

Application to Amend NVCP CPS 7139/4 Central Pilbara West Exploration

**Native Vegetation Clearing Permit Amendment
Application Supporting Document**

October 2024



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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 and 35) located approximately two kilometres (km) west of Newman Township; and;
 - 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 18 and Wheelarra Hill (Jimblebar) Mine located approximately 35 km east of Newman Township; and
- 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 7139/4 for clearing for the purposes of rehabilitation, geotechnical investigations, access tracks, mineral exploration, monitoring facilities, hydrogeological drilling, water bores and associated activities (**Figure 1**).

BHP has identified the need to amend this permit to:

- Amend the permit boundary to:
 - Remove the overlap between CPS 7139 and Ministerial Statement 1072;
 - Remove two recently identified caves with a 100m buffer;
- Amend the permit purpose to: "Clearing for the purposes of rehabilitation, geotechnical investigations, access tracks, mineral exploration, monitoring facilities, hydrogeological drilling, water bores, communications towers, weather masts, LiDAR installations and associated activities";
- Remove Exploration Licence 47/17-I from the list of Land on which clearing is to be done.
- Update the Update Condition 11 based on the current approved North Quoll Management Plan (revision 3):

Condition 11. Environmental management plan

- (a) the Permit Holder must implement the Northern Quoll Management Plan Rev 3 (or subsequent revisions)
 - (b) If it is necessary to modify the Management Plan, the Permit Holder must submit the modified plan to the CEO and must include:
 - (i) a plan for managing the impacts to Northern Quoll (*Dasyurus hallucatus*);
 - (ii) a table setting out the Permit Holder's commitments to the Management Plan requirements; and
 - (iii) a program for monitoring compliance with the Permit Holder's commitments.
 - (c) Any modified Management Plan must approved by the CEO prior to being implemented.
 - (d) An approved modified Management Plan supersedes any previous Management Plans.
- Extend the Clearing Period to 30 November 2029; and
 - Extend the Permit Duration to 30 November 2034.

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 9139/4 to the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS).

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 approximately 80 km north west of the town of Newman in the Pilbara region of WA (**Figure 1**).

1.2 TENURE

The Amendment Application Area is located on Mineral Lease 249SA, Mineral Lease 251SA, Mineral Lease 281SA, Exploration Licence 47/13-I, Exploration Licence 47/14-I, Exploration Licence 47/15-I, Exploration Licence 47/1540-I and Prospecting Licence 47/1611-I.

1.3 LOCAL GOVERNMENT JURISDICTION

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

1.4 PROPONENT

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

The split between the partners of the Goldsworthy Joint Venture is as follows:

- | | |
|--|-----|
| • BHP Minerals Pty Ltd | 85% |
| • Itochu Minerals and Energy Australia Pty Ltd | 8% |
| • Mitsui Iron Ore Corporation Pty Ltd | 7% |

BHP Iron Ore (Jimblebar) Pty Ltd:

- | | |
|------------------------------------|------|
| • BHP Iron Ore (Jimblebar) Pty Ltd | 100% |
|------------------------------------|------|

The key contact for this proposal is:

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1.5 PROJECT DESCRIPTION

The proposed works will involve clearing for the purposes of rehabilitation, geotechnical investigations, access tracks, mineral exploration, monitoring facilities, hydrogeological drilling, water bores, communications towers, weather masts, LiDAR installations and associated activities.

1.6 PROJECT CHARACTERISTICS AND COMMITMENTS.

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

1.7 NVCP RECORDS

BHP reports on each NVCP in accordance with the permit reporting conditions. For a majority of 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 commenced in 2016 with a total of 723.82 ha of clearing and 11.95 ha of rehabilitation undertaken to date (BHP, 2024). Areas which are yet to be rehabilitated are still required for the purpose for which they were cleared.

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.

Table 1 Project Characteristics and Commitments

Permit Characteristics	
Authorising Agency	DEMIRS
Permit Title	Central Pilbara West Exploration
Area to be cleared	1,000 hectares
Amendment Application Area	76,714.22 ha
Purpose of the permit	Clearing for the purposes of rehabilitation, geotechnical investigations, access tracks, mineral exploration, monitoring facilities, hydrogeological drilling, water bores, communications towers, weather masts, LiDAR installations and associated activities
Tenure	Mineral Lease 249SA Mineral Lease 251SA Mineral Lease 281SA Exploration Licence 47/13-I Exploration Licence 47/14-I Exploration Licence 47/15-I Exploration Licence 47/1540-I Prospecting Licence 47/1611-I.
Clearing Duration	Until 30 November 2029
Permit Duration	Until 30 November 2034
Proposed Annual Reporting Date	01 October for the previous Financial Year
Proposed Final Reporting Date	30 November 2034
Application boundary	Map Reference: <ul style="list-style-type: none"> EXP_028NVCP_001_RevA_0 EXP_028NVCP_002_RevB_0 EXP_028NVCP_003_RevC_0 EXP_028NVCP_004_RevC_0 EXP_028NVCP_005_RevB_0 EXP_028NVCP_006_RevA_0 EXP_028NVCP_007_RevA_0 BHP Shapefile D2 Reference: https://waio-dctm.bhp.com/D2/?docbase=bhpbio_od_prod&locateld=0b03c41a849553cd&application=ManagedDocuments
Application Commitments	
Populations of Priority flora will be avoided by a 10 m buffer where practicable.	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
Active Pebble-mouse mounds will be avoided using a 10 m buffer, where practicable.	3.4.4 6.2
Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. 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.	3.6 6.6 6.9

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 Amendment Application Area. Average annual rainfall at Newman Aero is 318.0 mm (BOM, 2024a). This is mainly derived from tropical storms and cyclones during summer, producing sporadic, heavy rains over the area. Mean monthly rainfall varies from 4.6 mm in September to 71.6 mm in February (BoM, 2024a). Daily rainfall is highly variable; the highest maximum daily rainfall ranges from 34.8 mm in October, to 305.6 mm in February (BoM, 2024a). 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 23.0°C and 32.1°C (BoM, 2024a).

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, 2023b), 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, 2024b).

3.2 BIOREGION, LANDFORMS AND LAND SYSTEMS

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

- Hamersley subregion (PIL3) of the Pilbara region described as: *“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 300 mm 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. Subregional area is 6,215,092ha”* (Kendrick, 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, level stony plains and narrow sub-parallel drainage floors, relief up to 20 m. A common system in shallow valleys below hill systems such as Newman and Rocklea.
Calcrete:	Calcrete platforms, plains and narrow drainage tracts, shallow alkaline loamy soils.
Egerton:	Highly dissected hardpan plains, slopes and narrow drainage floors, relief up to 20 m.
Elimunna:	Level to gently undulating stony plains, gilgai plains and drainage tracts derived from basalt, relief up to 15 m.
Jamindie:	Level to gently undulating hardpan wash plains with mantles of ironstone grit and pebbles, minor stony plains, low rises and occasional low ridges with relief up to 30 m.
Newman:	Rugged high mountains, ridges and plateaux with near vertical escarpments of jaspilite, chert and shale, the second largest system in the survey area and prominent in southern parts (e.g. Ophthalmia Range, Hamersley Range), relief up to 450 m.
Pindering:	Level to gently undulating hardpan wash plains with surface mantles of ironstone pebbles and gravel, some patterns of small groves and minor tracts receiving more concentrated through flow; relief up to 10 m.
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.
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.
Spearhole:	Level to gently undulating hardpan wash plains with abundant to very abundant surface mantles of ironstone pebbles and prominent grove patterns of vegetation, widely spaced tributary drainage channels, low rises and dissected slopes with relief up to 35 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 of the survey area as broad flats within the Hamersley Ranges (Newman land system).

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 five soil types occur within the Amendment Application Area (CSIRO, 2021):

- 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 and 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.
- Fa15: Ranges of basalt along with shale, chert, jaspilite, and dolomite; some narrow winding valley plains. The soils are frequently shallow and there are extensive areas without soil cover: chief soils are shallow stony loams (Um5.51) along with (Um6.23) soils. (Dr2.33) soils occur on lower slopes extending onto the narrow valley plains where they are associated with (Uf6.71) and (Um5.52) soils.
- Fb3: High-level valley plains set in extensive areas of unit Fa13. There are extensive areas of pisolitic limonite deposits: principal soils are deep earthy loams (Um5.52) along with small areas of (Gn2.12) soils.
- Ja2: This unit occupies the central position within the high-level valley plains represented by unit Fb3: chief soils are earthy clays (Uf6.71) along with extensive areas of (Ug5.38) soils.

3.4 FLORA, VEGETATION AND FAUNA

There have been 32 flora and vegetation surveys across the Amendment Application Area. The most relevant surveys are:

- *Central Pilbara Hub Detailed and Targeted Flora Survey* (Biologic, 2023) (**Appendix 1**); and
- *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (Onshore, 2014) (**Appendix 2**);

There have been 24 vertebrate fauna surveys across the Amendment Application Area. The most relevant surveys are:

- *Central Pilbara Hub Targeted Matters of National Environmental Significance Vertebrate Fauna Survey* (Biologic, 2023) (**Appendix 3**); and
- *Consolidated Fauna Habitat Mapping 2017* (Biologic, 2017) (**Appendix 4**).

The Onshore Environmental (2014) *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (**Appendix 2**) and Biologic (2017) *Consolidated Fauna Habitat Mapping 2017* (**Appendix 4**), 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; and
- Provides consistency in methods and nomenclature across BHP's Pilbara operations.

3.4.1 Vegetation Communities

The Amendment Application Area is located within the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara Bioregion (Department of Environment and Heritage, 2005). According to the Government of Western Australia (2013), this bioregion is more than 99.9% 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*.
- 567 Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedowii*

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
Pilbara IBRA Bioregion	17,808,657	17,733,584	99.58	6.34
Vegetation type 18 in Western Australia	19,890,664	19,843,409	99.76	2.13
Vegetation type 18 in the Pilbara IBRA Bioregion	676,556	672,424	99.39	16.78
Vegetation association 29 within Western Australia	7,903,991	7,900,200	99.95	0.29
Vegetation association 29 within the Pilbara IBRA	1,133,220	1,132,939	99.8	1.91
Vegetation association 82 within Western Australia	2,565,901	2,553,217	99.51	10.25
Vegetation association 82 within the Pilbara IBRA	2,563,583	2,550,899	99.51	10.26
Vegetation association 567 within Western Australia	777,507	774,896	99.66	22.33
Vegetation association 567 within the Pilbara IBRA	776,824	774,213	99.66	22.35

The Onshore vegetation consolidation project also identified one Threatened Ecological Community (TEC) and six Priority Ecological Communities (PECs) within the Consolidation Study Area. None of the vegetation associations or landforms identified within the boundary of the Amendment Application Area are associated with a TEC or PEC (Onshore Environmental, 2014a).

Two Priority Ecological Communities (PECs) listed by the DBCA are adjacent to the Amendment Application Area and consist of the two sub-types of the PEC 'Coolibah-lignum flats: *Eucalyptus victrix* over *Muehlenbeckia florulenta*' described as:

- Coolibah (*Eucalyptus victrix*) woodland over Lignum (*Muehlenbeckia florulenta*) over Swamp Wandiree (*Eriachne benthamii*) (Priority 1); and
- Coolibah (*Eucalyptus victrix*) and Mulga (*Acacia aneura*) woodland over Lignum (*Muehlenbeckia florulenta*) and tussock grasses on clay plains (Priority 3).

These PECs have been excluded from the Amendment Application Area with a 50 m buffer.

A total of 20 broad floristic formations with 67 vegetation associations have been described and mapped within the Amendment Application Area (**Figure 2 and Table 3**).

The distinct mapped broad floristic communities and vegetation associations identified within Amendment Application Area extend or occur beyond the project boundary. It is considered unlikely that any changes in vegetation associations and local species over the time since the vegetation consolidation project would lead to elevated significance of the vegetation given that none of the vegetation associations identified within the Amendment Application Area were affiliated with any TECs or PECs and there are no vegetation associations within the Amendment Application Area that would be likely to be included in any updates to TEC or PEC listings.

Vegetation condition within the Amendment Application Area ranges from excellent to Completely Disturbed.

Table 3 Vegetation associations of the Amendment Application Area (Biologic, 2023; and Onshore, 2014)

