessed however is dependent on the SWIS line capacity.
- Consider emission commitments of third parties when selecting suppliers for the Proposal.
- Renewable electricity generation and other mitigation measures will continue to be investigated.

#### Rehabilitate

The MCP will be developed in accordance with relevant DMPE guidance and approved under the Mining Act. The majority of the Disturbance Footprint will be rehabilitated with native vegetation species endemic to the Proposal. Once mature, rehabilitated vegetation will contribute to the abatement of carbon emissions.

### 5.3.10 Bushfire risk

#### Minimise

The following measures will be implemented to minimise potential impacts from bushfire:

- Implement fire management measures to ensure that the Proposal does not lead to an increase in the frequency or severity of the local fire regime. Appropriate fire suppression appliances and equipment will be maintained on site and employees trained in their use.
- Naturally occurring bushfires will be monitored and controlled only when they are likely to become a threat to human life and Proposal infrastructure.
- During the bushfire season, the fire danger status will be monitored daily through the State managed (DFES) website.
- For “hot-work” activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions.

- Access tracks and fence lines will be used as firebreaks within the Proposal and regularly maintained.
- Smoking will only be permitted on site in designated areas.

### 5.3.11 Ineffective rehabilitation

#### Minimise

The following measures will be implemented to minimise potential impacts from ineffective rehabilitation:

- development of a highly prescriptive rehabilitation and mine closure plan by subject matter experts, reviewed and approved by DMPE
- inclusion of earth moving contractors in to design specifications, dissemination of the rehabilitation and mine closure plan implementation requirements as approved by DMPE
- integration of progressive rehabilitation in to medium and long term operations planning
- detailed supervision of contractors implementing the rehabilitation programme by the Proponent's Environmental Department and other rehabilitation subject matter experts
- monitoring and auditing of rehabilitation performance, with remediation where rehabilitation is not meeting performance targets.

#### Rehabilitate

Section 5.4 provides greater context on the approach to rehabilitation for the Proposal.

Rehabilitation will be progressive and continue until the agreed (under the Mining Act) completion criteria are met. The general objective for closure of the site is to reinstate the pre-mining land use as far as practical. This will involve rehabilitation of all disturbed areas, except the open pits, to achieve stable landforms with vegetation in rehabilitated areas having values equivalent to surrounding ecosystems not impacted by mining activity. An MCP will be developed in accordance with relevant State guidance and approved under the Mining Act. The MCP will detail all legal obligations for rehabilitation and closure that affect post-mining land-use and closure outcomes. The Proposal will be obligated to meet closure criteria as approved by DMPE in the MCP approved under the Mining Act. Initial rehabilitation targets will be 60% comparison to native vegetation for species richness, density and cover.

Monitoring programs will be implemented to track rehabilitation progress. Where monitoring indicates that progress towards meeting the completion criteria is not progressing as necessary, contingency actions will be implemented, which may include additional earthworks, additional removal of infrastructure, and/or additional revegetation works, with subsequent additional monitoring to then also be implemented.

### 5.3.12 Specific requirements for avoidance and mitigation

#### MNES fauna

The following specific measures will be implemented to avoid potential impacts to MNES fauna during clearing:

- Fauna inspections for MNES will be undertaken in areas immediately prior to clearing commencing. Should any MNES fauna be identified, clearing activities will be

postponed until the fauna have moved (or been moved by suitably qualified personnel) from the area.

- Malleefowl mounds will not be cleared during breeding season without prior assessment of mound activity. Active mounds (Rank 1/Rank 2) will not be cleared during Malleefowl breeding season. Camera monitoring will not be used as the primary method for mound status, as camera monitoring relies on the cameras not malfunctioning to capture the required data, which may not be realised until after the breeding period when the cameras are collected for review. Additionally, review of six months of data over multiple cameras/mounds will likely produce high volumes of images to be reviewed which is a time-consuming process. Camera monitoring will likely be used as supplementary information however will not be the primary method used to determine mound activity status. Assessing the mounds for activity using the Rank1/Rank 2 method allows for inclusion of the precautionary principle whereby Rank 2 mounds (Mound with signs of major activity in the current breeding season but not used for breeding) will also be excluded from being cleared during that breeding season.
- Where the mine development schedule permits, clearing adjacent to likely or probable active burrows will be avoided during *Idiosoma* reproductive season (Sept.-Nov) to reduce impact on active populations and mortality of wandering males or settling juveniles (Bennelongia, 2025a).
- Prior to clearing a local area of Disturbance Footprint, AWC radio tracking records will be reviewed to determine confirmed Chuditch denning habitat/ possible Chuditch presence within clearing area.. Should any Chuditch be identified, clearing activities will be postponed until they have moved (or been moved by suitably qualified personnel/AWC) from the area.
- Clearing will be undertaken in one direction (towards vegetation to remain wherever possible) to allow fauna the opportunity to escape into undisturbed habitat.

The following specific measures will be implemented to minimise potential impacts to MNES fauna during clearing:

- Information will be provided to site personnel by way of induction and specific training where necessary to identify MNES and highlight the importance of clearing protocols.
- The site Environmental Management Plan and MNES Environmental Management Plan will be implemented
- Undertake annual mound monitoring in accordance with the National Malleefowl Monitoring Manual. Monitoring will be undertaken by personnel with environmental or biological qualifications and/or suitably trained in the National Malleefowl Monitoring program.
- Undertake monitoring of known active *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) burrows adjacent to the Disturbance Footprint for indirect impacts from the Proposal.
- Implement best practice lighting design in accordance with the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023b). This includes lights being strategically placed and designed to shine towards operations to minimise light spill. to the surrounding environment and using the lowest intensity appropriate to the task.
- Feral fauna eradication programs undertaken as required using licenced service providers.
- Appropriate drainage and containment infrastructure will be installed to control runoff from hardstand areas, roads and other cleared surfaces. Any runoff will be contained

to the Disturbance Footprint and is highly unlikely to impact *Idiosoma sp.* in the Proposal.

- In excessively windy conditions when dust emissions cannot be adequately controlled, operations will be postponed until dust suppression can abate dust emissions.
- Clearing will be kept to the minimum required for the Proposal (maximum Disturbance Footprint of 1,612 ha) and undertaken in accordance with relevant approval conditions.
- Clearing will be undertaken progressively and only when necessary. A Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing will be implemented.
- Prior to clearing a local area of Disturbance Footprint, AWC radio tracking records will be reviewed to determine confirmed Chuditch denning habitat/ possible Chuditch presence within clearing area. Denning habitat positively confirmed (by radio tracking records) as in use that can be relocated, will be moved (following removal of any individuals by suitably qualified personnel) to the edge of the Disturbance Footprint or separately stored in topsoil storage areas for use in rehabilitation
- Suitable Chuditch denning habitat/hollow logs will be salvaged during clearing and stockpiled/pushed to edge of cleared areas.
- Further vehicle speed restrictions will be implemented on roads where MNES fauna habitat occurs or are regularly noted by site personnel.

Whilst not mitigation measures specifically for MNES, other measures outlined throughout this PER (e.g. drainage management infrastructure installed to maintain surface water flows across the Proposal, unsealed roads designed and constructed to minimise saline water runoff into undisturbed areas etc) will also mitigate risks to fauna habitat and Malleefowl mounds remaining in the Development Envelope (outside the Disturbance Footprint).

### ***Eremophila viscida***

Appropriate drainage and containment infrastructure will be installed to control runoff from hardstand areas, roads and other cleared surfaces. Any runoff will be contained to the Disturbance Footprint and is highly unlikely to impact the *Eremophila viscida* critical habitat.

Dust suppression using water trucks will be continuous on unsealed roads, in the pit and other open areas to minimise dust generation. Dust suppression using water trucks will be undertaken on the ROM and during materials handling activities. The water trucks will be fitted with dribble bars to minimise spray drift near vegetation areas. In excessively windy conditions when dust emissions cannot be adequately controlled, operations will be postponed until dust suppression can abate dust emissions.

Runoff or spray of saline water from dust suppression activities has the potential to result in the loss or reduced health of flora and vegetation. Dust suppression with saline water on unsealed roads appears to have a limited impact on surrounding vegetation (Loch & Squires 2010), providing that saline water application is limited to the road surface and appropriate runoff capture measure (such a table drains) are used.

A monitoring quadrat has been established in the area of the known *Eremophila viscida* individuals (TEPL, 2025a). Monitoring of vegetation health in the quadrat will be undertaken quarterly for decline in condition as a result of Proposal implementation (i.e., not attributable to natural factors such as climatic conditions). Dust monitoring will also be undertaken in this area.

Fencing will be established around the area of *Eremophila viscida* and the 8.96 ha of critical habitat, ensuring protection of the population from unauthorised clearing or potential overspray from dust suppression. Fencing will also protect the critical habitat from indirect impacts such as unauthorised access causing degradation or introduction of weeds.

As the two *Eremophila viscida* individuals are now dead, seed collection cannot be undertaken for this population. Harvesting of soil in the area (for a potential seed bank) is not considered feasible as there is likely to be bacteria and fungus in the soil that would not be suitable for storage. The possibility of trailing low-temperature mosaic burning to invigorate any remaining seed bank within the critical habitat will be assessed.

### 5.3.13 Management Plans

The MNES Environmental Management Plan (EMP) for the Proposal is included as Appendix Q. This EMP provides the outline for how environmental issues related to Matters of National Significance (MNES) will be addressed. In addition, the Proponent has developed a Proposal specific EMP that is currently being implemented to manage potential environmental impacts from current low impact activities at the site (Appendix R).

Compliance with these EMP's, appendices and other referenced documents is mandatory and indicates the minimum compliance requirement for all Business Units, Projects and Contracts. Contractors working on the Proposal and mobilised using their own Management Systems must meet the requirements and expectations set by the Proponent in this area.

## 5.4 Rehabilitation

In Western Australia, mine closure is regulated under the Mining Act and Mining Regulations 1981, through implementation of regulator (DMPE) assessed and approved Mining Development and Closure Proposals (MDCP) and Mine Closure Plans (MCP). Additionally, annual environmental reports detailing project disturbance, compliance with approved MDCP and MCPs and progress towards mine closure are submitted to DMPE for review. The Proponent recognises that mine closure planning is an integral part of mine development and operational planning and should be considered from the feasibility stage of planning, with ongoing review, development and continuous improvement throughout the life of the Proposal. As such, the Proponent has ensured that key design elements, such as stable final landform design, has been incorporated into the Proposal with the specific objective of improving progressive and post closure rehabilitation success.

The Proponent will undertake rehabilitation of the Disturbance Footprint as opposed to restoration. Restoration targets the recreation of pre-disturbance native ecosystems, whereas rehabilitation acknowledges that the environment will be permanently altered from Proposal implementation. The general objective for rehabilitation and closure of the site is to rehabilitate the disturbed land to a safe, stable, non-polluting landform in an ecologically sustainable manner that is self-sustaining and capable of sustaining an agreed post-mining land use, with consideration for cultural values and without unacceptable liability to the state.

This will involve rehabilitation of all disturbed areas, except the open pits, to achieve stable landforms with vegetation in rehabilitated areas having values equivalent to surrounding ecosystems not impacted by mining activity. Initial rehabilitation targets will be 60% comparison to native vegetation for species richness, density and cover. Based on rehabilitation at similar projects throughout WA, rehabilitation quality is expected to be high, particularly for foraging and areas of low disturbance (roads, laydowns etc.). Importantly, the Proposal area has been the subject of mixed rehabilitation success carried out during the

late 1990's and early 2000's as a result of the substantial mining carried out in the 1980's and 90's. Nevertheless, there are excellent results where the landform design and rehabilitation efforts have been done well. Rehabilitation of the Proposal will be progressive (as will clearing, leading to a balance to impact on fauna foraging habitat) and continue until the agreed completion criteria are met.

There are two key objectives for the progressive rehabilitation of the Proposal Disturbance Footprint:

- 1) Rehabilitation of a minimum 608 ha of the IWL using species of local provenance, particularly species in VSA 1 Acacia Shrublands and VSA 2 Allocasuarina Shrublands, to provide habitat suitable for use by Malleefowl for foraging/transit.
- 2) Rehabilitation of up to 100 ha across flat areas (e.g. roads, linear infrastructure) with species of local provenance, particularly species in VSA 4 (Eucalypt woodlands), with the objective of providing habitat suitable for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch.

Both objectives aim to achieve rehabilitation of fauna habitat suitable for use by Malleefowl, Chuditch and/or *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*), to mitigate the short term loss of habitat from implementation of the Proposal.

#### 5.4.1 General Rehabilitation Approach

Planning is essential to the successful implementation of both mining and progressive rehabilitation processes. Integration of the processes not only provides better chances of success but also provides opportunities for efficiency and cost savings. The general rehabilitation approach for Malleefowl habitat (IWL) and Chuditch and/or *Idiosoma kopejtkorum* (flat areas) are detailed below.

##### **Malleefowl Habitat Rehabilitation - IWL**

Malleefowl preferred habitat has been determined to be VSA 1 Acacia Shrubland and VSA 2 Allocasuarina Shrubland, due to having excellent structural integrity, ideal habitat type and adequate resources available for mound construction, as well as having the highest proportion of active mounds (refer to Section 4.4). The following key steps will be implemented for IWL rehabilitation:

1. Rehabilitation on the IWL will use species of local provenance, particularly species in VSA 1 and VSA 2, to provide a Malleefowl foraging/ transit habitat quality score (refer to Table 25) of four at a minimum
2. Collect available seed from key/dominant species from VSA 1 and VSA 2 within the Disturbance Footprint prior to clearing. Seed will continue to be collected annually from within and adjacent to the Development Envelope
3. Conventional earthmoving equipment will be used to remove growth media (topsoil and vegetation). Topsoil will be harvested at the horizon if evident but nominally to a depth of 200mm. Vegetation (other than large trees) and topsoil will be stripped and stockpiled together providing aeration to retain the health of the soil properties and seed bank
4. Large trees will be pushed to the edges of the Disturbance Footprint and stockpiled, providing suitable habitat similar to fallen timber refuges in the adjacent remnant Eucalypt Woodlands (VSA 4) outside the Development Envelope
5. Growth media will be stockpiled in designated areas, protected from vehicular access, dust suppression water and erosion and used later for rehabilitation. Growth media from VSA 1 and VSA 2 will be treated as 'priority growth media' and stockpiled separately

6. Progressive rehabilitation as areas become available, so topsoil and vegetation is stockpiled for the minimum practical time
  - IWL slopes to have a minimum 5 m cover of geotechnically competent, non acid forming (NAF) waste rock
  - profile IWL to design specifications (i.e. maximum battered slope angle of 18°, 20 m wide back sloping berms at 20 m vertical intervals, crest and internal bunds on berms and top sections to minimise erosion), including rock armouring where required
  - respread growth media at a minimum depth of 150 mm
  - contour rip
7. Seed rehabilitated areas 8-10 kg/ha with seed previously collected from the Disturbance Footprint and/or seed of local provenance.

***Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch Habitat Rehabilitation (flat areas)**

Hollow logs salvaged during clearing will be placed around the toe of the IWL to provide suitable Chuditch denning habitat. Flat disturbance areas (e.g. roads and other linear infrastructure, stockpile and laydown areas) where the remnant soil profile has not been significantly altered, will be rehabilitated with species of local provenance, particularly species in VSA 4 (Eucalypt woodlands) or VT 11 York Gum Woodlands (*Eucalyptus loxophleba* subsp. *supralaevis*) to provide habitat suitable for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch. The first priority will be rehabilitation of flat disturbance areas that are adjacent to remnant Eucalypt woodlands and especially where confirmed records of *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) occur, to provide continuity of habitat that will encourage potential recolonisation by the species.

However, Bennelongia (2025b) noted rehabilitation does not guarantee recolonisation by *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*). Although only a handful of studies have investigated spiders recolonising rehabilitated areas, some authors have suggested that it may take decades—if at all—for these areas to be recolonised. Certain areas in the Wheatbelt region that were cleared and cropped only once, and subsequently left to regenerate naturally, showed almost no recolonisation by mygalomorph spiders from adjacent bushland even after 20 years (Main 1987, in Bennelongia 2025b). Yen (1995, in Bennelongia 2025b) also noted that the persistence of long-lived adult individuals can often be misinterpreted as evidence of population survival in disturbed areas' as adults, particularly females, may outlive the viability of their habitats and fail to breed.

Similarly, the presence of wandering adult males in disturbed areas should be interpreted as a sign of biological activity rather than an indicator of a thriving population. Simmonds et al. (1994, in in Bennelongia 2025b) discussed how specific features of rehabilitated sites—such as leaf litter depth and ground cover—have a stronger influence on spider species recolonisation than others, as they provide prey availability, regulate temperature and moisture, and offer refuge and structural retreats. That study also noted that an unidentified *Idiosoma* species was only recorded at rehabilitated sites that were at least 18 years old (Bennelongia 2025b).

Based on monitoring of historic rehabilitation sites in 2018 at the Proposal and via recent observations by Tetris Environmental whilst attending the Proposal area to undertake biological surveys, York Gum tree's and Acacia understorey species have established in flat areas surrounding the open pits, on haul roads, the processing plant domain and old workshop/laydown area. This suggests that regrowth of the appropriate flora species in

rehabilitation to encourage future use by *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch is achievable.

The following key steps will be implemented for rehabilitation of flat areas:

1. Rehabilitation on flat areas will use species of local provenance, particularly species in VSA 4/VT 11, to provide habitat quality suitable for use by *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch
2. Collect available seed from key/dominant species from VSA 4 within the Disturbance Footprint prior to clearing. Seed will continue to be collected annually from within and adjacent to the Development Envelope
3. Large trees will be pushed to the edges of the Disturbance Footprint and stockpiled, providing suitable habitat for Chuditch similar to fallen timber refuges in the adjacent remnant Eucalypt Woodlands (VSA 4) outside the Development Envelope
4. Growth media will be stockpiled in designated areas, protected from vehicular access, dust suppression water and erosion and used later for rehabilitation.
5. Progressive rehabilitation as areas become available, so topsoil and vegetation is stockpiled for the minimum practical time:
  - removal of all causeways and other surface water diversion structures that have the potential to adversely restrict surface water flow after mine closure
  - decommission water infrastructure and remove any physical infrastructure (pipe, fencing etc) not required for monitoring or post mining land use
  - removal of all saline soils and hydrocarbon impacted materials where required
  - respread growth media where required
  - deep rip all compacted surfaces
  - seed rehabilitated areas 6-8 kg/ha with seed previously collected from the Disturbance Footprint and/or seed of local provenance.

#### 5.4.2 Seed Species Selection

Flora and fauna survey data for the Proposal has been utilised to produce a species target list representative of VSA 1, VSA 2 and VSA 4 as recorded within the Development Envelope. The Proponent, together with representatives from the Badimia Traditional Owners commenced collection of seed from species of local provenance within the proposed Disturbance Footprint in October 2025 and January 2026. Seed collection will continue annually within the Disturbance Footprint until it is fully cleared, progressing to the Development Envelope and surrounds throughout the life of the Proposal. Propagation of some species such as Eucalypts may be required from specialist nurseries or when seed cannot be collected locally, it may need to be procured from external seed suppliers with adequate stock of the target species. Seed of local provenance will always be sourced as the first priority, where this is not possible procurement of seed of the same species from other bioregions may be necessary.

Table 44 outlines the indicative species list representative of VSA 1 and VSA 2 that will be used in rehabilitation of the IWL.

**Table 44: Indicative species list for IWL rehabilitation**

Species	Species
<i>Acacia acuaria</i>	<i>Aluta aspera</i> subsp. <i>hesperia</i>
<i>Acacia acuminata</i>	<i>Enekbatus stowardii</i>

Species	Species
<i>Acacia assimilis</i>	<i>Eremophila clarkei</i>
<i>Acacia burkitti</i>	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>
<i>Acacia effusifolia</i>	<i>Goodenia rosea</i>
<i>Acacia longispinea</i>	<i>Eremophila clarkei</i>
<i>Acacia resinmarginea</i>	<i>Senna artemisioides</i> subsp. <i>filifolia</i>
<i>Acacia synoria</i>	<i>Scaevola spinescens</i>
<i>Acacia stereophylla</i> var. <i>stereophylla</i>	<i>Hemigenia ciliata</i>
<i>Allocasuarina acutivalvis</i>	<i>Melaleuca nematophylla</i>
<i>Allocasuarina campestris</i>	<i>Melaleuca radula</i>

Flat disturbance areas (e.g. roads and other linear infrastructure, stockpile and laydown areas) will be rehabilitated with species of local provenance, particularly species in VSA 4 (Eucalypt woodlands) or York Gum woodlands (*Eucalyptus loxophleba* subsp. *supralaevis*) to provide habitat suitable for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch.

Table 45 outlines the indicative species list representative of VSA 4 to be used in rehabilitation of flat disturbance areas.

**Table 45: Indicative species list for flat area rehabilitation**

Species	Species
<i>Acacia acuaria</i>	<i>Eucalyptus salubris</i>
<i>Acacia acuminata</i>	<i>Eucalyptus subangusta</i> subsp. <i>pusilla</i>
<i>Acacia anthochaera</i>	<i>Melaleuca eleuterostachya</i>
<i>Acacia colletioides</i>	<i>Olearia muelleri</i>
<i>Acacia effusifolia</i>	<i>Olearia pimeleoides</i>
<i>Alyxia buxifolia</i>	<i>Ptilotus drummondii</i>
<i>Dianella revoluta</i>	<i>Ptilotus exaltatus</i>
<i>Eremophila caperata</i>	<i>Ptilotus gaudichaudii</i>
<i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i>	<i>Rhagodia drummondii</i>
<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i>	<i>Rhagodia eremaea</i>
<i>Eucalyptus salicolia</i>	<i>Sclerolaena fusiformis</i>
<i>Eucalyptus salmonophloia</i>	<i>Senna artemisioides</i> subsp. <i>filifolia</i>

### 5.4.3 Rehabilitation monitoring, targets and completion criteria

To achieve the two key objectives detailed in Section 5.4.1, completion criteria, performance indicators and targets have been assigned to key aspects for rehabilitation of the Disturbance Footprint (Table 46). Targets are staged progressively over extended periods following the commencement of rehabilitation to reflect progress towards achieving the objective. Early targets remain conservative as a reflection of rehabilitation immaturity. However longer-term targets focus on the development and increasing maturity of rehabilitation and progression towards completion criteria/achieving rehabilitation objectives.

Vegetation monitoring reference (analogue) sites will be established (outside the Disturbance Footprint at a suitable distance to avoid any indirect impacts) within the main vegetation types found across the project area. These are intended to provide the background information used for comparison with the data collected from the rehabilitation monitoring sites to determine the extent to which completion criteria have been achieved in Year 20. These reference sites will be established and monitored within the first year of operation to enable collection of a baseline data set.

Rehabilitation monitoring sites will be established progressively as rehabilitation work is completed. The frequency of monitoring of rehabilitation and the information collected for comparative purposes is described in Table 46. Reference sites will be monitored at the same time, using the same survey parameters and methods, to compare trends observed at rehabilitated sites. For the assessment of rehabilitation performance across all disturbance areas (e.g. IWL and flat areas), monitoring methods will be standardised and will include floristic composition and recolonisation of fauna, particularly Malleefowl, *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) and Chuditch.

Where monitoring indicates that trajectory towards meeting the completion criteria is not progressing as necessary, an investigation into the cause will be undertaken and corrective actions implemented, which may include additional earthworks, seeding of areas with local, native seed species, fencing to exclude fauna and/or additional revegetation works, with subsequent additional monitoring to then also be implemented. The results of the investigation and remedial actions implemented will be included in the annual compliance report post approval of the Proposal.

**Table 46: Objectives, targets, completion criteria and monitoring for mine site rehabilitation**

Objective	Performance indicator	5 year target	10 year target	Year 20 (Completion criteria)	Corrective actions if targets not met	Monitoring		
1 At least 608 ha of the IWL is rehabilitated to provide habitat for the Malleefowl	Native vegetation species richness, abundance and cover in rehabilitated IWL areas is similar to areas in undisturbed VSA 1 and VSA 2 and is dominated by <i>Acacia</i> and <i>Allocasuarina</i> species	Progressive rehabilitation of the IWL has commenced utilising <i>Acacia</i> and <i>Allocasuarina</i> species recorded in VSA 1 and 2 and/or Table 44	<i>Acacia</i> and/or <i>Allocasuarina</i> species recorded in VSA 1 and 2 and/or Table 44 established and emerging as dominant	<i>Acacia</i> and/or <i>Allocasuarina</i> species recorded in VSA 1 and 2 and/or Table 44 present and dominant providing a Malleefowl Habitat Quality Score $\geq 4$ (Table 25)	Investigation into cause of target not being met, implement relevant remedial actions (e.g. undertake additional seeding/ planting of required species, fencing to exclude fauna until vegetation has established, weed control, erosion control).  Results of investigation and remedial actions implemented included in the annual compliance report post approval of the Proposal.	In-field flora quadrat measurement with photographic monitoring in rehabilitated and reference sites (annually for first three years following rehabilitation and as required thereafter)		
	Minimum 608 ha of IWL habitat is of suitable quality for Malleefowl use for foraging and/or transit		>100 ha of the IWL has been rehabilitated	$\geq 608$ ha of the IWL has been rehabilitated		In field assessment using Table 25 (biennially from year 3 following rehabilitation)		
			Evidence of Malleefowl utilising IWL rehabilitation for foraging/transit			Motion cameras, in field observations (scats, tracks etc) /photographic records during vegetation monitoring  (annually from year 6 following rehabilitation)		
2 At least 100 ha of flat area domains (e.g. roads, stockpiles, miscellaneous) are rehabilitated to provide habitat for <i>Idiosoma kopejtkaorum</i> and Chuditch	Native vegetation species richness, abundance and cover rehabilitated flat areas is similar to undisturbed VSA 4 or VT 11	Progressive rehabilitation of flat areas has commenced utilising Eucalypt species recorded in VSA 4, VT11 and/or Table 45	Eucalypt species recorded in VSA 4, VT 11 and/or Table 45 established and emerging as dominant	Eucalypt species recorded in VSA 4 and/or Table 45 present and dominant	Investigation into cause of target not being met, implement relevant remedial actions (e.g. undertake additional seeding/ planting of required species, fencing to exclude fauna until vegetation has established).  Results of investigation and remedial actions implemented included in the annual compliance report post approval of the Proposal.	In-field quadrat measurement with photographic monitoring in rehabilitated and reference sites (annually for first three years following rehabilitation and as required thereafter)		
	Minimum 100 ha of IWL habitat is of suitable quality for use by <i>Idiosoma kopejtkaorum</i> and Chuditch use for foraging and/or transit		Mean species richness, abundance and cover are $\geq 30\%$ of the average result of reference sites	Mean species richness, abundance and cover are $\geq 60\%$ of the average result of reference sites			>25 ha of flat area domains has been rehabilitated	$\geq 100$ ha of flat area domains has been rehabilitated
	<i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i> ) recolonise rehabilitated flat areas		No targets, completion criteria or corrective actions set for <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i> ) recolonisation as there is a paucity of scientific data on recolonisation, and the requirement of mygalomorph spiders to recolonise rehabilitated lands. Presence/absence monitoring over the life of the Proposal will confirm if this objective is achievable.				In field searching for burrows and activity in rehabilitated areas (Years 5 and 10 following rehabilitation and as required thereafter)	

#### 5.4.4 Risks and management actions

Poor planning and ineffective methods of conducting rehabilitation work can result in unstable, poorly performing landforms, including poor vegetation cover which can subsequently result in slope instability and ongoing erosion issues, instability and/or failure to achieve closure criteria (refer to Table 39). Rehabilitation will be undertaken progressively as described in this PER and the approved MCP, submitted per requirements of the State legislated Mining Act.

Inappropriate collection and storage of topsoil can result in sterilisation of the soil and subsequent poor performance in rehabilitation (refer to Table 39). To manage this risk:

- topsoil will not be stripped or handled in wet or dusty conditions
- topsoil will be stored in stockpiles of no more than 2m vertical height to reduce the loss of seed viability and biotic activity
- stockpiles will be located away from drainage lines and active areas
- stockpiles will be clearly signposted to deter traffic and inadvertent removal
- stockpiles will be monitored annually for weeds and control measures implemented as required.

Monitoring programs will be implemented to track rehabilitation progress. Where monitoring indicates that progress towards meeting the completion criteria is not progressing as necessary, contingency actions will be implemented, which may include additional earthworks, additional removal of infrastructure, and/or additional revegetation works and supplementary seeding, with subsequent additional monitoring to then also be implemented. Any seeding or planting undertaken during rehabilitation will use species of local provenance where available.

### 5.5 Residual Impact Assessment

Residual impacts refer to adverse impacts, whether temporary or permanent, predicted to remain after the application of avoidance, minimisation and rehabilitation have been pursued (Australian Government 2012).

The potential significance of any residual impacts on protected matters, as a result of the Proposal, has been determined in accordance with the Commonwealth Offsets Assessment Guide (DSWPAC 2012b) and the Commonwealth's significant impact guidelines 1.1 (Department of the Environment 2013), and presented in the following sections.

#### 5.5.1 WA Wheatbelt Woodlands TEC

The Proposal will result in the clearing of up to 27.5 ha of vegetation representative of the WA Wheatbelt Woodlands TEC. This represents 7.8% of the mapped WA Wheatbelt Woodlands TEC extent within the Development Envelope (350.3 ha). Clearing for the Proposal represents a decrease in the known local extent (2,394.3 ha) by 1.1%.

Table 21 details the reduction in area of each patch within the Disturbance Footprint. Proposal implementation will result in up to 20.2 ha of vegetation in the 40 m buffer zone in Good - Excellent condition being cleared for the purpose of roads, pits and topsoil storage (Figure 33).

A regional vegetation assessment, undertaken by van Etten (2013), assessed the vegetation present in the Mount Gibson area in support of the proposed Mummalo Iron Ore Project, located approximately 5 km northeast of the Proposal. van Etten (2013) highlights that while

salmon gum woodlands have experienced significant decline, this has occurred in the northern and eastern wheatbelt, with 96% of its distribution within the arid zone, which includes the Proposal, remaining uncleared (Elith and Bidwell 2004). van Etten (2013) concluded that there was no evidence to indicate that the vegetation types in the Mummaloo area are rare or restricted in their distribution or likely to be threatened by the mining development.

At the local scale, clearing for the Proposal will not remove any whole patch of the WA Wheatbelt Woodlands TEC mapped within the Development Envelope. All patches within the Disturbance Footprint will continue to meet the Approved Conservation Advice criteria and retain TEC status after clearing.

Based on the above, implementation of the Proposal will not contradict the Approved Conservation Advice (DoE, 2015) relevant Priority recovery and threat abatement actions of:

- Avoid or restrict further clearance and fragmentation of the ecological community, especially of:
- High quality eucalypt woodland sites (as per the condition thresholds). Do not allow such patches to be further reduced below the size thresholds.
- Components identified as particularly threatened, such as threatened and priority ecological communities recognised in WA
- Woodland sites known to be habitat for threatened species or species that are uncommon in the relevant IBRA subregion or catchment.
- Manage weeds, particularly during revegetation works or after disturbances to a site, to maximise natural establishment of native species and minimize spread of weeds.
- Do not plant (or spread) known or potential environmental weeds within or near the ecological community.

The likelihood of indirect impacts (e.g. from dust deposition, altered surface water regimes or altered fire regimes) from the Proposal, after avoidance, mitigation and management measures have been implemented, is considered low. Should any occur, they are expected to be short term and reversible as a result of the implemented avoidance, mitigation and management measures.

Avoidance and mitigation actions outlined in Section 5.3, including implementation of Environmental Management Plans (Appendix Q and R), reduces any potential impacts to as low as reasonably practicable.

An assessment of the potential impacts against the significant impact criteria (DoE, 2013) for the WA Wheatbelt Woodlands is provided in Table 47.

