Commodore Coal Mine Expansion: Terrestrial Ecological Assessment

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Document Management

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Definitions

Term	Definition
Broad Vegetation Group	A pragmatic, higher level grouping of regional ecosystems and vegetation communities that provide an overview of the vegetation across Queensland (Neldner et al., 2021). They describe major ecological patterns and relationships across Queensland, independent of bioregions and land zones, and facilitate comparisons with vegetation in other States and internationally.
Environmentally Sensitive Area	Environmentally sensitive areas as described under the Queensland *Environmental Protection Regulation 2019*.
Groundwater dependent ecosystem	Ecosystems that require access to groundwater to meet all or some of their water requirements on a permanent or intermittent basis for maintenance of the ecosystem (Richardson *et al.*, 2011).
Category X vegetation	All areas other than Category A, B, C and R areas as mapped by the Department of Resources on a regulated vegetation management map.
Category A ESA	Areas including National Parks, conservation areas, forests reserves and wildlife reserves as identified on a Department of Environment and Science environmentally sensitive areas map.
Category B vegetation	An area of remnant vegetation, as defined under the Queensland *Vegetation Management Act 1999*, as mapped by the Department of Resources on a regulated vegetation management map.
Category B ESA	Areas including Queensland Heritage places, special forestry areas, endangered Regional Ecosystems (regrowth and remnant) and fish habitat areas as identified on a Department of Environment and Science environmentally sensitive areas map.
Category C vegetation	An area containing high-value regrowth vegetation containing an endangered, of concern, or least concern regional ecosystem that has not been cleared in the last 15 years; and is also an on: • freehold land • Indigenous land; or • land the subject of a lease issued under the Queensland *Land Act 1994* for agriculture or grazing purposes or an occupation licence under that Act. These areas are mapped by the Department of Resources on a regulated vegetation management map.
Category C ESA	Areas including nature refuges, state forests, resource reserves and coastal management districts as identified on a Department of Environment and Science environmentally sensitive areas map.
Habitat type	Broad, informal groupings of habitats having equivalent structure, function, and responses to disturbance.
Regrowth	Vegetation that does not meet the canopy cover and/or height thresholds for remnant status, however species present are consistent with a regional ecosystem.

Term	Definition
Non-remnant vegetation	All vegetation that is not mapped as remnant vegetation. May include regrowth, heavily thinned or logged and significantly disturbed vegetation that fails to meet the structural and/ or floristic characteristics of remnant vegetation. It also includes urban and cropping land (Neldner et al., 2020).
Regional Ecosystem	A vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil (Neldner et al., 2020). Regional Ecosystems are described in the Regional Ecosystem Description Database, produced by the Queensland Herbarium.
Regrowth	Is non-remnant vegetation that has a significant woody component but fails to meet the structural and/or floristic characteristics of remnant vegetation. Includes vegetation that has regrown after clearing or been heavily thinned or logged (Neldner *et al.*, 2019).
Remnant vegetation	A regional ecosystem that has not undergone recent clearing. It is defined under the Queensland *Vegetation Management Act 1999* as: (b) forming the predominant canopy of the vegetation— (i) covering more than 50% of the undisturbed predominant canopy; and (ii) averaging more than 70% of the vegetation's undisturbed height; and (iii) composed of species characteristic of the vegetation's undisturbed predominant canopy.
Study Area	Areas located within MDL 299 and MDL 300 encompassing the Project area and surrounds totalling 1,688 ha.
The Project	The Commodore Coal Mine Expansion.
Disturbance footprint	Disturbance associated with the Project located within MDL 299 (approx. 224 ha) and MDL 301 (approx. 535 ha) as well as the road diversions, comprising a 40 m corridor for the existing Inglewood Road and Gillespie's Dam Road. The total Disturbance footprint spans 797.79 ha.
Threatened Ecological Community	An ecological community is a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability. Threatened ecological communities are listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
Threatened species	A threatened species is any plant or animal species that is at risk of extinction. Species listed as extinct (EX), extinct in the wild (XW), critically endangered (CE), endangered (E), vulnerable (V) or conservation dependent (CD) under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* or extinct (EX), extinct in the wild (XW), critically endangered (CE), endangered (E), vulnerable (V) under the Queensland *Nature Conservation Act 1992*.
Vegetation community	An area of vegetation which is relatively uniform with respect to structure and floristic composition.

Abbreviations

Abbreviation	Description
MPP	Millmerran Power Partners
ALA	Atlas of Living Australia
CCM	Commodore Coal Mine
AU	Assessment Unit
SKM	Sinclair Knight Merz
Biosecurity Act	Queensland *Biosecurity Act 2014*
BOM	Bureau of Meteorology
Brigalow TEC	Brigalow (*Acacia harpophylla* dominant and co-dominant) Threatened Ecological Community
DAWE	Commonwealth Government Department of Agriculture, Water and the Environment
DEE	Former Commonwealth Government Department of the Environment and Energy (now DAWE)
DES	Queensland Department of Environment and Science
DEWHA	Former Commonwealth Department of Environment, Water, Heritage and the Arts (now DAWE)
DNRME	Queensland Department of Natural Resources, Mines and Energy (now DoR)
DoR	Queensland Department of Resources
DotE	Former Commonwealth Department of the Environment (now DAWE)
E	Endangered
V	Vulnerable
LC	Least Concern
NC	No Concern at Present
NT	Near Threatened
CE	Critically Endangered
E2M	E2M Pty Ltd
EA	Environmental Authority
EDL	Ecologically Dominant Layer
EIS	Environmental Impact Statement
EO Act	Queensland *Environmental Offsets Act 2014*
EO Regulation	Queensland *Environmental Offsets Regulation 2014*
EP Act	Queensland *Environmental Protection Act 1994*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Abbreviation	Description
ESA	Environmentally Sensitive Area
GDE	Groundwater Dependent Ecosystem
ML	Mining Lease
MDL	Mining Development Licence
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NC Act	Queensland *Nature Conservation Act 1992*
Poplar Box TEC	Poplar Box Grassy Woodland on Alluvial Plains Threatened Ecological Community
PMST	Commonwealth Protected Matters Search Tool
RE	Regional Ecosystem
SAT	Spot Assessment Technique (koala)
sp.	Singular species. For example, *Eucalyptus* sp. refers to a single species of *Eucalyptus*
spp.	Multiple species. For example, *Eucalyptus* spp. refers to multiple species of *Eucalyptus*
TEC	Threatened Ecological Community
ToR	Terms of Reference
VM Act	Queensland *Vegetation Management Act 1999*
WoNS	Weed of National Significance

Executive Summary

Millmerran Power Partners (MPP) proposes to expand the existing Commodore Coal Mine (CCM) and Power Station, located south of the township of Millmerran in southern Queensland. Currently situated within Mining Lease (ML) 50151, the proposed expansion of the mine will facilitate the development into the adjacent Mineral Development Leases (MDLs) 299 and 301. The proposed expansion of the CCM, is herein referred to as 'the Project'. The Project will involve the extension and continued operation of the CCM deposit with the inclusion of two new resources areas within MDL 301 to the east of ML 50151 and a portion of MDL 299 to the northwest of the ML 50151.

This report documents the terrestrial ecological values in the vicinity of the Project and provides an assessment of the potential impacts and associated mitigation measures of the Project on terrestrial ecological values. These ecological values include Matters of National Environmental Significance (MNES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Matters of State Environmental Significance (MSES) outlined under the Queensland *Environmental Offsets Act 2014*.

E2M Pty Ltd (E2M) conducted a terrestrial ecological assessment of values within a Study Area encompassing the Project, comprising a comprehensive desktop assessment and field survey. The desktop assessment consolidated information from available environmental databases and literature reviews of environmental documents, including the Draft Impact Assessment Study (SKM, 1998a) and associated Supplementary Report (SKM, 1998b).

A field survey was undertaken by E2M in accordance with relevant Commonwealth and State guidelines for surveying flora and fauna, including threatened species and mapping vegetation communities. The field survey was undertaken from 14 to 17 April 2020.

The Study Area is located on approximately 1,688 ha of predominately gently undulating to flat landscape. subject to historical vegetation clearance and modification. The majority of the Study Area (approx. 92%) consists of improved/disturbed pasture dominated by non-native grasses and cropping areas.

A total of four remnant Regional Ecosystems (REs) were identified within the Study Area, comprising one 'Endangered' RE (i.e. REs 11.4.3) and two 'of concern' REs (i.e. REs 11.3.4 and 11.3.17) under the Queensland *Vegetation Management Act 1999*. One Threatened Ecological Community (TEC) under the EPBC Act was also identified within the Study Area, namely Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC (Brigalow TEC). Areas of TEC were located in small, isolated patches comprising regrowth RE 11.4.3.

One threatened species was observed during the field survey with an additional six species considered likely to occur within the Study Area, including:

- *Homopholis belsonii* (a perennial grass listed as Endangered under the *Nature Conservation Act 1992* [NC Act] and Vulnerable under the EPBC Act) (known to occur)
- *Picris barbarorum* (Vulnerable under the NC Act)
- *Picris evae* (Vulnerable under the NC Act and EPBC Act)
- squatter pigeon (southern subspecies) (*Geophaps scripta scripta*) (Vulnerable under the EPBC Act and NC Act)
- glossy black-cockatoo (*Calyptorhynchus lathami lathami*) (Vulnerable under the NC Act)
- koala (*Phascolarctos cinereus*) (Vulnerable under the EPBC Act and NC Act); and
- white-throated needletail (*Hirundapus caudacutus*) (Vulnerable under the NC act and EPBC Act).

Although another threatened species, *Eucalyptus argophloia* (Chinchilla white gum), was identified within the Study Area, the populations is located outside of its natural distribution and established through human intervention (planted wind break) and not considered to be 'in the wild'.

The majority (97%; 736 ha) of the Disturbance footprint (759 ha) has been historically cleared and is characterised as non-remnant (regrowth and other vegetation). A total of 22.44 ha of remnant vegetation, containing endangered RE 11.4.3, will require removal as a result of the Project.

Where possible, the Project would avoid, mitigate and manage environmental impacts associated with the construction and operation of the Project by implementing and maintaining environmental management plans and measures. Mitigation measures within these plans would include but are not limited to:

- a vegetation management plan
- vegetation clearing mitigation measures, including pre-clearance surveys, presence of a suitably experienced and qualified fauna spotter/catcher and sequential clearing
- weed hygiene practices and environmental weed and animal pest monitoring and control
- erosion and sediment control management plan
- rehabilitation of post-mine landforms; and
- directional lighting and dust suppression.

The Project has been designed to avoid or minimise impacts to terrestrial environmental values, however some residual impacts are likely to occur. The Project is likely to result in a significant residual impact to the following MNES:

- removal of Brigalow TEC listed under the EPBC Act (1.08 ha); and
- disturbance to habitat for two threatened species listed under the EPBC Act, comprising:
  - *Homopholis belsonii* (6.37 ha of known habitat); and
  - squatter pigeon (*Geophaps scripta scripta*) (4.63 ha of breeding and 3.69 ha of foraging habitat).

Similarly, in accordance significant residual impacts to two MSES associated with the Project, including:

- Regulated vegetation comprising:
  - 22.44 ha of Endangered RE; and
  - 2.97 ha of RE 11.4.3 (BVG 25a) within the defined distance of a vegetation management watercourse.
- Protected wildlife habitat for three threatened species, comprising suitable habitat for:
  - *Homopholis belsonii* (6.37 ha of known habitat)
  - squatter pigeon (4.63 ha of breeding and 3.69 ha of foraging habitat); and
  - glossy-black cockatoo (*Calyptorhynchus lathami lathami*) (45.31ha of foraging habitat).

Residual impacts on MNES and MSES would be offset in accordance the *EPBC Act Environmental Offsets Policy* and *Queensland Environmental Offsets Policy*.

1 Introduction

1.1 Project background

Millmerran Power Partners (MPP) are seeking to expand the existing Commodore Coal Mine (CCM) and Power Station, located approximately 10 km south of the township of Millmerran. Situated within Mining Lease (ML) 50151, the proposed expansion of the mine aims to extend the CCM operating life to approximately 2050 and will require an amendment to the existing Environmental Authority (EA) (EPML00841513). The proposed expansion of the CCM, is herein referred to as 'the Project'. The Project will involve the extension and continued operation of the CCM deposit with the inclusion of two new resources areas within MDL 301 to the east of ML 50151 and a portion of MDL 299 to the northwest of the ML 50151. The Project also includes the establishment of a new road corridor to divert the existing Inglewood Road and Gillespie's Dam Road.

Other additional infrastructure associated with the Project includes:

- New haul roads joining existing haulage networks to the two new resources areas
- Additional fencing to surrounding mining activities
- Additional sediment dams; and
- Culverts for operational and surface water management.

1.2 Scope and objectives

E2M Pty Ltd (E2M) was engaged by SLR Consulting on behalf of Millmerran Power Management Pty Ltd to undertake an ecological assessment to accompany an application for an EA amendment for the expansion of the Commodore Coal Mine. The objective of the assessment was to:

- confirm the ecological attributes within the Study Area as mapped by various governmental bodies
- determine the potential impacts from the proposed mine expansion; and
- provide appropriate mitigation measures to minimise identified ecological impacts.