Broad Floristic Formation		Vegetation Association Description	
Acacia High Shrubland	FP AbApr Tp ArcSpau	High Shrubland of <i>Acacia bivenosa</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia pungens</i> and Very Open Hummock Grassland of <i>Aristida contorta</i> and <i>Sporobolus australasicus</i> on brown loam on stony dolerite floodplains and outwash zones.	
	FP AaApApt TtChfErb	Low Open Forest of <i>Acacia aptaneura</i> , <i>Acacia paraneura</i> and <i>Acacia pteraneura</i> over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Chrysopogon fallax</i> and <i>Eriachne benthamii</i> on red brown clay loam on floodplains.	
Acacia Low Open Forest	FP AaCa Mav Tm	Low Open Forest of <i>Acacia aptaneura</i> and <i>Corymbia aspera</i> over Low Open Shrubland of <i>Maireana villosa</i> over Open Hummock Grassland of <i>Triodia melvillei</i> on red brown cracking clays and alluvial loams on floodplains.	
	MA AaAciApr CcTtChf EvEcr	Low Open Forest of <i>Acacia aptaneura</i> , <i>Acacia citrinoviridis</i> and <i>Acacia pruinocarpa</i> over Open Tussock Grassland of <i>*Cenchrus ciliaris</i> , <i>Themeda triandra</i> and <i>Chrysopogon fallax</i> with Open Woodland of <i>Eucalyptus victrix</i> and <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> on brown loamy sand on major drainage lines with broad and deeply incised drainage channels.	
	SP AaApr TmTwTp TtChfAri	Low Open Forest of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia melvillei</i> , <i>Triodia wiseana</i> and <i>Triodia pungens</i> over Tussock Grassland of <i>Themeda triandra</i> , <i>Chrysopogon fallax</i> and <i>Aristida inaequiglumis</i> on red brown loam on stony plains.	
	SP AcaoAa ArobDiaChf	Low Open Forest of <i>Acacia catenulata</i> subsp. <i>occidentalis</i> and <i>Acacia aptaneura</i> over Very Open Tussock Grassland of <i>Aristida obscura</i> , <i>Digitaria ammophila</i> and <i>Chrysopogon fallax</i> on red brown clay loam on lower stony plains.	
	FP AaAcaoAp ErlnSolPto ArcErdiArj	Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia catenulata</i> subsp. <i>occidentalis</i> and <i>Acacia paraneura</i> over Low Open Shrubland of <i>Eremophila lanceolata</i> , <i>Solanum lasiophyllum</i> and <i>Ptilotus obovatus</i> over Very Open Tussock Grassland of <i>Aristida contorta</i> , <i>Eragrostis dielsii</i> and <i>Aristida jerichoensis</i> var. <i>subspinulifera</i> on red brown clay loam on hardpan intergrove plains.	
Acacia Low Open Woodland	FP AaAp Po Tt	Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia pruinocarpa</i> over Low Open Shrubland of <i>Ptilotus obovatus</i> var. <i>obovatus</i> over Tussock Grassland of <i>Themeda triandra</i> .	
	FP AaAp TmTp ArcTtCf	Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Sparse Hummock Grassland of <i>Triodia melvillei</i> (<i>Triodia pungens</i>) over Tussock Grassland of <i>Aristida contorta</i> , <i>Themeda triandra</i> , <i>Chrysopogon fallax</i> on red brown loam.	
	FP AaApt SaaPoSsL Ac	Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia pteraneura</i> over Low Open Shrubland of <i>Senna artemisioides</i> subsp. <i>x artemisioides</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. L (A.M. Ashby 4202) over Open Tussock Grassland of <i>Aristida contorta</i> .	
	SP Aa ArcCfTt AoSsL	Low Open Woodland of <i>Acacia aptaneura</i> over Open Tussock Grassland of <i>Aristida contorta</i> (<i>Chrysopogon fallax</i> , <i>Themeda triandra</i>) with Low Open Shrubs of <i>Abutilon otocarpum</i> , <i>Sida</i> sp. L (A.M. Ashby 4202).	
	FP AaApr PtoErln ArcArobTt	Low Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Low Shrubland of <i>Ptilotus obovatus</i> and <i>Eremophila lanceolata</i> over Open Tussock Grassland of <i>Aristida contorta</i> , <i>Aristida obscura</i> and <i>Themeda triandra</i> on plains.	
Acacia Low Woodland	FP AaEv Duf EuaErbArc	Low Woodland of <i>Acacia aptaneura</i> and <i>Eucalyptus victrix</i> with Scattered Shrubs of <i>Duma florulenta</i> over Open Tussock Grassland of <i>Eulalia aurea</i> , <i>Eriachne benthamii</i> and <i>Aristida contorta</i> on orange brown clay loam on floodplains.	
	FP Ev Aa EuaErbTt	Woodland of <i>Eucalyptus victrix</i> over Low Woodland of <i>Acacia aptaneura</i> over Open Tussock Grassland of <i>Eulalia aurea</i> , <i>Eriachne benthamii</i> and <i>Themeda triandra</i> on orange clay loam on floodplains.	
	GG AaAcaoEII DopErtiErjp TpTw	Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia catenulata</i> subsp. <i>occidentalis</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Dodonaea pachyneura</i> , <i>Eremophila tietkensii</i> and <i>Eremophila jucunda</i> subsp. <i>pulcherrima</i> over Open Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia wiseana</i> on red brown loam on breakaway slopes, cliff lines and minor gorges	

		HS AaApr ErjpAmarCocf TwTp	Low Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Shrubland of <i>Eremophila jucunda</i> subsp. <i>pulcherrima</i> , <i>Acacia marramamba</i> and <i>Codonocarpus cotinifolius</i> over Open Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia pungens</i> on red brown loam on steep hill slopes.
		SP Aa ErfrSegl TtArc	Low Woodland of <i>Acacia aptaneura</i> over High Shrubland of <i>Eremophila fraseri</i> and <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> and <i>Aristida contorta</i> on red brown clay loam on dolerite stony plains.
<i>Acacia</i> Scrub	Open	MI AtpPIAm TpTs ChEil	Open Scrub of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Petalostylis labicheoides</i> and <i>Acacia monticola</i> over Open Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> on red brown sandy loam on minor drainage lines.
<i>Acacia</i> Shrubland		MI AbAdAma Tp TtPamuEua	Shrubland of <i>Acacia bivenosa</i> , <i>Acacia dictyophleba</i> and <i>Acacia maitlandii</i> over Open Hummock Grassland of <i>Triodia pungens</i> over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Paraneurachne muelleri</i> and <i>Eulalia aurea</i> on brown sandy loam on minor drainage lines.
<i>Callitris</i> Open Forest	Low	GG CcolCfEil ErnuThmbCya	Low Open Forest of <i>Callitris columellaris</i> , <i>Corymbia ferritcola</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Tussock Grassland of <i>Eriachne mucronata</i> , <i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471) and <i>Cymbopogon ambiguus</i> and Very Open Hummock Grassland of <i>Triodia pungens</i> on orange brown loam on upper gorges.
<i>Corymbia</i> Woodland	Low	GG CfEilFib AhDovmAsha CyaErnuThmb	Low Woodland of <i>Corymbia ferritcola</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Ficus brachypoda</i> over Open Shrubland of <i>Acacia hamersleyensis</i> , <i>Dodonaea viscosa</i> subsp. <i>mucronata</i> and <i>Astrotricha hamptonii</i> over Open Tussock Grassland of <i>Cymbopogon ambiguus</i> , <i>Eriachne mucronata</i> and <i>Themeda</i> sp. Mt Barricade on red brown loam along cliff lines and gorge walls.
<i>Enneapogon</i> Tussock Grassland		HS EnlCya ErfrAte InmDiau	Tussock Grassland of <i>Enneapogon lindleyanus</i> and <i>Cymbopogon ambiguus</i> with Shrubland of <i>Eremophila fraseri</i> and <i>Acacia tetragonophylla</i> over Low Shrubland of <i>Indigofera monophylla</i> and <i>Dipteracanthus australasicus</i> on brown sandy clay loam on mudstone outcrops and boulders on lower slopes of The Governor Range.
<i>Eriachne</i> Tussock Grassland		FP ErbEuaTt Ev Duf	Tussock Grassland of <i>Eriachne benthamii</i> , <i>Eulalia aurea</i> and <i>Themeda triandra</i> with Woodland of <i>Eucalyptus victrix</i> over Open Shrubland of <i>Duma florulenta</i> on orange brown loamy clay on alluvial plains.
		MI Erb VfAteAa PihCemPtgo	Tussock Grassland of <i>Eriachne benthamii</i> with Shrubland of * <i>Vachellia farnesiana</i> , <i>Acacia tetragonophylla</i> and <i>Acacia aptaneura</i> over Open Herbs of <i>Pimelea holroydii</i> , <i>Centipeda minima</i> and <i>Ptilotus gomphrenoides</i> on red silty loam on basalt parent rock on minor drainage lines.
<i>Eucalyptus</i> Open Forest	Low	MA EcrEvEx ApypAtpGoro TtEuaCyp	Low Open Forest of <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus xerothermica</i> over High Shrubland of <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Gossypium robinsonii</i> over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Eulalia aurea</i> and <i>Cymbopogon procerus</i> on red brown clay loam on major drainage lines.
<i>Eucalyptus</i> woodland		CY EvAaDf	<i>Eucalyptus victrix</i> and <i>Acacia aptaneura</i> woodland to open woodland over <i>Acacia aptaneura</i> sparse shrubland to open shrubland over <i>Duma florulenta</i> sparse shrubland over <i>Eriachne flaccida</i> , <i>Eulalia aurea</i> and <i>Paspalidium rarum</i> tussock grassland to open tussock grassland over <i>Cleome viscosa</i> , <i>Euphorbia drummondii</i> and <i>Peplidium</i> sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158) open forland on red brown clay loam on cracking clay plain.
		CY EvAaHIDf	<i>Eucalyptus victrix</i> woodland to isolated trees with occasional <i>Acacia aptaneura</i> over <i>Hakea lorea</i> subsp. <i>lorea</i> sparse shrubland over <i>Duma florulenta</i> sparse shrubland over <i>Themeda</i> sp. Hamersley Station (M. E. Trudgen 11431), <i>Eriachne flaccida</i> and <i>Eulalia aurea</i> tussock grassland to open tussock grassland over <i>Swainsona oroboides</i> , <i>Euphorbia drummondii</i> and <i>Cleome viscosa</i> open forland on red brown clay loam on cracking clay plain.
		CYHPSS EvAaAp	<i>Eucalyptus victrix</i> , <i>Acacia aptaneura</i> and <i>Acacia paraneura</i> with occasional <i>Eucalyptus xerothermica</i> woodland to open woodland over <i>Acacia pruinocarpa</i> , <i>Acacia aptaneura</i> and <i>Acacia tetragonophylla</i> sparse shrubland over <i>Triodia melvillei</i> and/or <i>Triodia epactia</i> open hummock grassland over <i>Chrysopogon fallax</i> , <i>Digitaria ammophila</i> and <i>Enneapogon polyphyllus</i> open tussock grassland over <i>Ptilotus gaudichaudii</i> , <i>Roebuckiella similis</i> and <i>Tribulus astrocarpus</i> open forland on red brown clay loam with occasionally rocky pebbles on Mulga claypan, hardpan plain or sandy/stony plain, including on edge of PEC (VT01 and VT02).

	HS HC EIAiAp	<i>Eucalyptus leucophloia</i> woodland to open woodland over <i>Acacia incurvaneura</i> and <i>Acacia pruinocarpa</i> sparse shrubland to open shrubland over <i>Acacia bivenosa</i> , <i>Acacia trudgeniana</i> and <i>Acacia marramamba</i> sparse shrubland to open shrubland over <i>Triodia wiseana</i> and/or <i>Triodia epactia</i> hummock grassland to open hummock grassland over <i>Corchorus lasiocarpus</i> subsp. <i>parvus</i> , <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> open forbland on red/brown sandy loam on rocky hillslopes, hillcrest and hillslope on low undulating hills.
<i>Themeda</i> Closed Tussock Grassland	FP Thhs Ca PtoSaa	Closed Tussock Grassland of <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) with Low Open Woodland of <i>Corymbia aspera</i> over Low Open Shrubland of <i>Ptilotus obovatus</i> and <i>Salsola australis</i> on orange light clay on flood plains.
<i>Themeda</i> Mid Tussock Grassland	SP TtArcEua AanHll	Mid Tussock Grassland of <i>Themeda triandra</i> (+/- <i>Aristida contorta</i> , <i>Eulalia aurea</i>) with Low Isolated clumps of (+/- <i>Acacia aneura</i> group) <i>Hakea loreus</i> subsp. <i>loreus</i> trees.
<i>Themeda</i> Open Tussock Grassland	ME TtAriCya ChEil AmPIAnl	Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequiglumis</i> and <i>Cymbopogon ambiguus</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Acacia monticola</i> , <i>Petalostylis labicheoides</i> and <i>Androcalva luteiflora</i> on red brown alluvium on minor and medium drainage lines.
<i>Themeda</i> Tussock Grassland	FP TtAsp AmaAinApr PoAff	Mid tussock grassland of <i>Themeda triandra</i> , <i>Aristida</i> spp., with <i>Acacia macraneura</i> , <i>Acacia incurvaneura</i> , <i>Acacia pruinocarpa</i> low open woodland over <i>Ptilotus obovatus</i> subsp. <i>obovatus</i> , <i>Abutilon fraseri</i> subsp. <i>fraseri</i> low shrubs.
	FP TtEua ExAa AprAtpErlo	Tussock Grassland of <i>Themeda triandra</i> and <i>Eulalia aurea</i> with Low Woodland of <i>Eucalyptus xerothermica</i> and <i>Acacia aptaneura</i> over Open Shrubland of <i>Acacia pruinocarpa</i> , <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Eremophila longifolia</i> on red brown clay loam on unincised drainage lines and floodplains.
	FP TtEuaCc ChEx AdAacAmc	Tussock Grassland of <i>Themeda triandra</i> , <i>Eulalia aurea</i> and * <i>Cenchrus ciliaris</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus xerothermica</i> over High Open Shrubland of <i>Acacia dictyophleba</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia macraneura</i> on brown silty clay loam on floodplains.
	GG TtErmuThmb EilChCf AtpGoroPI	Tussock Grassland of <i>Themeda triandra</i> , <i>Eriachne mucronata</i> and <i>Themeda</i> sp. Mt Barricade with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> and <i>Corymbia ferriticola</i> over High Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> , <i>Gossypium robinsonii</i> and <i>Petalostylis labicheoides</i> on red brown sandy loam on narrowly incised rocky drainage lines.
	MA TtCc PIAbAnl EilCh	Tussock Grassland of <i>Themeda triandra</i> and * <i>Cenchrus ciliaris</i> with Shrubland of <i>Petalostylis labicheoides</i> , <i>Acacia bivenosa</i> and <i>Androcalva luteiflora</i> and Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> on red brown loam on drainage levees.
	ME TtEuaCya ExCh AnlApyErlo	Tussock Grassland of <i>Themeda triandra</i> , <i>Eulalia aurea</i> and <i>Cymbopogon ambiguus</i> with Low Open Woodland of <i>Eucalyptus xerothermica</i> and <i>Corymbia hamersleyana</i> and High Open Shrubland of <i>Androcalva luteiflora</i> , <i>Acacia pyrifolia</i> and <i>Eremophila longifolia</i> in medium drainage lines.
<i>Triodia</i> Closed Hummock Grassland	HC TpTw Eil NehrOls	Closed Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia wiseana</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Scattered Shrubs of <i>Newcastelia</i> sp. Hamersley Range (S. van Leeuwen 4264) and <i>Olearia stuartii</i> on brown silty loam.
<i>Triodia</i> Hummock Grassland	CP TwTa Ese AbPIApyp	Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia angusta</i> with Open Mallee of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> and Open Shrubland of <i>Acacia bivenosa</i> , <i>Petalostylis labicheoides</i> and <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> on light brown clay loam on calcrete plains and rises.
	FP TpTm AaptApaAco	Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia melvillei</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia pachyacra</i> , <i>Acacia catenulata</i> subsp. <i>occidentalis</i> .
	FS Tp EgEil Aatk	Hummock Grassland of <i>Triodia pungens</i> with <i>Eucalyptus gamophylla</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> .
	FS TpTv Eg AceAcid Se	Mid to Low Hummock Grassland of <i>Triodia pungens</i> (+/- <i>Triodia vanleeuwenii</i>) with <i>Eucalyptus gamophylla</i> low mallee trees over tall shrubs of <i>Acacia elachantha</i> and <i>Acacia dictyophleba</i> with low shrubs of <i>Seringia exastia</i> .
	FS Ts CdHc AancAiGrwh	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>Hakea chordophylla</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia inaequilatera</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> on red brown sandy loam on footslopes and stony plains.