**Table 47: Consideration of Significant Impact Guidelines – WA Wheatbelt Woodlands**

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<p><b>Reduce the extent of an ecological community</b></p>	<p>The WA Wheatbelt Woodlands occurs across a 939,470 ha extent in Western Australia, ranging from Mullewa in the north to Cranbrook, 700 km to the south. The WA Wheatbelt Woodlands occurs across three IBRA subregions, the Avon Wheatbelt subregions AVW01 and AVW02, and Mallee subregion MAL02 and extends into the Jarrah forest region in areas under 600 mm of rainfall. The Proposal occurs within the arid zone region of Western Australia and receives 250-300 mm of average rainfall per year (BoM, 2023a). The generally accepted rainfall range for the WA Wheatbelt Woodlands of 300-600 mm average (DoE, 2015).</p> <p>The Proposal is located within the far northeastern extent of the AVW01 subregion, adjacent to the Talling subregion of the Yalgoo Bioregion. Vegetation of the Talling subregion is characterised by low woodlands to open woodlands of Eucalyptus, Acacia and Callitris on red sandy plains of the Western Yilgarn Craton and Southern Carnarvon. Vegetation of the Western Yilgarn Craton, on which the Proposal occurs, comprises mulga, <i>Callitris-E. salubris</i>, and Bowgada open woodlands and scrubs on earth to sandy-earth plains (Desmond and Chant 2001). Both the vegetation and soil profiles present within the Development Envelope are consistent with that described in the Talling subregion. The consistency in vegetation supports the position that vegetation associated with the WA Wheatbelt Woodlands, in this location, is contiguous and extends broadly in the regional area beyond the Avon Wheatbelt bioregion to the Yalgoo bioregion where the same Eucalypt Woodlands are not considered a TEC. Work undertaken by van Etten (2013) adds further verification to this position.</p> <p>A regional vegetation assessment, undertaken by van Etten (2013), assessed the vegetation present in the Mount Gibson area in support of the proposed Mummaloo Iron Ore Project, located approximately 5 km northeast of the Proposal. van Etten (2013) discusses that in the Mount Gibson area, the salmon gum woodland is close to its northern most extent, and that many of the characteristic understorey species within the Mt Gibson area occur throughout salmon gum woodlands in the Goldfields. This finding further supports the position that salmon gum woodland, representative of the WA Wheatbelt Woodlands, occurs extensively to the east of Mount Gibson into the Goldfields.</p> <p>van Etten (2013) highlights that while salmon gum woodlands have experienced significant decline, this has occurred in the northern and eastern wheatbelt, with 96% of its distribution within the arid zone, which includes Mount Gibson, remaining uncleared (Elith &amp; Bidwell, 2004). van Etten (2013) concluded that there was no evidence to indicate that the vegetation types in the Mummaloo area are rare or restricted in their distribution or likely to be threatened by the mining development.</p> <p>In the Proposal context, clearing up to 27.5 ha of vegetation representative of the WA Wheatbelt Woodlands is required. Additional field surveys have delineated ~2,050 ha of the WA Wheatbelt Woodlands within a 7 km buffer outside the Development Envelope. Clearing for the Proposal represents a decrease in the known local extent (2,394.3 ha) by 1.1%. All of the patches within the Disturbance Footprint will continue to meet the Approved Conservation Advice criteria and retain TEC status after clearing.</p> <p>As discussed in Section 2.3, the application of the mitigation hierarchy in the design of the Proposal has significantly reduced the extent of the clearing to mapped occurrences of WA Wheatbelt Woodlands within the Development Envelope. The original design of the Disturbance Footprint required the direct clearing of up to 142.1 ha of the TEC within the Development Envelope.</p> <p>With regards to indirect impacts, the implementation of the Proposal may result in increased dust emissions, introduction or spread of invasive species (such <i>Rumex vesicarius</i> (Ruby Dock)), and alterations to hydrological and fire regimes, as discussed in Section 5.2. Following the implementation of the management measures outlined in Section 5.3, it is considered unlikely that these potential impacts will reduce the extent of the WA Wheatbelt Woodlands within the local area. Further consideration of these potential indirect impacts is provided in the subsequent assessment against the relevant impact criteria below.</p> <p>Through clearing, the Proposal will directly reduce the extent of the WA Wheatbelt Woodlands by 27.5 ha.</p>	Y	Y
<p><b>Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines</b></p>	<p>The Proposal will not fragment or significantly increase fragmentation of any known occurrences of the WA Wheatbelt Woodlands. All patches within the Disturbance Footprint will continue to meet the Approved Conservation Advice criteria and retain TEC status after clearing (TEPL, 2025a).</p> <p>The WA Wheatbelt Woodlands has been subject to extensive clearing and fragmentation within the wheatbelt agricultural zone, particularly the eastern wheatbelt. The Proposal is located within the Mount Gibson area, considered to be within the arid zone of Western Australia (van Etten, 2013). van Etten (2013) outlines that within the arid zone, 96% of the salmon gum woodlands distribution remains uncleared, highlighting low occurrences of fragmentation and the contiguous nature of the salmon gum woodlands (representative of the WA Wheatbelt Woodlands) extending into the Goldfields region.</p>	N	N

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>At the local scale, clearing for the Proposal will not remove any whole patch of the WA Wheatbelt Woodlands mapped within the Development Envelope. Clearing associated with the Proposal will be isolated to the edges of existing patches within the Development Envelope (Figure 30) and managed through the implementation of the MNES EMP (Appendix Q).</p> <p>The establishment of vehicle access may result in minor fragmentation however; this will be limited in extent and will not inhibit the natural processes of the existing community. As far as practicable, existing roads will be used and widened only where required. If additional clearing is required for new roads, these have been designed to avoid the WA Wheatbelt Woodlands patches and where this is not possible, disturbance to large trees will be kept to the minimum necessary to ensure safe access. Roads will not alter the natural composition or ecological function of a patch as disturbance is minimal and other potential impacts (e.g. weeds, saline overspray) will be managed in accordance with the actions listed in Section 5.3.</p> <p>Management measures (Section 5.3) will be implemented to minimise or prevent increased fragmentation. Disturbance from roads, tracks and historic mining activities exist in the proposed clearing area, which will be utilised where possible to prevent increased fragmentation of the WA Wheatbelt Woodlands.</p> <p>Noting the above, it is unlikely that the Proposal will significantly fragment or increase the fragmentation of the WA Wheatbelt Woodlands.</p>		
<p><b>Adversely affect habitat critical to the survival of an ecological community</b></p>	<p>Habitat critical to the survival of the ecological community is defined in the Approved Conservation Advice (DoE, 2015) as areas of the WA Wheatbelt Woodlands that meet the key diagnostic characteristics and condition thresholds for the ecological community, plus the buffer zones (up to 40 m), particularly where this comprises native vegetation.</p> <p>Within the Development Envelope, there is ~537.9 ha of native vegetation in Good - Excellent condition considered critical to the survival of the WA Wheatbelt Woodlands, of which ~350.3 ha occurs within eligible WA Wheatbelt Woodlands patches and ~187.6 ha occurs within the 40 m buffer zone around WA Wheatbelt Woodlands patches (TEPL, 2025a).</p> <p>After removal of 27.5 ha of TEC within the Disturbance Footprint, ~510.4 ha of native vegetation considered critical to the survival of the TEC will remain undisturbed in the Development Envelope; of which ~322.8 ha will be retained in eligible TEC patches and ~187.6 ha will be retained in the 40 m buffer zone around TEC patches (TEPL, 2025a).</p> <p>With regards to indirect impacts, the Proposal will be implemented in accordance with the MNES EMP such that potential indirect impacts are managed and are unlikely to result in adverse impacts to habitat critical to the survival of the WA Wheatbelt Woodlands. Through the EMP, clearing will be controlled via on-site demarcation and managed through the Site Disturbance Permit procedures. Vegetation health monitoring will be undertaken to ensure dust and weed management controls are effective and no new occurrences of weed species attributable to the Proposal are recorded within occurrences of the WA Wheatbelt Woodlands.</p> <p>With regards to surface water flows to the WA Wheatbelt Woodlands, Advisian (2023) was engaged to undertake a detailed hydrology study for the Proposal. As part of the scope of the study, Advisian (2023) assessed water-related impacts and the proposed surface water management measures, including diversions and drain installation. The assessment determined a negligible difference in surface water quantity at identified hydrograph comparison locations and, therefore a negligible impact to surface water flows reporting to downstream receptors. The installation of drainage features within the Development Envelope, will ensure surface water flows continue to support occurrences of the WA Wheatbelt Woodlands immediately adjacent to the Disturbance Footprint.</p> <p>Considering the relatively small area of disturbance in the context of the mapped local occurrence, the known contiguous extent of the WA Wheatbelt Woodlands outside of the Development Envelope, and the implementation of management measures (Section 5.3), the Proposal will not adversely affect habitat critical to the survival of the WA Wheatbelt Woodlands.</p>	N	N
<p><b>Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns</b></p>	<p>The implementation of the Proposal is not likely to modify or destroy abiotic factors necessary for the community's survival. Clearing for the Proposal will be confined to the Disturbance Footprint and existing surface water flow regimes will be maintained as much as possible with the installation and maintenance of surface water/drainage infrastructure across the Proposal site. Appropriate drainage and containment infrastructure will be installed to control runoff from hardstand areas, roads and other cleared surfaces. Based on the surface water assessment by Advisian (2023), no changes are expected to the surrounding surface water drainage patterns or nutrient cycles.</p>	N	N

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>Waste, including tailings, will be managed in accordance with the Department of Energy, Mines, Industry Regulation and Safety (DMPE) Guidelines and subject to regulation under the Mining Act. The risk of tailings or other waste materials impacting the WA Wheatbelt Woodlands is considered negligible.</p> <p>Groundwater abstraction for mining purposes is unlikely to impact the WA Wheatbelt Woodlands. A review of the Groundwater Dependent Ecosystems (GDE) Atlas (BoM, 2023) indicates that vegetation within the Development Envelope has a 'Low Potential' for GDE's.</p> <p>A Groundwater Dependent Vegetation Desktop Study undertaken by TEPL (2023) with support from Jenny Borger, a botanist experienced in the mid-west area of Western Australia. This study determined that it is unlikely there is any groundwater dependent vegetation which would be impacted as a result of the Proposal (refer to Section 3.7.3). TEPL (2023) found that groundwater in the Development Envelope is typically deep and most likely outside the vegetation root zone.</p> <p>Additionally, the depth to groundwater is approximately 4 m or greater and the groundwater is highly saline (typically over 10,000 mg/L) and therefore unlikely to support large vegetation such as Eucalypt trees, which have a shallow lateral root system and are typically susceptible to water logging and saline conditions.</p> <p>As previously discussed, Advisian (2023) completed a detailed hydrology study for the Proposal, investigating water-related impacts and assessing the proposed surface water management measures, including diversions and drain installation. The assessment determined a negligible difference in surface water quantity at identified hydrograph comparison locations and, therefore a negligible impact to surface water flows reporting to downstream receptors. TEPL (2023) found Patch 2 (Figure 32) may be at risk from inundation as it is located lower in the landscape, however, this risk can be managed with appropriate controls such as bunding or diversion channels. All other patches are located higher in the landscape or within separate sub-catchments.</p> <p>The installation of drainage features within the Development Envelope will ensure surface water flows continue to support occurrences of the WA Wheatbelt Woodlands immediately adjacent to the Disturbance Footprint.</p> <p>Based on the above, the Proposal is not expected to modify or destroy abiotic factors necessary for the community's survival.</p>		
<p><b>Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting</b></p>	<p>The proposed clearing of 27.5 ha, representing 1.1% of the WA Wheatbelt Woodlands occurrence within the local area (2,394.3 ha), is unlikely to substantially change the species composition of an occurrence of the ecological community.</p> <p>Clearing will be limited to removing the edges of WA Wheatbelt Woodlands patches rather than fragmenting. Clearing is not expected to lead to the decline of any particular species or the loss of functionally important species outside of the Disturbance Footprint. As outlined in the Approved Conservation Advice (DoE, 2015) there is a lack of specific information about the ecological functional roles for most species that occur in the WA Wheatbelt Woodland TEC. The reductions in patch sizes are not expected to significantly alter any patch's functionality or conservation status, due to patch residual size (small and isolated patches are less resilient to disturbances and less likely to recover lost diversity and functions (DoE, 2015)) and presence of the eucalypt canopy (tree canopy eucalypts are considered functionally important to the TEC (DoE, 2015)). No entire patch of WA Wheatbelt Woodlands will be removed. Patches 6, 7, 8 and 10 (Figure 34), have the greatest potential risk of edge effects due to their size after Proposal implementation (less than 4 ha) and being adjacent to the Disturbance Footprint; following implementation of the mitigation and management actions listed in Section 5.3, the risk of edge effects to these patches is considered low.</p> <p>Cleared topsoil and vegetation will be retained and respread over disturbed areas for rehabilitation, and no material will be removed from the Development Envelope. The topsoil and vegetation contain seed species of both overstorey and understorey species, which will support natural regeneration over time. The disturbance areas are small, and the surrounding vegetation will also supply seed for future regeneration.</p> <p>Potential impacts on the species composition of the WA Wheatbelt Woodlands as a result of fire, weeds or altered surface water flows will be minimised through the management measures outlined in Section 5.3. Intentional burning and fires will be prohibited, and appropriate hygiene measures will be employed during Proposal implementation to prevent or contain any invasive species or diseases.</p> <p>The Proposal will not result in a significant or substantial change in the species composition of an occurrence of the WA Wheatbelt Woodlands at either the local or regional scale. Based on the above, the Proposal is not expected to impact or lower the WA Wheatbelt Woodlands patches resilience.</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<p><b>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</b></p> <ul style="list-style-type: none"> <li>• assisting invasive species, that are harmful to the listed ecological community, to become established, or</li> <li>• causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.</li> </ul>	<p>The implementation of the Proposal will be managed such that clearing will be limited to the Disturbance Footprint only. Management actions (Section 5.3) will be implemented to prevent any indirect impacts to surrounding areas of WA Wheatbelt Woodlands.</p> <p>The Proposal does not involve any activities that could cause regular mobilisation of fertilisers, herbicides or other chemicals or pollutants. Waste, including tailings, will be managed per the Department of Energy, Mines, Industry Regulation and Safety (DMPE) Guidelines and subject to regulation under the Mining Act. The risk of tailings or other waste materials impacting the WA Wheatbelt Woodlands is negligible.</p> <p>Many of the threats to the ecological community's recovery, such as bushfires and weeds, are pre-existing in the surrounding area. The local area is an ex pastoral station and mining operation and many weed species, including the invasive species, <i>Rumex vesicarius</i> (Ruby Dock), are widespread in the area as a result. Weeds such as Ruby Dock, <i>Cleretum papulosum</i>, <i>Carrichtera annua</i> and <i>Mesembryanthemum spp.</i>, are known to occur in areas of the WA Wheatbelt Woodlands, particularly adjacent to disturbances where edge effects are apparent (FVC, 2023).</p> <p>Implementing the Proposal will not substantially increase these risks, however, proactive management to prevent these threats from increasing because of the Proposal will be undertaken. Weed control activities were undertaken during 2023 and 2024 and a weed management program will be implemented during the life of the Proposal.</p> <p>It is considered unlikely that the Proposal will result in a reduction of the quality or integrity of the WA Wheatbelt Woodlands.</p>	N	N
<p><b>Interfere with the recovery of an ecological community.</b></p>	<p>No Recovery Plan has been adopted for the WA Wheatbelt Woodlands as it was not deemed required (DoE 2015). The Approved Conservation Advice details the key threats to the WA Wheatbelt Woodlands, with several recovery priorities and associated threat abatement actions outlined.</p> <ul style="list-style-type: none"> <li>• The key actions and priorities for the recovery of the WA Wheatbelt Woodlands are:</li> <li>• Avoiding or restricting the clearing and fragmentation of the WA Wheatbelt Woodlands</li> <li>• Revegetation of degraded patches</li> <li>• Preventing the spread of weeds.</li> </ul> <p>Implementing the Proposal will require the removal of 27.5 ha of the WA Wheatbelt Woodlands, reducing the mapped local occurrence (2,394.3 ha) by 1.1%. Following completion of mining, cleared areas of WA Wheatbelt Woodlands will be rehabilitated per an approved closure and rehabilitation plan and in consultation with DBCA, DMIRS and other relevant stakeholders.</p> <p>No significant fragmentation of the local or regional patch will occur as clearing is predominately located on the edges of patches, and no entire patch will be removed, nor will any become ineligible for TEC status (TEPL, 2025a). It is expected that rehabilitation will be effective due to the proximity of clearing and intact, good condition vegetation which will have a good supply of seed. Appropriate hygiene measures will be employed during the Proposal to prevent or contain any invasive weed species, with eradication measures implemented where necessary.</p> <p>Based on the above, the Proposal is not expected to interfere with the recovery of the TEC.</p>	N	N

### 5.5.2 *Eremophila viscida* (Varnish Bush)

There is no documented knowledge of pollinators of *Eremophila viscida* publicly available; however, potential pollinators could include birds or moths (TEPL, 2025a). The Proposal is not expected to impact pollinators due to contiguous habitat available in the area, particularly just to the east of the known *Eremophila viscida* location, where only an access road will be constructed and utilised infrequently by light vehicles. However, it is acknowledged the removal of vegetation within the Disturbance Footprint could have an unpredictable impact on pollinators to *E. viscida* due to the exact type of pollinator (insect or bird) being unknown. The Proposal does not fragment or isolate the critical habitat for the species, and based on the assessment undertaken by Bamford (2024b) the Proposal is expected to have a negligible impact on fauna habitat loss and fragmentation.

Appropriate drainage and containment infrastructure will be installed to control runoff from hardstand areas, roads and other cleared surfaces. Any runoff will be contained to the Disturbance Footprint and is highly unlikely to impact the *Eremophila viscida* critical habitat.

Dust suppression using water trucks will be continuous on unsealed roads, in the pit and other open areas to minimise dust generation. Dust suppression using water trucks will be undertaken on the ROM and during materials handling activities. In excessively windy conditions when dust emissions cannot be adequately controlled, operations will be postponed until dust suppression can abate dust emissions.

Runoff or spray of saline water from dust suppression activities has the potential to result in the loss or reduced health of flora and vegetation. Dust suppression with saline water on unsealed roads appears to have a limited impact on surrounding vegetation (Loch & Squires 2010), providing that saline water application is limited to the road surface and appropriate runoff capture measure (such as table drains) are used.

Dust deposition levels at the Proposal are predicted to be low (GHD, 2023). Matsuki et.al (2016) found no evidence of negative impacts on plant health due to dust deposition in semi-arid environments. Plants in semi-arid environments are exposed to dust naturally and may be less likely than plants in more mesic landscapes to suffer from short-term impacts of dust. These plants often have morphological adaptations that capture and retain moisture (Matsuki 2016).

The Proposal is unlikely to impact *Eremophila viscida*. The two individuals known to occur in the Development Envelope have now senesced. There will be no direct impact to *Eremophila viscida* or its critical habitat from the Proposal.

The avoidance and mitigation actions outlined in Section 5.3, including implementation of Environmental Management Plans (Appendix Q and R), will reduce any potential impacts to critical habitat to as low as practicable. The likelihood of indirect impacts to critical habitat (e.g. from dust deposition, altered surface water regimes or altered fire regimes) from the Proposal, after avoidance, mitigation and management measures have been implemented, is considered low. Should any occur, they are expected to be short term and reversible as a result of the avoidance, mitigation and management measures.

The Proposal is consistent with the relevant recovery actions (CALM, 2003) of conducting further surveys, installing fencing, undertaking weed control and monitoring populations.

An assessment of the potential impacts against the significant impact criteria (DoE, 2013) for *Eremophila viscida* is provided in Table 48.

**Table 48: Consideration of Significant Impact Guidelines – *Eremophila viscida***

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<b>Lead to a long-term decrease in the size of a population</b>	<p>The two known plants died during 2024 following very dry conditions in 2023 until May 2024. The species is thought to have a life expectancy of approximately 20 years with fire or other disturbance being required for germination. The time since fire at the Proposal is just over 20 years, and there have been no known fires within the last 20 years recorded in the Development Envelope area (TEPL, 2025a).</p> <p>The Proposal will not lead to a long-term decrease in the size of the population.</p>	N	N
<b>Reduce the area of occupancy of the species</b>	<p>The assessment of potential habitat in the Development Envelope and surrounds can only be based on the one known location of <i>Eremophila viscida</i> in the Development Envelope and the habitat present there. The vegetation type within this habitat varies from other known locations of the species and there is limited information available of vegetation types of the other known locations, with most known populations occurring in small pockets of remnant vegetation (TEPL, 2025a). The population at Mount Gibson is in one of the largest patches of contiguous bushland in which the species occurs (FVC, 2023).</p> <p>Potential habitat is likely to be extensive in the area outside the Development Envelope, particularly within vegetation similar to Vegetation Communities 19 and 27 (as described by FVC, 2023), which contain habitat most likely to support the species. There may be potential habitat within Biluny Wells Nature Reserve (Ex White Wells Station), managed by DBCA, which is located to the south of the Proposal and closer to previously recorded populations of <i>Eremophila viscida</i>. It should be noted that whilst habitat has the potential to support <i>Eremophila viscida</i>, there is no certainty that any of the areas would successfully support the species, particularly without assistance from fire.</p> <p>The Proposal will not reduce the area of occupancy of the species.</p>	N	N
<b>Fragment an existing population into two or more populations</b>	<p>In the local area, <i>Eremophila viscida</i> is only known from the single location within the Development Envelope (Figure 34).</p> <p>Therefore, implementation of the Proposal will not fragment the population into two or more populations.</p>	N	N
<b>Adversely affect habitat critical to the survival of a species</b>	<p>Critical habitat for <i>Eremophila viscida</i> in the Development Envelope has been determined as 8.96 ha of similar habitat within 200 m of the known individuals (TEPL, 2025a). A topsoil storage area proposed within this area (Figure 37) will be adjusted to avoid disturbance to critical habitat.</p> <p>Management actions (Section 5.3) will be implemented to prevent any indirect impacts to the critical habitat.</p> <p>The only current threat (as defined by CALM, 2003) to the critical habitat is poor recruitment due to lack of appropriate disturbance (fire), as the time since fire in this area is just over 20 years and there have been no known fires within the last 20 years recorded in the area. Whilst the Proposal will implement management actions to prevent fires starting at the Proposal, no actions will be taken against naturally occurring fires unless deemed necessary by the threat to critical infrastructure (e.g. processing plant) or human life.</p> <p>Implementation of the Proposal is not expected to adversely affect habitat critical to the species.</p>	N	N
<b>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b>	<p>Implementation of the Proposal will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline (noting both individuals are already dead).</p> <p>A topsoil storage area proposed within the area of critical habitat (Figure 37) will be adjusted to avoid disturbance to critical habitat and management actions (Section 5.3) will be implemented to prevent any indirect impacts to the critical habitat.</p> <p>Potential habitat is likely to be extensive in the area outside the Development Envelope, particularly within vegetation similar to Vegetation Communities 19 and 27 (as described by FVC, 2023), which contain habitat most likely to support the species. There may be potential habitat within Biluny Wells Nature Reserve (Ex White Wells Station), managed by DBCA, which is located to the south of the Proposal and closer to previously recorded populations of <i>Eremophila viscida</i>. It should be noted that whilst habitat has the potential to support <i>Eremophila viscida</i>, there is no certainty that any of the areas would successfully support the species, particularly without assistance from fire.</p> <p>Therefore, it is considered unlikely that the Proposal will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	N	N
<b>Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat</b>	<p>The Proposal is unlikely to result in the introduction of harmful or invasive species. Weeds in the Development Envelope predominately occur on previously disturbed land; however, are not currently degrading the structure and composition of native vegetation communities and are symptomatic of disturbance (i.e. from historical mine activities).</p>	N	N

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>None of the weed species recorded in the Disturbance Footprint are Weeds of National Significance (Centre for Invasive Species Solutions, 2023), however <i>Rumex vesicarius</i> (Ruby Dock) is listed as a Declared Pest on the Western Australian Organism List (DPIRD, 2023b). Ruby Dock is an invasive species that can rapidly colonise disturbed areas. The seeds are salt tolerant and form a persistent seed bank within the soil that can last for many years (Schatral and Osborne, in FVC 2023).</p> <p>The Proposal will be implemented in accordance with the management actions outlined in Section 5.3 and the MNES EMP (Appendix Q), which include measures to manage the potential spread of weeds that may reduce habitat quality.</p> <p>It is considered unlikely that the Proposal will result in invasive species harmful to <i>Eremophila viscida</i> becoming established, particularly in the area of critical habitat for this species.</p>		
<b>Introduce disease that may cause the species to decline</b>	<p>There is currently no information on diseases in wild <i>Eremophila viscida</i> populations. Whilst many native plants are susceptible to dieback caused by plant pathogen from the genus <i>Phytophthora</i> (particularly <i>Phytophthora cinnamomi</i>), in Western Australia, dieback occurrence is restricted to the South-west of the state where annual rainfall exceeds 400 mm (DBCA, 2024).</p> <p>Based on the location of the Proposal where the climate is drier and does not support <i>Phytophthora</i> spp. the introduction of disease that may affect <i>Eremophila viscida</i> is not a risk associated with the Proposal.</p>	N	N
<b>Interfere with the recovery of the species</b>	<p>The Proposal is unlikely to interfere with the recovery of the species. The Proposal has been considered against the relevant priorities for the species recovery, as documented in the Interim Recovery Plan (CALM, 2003). This assessment found the Proposal was not inconsistent with the relevant key priorities of the Recovery Plan, including weed control, rabbit control, population monitoring and promote awareness.</p> <p>Furthermore, the Proposal will not clear critical habitat for this species. It is considered unlikely that the Proposal will interfere with the recovery of the species. The ability of the site to support future occurrences of the species will remain, providing suitable conditions occur.</p>	N	N

### 5.5.3 *Leipoa ocellata* (Malleefowl)

The Proposal will result in the following residual impacts:

- permanent loss of two active and eight inactive (as recorded during monitoring in 2024) Malleefowl mounds.
- 568.8 ha of preferred breeding habitat (VSA 1 and VSA 2)

This equates to 12.5% of active and 5.2% of inactive mounds (excluding those identified by lidar/unverified) known in the Development Envelope and surrounds (Figure 38). Based on the results of surveys undertaken, the population size of Malleefowl in the Development Envelope and surrounds is estimated to be at least 16 breeding pairs (32 individuals), with an area of occupancy of approximately 0.09 pairs/1 km<sup>2</sup>.

Malleefowl have relatively large territories and maintain more than one mound at any one time (although only one mound is generally used for nesting). The removal of an island of land within contiguous habitat will reduce the area of available habitat however will not result in restriction of Malleefowl in the area given the available connected habitat around. There are no boundaries to Malleefowl in this region except for clearing in the wheatbelt to the south-west. Therefore, it is expected that the breeding pairs of Malleefowl associated with the two active mounds to be cleared, will select alternatively maintained mounds during subsequent breeding seasons. There are 150 mounds and an additional 71 potential mounds (identified by Lidar and not yet verified) that occur outside the Development Envelope, including 14 recorded as active during 2024.

A slight reduction in east-west movement can be expected. Existing disturbance is about 16 km in length but with some gaps between mine pits that could allow movement of birds. The Proposal is likely to close these gaps, however, there is continuous vegetation to the north and south that will continue to allow passage of birds in an east-west dispersion (Bamford, 2024b).

As discussed in the National Recovery Plan for the species (CoA, 2024), Malleefowl habitat has been described for some locations within the distribution, but these present an incomplete understanding of the habitats likely to be critical to the survival of the Malleefowl. Based on the results from Bamford (2024b), the Proposal will directly remove approximately 568.8 ha of preferred Malleefowl breeding habitat (VSA 1 and VSA 2). An additional estimated 1,037 ha of this habitat has been mapped locally outside the Development Envelope. Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b).

Two breeding pairs will be displaced and there will be loss of 568.8 ha of preferred breeding habitat (VSA 1 and VSA 2). Except for the pit areas, the loss of fauna habitat will be temporary until rehabilitation commences, with early rehabilitation areas often containing high densities of *Acacia* spp. that provide seeds suitable for Malleefowl foraging (Bamford, 2024b). The EPA (2016b, in Bamford 2024b) suggests that the availability of fauna habitats within 15 km can be used to assess the significance of habitat loss as an impact. While there is no precise measure of breeding habitat, there is 6,251 ha of habitat mapped within 15 km of the Disturbance Footprint. Therefore, the Disturbance Footprint represents a maximum 19.4% of habitat within a 15 km buffer (Bamford, 2024b).

As Malleefowl have relatively large territories (Biostat, 2018), individuals utilising the mounds within the Disturbance Footprint are expected to disperse to nearby areas of habitat. The Proposal is relatively short-lived (~15 years), and any potential impacts to the area of

occupancy are expected to return to previous levels following closure and implementation of rehabilitation actions.

The high number of usable mounds in the local area and contiguous habitat provides ample opportunity for dispersal and ongoing breeding. Bamford (2024b) concluded that given the expansive areas of suitable surrounding Malleefowl breeding habitat, it is highly unlikely that this will lead to population decline for this species (even at the local scale).

The long term effect of vegetation clearing is not expected to significantly impact the regional population. The Proposal will be obligated to meet closure criteria as approved by DMPE in the MCP approved under the Mining Act. Initial rehabilitation completion criteria in the MDCP will be 60% comparison to native vegetation for species richness, density and cover. Based on rehabilitation at similar projects throughout WA, rehabilitation quality is expected to be high, particularly for foraging and areas of low disturbance (roads, laydowns etc).

Rehabilitation areas often contain high densities of *Acacia* spp. that provide seeds suitable for Malleefowl foraging (Bamford, 2025). Malleefowl are generalist feeders with variable diets, however, have been observed with diets consisting mostly of seeds and fruits of shrubs, particularly acacias (DCCEEW, 2024d). Malleefowl returning to areas following rehabilitation has been recorded during monitoring at Mt Jackson (MRL, 2022), where active mounds have been recorded surrounding rehabilitated operations (J2 and J3).

Permanent impacts to birds, such as hearing loss, threshold shift and significant behavioural impacts are found at sound pressure levels above 110 dBA. At lower sound pressure levels, between 110 dBA and 93 dBA, some temporary impacts could arise, including masking of communication signals. From the loudest of the mining equipment that will operate continuously, neither the 93 dBA nor the 110 dBA thresholds are exceeded at any distance greater than 10 m from the mining equipment (GHD, 2025, Appendix M).

Additionally, airborne noise from blasting does create noise levels that have peak pressure levels that could be potentially damaging to the Malleefowl. It is not expected that masking of communication signals or other temporary shifts will occur due to irregularity of blasts (GHD, 2025).

If disturbed, Malleefowl are expected to utilise the adjacent areas outside the mining area (GHD, 2023b). This is evidenced by behaviour in Malleefowl moving breeding areas by as much as several square kilometres when disturbed (Benshemesh, in GHD 2025).

Malleefowl at other mine sites suggest the species is very tolerant of noise, having been observed to continue working on a mound, and subsequently returning to a mound <50m from a major haul road. One male continued to work a mound within <50m of clearing being carried out and continued to maintain that mound until the end of the season (Bamford, 2024b). If the Development Envelope is assumed to be the area over which Malleefowl may be subject to some disturbance there are nine mounds that may be affected by disturbance (Figure 38), none of which have been assessed as active during 2022 – 2024 monitoring. The risk of impact to Malleefowl from noise is considered negligible.

Mortality from vehicle strikes is considered the greatest risk to Malleefowl from the Proposal (Bamford, 2024b). However, the likelihood of indirect impacts (e.g. from noise and vibration, mortality from vehicle strikes, predation by feral fauna or reduction in habitat through altered fire regimes) from the Proposal, after avoidance, mitigation and management measures have been implemented, is considered low. Should any occur, they are expected to be short term and reversible as a result of the avoidance, mitigation and management measures. However, an uncontrolled wildfire may result in a reduction of preferred breeding habitat and

recover of this habitat would be long term due to time required for vegetation to mature and reach the density of preferred breeding habitat.

The greatest risk to the species in the Proposal area are landscape scale processes, grazing of food sources by any remaining livestock or rabbits, and predation by foxes and cats. Long-term changes in rainfall such as drought and availability of food supply, also have implications for their clutch size and breeding success. However, the sort of landscape scale control of feral fauna that is proposed in Section 6 has the potential to increase the local population size despite some of the impacts from the Proposal, as evidenced by the percentage of active mounds within the predator free ex-closure compared with outside (refer to Section 5.2.1).

The Proposal is not inconsistent with most of the relevant key priorities of the National Recovery Plan. The Proposal will contribute to some priorities, such as control weeds in and adjacent to Malleefowl habitat to retain habitat quality, implement fire management plans, control feral animals, undertake predator management consistent with the Adaptive Management Predator Experiment project, collect dropped Malleefowl feathers and undertake monitoring (annually where possible) at sites registered in the National Malleefowl Monitoring Program (DCCEE, 2024d). Whilst inconsistent with the recovery action of retaining Malleefowl habitat due to clearing of the Disturbance Footprint, this item has been captured in the potential management actions and targets detailed in the proposed Offset Plan (refer to Section 6).

An assessment of the potential impacts against the significant impact criteria (DoE, 2013) for Malleefowl is provided in Table 49.

