Environmental Assessment
Merredin Great Eastern Highway Road Widening
Clearing Permit Application

January 2020
Version 1

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Document Job Number: 2019/125

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Contents **Page No.**

Tables

Figures

Glossary

Acronym	Description
ANCA	Australian Nature Conservation Agency.
BA	Birdlife Australia (Formerly RAOU, Birds Australia).
BAM Act	*Biosecurity and Agriculture Management Act 2007*, WA Government.
BC Act	*Biodiversity and Conservation Act 2016,* WA Government.
Botanica	Botanica Consulting.
BoM	Bureau of Meteorology.
CAMBA	China Australia Migratory Bird Agreement 1998.
DAFWA	Department of Agriculture and Food (now DPIRD), WA Government.
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW), WA Government.
DEC	Department of Environment and Conservation (now DBCA), WA Government.
DER	Department of Environment Regulation (now DWER), WA Government.
DMIRS	Department of Mines, Industry Regulation and Safety (formerly DMP), WA Government
DMP	Department of Mines and Petroleum (now DMIRS), WA Government.
DotEE	Department of the Environment and Energy (formerly DSEWPaC), Australian Government.
DoW	Department of Water (now DWER), WA Government.
DPaW	Department of Parks and Wildlife (now DBCA), WA Government.
DPIRD	Department of Primary Industries and Regional Development, WA Government
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotEE), Australian Government.
DWER	Department of Water and Environmental Regulation (formerly OEPA, DER and DoW), WA Government
EP Act	*Environmental Protection Act 1986,* WA Government.
EP Regulations	Environmental Protection (Clearing of Native Vegetation) Regulations 2004, WA Government.
EPA	Environmental Protection Authority, WA Government.
EPBC Act	*Environment Protection and Biodiversity Conservation Act* 1999, Australian Government.
ESA	Environmentally Sensitive Area.
Ha	Hectare (10,000 square metres).
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.
JAMBA	Japan Australia Migratory Bird Agreement 1981.
Km	Kilometre (1,000 metres).
Main Roads	Main Roads Western Australia.
MVG	Major Vegetation Groups.
NVIS	National Vegetation Information System.
OEPA	Office of the Environmental Protection Authority (now DWER), WA Government.
PEC	Priority Ecological Community.
Permit Area	Clearing Permit application area
Project	Merredin Goldfields Highway Road Widening

Acronym	Description
Ramelius	Ramelius Resources Limited.
RAOU	Royal Australia Ornithologist Union.
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement 2007.
SRE	Short Range Endemic.
SSC	Species Survival Commission, International.
Survey Area	Great Eastern Highway-Merredin to Southern Cross SLK 258.5 - 365.5 Project which covered an area of 1401 ha.
TEC	Threatened Ecological Community.
WA	Western Australia.
WAHERB	Western Australian Herbarium.
WAM	Western Australian Museum, WA Government.
WC Act	*Wildlife Conservation Act* 1950, WA Government.

1 Introduction

Ramelius Resources Limited (Ramelius) is proposing to use 100 t triple road trains to haul ore from Narembeen to Westonia. The route uses existing Shire roads to reach the Great Eastern Highway. The intersection of the Narembeen-Merredin Road and Great Eastern Highway approximately 2.4 km east of Merredin, Western Australia requires upgrading to facilitate the road trains. The upgrade consists of an acceleration lane along the Great Eastern Highway (Figure 1-1). A clearing permit application (purpose permit) has been submitted to the Department of Water and Environmental Regulation (DWER). The Permit Area covers an area of 0.91 ha (Figure 1-2).

This document summarises the results of flora/vegetation and fauna surveys conducted for the Great Eastern Highway-Merredin to Southern Cross SLK 258.5 - 365.5 Project (referred to as the 'survey area') and assesses the potential impacts to significant flora/ vegetation and fauna from the clearing activities proposed. This document has been prepared as supporting documentation for the clearing permit application.