FS Tv CdHc AancAiGrwh	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Corymbia deserticola</i> subsp. <i>deserticola</i> and <i>Hakea chordophylla</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia inaequilatera</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> on red brown sandy loam on footslopes and stony plains.
FS Tv Eg AatAtenAanc	Hummock Grassland of <i>Triodia vanleeuwenii</i> and <i>Triodia pungens</i> with Low Open Woodland of <i>Corymbia deserticola</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and High Open Shrubland of <i>Acacia atkinsiana</i> , <i>Acacia tenuissima</i> .
FS Tv EllCdd Ac	Hummock Grassland of <i>Triodia vanleeuwenii</i> with scattered <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia deserticola</i> subsp. <i>deserticola</i> over Open Shrubland of <i>Acacia bivenosa</i> , <i>Solanum lasiophyllum</i> , <i>Acacia</i> spp. mid to tall shrubs.
HC TpTvTw EllCh Sgg	<i>Triodia pungens</i> (<i>Triodia vanleeuwenii</i> , <i>Triodia wiseana</i>) hummock grassland with <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low isolated trees over <i>Senna glutinosa</i> subsp. <i>glutinosa</i> mid to low shrubs.
HC Tw Ah EkkEgCh	Hummock Grassland of <i>Triodia wiseana</i> with Shrubland of <i>Acacia hamersleyensis</i> and Open Mallee of <i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i> , <i>Eucalyptus gamophylla</i> and <i>Corymbia hamersleyana</i> (mallee form) on red brown loam and silty loam on hill crests.
HC Tw AiAb InrSeao	Hummock Grassland of <i>Triodia wiseana</i> with High Open Shrubland of <i>Acacia inaequilatera</i> and <i>Acacia bivenosa</i> over Low Open Shrubland of <i>Indigofera rugosa</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> on red silty loam on dolerite hill crests.
HC TwTbrTp EllCh AmaGrwhAb	Hummock Grassland of <i>Triodia wiseana</i> , <i>Triodia brizoides</i> and <i>Triodia pungens</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> over High Open Shrubland of <i>Acacia maitlandii</i> , <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> and <i>Acacia bivenosa</i> on red brown sandy loam on hill crests and upper hill slopes.
HC TwTsTp EllCh Ah	Hummock Grassland of <i>Triodia wiseana</i> , <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia pungens</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> over Open Shrubland of <i>Acacia hamersleyensis</i> on red brown clay loam on hill crests and upper hill slopes.
HS Tbr Ell Er	Hummock Grassland of <i>Triodia brizoides</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Mallee of <i>Eucalyptus repullulans</i> on red brown sandy loam on hill slopes and breakaway scree slopes.
HS TbrTw Ell	Hummock Grassland of <i>Triodia brizoides</i> and/or <i>Triodia wiseana</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> on brown sandy loam on steep hill slopes.
HS Tp Ama Tt	Hummock Grassland of <i>Triodia pungens</i> with Shrubland of <i>Acacia maitlandii</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> on brown loam on low basalt hills.
HS TsTw Eg GrwhSeggAb	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia wiseana</i> with Very Open Mallee of <i>Eucalyptus gamophylla</i> over Open Shrubland of <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Acacia bivenosa</i> on red brown sandy clay loam on hill slopes.
HS TsTwTp EllCh AhiAaa	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia wiseana</i> and <i>Triodia pungens</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> over Low Open Shrubland of <i>Acacia hilliana</i> and <i>Acacia adoxa</i> var. <i>adoxa</i> on red brown sandy loam on hill slopes.
HS Tw EllCh AaaAhi	Hummock Grassland of <i>Triodia wiseana</i> (<i>Triodia vanleeuwenii</i>) with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia hamersleyana</i> and Low Open Shrubland of <i>Acacia adoxa</i> var. <i>adoxa</i> , <i>Acacia hilliana</i> , <i>Acacia</i> spp. on ironstone hills.
HS TwTpTbr Ell Ep	Hummock Grassland of <i>Triodia wiseana</i> , <i>Triodia pungens</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Mallee of <i>Eucalyptus pilbarensis</i> on red brown loam on steep hill slopes.
HS TwTpTs Ell AprAaAanc	Hummock Grassland of <i>Triodia wiseana</i> , <i>Triodia pungens</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Acacia pruinocarpa</i> , <i>Acacia aptaneura</i> and <i>Acacia ancistrocarpa</i> on red brown loam on plains and low hills.
ME TpTlo ExAciCh PIApypGoro	Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia longiceps</i> with Low Woodland of <i>Eucalyptus xerothermica</i> , <i>Acacia citrinoviridis</i> and <i>Corymbia hamersleyana</i> over High Shrubland of <i>Petalostylis labicheoides</i> , <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Gossypium robinsonii</i> on red brown clay loam on medium drainage lines and surrounding floodplains.

	SP TpTb Eg PIAbAanc	Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia basedowii</i> with Open Mallee of <i>Eucalyptus gamophylla</i> and Shrubland of <i>Petalostylis labicheoides</i> , <i>Acacia bivenosa</i> and <i>Acacia ancistrocarpa</i> on red brown loamy sand on stony plains and footslopes.
	SP TsTwTp EgEt AbApaApr	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia wiseana</i> and <i>Triodia pungens</i> with Very Open Mallee of <i>Eucalyptus gamophylla</i> and <i>Eucalyptus trivalva</i> over Open Shrubland of <i>Acacia bivenosa</i> , <i>Acacia pachyacra</i> and <i>Acacia pruinocarpa</i> on red brown sandy loam and clay loam on stony plains.
	SP TvTwTp EgEt AbApaApr	Hummock Grassland of <i>Triodia vanleeuwenii</i> , <i>Triodia wiseana</i> and <i>Triodia pungens</i> with Very Open Mallee of <i>Eucalyptus gamophylla</i> and <i>Eucalyptus trivalva</i> over Open Shrubland of <i>Acacia bivenosa</i> , <i>Acacia pachyacra</i> and <i>Acacia pruinocarpa</i> .
Triodia Mid Open Hummock Grassland	HS Tp AaApr ErfrAmarSegl	Open Hummock Grassland of <i>Triodia pungens</i> with Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Eremophila fraseri</i> , <i>Acacia marramamba</i> and <i>Senna glutinosa</i> subsp. x <i>luerssenii</i> on red brown loam on undulating hills.
	SP Tm Tt AaptApr	Hummock Grassland of <i>Triodia melvillei</i> and <i>Triodia pungens</i> with High Shrubland of <i>Acacia atkinsiana</i> and <i>Acacia kempeana</i> and Low Open Woodland of <i>Acacia aptaneura</i> , <i>Corymbia deserticola</i> and <i>Acacia pruinocarpa</i> on stony plains.
Triodia Open Hummock Grassland	SP TpTm AaExAcao ApaErffAads	Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia melvillei</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus xerothermica</i> and <i>Acacia catenulata</i> subsp. <i>occidentalis</i> and Open Shrubland of <i>Acacia pachyacra</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia adsurgens</i> on red brown clay loam or silty loam on stony plains and floodplains.

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.

Twenty seven Priority Flora species have been identified adjacent to the Amendment Application Area (**Figures 3 to 5, Table 4**):

Priority 1

- *Tephrosia rosea* var. Port Hedland (A.S. George 1114).

Priority 2

- *Eremophila* sp. West Angelas (S. van Leeuwen 4068); and
- *Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708).

Priority 3

- *Acacia effusa*;
- *Aristida jerichoensis* var. *subspinulifera*;
- *Aristida lazaridis*;
- *Dampiera metallorum*;
- *Eragrostis* sp. Mt Robinson (S. van Leeuwen 4109);
- *Eremophila magnifica* subsp. *velutina*;
- *Eremophila naaykensis*;
- *Goodenia lyrata*;
- *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727);
- *Grevillea saxicola*;
- *Indigofera gilesii*;
- *Oxalis* sp. Pilbara (M.E. Trudgen 12725);
- *Pilbara trudgenii*;
- *Rhagodia* sp. Hamersley (M. Trudgen 17794);
- *Rostellularia adscendens* var. *latifolia*;
- *Solanum kentrocaule*;
- *Themeda* sp. Hamersley Station (M.E. Trudgen 11431);
- *Triodia* sp. Mt Ella (M.E. Trudgen 12739); and
- *Vittadinia* sp. Coondewanna Flats (S. van Leeuwen 4684)

.Priority 4

- *Acacia bromilowiana*;
- *Eremophila magnifica* subsp. *magnifica*;
- *Lepidium catapycnon*;
- *Ptilotus mollis*; and
- *Sida* sp. Barlee Range (S. van Leeuwen 1642).

One additional Priority 3 Flora species (*Olearia mucronata*) has been recorded in close proximity to the Application Area:

Populations of Priority flora will be avoided by a 10 m buffer where practicable.

Table 4: Conservation Significant Flora Occurring within the Application Area (Biologic, 2023; Onshore Environmental, 2014a)

Conservation Significant Species	Description	Habitat Relevance	Potential Impact on Species
Priority 1			
<i>Tephrosia rosea</i> var. Port Hedland (A.S. George 1114)	<i>Tephrosia rosea</i> var. Port Hedland (A.S. George 1114) is an erect shrub reaching 1.7 m in height, flowers are red or purple and occur between August to September, (DPaW and Rio Tinto, 2015, Onshore, 2014b).	<i>Tephrosia rosea</i> var. Port Hedland (A.S. George 1114) appears to be a coastal species that is endemic to the Pilbara where it has been found to the west, south and east of Port Hedland as well as on some offshore islands (DPaW and Rio Tinto, 2015). It occurs on red sands near creeks and on disturbed road sides and rail lines around Port Hedland (Onshore Environmental, 2014b). It has also been found on loams, <i>Triodia</i> hummock grasslands and <i>Acacia stellaticeps</i> woodlands (DPaW and Rio Tinto, 2015). This species has been recorded from: <ul style="list-style-type: none"> 1 locations within the Amendment Application Area; and 956 other locations across the coastal Northern Pilbara region ranging from west of Point Sampson to east of Port Hedland with two isolated inland records (one east of Yarrie and one north of Mungaroona Range Nature Reserve). 	Low The clearing of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: <ol style="list-style-type: none"> This species is broadly distributed across the Chichester and Roebourne IBRA subregions, predominantly along coastal areas; There are 956 other records of this species across the broader region; and This species appears to respond well to disturbance.
Priority 2			
<i>Aristida lazareidis</i>	<i>Aristida lazareidis</i> 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 (Onshore Environmental, 2013a).	This species occurs in the Pilbara region of Western Australia, in the Northern Territory and extensively throughout Queensland (ALA, 2016). This species has been recorded from: <ul style="list-style-type: none"> 66 locations within the Amendment Application Area; 17 locations within Coondewanna Flats which have been excluded from the Application Area; one location within Karijini National Park; and 252 numerous other locations outside of the Application Area across the Pilbara and the entire north of Australia. 	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: <ol style="list-style-type: none"> This species is widespread across the broader Pilbara region and the north of Australia; There are 17 records of this species within Coondewanna Flats which has been excluded from this application; and This species is known from within Karijini National Park.
<i>Eragrostis</i> sp. Mt Robinson (S. van Leeuwen 4109)	<i>Eragrostis</i> sp. Mt Robinson is a perennial tussock grass with a woolly base growing to 0.3 m high. It occurs on red-brown skeletal soils, ironstone on steep slopes and summits	<i>Eragrostis</i> sp. Mt Robinson occurs on red-brown skeletal soils, ironstone on steep slopes and summits. This species has been recorded from: <ul style="list-style-type: none"> one location within the Amendment Application Area five locations which have been excluded from the Amendment Application Area. three 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: <ol style="list-style-type: none"> There are five records of this species in areas that have been specifically excluded from the Amendment Application Area; and There are three other records in the broader region.
<i>Eremophila</i> sp. West Angelas (S. van Leeuwen 4068)	<i>Eremophila</i> sp. West Angelas is an erect-branched or tall spindly shrub with narrow leaves and purple flowers in September to October. It has been recorded from rocky hills or ridges but also from mulga bands in clay soil between rocky ridges (DPaW and Rio Tinto, 2015).	<i>Eremophila</i> sp. West Angelas occurs on rocky hills or ridges but also from mulga bands in clay soil between rocky ridges (DPaW and Rio Tinto, 2015). This species has been recorded from: <ul style="list-style-type: none"> five locations within the Amendment Application Area one location which have been excluded from the Amendment Application Area five 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: <ol style="list-style-type: none"> There is one records of this species in an area that has been specifically excluded from the Amendment Application Area; and There are five other records in the broader region.
<i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	<i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708) is a large diffuse perennial shrub 1.5 to 2.5 m tall. It has creamish brown to rusty brown erect star-shaped hairs densely covering all vegetative parts so as to appear woolly in texture. Flowers are pale mauve with a darker mauve marking at the base (DPaW and Rio Tinto, 2015).	The current distribution of <i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708) is restricted to the southeast Pilbara, where it has been recorded from breakaway slopes. The distribution is likely to be wider with additional survey work (Onshore Environmental, 2015). This species has been recorded from: <ul style="list-style-type: none"> 23 locations within the Application Area; one location which has been excluded from the Application Area; two locations within Karijini National Park; and 110 other locations outside of the Application Area. 	Low The clearing of the either of the two records of this species (if required) within the Application Area would not result in any significant impact upon species distribution as: <ol style="list-style-type: none"> The preferred habitat for this species (breakaway slopes) is unlikely to be disturbed by the proposed activities under this permit; There is one record of this species within areas specifically excluded from the application; This species is known from within Karijini National Park; and The species is distributed throughout the south-eastern Pilbara region and is considered likely to have a wider distribution.