**Table 49: Consideration of Significant Impact Guidelines – Malleefowl**

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<p><b>Lead to a long-term decrease in the size of an important population of a species</b></p>	<p>The Proposal will not lead to the long-term decrease in the size of an important population of Malleefowl. An 'important population' is defined by DoE (2013) as a population that is necessary for a species' long-term survival and recovery and/or that are:</p> <ul style="list-style-type: none"> <li>• key source populations either for breeding or dispersal</li> <li>• populations that are necessary for maintaining genetic diversity, and/or</li> <li>• populations that are near the limit of the species range.</li> </ul> <p>The Malleefowl in the Development Envelope and surrounds are none of these, however, are a small part of a larger, important regional population which is extensive in the region, extending more or less continuously across similar landscapes well to the north and east (but truncated 30 km to the west and about 10 km to the south where extensive agricultural clearing has occurred). Bamford (2024b) estimated the two pairs that may be displaced by the Disturbance Footprint represent &lt;1% of the regional population within 9 km (Section 4.4).</p> <p>The evidence of Malleefowl across the Development Envelope and wider survey area is consistent, with widely distributed nature of the species within the Western Australia wheatbelt. In this particular area, there are numerous recorded occurrences of the species across the Development Envelope and surrounds, verified through surveys and recorded to occur abundantly within adjacent nature reserves, such as the AWC Mount Gibson Wildlife Sanctuary, covering an area of over 130,000 ha, and the Charles Darwin Reserve. Both support viable local populations. Given the continuity of habitat, wide distribution of the species and records throughout the local area, there is no evidence to support the individuals within the Development Envelope represent an important individual population; however, it is acknowledged they are a valuable part of a larger, important population in the surrounding region.</p> <p>While Malleefowl may utilise all habitats within the Development Envelope (for foraging, movement through the landscape, etc.) VSA 1 - Acacia Shrubland and VSA 2 - Allocasuarina Shrubland appear to be strongly favoured for the construction of nest mounds, particularly VSA 2 (Figure 39 and Figure 40). There is 568.8 ha of VSA 1 and VSA 2 habitat in the Disturbance Footprint, with an additional ~1,365 ha mapped outside the Disturbance Footprint (Table 13). Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b).</p> <p>A review of the mapped fauna habitat against pre-European vegetation associations, highlighted that Vegetation Association 437 was consistent with Shrubland habitat type. Regionally, up to 144,425 ha of Vegetation Association 437 occurs within the Avon Wheatbelt Bioregion, with this habitat type extending contiguously beyond the Development Envelope. Shrubland habitat clearing within the Disturbance Footprint (569.4 ha) represents less than 0.4% of this potential regional extent.</p> <p>Noting the above, it is considered that the Proposal is unlikely to lead to any long-term decrease in the population of the species, given the following:</p> <ul style="list-style-type: none"> <li>• The individuals identified are not considered an important individual population, given continuity of records and currently known distribution beyond the Development Envelope confirmed through local area flora, vegetation and heritage surveys and frequent Malleefowl sightings by exploration personnel currently working in the area</li> <li>• The area to be impacted comprises a very small portion of potential regional habitat</li> <li>• Large proportion of inferred regional habitat occurring within adjacent private conservation areas (Mount Gibson Wildlife Sanctuary).</li> </ul>	<p>N</p>	<p>N</p>
<p><b>Reduce the area of occupancy of an important population</b></p>	<p>The Proposal will not result in a significant reduction in the area of occupancy of an important Malleefowl population due to the contiguous nature of the preferred Malleefowl habitat. No specific populations of Malleefowl can be described as being of greater importance than any other (Benshemesh 2007). Furthermore, Bamford (2024b) concluded the Malleefowl individuals within the Development Envelope do not form an 'important population' as defined by DoE (2013), however are a valuable part of a larger, important population in the surrounding region.</p> <p>Habitat for the species is well represented within the region and clearing for the Proposal is relatively small. The Development Envelope is surrounded by nature conservation areas that support and maintain habitat for the species and breeding pairs. It is expected that Malleefowl utilising the mounds within the Disturbance Footprint will disperse to nearby areas of habitat (Bamford, 2024b). The Proposal is relatively short-lived (~15 years) and any potential impacts to the area of occupancy are expected to return to previous levels following closure and implementation of rehabilitation actions. This is supported by monitoring at Mt Jackson (MRL, 2022), where active mounds have been recorded surrounding rehabilitated operations (J2 and J3).</p> <p>While Malleefowl may utilise all habitats within the Development Envelope (for foraging, movement through the landscape, etc.) VSA 1 - Acacia Shrubland and VSA 2 - Allocasuarina Shrubland appear to be strongly favoured for the construction of nest mounds, particularly VSA 2 (Figure 39 and Figure 40). There is 568.8 ha of VSA 1</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>and VSA 2 habitat in the Disturbance Footprint, with an additional ~1,365 ha mapped outside the Disturbance Footprint (Table 13). Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b).</p> <p>Based on the above, the Proposal is not expected to impact on an important population, nor significantly reduce the area of occupancy for Malleefowl.</p>		
<p><b>Fragment an existing important population into two or more populations</b></p>	<p>The implementation of the Proposal will not fragment an existing important population into two or more populations.</p> <p>Malleefowl are a mobile species and will move to take advantage of better conditions within various habitat types. As discussed above, no important or isolated population of Malleefowl occurs, or is known to occur within the Development Envelope. The implementation of the Proposal will not split a population into two or more populations or limit genetic flow within the regional species occurrence. It should be noted that existing infrastructure and open pits exist within the Development Envelope with no evidence to support any existing habitat fragmentation or impediments to species movement.</p> <p>Furthermore, suitable contiguous habitat for the species occurs outside of the Development Envelope in all directions. Clearing for the Proposal will not impede movement through vegetation which is well represented across the wider survey area and region around the Disturbance Footprint (Bamford, 2024b).</p> <p>Based on the above, the implementation of the Proposal will not fragment an existing important population into two or more populations.</p>	<p>N</p>	<p>N</p>
<p><b>Adversely affect habitat critical to the survival of a species</b></p>	<p>Habitat critical to the survival of a species as defined under the EPBC Act is refers to areas that are necessary:</p> <ul style="list-style-type: none"> <li>• For activities such as foraging, breeding, roosting, or dispersal</li> <li>• For the long-term maintenance of the species</li> <li>• To maintain genetic diversity and long term evolutionary development, or</li> <li>• For the reintroduction of populations or recovery of the species.</li> </ul> <p>As previously discussed, Malleefowl occur in a wide range of habitat types and habitat critical to the survival of the species is known only in broad terms (DCCEEW, 2024d). VSA 1 - Acacia Shrubland and VSA 2 - Allocasuarina Shrubland appear to be strongly favoured for the construction of nest mounds, particularly VSA 2 (Figure 39 and Figure 40). There is 568.8 ha of VSA 1 and VSA 2 habitat in the Disturbance Footprint, with an additional ~1,365 ha mapped outside the Disturbance Footprint (Table 13). Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b).</p> <p>Furthermore, most of this potential regional habitat extent occurs within both the adjacent AWC Mount Gibson Wildlife Sanctuary and the Charles Darwin Reserve, located 1 km west of the Development Envelope. These conservation areas are known to contain individual records of Malleefowl as well as support breeding and foraging habitat (AWC, 2023).</p> <p>In the context regional area, including the presence of adjacent conservation reserves and the contiguous nature of potential habitat outside of the Development Envelope, it is considered unlikely that the species is reliant on habitat within the Disturbance Footprint for survival and the Proposal is unlikely to significantly impact habitat critical to the long-term survival of Malleefowl. Approximately ~568.8 ha of preferred breeding and foraging habitat will be removed, however, given the implementation of actions outlined in Sections 5.3 and 6, this is highly unlikely to affect the survival of the species in the area.</p>	<p>Y</p>	<p>Y</p>
<p><b>Disrupt the breeding cycle of an important population</b></p>	<p>The Proposal will not significantly disrupt the breeding cycle of an important population of Malleefowl. The breeding season for Malleefowl starts in late autumn with construction of the nest mound followed by egg laying from September to January. Eggs typically hatch between late November and March. Whilst this cycle is relatively long it can be impacted by climate conditions. For example, low and/or late winter rainfall may delay mating and laying to late spring (November) with subsequent knock-on effects to chick hatching (Benshemesh, 2004).</p> <p>240 Malleefowl mounds (including 71 identified by Lidar and not yet verified) have been recorded in the Development Envelope and surrounds (refer to Section 4.4.2) of which 10 occur within the Disturbance Footprint (eight inactive and two active).</p> <p>Malleefowl have relatively large territories and maintain more than one mound at any one time (although only one mound is generally used for nesting) (Biostat, 2018). Therefore, it is expected that the breeding pairs of Malleefowl associated with the two active mounds to be cleared, will select alternatively maintained mounds during subsequent breeding seasons. One of the active mounds is close to the boundary of the Disturbance Footprint, and therefore that male probably has alternative mounds that will not be cleared. Observations at other projects (Bamford, 2024b) indicate that Malleefowl will be displaced by clearing and will construct new mounds if suitable nearby habitat is available. The high number of usable mounds in the local area and contiguous habitat provides ample opportunity for dispersal and ongoing breeding.</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>While there is a preference for clearing the two active mounds outside of the breeding season, should clearing activities occur during Malleefowl breeding season, the mounds will be monitored for activity before clearing. No active mounds, as defined by the National Malleefowl Monitoring Manual (National Malleefowl Recovery Team, 2020), will be cleared during Malleefowl breeding season.</p> <p>Annual Malleefowl mound monitoring has been undertaken at Mt Jackson (approximately 200 km east of the Proposal) since 2013, to determine if any spatial trend of declining breeding activity exists that may be related to being in close proximity to mining operations. The 2018 monitoring found that the data consistently showed no relationship between distance from mining and mound activity. This is likely because Malleefowl males (the primary creator of mounds) have relatively large territories, are mobile and maintain more than one mound at any one time (although only one mound is generally used for nesting) (MRL, 2019). More recent monitoring in 2021 recorded the same result, with no apparent spatial pattern of decreased breeding activity closer to mining operations (MRL, 2022).</p> <p>Additionally, environmental factors such as rainfall, fire and predation appear to be the most important factors affecting successful Malleefowl breeding (Benshemesh, 2007).</p> <p>No evidence suggests that Malleefowl individuals within the Development Envelope form an 'important population' defined by DoE (2013), however they are a valuable part of a larger, important population in the surrounding region. Regionally the Proposal tenure adjoins the Mount Gibson Wildlife Sanctuary, a reserve of over 130,000 ha, that is known to support and contain breeding Malleefowl pairs (AWC, 2023). This is seen also at the Charles Darwin Reserve, located 1 km west of the Development Envelope. The presence of breeding pairs within large conservation areas, near the Development Envelope suggests that it is unlikely the Proposal will significantly disrupt the breeding cycle of either the local or regional population.</p> <p>Based on the above, it is unlikely the Proposal would disrupt the breeding cycle of Malleefowl.</p>		
<p><b>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b></p>	<p>The implementation of the Proposal will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Within the Development Envelope and surrounds habitat suitable for the species is largely contiguous and well-represented. Furthermore, Malleefowl are mobile, have relatively large territories and maintain more than one mound at any one time (although only one mound is generally used for nesting) (Biostat 2018).</p> <p>As previously discussed, Malleefowl occur in a wide range of habitat types and habitat critical to the survival of the species is known only in broad terms (DCCEEW, 2024d). VSA 1 - Acacia Shrubland and VSA 2 - Allocasuarina Shrubland appear to be strongly favoured for the construction of nest mounds, particularly VSA 2 (Figure 39 and Figure 40). There is 568.8 ha of VSA 1 and VSA 2 habitat in the Disturbance Footprint, with an additional ~1,365 ha mapped outside the Disturbance Footprint (Table 13). Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b). There is over 5 km of continuous habitat north-east of the Proposal Development Envelope, 15 km of continuous habitat north of the Proposal and unrestricted habitat to the south for 15km (linear), in which Malleefowl can move through.</p> <p>Furthermore, most of this potential regional habitat extent occurs within both the adjacent AWC Mount Gibson Wildlife Sanctuary and the Charles Darwin Reserve, located 1 km west of the Development Envelope. These reserves are known to contain individual records of Malleefowl as well as support breeding and foraging habitat (AWC, 2023).</p> <p>Malleefowl have relatively large territories and maintain more than one mound at any one time (although only one mound is generally used for nesting) (Biostat, 2018). It is expected that the breeding pairs of Malleefowl associated with the two active mounds to be cleared, will select alternatively maintained mounds during subsequent breeding seasons. One of the active mounds is close to the boundary of the Disturbance Footprint, and therefore that male probably has alternative mounds that will not be cleared. Observations at other projects (Bamford, 2024b) indicate that Malleefowl will be displaced by clearing and will construct new mounds if suitable nearby habitat is available. The high number of usable mounds in the local area and contiguous habitat provides ample opportunity for dispersal and ongoing breeding.</p> <p>Noting the large extent of the available habitat and that mining operations do not seem to prevent breeding occurrences, clearing suitable habitat is not considered significant. It will not result in the species' decline.</p>	<p>N</p>	<p>N</p>
<p><b>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</b></p>	<p>The Proposal is unlikely to result in the introduction of harmful or invasive species.</p> <p>The Proposal will be implemented in accordance with approval conditions, management plans (Appendix Q and R), and management actions outlined in Section 5.3; which include measures to manage the potential spread of weeds into adjacent retained vegetation, and feral animals (cats, foxes) that will predate on eggs or the birds themselves.</p> <p>Historic operations do not appear to have resulted in increasing the presence of predators to Malleefowl (cats, foxes and wild dogs), given the observed records of the species within the Development Envelope and surrounds (Figure 39). There is a risk that the Proposal introduces a resource (water or food) that is typically scarce in</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>the area that may lead to increased predators. Feral predator monitoring and control will be implemented as well as waste handling and disposal procedures to prevent feral animals being attracted to the Proposal during construction and operations.</p> <p>It is considered unlikely that the Proposal will result in invasive species harmful to Malleefowl becoming established.</p>		
<p><b>Introduce disease that may cause the species to decline</b></p>	<p>DCCEEW (2024d) outlines that there is currently no information on disease in wild Malleefowl populations. However, the species is known to be susceptible to common diseases based on observations from individuals in captivity. A significant risk for disease transmission appears to be associated with reintroducing captive-bred Malleefowl into the wild.</p> <p>Management measures (Section 5.3) will be implemented to minimise feral animals and prohibit domestic animals within the Development Envelope. The introduction of disease that may affect the Malleefowl is not a risk associated with the Proposal.</p>	<p>N</p>	<p>N</p>
<p><b>Interfere substantially with the recovery of the species.</b></p>	<p>The Proposal is unlikely to interfere with the recovery of the species. The Proposal has been considered against the relevant priorities for the species recovery, as documented in the Malleefowl National Recovery Plan and is not inconsistent with most of the relevant key priorities of the Recovery Plan. The Proposal has potential to contribute to some priorities, such as control weeds in and adjacent to Malleefowl habitat to retain habitat quality, implement fire management plans, control feral animals, undertake predator management consistent with the Adaptive Management Predator Experiment project, including treatment and control sites, make information easily available to the National Malleefowl Recovery Team, review camera-trap photos from selected sites to detect young birds and temporal patterns over time, collect dropped Malleefowl feathers and undertake monitoring (annually where possible) at sites registered in the National Malleefowl Monitoring Program (DCCEEW, 2024d). Whilst inconsistent with the recovery action of retaining Malleefowl habitat due to clearing of the Disturbance Footprint, this item has been captured in the potential management actions and targets detailed in the proposed Offset Plan (refer to Section 6).</p> <p>There is 568.8 ha of VSA 1 and VSA 2 habitat in the Disturbance Footprint, with an additional ~1,365 ha mapped outside the Disturbance Footprint (Table 13). Based on aerial photography and recorded mound locations, suitable habitat is expected to occur extensively throughout the wider region (Bamford 2024b).</p> <p>Furthermore, most of this potential regional habitat extent occurs within both the adjacent AWC Mount Gibson Wildlife Sanctuary and the Charles Darwin Reserve, located 1 km west of the Development Envelope. These reserves are known to contain individual records of Malleefowl as well as support breeding and foraging habitat (AWC, 2023).</p> <p>Based on the above, it is considered unlikely that the Proposal will substantially interfere with the recovery of the species and will contribute to several key priorities outlined in the National Recovery Plan (DCCEEW, 2024d).</p>	<p>N</p>	<p>N</p>

#### 5.5.4 *Dasyurus geoffroii* (Chuditch)

Clearing and fragmentation can result in loss of habitat (including foraging) and refuges and loss of prey species/food sources. During the day, Chuditch shelter in dens; predominantly hollow logs and earth burrows. Bamford (2024b) determined that the availability of such dens is probably an important habitat feature, therefore VSA 4 Eucalypt Woodland may provide abundant shelter in the form of hollow logs (both on the ground and in standing trees), although the Chuditch will probably forage throughout all VSAs. In the context of the Proposal, a total of 2,467 ha of VSA 4 has been mapped in the Development Envelope and surrounds, including 1,313.6 ha within the Development Envelope and 248.2 ha within the Disturbance Footprint (Figure 22). Suitable area to provide dens and foraging are very widespread across the landscape, and such suitable habitat is continuous (Bamford, 2024b).

Chuditch are highly mobile and the impact area is small across the broad landscape. Habitat across the landscape is continuous and Chuditch are likely to occupy the entire area as the reintroduction population expands (Bamford, 2024b).

Figure 41 shows the recent records of Chuditch translocated by AWC. The animals have dispersed widely, with most records to the north-east of the Development Envelope, where releases were made. There are no records within the Development Envelope. The Proposal will not interfere with the AWC translocation program given the contiguous habitat present in the surrounding area, however, will further enhance the success of the programme and survivability of the Chuditch through feral predator control within and adjacent to the Development Envelope. The most significant threat to the translocation programme is feral predators (Dr Louis O’Neil, personal communication). AWC have not raised any concerns about the Proposal affecting the translocation program.

There is negligible impact expected to occur on the Chuditch from habitat clearing or degradation as the Disturbance Footprint is small across a broad and continuous landscape (Bamford, 2024b). There is over 5 km of continuous habitat north-east of the Proposal Development Envelope, 15 km of continuous habitat north of the Proposal and unrestricted habitat to the south for 15km (linear), in which Chuditch can move through to access the AWC Sanctuary.

Feral predators have the potential to have a major impact on Chuditch. The red fox has been implicated in the decline of Chuditch across much of its range, so the reintroduced population is likely to be vulnerable to this predator and to any increase in its abundance. Such changes in the abundance of introduced species can occur in association with disturbance during mining and an increase in food supply from inappropriately stored food waste (Bamford, 2024b).

The effect of disturbance (noise, vibration or lighting) on Chuditch is uncertain, however there are records of them entering suburban gardens (e.g. to prey on domestic chickens), suggesting the species is tolerant of disturbance (Bamford, 2024b).

There is a negligible to minor risk to Chuditch from vehicle strikes. Mortality during clearing is unlikely but possible, particularly when large fallen and standing tree hollows are impacted, since these are potential denning sites (Bamford, 2024b).

The likelihood of indirect impacts (e.g. from noise and vibration, mortality from vehicle strikes, predation by feral fauna or reduction in habitat through altered fire regimes) from the Proposal, after avoidance, mitigation and management measures have been implemented, is considered low. Should any occur, they are expected to be short term and reversible due to the avoidance, mitigation and management measures.

This is supported by Bamford (2024b) who found overall, the effects of impacting processes (prior to the implementation of management actions listed in Section 5.3) are Minor or Negligible, except for potential impact from invasive species which is considered Major (Bamford, 2024b). Following implementation of management actions this risk is reduced to as low as practicable.

The Proposal will not interfere with recovery actions outlined in the National Recovery Plan (DEC, 2012), and may contribute to some, such as determining impacts of feral cats and feral cat control methods on Chuditch, continue, expand and improve baiting of foxes and feral cats and establish reference sites for monitoring Chuditch population abundance to evaluate the effectiveness of fox and cat control. Although clearing for the Proposal will result in removal of 248.2 ha of VSA 4, suitable area for breeding and foraging are very widespread across the landscape, and such suitable habitat is continuous (Bamford, 2024b). Therefore, the Proposal will not interfere with this recovery action.

Chuditch habitat will be improved by actions such as shifting logs around the mine, rehabilitation using eucalypt species such as York Gum (which grow quickly and provide good hollows for Chuditch and are a highly regarded species by AWC). The Disturbance Footprint has generally avoided eucalypt woodlands as the first step in the mitigation hierarchy, and the implementation of feral predator monitoring and control in partnership with AWC and others is considered the most critical mitigation measure for Chuditch survival (and all MNES vertebrate fauna species in the Proposal). An assessment of the potential impacts against the significant impact criteria (DoE, 2013) for Chuditch is provided in Table 50.

**Table 50: Consideration of Significant Impact Guidelines – Chuditch**

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<p><b>Lead to a long-term decrease in the size of an important population of a species</b></p>	<p>The Proposal is unlikely to lead to the long-term decrease in the size of an important population of Chuditch. An 'important population' is defined by DoE (2013) as a population that is necessary for a species' long-term survival and recovery and/or that are:</p> <ul style="list-style-type: none"> <li>• key source populations either for breeding or dispersal</li> <li>• populations that are necessary for maintaining genetic diversity, and/or</li> <li>• populations that are near the limit of the species range.</li> </ul> <p>The Chuditch in the broader region occur as a discrete (reintroduced) population and meets all these criteria as an important population, effectively being a founder population for the return of the species to the region (Bamford, 2024b).</p> <p>Chuditch occur mainly to the north-east of the Development Envelope (Figure 41) as that is where animals were released but have the potential to spread across the entire regional landscape. Habitat across the landscape is continuous and Chuditch are likely to occupy the entire area as the reintroduction population expands, and the animals are likely to be resident in and disperse across the entire landscape (Bamford, 2024b).</p> <p>Management actions outlined in Section 5.3, will reduce the risk of impact to the Chuditch as a result of road kill or predation by feral fauna such as the red fox.</p> <p>Noting the above, it is considered that the Proposal is unlikely to lead to any long-term decrease in the population of the species, given the following:</p> <ul style="list-style-type: none"> <li>• The area to be impacted comprises a very small portion of potential regional habitat</li> <li>• Large proportion of regional habitat occurring within adjacent private reserves (Mount Gibson Wildlife Sanctuary).</li> </ul>	<p>N</p>	<p>N</p>
<p><b>Reduce the area of occupancy of an important population</b></p>	<p>The Proposal will not result in a significant reduction in the area of occupancy of an important Chuditch population due to the contiguous nature available habitat.</p> <p>Chuditch occur mainly to the north-east of the Development Envelope (Figure 41) as that is where animals were released but have the potential to spread across the entire regional landscape. Habitat across the landscape is continuous and Chuditch are likely to occupy the entire area as the reintroduction population expands, and the animals are likely to be resident in and disperse across the entire landscape (Bamford, 2024b).</p> <p>Based on the above, the Proposal is not expected to significantly reduce the area of occupancy for Chuditch.</p>	<p>N</p>	<p>N</p>
<p><b>Fragment an existing important population into two or more populations</b></p>	<p>The implementation of the Proposal will not fragment an existing important population into two or more populations.</p> <p>Chuditch are highly mobile and the impact area is small across the broad landscape. Habitat across the landscape is continuous and Chuditch are likely to occupy the entire area as the reintroduction population expands, and the animals are likely to be resident in and disperse across the entire landscape (Bamford, 2024b).</p> <p>Based on the above, the implementation of the Proposal will not fragment an existing important population into two or more populations.</p>	<p>N</p>	<p>N</p>
<p><b>Adversely affect habitat critical to the survival of a species</b></p>	<p>Chuditch occur at a low density in the area and it is the extent of available habitat that is critical, rather than any particular VSA type (Bamford, 2024b), however, VSA 4 (Eucalypt Woodland) may provide a higher density of denning sites than other VSAs.</p> <p>As previously discussed, suitable habitat is extensive in the area surrounding the Development Envelope, Chuditch are highly mobile and the impact area is small across the broad landscape (Bamford, 2024b).</p> <p>In the context regional area, including the presence of adjacent nature reserves and the contiguous nature of habitat outside of the Development Envelope, it is considered unlikely that the species is reliant on habitat within the Disturbance Footprint for survival and the Proposal is unlikely to significantly impact habitat critical to the long-term survival of Chuditch.</p>	<p>N</p>	<p>N</p>
<p><b>Disrupt the breeding cycle of an important population</b></p>	<p>The Proposal will not significantly disrupt the breeding cycle of Chuditch.</p> <p>The entire landscape is important for the Chuditch, however, VSA 4 (Eucalypt Woodland) may provide a higher density of dens that are important at all times of the year, but particularly for females with young (Bamford, 2024b). Clearing for the Proposal represents ~10% of the mapped VSA 4 habitat; however, as previously discussed, suitable habitat is extensive in the area surrounding the Development Envelope.</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>Chuditch currently occur mainly to the north-east of the Development Envelope and there is evidence that Chuditch are tolerant of disturbance from noise and/or lighting, having been recorded entering suburban gardens to prey on domestic chickens (Bamford, 2024b).</p> <p>Based on the above, it is unlikely the Proposal would disrupt the breeding cycle of Chuditch.</p>		
<b>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b>	<p>The implementation of the Proposal will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Within the Development Envelope and surrounds habitat suitable for the species is extensive, Chuditch are highly mobile and the impact area is small across the broad landscape (Bamford, 2024b)</p> <p>Noting the large extent of the available habitat, clearing for the Proposal is not considered significant and is unlikely to result in the species' decline.</p>	N	N
<b>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</b>	<p>Chuditch occur at a low density in the area and it is the extent of available habitat that is critical, rather than any particular VSA type (Bamford, 2024b), however, VSA 4 (Eucalypt Woodland) may provide a higher density of denning sites than other VSAs.</p> <p>A critical feature of the habitat is the low abundance of the red fox. The red fox has been implicated in the decline of Chuditch across much of its range, so the reintroduced population is likely to be vulnerable to this predator, and to any increase in its abundance.</p> <p>The Proposal will be implemented in accordance with approval conditions, management plans (Appendix Q and R), and management actions outlined in Section 5.3; which include measures to manage the potential spread of weeds into adjacent retained vegetation, and feral animals (cats, foxes) that will predate on the species.</p> <p>There is a risk that the Proposal introduces a resource (water or food) that is typically scarce in the area that may lead to increased predators. Feral predator monitoring and control will be implemented as well as waste handling and disposal procedures to prevent feral animals being attracted to the Proposal during construction and operations.</p> <p>It is considered unlikely that the Proposal will result in invasive species harmful to Chuditch becoming established.</p>	N	N
<b>Introduce disease that may cause the species to decline</b>	<p>There is little public information on diseases that may impact Chuditch. Management measures (Section 5.3) will be implemented to minimise feral animals and prohibit domestic animals within the Development Envelope. The introduction of disease that may affect the Chuditch is not a risk associated with the Proposal.</p>	N	N
<b>Interfere substantially with the recovery of the species.</b>	<p>The Proposal is unlikely to interfere with the recovery of the species. The Proposal has been considered against the relevant actions for the species recovery, as documented in the Chuditch National Recovery Plan (DEC, 2012) and is not inconsistent with the relevant key actions of the Recovery Plan and has potential to assist some actions, such as determining impacts of feral cats and/or cat control methods on Chuditch, continue, expand and improve baiting of foxes and feral cats and establish reference sites for monitoring Chuditch population abundance to evaluate the effectiveness of fox and cat control (DEC, 2012).</p> <p>The Proposal will not interfere with the AWC translocation program given the contiguous habitat present in the surrounding area, however, will further enhance the success of the programme and survivability of the Chuditch through feral predator control within and adjacent to the Development Envelope. The most significant threat to the translocation programme is feral predators (Dr Louis O'Neil, personal communication). Additionally, all translocated Chuditch are radio collared (except any offspring) and there have been no records in the Proposal area to date. AWC have not raised any concerns about the Proposal affecting the translocation program.</p> <p>Clearing for the Proposal represents 10% of the mapped VSA 4 habitat; however, as previously discussed, suitable habitat is extensive in the area surrounding the Development Envelope. Furthermore, most of this potential regional habitat extent occurs within both the adjacent AWC Mount Gibson Wildlife Sanctuary and the Charles Darwin Reserve, located 1 km west of the Development Envelope.</p> <p>Considering the relatively small area of clearing and that the Proposal is not inconsistent with the Recovery Plan, it is considered unlikely that the Proposal will substantially interfere with the recovery of the species.</p>	N	N

### 5.5.5 *Aphelocephala leucopsis* (Southern Whiteface)

There is negligible impact expected to occur on the Southern Whiteface from habitat clearing or degradation, as no records occurred within the Disturbance Footprint and there is little if any core habitat present (refer to Section 4.6.3). Core habitat (suitable for residency and breeding) is more extensive to the north, towards Mount Gibson Road. The extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b). Vegetation in the Disturbance Footprint may have a dispersal function but the species appears to be very patchily distributed in that area. (Bamford, 2024b). Given this, and the extensive habitat occurring to the north of the Development Envelope, clearing of the Disturbance Footprint will result in a negligible impact to the species.

Direct impacts to Southern Whiteface from the Proposal are considered unlikely, given no occurrences of the species has been identified in the Disturbance Footprint to date.

The likelihood of indirect impacts (e.g. from noise and vibration, mortality from vehicle strikes, predation by feral fauna, or reduction in habitat through altered fire regimes) from the Proposal after avoidance, mitigation, and management measures have been implemented is considered low. Should any occur, they are expected to be short term and reversible due to the avoidance, mitigation, and management measures.

The Proposal will not interfere with the relevant recovery actions listed in the Approved Conservation Advice (DCCEEW, 2023a), including ceasing clearing of habitat critical to the survival of southern whiteface. The Proposal may contribute to some actions, such as undertaking revegetation using a diverse mix of locally appropriate native species.

An assessment of the potential impacts against the significant impact criteria (DoE, 2013) for Southern Whiteface is provided in Table 51.

**Table 51: Consideration of Significant Impact Guidelines – Southern Whiteface**

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<b>Lead to a long-term decrease in the size of an important population of a species</b>	<p>The Proposal is unlikely to lead to the long-term decrease in the size of an important population of Southern Whiteface. An 'important population' is defined by DoE (2013) as a population that is necessary for a species' long-term survival and recovery and/or that are:</p> <ul style="list-style-type: none"> <li>• key source populations either for breeding or dispersal</li> <li>• populations that are necessary for maintaining genetic diversity, and/or</li> <li>• populations that are near the limit of the species range.</li> </ul> <p>The Southern Whiteface at the Proposal are none of these, but the birds in the area are a small part of a larger regional population, with extensive regional records. Based upon the distribution of VSAs, survey results (Figure 42) and the habitat preference of the species, its distribution within the Development Envelope is limited (Bamford 2024b). Given the small number of birds present and the extensive population more regionally, the birds in the Development Envelope do not represent an important population.</p> <p>Management actions outlined in Section 5.3, will reduce the risk of impact to the Southern Whiteface as a result of road kill or predation by feral fauna such as the cat.</p> <p>Noting the above, it is considered that the Proposal is unlikely to lead to any long-term decrease in the population of the species, given the following:</p> <ul style="list-style-type: none"> <li>• There are no records within the Disturbance Footprint and little if any core habitat (suitable for residency and breeding).</li> <li>• There is an extensive population more regionally</li> <li>• Habitat across the landscape is patchily distributed and suitable habitat appears to be moderately extensive north of the Development Envelope, towards Mount Gibson Road (Bamford, 2024b).</li> </ul>	N	N
<b>Reduce the area of occupancy of an important population</b>	<p>The Proposal will not result in a significant reduction in the area of occupancy of an important Southern Whiteface population due to the contiguous nature available habitat.</p> <p>Southern Whiteface could occur anywhere at least occasionally, but core habitat (suitable for residency and breeding) is more limited. Within the Development Envelope (outside the Disturbance Footprint), core habitat may be limited to a few hectares in the south-east where birds were recorded (Figure 42). Core habitat is more extensive to the north, towards Mount Gibson Road. The extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b).</p> <p>Based on the above, the Proposal is not expected to significantly reduce the area of occupancy for Southern Whiteface.</p>	N	N
<b>Fragment an existing important population into two or more populations</b>	<p>The implementation of the Proposal will not fragment an existing important population into two or more populations.</p> <p>The Disturbance Footprint is expected to be of limited value for dispersal as there is little core habitat (suitable for residency and breeding) for the species in the Development Envelope. Additionally, the extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b).</p> <p>Based on the above, the implementation of the Proposal will not fragment an existing important population into two or more populations.</p>	N	N
<b>Adversely affect habitat critical to the survival of a species</b>	<p>The Proposal will not adversely affect habitat critical to survival of Southern Whiteface.</p> <p>Southern Whiteface could occur anywhere at least occasionally, but core habitat is more limited. Within the Development Envelope (outside the Disturbance Footprint), core habitat (suitable for residency and breeding) may be limited to a few hectares in the south-east where birds were recorded (Figure 42). Core habitat is more extensive to the north, towards Mount Gibson Road. The extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b).</p> <p>It is considered highly unlikely that the species is reliant on habitat within the Development Envelope for survival and the Proposal is unlikely to significantly impact habitat critical to the long-term survival of Southern Whiteface.</p>	N	N
<b>Disrupt the breeding cycle of an important population</b>	<p>The Proposal will not significantly disrupt the breeding cycle of Southern Whiteface.</p> <p>All native vegetation is potentially dispersal habitat, which means it will also be used for foraging, but core habitat to support resident and breeding birds is best described as Acacia Open Shrubland (often close to VSA 4 Eucalypt Woodland). This core habitat appears to be very patchy and even where the birds</p>	N	N

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>were recorded, it was not continuous. The extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b).</p> <p>Based on the above, it is unlikely the Proposal would disrupt the breeding cycle of Southern Whiteface.</p>		
<b>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b>	<p>The implementation of the Proposal will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p> <p>The Disturbance Footprint is expected to be of limited value for dispersal as there is little core habitat (suitable for residency and breeding) for the species in the Development Envelope. Additionally, the extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b).</p> <p>Noting the large extent of the available habitat, clearing for the Proposal is not considered significant and is unlikely to result in the species' decline.</p>	N	N
<b>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</b>	<p>The Proposal is unlikely to result in the introduction of harmful or invasive species.</p> <p>The Proposal will be implemented in accordance with approval conditions, management plans (Appendix Q and R), and management actions outlined in Section 5.3; which include measures to manage the potential spread of weeds into adjacent retained vegetation, and feral animals (e.g. cats) that could predate on the species.</p> <p>There is a risk that the Proposal introduces a resource (water or food) that is typically scarce in the area that may lead to increased predators. Feral predator monitoring and control will be implemented as well as waste handling and disposal procedures to prevent feral animals being attracted to the Proposal during construction and operations.</p> <p>It is considered unlikely that the Proposal will result in invasive species harmful to Southern Whiteface becoming established.</p>	N	N
<b>Introduce disease that may cause the species to decline</b>	<p>There is little public information on diseases that may impact Southern Whiteface.</p> <p>Management measures (Section 5.3) will be implemented to minimise feral animals and prohibit domestic animals within the Development Envelope. The introduction of disease that may affect the Southern Whiteface is not a risk associated with the Proposal.</p>	N	N
<b>Interfere substantially with the recovery of the species.</b>	<p>The Proposal is unlikely to interfere with the recovery of the species. The Proposal has been considered against the relevant actions for the species recovery, as documented in the Approved Conservation Advice (DCCEEW, 2023a) and is not inconsistent with the relevant key actions of the Conservation Advice.</p> <p>The Disturbance Footprint is expected to be of limited value for dispersal as there is little core habitat (suitable for residency and breeding) for the species in the Development Envelope. Additionally, the extent of database records for the species indicates that occupied habitat is very extensive in the region (Bamford, 2024b).</p> <p>Considering the relatively small area of clearing relative to suitable habitat and that the Proposal is not inconsistent with the Approved Conservation Advice, it is considered unlikely that the Proposal will substantially interfere with the recovery of the species.</p>	N	N

### 5.5.6 *Idiosoma kopejtkaorum* - listed as *Idiosoma nigrum* (Lake Goorly Shield-backed trapdoor spider)

Implementing the Proposal will not result in a significant residual impact on *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*). Within the Development Envelope, there is 1,313.6 ha of habitat for the species in VSA 4 Eucalypt Woodlands, of which a total of 203.1 ha of its preferred habitat York and Salmon Gum Woodlands will be cleared (Table 33), representing a 15.5% decrease in available habitat within the Development Envelope. Additionally, the clearing will result in the loss of 20 confirmed active *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) burrows, representing 8% of the known (to December 2025) confirmed active burrows (250) recorded (Section 4.7.2).