This report addresses relevant Commonwealth, State and Local Government legislative requirements. The scope of works for the preparation of this report included:

- reviewing Commonwealth, State and Local Government regulatory mapping and database records
- reviewing documents and data prepared as part of previous studies undertaken across CCM
- conducting a site assessment to identify the presence, or otherwise, of ecological features within the Study Area

- identifying and mapping of ecological features and processes that are essential to the maintenance and conservation of local ecosystem functioning, such as environmental corridors, threatened[1] species habitat and significant vegetation communities
- assessing likelihood of threatened species occurrence within the Study Area
- reviewing and assessing the potential impacts of the Project Disturbance footprint on identified ecological features and processes
- detailing mitigation and management strategies (where required) that avoid or reduce identified impacts and enable the development to meet regulatory conservation obligations; and
- producing a series of maps depicting the ground-truthed extent of vegetation communities throughout the Study Area and any other relevant ecological findings.

1.3 Study Area, Disturbance footprint and regional context

The ecological assessment encompassed the entirety MDL 301 and portions of MDL 299. These areas, including the road diversion corridors outside of the MDLs, are collectively hereby referred to as the 'Study Area' (Figure 1).

The Study Area is located within the Inglewood Sandstones province within the southern Brigalow Belt Bioregion. The Inglewood Sandstones province is characterised by undulating to low hilly country on deeply weathered and laterised Jurassic-Creataceous sandstone and associated colluvial and alluvial plains (Sattler & Williams, 1999). Common vegetation types within the area include *Eucalyptus crebra* (narrow-leaved ironbark), *Callitris glaucophylla* (white cypress pine) and *Allocasuarina luehmannii* (buloke) on solodic soils and undulating pains, *E. populnea* (poplar box) on lower slopes and flat and minor areas of *Acacia harpophylla* (brigalow) and *Casuarina cristata* (belah) woodlands (Sattler & Williams, 1999).

Areas within the Study Area have been largely modified with the majority previously cleared, consisting of cropping land and improved pasture. Small patches of remnant and regrowth vegetation have been retained, primarily associated with watercourses and drainage lines. Historical land use practices and clearing of vegetation have contributed to the fragmentation of habitat and native vegetation within the greater landscape context.

The Project disturbance associated with the mine expansion spans approximately 1,135 ha across the ML50155, MDL 299 and MDL 301. Disturbance areas located within ML 50151 are subject to conditions under the existing approval/Environmental Authority EPML00841513 and not included as part of this assessment. Disturbance associated with MDL 299 (approx. 224 ha) and MDL 301 (approx. 535 ha) spans around 758.77 ha (Figure 1). The road diversions comprise a 40 m corridor for the existing Inglewood Road and Gillespie's Dam Road (Figure 1). This road diversion corridor (39.02 ha) includes areas within MDL 299 and MDL 301 as well as additional areas outside of these leases. The combined areas associated with the mine expansion (MDL 299 and MDL 301 only) and road diversion corridors are herein referred to as the Disturbance footprint and comprises 797.79 ha (Figure 1). For the purposes of the impact assessment, only values within the Disturbance footprint have been addressed within this report.

[1] Extinct (EX), extinct in the wild (XW), critically endangered (CE), endangered (E), vulnerable (V) or conservation dependent (CD) under the *Environmental Protection and Biodiversity Conservation Act 1999* or extinct in the wild (PE), Endangered, Vulnerable or Near Threatened (EVNT) under the *Nature Conservation Act 1992*.

1.4 Terms of reference

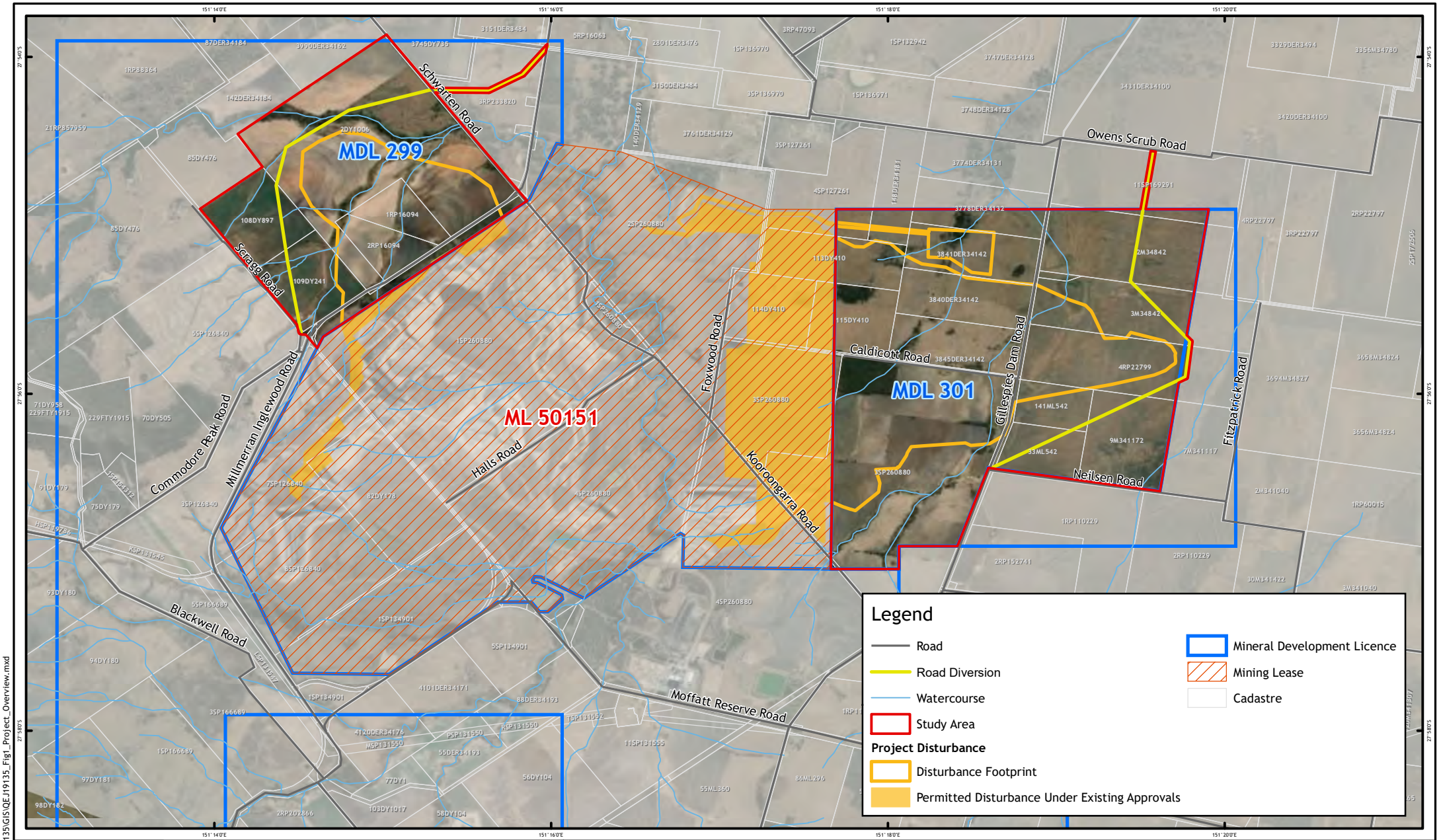
The draft Terms of Reference (ToR) for the Project, released in July 2021, describe the matters MPP are to address in an EIS. The ToR concerning this terrestrial ecology assessment are detailed in Table 1.

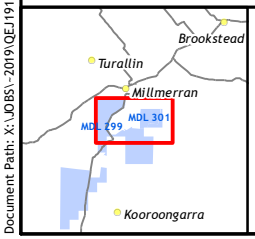
Table 1: Terms of Reference

ToR Number	ToR	Report Section Reference
Environmental Values		
8.1	Consider all available baseline information relevant to the environmental risks of the proposed project, including seasonal and long-term variations. Describe the quality of all information, in particular the source of the information, how recent the information is, how the reliability of the information was tested, and any assumptions and uncertainties in the information.	Sections 2.5, 3, 4.1, 4.2 and 4.3.
Impact Assessment		
8.2	Assess the impacts of the proposed project on environmental values. This includes demonstrating that the proposed project meets the environmental objectives and outcomes for each matter in section 9 and the environmental objectives and performance outcomes for any matters listed in Schedule 8 of the EP Regulation.	Impact assessment for terrestrial ecological values are included in Sections 6.1, 6.2
Cumulative Impacts		
8.3	Impact assessment must address cumulative impacts, including: environmental values of land, air and water, public health and the health of terrestrial and aquatic ecosystems and environmental values over time or in combination with other impacts in the dimensions of scale, intensity, duration or frequency of the impacts.	Cumulative impact assessment for terrestrial ecological values are included in Section 6.3.
Avoidance and Mitigation		
8.4	Propose and describe avoidance, mitigation and management strategies for the protection or enhancement of identified environmental values.	Section 6.2
Critical Matters		
8.7	Critical environmental matters identified for this proposed project which the EIS must give priority are: Land and Flora and fauna	This report details critical matters in relation to terrestrial flora and fauna.
Flora and Fauna - Impact assessment		
9.6	Describe the potential direct and indirect impacts on the biodiversity and natural environmental values of affected areas impacted by the construction, operation and decommissioning of the proposed project. Take into account any proposed avoidance and/or mitigation measures.	Sections 6.1, 6.2 and 6.3.
	The assessment should include the following key elements:	

ToR Number	ToR	Report Section Reference
	Identification of all significant species and ecological communities, including MSES and MNES, listed flora and fauna species, and regional ecosystems, on the proposed project's site and in its vicinity	Sections 4.1, 4.2, 4.3 and 5.
	Terrestrial and aquatic ecosystems including groundwater dependent ecosystems and subterranean fauna such as stygofauna and their interactions	This report details terrestrial ecosystems including terrestrial groundwater dependent ecosystems
	Biological diversity	Sections 4.1, 4.2 and 4.3.
	The integrity of ecological processes, including habitats of listed threatened, near threatened or special least concern species	Sections 4.1.3, 4.1.4, 4.1.5, 4.2.3, 4.2.4 and 5.
	Connectivity of habitats and ecosystems	Sections 4.2.2 and 4.3.
	The integrity of landscapes and places, including wilderness and similar natural places	Section 4.
	Direct and indirect impacts on terrestrial and aquatic species and ecosystems whether due to: vegetation clearing; hydrological changes; discharges of contaminants to water, air or land; noise; and other relevant matters,	Sections 6.1, 6.2, 6.3 and 7.
	Assess the need for buffer zones and the retention, rehabilitation or planting of movement corridors. The assessment should take account of the role of buffer zones in maintaining and enhancing riparian vegetation to enhance water quality and habitat connectivity	Sections 6.1, 6.2, 6.3 and 7.
9.6.2	Describe the current distribution and abundance of pest animals and weeds on the proposed project site.	Sections 4.1.6 and 4.2.5.
	Describe the impact the project's construction and operation will have on the spread of pest animals, weed species and disease.	Sections 6.2.3 and 6.2.4.
	Propose detailed measures to remove, control and limit the spread of pests, weeds, diseases, pathogens and contaminants on the proposed project site and any areas under the proponent's control. This includes declared plants and animals and restricted areas under Queensland's *Biosecurity Act 2014*, the Commonwealth *Biosecurity Act 2015* and weeds of national significance and designated pests under the Queensland *Public Health Act 2005*. All proposed measures are to be in accordance with biosecurity surveillance or prevention measures authorised under the *Biosecurity Act 2014* and aligned with local government pest management priorities.	Sections 6.2.3 and 6.2.4.
Matters of National Environmental Significance under the EPBC Act		

ToR Number	ToR	Report Section Reference
9.15	The EIS must state and address the controlling provisions and describe the particular aspects of the environment leading to the controlled action declaration under the EPBC Act. Enough information about the proposed project and its relevant impacts must be provided to allow the Australian Government's Environment Minister to make an informed decision whether to approve the proposed project under the EPBC Act.	Sections 5, 6 and 7.
	The assessment of the potential impacts, mitigation measures and any offsets for residual impacts must be dealt with in a stand-alone section of the EIS that fully addresses the matters relevant to the controlling provisions. This must be consistent with the department's MNES—EIS information guideline (DES 2020) for additional guidance.	Section 7.





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Scale 1:55,000 (A4)

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Kilometres

Coordinate System: GCS GDA 1994

Notes:
Aerial Imagery: © ESRI 2021
Cadastre: © DoR 2021
Watercourse: © Geoscience Australia 2018
Road: © PSMA 2014
MDL/ML: © DoR 2021

Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	21/03/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 1: PROJECT OVERVIEW

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

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2 Methods

2.1 Desktop assessment

The purpose of the desktop assessment is to consolidate information from relevant databases, available mapping, aerial photography and published literature to produce an initial characterisation of the ecological values of the Study Area and the surrounding landscape. The desktop assessment comprised the following sources:

- Protected Matters Report as issued by the Department of Agriculture, Water and the Environment (DAWE) (2021a)
- Regulated Vegetation Management Map and supporting map as issued by the Department of Resources (DoR) (2021)
- Queensland Remnant Regional Ecosystem mapping provided by DES (Version 12) (2021) and associated Regional Ecosystem Description Database (Version 12) (Queensland Herbarium, 2021a)
- DoR Vegetation Management watercourse and drainage feature mapping (Version 4.10) (2021)
- Wildlife Online Extract issued by the Department of Environment and Science (DES, 2021b)
- Queensland Herbarium HERBRECS Specimen database (Queensland Herbarium, 2017)
- Queensland Detailed Surface Geology (Department of Resources (DoR), 2018) and Geoscience Australia 1:250,000 geology mapping series (Geoscience Australia, 2020)
- DES Biodiversity Planning Assessment mapping (2018)
- Protected Plants Flora Survey Trigger Map (DES, 2021)
- Atlas of Living Australia (ALA) species search (Atlas of Living Australia, 2022)
- Latest available aerial imagery (NearMap, 2021)
- Map of Queensland Wetland Environmental Values (DES, 2020)
- Map of Environmentally Sensitive Areas (ESAs) under the Environmental Protection Act 1994 (DES, 2020a)
- Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) State Planning Policy (SPP) Interactive Mapping System; and
- Bioregional Assessment Programme National Groundwater Dependent Ecosystems Atlas (Bureau of Meteorology (BOM), 2019); and
- existing Ecological Assessment Reports for the Project, including:
  - Draft Impact Assessment Study for the Millmerran Power Project (Sinclair Knight Merz (SKM), 1998)
  - Impact Assessment Study Supplementary Report for the Millmerran Power Project (Sinclair Knight Merz (SKM), 1999).