Conservation Significant Species	Description	Habitat Relevance	Potential Impact on Species
<i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725)	<i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725) is a low annual herb which grows up to 15 cm in height (Onshore Environmental, 2013a).	<p>This species occurs in pebbly/gravelly red brown loam soil amongst boulders and shaded gullies on lower hill slopes. Within the Pilbara, this species is restricted to the southern central Hamersley Range. There is one confirmed record from Mount Meharry in Karijini National Park, and one record from the Gascoyne approximately 265 km from the nearest Pilbara record.</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> two location within the Amendment Application Area; two locations which have been excluded from the Application Area; one location within Karijini National Park; and 12 other locations outside of the Amendment Application Area. 	<p>Low</p> <p>The clearing of the single record of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as:</p> <ol style="list-style-type: none"> This species is known from within Karijini National Park; There are two records of this species within areas specifically excluded from the application; and There are 12 other records in the broader Hamersley region and is known from beyond the Pilbara region.
Priority 3			
<i>Acacia effusa</i>	<i>Acacia effusa</i> is a dense to spreading low viscid shrub that grows to 1 m high. It has characteristic 'minni-ritchi' bark (bark that peels in small curly flakes) and produces yellow flowers from May to August (WAH 2014 in Onshore, 2014b).	<p>This species occurs only within the Pilbara on the scree slopes of low ranges. It is restricted to the Hamersley Range occurring broadly from Tom Price to west of Newman in the central southern sector of the Pilbara bioregion (WAH 2014 in Onshore Environmental, 2014b).</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> two location within the Amendment Application Area; 18 locations within Karijini National Park; and 81 records to the north and south of the Amendment Application Area including a large population to the north consisting of 61 plants. 	<p>Low</p> <p>The clearing of the single record of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as:</p> <ol style="list-style-type: none"> This species is known from within Karijini National Park; and There is a large population of this species (61 plants) to the north of the Amendment Application Area, and additional populations in the surrounding area.
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i> is a compact tufted perennial grass ranging in height from 0.3 to 0.8 m with rough lower floret grooves (WAH, 2016).	<p>This species occurs on hardpan plains in the Pilbara. It is known from approximately over 300 records within the Pilbara region, including numerous records around Newman extending west, and large populations throughout the central Pilbara region directly east of Karijini National Park.</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> 162 locations within the Amendment Application Area; five locations within Coondewanna Flats, which have been excluded from the Amendment Application Area; and 148 other locations outside of the Amendment Application Area. 	<p>Low</p> <p>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, including from Coondewanna Flats.</p>
<i>Dampiera metallorum</i>	<i>Dampiera metallorum</i> is a rounded, multi-stemmed perennial grey herb growing to 0.5 m high. Small blue flowers bloom in April or June to October (DPaW and Rio Tinto, 2015).	<p>This species is restricted to the Hamersley Range east of Karijini National Park. It grows on skeletal red-brown gravelly soil over banded ironstone on steep slopes and the summits of hills.</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> 16 locations within the Amendment Application Area; 13 locations at Mount Robinson which have been excluded from the Amendment Application Area; 11 locations within Karijini National Park; and 22 other locations outside of the Amendment Application Area. 	<p>Low</p> <p>While restricted to the Hamersley Range east of Karijini National Park 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:</p> <ol style="list-style-type: none"> This species is widely distributed across the eastern Hamersley Range; This species is known from within Karijini National Park; and There are 13 records of this species within areas specifically excluded from the application.
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	<i>Eremophila magnifica</i> subsp. <i>velutina</i> is a perennial erect shrub which grows up to 1.5 m in height with purple or blue flowers between August and November (WAH, 2010 in Onshore Environmental, 2013a).	<p><i>Eremophila magnifica</i> subsp. <i>velutina</i> grows in skeletal soils on ironstone hill slopes and rocky screes. This species occurs over a range of approximately 300 km extending from south-east of Newman to west of Tom Price.</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> 62 locations within the Amendment Application Area; four locations within Karijini National Park; and 122 other locations outside of the Application Area, predominately in the southern Pilbara, but with one record in the Gascoyne. 	<p>Low</p> <p>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:</p> <ol style="list-style-type: none"> This species has a wide distribution across the southern Pilbara; and This species is known from within Karijini National Park.
<i>Eremophila naaykensis</i>	<i>Eremophila naaykensis</i> 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).	<p><i>Eremophila naaykensis</i> is found on open rocky slopes, gullies and rock faces associated with large hills and cliffs.</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> 27 locations within the Amendment Application Area; 475 other locations across the southern Pilbara outside of the Amendment Application Area. 	<p>Low</p> <p>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.</p>
<i>Goodenia lyrata</i>	<i>Goodenia lyrata</i> is a prostrate herb with lyrate leaves. Flowers are yellow and occur during August (WAH 2013 in Onshore Environmental 2013a).	<p><i>Goodenia lyrata</i> occurs on red sandy loam soils generally near claypan landforms.</p> <p>This species has been recorded from:</p> <ul style="list-style-type: none"> six locations within the Amendment Application Area; four locations within Coondewanna Flats which have been excluded from the Amendment Application Area (three individual records and one location with more than 100 individual plants); eight locations within Karijini National Park; nine locations outside of the Amendment Application Area in the broader Pilbara region; and nine additional locations across WA (Gascoyne, Gibson Desert and Murchison). 	<p>Low</p> <p>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:</p> <ol style="list-style-type: none"> This species has a large range (distributed across four bioregions); and There is a large population of this species (more than 100 plants) within an area specifically excluded from the application (Coondewanna Flats). This species is known from within Karijini National Park.

Conservation Significant Species	Description	Habitat Relevance	Potential Impact on Species
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) is an open erect annual or biennial herb that grows up to 0.2 m in height. This species produces yellow flowers between March and September (WAH, 2016).	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727) occurs in red-brown clay soil with calcrete pebbles on low undulating plains or swampy plains in close proximity to major drainage lines. This species is relatively widely distributed in the southern Pilbara and has been recorded from: <ul style="list-style-type: none"> two locations within the Amendment Application Area; and 17 locations with more than 1,020 records between Paraburdoo and Mount Cooke. 	Low The clearing of any of the records of this species (if required) within the Application Area would not result in any significant impact upon species distribution as this species relatively widely distributed in the southern Pilbara.
<i>Grevillea saxicola</i>	<i>Grevillea saxicola</i> is a single stemmed tree or tall shrub with grey-black rough bark up to 7 m in height with cream flowers (Onshore Environmental 2015; DPaW and Rio Tinto, 2015).	Based on WA Herbarium records, <i>Grevillea saxicola</i> appears to be restricted to the southern Pilbara. It typically occurs on orange / brown loam soils on steep breakaway and scree slopes (often with southerly aspect) (Onshore Environmental 2015). This species has been recorded from: <ul style="list-style-type: none"> 8 locations within the Application Area; three locations specifically excluded from the Amendment Application Area; eight locations within Karijini National Park; and 80 other locations outside of the Amendment Application Area. 	Low While restricted to the southern Pilbara, 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: <ol style="list-style-type: none"> This species is found across the broader southern Pilbara; This species is known from within Karijini National Park; and Three records of this species occur within areas specifically excluded from the Amendment Application Area.
<i>Indigofera gilesii</i>	<i>Indigofera gilesii</i> is a shrub growing up to 1.5 m in height. It produces pink or purple flowers between May and August (Onshore Environmental, 2015).	<i>Indigofera gilesii</i> is widely distributed within the southeast Pilbara (west of Newman) and represented in three other bioregions extending east to the Northern Territory border and south to Wiluna. This species is generally found in pebbly loam amongst boulders and outcrops amongst hills. Within and adjacent to the Amendment Application Area this species has been recorded on rocky hill tops and creek lines. This species has been recorded from: <ul style="list-style-type: none"> 29 locations within the Amendment Application Area; two locations specifically excluded from the Amendment Application Area; one location within Karijini National Park; and 223 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: <ol style="list-style-type: none"> This species has a large range (distributed across four bioregions); This species is widely distributed within the southeast Pilbara (west of Newman); This species is known from within Karijini National Park; and Two records of this species occur within areas specifically excluded from the Amendment Application Area.
<i>Pilbara trudgenii</i>	<i>Pilbara trudgenii</i> is a gnarled aromatic shrub which grows up to 1 m in height (Onshore Environmental, 2015).	<i>Pilbara trudgenii</i> occurs in skeletal, red stony soil over ironstone on hill crests, steep hill slopes, scree slopes and cliff faces. The current known distribution is restricted to the Pilbara IBRA region. This species has been recorded from: <ul style="list-style-type: none"> 21 locations within the Amendment Application Area; four locations specifically excluded from the Amendment Application Area; seven locations within Karijini National Park; and six 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: <ol style="list-style-type: none"> This species has been recorded in the southern Pilbara; The preferred habitat for this species (steep slopes) is unlikely to be disturbed by the proposed activities under this permit; This species is known from within Karijini National Park; and Four records of this species occur within areas specifically excluded from the Amendment Application Area.
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) is a shrub or scrambler species growing to a height of 2 to 4 m. Fruit grows in small red drupelets (DPaW and Rio Tinto, 2015).	<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) occurs in orange to red loam soils on flood plains. The current known distribution is restricted to the Pilbara IBRA region with increasing numbers of populations recorded in recent years between Tom Price and Newman. This species has been recorded from: <ul style="list-style-type: none"> 890 locations within the Amendment Application Area; seven locations specifically excluded from the Amendment Application Area; one location within Karijini National Park; and 495 additional locations across the broader region outside of the Amendment Application Area. 	Medium Given the large numbers of this species across the Amendment Application Area and, while all priority flora will be avoided where practicable and less than 1.5% of the Amendment Application Area will be disturbed, it is likely that some individual plants may need to be removed. The clearing of some of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: <ol style="list-style-type: none"> This species has been recorded in large numbers across the Amendment Application Area and clearing is only proposed to disturb less than 1.5% of the area; This species is known from within Karijini National Park; Seven records of this species occur within areas specifically excluded from the application; and This species has been recorded from locations across the broader southern Pilbara region outside of the Amendment Application Area.

Conservation Significant Species	Description	Habitat Relevance	Potential Impact on Species
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	<i>Rostellularia adscendens</i> var. <i>latifolia</i> is a low shrub growing to 0.3 m in height. It has blue-purple-violet flowers in April and May (WAH, 2016).	<i>Rostellularia adscendens</i> var. <i>latifolia</i> grows in ironstone soils in protected areas near watercourses or along shaded rocky ridges, often in dry gullies and gorges (DPaW and Rio Tinto, 2015). While <i>Rostellularia adscendens</i> species is widespread from Africa, India and south-East Asia and occurs in all Australian States (except Victoria) this subspecies is only found in the Pilbara, where it is widely distributed across the region (DPaW and Rio Tinto, 2015). This species has been recorded from: <ul style="list-style-type: none"> 15 locations within the Amendment Application Area; one location within an area specifically excluded from the Amendment Application Area; five locations within Karijini National Park; and 233 other locations across the broader region 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: <ol style="list-style-type: none"> This species is widely distributed within the southern Pilbara (west of Newman) and eastern Pilbara (north of Newman). This species is known from within Karijini National Park; and One record of this species occurs within areas specifically excluded from the Amendment Application Area.
<i>Solanum kentrocaule</i>	<i>Solanum kentrocaule</i> is a shrub growing 0.5 to 1.5 m high. It has densely prickled stems with mauve flowers from July to October (DPaW and Rio Tinto, 2015).	<i>Solanum kentrocaule</i> occurs on hillsides and mountain tops, or occasionally in creek beds in skeletal red-brown soil over ironstone or on basalt scree (DPaW and Rio Tinto, 2015). This species occurs across the southern Pilbara and northern Gascoyne. This species has been recorded from: <ul style="list-style-type: none"> 11 locations within the Amendment Application Area; three locations within areas specifically excluded from the Amendment Application Area; four locations within Karijini National Park; and six other locations across the broader region to the south and west 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: <ol style="list-style-type: none"> This species is known from within Karijini National Park; Three records of this species occur within areas specifically excluded from the Amendment Application Area; and This species has been recorded across the broader Pilbara region and from the Gascoyne region outside of the Amendment Application Area.
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) is tussock perennial grass growing 0.9 to 1.8 m high, flowering in August (WAH, 2016).	<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) occurs on red clay, clay pans and grassy plains across the Pilbara bioregion between Newman and Karratha. This species has been recorded from: <ul style="list-style-type: none"> 15 locations within the Amendment Application Area; six locations within Coondewanna Flats which has been specifically excluded from the Amendment Application Area; and 83 other locations across the broader Pilbara region. 	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: <ol style="list-style-type: none"> This species is broadly distributed across the Pilbara outside of the Amendment Application Area; and There are six records of this species within Coondewanna Flats which has been specifically excluded from the application.
<i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739)	<i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739) is a diffuse, loose sprawling, rather than rounded perennial hummock grass to 1.5 m wide to 0.4 m in height, which flowers between May and August (DPaW and Rio Tinto, 2015).	<i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739) occurs amongst rocks and outcrops on hill slopes and gullies on light orange brown pebbly loam (Onshore Environmental, 2015). It has been recorded from the Gascoyne, Little Sandy Desert and Pilbara bioregions (WAH, 2016) and is considered to be geographically restricted and uncommon, but unlikely to be rare (Trudgen, 1998 in Onshore Environmental, 2015). This species has been recorded from: <ul style="list-style-type: none"> 215 locations within the Amendment Application Area; 26 locations which have been specifically excluded from the Amendment Application Area; six locations within Karijini National Park; one location within Karlamilyi National Park; and 393 other locations across the southern Pilbara and northern Gascoyne regions. 	Low Given the large numbers of this species across the Amendment Application Area and, while all priority flora will be avoided where practicable and less than 1.5% of the Amendment Application Area will be disturbed, it is likely that some individual plants may need to be removed. The clearing of some of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: <ol style="list-style-type: none"> This species has been recorded in large numbers across the Amendment Application Area and clearing is only proposed to disturb less than 1.5% of the area; This species is known from within Karijini National Park and Karlamilyi National Park; Twenty six records of this species occur within areas specifically excluded from the Amendment Application Area; and This species has been recorded across the broader Pilbara region and from the Gascoyne region outside of the Amendment Application Area.
<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684)	<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684) is a woody, annual herb or short lived perennial growing up to 1 m tall. It has white ray florets and light yellow disc florets from May to September (DPaW and Rio Tinto, 2015).	This species has been recorded from clay-loams, clays, cracking clays, gilgai (DPaW and Rio Tinto, 2015) and stony plains supporting mulga vegetation (Onshore Environmental, 2013a). It is suspected that the infrequent records of this species may possibly due to seasonality. This species has been recorded from: <ul style="list-style-type: none"> three locations within the Amendment Application Area; one location within Coondewanna Flats which has been excluded from the Amendment Application Area; and 31 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: <ol style="list-style-type: none"> This species has been found across, the broader southern Pilbara region; There is one record of this species within Coondewanna Flats which has been excluded from the Amendment Application Area; Areas where this species occur tend to be outside of areas of potential mineralisation and are therefore unlikely to be disturbed for Exploration Activities; and It is likely that the infrequent records of this species is due to seasonality rather than a spare or low occurrence.