Applying the precautionary principle, there are also 55 active burrows (Table 33) that are likely (Table 32) *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) within the Development Envelope, of which 18 occur within the Disturbance Footprint.

Regionally, the Extent of Occurrence (EOO) for *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) is estimated to be 4,930 km<sup>2</sup>, with an Area of Occupancy (AOO) of approximately 300 km<sup>2</sup>. Habitat within the Development Envelope represents 3.65% of the species' known AOO (Bennelongia, 2025b). Based on extrapolation of regional vegetation data and using the preferred Eucalypt Woodland habitat as a proxy for high likelihood of occurrence of *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) (as discussed in Section 4.7.3), the impact to the AOO is likely to be as low as 0.8%.

The EOO of *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) can be divided into two broad categories based on habitat connectivity: discontinuous habitat and continuous intact habitat (Figure 46). Continuous habitat is defined by good quality, unfragmented habitat which has the potential to provide connectivity between populations. The Development Envelope is located within the continuous habitat portion of the EOO (2,139 km<sup>2</sup>/ 43.4% of EOO), as shown in Figure 45 (Bennelongia, 2025b). All identified VSAs are known to occur extensively outside of the Development Envelope (Bennelongia, 2025a), and clearing represents approximately 0.9% of native vegetation within 15 km of the Development Envelope (Bennelongia, 2025a).

Impacts on *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) will predominantly occur during the construction phase, with reduced impacts over the operational phase as the Disturbance Footprint is finalised. No further impacts are expected to occur during the rehabilitation phase of the Proposal. It should be noted that there is a paucity of scientific data on recolonisation of mygalomorph spiders to rehabilitated lands, however, the species has been recorded in the windrows of rehabilitated areas in the Disturbance Footprint. Clearing for the Proposal will remove 248.2 ha of VSA 4 Eucalypt Woodlands of which 151.7 ha is dominated by York Gum Woodlands (*E. loxophleba* subsp. *supralaevis*), considered to be the species preferred habitat/vegetation type. Approximately 103 ha of this clearing occurs within flat areas for low level disturbance domains (e.g. roads and other linear infrastructure, stockpile and laydown areas) where the natural soil profile will not be significantly altered from background conditions and once rehabilitated with its preferred Eucalypt habitat species, rehabilitation of these rehabilitated domains could provide habitat conditions suitable for *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) colonisation.

The time for rehabilitated areas to recover sufficiently to provide adequate soil profile, vegetation cover and leaf litter conditions for spider recolonisation and burrow construction is estimated to be at least 10-20 years however, it is unlikely recolonisation of constructed landforms such as the IWL will be possible due to the heavily altered and porous soil

conditions that will be created. It is expected the species could recolonise post mining where soil conditions have not been significantly altered by mining such as rehabilitated flat areas; however, it is acknowledged that this will take time, given the species disperses slowly and the reproductive rate is low (Bennelongia personal communication 2025). Data will be collated on recolonisation through monitoring of rehabilitation that will be undertaken per State legislative requirements, with the results provided to DCCEE in the annual compliance report post approval of the Proposal.

Based on the above, the direct impacts associated with implementing the Proposal will not result in a significant residual impact on *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*). Furthermore, the likelihood of indirect impacts (e.g., noise and vibration or reduction in habitat through altered fire regimes) from the Proposal, after implementing avoidance, mitigation and management measures, is considered low.

An assessment of the potential impacts against the significant impact criteria (DoE, 2013) for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) is provided in Table 52.

**Table 52: Consideration of Significant Impact Guidelines – Lake Goorly Shield-backed Trapdoor Spider (*Idiosoma kopejtkaorum*) listed as *Idiosoma nigrum***

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<p><b>Lead to a long-term decrease in the size of an important population of a species</b></p>	<p>The Proposal is unlikely to lead to the long-term decrease in the size of an important population of Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i>. An 'important population' is defined by DoE (2013) as a population that is necessary for a species' long-term survival and recovery and/or that are:</p> <ul style="list-style-type: none"> <li>• key source populations either for breeding or dispersal</li> <li>• populations that are necessary for maintaining genetic diversity, and/or</li> <li>• populations that are near the limit of the species range.</li> </ul> <p>It should be noted that at the time of the draft PER submission to DCCEEW in December 2024, known AOO and EOO were 172 km<sup>2</sup> and 4,444 km<sup>2</sup> respectively, with the Proposal impact to the species AOO being 6.97%. Additional survey work undertaken since that (Bennelongia, 2025b) has increased the AOO and EOO to 300 km<sup>2</sup> and 4,930 km<sup>2</sup> (respectively) and reduced the Proposal impact to AOO to 3.65%. Therefore, it is highly likely that the AOO and EOO would continue to increase (and Proposal impact decrease) with additional surveys throughout the region, indicating there would be a significant increase to the spider population hence genetic diversity across the EOO.</p> <p>Population estimates for <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) suggest there are approximately 11,348 spiders within the Development Envelope and surrounds, including 6,042 within the Development Envelope, 695 of which occur within the Disturbance Footprint (refer to Section 4.7.2). Based on the high genetic diversity discovered within the populations sampled to date, the removal of 20 confirmed burrows or 695 estimated individuals from within the Disturbance Envelope is not considered to be detrimental to maintaining a high level of genetic diversity across the species or result in population decline.</p> <p>Management actions outlined in Section 5.3, including progressive rehabilitation to restore habitat for the species, will reduce the risk of impact to the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>Noting the above, it is considered unlikely that the Proposal will lead to any long-term decrease in the population of the species, given the following:</p> <ul style="list-style-type: none"> <li>• Clearing represents approximately 0.9% of native vegetation within 15 km of the Development Envelope (Bennelongia, 2025a).</li> <li>• Preferred habitat VSA 4: Eucalypt Woodlands (and all other identified VSAs) are known to occur extensively outside of the Development Envelope.</li> </ul>	<p>N</p>	<p>N</p>
<p><b>Reduce the area of occupancy of an important population</b></p>	<p>The Proposal will not result in a significant reduction in the area of occupancy of an important Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i> population due to the contiguous intact habitat available outside the Development Envelope. The Proposal will expand on an island of existing disturbance and will not reduce connectivity between populations, given the contiguous native vegetation surrounding the Disturbance Footprint.</p> <p>Current data shows an Extent of Occurrence (EOO) of 4,930 km<sup>2</sup> and an Area of Occupancy (AOO) of approximately 300 km<sup>2</sup> (Figure 45). Whilst clearing will result in the removal of up to 3.65% of the species' known AOO (Bennelongia, 2025b), preferred habitat VSA 4: Eucalypt Woodlands (and all other identified VSAs) are known to occur extensively outside of the Development Envelope (Bennelongia, 2025a). Additionally, the AOO is a result of survey effort and the species is expected to occur elsewhere in the region.</p> <p>As previously outlined, at the time of the draft PER submission to DCCEEW in December 2024, known AOO and EOO were 172 km<sup>2</sup> and 4,444 km<sup>2</sup> respectively, with the Proposal impact to the species AOO being 6.97%. Additional survey work undertaken since that (Bennelongia, 2025b) has resulted in an increase to the AOO and EOO to 300 km<sup>2</sup> and 4,930 km<sup>2</sup> (respectively) and reduced the Proposal impact to AOO to 3.65%. Therefore, it is highly likely that AOO and EOO would continue to increase (and Proposal impact decrease) with additional surveys targeting York Gum and Salmon Gum woodlands throughout the region.</p> <p>The detailed habitat assessment of 158 confirmed active burrows found 82% of <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) records occurred in Eucalypt Woodlands, and when targeting Eucalypt Woodland habitat, there has been a success rate (confirmed <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) presence) of ~90%. Based on broadscale publicly available mapping of regional Eucalypt Woodland vegetation by DBCA (Figure 45) as a proxy for high likelihood of occurrence of <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>), AOO increases from 30,000 ha to an extrapolated AOO of 132,512 ha. Noting ground truthing would be required to</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>confirm <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>) presence in these areas, Proposal impact on AOO could be as low as 0.8%, or potentially lower given some <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>) have also been recorded in non-Eucalypt Woodlands (at a lower rate).</p> <p>Based on the above, the Proposal is not expected to significantly reduce the area of occupancy for the Lake Goorly Shield-backed trapdoor spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i> and is expected to increase with future surveys either by the Proponent or others in unsurveyed Eucalypt Woodlands within the species current EOO.</p>		
<p><b>Fragment an existing important population into two or more populations</b></p>	<p>Considering the fragmentation created by the mining operations in the 1980's and 1990's and that there are abundant populations adjacent to the existing disturbance, the implementation of the Proposal will not fragment an existing important population into two or more populations.</p> <p>Although clearing will remove of an important part of the known gene pool for the species, gene flow will not completely stop between populations outside of the Development Envelope (Bennelongia, 2025a). As previously discussed, there contiguous intact habitat available outside the Development Envelope for the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>Avoidance measures for the Proposal have considered the reduction of the Disturbance Footprint to avoid fragmentation as much as possible and leave intact Eucalyptus woodland corridors within both the Disturbance Footprint and Development Envelope. These natural corridors maintain suitable microhabitats, such as areas with adequate soil, leaf litter, vegetation cover, and prey availability (Bennelongia, 2025a).</p> <p>Based on the above, the implementation of the Proposal will not fragment an existing important population into two or more populations.</p>	<p>N</p>	<p>N</p>
<p><b>Adversely affect habitat critical to the survival of a species</b></p>	<p>The Proposal will not adversely affect habitat critical to survival of the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>Whilst clearing will result in the removal of up to 3.65% of the species' known AOO, preferred habitat VSA 4 Eucalypt Woodlands are known to occur extensively outside of the Development Envelope (Bennelongia, 2025a). Clearing represents approximately 0.9% of native vegetation within 15 km of the Development Envelope (Bennelongia, 2025a). Additionally, the AOO is a result of survey effort and the species is expected to occur elsewhere in the region</p> <p>As previously outlined, at the time of the draft PER submission to DCCEEW in December 2024, known AOO and EOO were 172 km<sup>2</sup> and 4,444 km<sup>2</sup> respectively, with the Proposal impact to the species AOO being 6.97%. Additional survey work undertaken since that (Bennelongia, 2025b) has resulted in an increase to the AOO and EOO to 300 km<sup>2</sup> and 4,930 km<sup>2</sup> (respectively) and reduced the Proposal impact to AOO to 3.65%. Therefore, it is highly likely that AOO and EOO would continue to increase (and Proposal AOO impact decrease) with additional surveys targeting York Gum and Salmon Gum woodlands throughout the region.</p> <p>The detailed habitat assessment of 158 confirmed active burrows found 82% of <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>) records occurred in Eucalypt Woodlands, and when targeting Eucalypt Woodland habitat, there has been a success rate (confirmed <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>) presence) of ~90%. Based on broadscale publicly available mapping of regional Eucalypt Woodland vegetation by DBCA (Figure 45) as a proxy for high likelihood of occurrence of <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>), AOO increases from 30,000 ha to an extrapolated AOO of 132,512 ha. Noting ground truthing would be required to confirm <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>) presence in these areas, the Proposal's impact on AOO could be as low as 0.8%, or potentially lower, given that some <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>) have also been recorded in non-Eucalypt Woodlands (at a lower rate).</p> <p>Management actions outlined in Section 5.3, including progressive rehabilitation to restore habitat for the species, will reduce the risk of impact to the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>It is considered unlikely that the species is reliant on habitat within the Development Envelope for survival and the Proposal is unlikely to significantly impact habitat critical to the long-term survival of the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i>.</p>	<p>N</p>	<p>N</p>
<p><b>Disrupt the breeding cycle of an important population</b></p>	<p>The Proposal will not significantly disrupt the breeding cycle of the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i>.</p>	<p>N</p>	<p>N</p>

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
	<p>Dispersal activity for the species is typically highest during the reproductive season (Sept.-Nov, Bennelongia, 2025a), when males wander in search of females and juveniles settle in their own areas.</p> <p>Habitat fragmentation can exacerbate issues with reproductive capacity as it makes it harder for males to locate females for mating, and fragmented populations tend to have limited access to potential mates, reducing mate choice and potentially leading to inbreeding.</p> <p>Management actions outlined in Section 5.3, including progressive rehabilitation to restore habitat for the species and progressive clearing in one continuous direction, will reduce the risk of impact to the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>Based on the above, the Proposal is unlikely to disrupt the breeding cycle of the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i>.</p>		
<p><b>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</b></p>	<p>The implementation of the Proposal will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p> <p>As previously discussed, clearing will result in the removal of up to 3.65% of the species' known AOO and all identified VSAs (including preferred habitat VSA 4: Eucalypt Woodland) are known to occur extensively outside of the Development Envelope. Clearing represents approximately 0.9% of native vegetation within 15 km of the Development Envelope (Bennelongia, 2025a). Additionally, the AOO is a result of survey effort and the species is expected to occur elsewhere in the region.</p> <p>As previously outlined, at the time of the draft PER submission to DCCEEW in December 2024, known AOO and EOO were 172 km<sup>2</sup> and 4,444 km<sup>2</sup> respectively, with the Proposal impact to the species AOO being 6.97%. Additional survey work undertaken since that (Bennelongia, 2025b) has resulted in an increase to the AOO and EOO to 300 km<sup>2</sup> and 4,930 km<sup>2</sup> (respectively) and reduced the Proposal impact to AOO to 3.65%. Therefore, it is highly likely that AOO and EOO would continue to increase (and Proposal impact decrease) with additional surveys targeting York Gum and Salmon Gum woodlands throughout the region.</p> <p>The detailed habitat assessment of 158 confirmed active burrows found 82% of <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) records occurred in Eucalypt Woodlands, and when targeting Eucalypt Woodland habitat, there has been a success rate (confirmed <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) presence) of ~90%. Based on broadscale publicly available mapping of regional Eucalypt Woodland vegetation by DBCA (Figure 45) as a proxy for high likelihood of occurrence of <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>), AOO increases from 30,000 ha to an extrapolated AOO of 132,512 ha. Noting ground truthing would be required to confirm <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) presence in these areas, Proposal impact on AOO could be as low as 0.8%, or potentially lower given some <i>Idiosoma kopejtkaorum</i> (listed as <i>Idiosoma nigrum</i>) have also been recorded in non-Eucalypt Woodlands (at a lower rate).</p> <p>Noting the large extent of the available habitat, clearing for the Proposal is not considered significant and is unlikely to result in the species' decline.</p>	N	N
<p><b>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</b></p>	<p>The Proposal is unlikely to result in the introduction of harmful or invasive species.</p> <p>The Proposal will be implemented in accordance with approval conditions, management plans (Appendix Q and R), and management actions outlined in Section 5.3; which include measures to manage the potential spread of weeds into adjacent retained vegetation, and feral animals (e.g. rodents and cats) that could predate on the species.</p> <p>There is a risk that the Proposal introduces a resource (water or food) that is typically scarce in the area that may lead to increased predators. Feral predator monitoring and control will be implemented as well as waste handling and disposal procedures to prevent feral animals being attracted to the Proposal during construction and operations.</p> <p>It is unlikely that the Proposal will result in invasive species harmful to Lake Goorly Shield-backed Trapdoor Spiders (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i> becoming established.</p>	N	N
<p><b>Introduce disease that may cause the species to decline</b></p>	<p>There is little public information on diseases that may impact the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>Management measures (Section 5.3) will minimise feral animals and prohibit domestic animals within the Development Envelope. Introducing disease that may affect the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkaorum</i>) listed as <i>Idiosoma nigrum</i> is not a risk associated with the Proposal.</p>	N	N

Significant Impact Criteria	Assessment	Residual Significant Impact?	Offset Required (Y/N)
<p><b>Interfere substantially with the recovery of the species.</b></p>	<p>The Proposal is unlikely to interfere with the recovery of the species. The Proposal has been considered against the relevant actions for the parent species (<i>Idiosoma nigrum</i>) recovery, as documented in the Approved Conservation Advice (DSEWPaC, 2013) and is not inconsistent with the relevant key actions of the Conservation Advice.</p> <p>The Proposal will be implemented in accordance with approval conditions, management plans (Appendix Q and R), and management actions outlined in Section 5.3 to minimise the risk of the Proposal implementation on the Lake Goorly Shield-backed Trapdoor Spider (<i>Idiosoma kopejtkorum</i>) listed as <i>Idiosoma nigrum</i>.</p> <p>Considering the relatively small area of clearing relative to suitable habitat and that the Proposal is not inconsistent with the Approved Conservation Advice, it is considered unlikely that the Proposal will substantially interfere with the recovery of the species.</p>	<p>N</p>	<p>N</p>

## 6 Environmental Offsets

Offsets are required to achieve a conservation outcome that counterbalances any residual significant impact on MNES due to the Proposal, following the application of the mitigation hierarchy. Offsets will provide environmental values similar to those impacted, minimise the time-lag between impact and benefit, and deliver additional, measurable conservation outcomes.

The provision of offsets is proposed based on the extent of the significant residual impacts identified, as described in Section 5.5 and summarised in Table 53. Based on the impact assessment undertaken against the Proposal, two protected matters have been identified as requiring offsetting:

- WA Wheatbelt Woodlands
- *Leipoa ocellata* (Malleefowl)

**Table 53: Residual Significant Impacts Requiring Offset**

Environmental Value	Conservation Significance	Residual Significant Impact
<b>WA Wheatbelt Woodlands TEC</b>	Critically Endangered	<ul style="list-style-type: none"> <li>• 27.5 ha</li> </ul>
<b><i>Leipoa ocellata</i> (Malleefowl)</b>	Vulnerable	<ul style="list-style-type: none"> <li>• 568.8 ha of potential breeding habitat</li> <li>• Permanent loss of two active and eight inactive Malleefowl mounds</li> </ul>

The following sections outline and detail the proposed offsets to counterbalance the residual impact resulting from the Proposals' implementation.

### 6.1 Environmental Offset Strategy Overview

#### 6.1.1 Regulatory Frameworks and Offset Types

##### EPBC Act Environmental Offsets Policy

The application of the mitigation hierarchy, with a focus on avoidance, minimisation and mitigation measures, is the primary strategy for managing the potential significant impact of a proposed action. Offsets do not mitigate the likely impacts of a proposed action but are intended to compensate for any residual significant impacts.

Environmental offsets are required to comply with the EPBC Act Environmental Offsets Policy (DSEWPC 2012), henceforth referred to as the Offsets Policy. This policy outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the EPBC Act.

Where environmental offsets are required for MNES an offsets package should be provided. An offsets package is a suite of actions, both direct and indirect, that a proponent undertakes to compensate for the residual significant impacts to the identified MNES. The EPBC Act requires offsets to be mainly comprised of direct (land-based) offsets and other compensatory measures. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain (DSEWPC 2012).

Consideration is given to the proposed offset suite and compliance with the Offsets Policy Principles is provided in Section 6.4.

### **Direct Offsets**

Direct offsets are land-based offsets where native vegetation associated with a particular biodiversity value is managed for a specified period to enhance its ecological condition and function. Direct offsets are typically larger than the impact area and are strategically located to enhance existing large patches of vegetation and protected areas, or to improve connectivity.

The EPBC Act Environmental Offsets Policy requires that offsets be built around direct, land-based offsets that protect and enhance the habitats of threatened ecological communities and species that were impacted. At least 90 % of the total offset requirement should deliver a conservation gain to the impacted MNES (i.e. like for like) through direct measures that are additional to what is already required, including improving the condition of existing habitat and reducing threats or creating new habitat. The remaining 10 % of an offset obligation can be indirect or supplementary measures that also relate to the impacted MNES such as research or threat abatement.

Deviation from the minimum of 90% direct offset requirement will only be considered where:

- It can be demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures in an offsets package; or
- Scientific uncertainty is so high that it isn't possible to determine a direct offset that is likely to benefit the protected matter. For example, this can be the case in some poorly understood ecosystems in the Commonwealth marine environment (DSEWPC 2012).

The Offsets Policy (DSEWPC 2012) states that as a general guide, the best legal mechanisms for protecting land are intended to be permanent (lasting forever) and are secure (that is, they are difficult to change or alter). These two elements are important because they mean that land set aside as an offset will continue to provide a secure benefit to the impacted protected matter. A conservation gain may be achieved by:

- Improving existing habitat for the protected matter
- Creating new habitat for the protected matter
- Reducing threats to the protected matter
- Increasing the values of a heritage plan
- Averting the loss of a protected matter or its habitat that is under threat.

The offset must have transparent governance arrangements, including the ability to be readily measured, monitored, audited, and enforced. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain. For instance, if the proposed action is likely to have an impact on the foraging habitat of a particular protected species, then the offset should create, improve, protect, and/or manage that habitat.

### **Indirect Offsets**

Indirect offsets are generally seen as supplementary to direct offsets. Indirect offsets need to relate directly to the biodiversity value being impacted. be an action associated with a threatening process identified in a conservation plan or recovery plan.

Indirect offsets may consist of measures such as:

- Implementing priority actions outlined in relevant recovery plans
- Contributing to relevant research or education programs
- Habitat mapping/modelling for priority critically endangered, endangered, vulnerable or near threatened species listed under the EPBC Act, using a methodology approved by the Regulator.

### 6.1.2 Environmental Offset Strategy Summary

The Proponent has entered into agreements with multiple conservation service providers with significant and relevant expertise in the particular MNES Offset being addressed. The anticipated costs for the Proposal Offsets Strategy including other conservation initiatives is summarised in Table 54 below and is made up of:

- Direct Offsets for Malleefowl and TEC of \$4.75 million and \$1.6 million respectively, totalling \$6.4 million
- Indirect Offsets for Malleefowl and Idiosoma species of \$1.0 million and \$0.5 million respectively, totalling \$1.5 million
- Total direct and indirect offsets therefore total \$7.9 million over the life of the Proposal.

In addition, the Proponent has established long term agreements to fund other conservation initiatives with the Australian Wildlife Conservancy (AWC) and the Gunduwa Regional Conservation Association (GRCA) for \$5.8 million and \$1.1 million respectively, totalling \$6.9 million.

**Table 54: Environmental Offset Strategy and Other Conservation Initiatives Cost Summary**

Partner/Program	Offset Type	Actual		5 yr Forecast					Act+Fcst to end 29/30 \$k	Remain- ing LoM (11 yrs) \$k/yr	Rehab (3 yrs) \$k	LoM Total \$k
		23/24	24/25	25/26	26/27	27/28	28/29	29/30				
NACC NRM	Direct (Mfowl)	-	-	241	259	313	302	309	1,424	3,322	-	4,745
Mummaloo	Direct (TEC)	-	1,586	-	-	-	-	-	1,586	-	-	1,586
NMRG	Indirect (Mfowl)	-	-	280	195	195	195	155	1,020	-	-	1,020
ARC Linkage	Indirect (IK)	-	-	-	130	130	130	130	520	-	-	520
<b>Total - Direct &amp; Indirect Offsets</b>		-	<b>1,586</b>	<b>521</b>	<b>584</b>	<b>638</b>	<b>627</b>	<b>594</b>	<b>4,550</b>	<b>3,322</b>	-	<b>7,872</b>
AWC	Other conservation initiatives	250	100	320	320	320	320	320	1,950	3,520	300	5,770
GRCA	Other conservation initiatives	-	-	75	75	75	75	75	375	750	-	1,125
<b>Total - Other Conservation Initiatives</b>		<b>250</b>	<b>100</b>	<b>395</b>	<b>395</b>	<b>395</b>	<b>395</b>	<b>395</b>	<b>2,325</b>	<b>4,270</b>	<b>300</b>	<b>6,895</b>
<b>Grand Total - Offsets and Initiatives</b>		<b>250</b>	<b>1,686</b>	<b>916</b>	<b>979</b>	<b>1,033</b>	<b>1,022</b>	<b>989</b>	<b>6,875</b>	<b>7,592</b>	<b>300</b>	<b>14,767</b>

Source - Crimson Metals Pty Ltd

The proposed offset strategy is summarised in Table 55 and detailed in Section 6.2.

**Table 55: Environmental Offset Strategy Summary**

Offset	Offset Type	MNES	Offset Implementer/ Partner	Offset outcomes	Offset Achieved
<b>Malleefowl Habitat Restoration</b>	Direct	Malleefowl ( <i>Leipoa ocellata</i> )	Northern Agricultural Catchments Council NRM	<ul style="list-style-type: none"> <li>Long term funding of \$4.75 million to enable revegetation of 700 ha of degraded agricultural land to provide potential Malleefowl breeding and foraging habitat</li> <li>Additional 100 ha of degraded land available for revegetation to be implemented as a contingency to ensure offset is achieved</li> <li>Habitat restored to a quality score of 7 (Table 25)</li> </ul>	≥90%
<b>Eastern portion of Mummaloo Iron Ore Tenure which is currently subject to WA Ministerial Statement 943 approving iron ore mining</b>	Direct	WA Eucalypt Woodland TEC	Proponent	<ul style="list-style-type: none"> <li>Purchase of the Mummaloo Iron Ore Tenure at an attributable cost of \$1.6 million for the protection of 135.8 ha of Eucalypt Woodland TEC within an overall 440 ha conservation reserve.</li> <li>Secure tenure protections will also be in place until conservation reservation tenure and management are achieved.</li> <li>Habitat condition will be maintained in the meantime. For example, weed and fire management to support the maintenance of habitat quality of Eucalypt Woodland TEC at a score of 8 (Table 20) from the commencement of the action until overall reservation tenure and management are in place.</li> </ul>	>100%
<b>Delivery of Malleefowl National Recovery Plan research projects</b>	Indirect	Malleefowl ( <i>Leipoa ocellata</i> )	National Malleefowl Recovery Group	<ul style="list-style-type: none"> <li>Provision of \$1.02 million over 5 years for key research initiatives defined in the National Recovery Plan</li> <li>Delivery of National scale Malleefowl research Projects including:</li> <li>Examine genetic differentiation and inbreeding small and isolated populations, comparing and developing strategies to increase genetic variation</li> <li>Use camera-trapping to quantify how frequently Malleefowl and other animals use habitat links and restored habitat (potential to be linked to NACC NRM revegetation), and</li> <li>Continue the Adaptive Management Predator Experiment (AMPE) to determine the benefit of reducing the abundance of introduced predators, particularly foxes, on Malleefowl populations.</li> </ul>	10% (indirect cap)
<b>Financial contribution and participation in an ARC Linkage Project - Informing the conservation and impact assessment of trapdoor spiders in Western Australia</b>	Indirect	Lake Goorly Shield-backed Trapdoor Spider ( <i>Idiosoma kopejtkorum</i> ) listed as <i>Idiosoma nigrum</i> .	Flinders University, DBCA, other Research and Industry Partners	<ul style="list-style-type: none"> <li>Contribution of \$0.5 million over 4 years to develop innovative and improved methodologies for detecting and monitoring trapdoor spiders and provide crucial data for the assessment and mitigation of impacts on key groups of <i>Idiosoma</i> species in the Yalgoo, Murchison and Wheatbelt. Specifically, this project will: <ul style="list-style-type: none"> <li>Develop innovative methodologies to improve the efficiency and effectiveness of surveys and provide an improved and standardised roadmap for future surveys during environmental impact assessment processes. During project development and implementation, environmental regulators will be consulted to ensure that measures developed are consistent with or improve regulator guidance</li> <li>Resolve uncertainties regarding population characteristics and putative direct and indirect impacts of developments for key trapdoor spider taxa, with a particular focus on species in the genus <i>Idiosoma</i>, thereby providing key information that will reduce delays for impact assessment. Importantly, the information generated by addressing these knowledge gaps will facilitate cumulative impact assessments of listed species and other significant taxa.</li> <li>Trial putative recovery actions, providing a roadmap and resources for strategic impact avoidance and mitigation for industry partners during exploration and development activities, and for rehabilitation during and after development.</li> </ul> </li> </ul>	Financial contribution and participation in an ARC Linkage Project - Informing the conservation and impact assessment of trapdoor spiders in Western Australia

### 6.1.3 Other Conservation Initiatives

In addition to direct and indirect offsets summarised above, the Proponent has committed to other conservation initiatives within the local region that will support the management and enhancement of habitat that supports MNES.

Whilst these additional conservation initiatives are not being claimed as an offset, it is important to acknowledge that the very long term funding by the Proponent to established local environmental groups with a proven track record in conserving and restoring ecosystems will potentially contribute significantly in aiding MNES within the region.

These initiatives are comprised of:

- Total contribution of \$5.77 million (\$1.97 million in the first 5 years) to the Australian Wildlife Conservancy (AWC), for the life of the Proposal to manage and maintain the Mount Gibson Wildlife Sanctuary and undertake additional biodiversity actions within the regional area
- Total contribution of \$1.125 million to the Gunduwa Regional Conservation Association (GRCA) for the operating life of the Proposal to provide advice to the Proponent in matters relating to offset activities.

Further detail on these conservation initiatives are provided in the sections below.

#### **Australian Wildlife Conservancy**

The Proponent has an existing Access, Compensation and Co-operation agreement in place with the Australian Wildlife Conservancy (AWC). This agreement with AWC was not a regulatory permit condition or other regulatory requirement and was entered into by Crimson as part of a proactive conservation initiative. The agreement will be continued for the life of the Proposal and comprises of:

- Data and knowledge-sharing obligations
- Joint environmental monitoring in the local area occupied by the Proponent and AWC
- Agreed cooperation actions for the management of threatening processes including weed control, fire management, and feral predator control
- Funding AWC to manage and maintain the Mount Gibson Wildlife Sanctuary and undertake additional biodiversity actions within the regional area. The funding will total at least \$5.77 million, and the arrangement comprises:
  - annual payments of \$100,000 per year until commencement of mining operations
  - annual payments of \$320,000 per year from commencement to cessation of mining operations
  - annual payment of \$100,000 per year from cessation of mining until completion of rehabilitation.

Funding contributions to date has been used for fencing activities, the purchase of equipment necessary for land management (e.g., weed control), and the employment of an environmental specialist responsible for Malleefowl nest mound monitoring and feral predator control.

Additionally, the funding to date has enabled the testing of artificial refuges to improve the reintroduction of nationally threatened native rodent species. A number of these have been deployed at Mount Gibson Wildlife Sanctuary, with the outcomes informing future Shark Bay Mouse translocations (listed as Vulnerable under the EPBC Act).

The ongoing partnership will ensure that the habitat supporting Malleefowl populations within the Mount Gibson Wildlife Sanctuary is maintained, and individuals are protected, so that the local population remains healthy and continues to grow. The provision of these funds to the AWC will result in increased outcomes for known populations, which exceeds standard land acquisition offsets and the hope that species will utilise the acquired areas.

### **Gunduwu Regional Conservation Association**

Gunduwu Regional Conservation Association (GRCA) was initially established to provide the resources to support the implementation of on-ground offsets for the Mount Gibson and Extension Hill iron ore mining operations. The GRCA aims to apply effort and financial resources to innovative long-term projects through third-party applications that deliver enhanced biodiversity values across the Gunduwu region (Figure 49).

The Gunduwu region contains the botanical transitional zone between the woodlands of the Wheatbelt and the expansive mulga zone of the interior. It is bordered by Beacon, Wubin, Morawa, and Paynes Find.

