Application to Amend NVCP CPS 7374/3 Eastern Ridge Strategic Exploration

Native Vegetation Clearing Permit Amendment Application Supporting Document

February 2026

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1 INTRODUCTION

BHP Iron Ore Pty Ltd (BHP) currently operates a number of Iron Ore mines and associated rail and port infrastructure within the Pilbara region of Western Australia (WA). Current mining operations include the:

- Newman Operations consisting of:
  - The Mount Whaleback hub (including Orebodies 29, 30, 35 and Western Ridge) located approximately two kilometres (km) west of Newman Township
  - The Eastern Ridge hub (Consisting of Orebodies 23, 24, 25 25 West and 32) located approximately 5 km east of Newman Township
- Mining Area C / South Flank located approximately 90 km north west of Newman Township
- Orebodies 17, 18, 31 and Wheelarra Hill (Jimblebar) Mine located approximately 35 km east of Newman Township
- Yandi Mine located approximately 100 km north west of Newman Township.

Ore from the above mining operations is transported to Port Hedland via the BHP Newman to Port Hedland Mainline (and associated spur lines) and is then shipped out through Port Hedland at the BHP facilities at Nelson Point and Finucane Island.

BHP currently holds Native Vegetation Clearing Permit (NVCP) CPS 7374/3 for the purposes of geotechnical investigations, the construction of access tracks, drill pads, mineral exploration and hydrogeological drilling, pipelines, powerlines, water bores, safety bunds, potential flyrock damage, borrow pits and other associated activities. The clearing period of this permit expires on 30 November 2026.

The full extent of these works is yet to be undertaken and therefore BHP is seeking to:

- Update the boundary to exclude newly identified habitat features and potential Priority flora locations
- Extend the permit duration to 30 November 2036
- Extend the clearing period to 30 November 2031
- Extend the final reporting date to 30 November 2036.

No other changes to the permit are required.

In accordance with Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), BHP hereby refers the application to amend NVCP CPS 7374/3 to the Department of Mines, Petroleum and Exploration (DMPE).

BHP considers that the proposed amendment application will not result in any significant environmental or social impacts and that the proposed Project complies with the 'Ten Clearing Principles', as defined in Schedule 5 of the *Environmental Protection Act 1986* (EP Act).

1.1 LOCATION

The Amendment Application Area is located north east of the Town of Newman in the Pilbara region of Western Australia (**Figure 1**).

1.2 TENURE

The Amendment Application Area is located on Mineral Lease ML244SA, Mining Lease M266SA and Miscellaneous Licence 47/92.

1.3 LOCAL GOVERNMENT JURISDICTION

The Amendment Application Area is located within the Shire of East Pilbara.

1.4 PROPONENT

The Amendment Application Area is managed and operated by BHP Billiton Iron Ore on behalf of the owners, the Newman Joint Venture (NJV), and BHP Iron Ore (Jimblebar) Pty Ltd.

The split between the partners of the NJV is as follows:

- BHP Billiton Minerals Pty Ltd 85%
- Itochu Minerals and Energy Australia Pty Ltd 5%
- Mitsui Iron Ore Corporation Pty Ltd 10%

BHP Iron Ore (Jimblebar) Pty Ltd:

- BHP Iron Ore (Jimblebar) Pty Ltd 100%

The key contact for this proposal is:

Mr Chris Hopkins
Principal Environmental Approvals
BHP Iron Ore Pty Ltd
Level 40, 125 St George's Terrace
PERTH WA 6000
Phone: 0417 093 070
Email: chris.s.hopkins@bhp.com and environmentapprovals-waio@bhp.com

1.5 PROJECT DESCRIPTION

The proposed works will involve clearing for the purposes of geotechnical investigations, the construction of access tracks, drill pads, mineral exploration and hydrogeological drilling, pipelines, powerlines, water bores, safety bunds, potential flyrock damage, borrow pits and other associated activities.

1.6 MITIGATION HIERARCHY

1.6.1 Avoid

The current boundary for CPS 7374/3 contains numerous newly identified potential bat caves (**Section 3.4.4**) as well as multiple records of a potential Priority 3 flora species *Hibiscus* aff. *campanulatus* (**Section 3.4.2**). The proposed boundary for CPS 7374/4 has been revised to exclude:

1. Breakaway and Gorge / Gully habitat, as defined by Biologic (2017)
2. all known bat caves by applying a buffer of 50 m to 150 m depending on cave category (except where there is existing disturbance)
3. all known water features (pools and water holes)
4. 822 of the 1049 records of *Hibiscus* aff. *campanulatus*.

1.6.2 Minimise

Where practicable any ground disturbance will be kept to previously disturbed areas.

Priority flora will be avoided using a 10 m buffer, where practicable.

Records of *Hibiscus* aff. *campanulatus* will be avoided using a 10 m buffer, where practicable, with no more than 40 records of *Hibiscus* aff. *campanulatus* being cleared if necessary.

Where practicable, existing cleared tracks will be used to cross areas identified as Major Drainage Lines (**Figure 6**). If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

1.6.3 Mitigate

Areas that are no longer required for the purpose for which they were cleared will be rehabilitated in accordance with Conditions 8 and 9 of CPS 7374/3 (or subsequent revisions).

1.6.4 Offset

Based on the low level of potential impacts associated with this application no offsets are proposed.

1.7 PROJECT CHARACTERISTICS AND COMMITMENTS.

BHP commits to undertake the Project in accordance with the details set out in **Table 1**.

Table 1 Project Characteristics and Commitments

Permit Characteristics	
Authorising Agency	DMPE
Permit Title	Eastern Ridge Strategic NVCP
Area to be cleared	700 hectares
Amendment Application Area	13,735.62 hectares
Purpose of the permit	Clearing for the purposes of geotechnical investigations, the construction of access tracks, drill pads, mineral exploration and hydrogeological drilling, pipelines, powerlines, water bores, safety bunds, potential flyrock damage, borrow pits and other associated activities
Tenure	• Mineral Lease ML244SA, • Mining Lease M266SA • Miscellaneous Licence 47/92
Clearing Duration	Until 30 November 2031
Permit Duration	Until 30 November 2036
Proposed Annual Reporting Date	01 October for the previous Financial Year
Proposed Final Reporting Date	30 November 2036
Application boundary	Map Reference: • EXP_033NVCP_001_RevB_0 • EXP_033NVCP_002_RevC_0 • EXP_033NVCP_003_RevC_0 • EXP_033NVCP_004_RevC_0 • EXP_033NVCP_005_RevC_0 • EXP_033NVCP_006_RevB_0 • EXP_033NVCP_007_RevB_0 BHP Shapefile D2 Reference: https://waio-dctm.bhp.com/D2/?docbase=bhpbio_od_prod&locateId=0b03c41a84eab766&application=ManagedDocuments

Application Commitments	**Section**
Where practicable any ground disturbance will be kept to previously disturbed areas.	1.6.2
Priority flora will be avoided using a 10 m buffer, where practicable.	1.6.2 3.4.2 6.1
Records of *Hibiscus* aff. *campanulatus*) will be avoided using a 10 m buffer, where practicable, with no more than 40 records of *Hibiscus* aff. *campanulatus* being cleared if necessary.	1.6.2 3.4.2 6.1
Control of established weed populations will be carried out according to BHP's standard Weed Control and Management Procedures.	3.4.3 6.7.4
Disturbance to known active Mulgara burrows will be avoided using a 10 m buffer, where practicable.	3.4.4 6.2
Disturbance to known active Western Pebble-mound Mouse mounds will be avoided with a 10m buffer where practicable.	3.4.4 6.2
Where practicable, existing cleared tracks will be used to cross areas identified as Major Drainage Lines (**Figure 6**). If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.	1.6.2 3.6 6.6 6.9
Areas that are no longer required for the purpose for which they were cleared will be rehabilitated in accordance with Conditions 8 and 9 of CPS 7374/3 (or subsequent revisions	1.6.3

1.8 NVCP RECORDS

BHP reports on each NVCP in accordance with the permit reporting conditions. For a majority of NVCPs this is incorporated into BHP Iron Ore's Annual Environmental Report (AER) which is submitted to government prior to the 01 October each year.

Clearing under CPS 7374/3 commenced in 2017 with a total of 257.78 ha cleared and 86.83 ha rehabilitated to the end of FY25 (BHP 2025). The remaining locations cleared are still required for the purpose for which they were cleared or have become part of the Orebody 31 mining operations.

Clearing has been minimised by restricting activities to the minimal required for safety and equipment access. Populations of significant flora have been avoided using the BHP Project Environmental and Heritage Review (PEAHR) procedure. This internal BHP procedure authorises ground disturbing activities. No environmental offsets are required for this NVCP.

2 ASSOCIATED APPROVALS

Any other additional approvals will be sought as required.

3 EXISTING ENVIRONMENT

3.1 CLIMATE

Newman Aero meteorological site (007176) is the closest Bureau of Meteorology (BoM) station to the to the Amendment Application Area. Average annual rainfall at Newman Aero is 319.9 mm (BoM 2025a). This is mainly derived from tropical storms and cyclones during summer, producing sporadic, heavy rains over the area. Mean monthly rainfall varies from 5.5 mm in September to 70.2 mm in February (BoM 2025a). Daily rainfall is highly variable; the highest maximum daily rainfall ranges from 34.8 mm in October, to 305.6 mm in February (BoM 2025a). The mean maximum temperature in summer months (October to March) is 35.2°C to 39.4°C, and mean maximum temperature in winter (April to September) is between 23.1°C and 32.1°C (BoM 2025a).

Wittenoom meteorological site (005026) is the closest station to the Amendment Application Area that records daily evaporation. Wittenoom is located approximately 120 km northwest of the Amendment Application Area. Mean daily evaporation at Wittenoom throughout the year is 8.6 mm/day (BoM 2025b), which equates to 3.1 metres per year. Evaporation greatly exceeds rainfall in the region throughout the year and on a month-by-month basis (BoM 2025b).

3.2 BIOREGION, LANDFORMS AND LAND SYSTEMS

The Amendment Application Area is situated in the following biogeographic sub-regions:

- Fortescue Plains subregion (PIL2) of the Pilbara region described as: "*Alluvial plains and river frontage. Extensive salt marsh, mulga-bunch grass, and short grass communities on alluvial plains in the east. Deeply incised gorge systems in the western (lower) part of the drainage. River gum woodlands fringe the drainage lines. Northern limit of Mulga (Acacia aneura). An extensive calcrete aquifer (originating within a palaeo-drainage valley) feeds numerous permanent springs in the central Fortescue, supporting large permanent wetlands with extensive stands of river gum and cadjeput Melaleuca woodlands. Climatic conditions are semi desert tropical, with average rainfall of 300 mm, falling mainly in summer cyclonic events. Drainage occurs to the north-west. Subregional area is 2,041,914ha*." (Kendrick 2001a).
- Hamersley subregion (PIL03) of the Pilbara region described as: "*Southern section of the Pilbara Craton. Mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges (basalt, shale and dolerite). Mulga low woodland over bunch grasses on fine textured soils in valley floors, and Eucalyptus leucophloia over Triodia brizoides on skeletal soils of the ranges. The climate is Semi-desert tropical, average 300mm rainfall, usually in summer cyclonic or thunderstorm events. Winter rain is not uncommon. Drainage into either the Fortescue (to the north), the Ashburton to the south, or the Robe to the west* (Kendrick 2001b)."
- The Augustus subregion (GAS03) of the Gascoyne region described as: "*Rugged low Proterozoic sedimentary and granite ranges divided by broad flat valleys. Also includes the Narryera Complex and Bryah Basin of the Proterozoic Capricorn Orogen (on northern margin of the Yilgarn Craton), as well as the Archaean Marymia and Sylvania Inliers. Although the Gascoyne River System provides the main drainage of this subregion, it is also the headwaters of the Ashburton and Fortescue Rivers. There are extensive areas of alluvial valley-fill deposits. Mulga woodland with Triodia occur on shallow stony loams on rises, while the shallow earthy loams over hardpan on the plains are covered by Mulga parkland. A desert climate with bimodal rainfall* (Desmond *et al*. 2001)."

The proposed Amendment Application Area is also located in the following land systems, as mapped by van Vreeswyk *et al*. (2004):

Boolgeeda: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands.

Elimunna: "Level to gently undulating stony plains, gilgai plains and drainage tracts derived from basalt, relief up to 15 m."

McKay: "Hills, ridges, plateaux remnants and minor breakaways of sedimentary and meta sedimentary rocks, relief up to 100 m."

Newman: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.

Platform: "Narrow, raised plains and highly dissected slopes on partly consolidated colluvium below the footslopes of hill systems such as Newman, relief mostly up to about 30 m but occasionally considerably greater."

River: "Narrow floodplains and major channels."

Rocklea: "Rough hill and mountain tracts predominantly of basalt, the largest land system in the survey area and widespread throughout, relief up to 110 m."

Wannamunna: "Level alluvial plains with prominent grove patterns of vegetation and shallow loamy soils over hardpan and broad internal drainage plains with deeper more clayey soils, relief up to 5 m. The system is found in south central parts

These Land Systems are well represented in their bioregions.

3.3 GEOLOGY AND SOILS

The Australian Soil Resource Information System (ASRIS) provides soil and land resource information across Australia. The following four soil types occur within the Amendment Application Area (CSIRO 2021):

BE6: Extensive flat and gently sloping plains, which sometimes have a surface cover of gravels and on which redbrown hardpan frequently outcrops: chief soils are shallow earthy loams (Um5.3), with associated (Gn) soils of units My5O and Mz23 of Sheet 6. As mapped, there are inclusions of units Oc47 and BB9.

Fa13: Ranges of banded jaspilite and chert along with shales, dolomites, and iron ore formations; some areas of ferruginous duricrust as well as occasional narrow winding valley plains and steeply dissected pediments. This unit is largely associated with the Hamersley and Ophthalmia Ranges. The soils are frequently stony and shallow and there are extensive areas without soil cover: chief soils are shallow stony earthy loams (Um5.51) along with some (Uc5.11) soils on the steeper slopes. Associated are (Dr2.33, Dr2.32) soils on the limited areas of dissected pediments, while (Um5.52) and (Uf6.71) soils occur on the valley plains.

Fa14: Steep hills and steeply dissected pediments on areas of banded jaspilite and chert along with shales, dolomite, and iron ore formations; some narrow winding valley plains: chief soils are shallow stony earthy loams (Um5.51) along with some (Uc5.11) soils on the steeper slopes. (Dr2.33, Dr2.32) soils which occur on the pediments are more extensive in this unit than in unit Fa13. (Um5.52) and (Uf6.71) soils occur on the valley plains.

Mz25: Plains associated with the Fortescue valley; there is a surface cover of stony gravels close to the ranges and hills: chief soils are acid red earths (Gn2.11) with some neutral red earths (Gn2.12); red-brown hardpan is absent. Associated are areas of calcareous earths (Gc) and loams (Um1) on calcrete (kunkar) and some hard red (Dr) soils around creek lines.

Oc64: Low stony hills and dissected pediments on granite with occasional basic dykes: chief soils are hard, alkaline red soils (Dr2.33) having shallow stony A horizons. Associated are shallow stony (Uc5.11) soils on steep slopes; (Uc1.22) soils along creek lines (Um5.11) soils on patches of calcrete (kunkar).