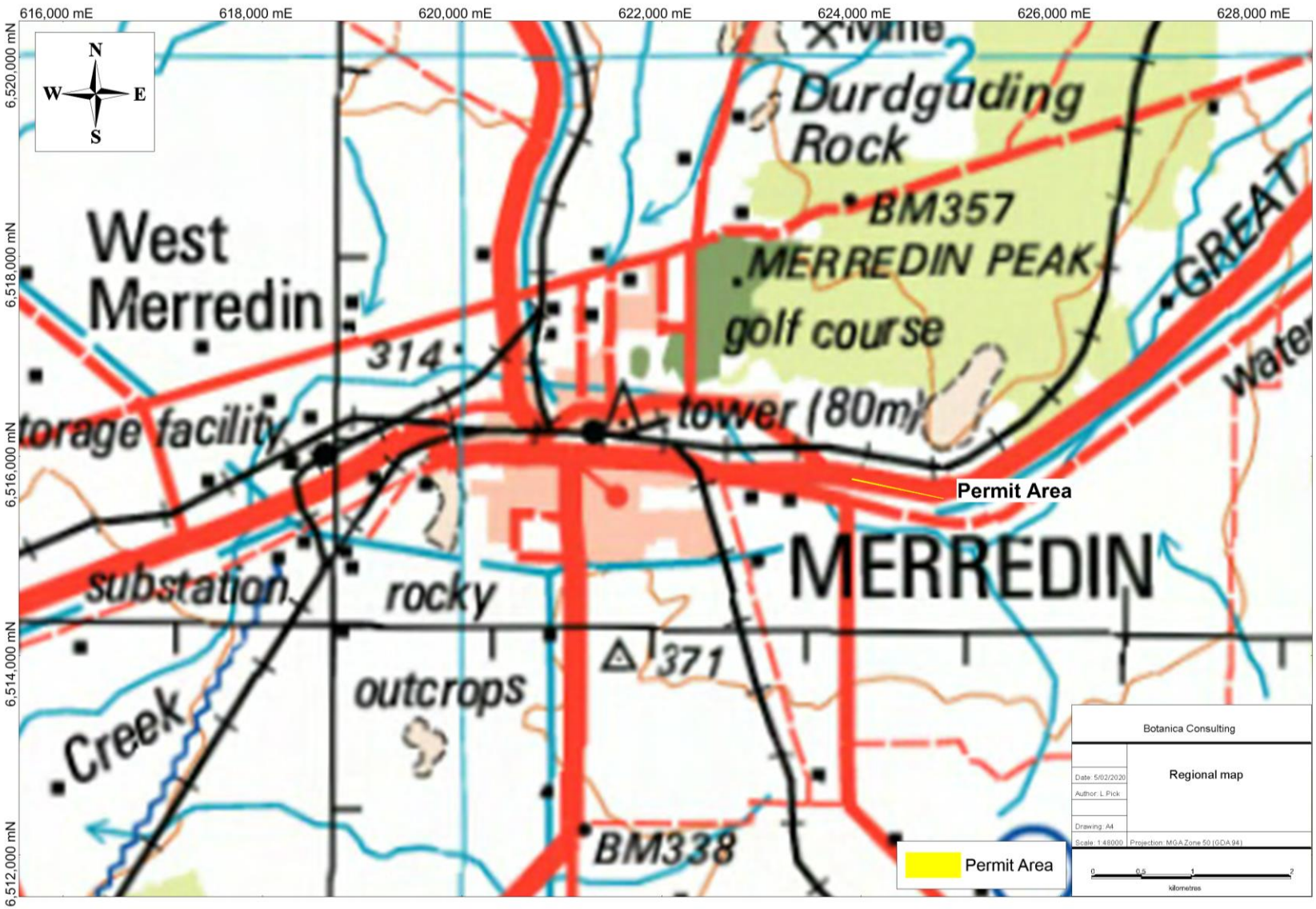

Figure 1-1: Regional map of the Permit Area

Figure 1-2: Map of the Permit Area

2 Existing Environment

2.1 Regional Setting

The Permit Area occurs in the Avon Wheatbelt Bioregion (Figure 2-1), as defined by the Interim Biogeographic Regionalisation for Australia (IBRA) classification system (McKenzie, 2003). The region is divided into two major components: the Merredin subregion (AW1) and the Katanning subregion (AW2). The Permit Area lies within the Merredin subregion which is characterized by gently undulating landscapes of low relief; proteaceous scrub heaths on residual lateritic uplands and mixed woodlands on quaternary alluvial soils. The survey area locality is dominated by mixed woodland of Mallee and Eucalyptus species. The region has been extensively cleared for agriculture and grazed by stock (Beecham, 2001).

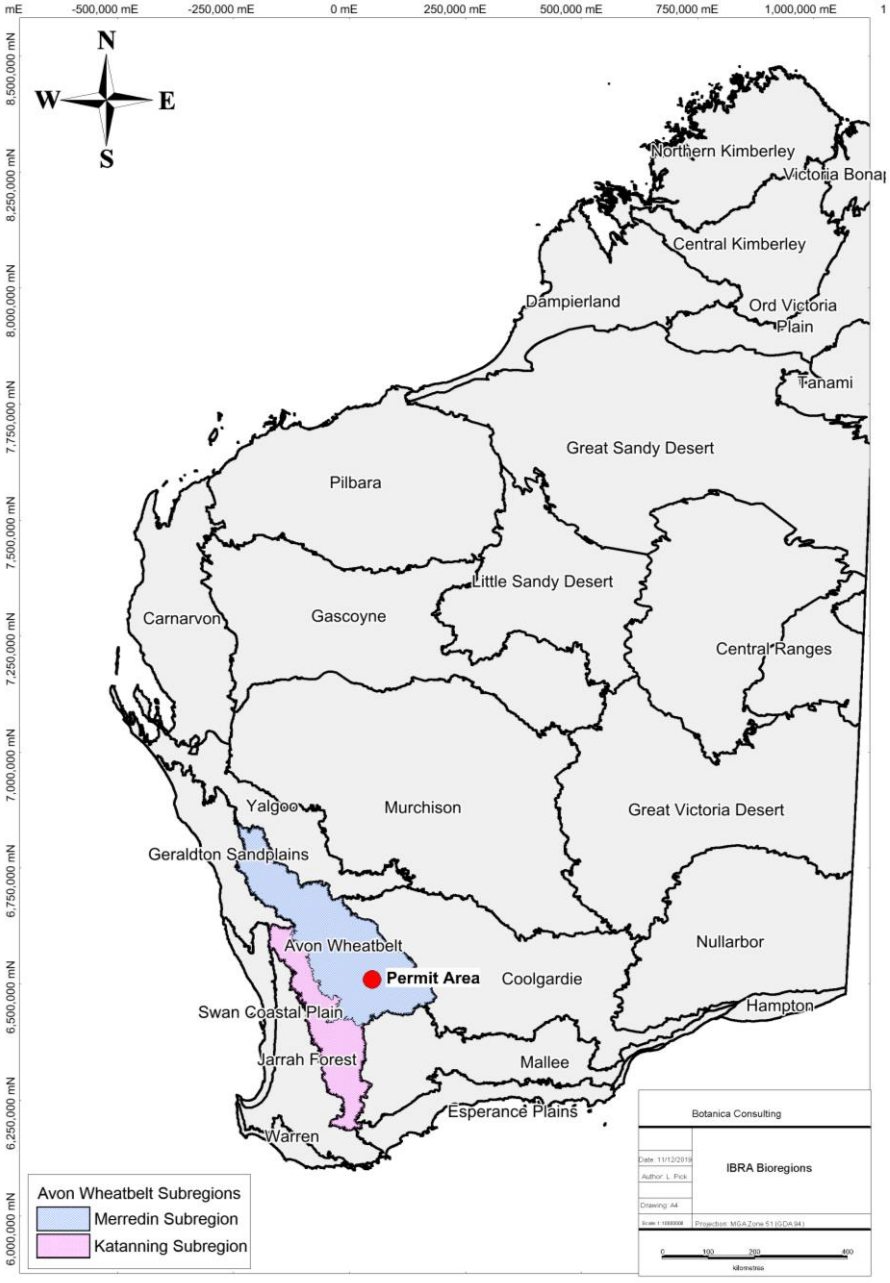

Figure 2-1: Map of IBRA Bioregions in relation to the Permit Area

Note-Permit Area not to scale

2.2 Soil Landscape Systems

The Permit Area lies within the Avon Province of Western Australia. The Avon Province consists of a laterised plateau (dissected at fringes and with saline drainage lines inland) on deeply weathered mantle and alluvium over granitic rocks of the Yilgarn Craton (and Albany-Fraser Orogen). Soils comprise of sandy duplexes soils and ironstone gravelly soils with loamy earths, loamy duplexes, sandy earths, deep sands and wet soils. Vegetation comprises of York gum-wandoo-salmon gum-morrel gimlet woodland and jarrah-marri-karri-wandoo woodlands/forests (with some mallee scrub, tammar-wodjil thickets and scrub-heath) (Tille, 2006). The Avon Province is further divided into soil-landscape zones, with the Permit Area located within the Zone of Ancient Drainage (258).