GRCA has several partners that support its continuing development. Some of these partners include, but are not limited to:

- Mount Gibson Mining
- Extension Hill Pty Ltd
- Badimia
- Australian Wildlife Conservancy
- Bush Heritage Australia
- National Malleefowl Recovery Group
- NACC and Rangelands NRM
- Local and State Government Authorities

In collaboration with these partners, the GRCA has delivered projects to improve the environment, including (GRCA 2024):

- Reconnection of landscapes through revegetation corridors
- Research into fire impacts and restoration outcomes
- Regional Malleefowl mound surveys
- Identification of landscape revegetation targets to enhance Malleefowl conservation

The Proponent has engaged GRCA and is in the process of establishing a long term partnership to provide advisory activities to the Proponent in the following areas:

- Guidance on how the offset activities with third party providers (such as but not limited to, NACC NRM and the NMRG) can align with the GRCA and Badimia conservation strategies for the Gunduwu Region
- Advice on other opportunities the Proponent may be able to support that align with the broader GRCA and Badimia conservation strategies for the Gunduwu Region;
- Early notice and advice where nature conservation markets may change and potentially affect the Proponent's conservation activities and how it can best address to those changes and risks;
- Advice as to where opportunities may exist to support and promote Aboriginal engagement around the Proponent's activities and the Gunduwu Region; and
- Support in facilitating an external independent consultant to perform annual reviews of the progress reporting provided by the Proponent's Offset partners.

In establishing its partnership with GRCA, the Proponent will contribute \$1,125,000 over the project life to provide the advisory services outlined above.



**Figure 49: Gunduwa Region (GRCA 2024)**

## 6.2 Offset Strategy

The proposed offset strategy comprises both direct and indirect offsets that will result in an overall net conservation improvement for the identified protected matters. The offset strategy is summarised below:

- Acquisition of the Mummaloo Iron Ore tenure has already been completed for the purpose of the long-term protection of the WA Wheatbelt Woodlands TEC which is currently under threat from iron ore mining. Proponent actions will now be taken to ensure perpetual protection of 135.8 ha of Eucalypt Woodland TEC, within an eventual 440 ha conservation reserve. The proponent will also seek to secure tenure protections be put in place in the meantime and will ensure that the habitat condition of the TEC is maintained until the reserve is in place.
- Biodiversity conservation funding to provide direct offsets for the Malleefowl by implementing habitat revegetation and carrying out management actions specified in National Recovery Plans. Funding is comprised of:
  - Total contribution of \$4.75 million (ex GST) to the Northern Agricultural Catchments Council (NACC) NRM to conduct 800 ha of Malleefowl habitat revegetation in degraded agricultural land approximate to the Proposal, utilising the Mid-West Aboriginal Ranger Program (MARF) to assist with implementation. The Proponent has made an initial contribution of \$241,000 (ex GST) to commence the implementation of the offset in the 2025/26 fiscal year.
- Biodiversity conservation funding to provide indirect offsets for the Malleefowl by supporting local conservation initiatives comprised of:
  - \$1.02 million in first 5 years to the National Malleefowl Recovery Group (NMRG) to support the delivery of projects including Genetic Health Isolated Populations, Malleefowl Camera Trap Study, and Adaptive Management Predator Experiment. The Proponent has made an initial payment of \$80,000 to commence implementation of the AMPE project in 2025.
- Biodiversity conservation funding to provide indirect offsets for *Idiosoma kopejtkorum* (listed as *Idiosoma nigrum*) comprised of \$400,000 direct and up to \$120,000 in-kind financial support over four years for research informing the conservation and impact assessment of trapdoor spiders in Western Australia; to be undertaken by research scientists from the Western Australian Museum, Department of Biodiversity, Conservation and Attractions (DBCA, State of WA) and associated research and industry partners over a four year period commencing in 2027.

The following sections provide further detail on the proposed offset strategy.

### 6.2.1 Direct Offset 1: Revegetation of Malleefowl Habitat in Degraded Wheatbelt Agricultural Land

The Northern Agricultural Catchments Council (NACC NRM) is the natural resource management body for the Northern Agricultural Region, which contains three of Australia's 15 national biodiversity hotspots: the Geraldton to Shark Bay Sandplains, Mount Lesueur-Eneabba and the Central and Eastern Avon Wheatbelt.

NACC NRM's work is guided by the Regional Natural Resource Management (NRM) Strategy and delivers activities and programs through collaboration and partnerships with community groups, business and industry, non-government organisations, and all levels of

government to conserve and enhance natural assets and advance sustainable outcomes in the region.

NACC NRM has extensive experience delivering outcomes for Malleefowl in the Northern Agricultural Region following the completion of a five-year Australian Government National Heritage Trust-funded project titled 'Gnow or Never: helping communities to save Malleefowl'. This project delivered a range of services in collaboration with key stakeholders, including revegetation, community engagement workshops, annual mound monitoring, and Adaptive Management Predator Experiment (AMPE) installation and monitoring, as well as controlling grazing pressure through fencing and protecting remnant vegetation.

In acknowledging NACC NRM's experience in delivering improved conservation outcomes for Malleefowl, a Service Agreement has been finalised by the Proponent with NACC NRM, which will see the Proponent contribute \$4.75 million (ex GST) to deliver the following key actions:

- Identify priority Malleefowl habitat areas in close proximity to the Proposal Development Envelope
- Increase the area of Malleefowl habitat in relation to known and/or prioritised Malleefowl sites, therefore providing improved connectivity and quality of existing habitat within the Gunduwa Region
- Develop an assessment framework for measuring revegetation outcomes.

NACC NRM will achieve these actions through:

- Defining at least 700 hectares of land in the Gunduwa region suitable to deliver Malleefowl habitat restoration (integrating the habitat rating tool detailed in Table 25), based on priority neighbourhoods for restoration, as presented in Figure 50, and correlated with either remnant or degraded agricultural land in the region.
- Undertake biodiverse revegetation efforts across 800 hectares of land, with a focus on identified priority areas utilising species from local provenance and suitable for Malleefowl habitat restoration.
- Establish an Ecological Assessment of revegetation activities in accordance with the Australian Government's Ecological Monitoring System Australia methodology.

DCCEEW (2024) lists clearing of agricultural land for broad acre cropping and livestock production as the main factor in the decline of Malleefowl populations. Fragmentation and population isolation caused by the clearing continues to increase the threatening processes impacting on the remaining Northern Agricultural Region's Malleefowl populations. The purpose of the revegetation offset is to restore landscape connection as well as increase the extent of habitat favoured by Malleefowl populations.

Revegetation methodology has been designed to ensure the key outcomes and offset assessment criteria can be met. It will be applied against each site to ensure that project success can be monitored against performance indicators and completion criteria to ensure offset criteria is met with sustainable benefits to Malleefowl populations in the Gunduwa region.

Four key deliverables for each revegetation site will form the basis of the project:

- Site assessment
- Preparation of a site specific revegetation plan (Appendix S presents the plan for the first revegetation site, with subsequent site plans developed based on this template)

- Monitoring plan (formed in conjunction with the revegetation plan & representative site assessment)
- Performance and completion assessments.

The standards, methodology, and monitoring framework applied by NACC NRM to regional revegetation projects are outlined below. These guidelines set out the criteria for site preparation, species selection, planting techniques, maintenance, and monitoring to ensure revegetation outcomes meet both ecological objectives and regulatory requirements. The methodology aligns with the National Malleefowl Recovery Plan, National Standards for Ecological Restoration, and regional site preparation methodologies, all designed to maximise plant survival rates, establish diverse and locally relevant native vegetation, and support the long-term restoration of Malleefowl habitat.

The monitoring program presented herein provides a nationally consistent approach for assessing project performance throughout its lifecycle. By capturing reliable, repeatable data, this framework supports adaptive management and allows early identification of emerging issues and the timely implementation of corrective actions to ensure compliance and the achievement of intended offset outcomes.

The revegetation approach outlined below directly supports the Malleefowl recovery plan objectives (Table 56) and is achieved through the prioritisation of habitat restoration within the species' known range and addressing key threats to its survival. Site selection, floristic composition, and vegetation structure are designed to enhance foraging and nesting opportunities, while strategic weed and predator management recommendations will help reduce pressures on existing and/or emerging populations.

By implementing best-practice standards for revegetation and ongoing monitoring, the Proposal contributes to measurable progress against recovery plan targets, ensuring that offset outcomes deliver tangible benefits for Malleefowl conservation at both a local and landscape scale.

**Table 56: Alignment of offset to National Malleefowl Recovery Plan (2024)**

<b>On ground strategy</b>
<i>1. Enhance protection and improve or maintain quality, connectivity and extent of habitat</i>
<i>1.1 Habitat clearance and degradation</i>
<i>1.1.1 Identify Malleefowl habitat areas</i>
<i>1.1.3 Increase area of Malleefowl habitat and quality of existing Malleefowl habitat</i>
<i>1.2 Habitat and Population fragmentation</i>
<i>1.2.1 Identify small and isolated populations at risk of loss</i>
<i>1.2.2 Identify strategic locations to establish habitat corridors and patches</i>
<i>1.2.4 Plant suitable vegetation in strategic corridors and patches as identified in action above</i>
<b>Supporting strategy</b>
<i>6. Engage the community</i>
<i>6.1 Engaging the community</i>
<i>6.1.4 Provide training for Aboriginal Rangers and Ranger Cadets (school children) to utilise data collection technology to record and analyse data.</i>

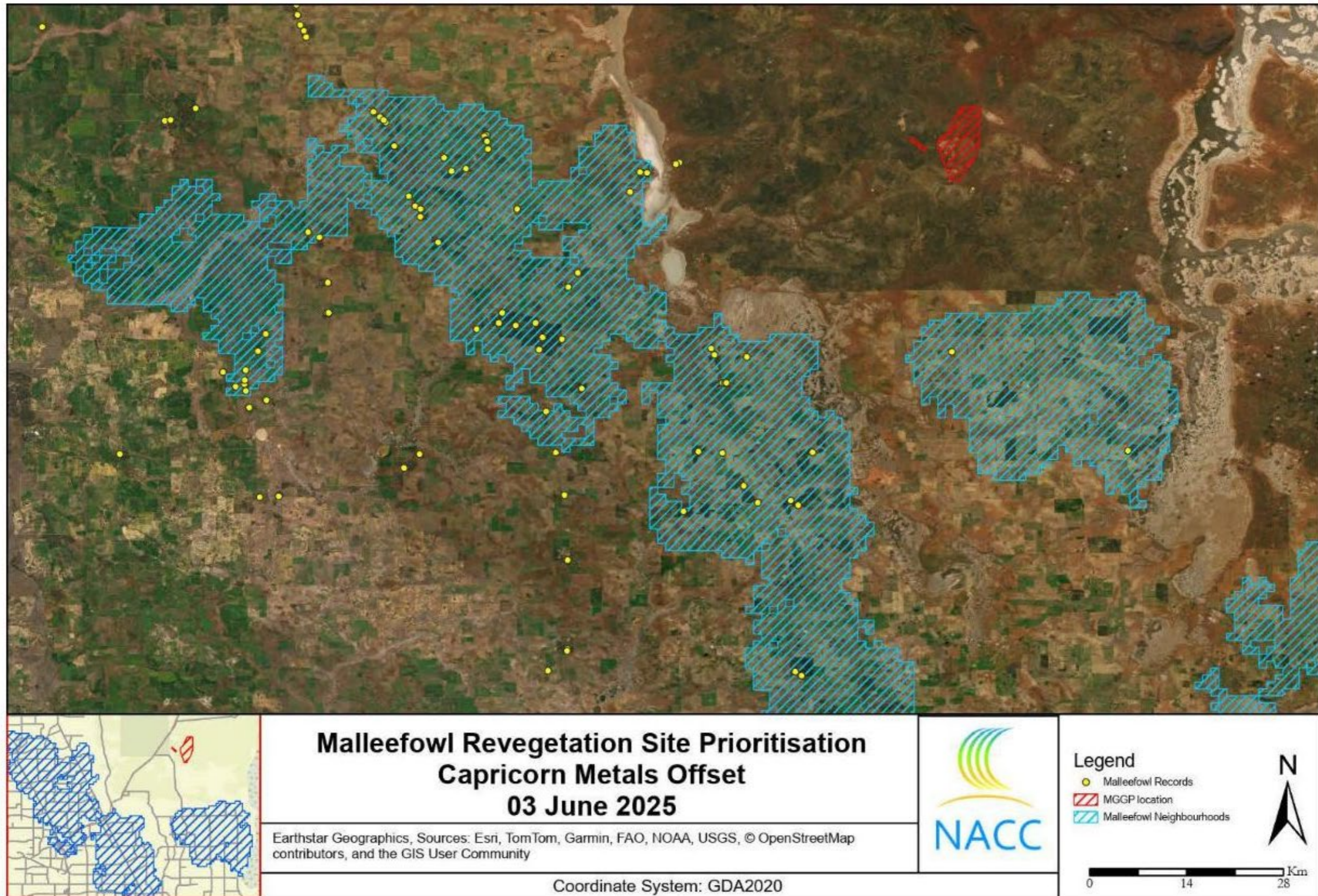


Figure 50: Priority habitats to restore and protect for Malleefowl

## Offset Calculator Values

Offset calculations have been undertaken to confirm that revegetation of 700 ha of degraded farmland achieves a minimum of 90% offset value. These values are summarised in Table 57.

**Table 57: Offset Values for the NACC NRM Revegetation Offset**

Value	Offset Size (ha)	Habitat Quality before Offset	Habitat Quality without Offset	Habitat Quality with Offset	Offset Value
Malleefowl habitat	700	0	0	7 <sup>1</sup>	90%

<sup>1</sup> – Habitat quality as assessed by the HQS in Table 25.

In addition to the 700 ha required to achieve 90% of the offset, a further 100 ha of revegetation will be undertaken by NACC NRM. This additional 100 ha will serve as contingency to ensure the offset outcomes are achieved and at least 90% of the direct offset required is delivered.

## Offset implementation

To deliver tangible restoration outcomes NACC NRM has identified a staged approach. Achieving a successful outcome for revegetation that also achieves a habitat value outcome includes the following key steps:

- Revise existing data sets, Multi-Criteria Analysis Shell for Spatial Decision Support and GIS mapping that identifies priority sites to undertake revegetation that strategically extends Malleefowl habitat.
- Conduct landholder engagement and management of revegetation agreements (biodiversity agreements - non-binding not on title 10 year commitment) – with the intention of supporting progression to a conservation covenant where desired.
- Undertake thorough site assessments to identify appropriate areas for restoration work.
- Site preparation that enables the best revegetation outcomes based on site assessment results (mechanical soil amelioration methodology, weed and pest control, cultural heritage assessment).
- Revegetation at sites identified as able to contribute important habitat, with individual Management Plans for the sites forming part of the land manager agreement and aligned to the Mt Gibson Gold Project Offsets Area Management Plan.
- Installation of up to three Ecological Assessment plots aligned to the Ecological Monitoring System Australia approach within the first 5 years of project activities (Quadrat establishment, site description, photo points, floristic diversity, condition and cover).
- Follow up monitoring of Ecological Assessment plots (Photo points, condition and cover).

A schedule of works and costing breakdown for the actions that enables the revegetation of >270 ha for the first 5 years is detailed in Table 58. It is important to note that the Proponent has established its agreement with NACC NRM to continue beyond the 5 year period at a pace of Malleefowl habitat restoration consistent with that established in the first 5 years, i.e. at ~50 ha of restored habitat per annum.

In undertaking the actions, NACC NRM will collaborate with First Nations Rangers, local industry service providers, WA Malleefowl Recovery Group, and the National Malleefowl Recovery Team, where appropriate. The establishment of appropriate monitoring protocols will allow for standardised and replicable monitoring in perpetuity. The delivery of these actions will be directly linked to the provided funding, ensuring a biodiversity gain.

**Table 58: Schedule of work and budget (\$,000) NACC NRM**

Service	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	Total 5 yr	FY 2031-2041	Total LoP
<b>Regional assessment – Site identification and prioritisation</b>	46	47	49	50	52	244	480	724
<b>Landholder engagement and biodiversity agreement</b>	23	23	23	23	23	114	220	334
<b>Revegetation work (&gt;270 ha over 5 years)</b>	150	165	170	174	179	838	1,816	2,655
<b>Ecological Assessment (initial)</b>	-	-	48	-	-	48	192	240
<b>Ecological Surveys (ongoing)</b>	-	-	-	30	30	60	334	394
<b>Administration</b>	22	24	24	28	25	120	279	399
<b>Total (ex GST)</b>	<b>241</b>	<b>259</b>	<b>313</b>	<b>305</b>	<b>309</b>	<b>1,423</b>	<b>3,322</b>	<b>4,745</b>

Source - NACC NRM Offset Proposal

### Site identification and prioritisation

Using an integrated approach, strategic identification of project sites will enable NACC NRM to prioritise ‘on-ground’ actions. Prioritisation ‘neighbourhoods’ are based on Dr Jeff Short and Blair Parsons previous research titled ‘Malleefowl conservation – informed and integrated action’. This research focused on informing practical land management decisions ensuring the best impact for Malleefowl. The mapping output provided by this research is one tool that guides NACC NRMs approach.

Application of on-ground revegetation will also be guided by the NRM Multi-Criteria Analysis Shell for Spatial (MCAS-S) analysis enabling threat assessment, identification of revegetation linkages and climate scenarios to be incorporated.

Desktop analysis of each identified site will provide NACC NRM with critical information including tenure, registered Aboriginal Cultural Heritage sites, threats and compatible vegetation types. This process will also enable proximity assessment to the Mount Gibson mine, with priority given to the nearest opportunities.

- Sites identified and prioritised according to Malleefowl neighbourhood mapping and population viability assessment. Highly aligned areas will be prioritised.
- MCAS-S analysis targeting opportunities for landscape linkages.
- Desktop assessment to refine property suitability (tenure, threats, Aboriginal cultural heritage sites, contaminated sites, proximity to impacted area etc.).

Site suitability will be assessed against the selection criteria outlined in Table 59 and Appendix S, to align with habitat requirements for Malleefowl.

**Table 59: Malleefowl offset site selection criteria**

Site Assessment Aspect	Detail	Assessment Condition
<b>Vegetation Type</b>	Site must be able to sustain suitable vegetation types for supporting local Malleefowl population/s.	Assessed against identified Malleefowl vegetation types
<b>Malleefowl Range</b>	Site must be within known Malleefowl range and prioritised rehabilitation areas.	Assessed against Parsons Malleefowl Neighbourhoods.
<b>Habitat Quality Score Future Prediction</b>	Site is expected to achieve a score of 7 in the Habitat quality score following >15 years of project.	Assessed against Habitat Quality Score table for Malleefowl. Future score (20 year prediction) must predictably be >7.
<b>Proximity to Offset Location</b>	Site must be within reasonable range of Offset location to ensure comparable condition and impact mitigation.	Within regional Wheatbelt boundaries. <500km distance from Crimson Metals project site.
<b>Size and Makeup</b>	Site must be greater than 10ha, with shape ensuring edge impacts are limited.  Connecting corridors will be assessed independently.	Total area >10ha.
<b>Landholder</b>	Landholder must have demonstrated willingness to work towards sustainable outcomes and agree to NACC NRM Biodiversity Agreement.	Signed Biodiversity Agreement.
<b>Best Practice Malleefowl Conservation targets</b>	Site is assessed against targets from the DCCEEW 2024 National Malleefowl Recovery Plan	Assessed against on ground strategy conditions to ensure best practice conservation outcomes.

### Securing land access and assessing site suitability

It is important to note that in August 2025 the Proponent made an initial payment of \$265,000 to NACC NRM to commence the site identification and land access process to secure suitable sites for revegetation in 2026. NACC NRM will leverage existing relationships with land owners to identify sites with the best potential for long-term outcomes.

- Prioritise known or existing relationships with land owners.

- Advertising using materials generated by NACC NRM that communicate incentive opportunities via members, social media channels, and interested local community groups.
- Determine interest/willingness with defined landowners.
- Field site assessment to determine suitability for biodiverse revegetation (Malleefowl habitat) including recording site threats and description (such as soils type, salinity, weed burden, pests, adjacent flora).
- Identification of suitable historic Malleefowl habitat for restoration activity inclusion (such as semi-arid to arid Mallee, Acacia and Allocasuarina shrublands).
- Detailed GIS mapping for any identified potential site (# potential hectares)
- Generation of land holder Biodiversity agreement, mapping, and site management plan (Table 60).

The Proponent will work to ensure offset sites under revegetation are protected in perpetuity via Conservation Covenant with land holders. Where Conservation Covenants are not possible, proponent will look to transfer the land to a partner such as AWC for such protection or acquire sufficient land directly for the same purposes.

NACC NRM applies a comprehensive site assessment approach, incorporating desktop analysis and on-ground evaluation to inform project planning. This process ensures that each site is thoroughly understood prior to revegetation works and allows for individualised site management planning. Key outcomes of the assessment include:

- DPLH data search and Identification of any registered Aboriginal Cultural Heritage sites.
- Documentation of indigenous plant communities and reference ecosystems (supporting stems per hectare planning).
- Recording site threats such as pests, weeds, diseases, salinity, rubbish, tracks and access issues, and erosion risk.
- Soil and historic vegetation classification using the Department of Primary Industries and Regional Development NRinfo map application and soil landscape mapping - best available and Pre-European Vegetation.
- Site photographs to provide baseline records.
- Recommendations for suitable revegetation species based on indigenous plant community and reference ecosystem assessment. Recommendation will also be informed by the Tree and Shrubs for the Midlands and Northern Wheatbelt 2nd edition.
- Assessment of climate change projections and likely climatic constraints at the site using the Climate Change in Australia Projection Tools.

This structured assessment enables NACC NRM to develop tailored revegetation strategies that are both ecologically appropriate and culturally sensitive.

**Table 60: Generalised Site Management Plan specifications for revegetation sites**

What will be done	When	How	Comments
<b>Fencing</b>	By date specified in Management Agreement.	Fence remnant vegetation according to the site works map provided. Once the fencing has been completed, monitor fence twice a year and maintain by repairing any damage where necessary.	N/A
<b>Grazing management</b>	Duration of Agreement	No grazing is to occur within restoration area	The land manager has agreed that there will not be grazing within the remnant area after restoration effort has occurred.
<b>Clearing of native vegetation</b>	Duration of Agreement	All clearing of native vegetation requires a permit unless it is exempt.	The land manager does not intend to clear native vegetation.
<b>Weed monitoring and control</b>	May – Aug each year and after any Summer rains	Undertake weed control when and where necessary in accordance with the Farm Chemical Label.  Monitor in May and August and after Summer rains by checking along fire breaks to check if there are any weed infestations.	Monitor and control annual weeds in the remnant understorey to prevent further spread.
<b>Establish fire breaks</b>	Prior to 1 November of each year in alignment with Shire issued Fire Hazard Reduction Notices	Ensure that the whole remnant area is protected with a fire break on both sides of the fence.	The boundary fire break width should be in accordance with local government (LG) specifications.
<b>Access to site</b>	Duration of Agreement	Build gates into fence design to allow access.	N/A
<b>Pest animal baiting</b>	April to May each year (implementation period)	Monitor rabbits by looking for recent signs of activity and active warrens. If detected, undertake management actions in accordance with WA Department of Agriculture and Food regulations and your local Recognised Biosecurity Group.	Pest rabbits and/or pigs shall be controlled using approved methods and monitored by land manager.
<b>Monitoring and evaluation</b>	Annually, commencing year three after site revegetation	NACC Project Officer will establish monitoring points for using the Photomon app and may establish long term monitoring on this site.	Monitoring and evaluation develop an understanding of the change that may occur in the area over time. This will help with future management.
<b>Vehicle movement</b>	Completion of site revegetation works	Restrict all vehicle movement within the remnant vegetation area.	It is preferred that vehicle movement is minimal to prevent the transfer of weeds. NACC NRM encourages restricted movement of vehicles in the area and the wash down of vehicles before entry.
<b>Firewood collection</b>	Duration of Agreement	It is preferable that firewood collection does not occur on the site, due to the habitat and nutrient cycling value of fallen timber.	If firewood collection is undertaken it must be in accordance with the <i>Biodiversity Conservation Act 2016 (WA)</i> .

## Revegetation Implementation and Management

NACC NRM's revegetation methodology (Appendix S) will be guided by the six key principles of ecological restoration practice as outlined in the Society for Ecological Restoration Australasia guidelines.

- Principle 1. Ecological restoration practice is based on an appropriate local indigenous reference ecosystem.
- Principle 2. Restoration inputs will be dictated by the level of resilience and degradation.
- Principle 3. Recovery of ecosystem attributes is facilitated by identifying clear targets, goals, and objectives.
- Principle 4. The goal of ecological restoration is full recovery insofar as possible, even if outcomes take long timeframes or involve high inputs.
- Principle 5. Restoration science and practice is synergistic.
- Principle 6. Social aspects are critical to successful ecological restoration.

NACC NRM delivers revegetation projects guided by key ecological and operational principles. This is achieved through a range of targeted practices, including:

- Engaging local, experienced revegetation practitioners to ensure high-quality outcomes.
- Sourcing seeds and seedlings of local provenance to maintain genetic integrity and ecosystem resilience.
- Providing expert advice and/or incentives to manage vertebrate grazing pressures, including livestock, rabbits, and kangaroos.
- Ensuring thorough site preparation, incorporating weed control and mechanical soil amelioration where required.
- Implementing planting techniques such as ripping or mounding (particularly in saline or waterlogged areas) in accordance with recognised best practice.

Developing and following a comprehensive site management plan to guide ongoing maintenance and monitoring. Generalised timelines for successful site implementation are provided in Table 62. Proposed project schedule is delineated in pictorial form in Table 63.

The indicative species list that will be used by NACC NRM for offset site revegetation are presented in

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Table 61. It should be noted that this list is indicative and not exhaustive; final species depend on the local native vegetation composition in the vicinity of each offsite site and the availability of revegetation stock at the time of revegetation. All revegetation will target genera (e.g. *Allocasuarina*, *Acacia* etc) recorded in VSA 1 and VSA 2 as a priority, where available and relevant to the local vegetation. Further details are provided in Appendix S, which presents the plan for the first revegetation site, with subsequent site plans developed based on this template.

**Table 61: Indicative species list for Malleefowl offset site revegetation**

Species	Species
<i>Acacia acuminata</i>	<i>Malleostemon tuberculatus</i>
<i>Allocasuarina acutivalvis</i>	<i>Melaleuca calyptroides</i>
<i>Allocasuarina campestris</i>	<i>Melaleuca cordata</i>
<i>Dianella revoluta</i>	<i>Melaleuca eleuterostachya</i>
<i>Eucalyptus salubris</i>	<i>Melaleuca hamata</i>
<i>Eucalyptus loxophleba</i> subsp. <i>loxophleba</i>	<i>Melaleuca nematophylla</i>
<i>Hakea recurva</i> subsp. <i>recurva</i>	<i>Melaleuca stereophloia</i>
<i>Hakea scoparia</i> subsp. <i>scoparia</i>	<i>Melaleuca radula</i>
<i>Malleostemon roseus</i>	<i>Rhagodia drummondii</i>

**Table 62: Generalised Schedule of Implementation for Revegetation and Management**

Timeframe	Specific Task
Prior to December Year 0 / January Year 1	Identify and collect native seed from within site or nearby provenance areas. Liaise and confirm nursery orders for tubestock propagation.
Year 1 – Following first rains in late autumn / winter (approx. April–June)	Prepare management areas (weed control, scalping, soil preparation, excavation) Conduct direct seeding (if applicable).  Tubestock planting using deep planting method.
Year 1 – July to August	Undertake weed control as required.
Year 1 – October to November	Tubestock survival assessment
Year 1 – November (approx.)	Order plants from specialist nursery for Year 2 infill planting (if applicable).
Year 2 – March	Evaluate management status and confirm progress towards revegetation criteria.
Year 2 – Following first rains in late autumn / winter (approx. April–June)	Undertake weed control in management areas (if applicable). Plant tubestock using deep planting method (if applicable). Undertake supplementary direct seeding as required. Apply contingency measures if required.
Year 2 – June	Evaluate weed cover and determine need for further weed control or contingency actions.
Year 2 – July to August	Undertake weed control as required.
Year 2 – October to November	Tubestock survival assessment
Year 2 – November (approx.)	Source plants from specialist nursery for Year 3.
Year 3 – March	Evaluate management status and confirm on track to meet revegetation criteria.  Install long term monitoring plot as per protocols (representative site only)
Year 3 – Following first rains in late autumn / winter (approx. April–June)	Undertake weed control. Apply contingency actions if required.
Year 3 – June	Evaluate weed cover and requirement for additional weed control.
Year 3 – July to August	Undertake weed control as required.
Year 4 – March	Evaluate management status and confirm on track to meet revegetation criteria.
Year 4 – Following first rains in late autumn / winter (approx. April–June)	Undertake weed control. Apply contingency actions if required.
Year 4 – June	Evaluate weed cover and requirement for weed control or contingency measures.
Year 4 – July to August	Undertake assessment of management against site management plan (in partnership with land manager).
Year 5 – March	Ongoing evaluation of management status and confirm revegetation criteria are met.
Year 5 – To be confirmed (TBC)	Apply contingency actions (if required).
Year 5 – Monitoring (TBC)	Consultation with land manager once establishment objectives are achieved. Ongoing management of long-term monitoring, commencement of target species presence monitoring.

**Table 63: Malleefowl Habitat Revegetation high level implementation plan**

Project	Task	FY26	FY27				FY28				FY29				FY30				FY31				FY32				FY33-40				
		Q3/4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>Regional assessment of land</b>	Review high priority regions for suitable contribution to Malleefowl 'neighbourhoods', confirmation of land status, and select minimum of 100 Ha of target land for subsequent consultations.		100Ha				100Ha				100Ha				100Ha				100Ha				100Ha				Ca 100Ha/yr				
<b>Landholder engagement &amp; assessment</b>	Define, inspect, design, communicate and progress to agreement land packages with individual landholders		55Ha				55Ha				55Ha				55Ha				55Ha				55Ha				Ca 55Ha/yr				
<b>Revegetation Efforts</b>	Identify and/or collect native seed from within site or nearby provenance areas. Liaise and confirm nursery orders for tubestock propagation.																														
	Prepare management areas (weed control, scalping, soil preparation, excavation) Conduct direct seeding (if applicable) Tubestock planting using deep planting method.																														
	Undertake weed control (if applicable). Plant tubestock using deep planting method (if applicable). Undertake supplementary direct seeding as required. Apply contingency measures if required.																														
	Tubestock survival assessment.																														
	Order plants from specialist nursery (starting Yr 2) for infill planting (if applicable).																														
	Evaluate management status and confirm progress towards rehabilitation criteria.																														
	Apply contingency actions (if required). Consultation with land manager once establishment objectives are achieved.																														
<b>Ecological assessment (initial)</b>	Evaluate rehabilitation status and confirm on track to meet criteria. Install long term monitoring plot as per protocols (representative sites only).																														
<b>Ongoing Ecological assessments</b>	Biannual plot surveys. Consideration for Malleefowl monitoring from year 5 (TBD).																														

Source: NACC NRM (2026)

## Monitoring and completion criteria

Monitoring is an important part of any restoration project and is essential to inform any challenges across the life of the Proposal. NACC NRM monitors projects using photo point monitoring, seedling success counts and the newly developed Australian Governments Ecological Monitoring System Australia protocols. Further details are provided in Appendix S, which presents the plan for the first revegetation site, with subsequent site plans developed based on this template.

### Establishment monitoring

During the revegetation establishment phase newly, planted seedlings are vulnerable to a range of threats. NACC NRM actively monitors the revegetation to inform and adapt site management activities. The main methodology utilised during this phase include:

- Photo point establishment.
- Seedling survival transect count.
- Visual inspection for weeds, pests and disease issues.

These early observations ensure timely intervention and set the foundation for long-term revegetation success.

### Long-term vegetation monitoring

For long term vegetation monitoring, Ecological Monitoring System Australia (EMSA) provides a nationally consistent standard for the collection of field-based ecological data, supporting both regulatory compliance and best-practice project evaluation. NACC NRM has adopted EMSA modules specifically suited to offset and restoration projects to assess vegetation condition and track progress following revegetation interventions. These include:

- Plot Description Module, download PDF - recording baseline characteristics and contextual information
- Plot Selection and Layout Module, download PDF - establishing consistent monitoring locations for repeatable data collection
- Cover, condition, and floristics – measuring vegetation structure, species composition, and ecological health.
- Cover Module, download PDF
- Condition Module, download PDF
- Floristics Module, download PDF

These modules ensure that monitoring data are robust, comparable across projects, and meet statutory reporting requirements. This approach also enables adaptive management by providing reliable evidence to guide decision-making, promptly address emerging issues, and verify that revegetation outcomes deliver intended ecological benefits.

Monitoring sites are to be implemented within the first five years of the revegetation program, with biannual monitoring. Site selection is to provide a representative sample of achieved Offsets and enable consistent project progress indicators.