Conservation Significant Species	Description	Habitat Relevance	Potential Impact on Species
Priority 4			
<i>Acacia bromilowiana</i>	<i>Acacia bromilowiana</i> is a tree / shrub typically growing to 6 m but can reach up to 12 m in favourable areas. It has dark grey fibrous bark with leafstalks that are covered in a grey/blue powdery wax coating. It has yellow/pink flowers between July and August (WAH, 2016).	<i>Acacia bromilowiana</i> occurs on red skeletal stony loam, orange-brown pebbly, gravel loam, laterite, banded ironstone and basalt and is typically found on rocky hills, breakaways, scree slopes, gorges and creek beds of the southern Pilbara (WAH, 2016). This species has been recorded from: <ul style="list-style-type: none"> 18 locations within the Amendment Application Area; two locations which have been specifically excluded from the Amendment Application Area; four locations within Karijini National Park; and 43 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: <ol style="list-style-type: none"> This species is known from within Karijini National Park; Two records of this species occur within areas specifically excluded from the Amendment Application Area; and This species has been recorded from across the broader southern Pilbara outside of the Amendment Application Area.
<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	<i>Eremophila magnifica</i> subsp. <i>magnifica</i> is an erect aromatic shrub with smooth glossy leaf surfaces and branches. It grows 0.5 to 1.5 m high and has lilac coloured flowers from August to November (DPaW and Rio Tinto, 2015).	<i>Eremophila magnifica</i> subsp. <i>magnifica</i> occurs on skeletal soils over ironstone and rocky screes of the southern Pilbara (WAH, 2016). This species has been recorded from: <ul style="list-style-type: none"> 234 locations within the Amendment Application Area; 45 locations which have been specifically excluded from the Amendment Application Area; 12 locations within Karijini National Park; and 267 other locations across the southern Pilbara. 	Low Given the large numbers of this species across the Amendment Application Area and, while all priority flora will be avoided where practicable and less than 1.5% of the Amendment Application Area will be disturbed, it is likely that some individual plants may need to be removed. The clearing of some of the records of this species (if required) within the Amendment Application Area would not result in any significant impact upon species distribution as: <ol style="list-style-type: none"> This species has been recorded in large numbers across the Amendment Application Area and clearing is only proposed to disturb less than 1.5% of the area; This species is known from within Karijini National Park; Forty five records of this species occur within areas specifically excluded from the Amendment Application Area; and This species has been recorded locations extending west of Newman across the southern Pilbara outside of the Application Area.
<i>Lepidium catapycnon</i>	<i>Lepidium catapycnon</i> 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).	<i>Lepidium catapycnon</i> 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). <i>Lepidium catapycnon</i> has been identified as a pioneer species that responds rapidly to disturbance, especially fire (Onshore Environmental, 2013c). The majority of known populations of this species have been recorded in areas that were recently burnt. This species has been recorded from: <ul style="list-style-type: none"> 90 locations within the Amendment Application Area; four locations within areas which have been specifically excluded from the Amendment Application Area; 45 locations within Karijini National Park; and 1,010 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: <ol style="list-style-type: none"> This species has been recorded broadly across the southern Pilbara outside of the Amendment Application Area. This species is known from within Karijini National Park; and There are four records of this species within areas which have been specifically excluded from the Amendment Application Area.
<i>Ptilotus mollis</i>	<i>Ptilotus mollis</i> is a compact, perennial shrub growing to 0.5 m high (WAH, 2016). It has woolly grey rounded leave and woolly pink flowers in May and September (DPaW and Rio Tinto, 2015).	<i>Ptilotus mollis</i> has been recorded from steep rocky sites, usually in full sun on massive ironstone formations (DPaW and Rio Tinto, 2015). This species has been recorded across the Pilbara bioregion and in the Little Sandy Desert bioregion. This species has been recorded from: <ul style="list-style-type: none"> seven locations within the Amendment Application Area; four locations within areas which have been specifically excluded from the Amendment Application Area; one location within Karijini National Park; and 53 other locations across the Pilbara bioregion. 	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: <ol style="list-style-type: none"> This species has been recorded broadly across the Pilbara bioregion outside of the Amendment Application Area. This species is known from within Karijini National Park; and There are four records of this species within areas which have been specifically excluded from the Amendment Application Area.
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642) is a rounded, densely woolly to velvety, somewhat woody shrub that grows to 0.5 m in height. It has small ovate, deeply veined leaves (DPaW and Rio Tinto, 2015). Flowers are yellow and occur in August (WAH, 2016).	<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642) grows on skeletal red soil pockets on the steep sides of ranges (WAH, 2016) and gullies (DPaW and Rio Tinto, 2015). This species is widely spread across the southern Pilbara and northern Gascoyne. This species has been recorded from: <ul style="list-style-type: none"> 37 locations within the Amendment Application Area; 10 locations within areas specifically excluded from the Amendment Application Area; four locations within Karijini National Park; three locations within the Barlee Range Nature Reserve; and 229 other locations across the broader region 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: <ol style="list-style-type: none"> This species has been recorded in the broader Pilbara region and from the Gascoyne region outside of the Amendment Application Area; The preferred habitat for this species (steep slopes) is unlikely to be disturbed by the proposed activities under this permit; This species is known from within Karijini National Park and Barlee Nature Reserve; and Ten records of this species occur within areas specifically excluded from the Amendment Application Area.

3.4.3 Weeds

Twenty two 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
* <i>Aerva javanica</i>	Kapok Bush	High and Rapid	No
* <i>Bidens bipinnata</i>	Bipinnate Beggartick	Unknown and Rapid	No
* <i>Bothriochloa pertusa</i>	Indian couch grass	Not listed	No
* <i>Cenchrus ciliaris</i>	Buffel Grass	High and Rapid	No
* <i>Cenchrus setiger</i>	Birdwood Grass	High and Rapid	No
* <i>Chloris virgata</i>	Feathertop Rhodes Grass	High and Rapid	No
* <i>Citrullus amarus</i>	Pie Melon	Unknown and Moderate	No
* <i>Citrullus colocynthis</i>	Wild Watermelon	Unknown and Moderate	No
* <i>Cucumis myriocarpus</i>	Prickly Paddy Melon	Low and Rapid	No
* <i>Datura leichhardtii</i>	Native Thornapple	Unknown and Unknown	No
* <i>Digitaria ciliaris</i>	Summer Grass	Not listed	No
* <i>Echinochloa colona</i>	Awnless Barnyard Grass	High and Rapid	No
* <i>Flaveria trinervia</i>	Speedy Weed	Not listed	No
* <i>Malvastrum americanum</i>	Spiked Malvastrum	High and Rapid	No
* <i>Melinis repens</i>	Natal Grass	Not listed	No
* <i>Portulaca pilosa</i>	Djanggara	Not listed	No
* <i>Setaria verticillata</i>	Whorled Pigeon Grass	High and Rapid	No
* <i>Sigesbeckia orientalis</i>	Indian Weed	Unknown and Rapid	No
* <i>Sonchus oleraceus</i>	Common Sowthistle	Low and Rapid	No
* <i>Stylosanthes hamata</i>	Verano Stylo	High and Moderate	No
* <i>Tribulus terrestris</i>	Caltrop	Unknown and Moderate	No
* <i>Vachellia farnesiana</i>	Mimosa Bush	High and Rapid	No

3.4.4 Fauna Habitats and Significant Fauna

Biologic (2017 and 2023) identified the following fourteen vertebrate fauna habitats within the Amendment Application Area (**Figure 6**):

- **Calcrete Plain:** The Calcrete Plain fauna habitat includes areas where some solid sheets of calcrete were present, but more commonly soils in this habitat were shallow red loams with calcrete rubble. The vegetation occurring differs from that of the surroundings, presumably due to the differences in soil type. Trees are isolated and the shrub layer tends to be sparse, with a low hummock grassland (*Triodia* sp.) dominant.
- **Gilgai Plain:** Often associated with tussock grasses. Cracking clay soils, usually contain weak crabhole (gilgai) microrelief, and which are generally saline at depth. Surface mantles are absent or common to abundant as pebbles and cobbles of ironstone, basalt and other rocks.
- **Hardpan Plain:** Gently inclined alluvial plains with shallow loams. Typically covered by low scattered woodlands of Mulga in groves arranged at right angles to the direction of sheet water flow. In areas where the hardpan is close to the surface and soil depth is insufficient to support trees, an open scrub may persist.
- **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.
- **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

¹ Biosecurity and Agriculture Management Act, 2007 (BAM Act) s22

dominated by *Triodia* and scattered Mulga, Eucalypt 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.
- **Breakaway/ Cliff:** Comprises single sided rock faces within steep mid-upper slopes with bare rock outcrops or cliffs (not the entire slope).
- **Gorge/ Gully:** Characterised by rugged, steep-sided valleys incised into the surrounding landscape. Gorges are deeply incised with vertical cliff faces, while gullies are more open (but not as open as Minor Drainage Lines). Caves and rock pools are most often encountered in this habitat type. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.
- **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.
- **Medium Drainage Line:** Medium Drainage Line habitat comprised scattered Eucalyptus and Acacias, or mulga woodland, with an understory dominated by tussock grasses. The structure and condition of vegetation often varies seasonally, particularly following rainfall events. Vegetation condition often subject to heavy cattle grazing. This habitat type is prone to pooling and ponding in areas.
- **Major Drainage Line:** Comprises scattered *Eucalyptus* and *Acacias*, or mulga woodland, with an understory dominated by tussock grasses. The structure and condition of vegetation often varies seasonally, particularly following rainfall events. Vegetation condition often subject to heavy cattle grazing. This habitat type is prone to pooling and ponding in areas. Also supports the Weeli Wolli PEC, which has groundwater dependent vegetation species including silver cadjeput (*Melaleuca argentea*).
- **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.

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

- Ghost Bat (*Macroderma gigas*) (Vulnerable EPBC Act and BC Act);
- Northern Quoll (*Dasyurus hallucatus*) (Endangered EPBC Act and BC Act);
- Peregrine Falcon (*Falco peregrinus*) ('Other Specially Protected Fauna' BC Act);
- Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) (EPBC Act and BC Act Vulnerable);
- Pilbara Barking Gecko (*Underwoodisaurus seorsus*) (Priority 2 DBCA);
- Pilbara Leaf-nosed Bat (*Rhinonictis aurantia*) (Vulnerable EPBC Act and BC Act).
- Short-tailed Mouse (*Leggadina lakedownensis*) (Priority 4 DBCA);
- Western Pebble-mound Mouse (*Pseudomys chapmani*) (Priority 4 DBCA).
- Wood Sandpiper (*Tringa glareola*) (Migratory EPBC Act and BC Act).

Based on the occurrence of the habitat types and significant fauna species previously recorded in the vicinity an additional three 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*) (EPBC Act and BC Act Migratory);
- Grey Falcon (*Falco hypoleucos*) (EPBC Act and BC Act Vulnerable); and
- Pilbara Flat-headed Blind-snake (*Anilius 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 6**.

Table 6 Significant Fauna Potentially Occurring within the Amendment Application Area

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Birds					
Fork-tailed Swift (<i>Apus pacificus</i>)	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 high above the Amendment Application Area in the summer months, associated with thunderstorms and cyclonic systems (Johnstone and Storr, 1998). This species usually occurs in flocks of up to 2000 and is often seen accompanying Tree Martins and Masked Wood Swallows (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 The Fork-tailed Swift is entirely aerial and not reliant on terrestrial habitats, therefore the impact to this species is considered to be negligible.
Grey Falcon (<i>Falco hypoleucos</i>)	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.	Suitable habitat for breeding may occur in the taller trees of the Major Drainage line habitat. Three Grey Falcons have been recorded in the centre of the Amendment Application Area.	Possible	Negligible While the Grey Falcon could potentially nest in the taller trees of the Major Drainage habitat of the Amendment Application Area, the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> the habitat for this species occurs extensively throughout the Pilbara; and this species has the ability to rapidly egress from the area.
Peregrine Falcon (<i>Falco peregrinus</i>)	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).	Suitable habitat for breeding occurs in the Gorge / Gully and Cliffs habitat types, specifically tall cliff faces and the taller trees of the major drainage line habitat. Three Peregrine Falcons have been recorded in the Amendment Application Area.	Recorded	Low The proposed clearing activities are unlikely to impact of the Peregrine Falcon as: <ul style="list-style-type: none"> This species preferred habitats (Gorge/ Gully and Cliffs) are unlikely to be disturbed by the proposed activities under this permit; the habitat for this species occurs extensively throughout the Pilbara; and this species has the ability to rapidly egress from the area.
Wood Sandpiper (<i>Tringa glareola</i>)	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 Wood Sandpiper may utilise the Amendment Application Area when temporary ponds are formed after heavy rains. This species has been recorded from one location within the Hardpan Clay habitat of the Amendment Application Area.	Recorded	Low The proposed activities are unlikely to have an impact on this species given its high mobility, the minimal disturbance (less than 1.5%) and large areas of its preferred habitat is present in the surrounding region in the same or better condition to that of the Amendment Application Area.
Mammals					
Ghost Bat (<i>Macroderma gigas</i>)	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).	Ghost Bats have been recorded within and adjacent the Amendment Application Area and its surrounds (Figure 7). All caves classified as suitable or potentially suitable for this species have been excluded from the Amendment Application Area with a 100m buffer (Figure 6).	Recorded	Low While this species has been recorded within and will forage across the Amendment Application Area, the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> All suitable caves have been excluded from the Amendment Application Area; This species is known to occur from numerous locations outside of the Amendment Application Area, including from within Karijini National Park; The preferred habitat for this species (Gorge/ Gully) is unlikely to be disturbed by the proposed activities under this permit; and Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area proposed to be cleared.
Northern Quoll (<i>Dasyurus hallucatus</i>)	Endangered (EPBC Act) Endangered (BC Act)	Northern Quoll populations occur in six geographical centres around Australia, including: Drummond Range, central Queensland; the wet tropics of Northern Queensland; northern Cape York Peninsula; northern and western Top End, Northern Territory; north Kimberley and the Pilbara, Western Australia (Braithwaite and Griffiths, 1994). Northern Quoll denning habitat in the Pilbara is associated with rocky habitats or riverine habitats with mature Eucalypt trees with hollows (SEWPaC, 2011).	While the Gorge / Gully habitat within and adjacent to the Amendment Application Area provides suitable habitat for the Northern Quoll there are very few records from the local area indicating that while the species may be present, it does not occur in high numbers. A majority of Gorge / Gully habitat has been excluded from the Amendment Application Area, including the Gorge / Gully habitat associated with records of the Northern Quoll adjacent to the Amendment Application Area (Figure 7).	Recorded	Low While the habitats within the Amendment Application Area may be utilised the Northern Quoll it is likely to be in very low numbers. The proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> It is not likely to occur in high numbers within the Amendment Application Area; A majority of Gorge / Gully habitat has been excluded from the Amendment Application Area, including the Gorge / Gully habitat associated with records of the Northern Quoll; The preferred habitat for this species (Gorge/ Gully) is unlikely to be disturbed by the proposed activities under this permit; and Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area proposed to be cleared.