For desktop sources requiring a search extent, a 20 km buffer to the Study Area was applied.

2.2 Field assessment

2.2.1 Survey timing and weather conditions

The Study Area is located approximately 80 km south-west of Toowoomba and is characterised by a sub-tropical climate. Rainfall is experienced year-round, but predominantly falls over the warmer summer months (December to February).

Flora and fauna surveys were conducted by two E2M ecologists from 14 to 17 April 2020. The region received above average summer rainfall in the three months (January to March) preceding the field assessment, recording approximately 383 mm (average 228.1 mm) of rainfall since January 2020[2]. Approximately 21 mm of rain had been recorded in the two weeks preceding the survey and at the time of the survey most water points including creek lines contained minimal water. Standing water was predominantly present at farm dams scattered throughout the Study Area. Weather conditions at the time of the survey were dry and warm, with daily maximum temperatures of approximately 27 ºC to 32 ºC[3].

2.2.2 Flora survey methods

A range of flora survey methods were utilised as part of the field assessment. Detailed description of each survey method undertaken is provided in Section 2.2.2.1 to Section 2.2.2.3, with the location of each survey assessment depicted in Figure 2.

2.2.2.1 Regional Ecosystem verification

Tertiary and Quaternary type surveys using the CORVEG Methodology, outlined within *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al., 2020), were undertaken throughout the Study Area. The objective of the surveys was to record sufficient information, including vegetation community structure and species composition, to confirm and ground truth existing or suspected vegetation community mapping. At a minimum, dominant species were recorded for the Ecologically Dominant Layer (EDL).

A total of 15 Tertiary and 20 Quaternary type assessments were undertaken throughout the Study Area. The distribution of the survey sites has been depicted in Figure 2.

Vegetation was characterised as:

- **Remnant vegetation** - communities that conform with the definition under the VM Act and referenced by Neldner et al. (2020). Specifically, this comprises 'vegetation, part of which forms the predominant canopy of the vegetation:
  - covering more than 50% of the undisturbed predominant canopy
  - averaging more than 70% of the vegetation's undisturbed height; and
  - composed of species characteristic of the vegetation's undisturbed predominant canopy.'
- **Non-remnant vegetation** – all vegetation that is not mapped as remnant vegetation. This included:

[2] Rainfall data recorded at Condamine Plains (weather station number 41019), approximately 27 km north of the Study Area (Bureau of Meteorology, 2021).
[3] Temperature data recorded at Wellcamp Airport (weather station number 99435), approximately 60 km from the Study Area (Bureau of Meteorology, 2021).

- Regrowth: vegetation that contained species composition consistent with a particular RE, but failed to meet the undisturbed height and/or canopy cover consistent with that of remnant vegetation; and
- Other vegetation: communities that have been historically cleared/disturbed or heavily modified (i.e. improved pastures, weed encroachment etc) that failed to meet the structural and/ or floristic characteristics of remnant vegetation or a particular RE. Threatened Ecological Community assessments.

Where strata height and cover data was unavailable for a particular RE, information provided in the Regional Ecosystem Technical Descriptions for the Brigalow Belt (DES, 2018b) and vegetation formations defined by Specht (1970) were used to determine remnant height thresholds.

In conjunction with Tertiary and Quaternary assessments, additional assessment was undertaken in the field within relevant vegetation communities to verify if key diagnostic characteristics and condition thresholds for EPBC Act-listed TECs were met. Specific condition criteria and characteristics used for the assessment are based on respective information provided within each 'approved listing advice' published for each TEC.

2.2.2.1.1 Brigalow (Acacia harpophylla dominant and co-dominant) TEC

To determine whether they meet the condition requirements of a Brigalow TEC (Department of the Environment, 2013), Brigalow ecological communities were assessed on whether they met the minimum thresholds pertaining to patch size and weed encroachment. Each community was also assessed on whether Brigalow was the dominant or co-dominant species within the tree layer. Using the recommendations of (Butler, 2007), remnant communities of poor condition were excluded from the Brigalow TEC if they included any of the following characteristics:

- brigalow patches that are smaller than 0.5 ha; and
- exotic perennial plants cover more than 50% of the patch, assessed in a minimum area of 0.5 ha (100 m by 50 m).

As part of the Queensland Brigalow Belt bioregion, it was necessary to determine if each ecological community belonged to one of the 16 REs associated with the Brigalow TEC. In total, 24 Brigalow TEC assessments were undertaken across the Study Area (Figure 2).

2.2.2.1.2 Poplar Box Grassy Woodlands on Alluvial Plains

Within the specified Brigalow Belt bioregion, the Poplar Box Grassy Woodland on Alluvial Plains is typically associated with a number of particular REs. Each community was assessed for whether they belong to at least one of these REs to determine whether it fits the classification of the TEC (Department of the Environment and Energy (DEE), 2019). Each community was also assessed according to the conservation advice on Poplar Box Grassy Woodland on Alluvial Plain (DEE, 2019), which states that the community must have the following structure:

- a tree crown cover >10% at patch scale
- a tree canopy that shows the following characteristics:
  - canopy trees can reach a potential height of at least 10 m or more
  - a dominance of poplar box (*Eucalyptus populnea*) within the canopy layer
  - hybrids of poplar box with other *Eucalyptus spp.* must be counted as part of the poplar box component when assessing the previous criterion

- a crown cover of shrubs to small trees (1 - 10 m height) less than 30%; and
- a ground cover dominated by perennial native grasses, other native herbs and sometimes chenopods.

A list of native plants associated with this TEC can be found in Appendix A of the Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains TEC (DEE, 2019). In total, three Poplar Box TEC assessments were undertaken across the Study Area (Figure 2).

2.2.2.2 Threatened flora

The random meander technique (Cropper, 1993) was used to survey for potential threatened flora species (including *Homopholis belsonii*) throughout the Study Area. The method involves traversing sections of the Study Area and searching for flora species that may not have been located using more structured (fixed transect) search methods. This technique is particularly suitable for locating species that typically occur at very low densities or that may be grouped in isolated clumps. Species habitat requirements, identified as part of the desktop assessment, were also used to assist in targeted searches for threatened species.

2.2.2.3 Opportunistic observations

Flora species not otherwise detected via other survey methods (Sections 2.2.2.1 to 2.2.2.2), including pest species, were recorded as opportunistic observations.

2.2.3 Fauna survey methods

A range of fauna survey methods were utilised as part of the field assessment. Detailed description of each survey method undertaken is provided in Section 2.2.3.1 to Section 2.2.3.6, with the location of each survey assessment depicted in Figure 2.

2.2.3.1 Fauna habitat assessments

Fauna habitat assessments were undertaken to characterise the type and quality of the habitats occurring throughout the Study Area. This also assisted in identifying potential threatened fauna species habitat. Habitat assessments primarily involved determining the abundance of macro and micro habitat features that are important in determining the likelihood or occurrence of threatened species. In total, 17 habitat assessments were undertaken across the Study Area at the same location as Habitat Quality Assessments (Figure 2). Habitat features collected included:

- Regional Ecosystem (RE)
- abundance of non-juvenile koala habitat trees
- koala habitat tree species
- abundance of small (<10 cm), medium (10-30 cm) and large (>30 cm) hollows
- abundance of small (<5 cm), medium (5-10 cm) and large (>10 cm) burrows
- gilgai abundance and depth
- soil crack abundance and depth
- leaf litter abundance and depth
- abundance of woody debris
- presence/absence of rocky outcrops
- abundance of decorticating bark

- abundance of mistletoe; and
- threat abundance and type (clearing, weed invasion, thinning, etc.).

2.2.3.2 Motion cameras

Three infra-red motion activated cameras were deployed at four locations across the Study Area (Figure 2). The cameras were baited with raw chicken necks in order to attract fauna to the camera. The cameras were deployed for the duration of one to three days per collection site. All cameras were set to medium sensitivity to take three sequential photos when triggered, followed by a 30 second trigger quiet period (period of inactivity). All photos captured were reviewed by an ecologist and where fauna was detected, the species was recorded.

2.2.3.3 Koala surveys

Koala surveys involved the use of the Spot Assessment Technique (SAT) to determine koala activity within representative patches of koala habitat throughout the Study Area. Koala SAT surveys occurred in accordance with the methods prescribed in Phillips & Callaghan (2011) and involved identifying a tree with known or likely koala activity and searching it and the nearest 29 trees for signs of koala activity (e.g. scats or scratches). In total, eight koala SAT surveys were undertaken across the Study Area within suitable habitat for the species (Figure 2).

2.2.3.4 Nocturnal spotlighting

Spotlight transects were undertaken by two ecologists on foot on the last night of the survey period. Spotlighting was undertaken at four sites across the Study Area within the three hours following dusk (6 – 9pm) (Figure 2). The survey effort for each spotlight transect varied from 30 minutes to one hour per site, depending on the size of the patch of habitat.

2.2.3.5 Diurnal active searches

Active searches were undertaken from mid-morning to late afternoon and involved searching suitable microhabitat (e.g. fallen woody debris, leaf litter, decorticating bark) across all habitat types within the Study Area. This survey method primarily targets reptiles and amphibians.

2.2.3.6 Opportunistic observations

Opportunistic surveys were undertaken to identify fauna species or wildlife traces (i.e. bones, hair traces, tracks, scats, diggings, burrows, nests, skins) that could indicate the presence of cryptic fauna species. If a species was sighted opportunistically, the following information was recorded:

- location (GPS coordinates)
- the species name
- number of individuals; and
- identification method (seen, heard, trace, etc.).

2.2.4 Habitat Quality assessment method

Seventeen habitat quality assessment surveys were undertaken across the Study Area (Figure 2). Habitat quality assessments were undertaken in accordance with the Queensland DES *Guide to Determining Terrestrial Habitat Quality version 1.3* (DES, 2020a) (herein referred to as the Habitat Quality Guide). As per the Habitat Quality Guide, habitat quality was determined based on assessment of:

- Site-based attributes: assessed in accordance with Queensland Herbarium's BioCondition Assessment Manual Version 2.2 (Eyre et al., 2015). A summary of the attributes assessed is presented in Table 2. Site-based attributes were then compared to relevant BioCondition benchmark scores to determine habitat quality.
- Fauna species habitat attributes: assessed in accordance with the Habitat Quality Guide to determine a matter area's ability to support a particular fauna species. Species habitat attributes were assessed for species that were considered to be potentially impacted by the project. A combination of BioCondition assessment data and fauna habitat assessment data were used to assess species habitat attributes for each species. A summary of the habitat attributes and associated indicators used for each species considered likely to be significantly impacted is presented in Table 3. As per the Habitat Quality Guide these indicators were determined based on a literature review. As different indicators have varying importance on habitat suitability, indicators were weighted depending on their importance.

In accordance with the Habitat Quality Guide, the number of sampling sites per assessment unit was revised where assessment units containing the same RE exhibit the same condition across the site (Department of Environment and Science, 2020). Quaternary assessments were undertaken in conjunction with terrestrial habitat quality assessments to assist in verifying vegetation type and condition across the Study Area.