3.4 FLORA, VEGETATION AND FAUNA

A total of 77 flora and vegetation surveys have previously been completed within the Amendment Application Area. The key flora and vegetation surveys[1] relevant to this application are:

- *OB32 SWD Settlement Pond Flora and Vegetation Technical memo* (Biologic 2025a)
- *Power 2030 Single Season Flora and Vegetation Report* (Biologic 2025b)
- *Homestead Creek & Cathedral Gorge Detailed Flora & Vegetation Assessment* (Spectrum Ecology & Spatial 2024a) (**Appendix 1**)
- *OB29, 30 and 35 Expansion and Newman Surplus Water Reconnaissance Flora & Vegetation Survey* (Spectrum Ecology & Spatial 2024b)
- *East Ophthalmia & Ninga Detailed Flora & Vegetation Survey* (Spectrum Ecology & Spatial 2022a)
- *Hibiscus aff. campanulatus Targeted Survey* Cathedral Gorge (Spectrum Ecology & Spatial 2022b) (**Appendix 2**)
- *OB32 Surplus Water & Homestead Creek Wetting Front Flora and Vegetation Assessment* (Spectrum Ecology & Spatial 2021) (**Appendix 3**)

[1] Note that key surveys have been provided as appendices where they have covered a significant portion of the Amendment Application Area. Where key surveys have only included minor portions of the Amendment Application Area any updated data has been used to prepare the application figures and in application impacts assessment.

- *OB32 West, OB33 and OB28 Single season detailed flora and vegetation* (GHD 2023) (**Appendix 4**)
- *Flora and Vegetation and Vertebrate fauna survey of the Newman to MAC powerline corridor* (Onshore 2017)
- *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (Onshore 2014) (**Appendix 5**).

A total of 46 vertebrate fauna surveys have been completed within the Amendment Application Area. The key vertebrate fauna surveys[1] relevant to this application are:

- *Jimblebar Wind Power 2030 Targeted Vertebrate Fauna Survey* (Biologic 2024)
- *Pilbara Olive Python Monitoring Western Ridge, Ophthalmia Dam and Millstream 2022-23* (Helix 2024)
- *Homestead West & Cathedral Gorge Targeted Significant Fauna Survey* (Astron 2023a) (**Appendix 6**)
- *OB29, 30 and 35 Expansion and Newman Surplus Water Targeted Significant Fauna Survey* (Astron 2023b)
- *East Ophthalmia and Ninga Detailed Vertebrate Fauna Survey* (Biologic 2022) (**Appendix 7**)
- *Orebody 32 Surplus Water Targeted MNES Vertebrate Fauna Survey* (Biota 2022)
- *OB32 West, OB28 and OB33 Targeted Vertebrate Fauna Surveys* (GHD 2022) (**Appendix 8**)
- *Jimblebar targeted ghost bat survey* (GHD 2020) (**Appendix 9**)
- *Consolidated Fauna Habitat Mapping 2017* (Biologic 2018) (**Appendix 10**)
- *Ore Body 24 Targeted Vertebrate Fauna Survey* (Biologic 2014).

Vegetation and Vertebrate Consolidation Projects

The Onshore Environmental (2014) *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (**Appendix 5**) and Biologic (2017) *Consolidated Fauna Habitat Mapping 2017* (**Appendix 11**). undertook a detailed review of all previous flora and vegetation surveys and vertebrate fauna surveys, respectively, across BHP's Pilbara operations. These reviews were supported by field visits where the analysis indicated that further information was required to confirm the exact vegetation associations.

Historical survey reports often used different techniques and/or nomenclature, however they generally utilised similar field methods. The Consolidation Projects resolved the inconsistencies between previous mapping and created one consolidated regional vegetation and one fauna habitat Geographic Information System (GIS) database which:

- Serves as BHP's base line vegetation and fauna datasets
- Maps and describes a total of 53 broad floristic communities with 218 distinct vegetation associations across BHP's Pilbara operations
- Maps and describes a total of 17 fauna habitats across BHP's Pilbara operations
- Provides consistency in methods and nomenclature across BHP's Pilbara operations.

GHD (2020) *OB32 West, OB28 and OB33 Targeted Vertebrate Fauna Surveys*

In undertaking the assessment of vertebrate fauna habitat for this Amendment Application it was noted that areas mapped as gorge and gully and four areas mapped as Breakaway in GHD (2022) *OB32 West, OB28 and OB33 Targeted Vertebrate Fauna Surveys* were not representative of the standard definitions of these habitat types as defined by Biologic (2017). The fauna habitat within these areas has been reviewed and reverted to the previous fauna habitat for the purpose of this Application (**Figure 6**). The area where the habitat of the Amendment Application Area has been reverted has been provided as a shapefile (**Attachment 1**).

3.4.1 Vegetation Communities

The Amendment Application Area is located within the Pilbara and Gascoyne Interim Biogeographic Regionalisation for Australia (IBRA) (Department of Environment and Heritage 2005). According to the Government of Western Australia (2013), these bioregions are more than 99% vegetated (**Table 2**). The vegetation within the Amendment Application Area is classified as the following vegetation associations, as mapped by Beard (1975):

18 Low woodland; mulga (*Acacia aneura*).

29 Sparse low woodland; mulga, discontinuous in scattered groups.

82 Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*.

There is more than 99% of the pre-European vegetation remaining of these vegetation associations (**Table 2**). The Amendment Application Area is not part of any significant remnant vegetation in the wider regional area.

Table 2 Pre European extent of vegetation associations occurring within the Amendment Application Area (Government of Western Australia 2013)

Vegetation Association	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	Pre-European % in IUCN Class I-IV Reserves
Gascoyne IBRA Bioregion	18,075,219	18,067,441	99.96	1.93
Pilbara IBRA Bioregion	17,808,657	17,733,584	99.58	6.34
Vegetation association 18 within Western Australia	19,890,664	19,843,409	99.76	2.13
Vegetation association 18 within the Gascoyne IBRA	3,273,579	3,271,339	99.93	2.49
Vegetation association 18 within the Pilbara IBRA	676,556	672,424	99.93	16.78
Vegetation association 29 within Western Australia	7,903,991	7,900,200	99.95	0.29
Vegetation association 29 within the Gascoyne IBRA	3,802,459	3,799,635	99.93	0.03
Vegetation association 29 within the Pilbara IBRA	1,133,219	1,132,939	99.98	1.91
Vegetation association 82 within Western Australia	2,565,901	2,553,217	99.51	10.25
Vegetation association 82 within the Gascoyne IBRA	2,318	2,318	100.00	0.00
Vegetation association 82 within the Pilbara IBRA	2,563,583	2,550,899	99.51	10.26

A total of 28 broad floristic formations with 74 vegetation associations have been described and mapped within the Amendment Application Area (**Figure 4 and Table 3**). The distinct mapped broad floristic communities and vegetation associations identified within Amendment Application Area extend or occur beyond the project boundary.

None of the vegetation associations or landforms identified within the boundary of the Amendment Application Area are associated with a TEC or PEC.

The closest PEC to the Amendment Application Area is more than 30 km north west.

The Amendment Application Area does intersect the Ethel Gorge aquifer stygobiont community Threatened Ecological Community. This is a stygofauna community which is not associated with vegetation. Impacts to this community are managed via managed aquifer recharge including groundwater recharge basins and Ophthalmia Dam.

Vegetation condition within the Amendment Application Area ranges from excellent to completely degraded.

Table 3 Vegetation associations of the Amendment Application Area

Broad Floristic Formation	Vegetation Association Description	
**Cenchrus* Open Tussock Grassland	FP Cc AdApaPl CooHall	Open Tussock Grassland of **Cenchrus cilliaris* with Tall Open Shrubland *Acacia dictyophleba*, *A. pachyacra* and *Petalostylis labicheoides* with Low Scattered Trees of *Corymbia opaca* and *Hakea lorea* subsp. *lorea* on brown sandy clay floodplains.
**Cenchrus* Tussock Grassland	FP Cci ChaAci AbiApr	Tussock Grassland of *Cenchrus ciliaris with Low Woodland of Corymbia hamersleyana and Acacia citrinoviridis over High Shrubland of Acacia bivenosa and Acacia pruinocarpa over Open Hummock Grassland of Triodia pungens on orange sand on floodplains.
	MA CcCs EvAciAthe	Tussock Grassland **Cenchrus ciliaris* and **Cenchrus setiger* with Low Woodland of *Eucalyptus victrix*, *Acacia citrinoviridis* and *Atalaya hemiglauca* on brown sandy loam on major drainage lines and adjacent flood plains.
	MA CcTtEua ChCa AbAtpAss	Tussock Grassland of **Cenchrus ciliaris*, *Themeda triandra* and *Eulalia aurea* with Low Open Woodland of *Corymbia hamersleyana* and *Corymbia aspera* over High Open Shrubland of *Acacia bivenosa*, *Acacia tumida* var. *pilbarensis* and *Acacia sclerosperma* subsp. *sclerosperma* on brown loamy sand on levee banks of major drainage lines.
	SC CciEpo Aci	Tussock Grassland of **Cenchrus ciliaris* and *Enneapogon polyphyllus* and Low Woodland of *Acacia citrinoviridis* on orange brown sand and clay on floodplains.
**Cenchrus* mid closed tussock grassland	MI CcCs AciAaAte ChEvEg	**Cenchrus ciliaris*, **Cenchrus setiger* closed tussock grassland with *Acacia citrinoviridis*, *Acacia aptaneura*, *Acacia tetragonophylla* tall shrubland with *Corymbia hamersleyana*, *Eucalyptus victrix* and *Eucalyptus gamophylla* low open woodland on red-brown clayey sand on drainage areas/ floodplains and drainage lines.
**Cenchrus* mid tussock grassland	MA CcCs EcEv Acp (±Cydi)	*Cenchrus ciliaris and **Cenchrus setiger* mid tussock grassland with *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* mid woodland over *Acacia coriacea* subsp. *pendens* tall open to sparse shrubland over (± *Cyperus difformis*) low isolated sedges on brown sand on major/ medium drainage lines.
**Cenchrus* tall open to closed tussock grassland	FP CcChfTt AaAci ChExCoc	**Cenchrus ciliaris*, *Chrysopogon fallax*, *Themeda triandra* tall open to closed tussock grassland with *Acacia aptaneura* and *Acacia citrinoviridis* tall open shrubland with *Corymbia hamersleyana*, *Eucalyptus xerothermica* and *Corymbia candida* low open woodland.
Acacia High Open Shrubland	SP AsyAteAb Tp HapAaGrst	High Open Shrubland of *Acacia synchronicia*, *Acacia tetragonophylla* and *Acacia bivenosa* with Very Open Hummock Grassland of *Triodia pungens* and Low Open Woodland of *Hakea preissii*, *Acacia aptaneura* and *Grevillea striata* on red-orange to red-brown sandy loam.
Acacia Low Open Forest	1a	Low Open Forest of *Acacia aptaneura* and *Eucalyptus leucophloia* subsp. *leucophloia* over Hummock Grassland of *Triodia pungens* with Very Open Tussock Grassland of *Themeda triandra* in skeletal sandy loam soils in incised rocky gullies.
	HS AcaoAaApr ScaErllAb TbrTw	Low Open Forest of *Acacia catenulata* subsp. *occidentalis*, *Acacia aptaneura* and *Acacia pruinocarpa* over Open Shrubland of *Scaevola acacioides*, *Eremophila latrobei* subsp. *latrobei* and *Acacia bivenosa* over Open Hummock Grassland of *Triodia brizoides* and *Triodia wiseana* on red brown clay loam on breakaway scree slopes and steep hill slopes.
	SA AanApr Tpu	Low Open Forest of *Acacia pteraneura* and *Acacia pruinocarpa* over Open Hummock Grassland of *Triodia pungens* on red sand clay on plains.
	SS AanAprApt Tp	*Acacia aneura*, *Acacia pruinocarpa*, *Acacia pteraneura* low open forest of over *Triodia pungens* open hummock grassland on red sand clay on plains.
Acacia Low Open Woodland	FP AaAciApr AsyAssAb Tp	Low Open Woodland of *Acacia aptaneura*, *Acacia citrinoviridis* and *Acacia pruinocarpa* over Open Shrubland of *Acacia synchronicia*, *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia bivenosa* over Very Open Hummock Grassland of *Triodia pungens* on red brown clay loam on floodplains and medium drainage lines.

Broad Floristic Formation	Vegetation Association Description	
Acacia Low Woodland	FP AaAprAcao ErffDopeSie ArcDiaAri	Low Woodland of *Acacia aptanerua*, *Acacia pruinocarpa* and *Acacia catenulata* subsp. *occidentalis* over Open Shrubland of *Eremophila forrestii* subsp. *forrestii*, *Dodonaea petiolaris* and *Sida ectogama* over Open Tussock Grassland of *Aristida contorta*, *Digitaria ammophila* and *Aristida inaequiglumis* on red orange clay loam on floodplains.
	FP TpCc AmaAsyAb AaHallCh	Hummock Grassland of *Triodia pungens* and *Triodia vanleeuwenii* with Tussock Grassland of **Cenchrus ciliaris*, with Low Woodland of *Acacia aptaneura*, *Acacia pruinocarpa* and *Acacia incurvaneura* with Scattered Shrubs of *Acacia sibirica*, *Acacia tetragonophylla* and *Acacia melleodora* on red-orange clay loam soils on gravel footslopes.
Acacia Open Shrubland	SA AaCocTb	Open shrubland of *Acacia aptaneura* with lower shrubland of *Grevillea striata*, *Eremophila forrestii* subsp. *forrestii* with low open woodland of *Corymbia candida* over very open hummock grassland of *Triodia basedowii* and very open tussock grassland of *Aristida pruinosa*, and **Cenchrus ciliaris* on orange sandy clay plains.
Acacia shrubland	MI AmAancPl ChEll TtAri	Shrubland of *Acacia monticola*, *Acacia ancistrocarpa* and *Petalostylis labicheoides* with Scattered Low Trees of *Corymbia hamerselyana* and *Eucalyptus leucophloia* subsp. *leucophloia* over Open Tussock Grassland of *Themeda triandra* and *Aristida inaequiglumis* on red loamy sand on minor drainage lines.
	MI AmAnlGoro TpTt Ch	High Shrubland of *Acacia monticola*, *Androcalva luteiflora*, and *Gossypium robinsonii* with Very Open Hummock Grassland of *Triodia pungens* with Very Open Tussock Grassland of *Themeda triandra* with Low Open Woodland of *Corymbia hamersleyana* on red-orange to brown sandy clay soils with large ironstone boulders in gorges and minor drianage lines on hills.
	MI EgCc	*Eucalyptus gamophylla* and *Corymbia hamerselyana* isolated trees over *Acacia dictyophleba*, *Acacia pyrifolia* var. *pyrifolia* and *Gossypium robinsonii* over *Themeda triandra*, *Aristida holathera* var. *holathera* and *Cymbopogon ambiguus* open tussock grassland over *Triodia pungens* and *Triodia vanleeuwenii* open hummock grassland over *Ptilotus exaltatus*, *Stemodia kingii* and *Rhynchosia minima* open forbland on red/brown sandy loam with some rocky areas on minor drainage lines.
	SA EgExCh	*Eucalyptus gamophylla*, *Eucalyptus xerothermica* and *Corymbia hamersleyana* isolated trees over *Acacia inaequilatera*, *Acacia bivenosa* and *Acacia tenuissima* open shrubland over *Aristida holathera* var. *holathera* and *Aristida contorta* open tussock grassland over *Triodia pungens* open hummock grassland over *Ptilotus calostachyus*, *Ptilotus exaltatus* and *Arivela viscosa* isolated forbs on red loamy sand on sand plains.
Acacia tall shrubland to tall open shrubland	FP AaApAte SeglMam EnpoEmuAri Tp	*Acacia aptaneura*, *Acacia paraneura* and *Acacia tetragonophylla* tall shrubland to tall open shrubland over *Senna glutinosa* subsp. ×*luerssenii* and *Maireana melanocoma* mid to low scattered shrubs over *Enneapogon polyphyllus*, *Eriachne mucronata*, *Aristida inaequiglumis* and *Triodia pungens* low scattered tussock and hummock grasses on brown clay loam on stony plains and drainage areas/ floodplains.
Corymbia Low Open Woodland	MI CocAa CcCs Tb	Low Open Woodland of *Corymbia candida* subsp. *dipsodes* and *Acacia aptaneura* over Open Tussock Grassland of **Cenchrus ciliaris* and **Cenchrus setiger* and Very Open Hummock Grassland of *Triodia basedowii* on red brown loam on floodplains and minor drainage lines.
Corymbia Low Woodland	MI AaCocAci CcTp AteAprAsy	Low Woodland of *Acacia aptaneura*, *Corymbia candida* and *Acacia citrinoviridis* with Open Tussock Grassland of **Cenchrus ciliaris* with Very Open Tussock Grassland of *Triodia pungens* with High Open Shrubland of *Acacia tetragonophylla*, *Acacia pruinocrapa* and *Acacia synchronicia* on red-orange to red-brown clay to clay loam soils on minor drainage lines.
Eucalyptus Low Woodland	ME TtEuaEte ApypAtpPl EvCh	Tussock Grassland of *Themeda triandra*, *Eulalia aurea* and *Eriachne tenuiculmis* with High Shrubland of *Acacia pyrifolia* var. *pyrifolia*, *Acacia tumida* var. *pilbarensis* and *Petalostylis labicheoides* and Open Woodland of *Eucalyptus victrix* and *Corymbia hamersleyana* on red brown silty loam on medium drainage lines and flood plains.