Significant Species	Conservation Status	Distribution and Ecology	Habitat Relevance	Likelihood	Potential Impact on Species
Pilbara Leaf-nosed Bat (<i>Rhinonictis aurantius</i>)	Vulnerable (EPBC Act) Vulnerable (BC Act)	As they are poor thermoregulators, the Pilbara Leaf-nosed Bat requires hot, humid, deep caves or disused mine shafts in which to roost (van Dyck and Strahan, 2008). 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).	This species has been recorded from a call within the Amendment Application Area and from three caves which have been excluded from the Amendment Application Area (Figure 7) and is likely to forage over the Amendment Application Area and surrounds. All caves classified as suitable or potentially suitable for this species have been excluded from the Amendment Application Area with a 100m buffer.	Recorded	Low While the Pilbara Leaf-nosed Bat has been recorded within and adjacent to the Amendment Application Area, the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> This species is not dependant on habitat within the Amendment Application Area as all suitable roosts have been excluded from the Amendment Application Area; and Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area proposed to be cleared.
Short-tailed Mouse (<i>Leggadina lakedownensis</i>)	Priority 4 (DBCA)	This species is endemic to northern Australia, where it occurs from Cape York in the east to the Pilbara, in Western Australia, although the distribution is discontinuous (Moro and Kutt, 2008). It is a nocturnal species found in areas of open tussock and hummock grassland, acacia scrubland, savanna woodland, and alluvial clay or sandy soils (Lee, 1995).	This species has been recorded from one locations within the Amendment Application Area in the Hillcrest / Hillslope habitat type.	Recorded	Low The proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> there are larger more suitable areas of the Hillcrest / Hillslope habitat type that occur within and outside of the Amendment Application Area; and Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area proposed to be cleared.
Western Pebble-mound mouse (<i>Pseudomys chapmani</i>)	Priority 4 (DBCA)	The Western Pebble-mound Mouse is restricted to the Pilbara, where it is recognised as an endemic species. Abandoned mounds to the east of its current range indicate a decline in distribution (Menkhurst 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 Hillcrest / Hillslope habitat of the Amendment Application Area. The Western Pebble-mound Mouse has been recorded from multiple locations across the Amendment Application Area.	Recorded	Low While the Hillcrest / Hillslope habitat of the Amendment Application Area may be utilised by the Western Pebble-mound Mouse, the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> Hillcrest / Hillslope habitat 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; Active Pebble-mouse mounds will be avoided using a 10 m buffer, where practicable; and Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area proposed to be cleared.
Reptiles					
Pilbara Flat-headed Blind Snake (<i>Anilius ganei</i>)	Priority 1 (DBCA)	The Pilbara Flat-headed Blind-snake is endemic to the Pilbara. This insectivorous species feeds on termites and their eggs, and larvae and pupae of ants (Wilson and Swan, 2008). This species is fossorial (lives underground) and is rarely encountered. There are few records of the species, however, given the species preference for rocky stony soils, it could occur broadly across the Pilbara region.	Little is known about this species habitat preference. It has been recorded in Gorge / Gully habitat in the broader.	Possible	Low This species may utilise the habitat types within the Amendment Application Area however the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> it is unlikely to be reliant on the areas within the Amendment Application Area; a majority of this species preferred habitat (Gorge / Gully) has been excluded from the Amendment Application Area; and the preferred habitat for this species (Gorge/ Gully) is unlikely to be disturbed by the proposed activities under this permit.
Pilbara Barking Gecko (<i>Underwoodisaurus seorsus</i>)	Priority 2 (DBCA)	This is a rock-inhabiting, restricted-range species encountered at mid elevations in the Hamersley Ranges, widely separated from the closest populations of the related Barking gecko <i>U. milii</i> in the northern Goldfields and Shark Bay in Western Australia (Doughty and Oliver, 2011)	There are two records of this species within the Amendment Application Area (Figure 7). These have been recorded from the Gorge / Gully habitat and Minor Drainage Line (adjacent to Gorge / Gully habitat). There is one additional record within an area of Gorge / Gully habitat which has been excluded from the Amendment Application Area	Recorded	Low This species may utilise the habitat types within the Amendment Application Area, however the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> it is unlikely to be reliant on the areas within the Amendment Application Area, and a majority of the Gorge / Gully habitat associated with this species has been excluded from the Amendment Application Area; and the preferred habitat for this species (Gorge/ Gully) is unlikely to be disturbed by the proposed activities under this permit.
Pilbara Olive Python (<i>Liasis olivaceus barroni</i>)	Vulnerable (EPBC Act) Vulnerable (BC Act)	Pilbara Olive Pythons 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.	There are five records of this species, all of which are within ir adjacent to Gorge / Gully or Drainage Line Habitats (Figure 7). This species has also been recorded adjacent to the Amendment Application Area. The Pilbara Olive Python may forage along the Major Drainage Line and Minor Drainage Line Drainage Line habitats of the Amendment Application Area but is most likely to den in the Gorge / Gully habitat.	Recorded	Low While this species has been recorded within the Amendment Application Area, the proposed clearing is unlikely to impact on this species as: <ul style="list-style-type: none"> it is unlikely to be reliant on the habitat within the Amendment Application Area as a majority of suitable denning habitat (Gorge / Gully habitat) has been excluded from the Amendment Application Area; and the preferred habitat for this species (Gorge/ Gully) is unlikely to be disturbed by the proposed activities under this permit.

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 are two main aquifers within the Amendment Application Area:

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)”.

Hamersley – Wittenoom Aquifer: The Wittenoom aquifer is distinguished as a separate aquifer system because the Wittenoom Dolomite is distinct from the other fractured rock aquifers in the Hamersley Basin, having karst development (solution cavities) and being overlain by a thick sequence of valley filled sediments consisting of pisolite, calcrete and alluvium. The Wittenoom Dolomite is the most important aquifer in the province and underlies the main valleys in the Hamersley Range; it is highly transmissive and high yielding where there is karst development. Water levels may be fairly deep. The groundwater is generally fresh. The aquifer has been developed for Tom Price and Marandoo water supply and has been investigated at other localities. There is likely to be significant development pressure on this aquifer for supply to iron ore operations (DoW, 2015b)

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 in the Ashburton River and Fortescue River Upper catchments. Numerous unnamed perennial drainage lines traverse the Amendment Application Area. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. 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.

Coondewanna Flats and Lake Robinson have been excluded from the Amendment Application Area with a 50m buffer.

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 Our Requirements 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 Our Requirements, 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 7 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle A.

Table 7 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.	Twenty seven Priority flora species have been recorded in the Amendment Application Area. While the proposed clearing within the Amendment Application Area may result in the removal of some priority flora records the overall impact on any of the 27 species is expected to be low (Table 4). Populations of Priority flora will be avoided by a 10 m buffer where practicable..	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 14 broad fauna habitat types within the Amendment Application Area (**Figure 6**).

The vegetation and habitat 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 (or specific exclusion zones) with an additional three species considered to potentially occur within the Amendment Application Area (**Table 6**). As described in **Section 3.4.4** and **Table 6** clearing of the Amendment Application Area is expected to have a low impact on these species.

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

Table 8 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.	<p>Six BC Act protected species have been recorded from the Amendment Application (or specific exclusion zones) and two BC Act protected species are considered 'possible' or 'likely' to occur within the Amendment Application Area (Table 6). The proposed activities are unlikely to have a significant impact on these species as:</p> <ul style="list-style-type: none"> • Similar habitat is well represented outside the Amendment Application Area and was found to be in the same or better condition than that of the Amendment Application Area; • Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area proposed to be cleared under this permit; • Most fauna species are transitory and are unlikely to use the Amendment Application Area for purposes other than foraging; • Except for six caves with nearby disturbance which will require rehabilitation, all suitable bat caves have been excluded from the Application Area with a 100 m buffer; • A majority of Gorge / Gully habitat been excluded from the Amendment Application Area; and • Disturbance to Gorge / Gully habitat within the Amendment Application Area will be minimised. 	Unlikely to be 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.	<p>Three Priority fauna species have been recorded within the Amendment Application Area with one species considered 'possible' or 'likely' to occur within the Amendment Application Area.</p> <p>As detailed in Table 6 these species are unlikely to be impacted for the following reasons:</p> <ul style="list-style-type: none"> • Similar habitat is well represented outside the Amendment Application Area and was found to be in the same or better condition than that of the Amendment Application Area; • Clearing will be of a low impact nature with less than 1.5% of the Amendment Application Area to be cleared under this permit; • Most fauna species are transitory and are unlikely to use the Amendment Application Area for purposes other than foraging; • Disturbance to Gorge / Gully habitat within the Amendment Application Area will be minimised; and • Active Pebble-mouse mounds will be avoided using a 10m buffer, where practicable. 	Not at variance with clearing principle.

Principle	Criteria	Assessment	Outcome
	b3) Native vegetation should not be cleared if it is or is likely to be habitat for fauna that is otherwise significant.	No other conservation significant fauna has been recorded within the Amendment Application Area. Habitat found within the Amendment Application Area may be suitable for use by conservation significant fauna, however similar habitat was found in similar condition adjacent to and within the local area that could be utilised by these species.	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. All suitable bat caves have been excluded from the Amendment Application Area with a 100 m buffer. A majority of Gorge / Gully habitat has been excluded from the Amendment Application Area. Disturbance to Gorge / Gully habitat within the Amendment Application Area will be minimised.	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.
	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 that are necessary for the maintenance of fauna run through the Amendment Application Area.	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 9 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle C.

Table 9 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 <i>in situ</i> existence of populations of Threatened Flora under the <i>BC Act 2016</i>	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 <i>in situ</i> 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.

No TECs, Environmentally Sensitive Areas or PECs are located in the Application Area (Onshore Environmental Consultants, 2014).

One PEC listed by the DBCA is adjacent to the Amendment Application Area (**Figure 1**). Two sub-types of the PEC 'Coolibah-lignum flats: *Eucalyptus victrix* over *Muehlenbeckia florulenta*' described as:

- Coolibah (*Eucalyptus victrix*) woodland over Lignum (*Muehlenbeckia florulenta*) over Swamp Wandiree (*Eriachne benthamii*) (Priority 1) – Lake Robinson being the only known occurrence; and
- Coolibah (*Eucalyptus victrix*) and Mulga (*Acacia aneura*) woodland over Lignum (*Muehlenbeckia florulenta*) and tussock grasses on clay plains (Priority 3) - Coondewanna Flats being one of two known occurrences (the other being Wanna Munna Flats).

This PEC has been excluded from the Amendment Application Area with a 50 m buffer.

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

Table 10 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 <i>Environment Protection and Biodiversity Conservation Act 1999</i> 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 <i>Environment Protection and Biodiversity Conservation Act 1999</i> .	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 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 <i>in situ</i> existence of significant examples of priority threatened ecological communities published by the Department of Environment and Conservation.	<p>One DBCA listed PEC is located adjacent to the Amendment Application Area:</p> <ul style="list-style-type: none"> • 'Coolibah-lignum flats: Eucalyptus victrix over Muehlenbeckia florulenta' – two sub-types of the PEC (Priority 1 and Priority3). <p>No Vegetation associated with this PEC will be impacted by the proposed works. The PEC has been excluded from the Amendment Application Area with a 50 m buffer.</p>	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 habitat and vegetation within the Amendment Application Area is 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 vegetation occurring in the Amendment Application Area.

Table 11 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle E.

Table 11 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 1.5% 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 1.5% 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 in the Ashburton River and Fortescue River Upper catchments. Numerous unnamed perennial drainage lines traverse the Amendment Application Area. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. 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 12 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle F.

Table 12 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 water courses or wetlands occur within the Amendment Application Area.	Not 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).	The Coondewanna Flats PEC is located adjacent to the Amendment Application Area. No native vegetation forming a buffer to this PEC will be cleared as the PEC has been excluded from the Amendment Application Area with a 50 m buffer.	Not 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.	This application 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.	Numerous unnamed perennial drainage lines traverse the Amendment Application Area. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. 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.	Not 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 13** provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle G.

Given 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 two introduced flora species have been recorded in the Amendment Application Area (**Table 5**). None are listed as a Declared Pest under the BAM Act. These are typical introduced species commonly recorded in the Pilbara region.

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

Table 13 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 infrastructure.	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.

There are no conservation estates occurring in the Application Area. The western edge of the Amendment Application Area is 50 m from Karijini National Park. Given the low impact nature of the proposed activities, it is unlikely that there will be any impacts on Karijini National Park from clearing within the Amendment Application Area.

The Amendment Application Area is not considered to form an ecological linkage to any 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 14** below.

Table 14 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 significantly 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.	The western edge of the Amendment Application Area is 50 m from Karijini National Park. Given the low impact nature of the proposed activities, it is unlikely that there will be any impacts on the Karijini National Park from clearing within 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 Amendment Application Area is not an ecological linkage to a conservation 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. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. 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.	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.

Numerous unnamed perennial drainage lines traverse the Amendment Application Area. Where practicable, existing cleared tracks will be used to cross the unnamed non-perennial minor drainage line. 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.

Appropriate surface water management practices will be implemented to minimise erosion and minimise potential impacts on the quality of surface water. The clearing is unlikely to cause deterioration in the quality of any surface or underground water.

Table 15 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle I.

Table 15 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 16 provides an assessment of the proposed clearing activities within the Amendment Application Area against the components of clearing Principle J.

Table 16 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

The Land Access Unit is the internal group within BHP that manages Aboriginal heritage matters. The Land Access Unit is responsible for ensuring that 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 following

- Banjima Native Title Claim WC2011/006;
- Nyiyaparli Native Title Claim WC2013/003;
- Yinhawangka Native Title Claim WC2010/011;
- Yinhawangka Native Title Claim WC2010/016; and
- Ngarlawangga Native Title Claim WC2005/003.