Table 2: Site-based Attributes

Attribute	Description	Assessment plot	Maximum score
Site condition attributes			
Large trees	Number of large trees per hectare, as determined by exiting BioCondition benchmarks for the associated RE	100 m x 50 m	15
Tree canopy height	Median canopy height in metres of the ecologically dominant layer.	100 m x 50 m	5
Recruitment (%)	The proportion of overstorey species present at a site that are regenerating (<5 cm diameter at breast height (DBH))	100 m x 50 m	5
Tree canopy cover (%)	Vertical projection of the tree canopy crown cover along a transect	100 m transect	5
Shrub layer cover (%)	Vertical projection of the shrub layer cover of native shrubs	100 m transect	5
Coarse woody debris	The length of fallen woody logs and other coarse woody debris (>10 cm diameter and >0.5 m in length) per hectare	50 m x 20 m	5
Native plant species richness	Native plant species richness, comprising all life forms (i.e. trees, shrubs, grasses and forbs/other)	100 m x 50 m (trees)	5
		50 m x 10 m (shrubs, grasses, forbs/other)	5 each
Non-native plant cover	Percentage cover of non-native/weed plant species	50 m x 10 m	10

Attribute	Description	Assessment plot	Maximum score
Native perennial grass cover (%)	Average percentage cover of native perennial grass species	Five 1 m x 1 m	5
Litter cover	The average percentage cover of organic material such as fallen leaves, twigs and branches <10 cm diameter	Five 1 m x 1 m	5
Site context attributes			
Size of patch	The size of the patch assessed and associated directly connecting remnant vegetation	-	10
Connectedness	The proportion of the site's boundary that is connected to remnant vegetation	-	5
Context	The percentage of remnant and regrowth vegetation within a 1 km buffer of the site	1 km buffer	5
Ecological corridors	Proximity to ecological corridors (riparian or terrestrial) identified Queensland biodiversity and vegetation offsets special features map	-	6

Table 3: Species habitat attributes

Species	Habitat attributes	Indicator	Score	Weighting
koala *Phascolarctos cinereus*	Quality and availability of food and habitat required for foraging	Abundance of koala food trees	absent (0) to high (5)	1
	Quality and availability of habitat required for shelter and breeding	Abundance of koala shelter trees / DBH>30cm	absent (0) to high (5)	1
	Quality and availability of habitat required for mobility	Connectivity to remnant vegetation	completely fragmented (0) to highly connected (5)	1
	Threat Abundance	Historical clearing / fragmentation	abundant (0) to absent (5)	0.6
		Abundance of feral dogs	abundant (0) to absent (5)	0.2
		Vehicle strike risk	high (0) to absent (5)	0.2
squatter pigeon (southern subspecies) *Geophaps scripta scripta*	Quality and availability of food and habitat required for foraging	Vegetation condition	non-remnant (0), regrowth (8.3), mature regrowth (16.6), remnant (25)	1
	Quality and availability of habitat required for shelter and breeding	Average distance to water	>3 km (0), 1-3 km (12.5), <1 km (25)	1
	Quality and availability of habitat required for mobility	N/A	N/A	N/A
	Threat Abundance	Historical clearing	abundant (0) to absent (5)	0.50
		Cattle abundance	abundant (0) to absent (5)	0.25

Species	Habitat attributes	Indicator	Score	Weighting
		Abundance of pests (feral dogs / cats)	abundant (0) to absent (5)	0.25
glossy black-cockatoo *Calyptorhynchus lathami lathami*	Quality and availability of food and habitat required for foraging	Abundance of food trees (*Casuarina* and *Allocasuarina* sp.)	absent (0) to high (5)	1
	Quality and availability of habitat required for shelter and breeding	Abundance of large hollows	absent (0) to high (5)	1
	Quality and availability of habitat required for mobility	N/A	N/A	N/A
	Threat Abundance	Historical clearing	abundant (0) to absent (5)	0.75
		Abundance of pests (possums / cats)	high (0) to absent (5)	0.25

2.3 Likelihood of occurrence assessment

Threatened flora and fauna species identified in the desktop review were assessed for their likelihood of occurrence within the Study Area. This assessment considered the species distribution, habitat requirements (foraging, breeding or related behaviour) and historical records in proximity to the Study Area as well as observations and evidence of occurrence, habitat suitability, threats and on-site conditions identified during the field survey.

The likelihood of occurrence of threatened species were based on the following criteria:

- **Known to occur**: species were recorded during field surveys within the Study Area.
- **Likely to occur**: suitable habitat to support the species is present and the species has previously been recorded within the desktop search extent.
- **Possible occurrence**: The Study Area is within the species known distribution and suitable habitat to support the species is present; however,
  - the species has not previously been recorded within the desktop search extent; and/or,
  - suitable habitat is degraded or of limited extent, thereby reducing the likelihood of the species occurrence; and/or
  - comprehensive field surveys during optimal conditions (flora species) at an intensity suitable to detect the species, thereby reducing the likelihood of the species occurrence.
- **Unlikely to occur**: the Study Area does not comprise suitable habitat for the species and/or is outside of the species known distribution.

For fauna species assessed as known or likely to occur, suitable habitat within the Study Area was further categorised as containing:

- **Breeding habitat:** where suitable habitat/microhabitat was present that comprised suitable breeding places, habitat connectivity and access to foraging resources. Removal of breeding habitat may impact a local population of the species; and
- **Foraging habitat:** where habitat is limited to a movement corridor by transient individuals, used intermittently or seasonally by foraging individuals and/or lacks suitable breeding places for the species.

2.4 Summary of survey effort

Surveys conducted within the Study Area aimed to meet the prescribed survey effort guidelines (where available) for each threatened species considered likely to occur within the Study Area; however, in some cases, achieving the recommended survey effort in the guidelines was not necessary or impractical, particularly where effort was measured by survey hours per potential habitat area. While the recommended survey effort in the guidelines was not achieved for some species, the survey effort undertaken is considered to adequate through the supplementation with habitat assessments. A summary of survey effort detailed within relative guidelines and survey effort undertaken for threatened species considered likely to occur within the Study Area during the field assessment, is summarised in Table 4.

Table 4: Summary of threatened terrestrial fauna species survey effort

Species	EPBC Act status	NC Act status	Optimal survey period	Recommended survey effort and source	Survey effort undertaken within Study Area
squatter pigeon (southern subspecies) *Geophaps scripta scripta*	V	V	**Present all year round** Breeding likely to occur during spring and summer (DEWHA, 2010).	***Survey Guidelines for Australia's Threatened Birds*** **(DEWHA, 2010)** • area searches: 15 hours/50 ha of suitable habitat.	Survey effort undertaken comprised: • eight person hours of diurnal active searches and driving transects within suitable habitat (6.31 ha breeding and 35.64 ha foraging. • habitat assessments.

Species	EPBC Act status	NC Act status	Optimal survey period	Recommended survey effort and source	Survey effort undertaken within Study Area
koala *Phascolarctos cinereus*	E	V	**Present all year round** Peak activity generally from August to January (DotE, 2014a).	***Repealed EPBC Act Referral Guidelines for the Vulnerable Koala*** (DotE, 2014a) The guideline does not prescribe survey effort standards for the species due to the high variation in environmental variables across the species range (DotE, 2014a). Direct and indirect survey methods may include: • strip transects • nocturnal spotlighting • call playback • remote sensor activated cameras; and • scratches and scats (e.g. Spot Assessment Technique (SAT), Regularised Grid Based Spot Assessment Technique or Koala optimised rapid assessment methodology). ***Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*** **(Eyre et al., 2018)** Species-specific survey guidelines are not prescribed for the species however may include: • active diurnal searches • camera traps • call playback • nocturnal spotlighting and vehicle transects • scat and sign searches (e.g. SAT)	Survey effort undertaken comprised: • eight person hours of diurnal active searches through suitable habitat (27.33 ha) • six person hours of nocturnal spotlighting • call playback • habitat assessments • eight SATs

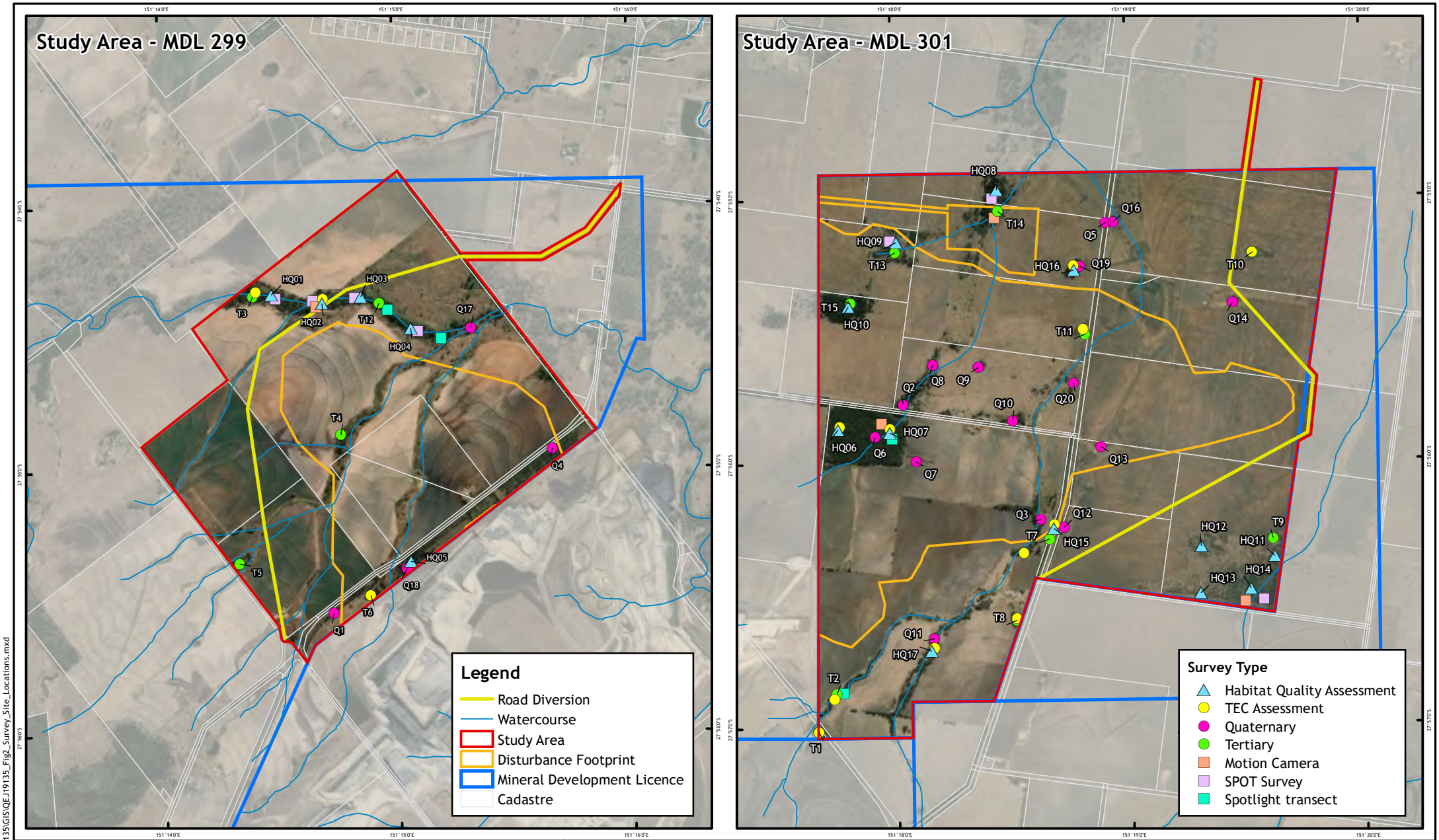
Species	EPBC Act status	NC Act status	Optimal survey period	Recommended survey effort and source	Survey effort undertaken within Study Area
glossy black-cockatoo *Calyptorhynchus lathami lathami*	-	V	**Present all year round** Breeding occurs from March to August (Hourigan, 2012).	***Targeted Species Survey Guidelines: Glossy black-cockatoo Calyptorhynchus lathami* (Hourigan, 2012)** • diurnal bird survey: 5 hours/50 ha of project area. • search for foraging and nesting signs: 20 hours/50 ha of project area.	Survey effort undertaken comprised: • 16 person hours of diurnal active searches and driving transects within suitable habitat (18.03 ha breeding and 73.04 ha foraging • habitat assessments.
white-throated needletail *Hirundapus caudacutus*	V; marine; migratory	V	Between October and April in northern and eastern Australia, and between December and March in south-eastern Australia (DAWE, 2022).	***Species Profile and Threats Database* (DAWE, 2022)** Due to the species ability to cover huge distances in a day, it is difficult to conduct systematic surveys for the species. The species can be detected through diurnal bird surveys with binoculars.	Survey effort undertaken comprised: • 16 person hours of diurnal active searches and driving transects within suitable habitat
Belson's panic *Homopholis belsonii*	V	E	Flowers between February to May , however can been identified outside of this period (DES, 2021e; Simon & Alfonso, 2011)	No specific survey guidelines are available for the species. Random meander surveys within suitable habitat were undertaken in accordance with Cropper (1993).	Survey effort undertaken comprised: • Random meanders within suitable habitat

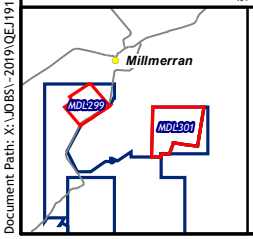
Species	EPBC Act status	NC Act status	Optimal survey period	Recommended survey effort and source	Survey effort undertaken within Study Area
hawkweed *Picris evae*	V	V	Optimal survey period is during flowering period from October to January (Holzapfel, 1994).	No specific survey guidelines are available for the species. Random meander surveys within suitable habitat were undertaken in accordance with Cropper (1993).	Survey effort undertaken comprised: • Random meanders within suitable habitat
Picris barbarorum	-	V	Optimal survey period is during flowering period from July to November (Holzapfel, 1994).	No specific survey guidelines are available for the species. Random meander surveys within suitable habitat were undertaken in accordance with Cropper (1993).	Survey effort undertaken comprised: • Random meanders within suitable habitat

2.5 Limitations and assumptions

Ecological surveys have a range of inherent limitations associated with seasonal timing of the survey, variable climate conditions and species behaviour. As such, the survey conducted represents a "snapshot" in time and may not provide a true indication of presence or absence of flora and fauna species within the Study Area. For species outside of the optimal survey period (e.g. *Picris* spp.), the precautionary principle was adopted whereby suitable habitat was an indicator of species presence.