The Zone of Ancient Drainage is characterised by gently undulating terrain (with some sandplains and salt lakes chains) on deeply weathered mantle and alluvium over granitic rocks of the Yilgarn Craton. Soils comprise of sandy earths (mostly yellow and red), loamy earths (often calcareous), sandy duplexes, loamy duplexes, deep sands and ironstone gravelly soils. Vegetation comprises of Salmon gum-gimlet-morrel-wandoo-York gum woodlands with mallee scrub (and some acacia-casuarina thickets, scrub-heath and samphire flats) (Tille, 2016). This zone is further divided into soil landscape systems, with the Permit Area located within two soil landscape systems as shown in Table 2-1 and Figure 2-2 below.

Table 2-1: Soil landscape systems within the Permit Area

Soil Landscape System	Description
Kellerberrin System	Valley floors, in the central Zone of Ancient Drainage, with alkaline red shallow loamy duplex, alkaline grey sandy duplexes mainly in branch valleys (shallow and deep), calcareous loamy earth and hard cracking clay. Salmon Gum-Gimlet-Wand
Tandegin System	Sandplain dominated interfluves with weakly indurated lateritised crests and upper slopes and long colluvial yellow sandplain upper to lower slopes. Unlateritised surfaces dominated by sodic and alkaline duplex soils.

Figure 2-2: Soil landscape systems within the Permit Area

2.3 Climate

The climate of the Merredin subregion is characterised as semi-arid warm Mediterranean and is characterised by hot dry summers and wet winters (Beard, 1990; Beecham, 2001). Climate data for the Merredin weather station (#13012) located approximately 2.4 km west of the Permit Area is shown in Figure 2-3 (BoM, 2019a). Monthly mean maximum temperature at Merredin ranges from 33.9ºC during January to 16.4ºC in July. Mean monthly rainfall ranges from 50.2 mm in July to 14.1 mm in December, whilst the mean annual rainfall is 326.2 mm (Figure 2-3).

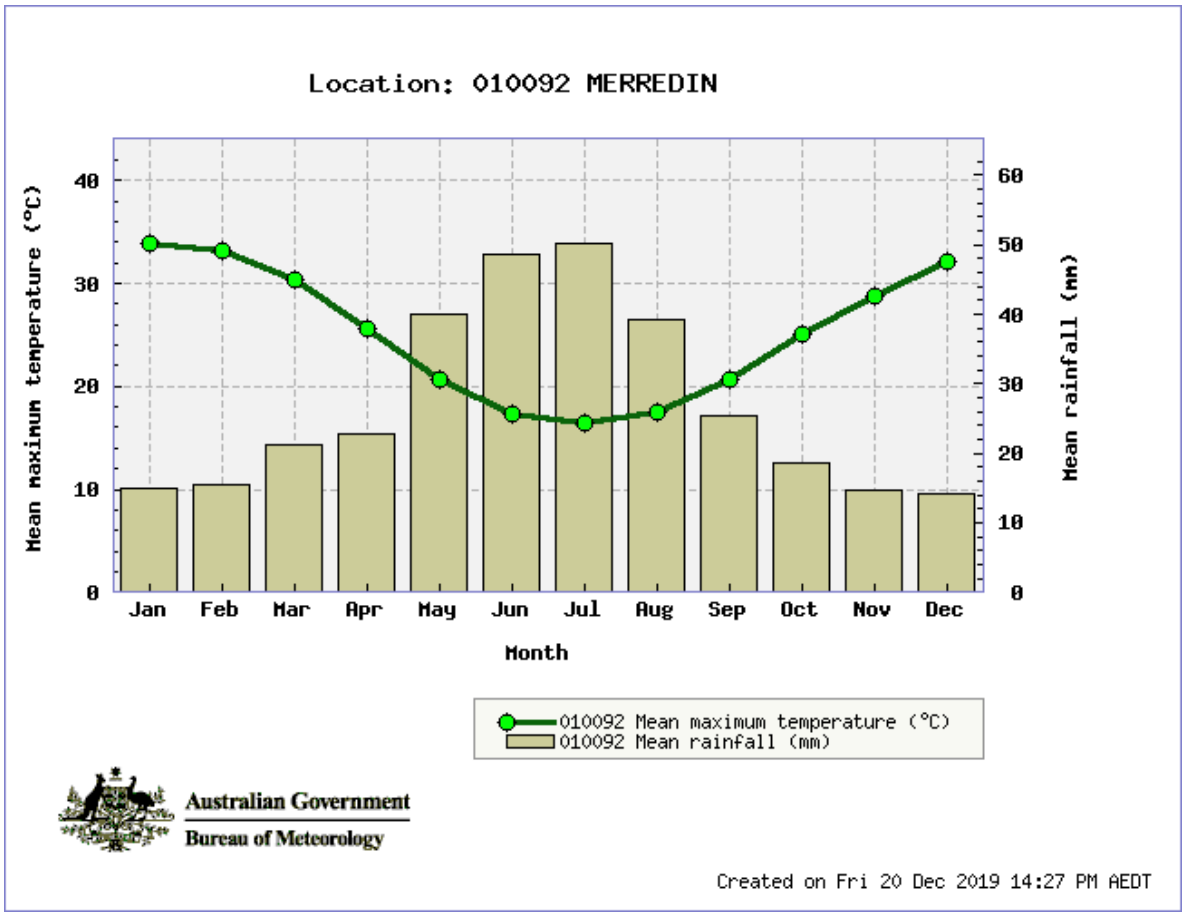

Figure 2-3: Average Climate Data for the Merredin weather station #10092 (BoM, 2019a)

2.4 Hydrology

According to the Geoscience Australia database (2015), there are no ephemeral or perennial drainage lines, inland waters or wetlands within the Permit Area (Figure 2-4).