Broad Floristic Formation	Vegetation Association Description	
Eucalyptus Mid Woodland	MA EvEcAci CcErbTp AsyPlAa	Woodland of *Eucalyptus victrix*, *Eucalyptus camaldulensis* and *Acacia citrinoviridis* with Open Tussock Grassland of **Cenchrus ciliaris* and *Eriachne benthamii* with Open Tussock Grassland of *Triodia pungens* with High Open Shrubland of *Acacia synchronicia*, *Petalostylis labichioides* and *Acacia aptaneura* on red-orange clay loam to sandy clay loam on major drainage lines.
Eucalyptus Woodland	MA EcrEv AciApypMg CcEuaTt	Woodland of *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* over High Open Shrubland of *Acacia citrinoviridis*, *Acacia pyrifolia* var. *pyrifolia* and *Melaleuca glomerata* over Tussock Grassland of **Cenchrus ciliaris*, *Eulalia aurea* and *Themeda triandra* on brown clay loam on banks of major drainage lines.
	MA EcrEvi Aci Mgl	Woodland of *Eucalyptus camaldulensis* and *Eucalyptus victrix* with Low Woodland of *Acacia citrinoviridis* and High Open Shrubland of *Melaleuca glomerata* with Low Scattered Shrubs of *Corchorus crozophorifolius* over Scattered Hummock Grass of *Triodia pungens*.
	MA EvAci CcCyaSopl ApyTefc	Low Woodland of Eucalyptus victrix and Acacia citrinoviridis with Very Open Tussock Grassland of *Cenchrus ciliaris, Cymbopogon ambiguus, and Sorghum plumosum with Open Shrubland of A. pyrifolia and Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2
	MA EvAciEcr TercCocrApyp CcEuaTt	Woodland of *Eucalyptus victrix*, *Acacia citrinoviridis* and *Eucalyptus camaldulensis* subsp. *refulgens* over Low Open Shrubland of *Tephrosia rosea* var. *clementii*, *Corchorus crozophorifolius* and *Acacia pyrifolia* var. *pyrifolia* over Very Open Tussock Grassland of **Cenchrus ciliaris*, *Eulalia aurea* and *Themeda triandra* on brown loamy sand on channels of major drainage lines.
Eucalyptus open woodland	MA EcoAciCyix	Low open woodland of *Eucalyptus camaldulensis* and *Eucalyptus victrix* over high open shrubland of *Acacia citrinoviridis* and (+/-) *Melaleuca glomerata* over very open sedgeland of *Cyperus ixiocarpus* and *Cyperus vaginatus* with very open tussock grassland of **Cenchrus ciliaris* on orange sandy clay in major creek lines.
	MA EvCcCh	*Eucalyptus victrix*, *Corymbia candida* and *Corymbia hamersleyana* woodland to open woodland over *Acacia pyrifolia* var. *pyrifolia, Acacia citrinoviridis* and *Acacia dictyophleba* open shrubland over **Cenchrus ciliaris*, *Chrysopogon fallax*, *Themeda triandra* tussock grassland over *Evolvulus alsinoides*, *Goodenia muelleriana* and *Trichodesma zeylanicum* var. *zeylanicum* open forbland on red/brown sandy loam on major drainage lines.
Mulga woodland	SS – Ap	*Acacia pteraneura* open woodland with occasional *Corymbia candida* and *Eucalyptus gamophylla* isolated trees over *Acacia ancistrocarpa*, *Acacia sibirica* and *Acacia pruinocarpa* open shrubland over **Cenchrus ciliaris*, *Themeda triandra* and tussock grassland over *Aristida holathera* var. *holathera* open tussock grassland over *Triodia pungens* and *Triodia vanleeuwenii* open hummock grassland over *Abutilon otocarpum, Arivela viscosa* and *Ptilotus exaltatus* open forbland on red/brown sandy loam sandy/stony plains.
Themeda Closed Tussock Grassland	4b	Closed Tussock Grassland of *Themeda triandra* Open Heath of *Acacia bivenosa*, *Petalostylis labicheoides* and *Acacia adsurgens* and Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* (Scattered Mallees of *Eucalyptus gamophylla*) in sandy alluvium along narrowly incised drainage lines.
Themeda Open Tussock Grassland	ME TtCcTp EtEx AdIngSivg	Open Tussock Grassland of *Themeda triandra* and **Cenchrus ciliaris*, with Open Hummock grassland of *Triodia pungens* with Low Woodland of *Eucalyptus trivalva* and *Eucalyptus xerothermica* with Low Open Shrubland of *Sida* sp. L (A.M. Ashby 4202) on brown clay drainage lines on flats.
	ME TtEaTp CoasEx AdIngSisl	Open Tussock Grassland of *Themeda triandra* and *Eulalia aurea*, with Open Hummock grassland of *Triodia pungens* with Low Open woodland of *Corymbia aspera* and *Eucalyptus xerothermica* with Open Shrubland of *Acacia dictyophleba*, *Indigofera georgei* and *Sida* sp. L (A.M. Ashby 4202) on brown clay drainage lines on flats.

Broad Floristic Formation	Vegetation Association Description	
Themeda Tussock Grassland	FP TtEuaCc ChEx AdAancAmac	Tussock Grassland of *Themeda triandra*, *Eulalia aurea* and **Cenchrus ciliaris* with Low Open Woodland of *Corymbia hamersleyana* and *Eucalyptus xerothermica* over High Open Shrubland of *Acacia dictyophleba*, *Acacia ancistrocarpa* and *Acacia macraneura* on brown silty clay loam on floodplains.
	ME TtChfEua ExEvCh PlApaApyp	Tussock Grassland of *Themeda triandra*, *Chrysopogon fallax* and *Eulalia* aurea with Low Open Woodland of *Eucalyptus xerothermica*, *Eucalyptus victrix* and *Corymbia hamersleyana* and Shrubland of *Petalostylis labicheoides*, *Acacia pachyacra* and *Acacia pyrifolia* var. *pyrifolia* on red sandy loam on medium drainage lines.
Triodia Hummock Grassland	2c	Hummock Grassland of *Triodia* sp. Shovelanna Hill (and *Triodia wiseana*) with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and Scattered Shrubs of *Senna glutinosa* subsp. x *luerssenii*, *Hakea chordophylla* and *Grevillea berryana* in red brown loam soils on footslopes and plains.
	2d	Hummock Grassland of *Triodia* sp. Shovelanna Hill and *Triodia pungens* with Low Woodland of *Acacia aptaneura*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* over Shrubland of *Acacia pruinocarpa*, *Eremophila latrobei* subsp. *latrobei* and *Acacia bivenosa* in pisolitic ironstone on hill crests.
	2h	Hummock Grassland of *Triodia wiseana* and *Triodia pungens* with Shrubland of *Acacia bivenosa*, *Acacia synchronicia* and *Senna glutinosa* subsp. x *luerssenii* and Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* in sandy loam soils on undulating low hill.
	CP TwTa Ese AbPlApyp	Hummock Grassland of *Triodia wiseana* and *Triodia angusta* with Open Mallee of *Eucalyptus socialis* subsp. *eucentrica* and Open Shrubland of *Acacia bivenosa*, *Petalostylis labicheoides* and *Acacia pyrifolia* var. *pyrifolia* on light brown clay loam on calcrete plains and rises.
	FP Tb AaApr Erff	Hummock Grassland of *Triodia basedowii* with Low Open Woodland of *Acacia aptaneura* and *Acacia pruinocarpa* over Open Shrubland of *Eremophila forrestii* subsp. *forrestii* on red sandy loam on floodplains.
	FS TpTsTrag Cc AaApr	Hummock Grassland of *Triodia pungens*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia angusta* over Open Tussock Grassland of *Cenchrus ciliaris* with Low Open Woodland of *Acacia aptaneura* and *Acacia pruinocarpa* on footslopes with brown silty loam.
	FS TpTvCc AaAprAin AsiAteAme	Hummock Grassland of *Triodia pungens* and *Triodia vanleeuwenii* with Tussock Grassland of **Cenchrus ciliaris*, with Low Woodland of *Acacia aptaneura*, *Acacia pruinocarpa* and *Acacia incurvaneura* with Scattered Shrubs of *Acacia sibirica*, *Acacia tetragonophylla* and *Acacia melleodora* on red-orange clay loam soils on gravel footslopes.
	GG Tp EllCf Dop	Hummock Grassland of *Triodia pungens* with Low Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia ferriticola* over Open Shrubland of *Dodonaea pachyneura* on red brown sandy clay loam in gullies.
	HC TpTs Ell AaAkAsi	Hummock Grassland of *Triodia pungens* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* over Scattered Tall Shrubs of *Acacia aptaneura*, *Acacia kempeana* and *Acacia sibirica* on red brown loam on hill crests, hill slopes and breakaway slopes.
	HC TwTbrTp EllCh AmaGrwhAb	Hummock Grassland of *Triodia wiseana*, *Triodia brizoides* and *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over High Open Shrubland of *Acacia maitlandii*, *Grevilllea wickhamii* subsp. *hispidula* and *Acacia bivenosa* on red brown sandy loam on hill crests and upper hill slopes.
	HC TwTvTp Ell AmaAbAi	Hummock Grassland of *Triodia wiseana*, *Triodia vanleeuwenii* and *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* with Open Shrubland of *Acacia maitlandii*, *Acacia bivenosa* and *Acacia inaequilatera* on red-orange loam on hill crests.

Broad Floristic Formation	Vegetation Association Description	
	HS TsAbEll	Hummock grassland of *Triodia vanleeuwenii* and *Triodia pungens* with very open tussock grassland of *Eriachne lanata* under open shrubland of *Acacia bivenosa* and or *Acacia hilliana* and woodland of *Eucalyptus leucophloia* subsp. *leucophloia* on stony hillslopes.
	HS TsTwTp EllCh AhiAaa	Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835), *Triodia wiseana* and *Triodia pungens* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia hamersleyana* over Low Open Shrubland of *Acacia hilliana* and *Acacia adoxa* var. *adoxa* on red brown sandy loam on hill slopes.
	HS Tw AiAbApa Ell	Hummock Grassland of *Triodia wiseana* with Open Shrubland of *Acacia inaequilatera*, *Acacia bivenosa* and *Acacia pachyacra* and Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* on hillslopes with brown sandy loam.
	HS Tw EllChHc AancAbAa	Hummock Grassland of *Triodia wiseana* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Corymbia hamersleyana* and *Hakea chordophylla* and Open Shrubland of *Acacia ancistrocarpa*, *Acacia bivenosa* and *Acacia aptaneura* on red sandy loam on hill slopes.
	SA Tb ChEg ScpBeKep	Hummock Grassland of *Triodia basedowii* with Low Open Woodland of *Corymbia hamersleyana* and *Eucalyptus gamophylla* over Low Open Shrubland of *Scaevola parvifolia*, *Bonamia erecta* and *Kennedia prorepens* on red loamy sand on sand plains.
	SP TpTb Eg PlAbAanc	Hummock Grassland of *Triodia pungens* and *Triodia basedowii* with Open Mallee of *Eucalyptus gamophylla* and Shrubland of *Petalostylis labicheoides*, *Acacia bivenosa* and *Acacia ancistrocarpa* on red brown loamy sand on stony plains and footslopes.
	SP Ts Ai	Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with High Open Shrubland of *Acacia inaequilatera* on red brown loamy sand on lower hill slopes and stony plains.
	RP Tpu EsoExe AciAscAbi	Hummock Grassland of *Triodia pungens* and Low Woodland of *Eucalyptus socialis* and *Eucalyptus xerothermica* over High Open Shrubland of *Acacia citrinoviridis*, *Acacia sclerosperma*, and *Acacia bivenosa* and Very Open Tussock Grassland of **Cenchrus ciliaris* and *Paraneurachne muelleri* on rocky plains.
Triodia Open Hummock Grassland	GG Tp CfFibAcao DopAh	Open Hummock Grassland of *Triodia pungens* with Low Open Woodland of *Corymbia ferriticola*, *Ficus brachypoda* and *Acacia catenulata* subsp. *occidentalis* over High Open Shrubland of *Dodonea pachyneura* and *Acacia hamerselyensis* on red sandy clay loam in gullies and on breakaway slopes.
	HC TpTvAms EllHc SeggSegpAhi	Open Hummock Grassland of *Triodia pungens* and *T. vanleeuwenii* with Very Open Tussock Grassland of *Amphipogon sericeus* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Hakea chordophylla*, with Open Shrubland of *Senna glutinosa* subsp. *glutinosa* and *S. glutinosa* subsp. *pruinosa*, and *Acacia hilliana* on red-orange to brown rocky ironstone hills and crests.
	HC TvAms CddHc	Open Hummock Grassland of *Triodia vanleeuwenii* with Scattered Tussock Grasses of *Amphipogon sericeus* with Scattered Low Trees of *Corymbia deserticola* subsp. *deserticola* with Scattered Tall Shrubs of *Hakea chordophylla* on light brown clay soils on rocky ironstone hills.
	HP TmTp AaAayApr PtoErff	Open Hummock Grassland of *Triodia melvillei* and *T. pungens* with Low Open Woodland of *Acacia aptaneura*, *A. ayersiana*, and *A. pruinocarpa* with Open Shrubland of *Ptilotus obovatus* and *Eremophila forrestii* subsp. forrestii on dark brown clay plains.
	HS TbrTw Ai SeggSegp	Very Open Hummock Grassland of *Triodia brizoides* and *T. wiseana* with Tall Sparse Shrubland of *Acacia inaequilatera* with Low Scattered Shrubs of *Senna glutinosa* subsp. *glutinosa* and *S. glutinosa* subsp. *pruinosa* on red-orange to brown rocky ironstone scree slopes.
	HS TpTwTv Ell SeggSegpAb	Open Hummock Grassland of *Triodia pungens*, *T. wiseana*, and *T. vanleeuwenii* with Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* with Open Shrubland of *Senna glutinosa* subsp. *glutinosa*, *S. glutinosa* subsp. *pruinosa*, and *Acacia bivenosa* on red-orange to brown rocky ironstone upper and mid slopes.