The proposed road diversion alignments were not available at the time of the field survey. As such, sections of the proposed road diversion corridors, including the northern 1.3 km stretch of Inglewood Road and northern 600 m of the Gillespie's Dam Road, were not assessed as part of the ecological assessment. Where possible, assessment of these areas has been undertaken as part of the desktop assessment and vegetation patterns observed throughout those areas assessed.





N

Scale 1:35,000 (A4)

0 1,000

Metres

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
Aerial Imagery: © ESRI 2021
Cadastre: © DoR 2021
Watercourse: © Geoscience Australia 2018
Road: © PSMA 2014
MDL: © DoR 2021

Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	18/03/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 2: SURVEY SITE LOCATIONS

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

Document Path: X:\JOBS\~2019\QEJ19135\GIS\QEJ19135_Fig2_Survey_Site_Locations.mxd

3 Desktop assessment results

3.1 Commonwealth

Desktop assessment identified the following MNES identified under the EPBC Act as potentially occurring within, or in proximity, to the Study Area (refer to Appendix A.1):

- seven Threatened Ecological Communities (TECs), including:
  - Brigalow (*Acacia harpophylla* dominant and co-dominant)
  - Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregion
  - Natural grasslands on basalt and fine-textures alluvial plains of northern New South Wales and southern Queensland
  - Poplar Box Grassy Woodland on Alluvial Plains
  - Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions
  - Weeping myall woodlands; and
  - White Box-Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland.
- four Ramsar listed wetlands, including:
  - Banrock Station wetland complex (approximately 1200 – 1300 km from the Study Area)
  - Narran lake nature reserve (approximately 400-500 km from the Study Area)
  - Riverland (approximately 1100 – 1200 km from the Study Area); and
  - The Coorong, and Alkes Alexandria and Albert wetland (approximately 1300 – 1400 km from the Study Area).
- A total of 37 threatened flora and fauna species, including:
  - 12 flora species
  - nine birds
  - eight mammals
  - six reptiles; and
  - two snails
- 13 migratory fauna species.

3.1.1 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are those that depend on access to groundwater for ongoing maintenance and survival. Typically, the main structural elements within the community (i.e. canopy flora species) are able to directly access groundwater, however; through 'hydraulic lift', soil water can be moved up the soil profile, accessing plants and thereby become available for less deeply rooted species (Eamus *et al*. 2006). The loss of elements such as canopy species, on which subsequent flora and fauna species rely, can lead to the loss of the ecosystem. Therefore, the community as a whole can be considered to be groundwater dependent.

There are three main types of GDE as defined by Eamus *et al.* (2006), including:

- aquifer/cave ecosystems, occupied by stygofauna (Subterranean GDEs)
- ecosystems dependant on the surface availability (discharge) of groundwater. These ecosystems are characterised by permanent provision of surface water (Aquatic GDEs); and
- ecosystems dependent on access to subsurface groundwater, which includes many riparian communities (Terrestrial GDEs).

The Groundwater Dependent Ecosystem Atlas (Bureau of Meteorology, 2019) identifies potential terrestrial GDEs occurring within the Study Area in association with the Condamine-Culgoa river region (Figure 4). No potential subterranean GDEs are mapped within the Study Area. Mapped terrestrial GDEs included:

- 61.34 ha of terrestrial GDEs, comprising:
  - 28.51 High Potential areas; and
  - 32.83 Low Potential areas.

3.2 State

Desktop assessment identified the following environmental values protected under Queensland legislation as potentially occurring within or in proximity to the Study Area (Appendix A):

- Regulated vegetation under the *Vegetation Management Act 1999* (VM Act) (Section 3.2.1), including:
  - 23.40 ha of Endangered and 18.10 ha of Of Concern REs; and
  - Habitat for species squatter pigeon (*Geophaps scripta scripta*).
- Threatened flora and fauna species listed under the *Nature Conservation Act 1992* (NC Act), including:
  - Thirteen threatened flora species, including areas mapped as 'high risk' on the Protected Plant Protected Plants Flora Survey Trigger Map
  - Twenty-five threatened fauna species, including:
    - ten birds
    - six mammals
    - five reptiles
    - two snails; and
    - two insects.
- DoR mapped watercourses (Section 3.2.2)
- State mapped Biodiversity corridors containing Regional Riparian corridors (Section 3.2.3); and
- Category B ESAs containing Endangered REs (biodiversity status) (Section 3.2.4).

3.2.1 Regulated vegetation

A review of the Regulated Vegetation Management Map and supporting map identified that the Study Area contains approximately:

- 61.07 ha of Category B (remnant)

- 14.39 ha of Category C (high-value regrowth); and
- 1,612.55 ha of Category X (non-remnant) vegetation.

A summary of the extent of DoR mapped Regulated Vegetation is provided in Table 5 and depicted in Figure 3.

Approximately 7.91 ha of DoR mapped essential habitat for the squatter pigeon (*Geophaps scripta scripta*) is located within the south-eastern corner of the Study Area within MDL 301. The essential habitat mapped is in association with DoR mapped REs 11.3.2 and 11.3.25/11.5.20/11.4.3.

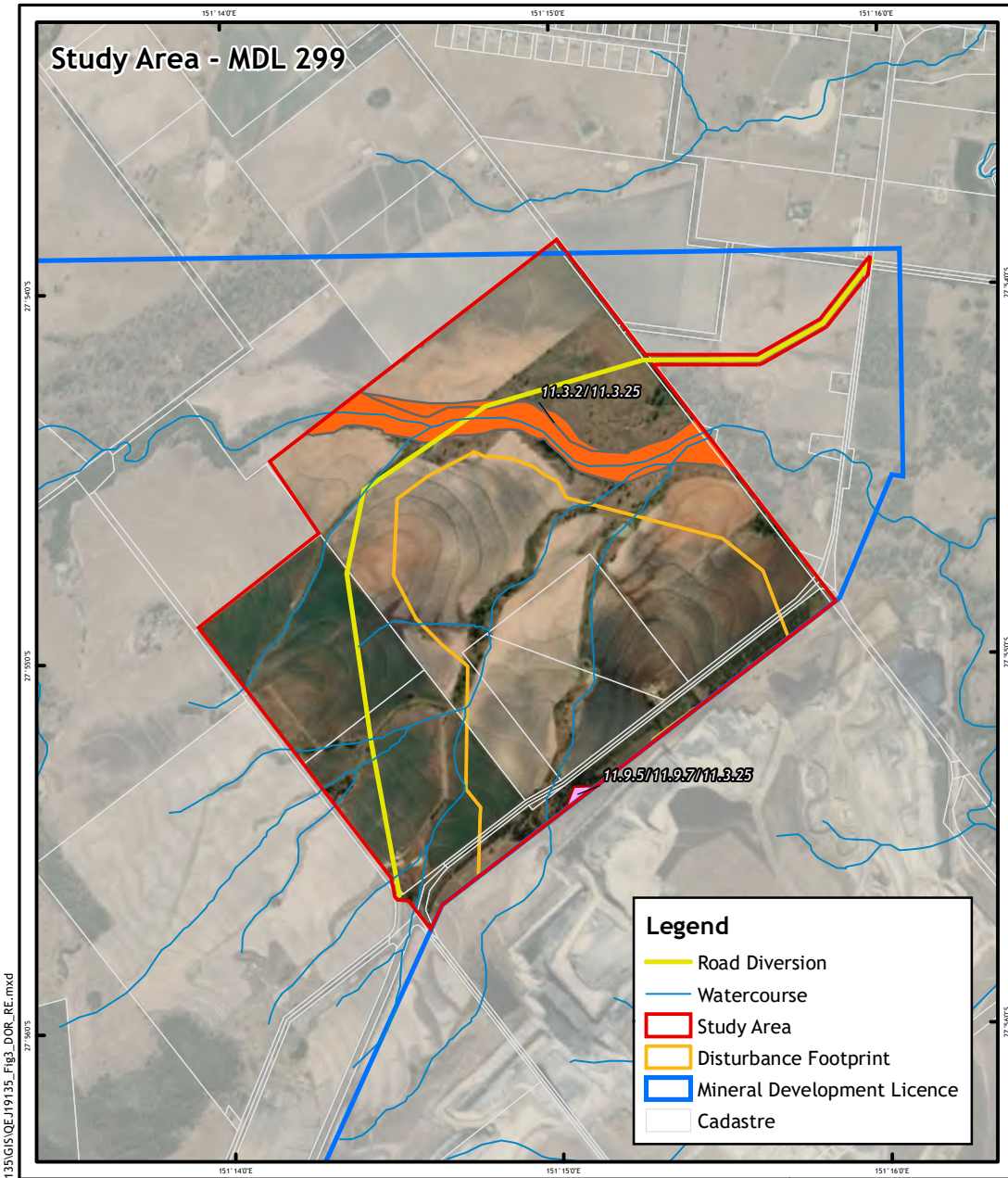
Table 5: DoR mapped Regulated Vegetation and associated REs within the Study Area

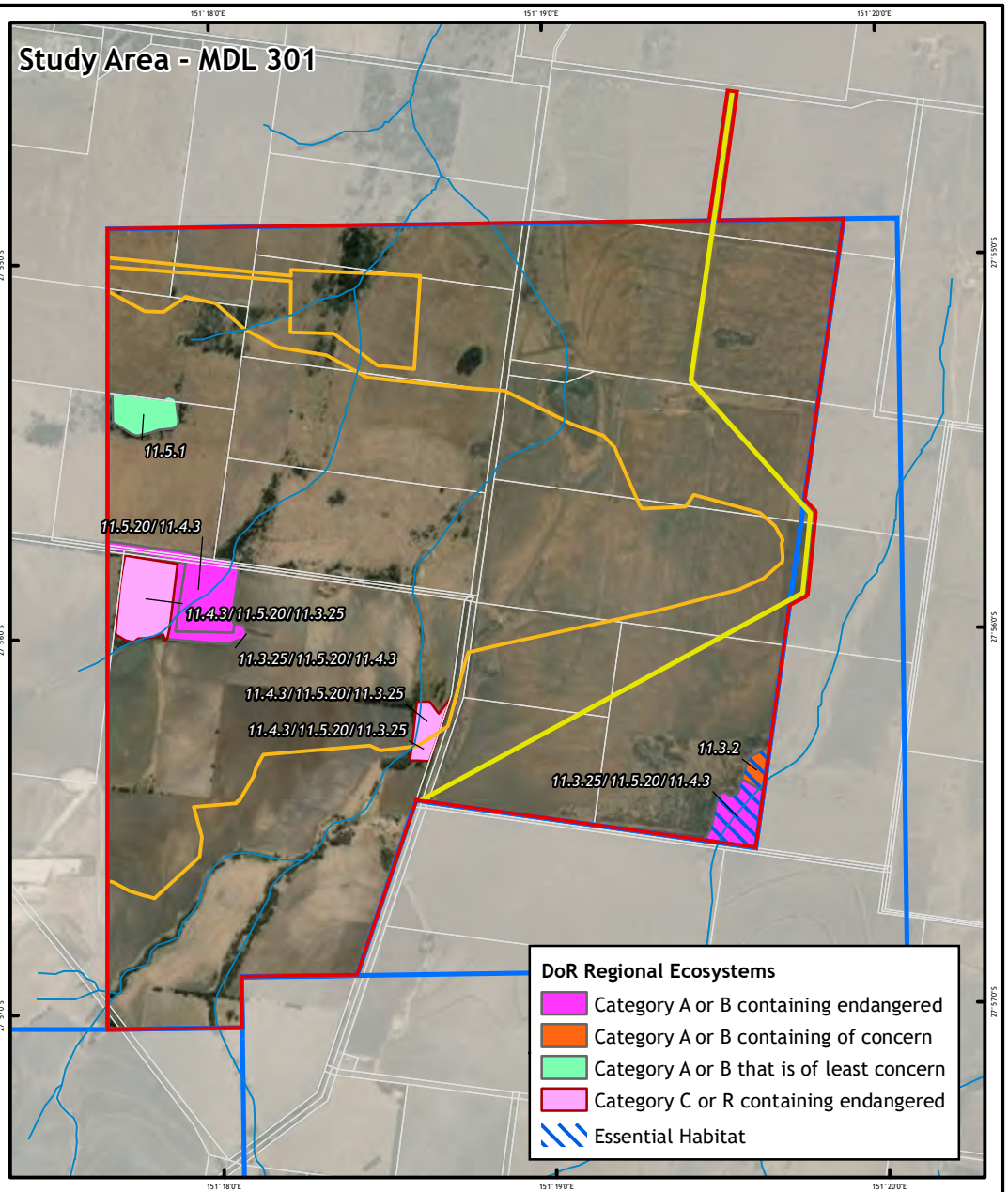
DoR mapped RE	VM Act class[1]	Biodiversity status[1]	Short description	Extent within Study Area (ha)
Category B (remnant vegetation)				
11.3.2	OC	OC	*Eucalyptus populnea* woodland on alluvial plains	30.66†
11.3.25	LC	OC	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	11.02†
11.4.3	E	E	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	1.07†
11.5.1	LC	NC	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces	5.31
11.5.20	LC	NC	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains	13.01†
Category C (high value regrowth)				
11.3.25	LC	OC	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	0.72†
11.4.3	E	E	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	10.32†
11.5.20	LC	NC	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains	2.75†
11.9.5	E	E	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	0.47†
11.9.7	OC	OC	*Eucalyptus populnea*, *Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks	0.13†
Category X (non-remnant)				

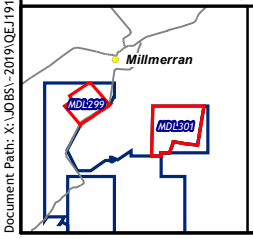
DoR mapped RE	VM Act class[1]	Biodiversity status[1]	Short description	Extent within Study Area (ha)
Non-rem	-	-	-	1,612.55
			Total	1,688.01

† Denotes areas of RE mapped based on percentage cover in heterogeneous polygons.