According to the Bureau of Meteorology (2019b) *Groundwater Dependent Ecosystem Atlas,* there are no aquatic or terrestrial Groundwater Dependent Ecosystems (GDE) within the Permit Area. A map showing the surface hydrology of the local area is provided in Figure 2-4.

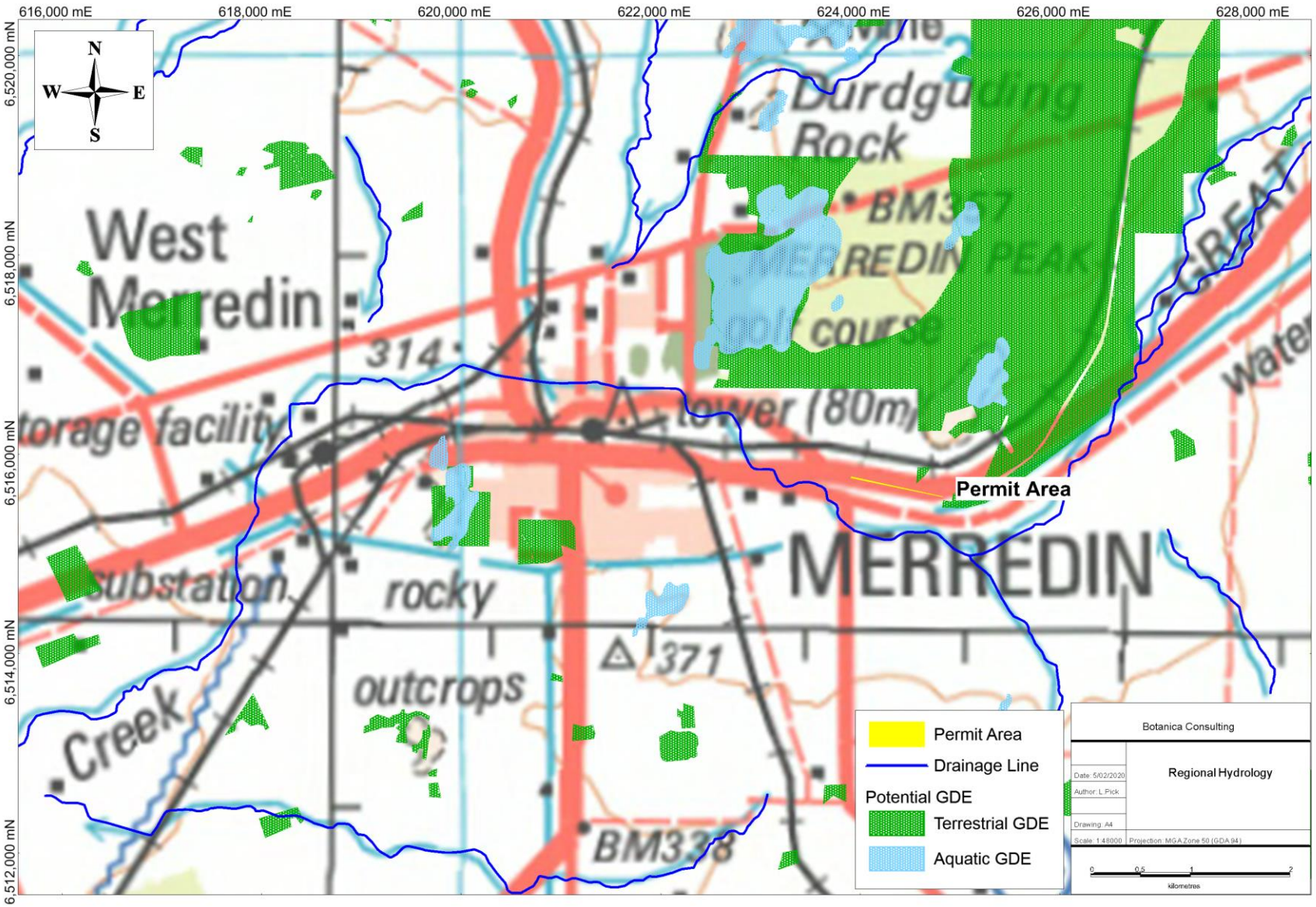

Figure 2-4: Surface drainage and potential GDEs of the Permit Area (Geoscience Australia, 2015; BoM, 2019)

2.5 Conservation Areas

As shown in Figure 2-5, the Permit Area is not located within any proposed or vested Conservation Reserves or any lands managed by DBCA (including Threatened and Priority Ecological Communities). The Permit Area does not contain any world or national heritage places. There are no wetlands of international importance (Ramsar Wetlands), national importance (Australian Nature Conservation Agency (ANCA) Wetlands) or conservation category wetlands within the Permit Area. The Permit Area does not contain any Environmentally Sensitive Areas (ESA) listed under the *Environmental Protection (EP) Act 1986*.