- EMSA plot establishment
- biannual ecological value EMSA plots, national standard with replicable/return monitoring over longer term

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**Malleefowl monitoring in established sites**

Establishing and managing habitat capable of sustaining a viable Malleefowl population is the central goal of this project. Achieving this outcome requires successful revegetation activities and the development of dense understorey and accumulated leaf litter, which are critical for Malleefowl nest building, forage and protection from predators. Evidence from monitoring at other restoration sites in particular Bush Heritage Australia's (BHA) Monjebup North Reserve demonstrates that Malleefowl will actively utilise revegetated areas once these structural habitat features mature, underscoring the importance of long-term management and ongoing ecological monitoring to track site progression and fauna response.

To assess the suitability of 'new' habitat for Malleefowl, NACC NRM will begin targeted presence/absence monitoring from year six, using camera traps and other survey methods once revegetation reaches a maturity likely to provide adequate cover, food resources, and nesting materials.

Table 64 outlines the objectives, targets, monitoring and completion criteria for Malleefowl habitat revegetation. Further details are provided in Appendix S, which presents the plan for the first revegetation site, with subsequent site plans developed based on this template.

**Table 64: Objectives, targets, completion criteria and monitoring for Malleefowl habitat revegetation**

Item number	Objective	Performance indicator	3 year target	5 year target	10 year target	Year 20 (Completion criteria)	Corrective actions if targets not met	Monitoring
1.	Identify priority restoration areas for Malleefowl to counterbalance the significant residual impacts to ~568 ha of critical Malleefowl habitat from the MGGP	Identify and secure through land access agreements at least 700 hectares of degraded land in the Gunduwa region, suitable for Malleefowl habitat restoration. Locations are based on proximity to the MGGP within identified Malleefowl neighbourhoods and confirmed bird occurrence.	175 hectares of degraded agricultural land revegetated to provide future Malleefowl breeding and foraging habitat	275 hectares of degraded agricultural land revegetated to provide future Malleefowl breeding and foraging habitat	700 hectares of degraded agricultural land revegetated to provide Malleefowl breeding and/ or foraging habitat	Minimum 700 hectares of degraded agricultural land revegetated to provide Malleefowl breeding and/ or foraging habitat	Additional 100 ha of suitable degraded land will be available for revegetation to be implemented as a contingency to ensure completion criteria is achieved.	Annual review of hectares of land selected for and included in the revegetation program.  Motion cameras, in field observations (scats, tracks etc) /photographic records during vegetation monitoring to determine Malleefowl usage  Annually from year 6 following revegetation
2.	Create biodiverse Malleefowl habitat utilising Malleefowl preferred flora species	Undertake biodiverse revegetation efforts across 700 hectares of land, with a focus on utilising flora species from local provenance and consistent with those utilised by Malleefowl in adjacent areas. The aim is to initially establish vegetation that will attract and provide foraging opportunities, then transition to adequate density and cover conditions that will enable breeding by year 20.	Restored habitat is on trajectory to achieve completion criteria	Sub-project site has a minimum Habitat Quality Score of 3 for Malleefowl (Table 25)	Sub-project site has a minimum Habitat Quality Score of 5 for Malleefowl (Table 25)	Sub-project site has a minimum Habitat Quality Score of 7 for Malleefowl (Table 25)	Investigation into cause of target not being met, implement relevant remedial actions (e.g. undertake additional seeding/ planting of required species, fencing to exclude fauna until vegetation has established).  Results of investigation and remedial actions implemented included in the annual compliance report post approval of the Proposal.	Sub-project site assessment against Habitat Quality Score (Table 25)  Years 3,5,10 then as required  In field assessment using transects across revegetation lines assessing, plant health and growth, survival number, vegetation density, weed burden  Years 1,3,5,7,10 then as required  Photo point and/or aerial drone monitoring  Years 0,1,2,3,5,10 then as required
3.	Utilisation and subsequent recolonisation of Malleefowl to revegetation sites	It is anticipated that Malleefowl will utilise the revegetation sites in some way (transit/forage) within 10 years post revegetation and mound creation possible by Year 20.	Restored habitat is on trajectory to achieve completion criteria	Restored habitat is on trajectory to achieve completion criteria	Malleefowl occurrence observed by year 10 at any sub-project revegetation site	Malleefowl occurrence and ongoing use of revegetation areas observed by year 20 across 50% of sub-project revegetation sites	Investigation into cause of target not being met, implement relevant remedial actions (e.g. undertake additional seeding/ planting of required species, fencing to exclude fauna until vegetation has established, weed control, erosion control).  Results of investigation and remedial actions implemented included in the annual compliance report post approval of the Proposal.	Motion cameras, in field observations (scats, tracks etc) /photographic records during vegetation monitoring  Ground survey for Malleefowl to inspect for mounds, breeding and foraging suitably.  Annually from year 6 following revegetation

## 6.2.2 Direct Offset 2: WA Wheatbelt Woodland TEC Averted Loss via Mummaloo Iron Ore Project Acquisition

Acknowledging the residual impact on vegetation associated with the WA Wheatbelt Woodlands TEC, Crimson acquired the tenure for the Mummaloo Iron Ore Project (MIOP) (Figure 51) in early 2025 (see announcement 31 January 2025) at an attributable cost of approximately \$1.6 million.

The mining tenure and approvals, which Crimson now is entitled to, has enabled the mining of iron ore over the last decade by Top Iron. The MIOP commenced development around March 2015, with 140.6 ha of native vegetation within an approved 440 ha Development Envelope cleared (Figure 50), until the MIOP was placed in Care and Maintenance around August 2015.

Subject to relevant State secondary approvals, the MIOP could easily be restarted, and the full extent of approved clearing (up to 190 ha of mine pits and 110 ha of infrastructure and waste rock landforms) could be resumed. It is worth noting that the nearby, and similarly sized, Mount Gibson Iron Ore Mine (MGIO, owned by Extension Hill Pty Ltd), located only 10km Northwest of Mummaloo, was also on care and maintenance until its restart in 2023 and has been operating to present day. Securing the tenure for Mummaloo offset has already enabled, and will continue to enable, the Proponent to facilitate the conservation (and prevention of further disturbance to) this area of WA Wheatbelt Woodlands TEC within an overall 440 ha conservation reserve, accounting for more than 100% of the offset required for WA Wheatbelt Woodlands TEC.

Based on vegetation surveys undertaken (Anders Environmental Consulting, 2026; Appendix T), up to 135.8 ha of WA Wheatbelt Woodlands TEC and 65.5 ha of buffer vegetation is remaining within the Ministerial Statement 943 (WA) Development Envelope (Figure 52). A maximum of 159.4 ha in this Development Envelope remains available to be cleared under Ministerial Statement 943.

The mining approved under MS 943 is also the subject of EPBC Act decision notice 2012/6634: not a controlled action if taken in a particular manner, dated 20 December 2012. This notice was issued after consideration of the iron ore mines' impacts to Malleefowl, but prior to the EPBC Act listing of the WA Wheatbelt Woodlands Threatened Ecological Community on 4 December 2015.

Within the known mineralised area of the Mummaloo project, 47.4 ha of WA Wheatbelt Woodland TEC and 38.2 ha of buffer vegetation critical to survival of the TEC remain undisturbed (Table 65). With regards to the proposed offset, the Proponent will protect the 135.8 ha of the WA Wheatbelt Woodland TEC within the Mummaloo Development Envelope, achieving an offset value of 127% (Table 66)

**Table 65: WA Wheatbelt Woodland TEC remaining within Mummaloo Iron Ore Project**

Area (ha)	Extent remaining within approved Mummaloo Development Envelope	Extent remaining within known Mummaloo Mineralisation Zone
<b>WA Wheatbelt Woodland TEC</b>	135.8	47.4
<b>40 m TEC buffer vegetation</b>	65.5	38.2
<b>Total</b>	<b>201.3</b>	<b>85.6</b>

The Proponent proposes the following key actions to achieve security of tenure and management:

- Immediately protect 135.8 ha WA Wheatbelt Woodland TEC, within an overall 440 HA offset conservation area
- Short-term protection of the conservation area through applying to amend and consolidate MS 943 (and related mining approvals) with the new gold mine approval, so MS 943 approval is used only to provide offset security for the new gold mine
- Medium term protection of the conservation area through surrender of MS 943 related mining tenure (once rehabilitation of past mining disturbance is complete. Note - rehabilitation is not part of the offset as it is an existing statutory obligation for past mining and is in areas not classed as TEC).
- Long term protection of the conservation area through its reservation as a conservation reserve, managed by Australian Wildlife Conservancy, who own the underlying pastoral lease and manages the remainder of the lease for conservation purposes already.
- Habitat quality maintenance of the TEC at a score of 8 (Table 20) at the Proponent's expense until long term protection is achieved.

There are several contingencies available in the event there is a delay or change in the proposed key actions. These include funds being payable to AWC consistent with MS 943, an EPBC Act condition in WA to require additional offsets if the primary option is not achieved, conservation covenants, and biodiversity and other regulatory notices.

The Proponent acknowledges that the law and policy related to environmental offsets is going through considerable reform at present and new mechanisms to secure and conserve TEC's may become available. The Proponent considers flexibility to achieve the best conservation security and outcomes should be maintained, and it will review the most efficient and effective mechanisms to deliver the offset at each stage of its implementation.

Apart from existing mining related disturbance, the remaining Mummaloo offset site is largely intact with WA Wheatbelt Woodland TEC quality assessed to be in a 'Good' to 'Very Good' quality. The Proponent will manage and maintain the existing vegetation to ensure that there is no loss or reduction in habitat quality for the duration of the Proposal.

### Offset Calculator Values

Offset calculations have been undertaken to confirm that a minimum of 100% offset value is achieved, these values are summarised in Table 66.

**Table 66: Offset Values for the Mummaloo Offset Site**

Value	Offset Size (ha)	Habitat Quality before Offset	Habitat Quality without Offset	Habitat Quality with Offset	Offset Value
<b>WA Wheatbelt Woodland TEC</b>	135.8	8 <sup>1</sup>	6	8 <sup>2</sup>	127%

1- as assessed by Anders (2026).

2- (Table 20)

**Management Actions**

To ensure habitat maintenance is achieved, the Proponent proposes undertaking a series of management actions within the Mummaloo offset site until long term protection is achieved. These actions are outlined in Table 67.

**Monitoring and completion criteria**

Table 68 outlines the objectives, targets, monitoring and completion criteria for the Mummaloo offset site.

**Table 67: Management Actions for Mummaloo Offset Area**

Category	Action	Timing	Responsibility
<b>Delineation and Access</b>	Install signage around TEC offset locations to restrict and control unauthorised access and protect existing native vegetation from potential degrading processes such as the introduction and spread of weeds.	Completed by the end of H1 2026	Proponent and/or offset area landowner and all contractors/consultants
	Where required, install gates or barriers (eg earth bunding) and signage at potential ingress locations highlighting it being a Conservation area and there being No Unauthorised Access.		
<b>Weed Management</b>	Prior to entering the Mummaloo offset site, all vehicles and equipment are to seek access approval and be free of mud and soil	Duration of Proposal impact until long term protection and transfer to AWC is achieved	
	Complete baseline surveys to identify existing weed species and abundance	Annually for the first five years of implementation. Timing reviewed based on weed presence and survey results	
	Develop and implement a weed control program to prevent offset location degradation and monitor weed presence across the Mummaloo site	Annual Oct/Nov commencing 2026 until long term protection and transfer to AWC is achieved	
<b>Fire Management</b>	Given the extreme bushfire hazard associated with the regional area, bushfire risk will be closely managed in regular consultation with the Local Government and Department of Fire and Emergency Services. Management actions will be considered on a case-by-case and centred on protecting the TEC occurrence within the Mummaloo offset site.	Duration of Proposal impact until long term protection and transfer to AWC is achieved	
	Potential management actions that may be implemented to reduce bushfire risk include:		
	Regular monitoring of fire fuel loads, implement reduction burns where relevant  Establishment of new firebreaks, and maintenance of any existing fire access tracks throughout the Mummaloo offset site, in accordance with Local Government Fire Hazard Reduction Notices		
<b>40 metre buffer management</b>	To ensure the maintenance of the TEC offset, the Proponent will ensure that no ground-disturbing activities or any actions are undertaken within the 40 m buffer surrounding the TEC offset area, that may impact the root zone or compromise the viability of the offset, or any occurrence of the TEC within the Mummaloo tenure	Duration of Proposal impact until long term protection and transfer to AWC is achieved	
<b>Monitoring Offset Site</b>	Conduct vegetation condition assessments within the offset site utilising on ground visual assessment and aerial multispectral imaging/remote sensing (Table 68)	Annually until long term protection and transfer to AWC is achieved	

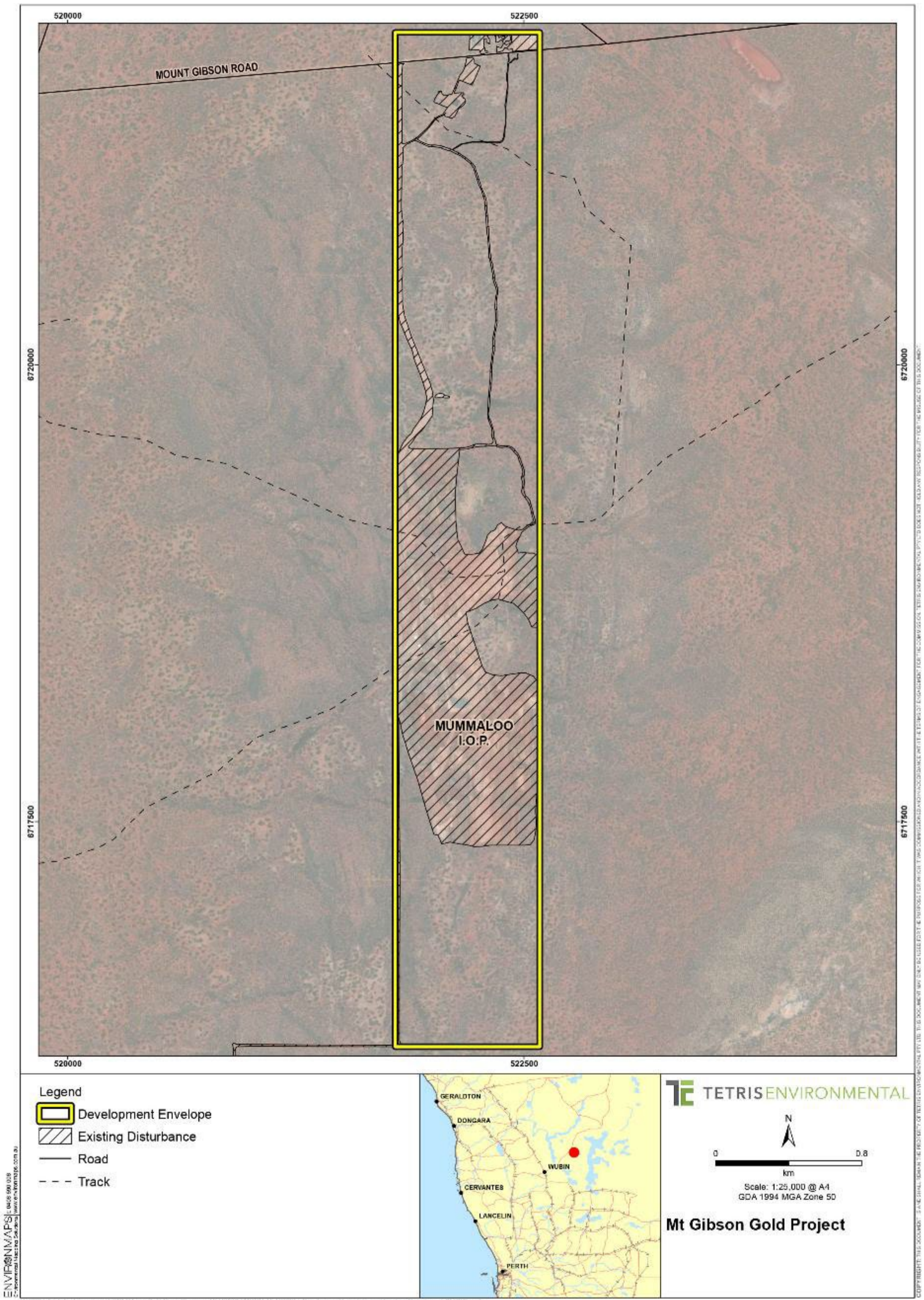


Figure 51: Mummaloo Iron Ore Project existing disturbance



Figure 52: Mummaloo Iron Ore Project WA Wheatbelt Woodlands TEC and offset site

**Table 68: Objectives, targets, completion criteria and monitoring for maintaining the Mummaloo offset site.**

Item number	Objective	Performance indicator	3 year target <sup>1</sup>	5 year target <sup>1</sup>	When long term protection is achieved (Completion criteria)	Corrective actions if targets not met	Monitoring
1	Mummaloo site is maintained and TEC values protected	Key Eucalypt species ( <i>Eucalyptus salmonophloia</i> , <i>Eucalyptus salubris</i> ) are maintained	Key Eucalypt species present at density sufficient to satisfy diagnostic criteria in approved conservation advice (DoE, 2015)			Investigation into cause of target not being met, implement relevant remedial actions (e.g. weed control, fencing to prevent fauna grazing, seeding/ planting of seedlings).  Results of investigation and remedial actions implemented included in the annual compliance report post approval of the Proposal.	In-field patch assessment and/or remote sensing
2		Patch condition / TEC status is maintained or enhanced	Patch condition and size thresholds maintained at a level to satisfy diagnostic criteria in approved conservation advice (Table 3 of DoE, 2015)				Years 1,3,5,10
3		Habitat Quality of TEC is maintained or enhanced	Habitat Quality Score (Table 20) maintained at a minimum 8				Assessment against Habitat Quality Score (Table 20) based on in-field monitoring results from items 1,2,4 and 5.
4		Weed diversity (species richness) is similar or less than undisturbed reference areas	Introduced species diversity is ~10% or less of the average result of baseline sites	Introduced species diversity is ≤10% of the average result of baseline sites			Years 1,3,5,10
5		Weed cover is similar or less than undisturbed reference areas	Introduced species cover is ~10% or less of the average result of baseline sites	Introduced species cover is ≤10% of the average result of baseline sites			In field quadrat measurement and/or remote sensing
							Years 1,3,5,10

<sup>1</sup>- If site not secured by this time

### 6.2.3 Indirect Offset 1: National Malleefowl Recovery Plan Project Implementation

The National Malleefowl Recovery Group (NMRG) has been operating since 1989 and has representatives from ACT, NSW, SA, Vic & WA. The main purpose of the NMRG is implementing the National Malleefowl Recovery Plan (DCCEEW, 2024d) to stop the decline and support the recovery of the species to maximise its chances of long-term survival across Australia.

The main actions currently implemented by NMRG are the adaptive management predator experiment (to understand the impacts of controlling predators on Malleefowl population) and annual mounds across Australia, with all data contributing to the National Database.

The Proponent has entered into a Service Agreement with the NMRG and will contribute \$1.02 Million (pre GST) over the first five years to undertake the following key projects:

- Project 1: Examine genetic differentiation and inbreeding indices in small and isolated populations, comparing this to large populations, and developing strategies to increase genetic variation where needed
- Project 2: Use camera-trapping to quantify how frequently Malleefowl and other animals use habitat links and restored habitat including sites revegetated under the NACC NRM direct offset project
- Project 3: Continue the Adaptive Management Predator Experiment (AMPE) to determine the benefit of reducing the abundance of introduced predators, particularly foxes, on Malleefowl populations (funding has commenced in 2025).

**Table 69: Proposed contributions to NMRG Projects over first 5 year period (\$k)**

	CMM Contribution					Total first 5 years
	25/26	26/27	27/28	28/29	29/30	
<b>NMRG Project</b>						
1 - Genetic Health Isolated Populations	50	50	50	50	50	250
2 - MF Camera Trap Study	150	65	65	65	65	410
3 - Adaptive Mgmt Predator Experiment	80	80	80	80	40	360
<b>Total</b>	<b>280</b>	<b>195</b>	<b>195</b>	<b>195</b>	<b>155</b>	<b>1,020</b>

Source - Crimson Metals Pty Ltd

The details of these projects are outlined in the following sections, with project implementation details provided in Table 70.

#### Project 1: Sustaining the genetic health of isolated Malleefowl populations

**Background:** Clearing for agriculture devastated Malleefowl populations by removing the most productive habitat and leaving remnant habitat severely fragmented. While typically small, these isolated remnants often support high densities of breeding Malleefowl with significantly more positive population trajectories than those in larger, uncleared landscapes on more arid and poorer soils. While demographics of Malleefowl in small patches within agricultural landscapes appear relatively favourable, their long-term prognosis is poor

because fragmentation has disrupted natural gene flow patterns, which will lead to genetic degradation and damaging inbreeding.

Populations in large, uncleared landscapes that are subject to extensive bushfires are at risk of localised extinction; small surviving populations may also face genetic bottlenecks and inbreeding depression.

**How the project will benefit Malleefowl and the recovery group:** This project aims to change the approach towards isolated remnants of high-quality Malleefowl habitat. It will use 'genetic rescue' to transform currently vulnerable and neglected populations, which are typically of low genetic diversity and poor long-term prognosis, into insurance populations that safeguard levels of genetic variation necessary for population persistence. This approach would leverage the benefits of small, isolated patches, which include more productive soils, access to edge forage, protection from wildfire, moderated climate, greater management options, and opportunities for community participation.

### **Project 2: Camera Trap Studies: Do Malleefowl use habitat links and restored habitat**

**Background:** Isolated populations are vulnerable to various threats of which inbreeding depression is perhaps the most insidious and damaging. Habitat linkages and corridors can reduce the genetic isolation of Malleefowl populations. However, their effectiveness depends on the frequency and timing of use by Malleefowl, the destinations of these corridors and the vulnerability of Malleefowl along these routes. Understanding the dispersal rate along corridors is not known but is critical to planning linkages between sites where Malleefowl occur. Similarly, the use by Malleefowl of restored habitat is not known but is vital for conservation planning.

**How the project will benefit Malleefowl and the recovery group:** Malleefowl use of linkages and restored habitat are vital pieces of missing information for developing sustainable management plans. Linkages are standard practice within conservation efforts but information on their effectiveness for Malleefowl is lacking. Despite best intentions, habitat corridors may be ineffective or even damaging to small populations. A better understanding of what constitutes an effective genetic link, and when and how Malleefowl use them, will significantly assist in developing sustainable populations throughout the species' range. The new National Recovery Plan for Malleefowl, released in 2024, highlights the need for genetic management of fragmented Malleefowl populations.

### **Project 3: Adaptive Management Predator Experiment (AMPE)**

**Background:** The AMPE project is a paired experiment where baited (treatment) and unbaited (control) sites are monitored for predator activity and Malleefowl breeding activity. Predator activity is monitored using arrays of remote motion-sensor camera traps. Images are processed to quantify the abundance/activity of foxes as well as other predators and herbivores. Malleefowl breeding numbers are monitored by visiting all mounds within the treated and control sites in accord with national guidelines (Malleefowl tend to reuse existing mounds for breeding rather than create new mounds). At least 5 years of baiting and monitoring at a pair of sites is required for the AMPE because it takes 3-4 years for chicks to reach breeding age and recruit into the breeding population. Recent analyses of AMPE data have not identified significant benefits to Malleefowl from baiting foxes/cats despite reductions in predator abundance. However, uncertainties remain, and it is important that

these be addressed through the AMPE's continuation over five years, as fox baiting is a standard management action for Malleefowl conservation.

**How the project will benefit Malleefowl and the recovery group:** Fox baiting is a common management strategy land managers use to increase Malleefowl populations. This project aims to determine if this strategy is effective and to what extent. Once results are determined, land managers can make more efficient cost-benefit decisions on the appropriate management of Malleefowl across the country. The NMRG aims to clarify the top management practices and their effectiveness in Australia for Malleefowl conservation.

**Table 70: National Recovery Plan Project Implementation**

Project no.	Project Aim	Alignment with the National Malleefowl Recovery Plan Strategy	Details	Targets	Deliverables	Contingency	Delivery Date
1	To examine genetic differentiation and inbreeding indices in small and isolated Malleefowl populations, compare this to large populations, and develop strategies to increase genetic variation where needed	Section 1.2.1 - in breeding of isolated populations	a) using innovative genomic methods to examine the distribution of genetic variation and develop programs to prevent inbreeding depression undermining existing Malleefowl populations	NMRG will undertake genomic analysis of Malleefowl populations across Australia, including samples available for the Northern Wheatbelt (5 high-quality tissue samples from museum collections, plus 11 feather samples collected during monitoring). Samples to be analysed as part of the first year.  If required, further sampling will target isolated populations of Malleefowl in the Northern Wheatbelt to determine the degree of inbreeding.	Year 1: Preliminary Sampling (Advisory Report supplied)  Samples delivered to Monash University (Preliminary Sampling)  Genetic inbreeding report provided by Monash University on the Inbreeding in Malleefowl Populations around Australia.  (Report will include the 36 samples from Northern Wheatbelt area)	Contingency (1):  If inbreeding is not detected (Feathers may not be high enough quality). Further sampling of high-quality samples would be required the following year.  Contingency (2):  If inbreeding is not detected (Feathers tell the story). Further sampling of offspring with intensive mound excavations and high-quality shell membrane sampling.	01.07.2026
			b) investigating the feasibility of genetically informed translocations of eggs to improve population fitness and persistence (genetic rescue)	Targets will be determined from year 1 results.	Year 2: Closer targeted samples more in depth report delivered  # sites identified in each state for translocation  Translocation successful at each site  Baseline study report to determine feasibility of translocation of eggs to improve fitness of genetically isolated populations.	Contingency (3):  Inbreeding not detected at all. Project pivots to planning connectivity in the Northern Wheatbelt area.	01.07.2027
			c) developing protocols for 'genetic rescue' translocations, and examine options for engaging citizen scientists, Traditional Owners and others into a sustainable program of egg movements between source and recipient locations to enhance the health and persistence of populations.	-	Year 3: Translocation can begin Year 3 until Year 5  Genetic rescue translocation protocols developed.  Citizen scientists/ Traditional Owners engagement plan developed. Training in excavation and correct protocols.  Annual report to CMM on how many eggs translocated across how many sites have been completed across the country.		01.07.2028 01.07.2028 01.07.2029
				Comprehensive final report assessing data collated over the term of Project 1.	Final year report delivered to CMM defining success, opportunities for improvement and recommendations	Report delivered within 6 months of Project 1 completion.	01.07.2030

Project no.	Project Aim	Alignment with the National Malleefowl Recovery Plan Strategy	Details	Targets	Deliverables	Contingency	Delivery Date	
					for progressing the translocation programme.			
2	Use camera-trapping to quantify how frequently Malleefowl and other animals use habitat links and restored habitat	Section 1.1.3 (Increasing Malleefowl Habitat)  Section 1.2.2 (Monitoring and increasing corridors and connecting isolated patches)	Project 2 will involve the following:	5 sites identified. NACC NRM re-vegetation site funded by Crimson Metals will be one of up to 5 sites across Australia targeted for this research.	Desktop review to determine appropriate sites for study (Up to 5 sites selected across WA, SA, Vic). Back up sites also detailed.	Minimum 2 sites already selected. NACC NRM Site and a Victorian Site just below the Big Desert (is being LIDAR'd this month).  If sites are deemed inappropriate for any research the desktop review will detail backup sites to be engaged.	01.07.2026	
			a) examining the use of narrow habitat corridors by Malleefowl and other species in areas where habitat fragmentation poses a risk of inbreeding among isolated Malleefowl populations, particularly in regions that have been extensively cleared	Study Design developed.  Equipment purchased.  Targets for next 4 years set.	Camera Network defined and Study design delivered.  Purchase motion detecting cameras for each site, SD cards and batteries required.			
			b) describing the utilisation of rehabilitated habitat by fauna, particularly Malleefowl.	Study design implemented.  Malleefowl use of degraded/fragmented land is defined. Comprehensive annual reporting.	Installation of Camera network across 5 sites.  Photos collected routinely and analysed. Report delivered to CMM annually on Malleefowl and other fauna detections and habitat use.			
			-	Comprehensive final report assessing data collated over the term of Project 2.	Final year report delivered to CMM on the utilisation of the rehabilitated land by Malleefowl and other fauna.			Report delivered within 6 months of Project 2 completion.
3	To determine the benefit of reducing the abundance of introduced predators, particularly foxes, on Malleefowl populations	Section 4.1 (Management and monitoring of feral predation)	Project 3 will involve coordinating and revitalising the national adaptive management predator experiment project	Add a new control and treatment site within the Mt Gibson Gold Project site.	Project review on status of the sites and establish new sites where required. Photos collated annually.	Where sites or partners are unresponsive or disinterested. We will determine new sites or potential locations in the first-year project review. This can be implemented as required.	01.07.2026	
				Purchase and install new cameras where required.				
				Review to determine whether Felixers can be added to the study.	First year report delivered to Crimson Metals on collated photos and baiting regimes.  Draft analysis from Dr Darren Southwell.			N/A
				Partner meetings (2 per year)  Draft Analysis delivered to CMM and Federal Government	Bi-annual meeting with partners to coordinate efforts.	Sites review each year for responsiveness and collaboration.  Implementing new sites if required.	01.07.2027  01.07.2028	

Project no.	Project Aim	Alignment with the National Malleefowl Recovery Plan Strategy	Details	Targets	Deliverables	Contingency	Delivery Date
				<p>Procure Felixers units based on Year 1 desktop assessment and consultation with Proprietor</p> <p>Additional data capture provides definitive evidence of Malleefowl response to presence/absence of feral predators</p>	<p>Data analysis annually by Dr Darren Southwell.</p> <p>Felixer units deployed in Year 2.</p>	In year 5, re-assess continuation of the Adaptive Management Predator Experiment if data provides inconclusive results.	01.07.2029 01.07.2030
				Comprehensive final report assessing data collated over the term of Project 3.	Final Report to Crimson Metals of findings and finalised analysis by Dr Darren Southwell.	Report delivered within 6 months of Project 3 completion.	01.07.2030

#### 6.2.4 Indirect Offset 2: *Idiosoma* ARC Linkage Project

Whilst not considered a significant residual impact (Table 52), it is acknowledged the impacts to *Idiosoma kopejtkaorum* (listed as *Idiosoma nigrum*) from loss of habitat and potential genetic impacts from Proposal implementation are uncertain. As a result, the Proponent has committed to participate as an Industry Partner in research to informing the conservation and impact assessment of trapdoor spiders in Western Australia, to be undertaken by research scientists from the Western Australian Museum, Department of Biodiversity, Conservation and Attractions (DBCA, State of WA) and associated research and industry partners. The Proponent has entered into an agreement to provide a total \$400,000 direct and up to \$120,000 in-kind financial support to this research program over its four year period, commencing in 2027. Key research initiatives for this program include:

1. Improving detectability and identification by developing and testing a mobile application for burrow recognition, increasing public DNA barcode reference libraries, expanding silk sampling and sequencing program for rapid, non-lethal species identification, training and trialing conservation dogs for detecting trapdoor spider burrows;
2. Characterisation of population sizes and structure by implementing survey innovations from initiative one to detect, identify and monitor populations and characterise population sizes and trends across time, characterise population structure and connectivity for key species using next generation genetic sequencing and analyses;
3. Quantifying the potential impacts of development by assessing long-term and cumulative effects of historical and current activities on movement, connectivity, and diversity, in heavily fragmented landscapes of southern WA, the importance of connectivity corridors in fragmented landscapes (e.g. via road reserves), the potential impacts of new developments in landscapes undergoing current exploration, including whether infrastructure creates barriers to movement/dispersal between populations, whether there are effects of noise and vibration from development activities, whether buffer zones (and buffer sizes) are required to reduce such effects;
4. Trialing mitigation strategies such as testing critical microhabitat requirements for target species to inform the identification of potential offset sites, or key areas of high-quality habitat and species diversity that would be best to avoid, microhabitat enhancement (e.g., addition of soil/leaf litter, provision of shading mid/understorey vegetation) and restoration during and after development, recolonisation and translocations of populations, including relocation out of development impact areas, assisted recolonisation into previously occupied areas (e.g. rehabilitated sites), and translocations for genetic rescue and/or restoration of breeding in small, isolated populations.

The Proponent recognises that the research streams associated with this program will significantly advance the understanding of *Idiosoma* spp. ecology and biology in the mid-west region of Western Australia, providing critical information for the development of impact mitigation strategies that will give increased certainty and efficiency for proponents and Government agencies to assess and mitigate the potential impacts of development.

### 6.3 Direct Offsets Risk Assessment

An overarching risk assessment has been undertaken that defines the potential risks to not achieving successful implementation of the key Direct Offsets (Table 71). The assessment was conducted utilising the risk likelihood, consequence and rating tables defined in Section 5.1.