[1] E = Endangered, OC = Of Concern, NC – No concern at present, LC = Least Concern.







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Coordinate System: GDA 1994 MGA Zone 56
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Notes:
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B	Issued for Review	PR	PW	18/03/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 3: DOR MAPPED REGULATED VEGETATION AND REGIONAL ECOSYSTEMS

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

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3.2.2 Wetlands and watercourses

3.2.2.1 Watercourses

A number of DoR mapped minor (ephemeral) watercourses traverse the Study Area (refer to Figure 3). All mapped watercourses are tributaries of the larger creeks which eventually form part of the Condamine River located approximately 8.5 km north-east of the Study Area and include:

- An un-named tributary of Back Creek located in the north-west of the Study Area
- Back Creek located north of the Study Area; and
- Grasstree Creek, located east of the Study Area.

No watercourses or drainage lines are mapped as High Ecological Value (HEV) watercourses (Appendix A).

3.2.2.2 Wetlands

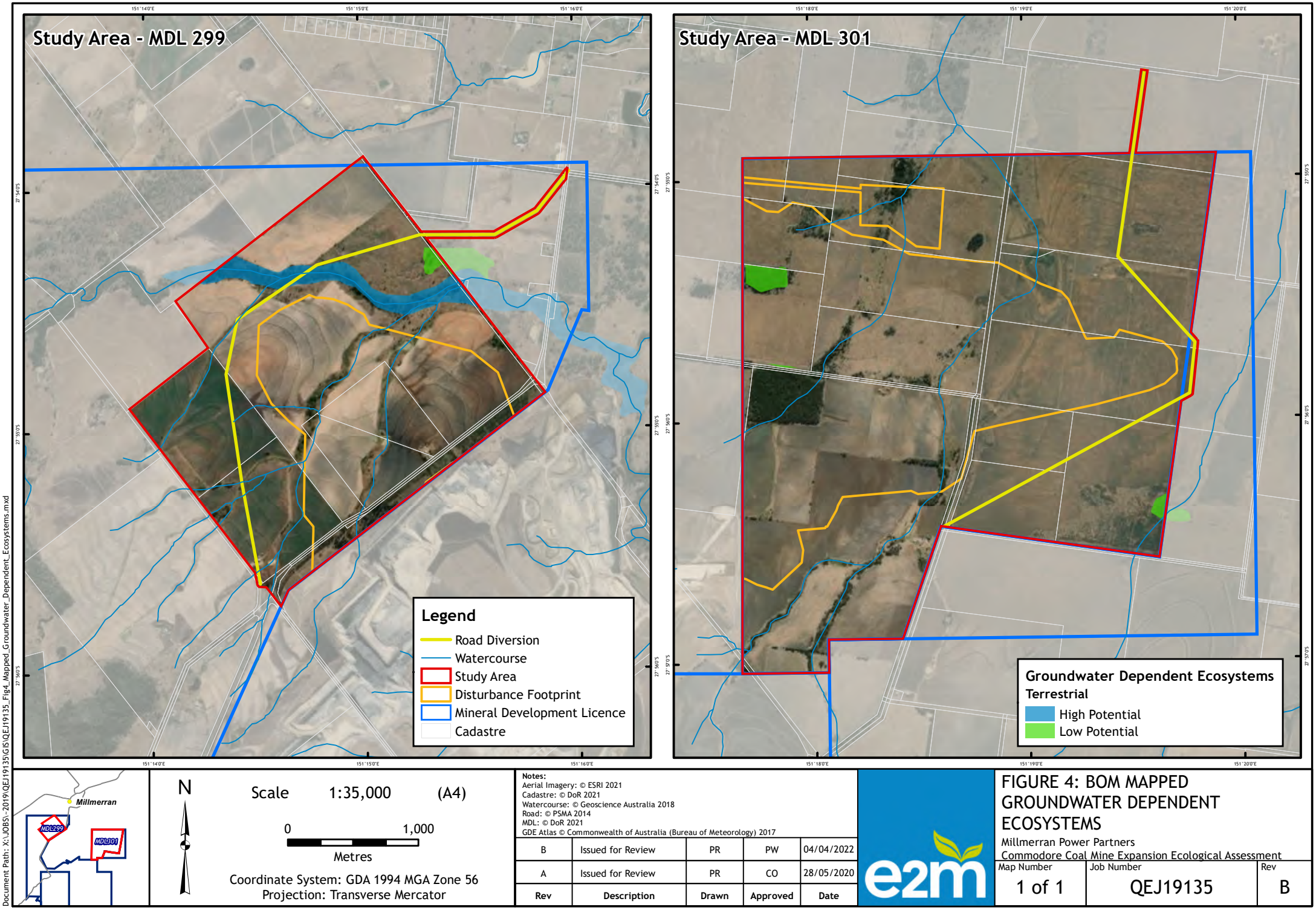
Desktop assessment identified that the Study Area does not contain any MSES wetlands (refer to Appendix A.3). However, Queensland Wetland Environmental Values Mapping identified a single small area of General Environmental Significance (GES) wetlands within the centre of the MDL 299 portion of the Study Area (Department of Environment and Science (DES), 2020d).

3.2.3 Corridors and connectivity

Review of the Brigalow Belt Bioregion Biodiversity Planning Assessments (BPA) identified the Study Area contains a single area mapped as having regional biodiversity values Appendix A). This area is associated with the riparian corridor along the major watercourse located in within the MDL 299 Study Area.

3.2.4 Environmentally Sensitive Areas

A search of the Environmentally Sensitive Areas (ESAs) Mining Activities mapping, produced by DES (refer to Appendix A.4), identified 35.83 ha Category B ESA areas within the Study Area. This included areas containing DoR mapped Endangered REs 11.4.3 and 11.9.5 (Figure 3). No Category A or C ESAs are mapped within the Study Area.



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B	Issued for Review	PR	PW	04/04/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 4: BOM MAPPED GROUNDWATER DEPENDENT ECOSYSTEMS

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

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3.3 Previous surveys

3.3.1 Millmerran Power Project Impact Assessment Study and Supplementary report

Ecological surveys were undertaken by Sinclair Knight Merz (SKM), as part of the *Draft Impact Assessment Study* (SKM, 1998a) and *Impact Assessment Study Supplementary Report* (SKM, 1998b) for the Millmerran Power Project, comprising the 840 MW power station, 3.4 mt/annum coal mine and associated water supply pipeline. Assessments for the mine and power station site were undertaken from the 22 to 27 April 1998 (SKM, 1998a) and within February 1999 (SKM, 1998b). Ecological surveys comprised:

- vegetation ground-truthing, including assessment of vegetation structure, composition and ecological condition
- fauna habitat assessment, including:
  - cage traps
  - Elliot traps
  - pitfall traps with drift fences
  - diurnal active searches and waterbody watches
  - spotlighting
  - harp trapping; and
  - anabat recorders.
- opportunistic flora and fauna observations

At the time of the investigation, the Commonwealth *Endangered Species Protection Act 1992* (no longer in force) was in place. As such, TECs, flora and fauna species protected at the time differed to those currently listed under the EPBC Act. Similarly, the Queensland *Vegetation Management Act 1999*, was not in place at the time of the assessment. As such, no REs were formally identified as part of the assessment, with findings describing broad vegetation types.

Key ecological findings associated with the mine and power station comprised:

- vegetation characterised by highly modified landscape, typical of agricultural areas, with mature vegetation largely restricted to road reserves, along creek lines, fence lines and isolated patches.
- six key vegetation communities including:
  - *Acacia harpophylla* (brigalow) tall open forest
  - Melaleuca low open forest
  - *Allocasuarina cristata* (now *Casuarina cristata*) tall open woodland
  - *Eucalyptus populnea* (poplar box) woodland
  - open eucalypt woodland; and
  - agricultural land.
- identified two threatened terrestrial species including:
  - squatter pigeon (*Geophaps scripta scripta*) - Vulnerable (NC Act and EPBC Act); and

- *Homopholis belsonii* - Endangered (NC Act) and Vulnerable (EPBC Act).

4 Field survey results

4.1 Flora

4.1.1 Flora diversity

A total of 109 flora species were recorded within the Study Area, which comprised of 78 native species and 31 introduced species. This included one threatened flora species, *Homopholis belsonii* (refer to Section 4.1.5.1), and three declared weed species (refer to Section 4.1.6). A detailed list of flora species observed within the Study Area is provided in Appendix B.1.

4.1.2 Vegetation communities

The outcomes of the field assessment identified the presence of five vegetation communities (VCs) within the Study Area. The floristic structure, composition, condition and area of each VC are detailed below.

4.1.2.1 VC 1: *Eucalyptus* spp. dominated open forest and woodlands drainage lines and alluvial plains.

This vegetation community occurs as numerous scattered patches along watercourses and drainage lines within the Study Area. In total the community covers approximately 18.83 ha of the Study Area and comprised remnant and non-remnant regrowth vegetation analogous with REs 11.3.4 and 11.3.25.

Areas consistent with RE 11.3.4 were characterised by a tree canopy (17 m in height and 27% cover) dominated by *Corymbia tessellaris*, with *Eucalyptus camaldulensis, Eucalyptus tereticornis* and *Angophora floribunda* occurring as sub-dominant species. The sub-canopy was sparse to moderate and dominated by *Acacia excelsa, Acacia salicina, Casuarina cristata* and *Eremophila mitchellii*. A sparse shrub layer was present, which comprised *Geijera parviflora, Alectryon diversifolius* and *Carissa ovata*. The ground layer was dense and dominated by exotic species, including *Megathyrsus maximus*, Eragrostis curvula*, Chloris gayana** and *Bidens pilosa**. Native species present within the ground layer included *Austrostipa verticillata, Enteropogon acicularis, Aristida calycina* and *Bothriochloa decipiens*.

Areas analogous with RE 11.3.25, located along watercourses within MDL 299, were characterised by a tree canopy (19 m in height and 49% cover) dominated by *Eucalyptus camaldulensis* and *Eucalyptus tereticornis*, with *Angophora floribunda* occurring as a sub-dominant species and *Eucalyptus tessellaris* occurring as an associated species. The sub-canopy was sparse and dominated by *Acacia excelsa, Acacia salicina, Casuarina cunninghamiana* and *Psydrax oleifolia*. A sparse shrub layer was present, which comprised *Casuarina cristata, Acacia salicina, Alectryon diversifolius* and *Maireana microphylla*. The ground layer was dense and dominated by exotic species, including *Megathyrsus maximus*, Schkuhria pinnata*, Eragrostis curvula*, Chloris gayana** and *Bidens pilosa**. Native species present within the ground layer included *Austrostipa verticillata, Enteropogon acicularis, Bothriochloa bladhii, Bothriochloa decipiens* and *Cyperus difformis*.

While the canopy within this community remains largely undisturbed, the understorey was typically degraded through encroachment of weeds and non-native pasture species.

4.1.2.2 VC 2: *Acacia harpophylla* (brigalow) sometimes with *Casuarina cristata* (belah) open forests to woodlands on heavy clay soils.

This community occurs as fragmented patches throughout the Study Area, spanning approximately 106 ha. These areas were consistent with remnant and non-remnant regrowth vegetation analogous with REs 11.3.17, 11.4.3 and 11.9.5.

Areas consistent with remnant and non-remnant regrowth RE 11.3.17 were characterised by a tree canopy (9 m to 12 m in height and 38% to 46% cover) dominated by *Casuarina cristata* and *Eucalyptus populnea*. The sub-canopy was moderate to sparse and dominated by young *Casuarina cristata and Eucalyptus populnea*, with *Geijera parviflora, Terminalia oblongata* and *Eremophila mitchellii* also commonly occurring. A sparse shrub-layer was present, which comprised of juvenile species consistent with the sub-canopy layer. The ground layer was moderate to dense and dominated by native species including *Aristida leptopoda, Sporobolus caroli, Dichanthium sericeum, Austrostipa verticillata, Aristida leptopoda, Enteropogon acicularis* and *Enchylaena tomentosa*.

Patches consistent with RE 11.4.3 were characterised by tree canopy layer (12 m to 17 m in height and 47 to 52% cover) dominated by *Casuarina cristata* and/or *Acacia harpophylla,* with some areas containing emergent *Eucalyptus populnea*. The sub-canopy and shrub layers vary from moderate to sparse between patches though are primarily dominated by *Casuarina cristata*. Areas with denser sub-canopy also contain a mixture of species, including *Geijera parviflora, Acacia pendula, Alectryon diversifolius, Eremophila mitchellii* and *Melaleuca bracteata*. The ground layer cover also varied between patches from moderate to low. However, species composition was consistent between patches, consisting of a mixture of native and exotic grasses and forbs, including *Chloris gayana*, Cenchrus ciliaris*, Enteropogon acicularis, Enchylaena tomentosa* and *Megathyrsus maximus**.