Broad Floristic Formation	Vegetation Association Description	
	SA TpPamu EgEx AtenSeaoAb	Open Hummock Grassland of *Triodia pungens* with Scattered Tussocks of *Paraneurachne muellerii* with Low Open Woodland of *Eucalyptus gamophylla* and *E. xerothermica* with Open Shrubland of *Acacia tenuissima*, *Senna artemisioides* subsp. *oligophylla* and *A. bivenosa* on orange to brown sandy clay plains.
	SA Tpu SaoSahAdi EerAhh	Open Hummock Grassland of *Triodia pungens* with a Shrubland of *Senna artemisioides* subsp. *oligophylla*, *Senna artemisioides* subsp. *helmsii*, and *Acacia dictyophleba* over Open Tussock Grassland of *Eragrostis eriopoda* and *Aristida holathera* var. *holathera* on orange sand plains.
	SL TvuTpu EllApr SggAbi	Open Hummock Grassland of *Triodia vanleeuwenii* and *Triodia pungens* with Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* over High Open Shrubland of *Senna glutinosa* subsp. *glutinosa* and *Acacia bivenosa* on orange sand clay slopes.
	SS Tp AbPlSal ExHc	Open Hummock Grassland of *Triodia pungens* with Open Shrubland of *Acacia bivenosa*, *Petalostylis labichiodes* and *Santalum lanceolatum* with Low Open Woodland of *Eucalyptus xerothermica* and *Hakea chordophylla* on orange-brown sandy clay loam soils with calcrete gravel.
Triodia Very Open Hummock Grassland	FS TbrTp AbSeaoSegl Ell	Very Open Hummock Grassland of *Triodia brizoides* and *T. pungens* with Low Open Shrubland of *Acacia bivenosa*, *Senna artemisioides* subsp. *oligophylla*, and *S. glutinosa* subsp. x *luerssenii* with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* on red-orange to brown clay soils with ironstone and quarts on low undulating hills.
	FS TvTpPamu EgHc AbAancAi	Very Open Hummock Grassland of *Triodia vanleeuwenii* and *T. pungens* with Scattered Tussock Grasses of *Paraneurachne muelleri* with Open Woodland of *Eucalyptus gamophylla Hakea chordophylla* with Very Open Shrubland of *Acacia bivenosa*, *A. ancistrocarpa*, and *A. inaequilatera* on red-orange to brown sandy clay with ironstone on lower slopes.
Triodia grassland	HS EgExEs	*Eucalyptus gamophylla*, *Eucalyptus xerothermica* and *Eucalyptus socialis* isolated mallee trees over *Acacia bivenosa*, *Acacia inaequilatera* and *Acacia ancistrocarpa* open shrubland over *Aristida holathera* var. *holathera*, *Paraneurachne muelleri* and *Aristida contorta* open tussock grassland over *Triodia wiseana* and *Triodia vanleeuwenii* open hummock grassland over *Ptilotus exaltatus*, *Ptilotus astrolasius* and *Gompholobium oreophilum* isolated forbs on red/brown sandy loam with rocky low hillslopes.
	HS El	*Eucalyptus leucophloia* subsp. *leucophloia* isolated trees over *Senna artemisioides* subsp. *oligophylla*, *Acacia inaequilatera* and *Hakea lorea* open shrubland over *Aristida contorta*, *Enneapogon caerulescens* and *Eriachne pulchella* open tussock grassland over *Triodia wiseana*, *Triodia vanleeuwenii* and *Triodia pungens* hummock grassland over *Ptilotus auriculifolius*, *Gomphrena canescens* and *Ptilotus astrolasius* and *Goodenia triodiophila* isolated forbs on rocky hillslopes, low rocky rises and hills.
	HS ElCd	*Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia deserticola* isolated trees over *Hakea lorea*, *Acacia inaequilatera* and *Senna glutinosa* subsp. *glutinosa* isolated shrubs over *Aristida holathera* var. *holathera*, *Eriachne mucronata* and *Aristida contorta* open tussock grassland over *Triodia vanleeuwenii*, *Triodia pungens* and *Triodia wiseana* hummock grassland over *Gomphrena canescens*, *Ptilotus calostachyus* and *Ptilotus exaltatus* isolated forbs on rocky hillslopes, low rocky rises and hills.
Triodia low open hummock grassland	HC TvTp AadAhi GrwPlAma ChHc	*Triodia vanleeuwenii* and *Triodia pungens* low open hummock grassland with *Acacia adoxa* var. *adoxa* and *Acacia hilliana* low sparse to open shrubland with *Grevillea wickhamii*, *Petalostylis labicheoides* and *Acacia maitlandii* tall isolated shrubs with *Corymbia hamersleyana* and *Hakea chordophylla* low isolated trees on red-brown sandy loam on ironstone hillcrests/ upper hillslopes and undulating low hills.
	HS TvTw AbAsiAsyApr ElHcEg	*Triodia vanleeuwenii*, *Triodia wiseana* low open hummock grassland with *Acacia bivenosa*, *Acacia sibirica*, *Acacia synchronicia* and *Acacia pruinocarpa* tall sparse shrubland with *Eucalyptus leucophloia* subsp. *leucophloia*, *Hakea chordophylla* and *Eucalyptus gamophylla* low isolated trees on red-brown sandy clay loam on low undulating stony hills.

Broad Floristic Formation	Vegetation Association Description	
Typha Sedges	MA TydCyv EcrEv AciAcp	Sedges of *Typha domingensis* and *Cyperus vaginatus* with Open Woodland of *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* over Low Open Woodland of *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* on brown clayey sand on permanent pools along major drainage lines.

3.4.2 Significant Flora

No species listed under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) or gazetted as Threatened Flora species under the *Biodiversity Conservation Act 2016* (BC Act) were identified within the Amendment Application Area.

Seven Priority Flora and one potential Priority Flora species have been identified within the Amendment Application Area (**Figure 5, Table 4**):

- *Aristida jerichoensis* var. *subspinulifera* (Priority 3): 1 record
- *Aristida lazaridi* (Priority 3): 9 records
- *Eragrostis* sp. Mt Robinson (S. van Leeuwen 4109) (Priority 3): 1 record
- *Eremophila naaykensii* (Priority 3): 5 records
- *Hibiscus* aff. *campanulatus* (Priority 3 if species is confirmed): 227 records (and a further 822 records clipped from the Amendment Application Area)
- *Ipomoea racemigera* (Priority 3): 4 records
- *Lepidium catapycnon* (Priority 4): 17 records
- *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (Priority 3): 2 records.

Priority flora (and records of *Hibiscus* aff. *campanulatus*) will be avoided using a 10 m buffer, where practicable.

Table 4 Significant Flora Occurring within the Amendment Application Area

Conservation Significant Species	Significance	Description	Habitat Relevance	Potential Impact on Species
Aristida jerichoensis var. *subspinulifera*	Priority 3 (DBCA)	*Aristida jerichoensis* var. *subspinulifera* is a compact tufted perennial grass ranging in height from 0.3 to 0.8 m with rough lower floret grooves (WAH 2016).	*Aristida jerichoensis* var. *subspinulifera* occurs on hardpan plains in the Pilbara. It is known from approximately 230 records within the Pilbara region, including numerous records around Newman extending west, and large populations of this species throughout the central Pilbara region directly east of Karijini National Park. This species has been recorded from: • one location within the Amendment Application Area • 450 other locations outside of the Amendment Application Area.	**Low** The clearing of a single record of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: 1. This species is widely distributed across the southern Pilbara outside of the Amendment Application Area 2. There are 450 records of this species outside of the Amendment Application Area.
Aristida lazaridis	Priority 2 (DBCA)	*Aristida lazaridis* is a tufted perennial grass ranging in height from 0.4 m to 1.5 m occurring in areas of sand or loam in the Pilbara (Atlas of Living Australia 2016).	*Aristida lazaridis* occurs in the Pilbara region of Western Australia, in the Northern Territory and extensively throughout Queensland (ALA 2016). This species has been recorded from: • 9 locations within the Amendment Application Area • one location within Karijini National Park • 587 other locations outside of the Amendment Application Area across the Pilbara and the entire north of Australia.	**Low** The clearing of the any of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: 1. This species is widespread across the Application Area, the broader region and the north of Australia 2. There are 587 records of this species outside of the Amendment Application Area 3. There is one record of this species within Karijini National Park.
Eragrostis sp. Mt Robinson (S. van Leeuwen 4109)	Priority 2 (DBCA)	*Eragrostis* sp. Mt Robinson is a perennial tussock grass with a woolly base growing to 0.3 m high .It is occurs on red-brown skeletal soils, ironstone on steep slopes and summits (DPaW and Rio Tinto 2015).	*Eragrostis* sp. Mt Robinson has occurs on red-brown skeletal soils, ironstone on steep slopes and summits. This species has been recorded from: • one location within the Amendment Application Area. • 13 other locations outside of the Amendment Application Area.	**Low** The clearing of any of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as it is known from 13 other records in the broader region.
Eremophila naaykensii	Priority 3 (DBCA)	*Eremophila naaykensii* is an erect shrub growing up to 3.5 m height. It has cream or lilac flowers in June to October. It is found on open rocky slopes, gullies and rock faces associated with large hills and cliffs (DPaW and Rio Tinto 2015).	*Eremophila naaykensii* is found on open rocky slopes, gullies and rock faces associated with large hills and cliffs. This species has been recorded from: • five locations within the Amendment Application Area • 780 other locations across the southern Pilbara outside of the Amendment Application Area.	**Low** The clearing of any of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as this species is widely distributed across the southern Pilbara outside of the Amendment Application Area.
Hibiscus aff.	Priority 3	*Hibiscus campanulatus* is a large	This record has not been confirmed and until a positive	**Low**

Conservation Significant Species	Significance	Description	Habitat Relevance	Potential Impact on Species
campanulatus	(DBCA)	perennial shrub growing 1.5 to 3 m tall, with whitish cream to light rusty brown, erect, stellate hairs densely covering all vegetative parts to a greater or lesser degree. Flowers are white to pale lilac in August. This species often grows in sheltered or rocky drainage lines associated with cliff-lines or rocky ridges typically in soils associated with the Canga detrital formations of the Pilbara region (DPaW and Rio Tinto 2015).	identification is determined the records will be treated as they are *Hibiscus campanulatus.* This species has been recorded from: • 227 locations within the Amendment Application Area • 822 locations that have been specifically excluded from the Amendment Application Area • 85 other locations in the broader region.	822 records of this species have been excluded from the Amendment Application Area. These relate to the more dense populations of this species. Records of *Hibiscus* aff. *campanulatus*) will be avoided using a 10 m buffer, where practicable, with no more than 40 records of *Hibiscus* aff. *campanulatus* being cleared if necessary. If required the clearing of up to 40 records would not result in any significant impact upon species distribution.
Ipomoea racemigera	Priority 3 (DBCA)	*Ipomoea racemigera* is a pilose, creeping annual herb or climber with twining stems and white funnel-shaped flowers which are produced throughout the year (DPaW and Rio Tinto 2015).	*Ipomoea racemigera* is mostly recorded from sandy soils along medium and major watercourses in the Pilbara region of Western Australia from Newman to Kununurra, as well as in the Northern Territory, South Australia and Queensland (DPaW and Rio Tinto 2015). This species has been recorded from: • four locations within the Amendment Application Area • 25 locations within Karijini National Park • 456 other locations across the Pilbara Region.	**Low** The clearing of a any of the four records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: 1. there are 25 records of this species within Karijini National Park 2. This species has been recorded broadly across the Pilbara from 456 locations outside of the Amendment Application Area 3. Is known to occur in the Northern Territory, South Australia and Queensland.
Lepidium catapycnon	Priority 4 (DBCA)	*Lepidium catapycnon* is an open, woody perennial herb / shrub growing between 0.2 to 0.3 m high with distinctive zigzag stems with white flowers in October (DPaW and Rio Tinto 2015).	*Lepidium catapycnon* occurs on skeletal soils in open woodland in usually hilly areas, more frequently on south facing slopes (DPaW and Rio Tinto 2015) in the southern Pilbara (WAH 2016). *Lepidium catapycnon* has been identified as a pioneer species that responds rapidly to disturbance, especially fire (Onshore Environmental 2013). The majority of known populations of this species have been recorded in areas that were recently burnt. This species has been recorded from: • 17 locations within the Amendment Application Area • 45 locations within Karijini National Park • 1120 other locations across the southern Pilbara.	**Low** The clearing of any of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: 1. there are 45 records of this species within Karijini National Park 2. This species has been recorded broadly across the southern Pilbara from 1,120 locations outside of the Amendment Application Area 3. This species responds rapidly to disturbance.

Conservation Significant Species	Significance	Description	Habitat Relevance	Potential Impact on Species
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	Priority 3 (DBCA)	Themeda sp. Hamersley Station (M.E. Trudgen 11431) is tussock perennial grass growing 0.9 to 1.8 m high, flowering in August (WAH 2016).	Themeda sp. Hamersley Station (M.E. Trudgen 11431) occurs on drainage lines, clay flats, crabhole flats and dark, self-mulching clays across the Pilbara bioregion (DPaW and Rio Tinto 2015). This species has been recorded from: • 2 locations within the Amendment Application Area • 166 other locations across the broader Pilbara region.	**Low** The clearing of either of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as this species is broadly distributed across the Pilbara IBRA region with 166 records outside of the Amendment Application Area.

3.4.3 Weeds

Twenty six introduced flora species (weeds) have been recorded within the Amendment Application Area (**Table 5**). Control of established weed populations will be carried out according to BHP's standard *Weed Control and Management Procedures.*

Table 5 Introduced Flora of the Amendment Application Area

Species	Common Name	DPAW Rating (DPAW 2016)	Declared Pest[1]
**Aerva javanica*	Kapok Bush	High and Rapid	No
**Agave americana*	Century Plant	High and Slow	No
**Bidens bipinnata*	Bipinnate Beggartick	Unknown and Rapid	No
**Bothriochloa pertusa*	Indian bluegrass	Not listed	No
**Brassica tournefortii*	Mediterranean Turnip	High and Rapid	No
**Cenchrus ciliaris*	Buffel Grass	High and Rapid	No
**Chloris barbata*	Purpletop Chloris	High and Rapid	No
**Chloris virgata*	Feathertop Rhodes Grass	High and Rapid	No
**Citrullus amarus*	Pie Melon	Unknown and Moderate	No
**Cyclospermum leptophyllum*	Wild Celery	Not listed	No
**Cynodon dactylon*	Couch	High and Rapid	No
**Cynodon nlemfuensis* var. *nlemfuensis*	African Stargrass	Not listed	No
**Dichanthium annulatum*	Marvel grass	Not listed	No
**Digitaria ciliaris*	Summer Grass	Not listed	No
**Echinochloa colona*	Awnless Barnyard Grass	High and Rapid	No
**Erigeron bonariensis*	Flaxleaf Fleabane	Not listed	No
**Ficus religiosa*	Sacred Fig	Not listed	No
**Lactuca serriola*	Prickly Lettuce	Not listed	No
**Malvastrum americanum*	Spiked Malvastrum	High and Rapid	No
**Rumex vesicarius*	Ruby Dock	High and Rapid	No
**Setaria verticillata*	Whorled Pigeon Grass	High and Rapid	No
**Sisymbrium orientale*	Indian Hedge Mustard	Low and Unknown	No
**Solanum nigrum*	Black Berry Nightshade	Low and Unknown	No
**Sonchus oleraceus*	Common Sowthistle	Low and Rapid	No
**Tamarix aphylla*	Athel Tree	High and Rapid	Yes
**Vachellia farnesiana*	Mimosa Bush	High and Rapid	No

[1] *Biosecurity and Agriculture Management Act* 2007 (BAM Act) s22

3.4.4 Fauna Habitat

A total of 10 vertebrate fauna habitats occur within the Amendment Application Area (**Figure 6**):

- **Drainage Area/ Floodplain:** Lower lying plain often subjected to sheet flow following large rainfall events. Vegetation and substrates of this habitat was variable, often comprising scattered *Eucalyptus* over *Acacia* and/or *Grevillea* shrubs with an understory dominated by *Triodia* hummock grasses and/or mixed tussock grasses on alluvial substrates, often with heavy clays and gravel. Tussock grasses can be dominant within Drainage Area/ Floodplain habitat as a result of high rainfall events.
- **Minor Drainage Line:** Usually lacks a tall dense upper storey, but with a dense mid storey, including sparse *Eucalyptus* sp., and *Acacia* sp. over tussock grasses and *Triodia* sp. hummock grasses.
- **Major Drainage Line:** Major Drainage Lines comprise mature River Red Gums, Coolibahs and stands of Silver Cadjeput over river pools. Open, sandy or gravelly riverbeds characterise this habitat type. In ungrazed areas, the vegetation adjacent to the main channel or channels is denser, taller and more diverse than adjacent terrain and can include reed beds around pools.
- **Wetland:** Wetland habitats differ from permanent/semi-permanent pools as they are generally a larger water body that supports their own distinct ecosystem and aquatic fauna assemblages (waterfowl, fish etc.). Due to their rarity in the Pilbara region, these habitats generally have elevated significance. Depending on the surrounding habitat, these areas can be of importance to MNES species, such as northern quoll and Pilbara olive python (if surrounded by rocky habitats) and to some Migratory listed bird species.
- **Mulga Woodland:** Comprises stands of mulga (*Acacia aneura*) over clay or stony substrates. Differs from other plains by having a monoculture of mulga compared to a diversity of other Acacia species.
- **Sand Plain:** Sand Plain habitat is characterised by relatively deep sandy soils supporting dense spinifex grasslands and sparse shrubs. This habitat transitions into patches of Mulga in places. This habitat often occurs as terraces along Major Drainage Lines
- **Sandy / Stony Plain:** These are predominantly stony plains with localised depositions of sand.
- **Stony Plain:** Comprises low-lying open plains and the rolling hills below upland areas, with very slight to no gradient. The substrate consists of gravel and pebbles, with vegetation dominated by *Triodia* and scattered Mulga, eucalpyt and *Acacia* trees, with patches of various small to medium shrub species.
- **Undulating Low Hills:** The Undulating Low Hills habitat comprises low hills and undulating stony plains of higher elevation than Stony Plain. The habitat supports hard spinifex with a mantle of gravel and larger rocks with occasional outcropping or minor breakaway. Vegetation is dominated by hard *Triodia* hummock grasslands with scattered *Eucalyptus* trees and *Acacia*, *Eremophila* and/or *Grevillea* shrubs.
- **Hillcrest/ Hillslope:** Comprises a rocky substrate, often with exposed bedrock, on moderate to steep slopes leading into lower footslopes. This habitat was characterised by steep slopes with a high proportion of coarse fragments dominated by ironstone. These can contain cracks and crevices. Instances of Gorge/ Gully is contained within this habitat. This habitat is usually dominated by open *Eucalyptus* woodlands, *Acacia* and *Grevillea* scrublands and *Triodia* low hummock grasslands.