**Table 71: Environmental Direct Offsets Risk Assessment**

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Direct Offset 1: Revegetation of Malleefowl Habitat in Degraded Wheatbelt Agricultural Land</b>											
<b>Non-delivery by a partner due to financial or other issues (e.g. a partner falling into administration, or disbandment of a partner)</b>	Rare	Moderate	Low	<p>Secure an Offset Partner with a history of long-term planning and execution of similar work programs with sound governance processes</p> <p>Offset Partner agreement allows for changes in costs in executing the program using mutually agreed cost/progress review intervals to inform/update forward looking work program and cost estimates</p> <p>Quarterly reviews on progress by 3rd party to identify any shortcomings and recommend next steps</p>	Rare	Moderate	Low	No missed revegetation targets due to lack of finances	<p>Partner is placed into administration or unable or is disbanded</p> <p>Results of 3rd party reviews of revegetation implementation</p>	<p>Proponent will take ownership of completed revegetation works</p> <p>New revegetation delivery partner will be sourced</p> <p>Reporting to DCCEE</p>	As per Table 64.
<b>The effects of climate change on measures and overall offset success (e.g. more frequent anomalous seasons)</b>	Likely	Moderate	Medium	<p>Revegetation will be planned based around climate change scenarios and account for likely reduced rainfall events.</p> <p>Long term condition monitoring of restored land</p> <p>Early identification of over/under achieving expected revegetation rates will be possible using this method</p> <p>Annual reviews on progress by 3rd party to identify any shortcomings and recommend next step</p>	Unlikely	Moderate	Low	As per Table 64	Targets (Table 64) not met.	<p>Review of Revegetation Plan and species list</p> <p>Additional seeding/ planting of flora species</p>	As per Table 64.

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Risk of significant damage due to bushfire to revegetation areas.</b>	Possible	Major	High	<p>Appropriate fire suppression appliances and equipment will be maintained on site and employees trained in their use</p> <p>Co-operation agreements with neighbours with respect to emergency services and firefighting resources</p> <p>Flammable materials will be stored onsite and handled in accordance with the applicable safety standards</p> <p>During the bushfire season, the fire danger status will be monitored daily through the State managed (DFES) website</p> <p>For “hot-work” activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions</p> <p>Access tracks and fence lines used as firebreaks within the Proposal regularly maintained</p> <p>Establishment and maintenance of fire breaks, if required, in accordance with Local Government Fire Hazard Reduction Notice</p> <p>Land selected for revegetation of the 700-800Ha will not be contiguous, reducing likely impact of any individual event</p>	Possible	High	Medium	<p>No uncontrolled or unplanned fires occur</p> <p>Vegetation fuel loads are maintained at sustainable levels</p> <p>No loss of revegetation areas due to fire originating from revegetation areas</p>	<p>Fires originating from revegetation areas impact revegetation sites and surrounding vegetation</p> <p>Fires originating outside of revegetation areas impact revegetation areas</p>	<p>Post-fire recovery actions will be implemented (e.g. seeding/ planting, weed control)</p> <p>An additional 100 ha of revegetation above that required to achieve the offset value provides redundancy against loss of areas to fire</p> <p>Reporting to DCCEE</p>	As per Table 64.
<b>Failure of Malleefowl to colonise restored habitat.</b>	Possible	High	Medium	<p>Revegetation is completed utilizing vegetation known to be foraging and breeding habitat for Malleefowl</p> <p>Revegetation areas will be located within the known distribution of Malleefowl and where regional records and breeding are known to occur</p>	Unlikely	Major	Medium	<p>Malleefowl occurrence observed by year 10 at any revegetation</p> <p>Malleefowl occurrence and ongoing use of revegetation areas observed by years 15-20 across 50% of revegetation sites</p>	<p>No Malleefowl occurrence observed by year 20 across any revegetation site</p>	<p>Investigation into absence of Malleefowl individuals</p> <p>Application of remedial actions based on investigation findings</p> <p>Reporting to DCCEE</p>	As per Table 64

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Failure to meet outcomes and commitments made by Crimson Metals. Eg due to going into receivership or transfer of ownership to other parties.</b>	Rare	Critical	Severe	<p>Continued good corporate and financial governance managed by high quality board</p> <p>Provisions for ensuring the ongoing security of the Offsets delivery should Crimson be conditioned in any purchase agreement with 3rd parties</p> <p>Proponent will work to ensure offset sites under revegetation are protected in perpetuity via Conservation Covenant with land holders.</p>	Rare	High	Low	<p>No missed revegetation targets due to lack of finances</p> <p>Offset requirements are legally binding on any future owner under section 145B of the EPBC Act</p>	Targets (Table 64) not met. Partner is placed into administration or unable or is disbanded	<p>'Transfer of Approval' request is submitted to DCCEEW</p> <p>Report to DCCEEW</p> <p>Where Conservation Covenants are not possible, proponent will look to transfer the land to a partner such as AWC for such protection or acquire sufficient land directly for the same purposes.</p>	As per Table 64
<b>Increasing competition for degraded land suitable for revegetation (e.g. carbon offsets for pastoralists)</b>	Likely	Moderate	Medium	<p>Offset Partner agreement allows for changes in costs in executing the program using mutually agreed cost/progress review intervals to inform/update forward looking work program and cost estimates</p> <p>Quarterly reviews on progress by 3rd party to identify any shortcomings and recommend next steps</p>	Likely	Minor	Low	700 ha of land rehabilitated	<p>Land access agreements are not on schedule</p> <p>Total area rehabilitated is behind schedule to deliver on offset requirements</p>	<p>Proponent will acquire sufficient land directly for the same purposes</p> <p>An additional 100 ha of revegetation above that required to achieve the offset value provides redundancy against loss of areas due to land availability</p>	As per Table 64
<p><b>Ineffective revegetation</b></p> <p><b>Poor planning and ineffective methods of conducting revegetation work can result in unstable, poorly performing landforms, including poor vegetation cover which can subsequently result in slope instability and ongoing erosion issues.</b></p> <p><b>Habitat values are not returned following rehabilitation</b></p>	Likely	High	High	<p>Undertake rehabilitation as per the Revegetation Management Plan</p> <p>Any seeding or planting undertaken during rehabilitation will use species of local provenance</p> <p>An additional 100 ha of revegetation above that required to achieve the offset value provides redundancy in case of revegetation failures in other areas</p>	Unlikely	High	Medium	Completion criteria (Table 64) are achieved.	Targets (Table 64) not met.	<p>As required by circumstance limiting achievement, e.g. remedial earthworks, application of matting/erosion control products, additional seeding on rehabilitated areas with local, native seed species, further analysis of areas showing poor rehabilitation performance</p> <p>Report to DCCEEW</p>	As per Table 64

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<p><b>Stakeholders / Collaborators (including land holders) withdraw or fail to engage including:</b></p> <p><b>non completion of services</b></p> <p><b>incomplete outcomes</b></p> <p><b>activities are misaligned to recovery plans or state conservation objectives</b></p>	Possible	Moderate	Medium	<p>Utilisation of a communication and community engagement plan for the applicability of stakeholder needs and expectations</p> <p>Early consultation and leverage of existing relationships enacted to ensure engagement. Activities will be organised in conjunction with community groups to maximise exposure and attendance</p>	Possible	Minor	Low	<p>Achievement of 700 ha revegetation target</p> <p>Land access agreements on schedule</p>	<p>Failure to acquire 800 ha of land</p> <p>Land access agreements are not on schedule</p>	<p>Proponent will acquire sufficient land directly for the same purposes.</p> <p>An additional 100 ha of revegetation above that required to achieve the offset value provides redundancy against loss of areas due to stakeholder withdrawal</p>	<p>Annual review of acquired land and revegetation progress</p> <p>Annual review of contract/ stakeholder management</p>
<p><b>Failure to deliver project services and failure to achieve key milestones including:</b></p> <p><b>non completion of services</b></p> <p><b>incomplete outcomes</b></p> <p><b>ineffective project or activity design</b></p> <p><b>non-compliance with permits/ license</b></p> <p><b>budget exceedance</b></p>	Possible	Major	High	<p>NACC NRM experience in delivering a (larger scope) 5 year program over the 2018-2023 period</p> <p>Work associated with project services will be mapped and planned in collaboration with stakeholders and developed from an informed position to ensure timely delivery through agreed framework as established in co-design</p> <p>Early engagement with stakeholders to identify and prepare foundational materials in a consistent manner and approach. NACC NRM maintains established contract and project management tools, which will be utilised to ensure that project activities are delivered on schedule</p>	Unlikely	Moderate	Low	<p>Achievement of 700 ha revegetation target</p> <p>Revegetation achieves quality score of 7</p> <p>Malleefowl occurrences observed within revegetation areas</p>	<p>Failure to acquire 800 ha of land</p> <p>Revegetation quality fails to achieve a score of 7 by year 20</p> <p>No occurrences of Malleefowl are observed by year 10</p>	<p>Investigation into quality drop</p> <p>Application of remedial actions based on investigation findings</p> <p>Report to DCCEEW</p> <p>An additional 100 ha of revegetation above that required to achieve the offset value provides redundancy in case of revegetation failures in other areas.</p>	<p>Annual review of acquired land and revegetation progress</p> <p>Annual assessment of habitat conditions against DCCEEW approved guidelines or conservation advice</p> <p>Other monitoring actions as per Table 64</p>

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Direct Offset 2: WA Wheatbelt Woodlands TEC Averted Loss via Mummaloo Iron Ore Project Acquisition</b>											
<b>Failure to maintain existing vegetation values</b>	Possible	High	High	<p>Adequate baseline surveys completed</p> <p>Encouragement of natural regeneration and actively identify patches of poor to moderate habitat quality and implement restoration to a high quality within the first two years. This is inclusive of restoring degraded patches to meet improved quality scores</p> <p>Maintenance of existing hydrology schemes that support current ecosystem functions</p>	Unlikely	High	Medium	Habitat quality is maintained (Quality Score of 8)	Habitat quality drops 1 point	<p>Investigation into quality drop</p> <p>Application of remedial actions based on investigation findings</p> <p>Reporting to DCCEEW</p>	<p>Annual assessment of habitat conditions against DCCEEW approved guidelines or conservation advice</p> <p>Additional monitoring as per Table 68</p>
<b>The effects of climate change on measures and overall offset success (eg more frequent anomalous seasons)</b>	Unlikely	Moderate	Low	<p>The degree to which climate change may impact the mature (virgin) Mummaloo TEC is unknown, however it is considered likely that, being mature woodland, its resilience to the possible impact of climate change is as good as could be expected</p> <p>Implement the management actions defined in Table 67 to prevent other threats (weeds, fire) reducing the resilience of the WA Wheatbelt Woodlands TEC to withstand the effects of climate change</p>	Unlikely	Moderate	Low	Habitat quality is maintained (Quality Score of 8)	Habitat quality drops 1 point	<p>Investigation into quality drop</p> <p>Application of remedial actions based on investigation findings</p> <p>Report to DCCEEW</p>	<p>Annual assessment of habitat conditions against DCCEEW approved guidelines or conservation advice</p> <p>Additional monitoring as per Table 68</p>

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Risk of significant damage to TEC due to bushfire</b>	Possible	Major	High	<p>Development of a Habitat Maintenance Plan</p> <p>The Mummaloo TEC location comprises 7 separate lots spread over a strike length of over 5.5 km, thus reducing the risk of catastrophic fire in all locations in all but major outbreaks</p> <p>Appropriate fire suppression appliances and equipment will be maintained on site and employees trained in their use.</p> <p>Co-operation agreements in place with neighbours (eg AWC) to assist resourcing in bushfire for and during events.</p> <p>Flammable materials will be stored onsite and handled in accordance with the applicable safety standards</p> <p>For "hot-work" activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions</p> <p>Access tracks and fence lines used as firebreaks within the Proposal regularly maintained.</p> <p>Establishment and maintenance of fire breaks, if required, in accordance with Local Government Fire Hazard Reduction Notice</p>	Possible	High	Medium	No uncontrolled or unplanned fires occur	<p>Fires originating from Mummaloo offset site impact surrounding vegetation</p> <p>Fires originating outside of Mummaloo offset site impacts vegetation within the Mummaloo offset site</p>	Post-fire recovery actions will be implemented	<p>Annual assessment of habitat conditions against DCCEEW approved guidelines or conservation advice</p> <p>Additional monitoring identified as per Table 68</p>

Risk	Likelihood	Consequence	Initial Risk Rating	Management actions	Likelihood	Consequence	Residual Risk Rating	Performance Criteria	Triggers	Corrective Actions	Monitoring
<b>Failure to meet outcomes and commitments made by Crimson Metals. Eg due to going into receivership or transfer of ownership to other parties.</b>	Rare	Major	Medium	<p>Continued good corporate and financial governance managed by high quality board</p> <p>Provisions for ensuring ongoing security of Offsets delivery should Crimson be conditioned in any purchase agreement with 3rd parties</p> <p>Proponent will work to ensure offset sites under revegetation are protected in perpetuity via Conservation Covenant or similar</p>	Rare	High	Low	<p>Tenure is held by and maintained by Crimson Metals</p> <p>Habitat quality is maintained (Quality Score of 8)</p>	<p>Crimson Metals is required to sell tenure ownership</p> <p>Habitat quality drops 1 point or more</p>	<p>Investigation into quality drop</p> <p>Application of remedial actions based on investigation findings</p> <p>Report to DCCEEW</p> <p>Where Conservation Covenants are not possible, proponent will look to transfer the land to a partner such as AWC for such protection or acquire sufficient land directly for the same purposes</p>	<p>Annual assessment of habitat conditions against DCCEEW approved guidelines or conservation advice</p> <p>Additional monitoring as per Table 68</p>
<b>Certainty of TEC area being protected from clearing/grazing activities for the long term</b>	Possible	High	Medium	<p>Development of a Habitat Maintenance Plan</p> <p>Education and awareness to employees and neighbours on the use of the area for conservation</p>	Unlikely	Moderate	Low	<p>Habitat quality is maintained (Quality Score of 8)</p>	<p>Habitat quality drops 1 point</p>	<p>Investigation into quality drop</p> <p>Application of remedial actions based on investigation findings</p> <p>Report to DCCEEW</p>	<p>Annual assessment of habitat conditions against DCCEEW approved guidelines or conservation advice</p> <p>Additional monitoring as per Table 68</p>

## 6.4 Consideration of EPBC Offset Policy Principles

The strategy for compensating for significant residual impacts to MNES resulting from the Proposal is consistent with the ten offset principles outlined in the Commonwealth Environmental Offsets Policy (DSEWPaC, 2012). Table 72 summarises how the ten principles were considered in developing the offset strategy.

**Table 72: Accordance with the EPBC Act Environmental Offsets Policy**

Environmental Offsets Principle	Consideration
<p><b>1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action</b></p>	<p>The proposed offset strategy has been prepared to compensate for the residual impacts on two protected matters:</p> <ul style="list-style-type: none"> <li>• WA Wheatbelt Woodlands</li> <li>• <i>Leipoa ocellata</i> (Malleefowl)</li> </ul> <p>The proposed offset strategy will achieve an overall conservation outcome that improves or maintains the viability of these protected matters through:</p> <ul style="list-style-type: none"> <li>• Restoring no less than 700 ha of land within the regional area that will ensure the restoration of native vegetation communities and ecosystems, rather than non-native ones.</li> <li>• By committing to a future quality that is equal to, or greater than, the quality of the impact site, and which is to be attained by the nominated time until ecological benefit and then maintained for the duration of the impact, and where possible, placed into a conservation covenant.</li> <li>• Acquisition of Mummaloo Iron Ore Project and associated tenure, which will protect vegetation that comprises WA Wheatbelt Woodlands TEC.</li> <li>• Enhancing habitat value immediately adjacent to and within the local area of the Proposal through managing threatening processes (e.g. feral predators, weeds) and undertaking targeted rehabilitation.</li> <li>• Provision of funding to ensure actions contained within National Recovery Plans and Conservation Advice are progressed</li> <li>• Support of local conservation groups to maintain and improve the habitat currently supporting the identified protected matters to ensure an improved conservation outcome is achieved within the regional area.</li> </ul> <p>It should be noted, and with reference to the National Malleefowl Recovery Plan, that these funded initiatives are crucial to the long-term viability of Malleefowl, as they ensure that projects captured within the National Recovery Plan are either commenced or continued in the absence of other funding sources and directly support</p>

Environmental Offsets Principle	Consideration
	<p>the objectives of the National Recovery Plan, which are that by 2033:</p> <ul style="list-style-type: none"> <li>• The Malleefowl population is stable or increasing across the species' range.</li> <li>• The occupancy of habitat by the Malleefowl has been maintained or increased throughout the species' range.</li> <li>• The genetic integrity of isolated populations is maintained.</li> </ul>
<p><b>2. Be built around direct offsets but may include other compensatory measures</b></p>	<p>As defined by DCCEEW, direct offsets... 'provide quantifiable and tangible conservation benefits to the impacted protected matter. They do this by undertaking actions specifically designed to improve environmental outcomes in the immediate future.' In the context of the proposed offset approach the following aspects are considered direct offsets:</p> <ul style="list-style-type: none"> <li>• Acquisition of Mummaloo Iron Ore tenure, which will protect Eucalypt Woodland TEC vegetation.</li> <li>• Revegetation of no less than 700 ha of degraded agricultural land within the local region, targeting fragmented and previously cleared areas to establish, maintain, and enhance habitat for Malleefowl.</li> </ul> <p>Significant indirect offsets include:</p> <ul style="list-style-type: none"> <li>• Undertaking feral predator control (in conjunction with AWC) and provision of funding for the deployment of felixer cat control units.</li> <li>• Funding to AWC and GRCA will result in direct habitat enhancement actions being undertaken that are otherwise not funded or able to be readily implemented.</li> <li>• Funding of the NMRG research programs for 5 years to inform long term Malleefowl actions at a national level.</li> <li>• Funding of an ARC Linkage research project in to the biology and conservation of Idiosoma species.</li> </ul> <p>The provision of the Biodiversity Funding will also result in several indirect offset initiatives being undertaken. While it is acknowledged that a large proportion of the offsets package facilitates compensatory measures, it should also be noted that there is an overall lack of land available for purchase as a direct offset in the regional area to meet the needs of MNES under threat. Therefore, the biodiversity funding proposed will include measures that are compensatory to direct offsets but will still achieve an overall net enhancement gain through:</p>

Environmental Offsets Principle	Consideration
	<ul style="list-style-type: none"> <li>• Direct management of threatening processes (e.g. weeds, fire and feral predators).</li> <li>• Bespoke research projects, which will enhance knowledge and ability to undertake future conservation actions, with the robust science expected by DCCEE, will be demonstrated. This is currently a significant gap in undertaking most restoration actions, and in the absence of this support coming from areas such as the Government, must be progressed via these mechanisms.</li> <li>• Proactive engagement and education with the local community, including indigenous ranger groups.</li> </ul> <p>In addition, the Proponent will rehabilitate a minimum of 608 ha of the IWL utilising key Malleefowl breeding and foraging flora species from VSA 1 and VSA 2 to provide habitat that once established, has the potential to encourage Malleefowl foraging.</p>
<p><b>3. Be in proportion to the level of statutory protection that applies to the protected matter</b></p>	<p>The Proponent offset requirement was calculated using the Commonwealth Offsets Calculator. This Calculator factors the level of statutory protection into the determination of the area required and nature of the offset. As such, the offset strategy is expected to be suitable and in proportion to the level of statutory protection applied to the three protected matters. The Proponent acknowledges that the WA Wheatbelt Woodland TEC is listed as 'Critically Endangered' under the EPBC Act and, in noting this, has ensured that the offset strategy achieves 100% of the offset requirement being met.</p>
<p><b>4. Be of a size and scale proportionate to the residual impacts on the protected matter</b></p>	<p>For Malleefowl, listed as 'Vulnerable', the Proponent has developed an offset strategy that comprises both direct offsets and other compensatory measures, provided through direct funding to local NGOs with demonstrated experience in undertaking conservation actions that benefit the species, ensuring a net conservation gain is achieved within the regional area. Additionally, some of the projects to be funded through the NMRG will benefit Malleefowl populations nationwide.</p> <p>The proposed offset strategy is considered sufficiently proportionate when considering the regional extent of habitat remaining for the three protected matters and the likely residual impacts.</p> <p>Financially, the size of the offset strategy will total (over the life of the Proposal):</p> <ul style="list-style-type: none"> <li>• Malleefowl direct offset (NACC NRM) \$4.75 Million through habitat restoration.</li> </ul>

Environmental Offsets Principle	Consideration
	<ul style="list-style-type: none"> <li>• TEC averted loss direct offset through the acquisition of the Mummaloo Iron Ore tenure of \$1.6 Million.</li> <li>• Malleefowl indirect offset through biodiversity funding to the NMRG of \$1 Million.</li> <li>• Improved regional conservation outcomes not included in offsets calculation as a result of conservation collaboration with the AWC and GRCA totalling \$6.9 Million.</li> </ul> <p>As described previously, the Biodiversity Funding will ensure that conservation actions are undertaken throughout the regional area for all three protected matters. Additionally, funding specific programs related to Malleefowl research will benefit populations nationwide, ensuring the scale of offsets is equivalent to or greater than the residual impact likely to occur.</p>
<p><b>5. Effectively account for and manage the risks of the offset not succeeding</b></p>	<p>By partnering with experienced organisations with a track record of successfully delivering conservation programs, the Proponent believes the overall risk of the offset strategy not succeeding is low. Agreements entered into by the Proponent and the identified NGOs contain contingency provisions if any of the proposed offset actions do not succeed. These provisions include, but are not limited to, ensuring that funding can be directed to alternative offset programs or locations.</p> <p>Regarding revegetation, specific plans will be prepared for each identified area utilising the approved NACC NRM revegetation plan at Appendix S. These plans will include a detailed risk assessment, identify access criteria and describe appropriate mitigation actions tailored to each site.</p>
<p><b>6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action)</b></p>	<p>None of the projects to be funded through any of the identified NGO groups are required under law, regulations, or existing approval conditions. Funding to be provided to the NMRG will ensure that projects that have either not commenced or stopped due to funding constraints are progressed. Indigenous organisations, communities and individuals have a greater role in Malleefowl conservation.</p> <p>The acquisition of any land or tenure by the Proponent is also not a legal requirement or obligation of any other regulation.</p>
<p><b>7. Be efficient, effective, timely, transparent, scientifically robust and reasonable</b></p>	<p>The proposed offsets present the most efficient means of ensuring effective and scientifically robust offsets are implemented. The offset strategy aligns with this principle through:</p> <ul style="list-style-type: none"> <li>• Allocating resources, including any required for management and monitoring, in an efficient manner that maintains or improves the viability of the Malleefowl and WA Wheatbelt Woodlands TEC.</li> </ul>

Environmental Offsets Principle	Consideration
	<ul style="list-style-type: none"> <li>• Implementing offsets before, or at the same time as, the impact occurring.</li> <li>• Being based on scientifically robust and verifiable information, including published peer reviewed studies, the Australian Government's Species Profile and Threats Database, expert opinion and field-collected data from the local area.</li> <li>• Implementing the Precautionary Principle if there is not scientific certainty.</li> <li>• Having realistic offset commitments and completion criteria that are likely to be achieved despite any potential threats or risks.</li> </ul>
<p><b>8. Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.</b></p>	<p>The offset strategy aligns with this principle through:</p> <ul style="list-style-type: none"> <li>• Detailing governance over the identified revegetation/restoration sites within individual restoration management plans, including ensuring that offset actions are fully funded for the required timeframe.</li> <li>• Committing to measure and monitor the performance of the offset with implementation partners, and annual performance and compliance reporting (post approval) to the DCCEE, with documentation published on the company website for public access.</li> <li>• Delivering the offset through contractual arrangements with a third party that require annual performance reporting.</li> <li>• Ensuring that offset commitments are measurable and specific through contract agreements and management plans that specify performance criteria and timeframe for implementation, so that they can be audited and enforced.</li> </ul>

## 6.5 Annual Compliance Reporting

In accordance with the EPBC Act requirements, a compliance report will be prepared and made accessible by the Proponent on an annual basis post approval of the Proposal for the time of the offset period (20 years). The annual compliance report will address how the conditions of the offsets, environmental outcomes, or targets are met and the progress on management actions during the 12-month period.

Any non-compliance with the conditions of the offsets will be made transparent within the document. The Proponent will also have a chance to address how effective management actions have resulted in or led to the completion criteria being met or exceeded.

The annual compliance report is adapted to document evidence that is both measurable and transparent. A copy will be provided to the DCCEE at the time of publishing and stored for periodic technical review and evaluations of the monitoring program and timeframes for implementing program components. A relevant review committee, including a suitably qualified ecologist, will undertake the periodic technical review and evaluation of the plan. Technical reviews will address, at a minimum, monitoring risks and response to risk levels and changing circumstances.

## 7 Environmental Outcomes

Environmental outcomes for MNES for the Proposal are detailed in Table 73 and have been developed based on the baseline data detailed in Section 4. The outcomes have been developed in consideration of the outcome-based conditions policy (DoE, 2016a) and outcome-based conditions guidance (DoE, 2016b) and the relevant recovery plans and conservation advice for each MNES based on the key threats identified in Section 4. The Proponent is willing to achieve these outcomes and will engage with the relevant qualified contractors/consultants to support achieving them.

The Proposal will also be subject to other approvals and conditions, as outlined in Section 8, which will also adequately manage potential impacts to MNES.

### 7.1 Record keeping

The Proponent will be responsible for overseeing and managing the monitoring activities required to achieve the outcomes listed in Table 73, including maintaining data records to confirm all associated activities have been undertaken as outlined in the PER and/or any approval conditions. These records will be made available to DCCEE as required.

### 7.2 Reporting and Audit

A performance audit against achieving the target outcomes will be undertaken annually. The results of the audit will be included as an Appendix in the Annual Compliance Report post approval which will report on compliance with the EPBC Act approval and be publicly available on the Proponents website.

Internal audits/reviews of management and monitoring activities will be undertaken in response to triggers (outlined in Table 39) being met and non-compliances with the environmental outcomes (outlined in Table 73). Following this internal audit/review, amendments to management actions, identification of additional monitoring activities and responses to adaptive management triggers may be undertaken. Any changes will be approved by the Minister prior to implementation.

External auditing will be undertaken as required by the approval conditions and will be published in annual compliance reports that will include details on the progress towards achieving the performance criteria outlined in Table 73.

**Table 73: Proposal MNES Environmental Outcomes**

MNES factor	Target outcome	Risks	Measurability	Baseline data	Likely impacts	Willingness and capability	Auditing	Management
<b>Malleefowl</b>	A local reduction in habitat and an overall increase in habitat regionally due to the implementation of direct offsets.	<ul style="list-style-type: none"> <li>Unauthorised clearing of vegetation outside approved boundaries results in impact to MNES or their habitat</li> <li>Feral predators, (predominately cats and foxes which are found throughout the region) are attracted to Proposal rubbish and waste, leading to increased populations of the feral predators and subsequent impact to MNES fauna.</li> <li>Hot work use or vehicle movement results in unplanned fires, altering natural fire regime and impacting MNES or habitat.</li> </ul>	<p>The Offset Service Agreements outline responsibilities, timeframes and monitoring and evaluation requirements</p> <p>Bi-annual drone survey/multispectral imaging</p> <p>Annual review of AWC feral fauna eradication results</p>	Baseline data on the presence of Malleefowl and habitat was assessed through field assessments as part of this PER (refer to Table 19)	<p>Potential impacts on Malleefowl have been assessed through this PER.</p> <p>Impacts addressed by this outcome include:</p> <ul style="list-style-type: none"> <li>Habitat clearing and degradation</li> <li>Invasive species including feral predators</li> <li>Bushfire risk</li> </ul>	The Proponent is willing to achieve this outcome and has engaged qualified ecologists to assist with offset implementation.	<p>Offset Partners will provide progress reports to the Proponent.</p> <p>Compliance with environmental requirements will be audited the Proponents Environmental Manager or suitably qualified delegate.</p> <p>The Proponent will submit reports on compliance as required by DCCEEW.</p>	<ul style="list-style-type: none"> <li>Offset measures as described in Section 6.2.1.</li> </ul> <p>An additional 100 ha of agricultural land above the 700 ha direct offset requirement will be secured for revegetation</p> <p>Offset Site Revegetation Management Plan (Appendix S)</p> <p>MNES Environmental Management Plan (Appendix Q)</p> <p>MGGP Environmental Management Plan (Appendix R)</p> <p>Management measures as described in Section 5.3 and Rehabilitation as described in Section 5.4</p>
	No reduction in Malleefowl population size outside the Disturbance Footprint (number of active mounds as an indicator) as a result of Proposal implementation.	<ul style="list-style-type: none"> <li>Unauthorised clearing of vegetation outside approved boundaries results in impact to MNES or their habitat</li> <li>Feral predators, (predominately cats and foxes which are found throughout the region) are attracted to Proposal rubbish and waste, leading to increased populations of the feral predators and subsequent impact to MNES fauna.</li> <li>Hot work use or vehicle movement results in unplanned fires, altering natural fire regime and</li> </ul>	<p>Annual monitoring of Rank 1 to Rank 3 mounds to determine activity</p> <p>Annual motion camera monitoring of active Malleefowl mounds</p> <p>Annual feral predator camera trap assessments</p> <p>Data collaboration with AWC</p>	Baseline data on the presence of Malleefowl and feral predators was assessed through field assessments as part of this PER (refer to Table 19)	<p>Potential impacts on Malleefowl have been assessed through this PER.</p> <p>Impacts addressed by this outcome include:</p> <ul style="list-style-type: none"> <li>Habitat clearing and degradation</li> <li>Invasive species including feral predators</li> <li>Bushfire risk</li> <li>Fauna mortality</li> </ul>	The Proponent is willing to achieve this outcome and has engaged qualified ecologists to support this PER and ongoing monitoring of Malleefowl populations	<p>Compliance with environmental requirements will be audited by the Proponents Environmental Department and/or suitably qualified external specialists.</p> <p>The Proponent will submit annual reports on approval condition compliance as required by DCCEEW.</p>	<p>MNES Environmental Management Plan (Appendix Q)</p> <p>MGGP Environmental Management Plan (Appendix R)</p> <p>Management measures as described in Section 5.3.</p>

MNES factor	Target outcome	Risks	Measurability	Baseline data	Likely impacts	Willingness and capability	Auditing	Management
		<p>impacting MNES or habitat.</p> <ul style="list-style-type: none"> <li>Increased road traffic, open trenches or vegetation clearing, results in mortality of MNES fauna.</li> </ul>						
<p><b><i>Idiosoma kopejtkorum</i></b> (listed as <b><i>Idiosoma nigrum</i></b>)</p> <p><b>Chuditch</b></p> <p><b>Southern Whiteface</b></p>	<p>No change in overall habitat quality outside the Disturbance Footprint as the PER demonstrates sufficient avoidance and mitigation measures to result in no detectable impact.</p>	<ul style="list-style-type: none"> <li>Unauthorised clearing of vegetation outside approved boundaries results in impact to MNES or their habitat</li> <li>Feral predators, (predominately cats and foxes which are found throughout the region) are attracted to Proposal rubbish and waste, leading to increased populations of the feral predators and subsequent impact to MNES fauna.</li> </ul>	<p>Progressive removal of no more than 1,213 ha of native vegetation within the Development Envelope.</p> <p>No impact to vegetation and habitat outside approved areas of disturbance.</p> <p>Pre and post clearing survey</p> <p>Quarterly drone aerial imagery</p> <p>Quarterly reconciliation of the Site Disturbance Permits issued vs. the actual area of disturbance.</p>	<p>Baseline data on the presence of <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>), Chuditch, Southern Whiteface and habitat were assessed through field assessments as part of this PER (refer to Table 19)</p>	<p>Potential impacts on <i>Idiosoma kopejtkorum</i> (listed as <i>Idiosoma nigrum</i>), Chuditch and Southern Whiteface have been assessed through this PER.</p> <ul style="list-style-type: none"> <li>Impacts addressed by this outcome include:</li> <li>Habitat clearing and degradation</li> <li>Invasive species including weeds and feral predators</li> </ul>	<p>The Proponent is willing to achieve this outcome and has engaged qualified ecologists and botanists to support this PER and ongoing monitoring of fauna habitat quality outside the Disturbance Footprint</p>	<p>Compliance with environmental requirements will be audited by the Proponents Environmental Department or suitably qualified delegate.</p> <p>The Proponent will submit reports on compliance as required by DCCEEW.</p>	<p>MNES Environmental Management Plan (Appendix Q)</p> <p>MGGP Environmental Management Plan (Appendix R)</p> <p>Management measures as described in Section 5.3.</p> <p>Implementation of Rehabilitation measures in Section 5.4 to reduce duration of habitat loss within the Disturbance Footprint</p>
<p><b>WA Wheatbelt Woodlands TEC</b></p>	<p>An overall minor reduction of 27.5 ha of TEC and an overall increase in TEC protection on secure tenure regionally due to the implementation of direct offsets.</p>	<ul style="list-style-type: none"> <li>Unauthorised clearing of vegetation outside approved boundaries results in impact to MNES or their habitat</li> <li>Dust emanating from mining related activities causes adverse impact to adjacent vegetation, including to MNES flora or vegetation.</li> <li>Saline water enters drainage lines, resulting in MNES flora or vegetation death, or changes in soil quality inhibiting MNES vegetation growth</li> </ul>	<p>Securement of tenure for Mummaloo to conserve (and prevent further disturbance to) this area of WA Wheatbelt Woodlands TEC.</p>	<p>Baseline data on the presence of WA Wheatbelt Woodlands TEC was assessed through field assessments as part of this PER (refer to Table 17)</p>	<p>Potential impacts to WA Wheatbelt Woodlands TEC have been assessed through this PER.</p> <ul style="list-style-type: none"> <li>Impacts addressed by this outcome include:</li> <li>Habitat clearing and degradation</li> <li>Changes to surface water conditions</li> <li>Dust</li> <li>Invasive species (weeds)</li> </ul>	<p>The Proponent is willing to achieve this outcome and has engaged qualified botanists to support this PER.</p>	<p>Compliance with environmental requirements will be audited the Proponents Environmental Department or suitably qualified delegate.</p> <p>The Proponent will submit reports on compliance as required by DCCEEW.</p>	<p>Offset measures as described in Section 6.2.2</p> <p>MNES Environmental Management Plan (Appendix Q)</p> <p>MGGP Environmental Management Plan (Appendix R)</p> <p>Management measures as described in Section 5.3.</p>

MNES factor	Target outcome	Risks	Measurability	Baseline data	Likely impacts	Willingness and capability	Auditing	Management
<b><i>Eremophila viscida</i></b>	Quality and quantity of <i>Eremophila viscida</i> critical habitat within 200 m of recorded individuals is maintained.	<ul style="list-style-type: none"> <li>Spread of existing weeds or introduction of new weeds results in adverse impacts to WA Wheatbelt Woodlands</li> <li>Bushfire started by mining activities</li> </ul>	<p>No reduction in the quality and quantity of <i>Eremophila viscida</i> populations or critical habitat inside the Development Envelope as a result of Proposal implementation.</p> <p>Bi-annual passive dust sampling programme</p> <p>Quarterly vegetation/flora health monitoring of <i>Eremophila viscida</i> critical habitat</p> <p>Annual weed survey</p> <p>Incident reporting</p>	Baseline data on the presence of <i>Eremophila viscida</i> was assessed through field assessments as part of this PER (refer to Table 17)	<p>Potential impacts to <i>Eremophila viscida</i> have been assessed through this PER.</p> <ul style="list-style-type: none"> <li>Impacts addressed by this outcome include:</li> <li>Habitat clearing and degradation</li> <li>Changes to surface water conditions</li> <li>Dust</li> <li>Invasive species (weeds)</li> </ul>			<p>MNES Environmental Management Plan (Appendix Q)</p> <p>MGGP Environmental Management Plan (Appendix R)</p> <p>Management measures as described in Section 5.3.</p>

## 8 Other Approvals and Conditions

The Proposal will be undertaken in accordance with the requirements of both Commonwealth and Western Australian legislation. The primary approvals for the Proposal are the approval under the EPBC Act (for which this PER has been prepared) and the State EP Act and Mining Act.