Minor areas of non-remnant regrowth RE 11.9.5 were characterised by a low tree canopy (11 m in height and 19% cover) dominated by *Casuarina cristata*. A sparse shrub layer was present, which comprised juvenile *Casuarina cristata,* as well as *Geijera salicifolia* and *Carissa ovata*. The ground layer cover was moderate and dominated by mixture of native species, including *Aristida calycina, Aristida leptopoda, Dichanthium sericeum, Panicum decompositum, Homopholis belsonii* and *Enchylaena tomentosa*.

This community was largely degraded through surrounding land uses, exhibiting evidence of past clearing and encroachment of weeds and non-native pasture species.

4.1.2.3 VC 3: Dry eucalypt woodlands to open woodlands primarily on sandplains or depositional plains.

This community occurs as single patch within the north-west portion of MDL301, spanning approximately 6.31 ha of the Study Area. This community was consistent with non-remnant regrowth vegetation analogous with RE 11.5.1.

The community is characterised by a low tree canopy (11 m in height and 28% cover) dominated by *Eucalyptus populnea,* with occasional occurrences of *Casuarina cristata, Callitris glaucophylla* and *Geijera parviflora*. A sparse shrub layer was present, which comprised juvenile *Casuarina cristata* and *Eucalyptus populnea,* as well as *Maireana microphylla* and *Geijera parviflora*. The ground layer cover was moderate and dominated by native grasses and forbs, including *Aristida calycina, Dichanthium sericeum, Enteropogon acicularis, Cymbopogon refractus* and *Eremophila debilis*.

Similar to other VCs, historical land use practices had resulted in encroachment of weeds and non-native pasture species within the understorey.

4.1.2.4 VC 4: Modified/Planted shade lines and shelter belts

This community occurs as multiple linear patches along the south-east boundary of the MDL 299 Study Area, located between Millmerran Inglewood Rd and the existing mining development. The community covers approximately 12 ha and comprised planted windrows of *Eucalyptus argophloia*, not analogous with any RE. While this species is listed as Vulnerable under the NC Act and EPBC Act, the *Eucalyptus argophloia* were planted within the site as part of rehabilitation efforts and are considered to not constitute 'in the wild' plants as defined under the NC Act.

This community is consistent with non-remnant vegetation (other vegetation) with a combination of native and non-native forbs and grasses.

4.1.2.5 VC 5: Improved pasture and cropping land

This community occurs across the majority of the Study Area and is consistent with non-remnant vegetation (other vegetation). These areas had been subject to historical clearing (e.g. blade-ploughed), livestock impacts, pasture improvement and cultivation. These areas are dominated by exotic pasture or cultivated species. While some areas contain scattered paddock trees, they are not characteristic of a particular RE or exhibit suitable cover and structure consistent with remnant or non-remnant regrowth vegetation.

4.1.3 Regional Ecosystems

A total of approximately 51 ha of remnant vegetation and 80 ha of regrowth REs were ground-truthed within the Study Area. A summary of REs, associated vegetation condition class and area is provided in Table 6 and depicted in Figure 5. Regional Ecosystems recorded within the Study Area comprised:

- 50.78 ha of remnant vegetation; and
- 1,637.45 non-remnant vegetation, comprising:
  - 80.00 ha of non-remnant regrowth vegetation; and
  - 1,557.45 ha of non-remnant (other vegetation).

Endangered (VM class) communities were associated with undulating clay plains (land zone 4) within the Study Area. Of concern (VM Act class) REs were located along riparian corridors and alluvial plains (land zone 3) within the Study Area. Detailed summaries of REs identified during the field survey are provided in Appendix C.

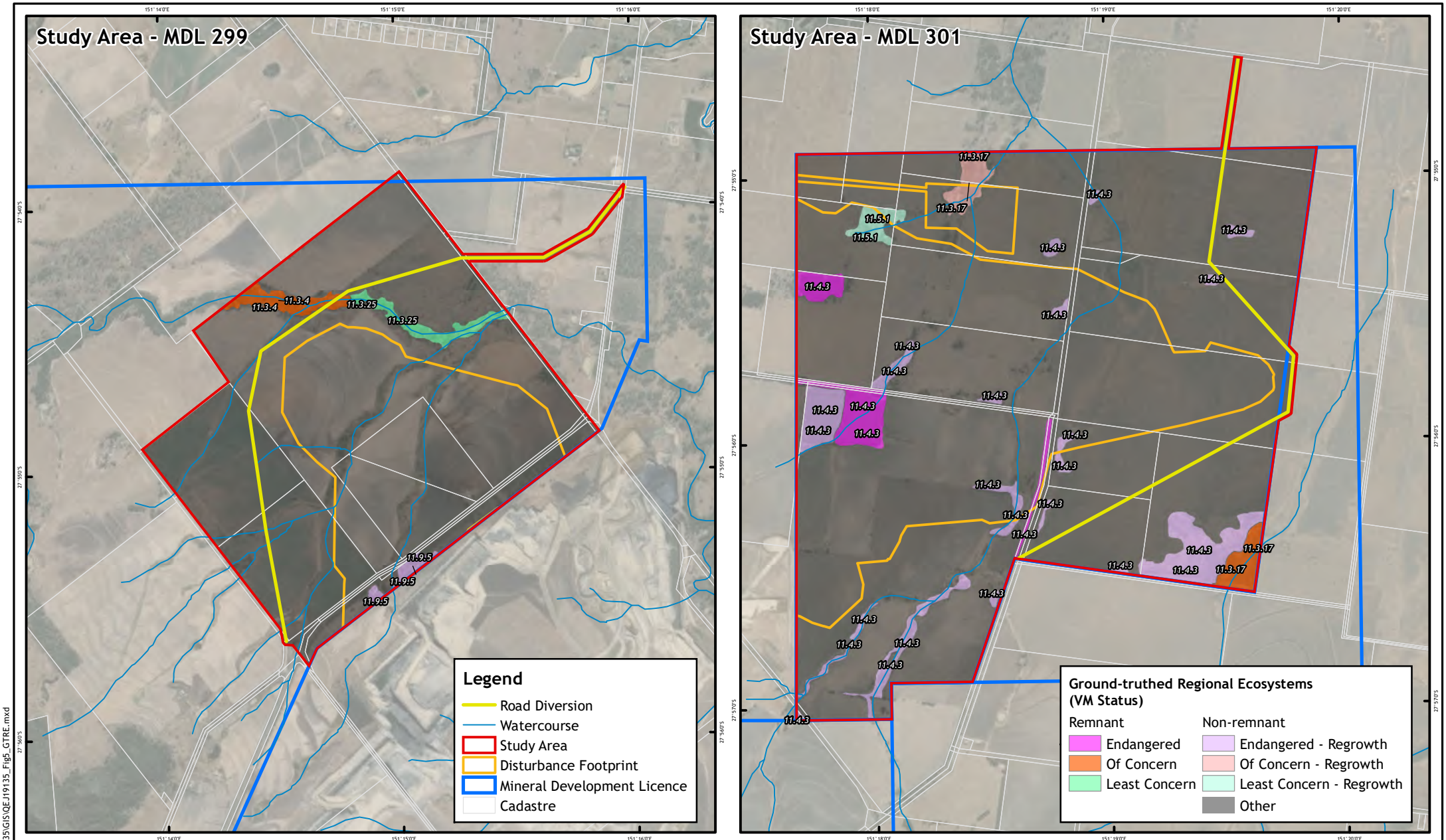
The extent of remnant vegetation throughout the Study Area was largely consistent with DoR Vegetation Management mapping (DoR, 2021a). Inconsistencies between the DoR mapped and ground-truthed remnant vegetation extents within the Study Area include:

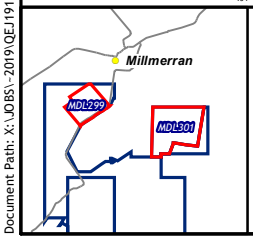
- DoR (2021a) mapped heterogenous polygons were not found to contain all of the REs mapped.
- An area of DoR (2021a) mapped remnant vegetation containing RE 11.5.1 within the north-western extent of the Study Area within MDL 301 was found to contain remnant vegetation consistent with RE 11.4.3. As described by Wilson & Taylor (2012), geological mapping within the Brigalow Belt does not always represent the true extent of clay plains. Extensive areas of Tertiary clay plains in the Brigalow Belt are shown as undifferentiated Cainozoic/Tertiary with unconsolidated sediments (Wilson & Taylor, 2012). These areas can contain alluvials (Land zone 3), clay plains (Land zone 4) and sand plains (land zone 5) (Wilson & Taylor, 2012).

Many areas of DoR (2021a) mapped riparian corridors containing REs 11.3.25/11.3.2 were found to be consistent with RE 11.3.17 and 11.3.4.

Table 6: Ground-truthed REs within the Study Area

RE	RE Description	VM Act class	Biodiversity status	BVG (1:1M)	Vegetation type	Ground-truthed extent (ha)
Remnant Vegetation						
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	Of concern	Of concern	16c	Remnant	9.31
11.3.17	*Eucalyptus populnea* woodland with *Acacia harpophylla* and/or *Casuarina cristata* on alluvial plains	Of concern	Endangered	25a	Remnant	8.50
					Non-remnant regrowth	8.01
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	Least concern	Of concern	16a	Remnant	9.52
11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	Endangered	Endangered	25a	Remnant	23.45
					Non-remnant regrowth	61.75
11.5.1	*Eucalyptus crebra* and/or *E. populnea, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	18b	Non-remnant regrowth	6.31
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks	Endangered	Endangered	25a	Non-remnant regrowth	3.93
Non-remnant (other)	N/A	NA	NA	NA	Non-remnant other vegetation	1,557.45
					Total	**1,688.23**





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A	Issued for Review	PR	CO	28/05/2020

FIGURE 5: GROUND-TRUTHED REGIONAL ECOSYSTEMS

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

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4.1.4 Threatened Ecological Communities

The Commonwealth Protected Matters Report issued by DAWE identified seven TECs with potential to occur within the Study Area (refer to Section 3.1). Field surveys identified REs analogous with two potential EPBC Act listed TECs, namely Brigalow (dominant and co-dominant) (Brigalow TEC) and Poplar Box Grassy Woodland on Alluvial Plains TECs (Poplar Box TEC). Table 7 summarises the TECs identified in the Study Area.

Table 7: Summary of TECs recorded within the Study Area

TEC	EPBC Act status	Presence within the Study Area
Brigalow (*Acacia harpophylla)* dominant and co-dominant	Endangered	**Confirmed Present** Approximately 2.27 ha of Brigalow TEC was observed within the Study Area in association with two patches of RE 11.4.3. Other potential brigalow REs were observed within the Study Area but did not meet the condition criteria for the TEC.
Coolibah-Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	**Not Present** Vegetation consistent with the TEC was not observed within the Study Area.
Natural grasslands on basalt and fine-grained textures alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	**Not Present** Vegetation consistent with the TEC was not observed within the Study Area.
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	**Not Present** Although REs potentially containing the TEC were observed within the Study Area (i.e. RE 11.3.17), they did not meet the condition criteria for the TEC.
Semi-evergreen vine thicket of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	**Not Present** Vegetation consistent with the TEC was not observed within the Study Area.
Weeping myall woodlands	Endangered	**Not Present** Vegetation consistent with the TEC was not observed within the Study Area.
White-box-Yellow box-Blakely's red gum grassy woodland and derived native grasslands	Critically Endangered	**Not Present** Vegetation consistent with the TEC was not observed within the Study Area.

4.1.4.1 Brigalow (Acacia harpophylla) dominant and co-dominant TEC

Potential brigalow TECs within the Brigalow Belt Bioregion consist of twelve Queensland REs, of which all contain brigalow that is dominant or co-dominant within the ecologically dominant layer. To qualify as the Brigalow TEC, an occurrence of brigalow must meet minimum threshold conditions pertaining to patch size and weed encroachment detailed within the *Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community* (Department of the Environment, 2013).

Several patches of brigalow-dominated REs were recorded within the Study Area during the field assessment, including remnant and regrowth REs 11.4.3 and 11.9.5. Of these patches only two met the performance criteria of the TEC. Totalling 2.27 ha, these areas were located within MDL 301 and contained isolated patches of non-remnant regrowth consistent with RE 11.4.3 (Figure 7).

The remaining patches of potential REs were excluded from the TEC as they were either dominated by *Casuarina cristata* (belah) and/or exceeded the exotic perennial cover thresholds (≥50%). Exotic species observed included *Urochloa mosambicensis** (sabi grass), *Megathyrsus maximus** (Guinea grass), *Chloris gayana** (Rhodes grass), *Opuntia* spp.*, *Xanthium occidentale** (Noogoora burr) and *Harissa martinii** (harissa cactus).