All areas of Gorge / Gully and Breakaway Cliff, excluding those which were incorrectly mapped by GHD 2022 (**Attachment 1**), have been clipped from the Amendment Application Area.

The fauna habitats identified within the Amendment Application Area extend beyond the project boundary and are common in the surrounding region.

3.4.5 Fauna Habitat Features

All known bat caves and waterholes / water features have been clipped out of the Amendment Application Area (**Table 6**).

Table 6 Habitat Features Clipped from the Amendment Application Area

Habitat Feature	Number of Features Clipped	Buffer Applied
Category 3 Ghost Bat Cave	9[1]	150 m
Category 4 Ghost Bat Cave	39	50 m
Category 5 Ghost Bat Cave	6	50 m
Category 4 Pilbara Leaf-nosed Bat Cave	1	50 m
Waterhole / water feature[2]	25	10 m

3.4.6 Significant Fauna

The surveys undertaken across the Amendment Application Area have resulted in 10 fauna species of significance being recorded from within or from areas specifically excluded from the Amendment Application Area (**Figure 7**):

- Brush-tailed Mulgara (*Dasycercus blythi*) (DBCA Priority 4)
- Common Sandpiper (*Actitis hypoleucos*) (EPBC Act and BC Act Migratory)
- Ghost Bat (*Macroderma gigas*) (EPBC Act and BC Act Vulnerable)
- Glossy Ibis (*Plegadis falcinellus*) (EPBC Act and BC Act Migratory)
- Grey Falcon (*Falco hypoleucos*) (EPBC Act and BC Act Vulnerable)
- Peregrine Falcon (*Falco peregrinus*) (BC Act Other Specially Protected Fauna)
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) (EPBC Act and BC Act Vulnerable)
- Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) (EPBC Act and BC Act Vulnerable)
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (DBCA Priority 4)
- Wood Sandpiper (*Tringa glareola*) (EPBC Act and BC Act Migratory).

Based on the occurrence of the habitat types and significant fauna species previously recorded in the vicinity an additional two species are considered to potentially occur within the Amendment Application Area (i.e. those considered 'likely' or 'possible' to occur within the Amendment Application Area):

- Fork-tailed Swift (*Apus pacificus*) (Migratory, EPBC Act and BC Act)
- Pilbara Flat-headed Blind-snake (*Anilios ganei*) (DBCA Priority 1).

An assessment of the potential impact of the proposed clearing on the species of significant fauna that may occur in the application amendment area is provided in **Table 7**.

[1] There are existing tracks within the buffer zone of 2 caves. These tracks have been kept within the Amendment Application Area to enable ongoing track maintenance and subsequent rehabilitation activities.
[2] Note that manmade water features (e.g. culverts and turkeys nests had not been excluded from the Amendment Application Area.

Table 7 Significant Fauna Potentially Occurring within the Amendment Application Area

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Birds					
Common Sandpiper (*Actitis hypoleucos*)	Migratory EPBC Act Migratory BC Act	*Actitis hypoleucos* is a non-breeding migratory shorebird which utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (Geering *et al*. 2007).	Two individuals have been recorded foraging in the Major Drainage Line habitat of the Amendment Application Area at Ophthalmia Dam (**Figure 7**).	Recorded	**Low** This species is widespread and distributed throughout Western Australia. Suitable habitat in the same or better condition is located adjacent to Amendment Application Area (i.e. Ophthalmia Dam) and in the wider region, therefore the impact to this species is considered to be Low.
Fork-tailed Swift (*Apus pacificus*)	Migratory (EPBC Act) Migratory (BC Act)	The Fork-tailed Swift breeds in north-east and east Asia, wintering in Australia and southern New Guinea (Johnstone and Storr 1998). Fork-tailed Swifts are entirely aerial within the Pilbara and may forage sporadically over the Amendment Application Area in the summer months, associated with thunderstorms and cyclonic systems (Johnstone and Storr 1998).	The Fork-tailed Swift is largely an aerial species and has a broad distribution across much of Western Australia. It is viewed as a nomadic species and may fly over the Amendment Application Area.	Possible	**Negligible** As this species is entirely aerial and not reliant on terrestrial habitats, therefore the impact to this species is considered to be negligible.
Glossy Ibis (*Plegadis falcinellus*)	Migratory EPBC Act Migratory BC Act	The Glossy Ibis inhabits areas of freshwater wetlands, irrigated areas, and margins of dams, floodplains, brackish and saline wetlands, tidal mudflats, pastures, lawns and public gardens (Johnstone and Storr 2004). This species is a casual vagrant in dry and hilly areas and is mainly a non-breeding visitor to Western Australia (Johnstone and Storr 1998).	The Major and Minor Drainage Line habitat provides some potentially suitable habitat; however it is not the typical habitat for this species. There are four records of this species within the Amendment Application Area at Ophthalmia Dam which provides a more characteristic habitat for the Glossy Ibis (**Figure 7**).	Recorded	**Low** This species is wide ranging and is unlikely to breed within the Amendment Application Area. It is also unlikely to rely solely on habitats within the Amendment Application Area, given that suitable habitat occurs in the Amendment Application Area surrounds (i.e. Ophthalmia Dam) and associated major drainage line habitat which extends beyond the Amendment Application Area, therefore the impact to this species is considered to be Low.
Grey Falcon (*Falco hypoleucos*)	Vulnerable (EPBC Act) Vulnerable (BC Act)	This species appears to have a distribution centred on ephemeral or permanent drainage lines (Garnett and Crowley 2000) with numerous records from the Fortescue Marsh region. Grey Falcons prefer sparsely-treed open plains and drainage lines for hunting (Slater *et al*. 2009). They typically nest in the abandoned nest of a raptor or corvid (Slater *et al*. 2009) in trees or man-made structures, most notably repeater towers.	This species may forage over the habitats of the Amendment Application area, but no suitable breeding habitat is present. One record exists within the Amendment Application Area (**Figure 7**).	Recorded	**Negligible** While the Grey Falcon may forage over the Amendment Application Area, the proposed clearing is unlikely to impact on this species as: • No suitable breeding habitat is present • It has the ability to egress from areas being disturbed • the habitat for this species occurs extensively throughout the Pilbara.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Peregrine Falcon (*Falco peregrinus*)	Other Specially Protected Fauna (BC Act)	The Peregrine Falcon is uncommon but wide ranging across Australia. They occur mainly along coastal cliffs, rivers and ranges as well as wooded watercourses and lakes. The Peregrine Falcon nests primarily on cliffs, granite outcrops and quarries, and feed mostly on birds (Johnstone and Storr 1998).	There are no suitable breeding sites for this species within Amendment Application Area. It may forage in the Amendment Application Area as part of a wider home range.	Possible	**Low** The proposed clearing activities are unlikely to impact of the Peregrine Falcon as: • While it may forage over the Amendment Application Area the habitats commonly associated with this species (i.e. cliffs) are not located in the Amendment Application Area • If foraging in the area it has the ability to egress from areas being disturbed.
Wood Sandpiper (*Tringa glareola*)	Migratory EPBC Act Migratory BC Act	The Wood Sandpiper is a summer non-breeding migratory shorebird that occurs along the coast and inland regions of Western Australia. It primarily inhabits shallow fresh waters such as lagoons, swamps, claypans, dams and sewerage ponds (Johnstone and Storr 1998; Geering *et al*. 2007).	The Major Drainage Line habitat type and open mud flats provided by retreating dam water can provide foraging habitat for this species. This species is more frequently recorded inland than other migratory wader species. It has been recorded from three locations at Ophthalmia Dam (**Figure 7**).	Recorded	**Low** This species is wide ranging, and it does not breed Western Australia. It is also unlikely to rely solely on habitats within the Amendment Application Area, given that suitable habitat occurs in the Amendment Application Area surrounds (i.e. Ophthalmia Dam) and associated major drainage line habitat which extends beyond the Amendment Application Area, therefore the impact to this species is considered to be negligible.
Mammals					
Brush-tailed Mulgara (*Dasycercus blythi*)	Priority 4 (DBCA)	Brush-tailed mulgaras occur in a range of vegetation types, however, the principal habitat is mature hummock grasslands of spinifex, especially *Triodia basedowii* and *T. pungens* (Masters *et al*. 2003). Note: Woolley, et. al. (2013) noted that the Crest-tailed Mulgara (*Dasycercus cristicauda*) is unlikely to occur within the Pilbara.	Sand Plain habitat of the Amendment Application Area represents suitable habitat for this species. There are twenty four records of Mulgara within the Amendment Application Area including two direct observations, two scat records and 20 burrows scattered within the Sand Plain habitat (**Figure 7**).	Recorded	**Low** Suitable sand plain habitat for this species is represented outside of the Amendment Application Area, following the Fortescue River tributary. Disturbance to known active Mulgara burrows will be avoided using a 10 m buffer, where practicable, therefore the impact to this species is considered to be negligible.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Ghost Bat (*Macroderma gigas*)	Vulnerable EPBC Act Vulnerable BC Act	Ghost Bats are patchily distributed across most of northern Australia, however the recent contraction in the distribution in central Australia has left the Pilbara population of ghost bats isolated by extensive sandy deserts (Worthington-Wilmer *et al*. 1994). They are generally associated with Gorge / Gully or drainage line habitats, requiring an undisturbed cave, deep fissure or disused mine shaft in which to roost. The Ghost Bat forages in areas of open woodland (Churchill 2008).	All caves with the potential to be used by Ghost Bats have been excluded from the Amendment Application Area (**Table 6**). There have been six records of Ghost Bats associated with four of the excluded caves making it likely that Ghost Bats will forage over the Amendment Application Area (**Figure 7**).	Recorded	**Low** This species is likely to forage across the Amendment Application Area and its surrounds. All suitable caves have been excluded from the Amendment Application Area and therefore the potential impact on the species is not expected to be significant.
Pilbara Leaf-nosed Bat (*Rhinonicteris aurantius*)	Vulnerable EPBC Act Vulnerable BC Act	The Pilbara Leaf-nosed Bat is a poor thermoregulators and requires deep caves or disused mine shafts in which to roost (van Dyck and Strahan 2008), at least in the dry season. These bats have been recorded in isolated populations in the Pilbara, and are present only where suitable roosting niches are available. They are generally sparsely distributed. The Pilbara Leaf-nosed Bat forages in areas of open woodland (Churchill 2008).	While there have been multiple records of Pilbara Leaf-nosed Bat across eight sites, five are associated with caves excluded from the Amendment Application Area and three are from bat calls within the Amendment Application Area (**Figure 7**). There are no suitable caves within the Amendment Application Area however it is likely that this species will forage over the Amendment Application Area.	Recorded	**Low** This species is likely to forage over the habitats within the Application Area and surrounds. No suitable roosting habitat has been identified within the Application Area and therefore the Pilbara Leaf-nosed Bat would not be dependent on the habitats present within the Application Area and therefore the potential impact on the species is not expected to be significant.
Western Pebble-mound mouse (*Pseudomys chapmani*)	Priority 4 (DBCA)	The Western Pebble·mound Mouse is restricted to the Pilbara region, where it is recognised as an endemic species. Abandoned mounds to the east of its current range indicate a decline in distribution (Menkhorst and Knight 2004). Abandoned mounds in disturbed areas suggest that the species is under threat by grazing and mining activities. The construction of extensive pebble mounds, built from small stones, which typically cover areas from 0.5·9.0 square metres, is characteristic of this species. Mounds are restricted to suitable class stones, and are usually found on gentle slopes and spurs (van Dyck and Strahan 2008).	Preferred habitat for this species includes the Crest / Slope and Stony Plain habitat of the Application Area. Within the Amendment Application Area the Western Pebble-mound Mouse has been recorded from: • 31 active mounds • 14 recently inactive mounds • 55 inactive mounds.	Recorded	**Low** The Western Pebble-mound Mouse is not dependant on the Hillcrest / Hillslope habitat within the Amendment Application Area. The proposed clearing is unlikely to impact on this species as: • the proposed area for clearing is small in a regional context and is contiguous with habitats in the local and regional area • There are large areas of suitable habitat for this species adjacent to the Amendment Application Area • Disturbance to known active Western Pebble-mound Mouse mounds will be avoided with a 10m buffer where practicable.
Reptiles					

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Pilbara Flat-headed Blind Snake (*Anilios ganei*)	Priority 1 (DBCA)	The Pilbara Flat-headed Blind Snake is a moderately robust blind snake known from widely separated areas between Newman and Pannawonica. A very cryptic species. Most often recorded in rocky or stony areas and considered to be possibly associated with moist gorges and gullies (Wilson and Swan 2010).	Little is known about this species habitat preferences and it may occur within habitats of the Amendment Application Area and therefore this species may be a transient visitor.	Possible	**Low** This species may utilise the habitat types within the Amendment Application Area however is unlikely to be reliant on the areas within the Amendment Application Area and therefore the potential impact on the species is not expected to be significant.
Pilbara Olive Python (*Liasis olivaceus barroni*)	Vulnerable (EPBC Act) Vulnerable BC Act	Pilbara Olive Python are widespread across the Pilbara, with many significant populations remaining (Pearson 2003). The Pilbara Olive Python is found in a range of habitats, including drier areas of woodland, escarpments, rocky gorges, gullies and around watercourses (Wilson and Swan 2010). This species is known to den/ shelter in rocky crevices or tree hollows and are often associated with areas containing watercourses. The Pilbara Olive Python uses drainage line habitat to forage and disperse throughout the landscape.	This species may occur in the Riverine / Major Drainage Line habitat of the Amendment Application Area. There are two records of the Pilbara Olive Python within the Amendment Application Area near Ophthalmia Dam and 11 other records from locations which have been excluded from the Amendment Application Area (**Figure 7**).	Recorded	**Low** While this species may forage within the Application Area the proposed activities are unlikely to impact on this species as: • All Gorge / Gully habitat has been excluded from the Amendment Application Area. • Water features with the potential to be used by this species have been excluded from the Amendment Application Area • It has a broad regional distribution that extends well outside of the Amendment Application Area • Its preferred habitat (Gorge/Gully and Major Drainage Line habitats) extend outside the Amendment Application Area and are represented throughout the Pilbara.