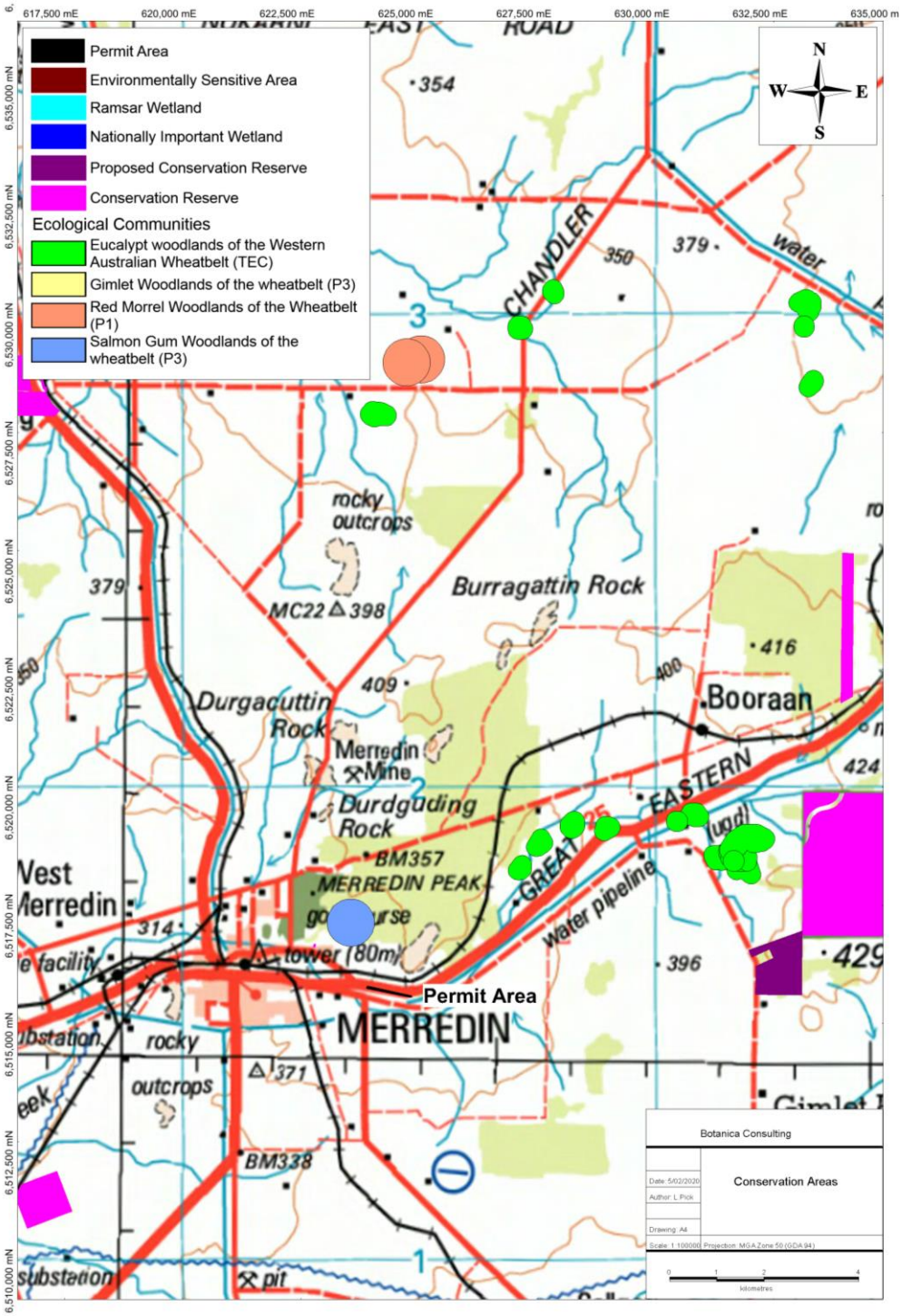

Figure 2-5: Conservation Areas in relation to the Permit Area

2.6 Flora and Vegetation

A reconnaissance flora and vegetation survey and targeted conservation significant flora survey of the Great Eastern Highway-Merredin to Southern Cross SLK 258.5 - 365.5 was conducted by GHD (2016) which covered an area of 1401 ha, encompassing the 0.91 ha Permit Area. Following this survey, additional survey work was conducted for Astron Environmental Services (Astron, 2018) in order to assess the potential presence and extent of the 'Eucalypt Woodlands of the Western Australian Wheatbelt' Threatened Ecological Community, in accordance with approved conservation advice.

Of the nineteen vegetation associations (not including highly disturbed areas) identified by GHD within the survey area, a single vegetation association (Rehabilitated areas) is located within the Permit Area (Table 2-2). The remaining area comprised of Infrastructure and Highly Disturbed areas. A map of the vegetation association within the Permit Area is provided in Figure 2-6.

Based on the vegetation condition rating scale for the South West and Interzone Botanical Provinces adapted from Keighery and Trudgen (EPA, 2016), condition of vegetation within the Permit Area was classified as 'Degraded'. Degraded condition indicates basic vegetation structure has been severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing. Vegetation within the Permit Area has been previously cleared and comprised of regrowth vegetation.

Table 2-2: Summary of vegetation associations within the Permit Area

Vegetation Association	Description	Image	Area within Survey Area (ha)	Area within Permit Area (ha)
Rehabilitated areas	Areas of vegetation rehabilitated in the past of varying ages. Includes some species native to the project area (*Eucalyptus loxophleba* and *Hakea preissii*), as well as non-native species.		93.3	0.85
Infrastructure and Highly Disturbed areas	Areas where clearing or other activities have fundamentally altered the composition of native vegetation and are not in a self-sustaining condition. These areas are completely cleared.		486.4	0.06
Total			**579.7**	**0.91**

Figure 2-6: Vegetation associations within the Permit Area

2.6.1 Remnant Vegetation

The Department of Primary Industries and Regional Development (DPIRD, 2018) GIS file indicates that the Permit Area is located within Pre-European Beard vegetation association Muntadgin 36 of the Merredin Subregion.

The extent of this vegetation association, as specified in the 2018 Statewide Vegetation Statistics (DBCA, 2018) is provided in Table 2-2. Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered "endangered" (EPA, 2000). The extent of this vegetation association is currently below 30% however it remains above 10%.

The only vegetation present within the Permit Area comprises of regrowth (rehabilitated) vegetation which accounts for 0.85 ha of the total Permit Area and is not representative of the Pre-European vegetation association Muntadgin 36.