Ethnographic and archaeological surveys of the Amendment Application Area have been conducted in consultation with the Traditional Owners and a number of heritage sites have been identified (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

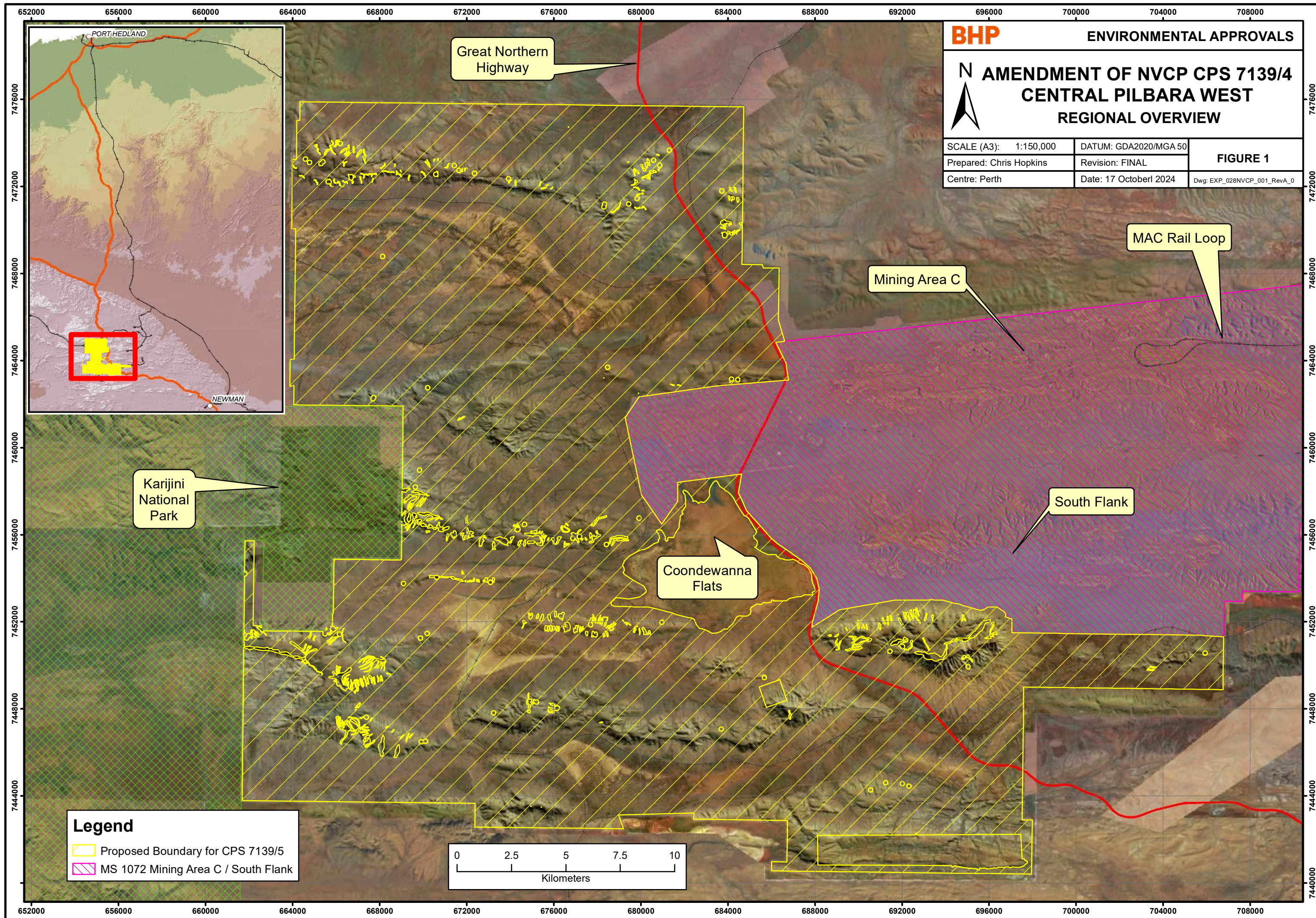
The proposed clearing in the Amendment Application Area is unlikely to be at variance to any of the Ten Clearing Principles. CPS 7139/43 authorises the clearing of up to 1,000 ha. To date BHP has cleared 723.82 ha and the clearing of a further 276.18 ha within an Amendment Application Area of 76,714.22 ha is unlikely to have any significant negative impacts on biodiversity and environmental values in the area.

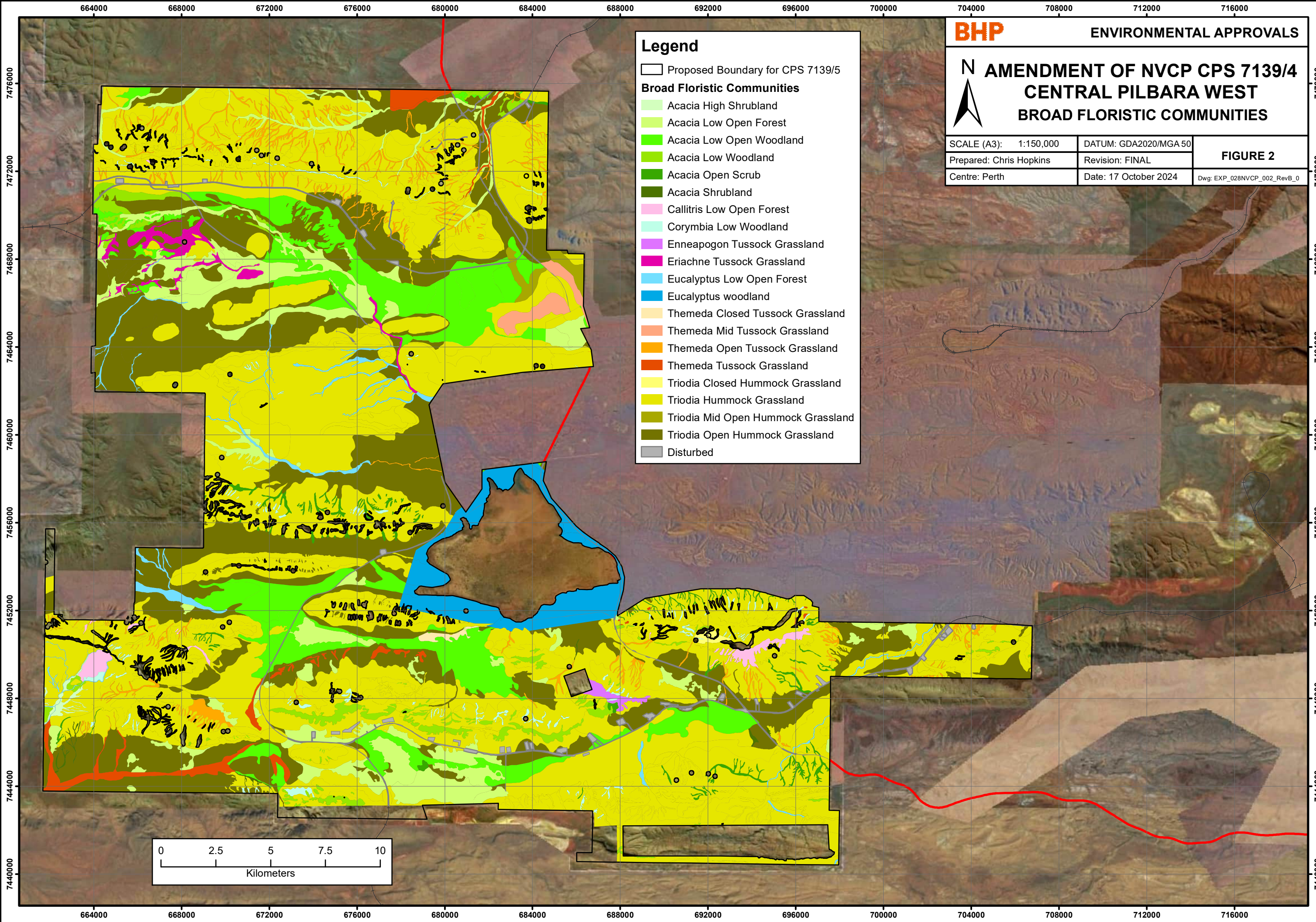
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Figures





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ENVIRONMENTAL APPROVALS



**AMENDMENT OF NVCP CPS 7139/4
CENTRAL PILBARA WEST
BROAD FLORISTIC COMMUNITIES**

SCALE (A3):	1:150,000	DATUM:	GDA2020/MGA 50
Prepared:	Chris Hopkins	Revision:	FINAL
Centre:	Perth	Date:	17 October 2024

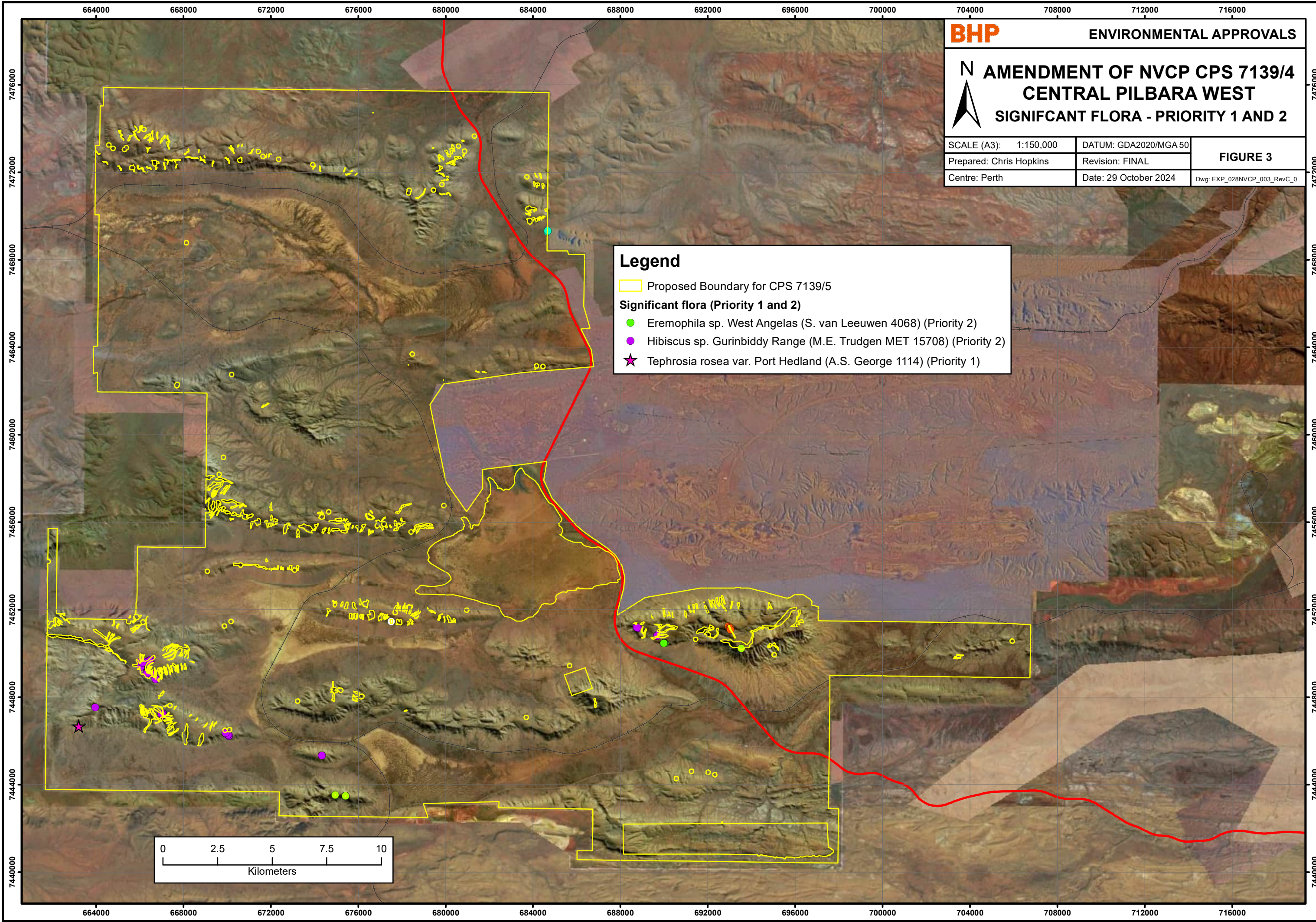
FIGURE 2
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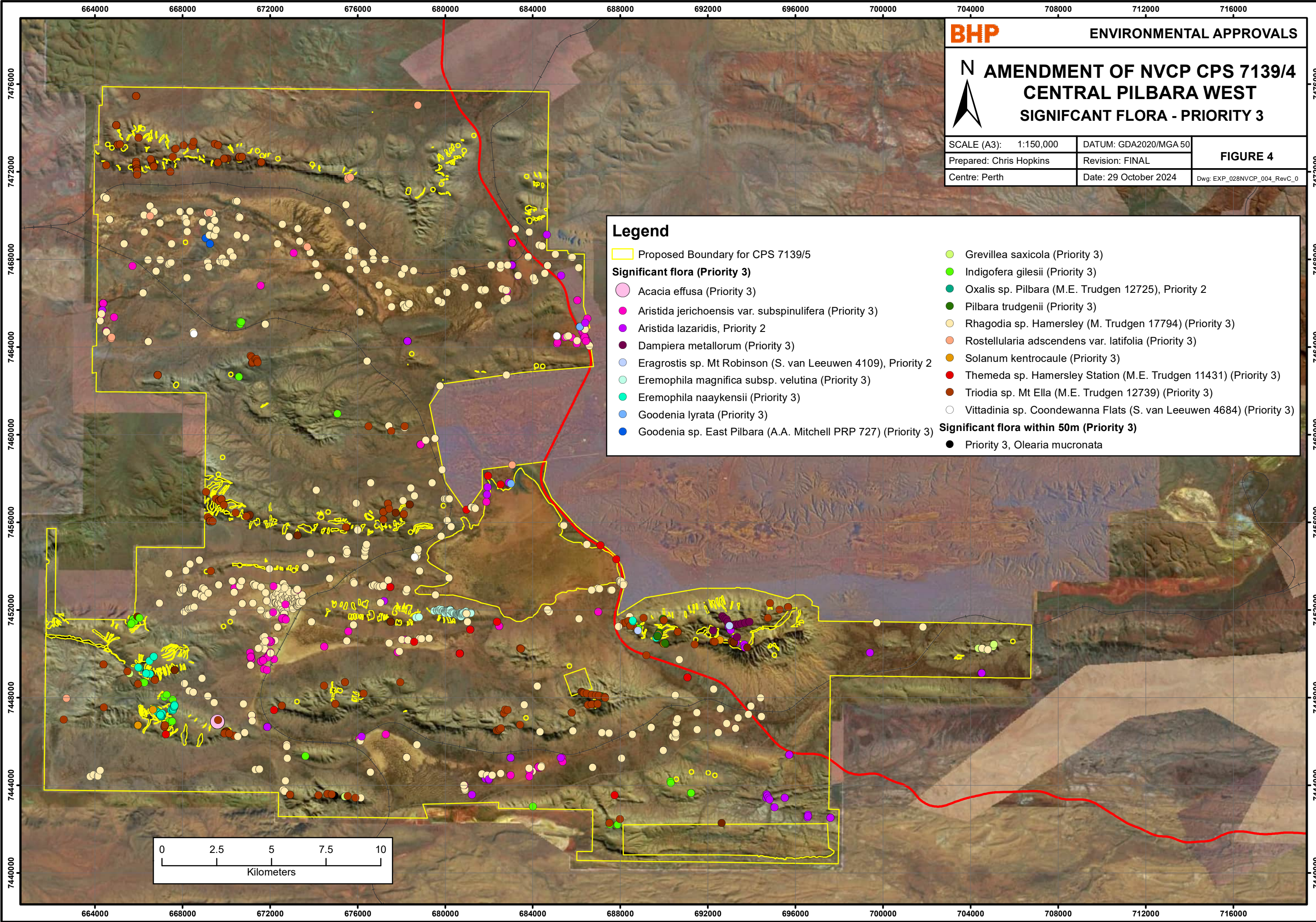
Legend