3.5 GROUNDWATER

The Amendment Application Area is located in the Pilbara Groundwater Area, proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) (DoW 2009a).

There is one main aquifer within the Amendment Application Area, the Hamersley – Fractured Rock Aquifer which is described as: "The Precambrian rocks of the Hamersley Basin are principally volcanics, shales and iron formations. Groundwater is contained within fractures within these rocks. The groundwater level may be deep below the surface, and is generally fresh. The main use of this aquifer is for mining and mine dewatering from iron ore mines. Bores have also been drilled for road and railway construction. There will be increasing dewatering from the fractured rocks around iron ore mines as the pits become deeper (DoW 2015)".

The Amendment Application Area is also located within the Newman Water Reserve Public Drinking Water Source Area (PDWSA). The Newman Water Reserve PDWSA is a Priority 1 area, which is defined to have no degradation of the water source, where the prime beneficial land use will be the provision of the highest quality public drinking water and hence these areas are treated with a risk avoidance principle.

3.6 SURFACE WATER

The Amendment Application Area is situated in the Pilbara Surface Water Area, proclaimed under the RIWI Act (DoW 2009b).

The Amendment Application Area is located within the four sub-catchments of the Fortescue River catchment: Fortescue River Upper, Homestead Creek, Warrawanda Creek and Whaleback Creek. Two named waterways flow through the Amendment Application Area: Fortescue River and Homestead Creek. The Fortescue River flows in a north-easterly direction approximately 2 km east of the Orebody 24. Homestead Creek runs from west to east across the Amendment Application Area and empties into the Fortescue River north of Ophthalmia Dam. Streamflow in these waterways is ephemeral and associated with high rainfall events during December to April. There are usually between one and three flow events per year. Numerous unnamed perennial drainage lines also traverse the Amendment Application Area. The Amendment Application Area also intersects Ophthalmia Dam which is a permanent and artificial surface water body located in the south east of the Application Area.

Where practicable, existing cleared tracks will be used to cross areas identified as Major Drainage Lines (**Figure 6**). If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

4 ENVIRONMENTAL MANAGEMENT

The management of the environmental aspects of BHP's operations at the Amendment Application Area are managed under the company's AS/NZS ISO 14001:2004 certified Environmental Management System (EMS). The EMS describes the organisational structure, responsibilities, practices, processes and resources for implementing and maintaining environmental objectives at all BHP sites

Additionally, operational controls for environmental management for the Project area are guided by BHP's Charter values. The Charter Values outline a commitment to develop, implement and maintain management systems for sustainable development that drive continual improvement and set and achieve targets that promote efficient use of resources. In order to give effect to the Charter Values, a series of "Global Documents" have been developed.

BHP has also developed a Sustainable Development Policy for its operations. The Sustainable Development Policy outlines a commitment to setting objective and targets to achieve sustainable outcomes and to continually improve our performance.

BHP also has an internal Project Environmental and Aboriginal Heritage Review (PEAHR) Procedure. The purpose of the procedure is to manage implementation of environmental, Aboriginal heritage, land tenure and legal commitments prior to and during land disturbance. All ground disturbance activities will meet the requirements of the PEAHR procedure, all relevant legislative and regulatory requirements, the BHP Charter, industry standards, and codes of practice.

All personnel carrying out works associated with clearing activities are required to comply with BHP's Charter Values, BHP's Global Documents, and relevant legislative and licensing requirements.

5 PROJECT COMPLIANCE WITH THE TEN CLEARING PRINCIPLES

BHP considers that native vegetation clearing within the Amendment Application Area will not result in any significant environmental or social impacts, and complies with the Ten Clearing Principles, as defined in Schedule 5 of the EP Act. **Section 6** provides an assessment of project compliance with the Ten Clearing Principles.

6 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

The information used to assess the application against the Ten Clearing Principles has been based on the findings of multiple baseline surveys (**Section 3**).

6.1 PRINCIPLE A

Native vegetation should not be cleared if it comprises a high level of biological diversity

This proposal is not likely to be at variance to this Principle.

Similar habitat to the Amendment Application Area is located outside the Amendment Application Area. These other areas of similar vegetation type are therefore expected to have a similar biological diversity and conservation value than that of the Amendment Application Area.

The proposed clearing is therefore unlikely to have any significant impact on the biodiversity of the region.

Table 8 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle A.

Table 8 Assessment against Principle A components

Principle	Criteria	Assessment	Outcome
a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	a1) Native vegetation should not be cleared if it is representative of an area of outstanding biodiversity in the Bioregion.	The native vegetation within the Amendment Application Area is represented in the same condition within the broader region and is not considered to be of outstanding biodiversity in the Bioregion.	Not at variance with clearing principle.
	a2) Native vegetation should not be cleared if it has higher diversity of indigenous aquatic or terrestrial plant or fauna species than native vegetation of that ecological community in good or better condition in the Bioregion.	The native vegetation within the Amendment Application Area is in the same condition as other areas of similar vegetation type within the broader region.	Not at variance with clearing principle.
	a3) Native vegetation should not be cleared if it has higher diversity of indigenous aquatic or terrestrial plant or fauna species than the remaining vegetation of that ecological community in the local area.	The native vegetation within the Amendment Application Area is not considered to have higher biodiversity and conservation value than that of the surrounding vegetation within the local area.	Not at variance with clearing principle.
	a4) Native vegetation should not be cleared if it has higher ecosystem diversity than other native vegetation of that local area.	The native vegetation within the Amendment Application Area is not considered to have a higher ecosystem diversity than other native vegetation of that local area.	Not at variance with clearing principle.
	a5) Native vegetation should not be cleared if it has higher genetic diversity than the remaining native vegetation of that ecological community.	The native vegetation within the Amendment Application Area is not considered to have a higher genetic diversity than the remaining native vegetation of that ecological community as the vegetation is contiguous with adjacent native vegetation and has no special features.	Not at variance with clearing principle.
	A6) Native vegetation should not be cleared if it is necessary for the continued in situ existence of significant habitat for priority flora species published by the Department of Environment and Conservation.	Impacts on Priority flora associated with clearing within the Amendment Application Area are considered to be Low (Table 4). Priority flora will be avoided using a 10 m buffer, where practicable. 822 records of *Hibiscus* aff. *campanulatus* have been excluded from the Amendment Application Area. Records of *Hibiscus* aff. *campanulatus*) will be avoided using a 10 m buffer, where practicable, with no more than 40 records of *Hibiscus* aff. *campanulatus* being cleared if necessary.	Not at variance with clearing principle.

6.2 PRINCIPLE B

Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia

This proposal is not likely to be at variance to this Principle.

There are ten broad fauna habitat types within the Amendment Application Area (**Figure 6**).

The vegetation and habitats found within the Amendment Application Area are considered to be well represented in the Pilbara bioregions.

Ten fauna species of significance have been recorded from within the Amendment Application Area with an additional two species considered to potentially occur within the Amendment Application Area (**Table 7**). As described in **Section 3.4.4** and **Table 7** clearing of the Amendment Application Area is expected to have a low impact on these species.

Table 9 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle B.

Table 9 Assessment against Principle B components

Principle	Criteria	Assessment	Outcome
b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	b1) Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is declared Specially Protected under the BC Act.	Eight BC Act protected species have been recorded from the Amendment Application Area (or specific exclusion zones) and one BC Act protected species are considered 'possible' or 'likely' to occur within the Amendment Application Area (**Table 7**). The proposed activities are unlikely to have a significant impact on these species as: • All species are wide-ranging and found throughout the broader region • Key habitat for these species has been excluded from the Amendment Application Area • All species are only likely to forage within the Amendment Application Area • These species do not exclusively depend on any habitat type or feature within the Amendment Application Area • Similar habitat is well represented outside the Amendment Application Area.	Not at variance with clearing principle.
	b2) Native vegetation should not be cleared if it is or is likely to be habitat for Priority Listed Fauna.	Two priority fauna species have been recorded within the Amendment Application Area and one other priority species may occur. As detailed in **Table 7** these species are unlikely to be impacted for the following reasons: • The preferred habitat for these species is well represented outside the Amendment Application Area • Similar habitat within close vicinity to the Amendment Application Area was found to be the same or better condition than that of the Amendment Application Area • Disturbance to known active Mulgara burrows will be avoided using a 10 m buffer, where practicable. • Disturbance to known active Western Pebble-mound Mouse mounds will be avoided with a 10m buffer where practicable.	Not at variance with clearing principle.
	b3) Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is otherwise significant.	Habitat found within the Amendment Application Area may be suitable for use by conservation significant fauna, however similar habitat in the same or better condition is widespread in the Amendment Application Area surrounds	Not at variance with clearing principle.
	b4) Native vegetation should not be cleared if it provides significant habitat for fauna species in the local area.	Habitat within the Amendment Application Area is not considered significant habitat for fauna species within the local area. Similar habitat to that proposed to be cleared is located to the area surrounding of the Amendment Application Area.	Not at variance with clearing principle.
	b5) Native vegetation should not be cleared if it maintains ecological functions and processes that protect significant habitat for fauna.	The clearing of native vegetation is not considered to alter ecological functions and processes that protect significant habitat for fauna.	Not at variance with clearing principle.

Principle	Criteria	Assessment	Outcome
	b6) Native vegetation should not be cleared if it forms, or is part of, an ecological linkage that is necessary for the maintenance of fauna.	No ecological linkages run through the Amendment Application Area that are necessary for the maintenance of fauna.	Not at variance with clearing principle.
	b7) Native vegetation should not be cleared if it provides significant habitat for fauna communities (assemblages) and meta-populations.	The Amendment Application Area is not considered to contain significant habitat for faunal assemblages that are not also present in other areas within the vicinity. The Amendment Application Area is not considered likely to contain geographically isolated fauna populations.	Not at variance with clearing principle.

6.3 PRINCIPLE C

Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora

This proposal is not likely to be at variance to this Principle.

No species listed under the EPBC Act or gazetted as Threatened under the BC Act were recorded in the Amendment Application Area. Three species listed as Priority Flora by the DBCA have been recorded in the Amendment Application Area (**Section 3.4.2**).

Table 10 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle C.

Table 10 Assessment against Principle C components

Principle	Criteria	Assessment	Outcome
c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	c1) Native vegetation should not be cleared if it is necessary for the continued *in situ* existence of populations of Declared Rare Flora under the *BC Act 2016*	No Threatened flora species were recorded in the Amendment Application Area.	Not at variance with clearing principle.
	c2) Native vegetation should not be cleared if it is necessary for the continued *in situ* existence of other significant flora.	No species listed under the EPBC Act or other significant flora species were recorded in the Amendment Application Area.	Not at variance with clearing principle.

6.4 PRINCIPLE D

Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community

This proposal is not likely to be at variance to this Principle.

None of the vegetation associations or landforms identified within Amendment Application Area are associated with a TEC or PEC. The closest PEC is more than 30 km north west of the Amendment Application Area (**Section 3.4.1**). **Table 11** provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle D.

Table 11 Assessment against Principle D components

Principle	Criteria	Assessment	Outcome
d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.	d1) Native vegetation should not be cleared if threatened ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are present.	No EPBC Act TECs are present in the Amendment Application Area.	Not at variance with clearing principle.
	d2) Native vegetation should not be cleared if it is necessary for the maintenance of Threatened Ecological Communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.	No EPBC Act TECs or associated native vegetation will be impacted by the proposed works.	Not at variance with clearing principle.
	d3) Native vegetation should not be cleared if other significant ecological communities are present.	No other significant ecological communities are known to occur or are likely to occur within the Amendment Application Area.	Not at variance with clearing principle.
	d4) Native vegetation should not be cleared if it is necessary for the maintenance of other significant ecological communities.	No DBCA listed TECs or associated native vegetation will be impacted by the proposed works.	Not at variance with clearing principle.
	d5) Native vegetation should not be cleared if it is necessary for the continued *in situ* existence of significant examples of priority threatened ecological communities published by the Department of Environment and Conservation.	No DBCA listed PECs or associated native vegetation will be impacted by the proposed works.	Not at variance with clearing principle.

6.5 PRINCIPLE E

Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared

This proposal is not likely to be at variance to this Principle.

The habitats and vegetation within the Amendment Application Area are well represented in the Land Systems of the region (**Section 3.4.1**), and therefore it is unlikely individual species would be restricted to a particular habitat and / or vegetation occurring in the Amendment Application Area.

Table 12 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle E.

Table 12 Assessment against Principle E components

Principle	Criteria	Assessment	Outcome
e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	e1) Native vegetation should not be cleared if the remaining native vegetation represents less than 30%, or the clearing would reduce the representation of remaining native vegetation to less than 30% in the Bioregion (or subregion where applicable).	Clearing native vegetation within the Amendment Application Area will not reduce the extent of native vegetation below 30% in the bioregion or subregion.	Not at variance with clearing principle.
	e2) Native vegetation should not be cleared if an ecological community represents less than 30% of its original extent or clearing would reduce the representation of any ecological community to less than 30% of its original extent in the Bioregion (or subregion where applicable).	Clearing native vegetation within the Amendment Application Area will not significantly reduce the known extent of the ecological community from pre-European extents. Current remaining extents of the vegetation communities in the bioregion are almost 100% of pre-European extents.	Not at variance with clearing principle.
	e3) Native vegetation should not be cleared if clearing would reduce an ecological community to less than 1% of the Bioregion (or subregion where applicable)	Clearing native vegetation within the Amendment Application Area will not significantly reduce the known extent of the vegetation community in the bioregion.	Not at variance with clearing principle.
	e4) Native vegetation should not be cleared if the remaining native vegetation represents less than 30% or the clearing would reduce the representation of remaining native vegetation to less than 30% in the Local Area.	Clearing native vegetation within the Amendment Application Area will not reduce the representation of remaining native vegetation to less than 30% in the local area.	Not at variance with clearing principle.
	e5) Native vegetation should not be cleared if an ecological community represents less than 30% of its original extent or clearing will reduce the representation of any ecological community to less than 30% of its original extent in the Local Area.	Clearing native vegetation within the Amendment Application Area will not reduce the representation of any ecological community to less than 30% of its original extent in the local area.	Not at variance with clearing principle.
	e6) Native vegetation should not be cleared if clearing would reduce any ecological community to less than 1% of the Local Area.	Clearing native vegetation within the Amendment Application Area will not significantly reduce the known extent of the vegetation community in the local area.	Not at variance with clearing principle.

6.6 PRINCIPLE F

Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland

This proposal is unlikely to be at variance to this Principle.

The Amendment Application Area is located within the four sub-catchments of the Fortescue River catchment: Fortescue River Upper, Homestead Creek, Warrawanda Creek and Whaleback Creek. Two named waterways flow through the Amendment Application Area: Fortescue River and Homestead Creek. The Fortescue River flows in a north-easterly direction approximately 2 km east of the Orebody 24. Homestead Creek runs from west to east across the Amendment Application Area and empties into the Fortescue River north of Ophthalmia Dam. Streamflow in these waterways is ephemeral and associated with high rainfall events during December to April. There are usually between one and three flow events per year. Numerous unnamed perennial drainage lines also traverse the Amendment Application Area. The Amendment Application Area also intersects Ophthalmia Dam which is a permanent surface water body located in the south east of the Application Area.

Where practicable, existing cleared tracks will be used to cross areas identified as Major Drainage Lines (**Figure 6**). If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

Table 13 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle F.