Table 2-3: Pre-European Vegetation Association within the Permit Area

Region	Current extent (ha)	Pre-European extent remaining (%)	% of Current extent within DBCA managed lands
Vegetation Association Muntadgin 36: Shrublands; thicket, Acacia-Casuarina alliance.			
Merredin Subregion	47,918.11	18.53	2.91
Western Australia	47,918.11	18.53	2.91

Figure 2-7: Pre-European Vegetation

2.6.2 Significant Flora

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016b) significant flora includes:

- flora being identified as threatened or priority species
- locally endemic flora or flora associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
- new species or anomalous features that indicate a potential new species
- flora representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids
- flora with relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

No Threatened or Priority flora, locally endemic flora, new or unusual species, relictual species, species representative of range extensions, or surface/groundwater dependent ecosystems were identified within the Permit Area.

One Threatened Flora taxon (*Eremophila resinosa*), pursuant to the *Biodiversity Conservation* (BC) Act 2016 and the Commonwealth *Environmental Protection and Biodiversity Conservation* (EPBC) Act 1999 and five Priority Flora were identified in the local area during surveys conducted by GHD; however none of these taxa were recorded within the Permit Area (Table 2-4 and Figure 2-8).

On-ground surveys of the Permit Area have concluded that the habitats[1] required by Threatened and Priority Flora recorded during the survey are unlikely to occur within the Permit Area. A description of the known habitat for each taxon recorded by GHD (2016) is provided in Table 2-4.

[1] Based on known habitat descriptions described on Florabase (WAHERB, 2019)/ habitat descriptions from GHD records (2016) and on-ground inspection of the Permit Area by Botanica

Table 2-4: Likelihood of occurrence for Threatened and Priority Flora within the Permit Area

Taxon	EPBC Act	BC Act	DBCA Priority Rating	Habitat Description-Florabase (WAHERB, 2019)	Habitat Description-GHD Records (GHD, 2016)	Potential habitat[2] present within the Permit Area
Acacia ancistrophylla var. *perarcuata*			P3	Red sand, clay loam, loam on undulating plains.	Recorded growing within a variety of habitats, including: • *Eucalyptus loxophleba* subsp. *lissophloia* open mallee forest; • *E. salubris* Open forest over *Melaleuca sheathiana* tall shrubland; • *E. sheathiana* open mallee forest; • *E. capillosa* subsp. *capillosa* open forest; • *E. salubris* open forest; • *E. loxophleba* subsp. *lissophloia* open mallee forest; and • *Allocasuarina* tall shrubland	Unlikely-no undulating plains within the Permit Area. No suitable vegetation within the Permit Area.
Acacia crenulata			P3	Clay, sandy clay, yellow sand on rocky rises, granite outcrops and breakaways.	Recorded growing in *Allocasuarina* tall shrubland and *Eucalyptus salubris* open forest over *Melaleuca sheathiana* tall shrubland.	Unlikely-no rocky rises, granite outcrops or breakaways within the Permit Area. No suitable vegetation within the Permit Area.
Acacia subrigida			P2	Yellow or red sand. Plains.	Recorded growing within *Eucalyptus sheathiana* open mallee forest.	Unlikely-no sandplains within the Permit Area. No suitable vegetation within the Permit Area.
Eremophila resinosa	EN	EN		Clay loam gravelly sandy clay on road verges.	Recorded growing in *Eucalyptus* spp. mallee woodland.	Unlikely- Permit Area is located on road verge however no suitable vegetation within the Permit Area.

[2] Based on known habitat descriptions described on Florabase (WAHERB, 2019)/ habitat descriptions from GHD records (2016) and on-ground inspection of the Permit Area by Botanica

Taxon	EPBC Act	BC Act	DBCA Priority Rating	Habitat Description-Florabase (WAHERB, 2019)	Habitat Description-GHD Records (GHD, 2016)	Potential habitat[2] present within the Permit Area
Leucopogon sp. Ironcaps (N.Gibson & K. Brown 3070)			P3	Skeletal sand, yellow sandy loam, rocky loam, gravel, laterite, ironstone. Gentle lower slopes, flat uplands, hill tops.	Recorded growing within *Ecdeiocolea monostachya* sedgeland.	Unlikely-no lateritic slopes, flat uplands or hill tops within the Permit Area. No suitable vegetation within the Permit Area. No suitable vegetation within the Permit Area.
Verticordia mitodes			P3	Yellow sand on undulating plains.	Recorded growing within *Allocasuarina* tall shrubland.	Unlikely-no sandplains within the Permit Area. No suitable vegetation within the Permit Area.