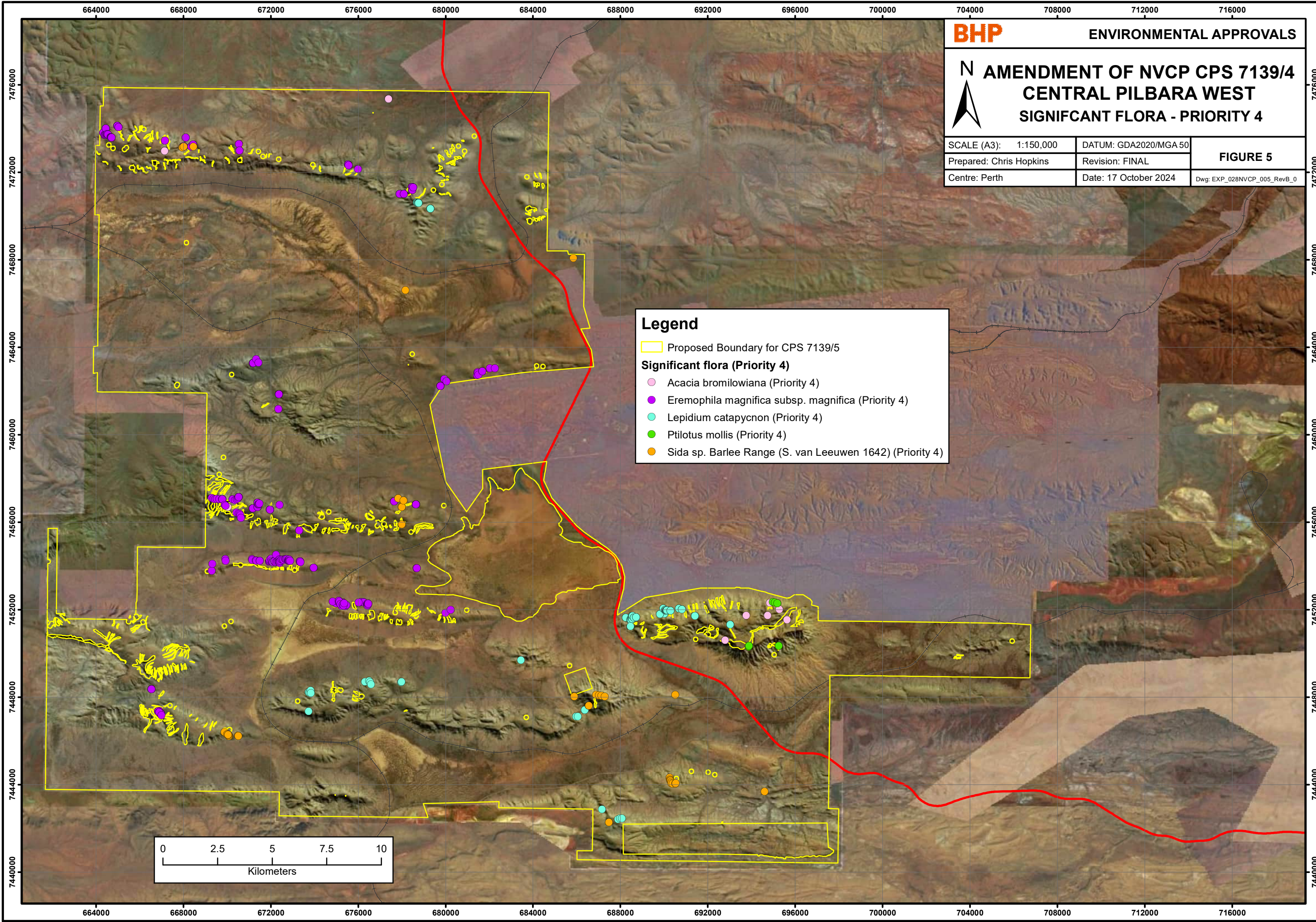
Proposed Boundary for CPS 7139/5

Broad Floristic Communities

- Acacia High Shrubland
- Acacia Low Open Forest
- Acacia Low Open Woodland
- Acacia Low Woodland
- Acacia Open Scrub
- Acacia Shrubland
- Callitris Low Open Forest
- Corymbia Low Woodland
- Enneapogon Tussock Grassland
- Eriachne Tussock Grassland
- Eucalyptus Low Open Forest
- Eucalyptus woodland
- Themeda Closed Tussock Grassland
- Themeda Mid Tussock Grassland
- Themeda Open Tussock Grassland
- Themeda Tussock Grassland
- Triodia Closed Hummock Grassland
- Triodia Hummock Grassland
- Triodia Mid Open Hummock Grassland
- Triodia Open Hummock Grassland
- Disturbed







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ENVIRONMENTAL APPROVALS



**AMENDMENT OF NVCP CPS 7139/4
CENTRAL PILBARA WEST
SIGNIFICANT FLORA - PRIORITY 4**

SCALE (A3): 1:150,000

DATUM: GDA2020/MGA 50

Prepared: Chris Hopkins

Revision: FINAL

Centre: Perth

Date: 17 October 2024

FIGURE 5

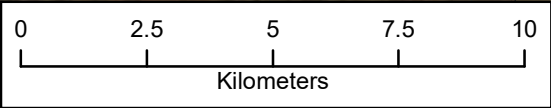
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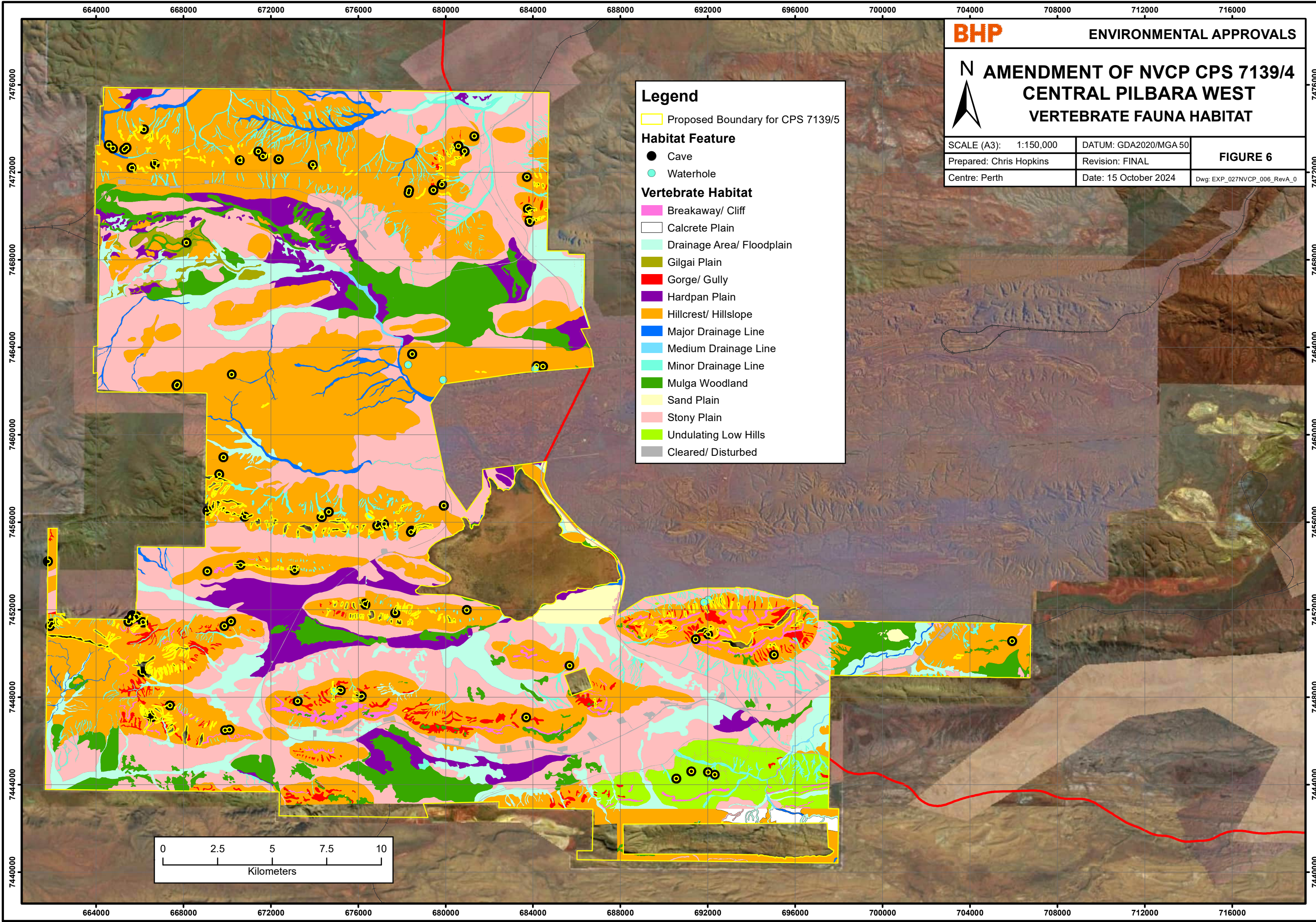
Legend

Proposed Boundary for CPS 7139/5

Significant flora (Priority 4)

- Acacia bromilowiana* (Priority 4)
- Eremophila magnifica* subsp. *magnifica* (Priority 4)
- Lepidium catapycnon* (Priority 4)
- Ptilotus mollis* (Priority 4)
- Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 4)





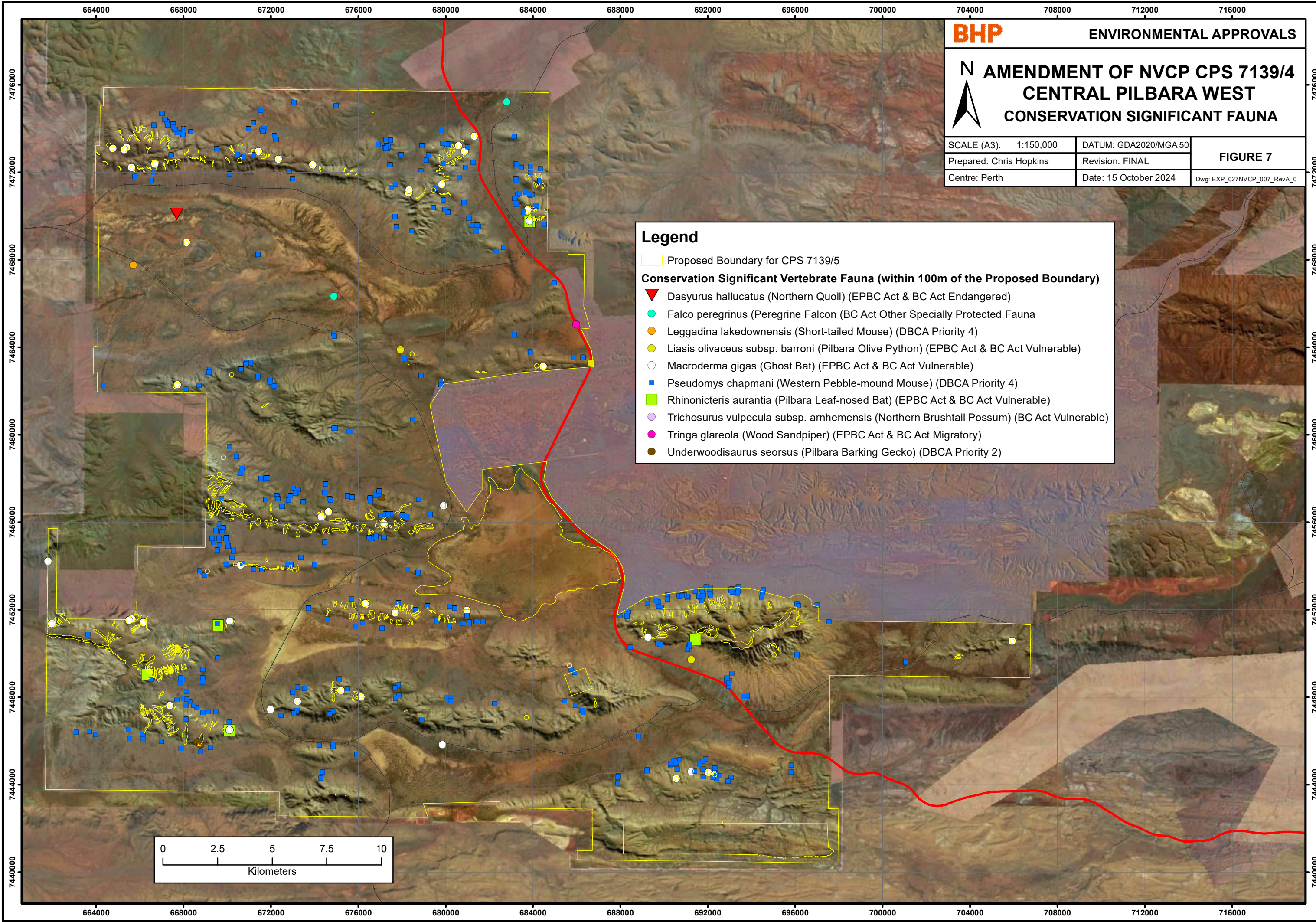
BHP

ENVIRONMENTAL APPROVALS



**AMENDMENT OF NVCP CPS 7139/4
CENTRAL PILBARA WEST
VERTEBRATE FAUNA HABITAT**

SCALE (A3): 1:150,000	DATUM: GDA2020/MGA 50	FIGURE 6 Dwg: EXP_027NVCP_006_RevA_0
Prepared: Chris Hopkins	Revision: FINAL	
Centre: Perth	Date: 15 October 2024	



Appendices

Appendix 1: *Central Pilbara Hub Detailed and Targeted Flora Survey* (Biologic, 2023)

Appendix 2: *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (Onshore Environmental, 2014a)

Appendix 3: *Central Pilbara Hub Targeted Matters of National Environmental Significance Vertebrate Fauna Survey* (Biologic, 2023)

Appendix 4: *Consolidated Fauna Habitat Mapping 2017* (Biologic, 2017)