Table 13 Assessment against Principle F components

Principle	Criteria	Assessment	Outcome
f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	f1) Native vegetation should not be cleared if it is growing in a watercourse or wetland that has been identified as having significant environmental values.	No watercourses of significant environmental values occur within the Amendment Application Area	Unlikely to be at variance with clearing principle.
	f2) Native vegetation should not be cleared if it provides a buffer area for watercourses and wetlands identified in criteria (f1) and (f2).	No native vegetation occurs within the Amendment Application Area that provides a buffer to watercourses or wetlands that have been identified as having significant environmental values.	Unlikely to be at variance with clearing principle.
	f3) Native vegetation should not be cleared if water tables are likely to change and adversely affect ecological communities that are wetland or groundwater dependent.	Due to the purpose of the clearing this project is not considered likely to adversely alter water tables, and as such will not impact on any ecological communities that are wetland or groundwater dependent.	Not at variance with clearing principle.
	f4) Native vegetation should not be cleared if it is growing in other watercourses or wetlands.	Where practicable, existing cleared tracks will be used to cross areas identified as Major Drainage Lines (**Figure 6**). If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.	Unlikely to be at variance with clearing principle.

6.7 PRINCIPLE G

Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation

This proposal is not likely to be at variance to this Principle.

Land degradation may include impacts such as erosion, changes to pH, water logging, salinisation or spread of weeds. These potential impacts are assessed in the sections below. **Table 14** provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle G.

Given the relatively small amount of clearing required for the project, the proposed management strategies for weed species within the Amendment Application Area and the low susceptibility of the soils to erosion, it is considered that the project will not be at variance to Principle G.

6.7.1 Erosion

It is not anticipated that the removal of vegetation will contribute to increased amounts of wind or water erosion in the Amendment Application Area or adjacent areas.

6.7.2 Changes to pH

The Amendment Application Area is not in an area at risk of acid sulphate soils and there are no recorded acid sulphate soils within the Amendment Application Area. It is not expected that the proposed clearing will result in changes to soil pH.

6.7.3 Water logging and salinisation

It is not expected that there will be a significant reduction in groundwater uptake due to the proposed clearing. No water logging or increased salinisation is expected to occur as a result of the proposed clearing.

6.7.4 Weeds

Twenty six introduced flora species have been recorded in the Amendment Application Area (**Table 5**). One species **Tamarix aphylla* (Athel Tree) is listed as a Declared Pest under the BAM Act and is common in the Pilbara region.

Control of established weed populations will be carried out according to the *BHP Weed Control and Management Procedure*.

Table 144 Assessment against Principle G components

Principle	Criteria	Assessment	Outcome
g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	g1) Native vegetation should not be cleared if wind or water erosion of soil is likely to be increased (on or off site).	Soil erosion is not anticipated to occur as any areas cleared will be revegetated where practicable, if not required for ongoing use.	Not considered to be at variance with clearing principle.
	g2) Native vegetation on land with soils with high or low pH should not be cleared.	The Amendment Application Area is not considered to contain soils at risk of having acid sulphate soils present. No vegetation on soils with significantly low (or high) pH will be impacted by the proposed works.	Not at variance with clearing principle.
	g3) Native vegetation should not be cleared if water logging is likely to be increased (on or off site).	It is not expected that water logging would be increased by the clearing of native vegetation within the Amendment Application Area.	Not at variance with clearing principle.
	g4) Native vegetation should not be cleared if land salinisation is likely to be increased (on or off site).	Soil salinity is not considered to be increased in the Amendment Application Area (on or off site) by the clearing of native vegetation.	Not at variance with clearing principle.

6.8 PRINCIPLE H

Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area

This proposal is not likely to be at variance to this Principle.

The Amendment Application Area is not within any conservation areas as listed by the DBCA or those protected under the EPBC Act. The closest conservation area is Karijini National Park which is more than 140 km west of the Amendment Application Area.

The Amendment Application Area is not considered to form an ecological linkage to these conservation areas.

An assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle H is provided in **Table 15** below.

Table 15 Assessment against Principle H components

Principle	Criteria	Assessment	Outcome
h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	h1) Native vegetation should not be cleared if it contributes significantly to the environmental values of a conservation area.	The vegetation of the Amendment Application Area does not contribute to the environmental values of a conservation area.	Not at variance with clearing principle.
	h2) Native vegetation should not be cleared if that vegetation provides a buffer to a conservation area.	There are no conservation areas within the vicinity of the Amendment Application Area.	Not at variance with clearing principle.
	h3) Native vegetation should not be cleared if the land contributes to an ecological linkage to a conservation area.	The nearest conservation area is more than 140 km west of the Amendment Application Area.	Not at variance with clearing principle.
	h4) Native vegetation should not be cleared if it provides habitats not well represented on conservation land.	There are no habitats within the Amendment Application Area that are not well represented on conservation land.	Not at variance with clearing principle.

6.9 PRINCIPLE I

Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

This proposal is not likely to be at variance to this Principle.

The Amendment Application Area is located within the four sub-catchments of the Fortescue River catchment: Fortescue River Upper, Homestead Creek, Warrawanda Creek and Whaleback Creek. Two named waterways flow through the Amendment Application Area: Fortescue River and Homestead Creek. The Fortescue River flows in a north-easterly direction approximately 2 km east of the Orebody 24. Homestead Creek runs from west to east across the Amendment Application Area and empties into the Fortescue River north of Ophthalmia Dam. Streamflow in these waterways is ephemeral and associated with high rainfall events during December to April. There are usually between one and three flow events per year. Numerous unnamed perennial drainage lines also traverse the Amendment Application Area. The Amendment Application Area also intersects Ophthalmia Dam which is a permanent surface water body located in the south east of the Application Area.

Where practicable, existing cleared tracks will be used to cross areas identified as Major Drainage Lines (**Figure 6**). If it is necessary for new crossings to be installed, clearing will be kept to a bare minimum and will be constructed flat level to the surface (i.e. a simple clearing with no bunds) to maintain the natural surface flow.

Table 16 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle I.

Table 16 Assessment against Principle I components

Principle	Criteria	Assessment	Outcome
i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	i1) Native vegetation should not be cleared if clearing the vegetation will reduce the quality of surface or underground water in proclaimed, gazetted or declared areas or catchments.	The clearing of native vegetation is not considered likely to alter the quality of surface or ground water within the Amendment Application Area due to the limited nature of the clearing within the Amendment Application Area.	Not at variance with clearing principle.
	i2) Native vegetation should not be cleared if sedimentation, erosion, turbidity or eutrophication of water bodies on or off site is likely to be caused or increased.	Localised erosion will not impact any waterbodies as clearing will be restricted to a bare minimum near surface water features and cleared areas that are no longer required will be revegetated.	Not at variance with clearing principle.
	i3) Native vegetation should not be cleared if water tables are likely to change significantly altering salinity or pH.	The clearing of native vegetation is not considered likely to alter the quality of surface or ground water within the Amendment Application Area.	Not at variance with clearing principle.
	i4) Native vegetation should not be cleared if the clearing is likely to alter the water regimes of groundwater-dependent ecosystems on or off site, causing degradation to the biological communities associated with these systems.	The clearing of native vegetation is not considered likely to alter the regimes of surface or groundwater dependent vegetation within the vicinity of the Amendment Application Area.	Not at variance with clearing principle.

6.10 PRINCIPLE J

Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding

This proposal is not likely to be at variance to this Principle.

Massive surface water runoff and localised flooding occurs following intense rainfall events during December to April. However, the incidence or intensity of flooding is not likely to be significantly influenced by the proposed vegetation clearing. It is highly improbable that surface runoff generated from the cleared area could create sufficient concentrated water volumes to cause even a localised flood event. Drainage infrastructure will be designed to ensure that post-construction flows will not differ significantly from pre-construction flows. Therefore the proposed clearing is unlikely to cause or exacerbate the incidence or intensity of flooding.

Table 17 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle J.

Table 177 Assessment against Principle J components

Principle	Criteria	Assessment	Outcome
j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	j1) Native vegetation should not be cleared if it is likely to lead to an incremental increase in peak flood height.	The clearing of native vegetation is not considered likely to cause any alteration to peak flood height.	Not at variance with clearing principle.
	j2) Native vegetation should not be cleared if it is likely to lead to an incremental increase in duration of flood peak.	The clearing of native vegetation is not considered likely to cause any impact on duration of flood peak.	Not at variance with clearing principle.

7 HERITAGE

BHP complies with the *Aboriginal Heritage Act 1972*, and all other state and federal heritage legislation. All land disturbance activities are subject to ethnographic and archaeological surveys as part of an internal PEAHR. The PEAHR process ensures that all heritage sites in the vicinity of the Project Area are identified and avoided where practicable.

The Amendment Application Area is located within the Nyiyaparli Traditional Owner Determination Area (WCD2018/008). Ethnographic and archaeological surveys of the Application Area have been conducted in consultation with the Nyiyaparli people. One heritage site has been identified within the Application Area (site details are not provided here out of respect of the wishes of the Traditional Owners).

If any heritage site cannot practicably be avoided, BHP Iron Ore would consult the relevant traditional owners and seek approval under the *Aboriginal Heritage Act 1972* before the site is disturbed.

8 CONCLUSION

The proposed clearing in the Amendment Application Area is unlikely to be at variance to any of the Ten Clearing Principles. CPS 7374/3 authorises the clearing of up to 700 ha. To date BHP has cleared 257.78 ha and the clearing of the remaining 442.22 ha within an Amendment Application Area of 13,735.62 ha is unlikely to have any significant negative impacts on biodiversity and environmental values in the area.

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Spectrum Ecology & Spatial (2022a) *East Ophthalmia & Ninga Detailed Flora & Vegetation Survey.*

Spectrum Ecology & Spatial (2022b) *Hibiscus aff. Campanulatus Targeted Survey Cathedral Gorge.*

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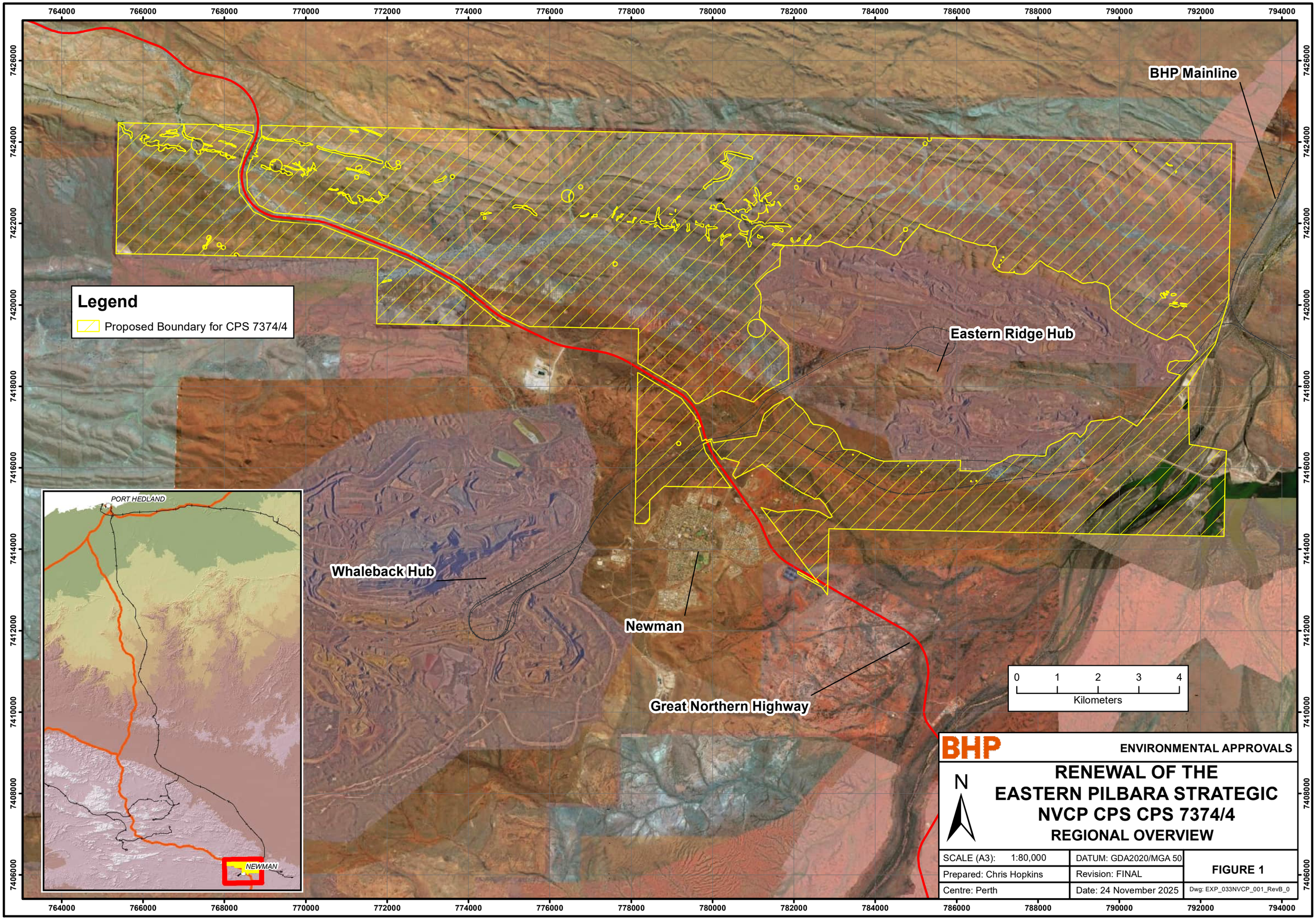
Figures



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Legend

Proposed Boundary for CPS 7374/4

Key Flora and Vegetation Surveys

- Biologic (2025) OB32 SWD Settlement Pond Flora and Vegetation Technical memo
- Biologic (2025) Power 2030 Single Season Flora and Vegetation Report
- Spectrum Ecology & Spatial (2024) OB29, 30 and 35 Expansion and Newman Surplus Water Reconnaissance Flora & Vegetation Survey
- Spectrum Ecology & Spatial (2023) Homestead Creek & Cathedral Gorge Detailed Flora & Vegetation Assessment
- Spectrum Ecology & Spatial (2022) East Ophthalmia & Ninga Detailed Flora & Vegetation Survey
- Spectrum Ecology (2022) BHP 2205 Hibiscus aff. campanulatus Targeted Survey
- GHD (2021) OB32, OB33 and OB29 Single season detailed flora and vegetation survey
- Spectrum Ecology (2021) OB32 Surplus Water & Homestead Creek Wetting Front Flora and Vegetation Assessment
- Onshore (2017) Flora and Vegetation and Vertebrate fauna survey of the Newman to MAC powerline corridor.
- Onshore (2014) Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure