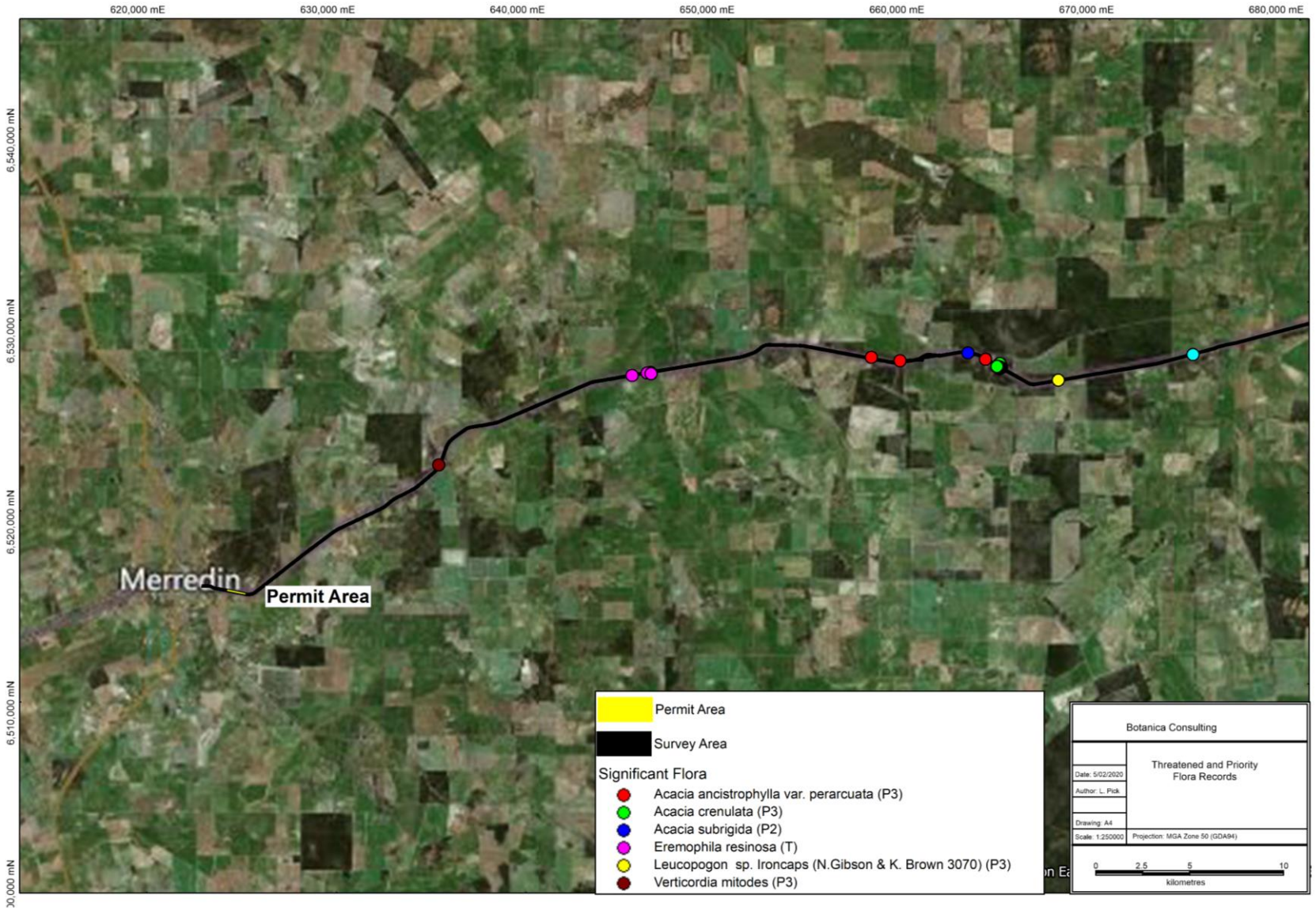

Figure 2-8 Threatened and Priority Flora records (GHD, 2016) in relation to the Permit Area

2.6.3 Significant Vegetation

According to the EPA *Environmental Factor Guideline for Flora and Vegetation* (EPA, 2016b) significant vegetation includes:

- vegetation being identified as threatened or priority ecological communities
- vegetation with restricted distribution
- vegetation subject to a high degree of historical impact from threatening processes
- vegetation which provides a role as a refuge
- vegetation providing an important function required to maintain ecological integrity of a significant ecosystem.

No significant vegetation was identified within the Permit Area. Vegetation within the Permit Area comprises of regrowth (rehabilitated) vegetation which is not representative of remnant vegetation, vegetation with restricted distribution, vegetation with an important function/ provide refuge. No Threatened or Priority Ecological Communities were identified during previous flora/vegetation surveys or listed on DBCA database as occurring within the Permit Area.

2.7 Fauna

A reconnaissance (Level 1) fauna survey and targeted search for Carnaby's Black Cockatoo of the Great Eastern Highway-Merredin to Southern Cross SLK 258.5 - 365.5 was conducted by GHD (2016) which covered an area of 1401 ha, encompassing the 0.91 ha Permit Area. A total of seven fauna habitat types were identified within the survey area, one of which is located within the Permit Area; Rehabilitated areas (Table 2-5). The remaining area comprised of Highly modified areas. A map of the Fauna habitats within the Permit Area is provided in Figure 2-9.

Table 2-5: Fauna habitats in relation to the Permit Area

Fauna Habitat	Description	Image	Area within Survey Area (ha)	Area within Permit Area (ha)
Rehabilitated areas	These rehabilitated areas provide typically more structurally uniform habitat for fauna species, and depending on the age of the vegetation vary in the resources present. Older rehabilitated areas tend to provide more refuge opportunities due to the density of the vegetation, while younger vegetation provides connectivity for fauna dispersal.		93.3	0.85
Highly modified areas	There are sections of the road reserve that are highly modified and are partially cleared and/or dominated by introduced species. These highly modified areas are in degraded condition and have been impacted by a number of disturbances such as past clearing, agriculture, the railway line, the water pipeline roads, tracks, and weed incursion. These areas consist of little or no overstorey or shrub species, and comprised of mainly pasture grasses and other weeds with some isolated trees. This vegetation would provide very limited habitat for fauna species, however in some areas the scattered trees or shrubs may provide cover for birds and reptiles, as well as foraging opportunities for small birds.		486.4	0.06
Total			**579.7**	**0.91**

Figure 2-9 Fauna habitat within the Permit Area

2.7.1 Significant Fauna

According to the EPA *Environmental Factor Guideline for Terrestrial Fauna* (EPA, 2016d) significant fauna includes:

- Fauna being identified as a threatened or priority species
- Fauna species with restricted distribution
- Fauna subject to a high degree of historical impact from threatening processes
- Fauna providing an important function required to maintain the ecological integrity of a significant ecosystem.

No Threatened or Priority Fauna, species with restricted distribution, or fauna providing an important function were identified within the Permit Area.

During field surveys conducted by GHD, one sighting of the Threatened Fauna taxon; Malleefowl (*Leipoa ocellata*) was recorded within the survey area, with one individual observed as a roadkill on the bend of the highway at SLK 303.7, within un-named Nature Reserve R18583 located approximately 41km east of the Permit Area. No breeding evidence was observed within the survey area (i.e. nesting mounds). No Malleefowl sightings/ breeding activity was recorded within the Permit Area. The Permit Area comprises of regrowth (rehabilitated) vegetation which is too sparse to provide suitable Malleefowl habitat.

Targeted surveys for Carnaby's Black Cockatoo conducted by GHD (2016) were carried out during the breeding season of Carnaby's Black Cockatoo, however no birds were sighted and there was no evidence of breeding, foraging or roosting recorded within the survey area. The Permit Area comprises of regrowth (rehabilitated) vegetation which was not identified as suitable foraging, breeding or roosting habitat.

2.8 Matters of National Environmental Significance

None of the following matters of national environmental significance as defined by the Commonwealth EPBC Act were identified within the Permit Area[3]:

- world heritage properties
- national heritage places
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- nationally threatened species and ecological communities
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mining) a water resource, in relation to coal seam gas development and large coal mining development.