State and Local Government approvals and regulatory requirements applying to this Proposal are outlined in Table 74.

**Table 74: Other approvals**

Relevant Legislation	Approval	Environmental Factor/ Issue Regulated	Can statutory decision-making process provide for the prevention, minimisation and management of relevant impacts?
<b>WA State, Department of Water and Environmental Regulation - Environmental Protection Authority (EPA) Services</b>			
<b>Environmental Protection Act 1986 (Part IV)</b>	Ministerial Statement	Flora and Vegetation Subterranean Fauna Terrestrial Environmental Quality Terrestrial Fauna Inland Waters Greenhouse Gas Emissions	Yes.  Proposal referred to EPA July 2024 (APP 0025375)  The assessment considers impacts to flora, vegetation, fauna, land and surface waters, greenhouse gas emissions and terrestrial environmental quality.
<b>WA State, Department of Water and Environmental Regulation</b>			
<b>Environmental Protection Act 1986 (Part V)</b>  <b>Environmental Protection (Unauthorised Discharges) Regulations 2004</b>	Works Approval  Prescribed Premises Licence	Emissions and discharges to Air, Land and Water from a Prescribed Premises  Environmental Pollution  Inland Waters  Air Quality/GHG Emissions  Terrestrial Environmental Quality	Yes.  Prescribed Category 5 Processing or beneficiation of metallic or non-metallic ore >50,000 t/annum is the main category relevant to the Proposal and is associated with the construction, commissioning and operation of the processing plant.  DWER can adequately assess and regulate emissions from prescribed activities and the general operations such as noise, dust and waste water to the environment through prevention, mitigation and monitoring conditions imposed on Works Approval and Operating Licence permits.  Annual Audit Compliance Report confirming compliance to conditions of the Licence submitted to DWER for assessment.
<b>Environmental Protection Act 1986 (Part V)</b>  <b>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</b>	Clearing Permit  Clearing permits may be required to facilitate the completion of preliminary or minor works before and after formal Part IV approval is granted.	Terrestrial Fauna  Flora and Vegetation  Inland Waters  Terrestrial Environmental Quality	Yes  Assessment against the 10 Clearing Principles which considers impacts to flora, vegetation, fauna, land and surface waters from clearing activities.
<b>Rights in Water and Irrigation Act 1914 (RIWI Act)</b>	Licence to construct a bore (26D)  Licence to take groundwater (5C)	Abstraction of groundwater  Groundwater quality and quantity  Groundwater Dependent Ecosystems  Inland Waters  Flora and Vegetation  Subterranean Fauna	Yes.  A 5C application will be submitted with DWER assessing the potential impacts of the abstraction on the environment and other users. Groundwater Dependent Ecosystems are included by DWER in assessment of 5C application.  Once the 5C is approved, Licence holders are obligated to comply with their resource allocation and any conditions included in the licence. Licence holders are also required to use water efficiently and responsibly, minimising impacts on the water resource and to verify this through monitoring in accordance with an Approved Groundwater Operating Strategy.  Annual/Triennial reporting on compliance with the Operating Strategy submitted to DWER for assessment.

Relevant Legislation	Approval	Environmental Factor/ Issue Regulated	Can statutory decision-making process provide for the prevention, minimisation and management of relevant impacts?
<b>Contaminated Sites Act 2003</b>	Known or suspected contaminated sites.	Terrestrial Environmental Quality Inland Waters	Yes.  The identification and management of contaminated sites will be undertaken in accordance with the Contaminated Sites Act.
<b>Environmental Protection (Noise) Regulations 1997</b>	N/A	Noise Emissions Social Surroundings Human Health	Yes.  No sensitive receptors nearby. While not expected to be significant, the primary source of noise emissions from the Proposal is the Processing Plant and the design of the plant will be assessed under Part V of the EP Act to ensure noise emissions are minimised and do not result in significant impacts to any sensitive receptors.
<b>WA State, Department of Mines, Petroleum and Exploration (DMPE)</b>			
<b>Mining Act 1978</b>	Mining Proposal and Mine Closure Plan Programme of Works	Rehabilitation Social Surroundings Terrestrial Fauna Flora and Vegetation Terrestrial Environmental Quality Inland Waters Landforms	Yes.  Key legislation and Decision Making Authority regulating mining operations in Western Australia.  A Mining Proposal will be submitted to DMPE prior to any disturbance at the Proposal and will include auditable outcomes for key DMPE factors (Biodiversity, Water Resources, Land and Soils). These outcomes will be defined and approved by DMPE to ensure that the impacts on the key DMPE factors are mitigated to an acceptable level. In the context of landscape stability this will include an auditable outcome that the landscape will be safe and stable during mining to prevent slumps or collapsed walls which could have environmental impacts.  A Mine Closure Plan will be submitted to DMPE with the Mining Proposal prior to any disturbance at the Proposal and will be revised every three years or with subsequent Mining Proposal applications. It will include auditable closure and rehabilitation outcomes and criteria which will be defined and approved by DMPE to ensure that impacts on key DMPE factors are mitigated to an acceptable level.  Mining activities are rehabilitated and closed in a manner to make them physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/ non contaminating, and capable of sustaining an agreed post-mining land use, and without unacceptable liability to the State.  Environmental monitoring programmes during operations and for some time post closure will be conducted in accordance with the approved schedules to confirm the achievement of the set environmental outcomes.  Requires the proponent to undertake an appropriate level of Stakeholder identification and consultation throughout the Proposal stages.  Annual Environmental Report on compliance with tenement conditions, commitments made in the MP and MCP submitted to DMPE for assessment.
<b>Dangerous Goods Safety Act 2004</b>	Dangerous Goods Licence	Contamination of soils, groundwater and surface water (hydrocarbon spills) Fire risk (combustion of stored flammable goods) Terrestrial Environmental Quality Inland Waters	Yes.  The storage and management of hydrocarbons will already be regulated under the Mining Proposal / MCP however the Dangerous Goods (DG) Licence provides additional mitigation for the design and storage of larger volumes of dangerous goods (if large volumes of hydrocarbons (>100,000 L) are required to be stored on site).

Relevant Legislation	Approval	Environmental Factor/ Issue Regulated	Can statutory decision-making process provide for the prevention, minimisation and management of relevant impacts?
			A DG Licence sets standards for the way in which DGs are stored on site. These standards are aimed at ensuring DGs are stored safely and in such a way that will not result in impacts to the environment. Having a DG Licence ensures potential spills and combustion risks from the Proposal are mitigated.
<b>WA State, Department of Planning, Lands and Heritage (DPLH)</b>			
<b>Aboriginal Heritage Act 1972</b>	Section 18 Permit	Disturbance to matters of Aboriginal heritage significance  Social Surroundings	Yes.  Archaeological and Ethnographic heritage surveys were undertaken by the Badimia people (Badimia Land Aboriginal Corporation and Badimia Bandi Barna Aboriginal Corporation) and a number of culturally significant locations were identified.  Section 18 approval has been granted to impact two Artefact Scatter sites. A Heritage Agreement has been signed with the Badimia.
<b>WA State, Department of Biodiversity, Conservation and Attractions (DBCA)</b>			
<b>Biodiversity Conservation Act 2016 (BC Act)</b>	Section 40 Authorisation	Threatened Fauna	No  Section 40 Authorisation is required to allow the Proposal to take (via mortality during clearing or vehicle strikes) or indirectly disturb Threatened Fauna.

## 9 Consultation

### 9.1 Key stakeholders

The key stakeholders identified for the Proposal are detailed in Table 75.

**Table 75: Key stakeholders of the Proposal**

Stakeholder group	Stakeholder	Key interests
<b>WA State Government</b>	DWER - Environmental Protection Authority (EPA) Services	Administration of the EP Act.  Part IV (EP Act) Environmental Impact Assessments
	Department of Water and Environmental Regulation (DWER)	Contaminated sites  Prescribed Premises  Surface and Groundwater Management  Groundwater Licensing and Abstraction
	Department of Biodiversity, Conservation and Attractions (DBCA)	Administration of the BC Act.  Flora, fauna and ecological communities conservation
	Department of Mines, Petroleum and Exploration (DMPE)	Administers the Mining Act, Mining Rehabilitation Fund Act 2012 and associated regulations.  Assess Native vegetation clearing permits (Part V) EP Act on behalf of DWER for mineral resource projects  Mining Proposals, Mine Closure Plan, Programs of Work  Tenement conditions  Closure and rehabilitation  Safety
	Department of Planning, Lands and Heritage (DPLH)	Aboriginal heritage  Crown land administration  Heritage, cultural and archaeological sites
<b>Federal Government</b>	Department of Climate Change, Energy the Environment and Water (DCCEEW)	Administration of the EPBC Act.  Referral and assessment of environmental impact assessments of MNES
<b>Local Government</b>	Shire of Yalgoo	Road use

Stakeholder group	Stakeholder	Key interests
		Regional employment and economic growth
<b>Traditional Owners</b>	Badimia People	Heritage protection
		Employment and contracting opportunities
<b>Adjoining Tenure Holders</b>	Australian Wildlife Conservancy (AWC)	Owner of Mount Gibson Wildlife Sanctuary, adjoining tenements to the west, south and east of the Proposal.
<b>Offset Partners</b>	Australian Wildlife Conservancy (AWC)	Implementation of the relevant Offset Agreements
	Northern Agricultural Catchments Council (NACC) NRM	
	National Malleefowl Recover Group (NMRG)	
	Gundawa Regional Conservation Association (GRCA)	

## 9.2 Stakeholder engagement process

The Proponent believes effective stakeholder engagement is vital to the success of the Mt Gibson Gold Project. The Proponent's strategy is to engage openly with relevant stakeholders to develop co-operative and mutually beneficial relationships.

Stakeholder engagement commenced in 2021. Consultation to date has comprised mostly of meetings and correspondence with several state and federal departments and agencies, local government authorities, traditional owners and non-government organisations.

Through this engagement process, the Proponent has been able to identify the required studies and investigations and importantly, key social and environmental effects and associated mitigation and management strategies required to support this Proposal.

The Proponent is committed to ongoing stakeholder identification, communication, engagement and consultation through the planning and approval phase, and through to construction, operations and closure phases of the Proposal. The outcomes of the stakeholder engagement activities are recorded in a Stakeholder Consultation Register.

## 9.3 Stakeholder consultation

The key stakeholder consultation and engagement activities undertaken to date for the Proposal is provided in Appendix U.

## 9.4 Public comments

Public comments on the PER were invited to be made between the 13 October 2025 and 7 November 2025. Public comments that were received are provided in Appendix V, along with the Proponent responses.

## **10 Environmental Record of Person(s) Proposing to Take the Action**

Crimson is a wholly owned subsidiary of Capricorn Metals Ltd (Capricorn). Capricorn is an Australian based gold producer with operational activities in Western Australia occurring since 2021. The management team behind Capricorn Metals are very experienced, having worked together for numerous years across several successful gold companies and projects and has a demonstrated history of responsible environmental management at its' Karlawinda Gold Project in the Pilbara region of Western Australia.

There are no past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment, or the conservation and sustainable use of natural resources against Capricorn.

The Proponent operates under an Environmental Policy and Environmental Management Plan (Appendix R) and is committed to operating in an environmentally responsible and sustainable manner. The Proponent acknowledges that the Proposal has the potential to impact on the environment now and in the future. For this reason, the Proponent adopts a systematic approach to understand, avoid or minimise, manage and remediate the environmental impacts of its operations.

Implementation of the Proposal will be supported by an effective environmental management system to minimise potential environmental impacts (such as contamination of soil and water, or disturbance outside of approved areas), ensuring that the health, diversity and productivity of the environment are protected.

## 11 Economic and Social Matters

### 11.1 Economic Impact Assessment

The Proponent engaged Gillespie Economics (2025; Appendix W) to complete an Economic Assessment of the Mt Gibson Mine Gold Project (the Proposal) in support of this application under the EPBC Act. From an economic perspective, there are two important aspects of the Proposal:

- its economic efficiency (i.e. consideration of the economic costs and benefits of the Proposal) which is evaluated using cost benefit analysis (CBA); and
- its effects on the regional and Western Australian economy, which is evaluated using input-output (IO) analysis.

#### 11.1.1 Economic Efficiency

Economic Efficiency has been measured using the Cost Benefit Analysis (CBA) method to assess the relative economic desirability (economic efficiency) of competing alternatives. CBA includes the consideration of costs and benefits to all members of society i.e. consumers, producers and the broader society as represented by the government. It provides a comparison of the present value of aggregate benefits to society, as a result of a project, policy or program, with the present value of the aggregate costs. Provided the present value of aggregate benefits to society exceed the present value of aggregate costs (i.e. a net present value of greater than zero), the project is considered to improve the well-being of society and hence is desirable from an economic efficiency perspective.

The Commonwealth Office of Impact Analysis (2023) follows this approach, identifying that “for most proposals, measuring the national costs and benefits is appropriate, rather than measuring any international impacts. That is, as far as is practical, you should count the costs and benefits to all people residing in Australia.”

Capricorn Metals Ltd is estimated to be 19% Australian owned. Consequently, the net production benefits that accrue to Australia are the mining royalties, company tax, i.e. 30% of taxable income in accordance with the Commonwealth Income Tax Rates Act 1986, and 19% of the residual net production benefits. The net production benefits are apportioned to Western Australia by assuming that company tax benefits, and residual net production benefits accrue to Western Australia based on its population share and that all mining royalties accrue to Western Australia

The Proposal is estimated to have net production benefits of ~ \$1,441 million to the Australian economy (present value at 7% discount rate) over the mine life. Further apportionment, the net production benefits that accrue to Western Australia are estimated at \$304 million.

**Table 76: Net Production Benefits of MGGP Proposal**

Benefits	Value (\$,000)	Assumptions
<b>Royalties</b>	171,000	100% to Western Australian Government
<b>Company Tax</b>	872,000	30% tax on Taxable Income paid in Australia
<b>Residual net production benefits</b>	2,136,000	Balance after tax and royalties
<b>Global Net Production Benefits</b>	<b>3,179,000</b>	
<b>Royalties</b>	171,000	100% to Western Australian Government
<b>Company Tax</b>	872,000	Australian Tax paid at 30%
<b>Residual net production benefits</b>	398,000	Portion of benefits accrued to Australian ownership - 19%
<b>Australian Net Production Benefits</b>	<b>1,441,000</b>	
<b>Royalties</b>	171,000	100% to Western Australian Government
<b>Company Tax</b>	91,000	Share of Australian Tax to WA based on % total population
<b>Residual net production benefits</b>	42,000	Portion of benefits accrued to Western Australian ownership – per capita basis
<b>Western Australian Net Production Benefits</b>	<b>304,000</b>	

Source: Gillespie Economics, 2025

### 11.1.2 Regional and State Impacts

The Proposal is located in the Yalgoo Shire Local Government Area within the Mid-West Statistical Area Level 3 (the regional economy). The construction and operation of the Proposal will provide economic activity for the regional and Western Australian economy.

Economic activity impacts are assessed at a regional and State using input-output analysis. This involved:

- development of an appropriate IO tables (regional and State transaction table) that can be used to identify the economic structure of the region and multipliers for each existing sector of the economy. IO tables for the regional and Western Australian economy were developed using the Generation of Regional Input Output Tables (GRIT) procedure developed by the University of Queensland.

- identification of the direct impact or stimulus of the Proposal, in a form that is compatible with the IO equations, so that the IO multipliers and flow-on effects for the impacts or stimulus of the project can then be estimated (West, 1993). The direct impact of the project was estimated from data provided by the proponent and production ratios in the IO tables.

The Proposals' average annual Economic activity impacts on the regional and state economy during the construction and operational phases are summarised in Table 77.

**Table 77: Summary of Regional and State Impacts**

Direct & Indirect Impacts	Construction impacts average per annum ( \$,000)		Operation impacts average per annum ( \$,000)	
	Regional	Western Australia	Regional	Western Australia
<b>Output</b>	80,000	137,000	878,000	1,047,000
<b>Value</b>	27,000	56,000	623,000	708,000
<b>Household income</b>	18,000	38,000	101,000	162,000

Source: Gillespie Economics, 2025

Impacts for the Australian economy would be greater than those for the Western Australian economy because of the greater ability of the Australian economy to provide the goods and services required for production and demand by workers.

## 11.2 Employment

The sectors of the regional economy most impacted by output, value-added, income and employment production induced flow-ons are likely to be as follows:

- Construction Services
- Exploration and Mining Support Services
- Other Repairs and Maintenance
- Professional, Scientific and Technical Services
- Wholesale and Retail Trade
- Road Transport
- Transport Support Services and Storage

For the Western Australian economy, the Exploration and Mining Support Services, Non-Residential Property Operators and Real Estate Services, Transport Support Services and Storage, Heavy Engineering Construction, Employment, Travel Agency and Other Administration Services are also important production induced flow-on sectors.

The Proponent estimates the Proposal will require a full time equivalent (FTE) workforce of approximately 300 employees during the construction phase and approximately 400 long term (+15 year) FTE roles (including contractors) during the operational phase.

The Gillespie report has calculated the overall regional and state impacts of the Proposal in Section 3 of the Economic Assessment and summarised in Table 78.

**Table 78: Employment Impacts of Proposal**

Direct & Indirect Impacts	Construction impacts Jobs per annum		Operation impacts Jobs per annum	
	Regional	Western Australia	Regional	Western Australia
<b>Direct Jobs</b>	130	130	300	300
<b>Indirect Jobs</b>	61	257	534	1068
<b>Total Jobs</b>	<b>191</b>	<b>387</b>	<b>834</b>	<b>1,368</b>

Source: Gillespie Economics, 2025

### 11.3 Social Impact Assessment

The Proponent and its long term contractors, have a successful history of community engagement and benefit sharing at its Karlawinda Project in the Pilbara (WA) over the last five years. The management team has the experience, systems and skills to apply the same measured approach to the Proposal being considered.

Consumption induced flow-on effects in the region will be mainly in the following sectors:

- Retail and Wholesale Trade
- Food and Beverage Services.
- Health Care Services
- Actual Rent for Housing
- Primary and Secondary Education
- Residential Care and Social Assistance
- Automotive Repairs and Maintenance

For the Western Australian economy, the Finance; Professional, Scientific and Technical Services; Employment, Travel Agency and Other Administrative Services, are also important consumption induced flow-on sectors.

The following potential negative impacts have been identified:

- Deterioration of environmental values held by the community
- Visual impacts of the Proposal resulting in a changed sense of place.

These potential impacts to social amenity will be managed by the robust environmental management and mitigation measures that will be implemented via the MNES EMP and MGGP EMP (Appendix Q, Appendix R). Visual, noise and air quality amenity are not anticipated social impacts given the remoteness of the Proposal (the nearest towns are approximately 60 km south west and 72 km north east of the Proposal).

## 12 Information sources provided in the PER

The PER Guidelines (Appendix A) require the PER to state the following for information used in the PER:

- the source of the information
- how recent the information is
- how the reliability of the information was tested
- what uncertainties (if any) are in the information.

This Section addresses these requirements.

### 12.1 Information sources

The PER was informed by technical studies carried out to understand the existing conditions of the study area and assess the potential impacts of the action, including a review of existing literature, undertaking desktop assessments and conducting field surveys.

Information sources are referenced throughout the PER and the corresponding Technical Appendices. A list of references used for the PER have been included in Section 14.

### 12.2 Status of data

The PER has been informed by the technical reports and therefore the status of information in the technical reports correlates to the status of information in the PER. These technical reports list the relevant sources and references used with the corresponding published date.

Ecological surveys were conducted throughout 2021 to 2025, with separate field surveys undertaken for flora and vegetation, terrestrial fauna and subterranean fauna. Surveys were undertaken in accordance with relevant Australian Standards and guidelines, the details of which are outlined in the respective chapters.

The list of references in Section 14 includes the publish date of the information sources used in the PER.

### 12.3 Information reliability

The reliability and accuracy of the information sources in the PER has been tested via detailed internal review. The PER was developed from the technical reports based on scientific methods in accordance with relevant standards and guidelines as noted throughout the PER and within the Technical Appendices.

The extent of field survey and accuracy of information available from other sources were considered adequate for the purpose of identifying potential impacts from the action on environmental values.

### 12.4 Mitigating uncertainty

The precautionary principle has been applied in relation to any scientific uncertainty associated with quality of information collected from the surveys and then assessed. Uncertainty associated with the Proposal has primarily applied to predictions of possible impacts to MNES post mine closure and where there is an absence of relevant documented information or studies to assist with providing greater certainty in the likelihood and consequences of those impacts.

The Project Team associated with the baseline studies, impact assessments and preparation of this PER are experts in their respective fields and have a minimum of 15 years direct environmental management experience in the WA Mining Industry. On this basis, the assessment of impact risk and derivation of appropriate mitigation measures can be considered comprehensive and the best available for mitigating any uncertainty, as defined in this PER document, Appendix Q and Appendix R.

## 13 Conclusions

The location of the Proposal is constrained by the location of the mineral deposits. The Proposal presented in this document is the result of an extensive design and iterative review process that has optimised specific elements, balanced with a precautionary approach to avoid, mitigate, and manage potential environmental impacts.

Comprehensive baseline studies and investigations have been undertaken since 2021 to understand the environmental and social values of the Proposal and inform the proposed design to avoid or minimise potential impacts as far as practicable. The Proposal has been modified from the original design to avoid direct impacts to *Eremophila viscidia*, 114.6 ha of WA Wheatbelt Woodlands TEC vegetation and approximately ~168 ha of fauna habitat. The Proposal will also utilise ~399 ha of existing (historical) disturbance.

As described in Section 5.5, the Proposal has been assessed as having a significant residual impact on the WA Wheatbelt Woodlands TEC and Malleefowl (habitat); therefore offsets are proposed as outlined in Section 6.

Progressive rehabilitation will be undertaken over the life of the mine as areas become available and are no longer required for ongoing operations; and will assist in addressing some of the permanent impacts associated with fauna habitat removal and potential fragmentation.

The Proposal is considered compliant with the objects and requirements of the EPBC Act and the principles of ESD, as detailed in Table 79 and Table 80 respectively.

**Table 79: Assessment of the Proposal compliance with the objects of the EPBC Act**

Object (s.3)	Proposal Compliance
<p><b>(a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance</b></p> <p><b>(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources</b></p> <p><b>(c) to promote the conservation of biodiversity</b></p>	<p>The Proposal has been designed to avoid and minimise impacts to areas of highest ecological value within the Proposal. The residual impacts are unavoidable, and offsets have been proposed for those considered significant residual impacts to MNES. To this end, the Proposal has been designed to avoid and minimise impacts to MNES, will (a) contribute to the protection of the environment, (b) promote ESD and (c) promote the conservation of biodiversity.</p>
<p><b>(d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples</b></p>	<p>As discussed in Section 9, the proponent has engaged with stakeholders from the local community, government, neighbours and traditional owners in the design and implementation of the Proposal. The Proponent is committed to ongoing stakeholder identification, communication, engagement and consultation through the planning and approval phase, and through to construction, operations and closure phases.</p>
<p><b>(e) to assist in the co-operative implementation of Australia's international environmental responsibilities</b></p>	<p>The Proposal aligns with the WA Government and Australian Government's commitments to the Paris Agreement. Implementation of the Proposal will not impede Australia's aspiration of net zero emissions by 2050.</p>
<p><b>(f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity</b></p>	<p>The proponent recognises the importance of Badimia knowledge of the site and their past, present and ongoing connection to the Land. The Badimia people are a key stakeholder group for this Proposal.</p>
<p><b>(g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in cooperation with, the owners of the knowledge.</b></p>	<p>A Heritage Agreement has been entered into with the Badimia Traditional Owners, who have been consulted from the early planning stage of the Proposal. The Badimia have been engaged to undertake all Archaeological and Ethnographic heritage surveys for the Proposal.</p> <p>Under the Heritage Agreement, consultation with the Badimia will continue throughout the life of the Proposal, including during closure to ensure their needs are considered. Similarly, under the Heritage Agreement, both parties have committed to explore employment and contracting opportunities at the Proposal.</p>

**Table 80: Assessment of the Proposal Compliance with the principles of ESD**

Principle of ESD (s. 3A)	Proposal Compliance
<p><b>(a) Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.</b></p>	<p>As described in Section 11, the Proposal will present economic and social opportunities to State and Commonwealth communities. Impacts to any MNES are likely to be short-term, particularly with the implementation of offsets and the commitment to rehabilitate areas when no longer required for the operation.</p>
<p><b>(b) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</b></p>	<p>The environmental impact assessment presented in this PER is based on a comprehensive review of available Proposal information and baseline technical studies undertaken by competent and qualified specialists in accordance with published guidelines (where applicable), to minimise the risk of incorrect or incomplete information leading to lack of scientific certainty.</p> <p>This work has informed the Proposal design to avoid or minimise potential impacts as far as practicable, including reduction of the IWL footprint and the relocation of topsoil stockpiles to avoid clearing of the Threatened <i>Eremophila viscida</i> and redesign of the layout to avoid clearing of WA Wheatbelt Woodlands TEC. The Proposal utilises areas of disturbance wherever possible.</p>
<p><b>(c) The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.</b></p>	<p>A Heritage Agreement has been entered into with the Badimia Traditional Owners, who have been consulted from the early planning stage of the Proposal. The Badimia have been engaged to undertake all Archaeological and Ethnographic heritage surveys for the Proposal. Under the Heritage Agreement, consultation with the Badimia will continue throughout the life of the Proposal, including during closure to ensure their needs are considered. Similarly, under the Heritage Agreement, both parties have committed to explore employment and contracting opportunities.</p> <p>The proponent operates under an Environmental Policy and Environmental Management Plan (Appendix R) and is committed to operating in an environmentally responsible and sustainable manner. The proponent acknowledges that the Proposal has the potential to impact on the environment now and in the future. For this reason, the proponent adopts a systematic approach to understand, avoid or minimise, manage and remediate the environmental impacts of its operations.</p> <p>The proponent’s decision-making processes incorporate the principle of intergenerational equity. Throughout development of the Proposal concept, the proponent has undertaken high level review followed by more detailed assessment of environmental factor inputs and has designed the Proposal with careful consideration of sustainable outcomes.</p> <p>From the technical work undertaken to assess the impacts of the Proposal, the proponent has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.</p> <p>Implementation of the Proposal will be supported by an effective environmental management system to minimise potential environmental impacts (such as contamination of soil and water, or disturbance outside of approved areas), ensuring that the health, diversity and productivity of the environment are protected.</p>
<p><b>(d) The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.</b></p>	<p>The various comprehensive ecological studies undertaken for the Proposal to date have informed the design such that potential impacts to biological diversity have been avoided or minimised as far as practicable.</p>
<p><b>(e) Improved valuation, pricing and incentive mechanisms should be promoted.</b></p>	<p>The proponent acknowledges the need to assess environmental factors against asset valuation, pricing and incentive mechanisms and endeavours to pursue these principles when practicable. For example:</p> <p>Detailed flora and vegetation, terrestrial fauna and subterranean fauna surveys have been undertaken to identify and confirm the relative environmental values within the Development Envelope. From this, environmental factors have been considered in determining the location of infrastructure.</p> <p>Procedures will be in place to ensure that emissions and discharges are minimised as far as practicable. Discharges to the environment will be recorded and reported through mechanisms such as the National Greenhouse and Energy Reporting Scheme, National Pollutant Inventory and Prescribed Premises Licence (EP Act Part V), where applicable. Prescribed Premises Licence fees are charged based on reported discharges to the environment, which incentivises abating volumes of pollutants discharged. Additionally, the NGER (Safeguard Mechanism) Rule 2015 requires a safeguard facility to keep net emissions levels at or below the baseline set by the Clean Energy Regulator</p> <p>Potential impacts on the identified ecological attributes within the Development Envelope have been fundamental in design consideration. The Proposal that is presented in this document is the result of an iterative design and review process which has optimised specific elements, balanced with a precautionary approach to avoid, mitigate and manage potential environmental impacts.</p>

Principle of ESD (s. 3A)	Proposal Compliance
	<p>Areas of vegetation clearing will be reported to the State department (DMPE) and a levy is charged based on reported areas and categories of land disturbance, which serves to incentivise progressive clearing and rehabilitation.</p> <p>The proponent will prepare the Proposal specific Environmental Management Plans that incorporate necessary measures to implement the Proposal in a responsible and environmentally sustainable manner. This includes environmental training and awareness for all personnel, and ensuring sufficient resources are available for effective implementation of these Plans.</p> <p>The full cost to close and rehabilitate the mine following closure of operations will be estimated when preparing the Mine Closure Plan, which is required as part of State environmental assessment of the Proposal. All costs of monitoring, mitigation provisions and closure will be borne by the proponent.</p>

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## **Appendices**

**Appendix A: DCCEEW PER Guidelines – Mount Gibson Gold  
Project (Ref: 2023/09745)**

## **Appendix B: CMW Geosciences (2023) – Tailings Storage Facility (TSF) Design Report**

## **Appendix C: FVC (2023) – Detailed Flora and Vegetation Assessment**

## **Appendix D: Protected Matters Search Tool Results**

## **Appendix E: TEPL (2023) – Groundwater Dependent Vegetation Desktop Study**

**Appendix F: TEPL (2025a) – Survey of *Eremophila viscida* Habitat  
and Eucalypt Woodlands of the Western Australian Wheatbelt**

## **Appendix G: Biota (2022) – Basic and Targeted Fauna Survey**

## **Appendix H: Biota (2023) – Extended Area Basic and Targeted Fauna Study**

## **Appendix I: Bamford (2024a) – Fauna Assessment**

## **Appendix J: Bamford (2024b) – Targeted Investigations into Significant Fauna**

**Appendix K: Bennelongia (2025a) – Lake Goorly Shield-Backed  
Trapdoor Spider (*Idiosoma kopejtkorum*) Impact Assessment**

**Appendix L: Bennelongia (2025b) – Lake Goorly Shield-Backed  
Trapdoor Spider (*Idiosoma kopejtkorum*) EOO and AOO expansion**

## **Appendix M: GHD (2025) – Acoustic Assessment**

## **Appendix N: GHD (2023) – Air Quality Assessment**

## **Appendix O: Greenbase (2023) – GHG Assessment**

## **Appendix P: Greenhouse Gas Environmental Management Plan**

## **Appendix Q: MNES Environmental Management Plan**

## **Appendix R: MGGP Environmental Management Plan**

## **Appendix S: NACC NRM (2026) Revegetation Plan**

## **Appendix T: Anders Environmental Consulting (2026) – MIOP Verification**

## **Appendix U: Stakeholder Consultation Register**

## **Appendix V: Public comments on PER and Proponents responses**

## **Appendix W: Gillespie Economics (2025) - MGGP Economic Assessment**



Tetris Environmental Pty Ltd

Suite 6C, 573 Canning Hwy, Alfred Cove WA 6154

PO Box 3103, Myaree WA 6154

ABN. 51 621 352 609

E: [info@tetrisenviro.com.au](mailto:info@tetrisenviro.com.au)