BHP

ENVIRONMENTAL APPROVALS

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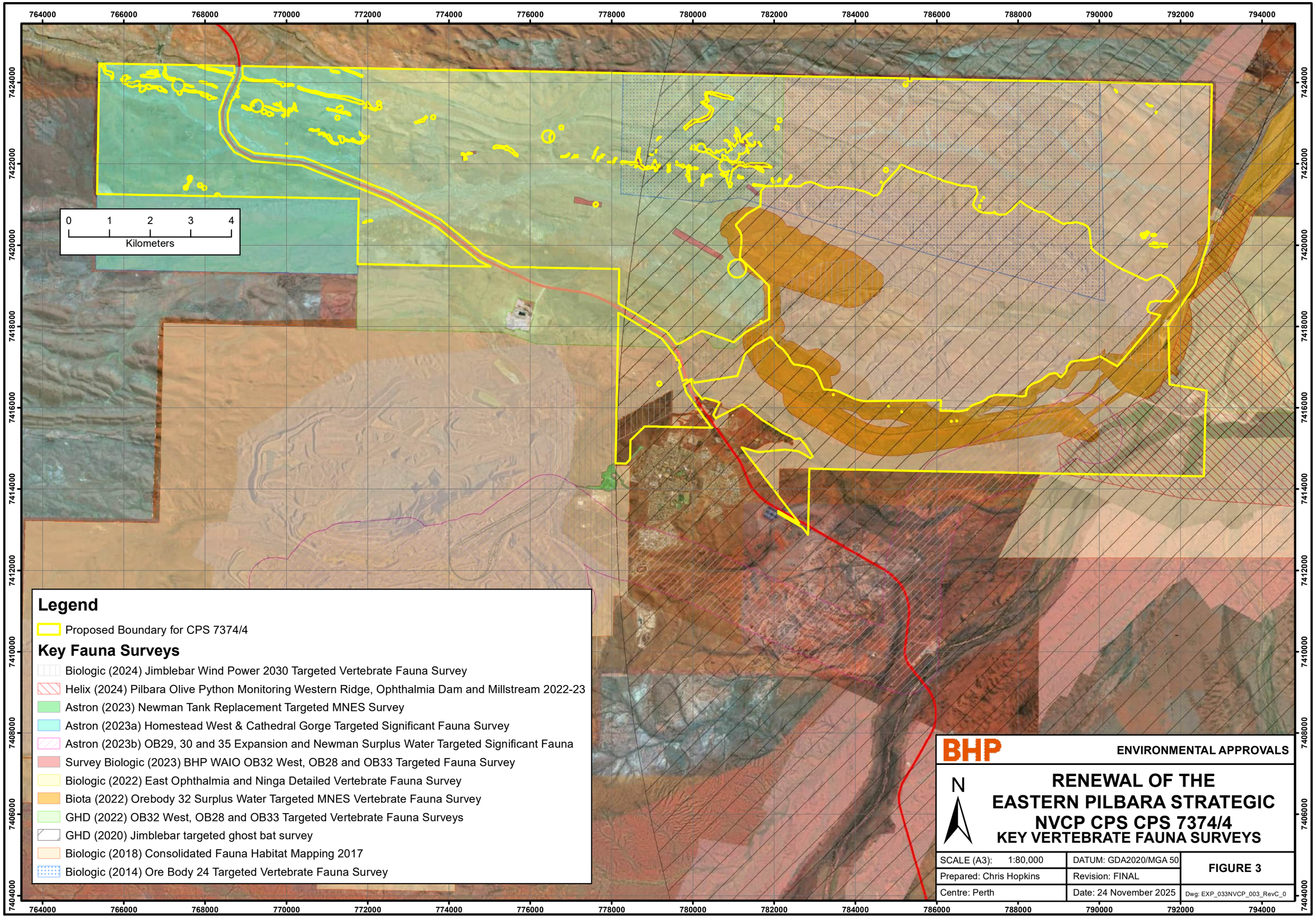
RENEWAL OF THE EASTERN PILBARA STRATEGIC NVCP CPS CPS 7374/4

KEY FLORA AND VEGETATION SURVEYS

SCALE (A3): 1:80,000	DATUM: GDA2020/MGA 50	FIGURE 2
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 24 November 2025	Dwg: EXP_033NVCP_002_RevC_0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Legend
Proposed Boundary for CPS 7374/4
Key Fauna Surveys
Biologic (2024) Jimblebar Wind Power 2030 Targeted Vertebrate Fauna Survey
Helix (2024) Pilbara Olive Python Monitoring Western Ridge, Ophthalmia Dam and Millstream 2022-23
Astron (2023) Newman Tank Replacement Targeted MNES Survey
Astron (2023a) Homestead West & Cathedral Gorge Targeted Significant Fauna Survey
Astron (2023b) OB29, 30 and 35 Expansion and Newman Surplus Water Targeted Significant Fauna
Survey Biologic (2023) BHP WAIO OB32 West, OB28 and OB33 Targeted Fauna Survey
Biologic (2022) East Ophthalmia and Ninga Detailed Vertebrate Fauna Survey
Biota (2022) Orebody 32 Surplus Water Targeted MNES Vertebrate Fauna Survey
GHD (2022) OB32 West, OB28 and OB33 Targeted Vertebrate Fauna Surveys
GHD (2020) Jimblebar targeted ghost bat survey
Biologic (2018) Consolidated Fauna Habitat Mapping 2017
Biologic (2014) Ore Body 24 Targeted Vertebrate Fauna Survey
BHP
ENVIRONMENTAL APPROVALS
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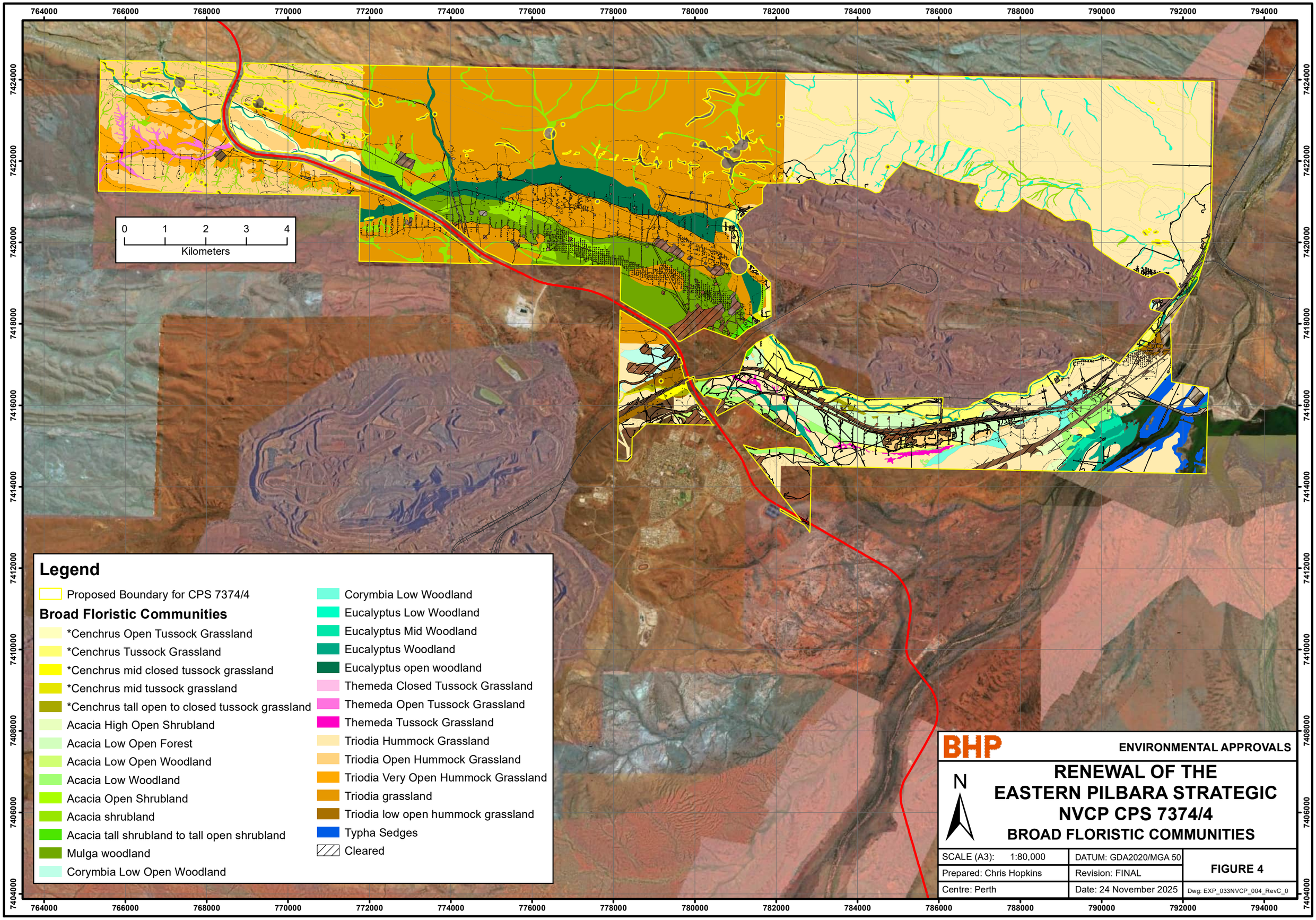
RENEWAL OF THE EASTERN PILBARA STRATEGIC NVCP CPS CPS 7374/4
KEY VERTEBRATE FAUNA SURVEYS
SCALE (A3): 1:80,000
DATUM: GDA2020/MGA 50
FIGURE 3
Prepared: Chris Hopkins
Revision: FINAL
Centre: Perth
Date: 24 November 2025
Dwg: EXP_033NVCP_003_RevC_0



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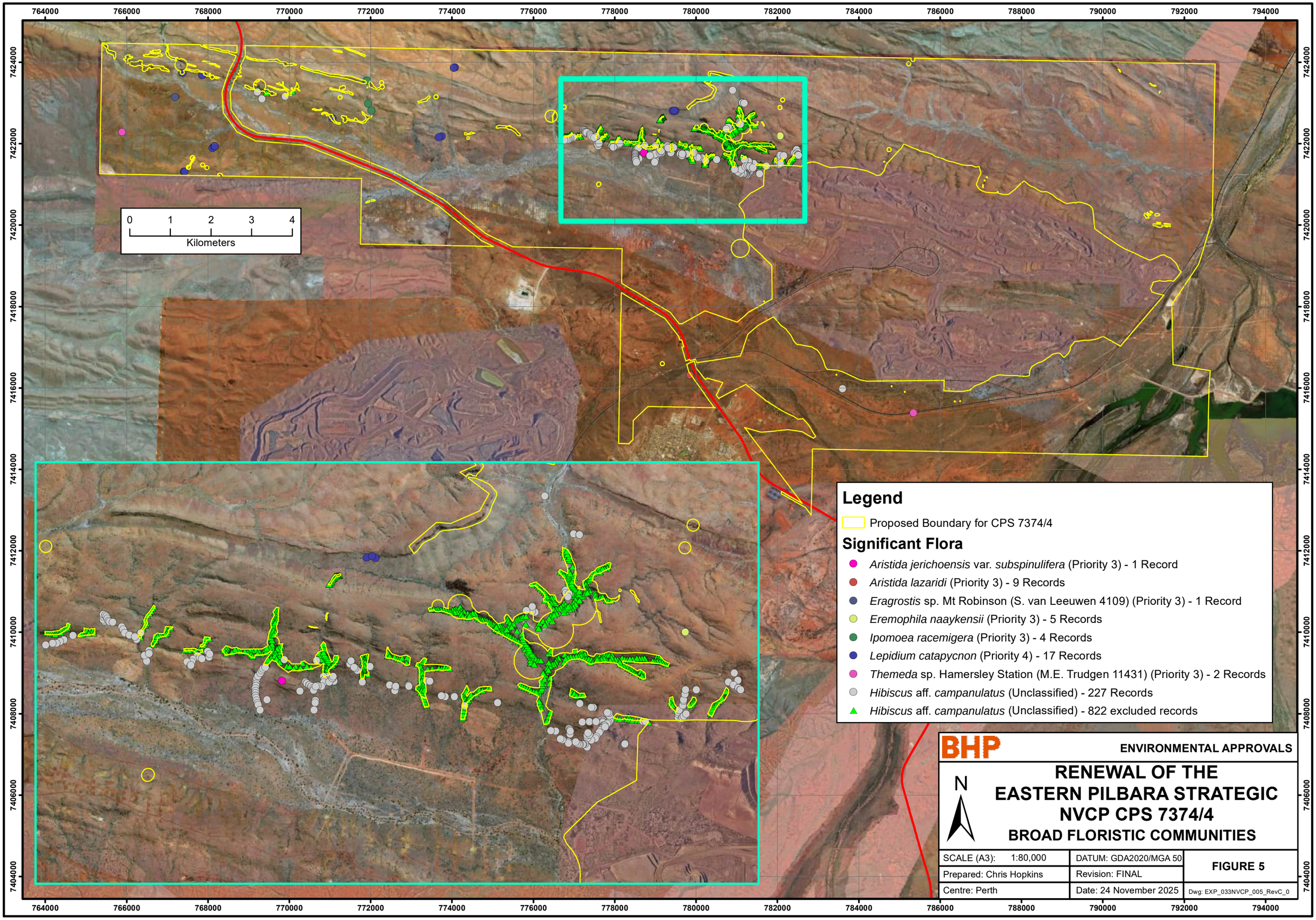

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Legend

- Proposed Boundary for CPS 7374/4
- Water Features / Water Holes (10m buffer)
- Ephemeral Pool (220m buffer)
- Ghost Bat Cave (Category 3 - 150m buffer)
- Ghost Bat Cave (Category 4 - 50m buffer)
- Ghost Bat Cave (Category 5 - 50m buffer)
- Pilbara Leaf-nosed Bat Cave (Category 4 - 50m buffer)

Vertebrate Fauna Habitat of the Amendment Application Area

- Drainage Area/ Floodplain
- Wetland
- Minor Drainage Line
- Medium Drainage Line
- Major Drainage Line
- Mulga Woodland
- Sand Plain
- Sandy/ Stony Plain
- Stony Plain
- Undulating Low Hills
- Hillcrest/ Hillslope
- Cleared/ Disturbed

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ENVIRONMENTAL APPROVALS

RENEWAL OF THE EASTERN PILBARA STRATEGIC NVCP CPS 7374/4

VERTEBRATE FAUNA HABITAT

SCALE (A3): 1:80,000	DATUM: GDA2020/MGA 50	FIGURE 6
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 24 November 2025	Dwg: EXP_033NVCP_006_RevC_0

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Legend

Proposed Boundary for CPS 7374/4

Significant Fauna

- Brush-tailed Mulgara (*Dasycercus blythi*) (DBCA Priority 4)
- Common Sandpiper (*Actitis hypoleucos*) (EPBC Act and BC Act Migratory)
- Ghost Bat (*Macroderma gigas*) (EPBC Act and BC Act Vulnerable)
- Glossy Ibis (*Plegadis falcinellus*) (EPBC Act and BC Act Migratory)
- Grey Falcon (*Falco hypoleucos*) (EPBC Act and BC Act Vulnerable)
- Peregrine Falcon (*Falco peregrinus*) (BC Act Other Specially Protected Fauna)
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) (EPBC Act and BC Act Vulnerable)
- Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) (EPBC Act and BC Act Vulnerable)
- Wood Sandpiper (*Tringa glareola*) (EPBC Act and BC Act Migratory)
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4) - Mound active
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4) - Mound recently inactive
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4) - Mound inactive)

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ENVIRONMENTAL APPROVALS

RENEWAL OF THE EASTERN PILBARA STRATEGIC NVCP CPS 7374/4

SIGNIFICANT FAUNA

SCALE (A3): 1:80,000	DATUM: GDA2020/MGA 50	FIGURE 7
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 24 Novemberr 2025	Dwg: EXP_033NVCP_007_RevB_0

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Appendices

Appendix 1: ***Homestead Creek & Cathedral Gorge Detailed Flora & Vegetation Assessment*** **(Spectrum Ecology & Spatial 2024a) – ISA-0001232**

Appendix 2: *Hibiscus* aff. *campanulatus* Targeted Survey Cathedral Gorge (Spectrum Ecology & Spatial 2022b) – ISA-0001231

Appendix 3: ***OB32 Surplus Water & Homestead Creek Wetting Front Flora and Vegetation Assessment*** **(Spectrum Ecology & Spatial 2021) – IBSA-2023-0106**

Appendix 4: ***OB32 West, OB33 and OB28 Single season detailed flora and vegetation*** **(GHD 2023) – ISA-0001229**

Appendix 5: ***Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure*** **(Onshore 2014) – IBSA-2020-0339**

Appendix 6: ***Homestead West & Cathedral Gorge Targeted Significant Fauna Survey*** **(Astron 2023a) – ISA-0001228**

Appendix 7: ***East Ophthalmia and Ninga Detailed Vertebrate Fauna Survey*** **(Biologic 2022) – IBSA-2024-0316**

Appendix 8: *OB32 West, OB28 and OB33 Targeted Vertebrate Fauna Surveys* (GHD 2022) – ISA-0001230

Appendix 9: *Jimblebar targeted ghost bat survey* (GHD 2020) – IBSA-2022-0318

Appendix 10: *Consolidated Fauna Habitat Mapping 2017* (Biologic 2017) – IBSA-2020-0345