2.9 Matters of State Environmental Significance

There are no wetlands of national importance (ANCA Wetlands) or conservation category wetlands within the Permit Area. The Permit Area does not contain any TEC as listed under the BC Act or EP Act[2]. No Threatened Flora or Fauna listed under the BC Act are known to occur within the Permit Area[2]. The Permit Area is not located within DBCA managed land and does not contain any ESA as listed under the EP Act.

[3] None identified during previous flora/vegetation surveys or listed on DBCA database as occurring within the Permit Area.

3 Native Vegetation Clearing Principles

Potential impacts of the proposed clearing activities have been assessed against the native vegetation clearing principles listed under Schedule 5 of the EP Act, based on the outcomes from flora and fauna surveys presented in this environmental assessment report (Table 3-1).

Table 3-1: Assessment of clearing against native vegetation clearing principles

Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
(a)	comprises a high level of biological diversity.	Vegetation of the Avon Wheatbelt Bioregion is not considered to be of high biological diversity comparative to other bioregions of Western Australia, yet is rich in endemic species, particularly on granite outcrops and sandplains. Neither of these habitats occur within the Permit Area and no endemic species were identified within the Permit Area. The total Permit Area is 0.91 ha and comprises of Rehabilitated areas and Infrastructure/ Highly Disturbed Areas. No Threatened Flora or Fauna taxa listed under the BC Act and EPBC Act are located within the Permit Area. No Priority Flora or Fauna taxa listed by DBCA are located within the Permit Area. The condition of vegetation in the Permit Area was degraded. Approximately 0.06 ha of the Permit area is completely cleared and the remaining 0.85 ha is rehabilitated (regrowth) vegetation.	Clearing is not likely to be at variance to this principle
(b)	comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA.	No unique fauna habitats (i.e. caves, rock outcrops overhangs or crevices) occur within the Permit Area. No significant fauna habitat was identified within the Permit Area. A single fauna habitat type was identified within the Permit Area; Rehabilitation area. No significant fauna were observed within the Permit Area. The Permit Area does not contain any potential foraging, breeding or roosting habitat for Carnaby's black cockatoo.	Clearing is not likely to be at variance to this principle
(c)	includes, or is necessary for the continued existence of rare flora.	No Threatened Flora taxa, pursuant to the BC Act and the EPBC Act are located within the Permit Area (none identified during previous flora/vegetation surveys or listed on DBCA database as occurring within the Permit Area).	Clearing is not at variance to this principle
(d)	comprises the whole or part of or is necessary for the maintenance of a threatened ecological community (TEC).	No Threatened Ecological Communities, pursuant to the BC Act and the EPBC Act are located within the Permit Area (none identified during previous flora/vegetation surveys or listed on DBCA database as occurring within the Permit Area).	Clearing is not at variance to this principle

Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
(e)	is significant as a remnant of native vegetation in an area that has been extensively cleared	According to DPIRD (2018), the survey area occurs in pre-European Beard vegetation association Muntadgin 36, which retains approximately 18.53% of the original vegetation extent in the Merredin subregion and Western Australia. The extent of this vegetation association is currently below 30% however it remains above 10% where vegetation is considered 'endangered'. The only vegetation present within the Permit Area comprises of regrowth (rehabilitated) vegetation in degraded condition which accounts for 0.85 ha of the total Permit Area and is not representative of the Pre-European vegetation association Muntadgin 36.	Clearing is not likely to be at variance to this principle
(f)	is growing, in, or in association with, an environment associated with a watercourse or wetland	According to the Geoscience Australia GIS database, there are no drainage lines or inland waters within the Permit Area. No riparian vegetation was identified within the Permit Area.	Clearing is not at variance to this principle
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	According to DPIRD (2018), the survey area occurs in pre-European Beard vegetation association Muntadgin 36, which retains approximately 18.53% of the original vegetation extent in the Merredin subregion and Western Australia. The extent of this vegetation association is currently below 30% however it remains above 10% where vegetation is considered 'endangered'. The only vegetation present within the Permit Area comprises of regrowth (rehabilitated) vegetation in degraded condition which accounts for 0.85 ha of the total Permit Area and is not representative of the Pre-European vegetation association Muntadgin 36. Given the limited clearing proposed (0.91 ha) and the previously degraded condition of vegetation currently present, clearing within the Permit Area will have a negligible impact on appreciable land degradation issues such as salinity, water logging or acidic soils.	Clearing is not likely to be at variance to this 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.	The Permit Area is not located within or in close proximity to any conservation areas.	Clearing is not at variance to this principle
(i)	Native vegetation should not be cleared if the clearing of the vegetation is likely to	According to the Geoscience Australia GIS database, there are no drainage lines or inland waters within the Permit Area. No riparian vegetation was identified within the Permit Area.	Clearing is not likely to be at variance to this principle

Letter	Principle	Assessment	Outcome
Native vegetation should not be cleared if it:			
	cause deterioration in the quality of surface or underground water.	The Permit Area is located in an arid to semi-arid environment with most rainfall lost by evaporation. Only a small portion infiltrates the soil and recharges the groundwater. The anticipated clearing is not expected to have a detrimental impact on surface or groundwater quality and there will be no abstraction associated with the development within the Permit Area.	
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding	Rainfall is unreliable and highly variable with an average rainfall of 300-330mm and an evaporation rate of 2000 mm. The region is not prone to flooding and does not contain riparian vegetation. The proposed clearing is unlikely to increase the incidence or intensity of flooding within the Permit Area or surrounds.	Clearing is not likely to be at variance to this principle

4 Summary and Conclusions

Recent flora/ vegetation and fauna surveys (GHD, 2016; Astron, 2018) and on-ground inspections of the Permit Area by Botanica have not found any significant flora, vegetation or fauna within the Permit Area. The Permit Area comprises of regrowth (rehabilitated) vegetation adjacent to the Great Eastern Highway which generally lacks the habitat required to support significant flora/ vegetation and fauna. Clearing within the Permit Area is not at variance and/ or not likely to be at variance with any of the clearing principles.

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