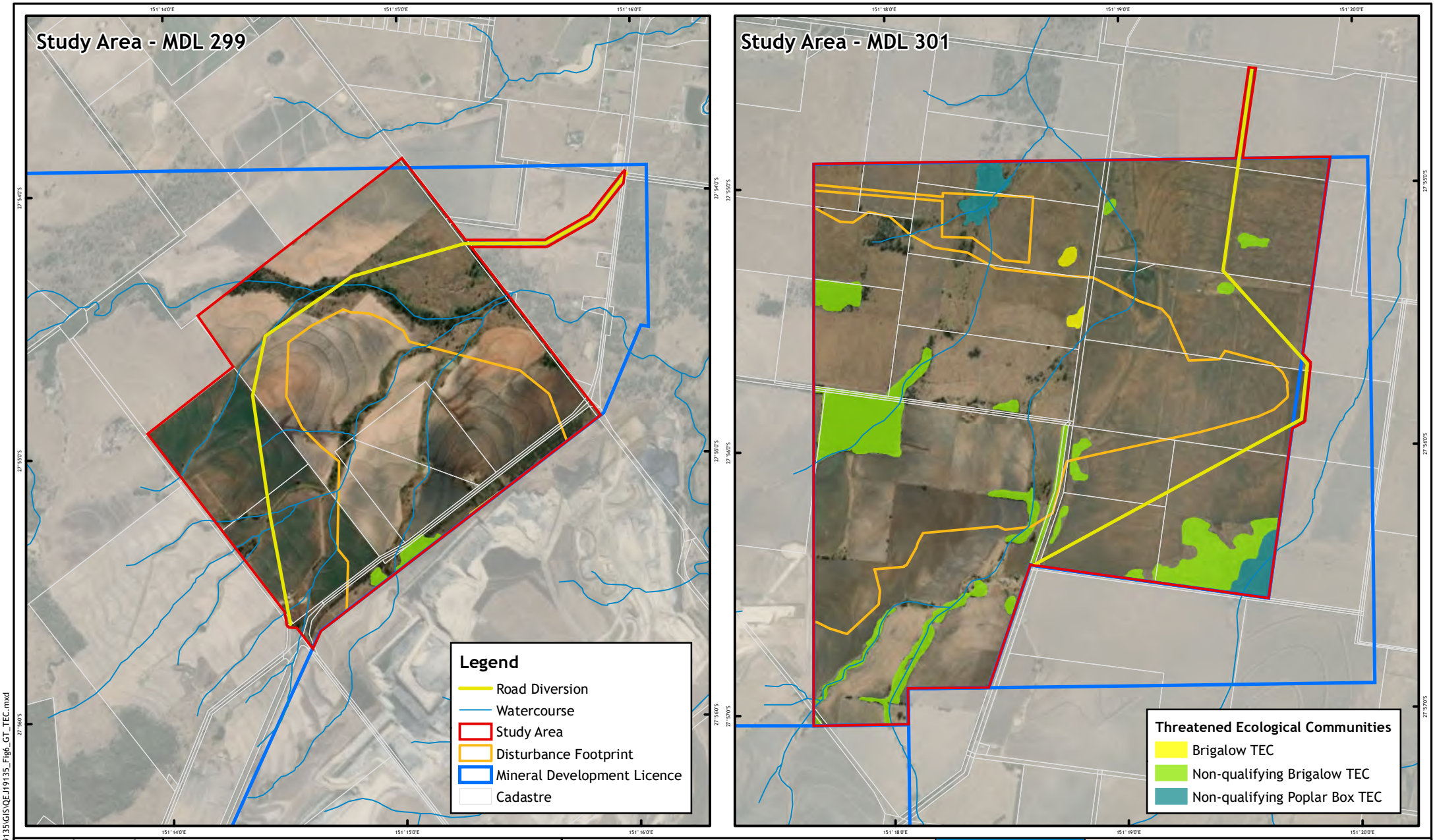
4.1.4.2 Poplar Box Grassy Woodland on Alluvial Plains

The Poplar Box TEC comprises grassy woodlands and open woodlands on active and relictual alluvial plains along the east coast of Australia (DEE, 2019). Three Condition Classes (Class A, B and C) are identified for the Poplar Box TEC and are based on the:

- crown cover dominance of canopy trees
- percentage cover of native perennial vegetation in the groundlayer
- native species richness within the groundlayer; and
- density of mature trees (>30 cm DBH).

Areas of remnant and regrowth RE 11.3.17 with potential to contain the Poplar Box TEC were observed within the Study Area. However, neither areas met the criteria for the TEC with both patches:

- dominated by *Casuarina cristata* (belah), not *Eucalyptus populnea*; and
- dominance of exotic species in the ground layer, including *Megathyrsus maximus** (Guinea grass), *Eragrostis curvula** (African lovegrass) and *Urochloa mosambicensis** (sabi grass).



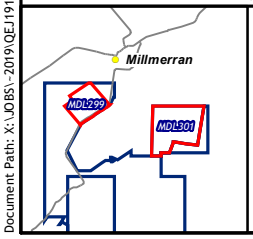


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FIGURE 6: GROUND-TRUTHED THREATENED ECOLOGICAL COMMUNITIES

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

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4.1.5 Threatened flora

Targeted surveys for threatened flora within the Study Area identified the presence of two threatened flora species:

- *Homopholis belsonii* (Belson's panic) - Endangered (NC Act) and Vulnerable (EPBC Act); and
- *Eucalyptus argophloia* (Chinchilla white gum) – Vulnerable (NC Act and EPBC Act).

Additionally, likelihood of occurrence assessment identified a further two threatened flora species as likely to occur within the Study Area:

- *Picris barbarorum* – Vulnerable (NC Act); and
- *Picris evae* (hawkweed) – Vulnerable (NC Act and EPBC Act).

4.1.5.1 *Homopholis belsonii* (Belson's panic)

Homopholis belsonii is a perennial grass that grows to approximately 40 cm tall (Stanley & Ross, 1989). The species produces panicles to 25 cm long and 20 cm wide with primary and secondary branchlets ending in a single spikelet (Stanley & Ross, 1989) (Image 1). *H. belsonii* has been recorded flowering from February to May (Simon & Alfonso, 2011). The species occurs in dry woodland habitats on poor soils, such as those derived from basalt. It occurs on rocky hills supporting *Eucalyptus albens* and in *Geijera parviflora* woodland; flat to gently undulating alluvial areas supporting *Casuarina cristata* forest; and soils and plant communities of *Eucalyptus populnea* woodlands. It may also be associated with shadier areas of *Acacia harpophylla, Acacia melvillei* and *Acacia pendula* communities; in *Eucalyptus orgadophila* communities; and on roadsides (Department of Environment, Water, Heritage and the Arts, 2008a).

Field assessment identified approximately 200 individuals within the Study Area, across two separate areas, covering a total area of approximately 10.05 ha (Figure 7B). One area was located within the Gillespie's Dam Road easement in the southern portion of MDL 301. In this area, individuals were recorded within both retained remnant RE 11.4.3 and cleared areas dominated by exotic grass species. The second area occurred directly adjacent to the Millmerran Inglewood Road within a patch of non-remnant regrowth analogous with RE 11.9.5. Other areas of RE 11.4.3 and RE 11.3.17 were found to contain suitable habitat for the species however no population/individuals were observed during the field survey (Figure 7B).

Image 1: *Homopholis belsonii* panicle (left) and glumes of seed (right) observed within the Study Area.

4.1.5.2 *Eucalyptus argophloia* (Chinchilla white gum)

Eucalyptus argophloia is a medium to tall tree, 18 m to 30 m, with smooth grey and reddish-grey trunk that weathers to powdery white (Brooker & Kleinig, 2004; DEWHA, 2008a) (Image 2). Juvenile leaves are opposite, linear to narrow-lanceolate (9 cm long, 1.4 cm wide) and greyish green in colour (Brooker & Kleinig, 2004). Adult leaves are alternate, narrow-lanceolate, concolorous and glossy green in colour (Brooker & Kleinig, 2004). The species produces white inflorescence (7-flowered) that develop into globular buds (approx. 0.4 cm by 0.4 cm) with a hemispherical operculum from May to August (Brooker & Kleinig, 2004). Mature fruit are hemispherical to cupular (0.5 cm by 0.7 cm) with four to six valves level or slightly exserted (Brooker & Kleinig, 2004) (Image 2). *E. argophloia* grows in association with *Acacia harpophylla* or *Eucalyptus microcarpa* on flat terrain of brown to black clay or clay-loam soils (Department of the Environment, Water, Heritage and the Arts, 2008a).

Field assessment identified multiple stands of *E. argophloia* had been planted within the Study Area (VC4), covering area of approximately 12.41 ha. All *E. argophloia* observed within the Study Area are considered not to be 'in the wild'. Stands of *E. argophloia* comprised clearly defined rows of individuals that had been planted on formerly cleared land. As outlined in the *Operational Policy: When a protected plant in Queensland is taken to be 'in the wild'* (DES, 2020f), exemptions are provided for protected plants that have been propagated and established through human intervention as these are not considered to be 'in the wild'.

Image 2: *Eucalyptus argophloia* habit (left) mature fruit with six valves (right) observed within the Study Area.

4.1.5.3 Picris barbarorum

Picris barbarorum is an annual forb, 5 cm to 60 cm tall and has been recorded flowering from July to November (Holzapfel, 1994). The species has a ribbed stem (lengthwise) and branched sparingly covered in hairs (Holzapfel, 1994). The basal leaves are characterized by narrowly obovate to oblanceolate and toothed (dentate) (Holzapfel, 1994). Leaves off the stem range from 4 to 20 cm in length and lanceolate to narrowly triangulate (Holzapfel, 1994). Inflorescence is yellow with sepals covered in dense hairs (indumentum), 1 to 1.5 cm long and 0.7 to 1 cm wide, recorded typically flowering and fruiting from July to November (Holzapfel, 1994). The species has been recorded along rivers and on floodplains containing

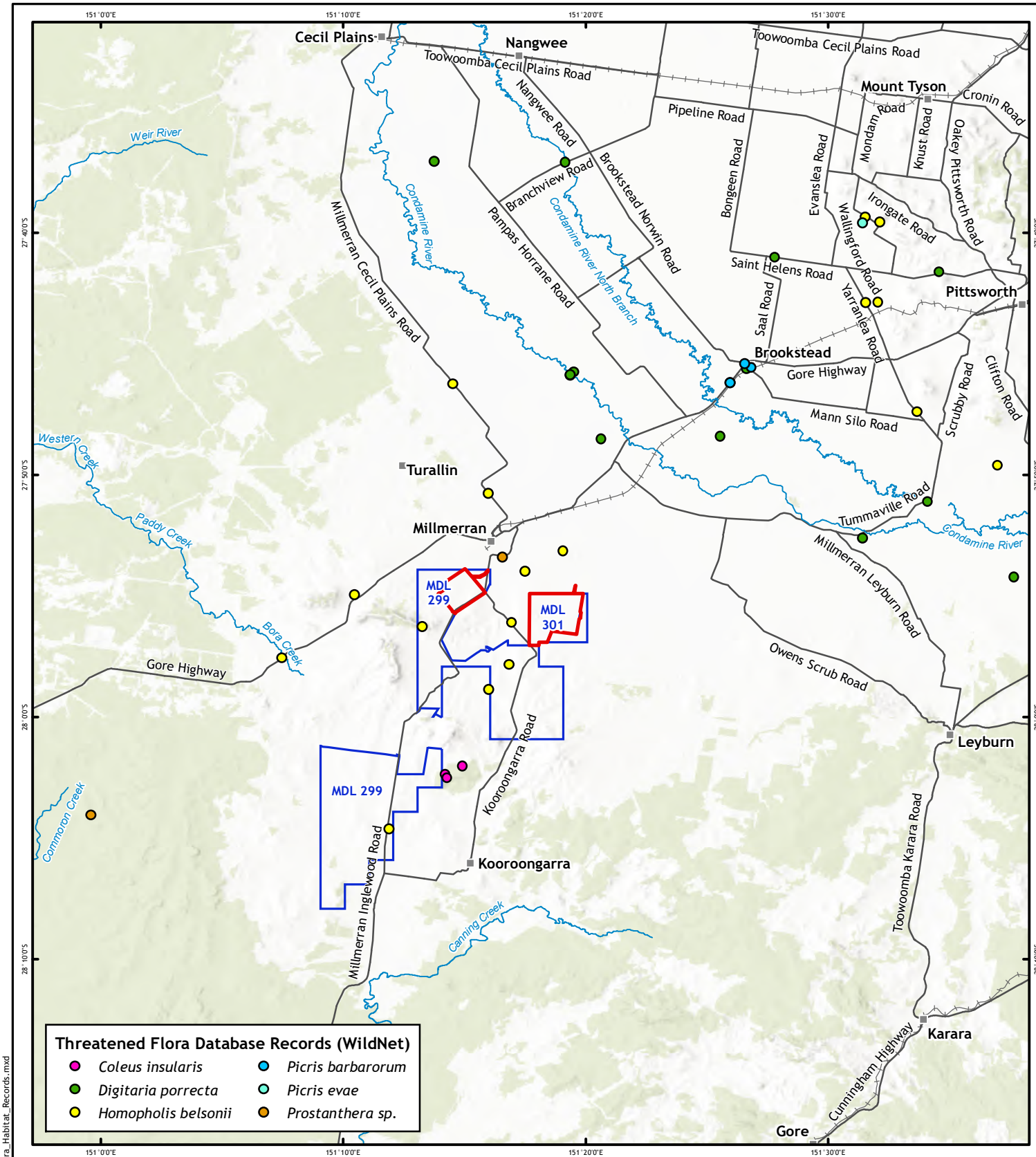
heavy grey clays, red and heavy black soils (Holzapfel, 1994). Populations have been observed within, disturbed grasslands, low chenopod shrublands as well as *Acacia* and eucalypt woodlands between 0-500 m ADH (Holzapfel, 1994; The Australasian Virtual Herbarium, 2020).

The species has been previously recorded in proximity to the Study Area in association with disturbed vegetation (i.e. roadside vegetation) the Condamine River and floodplain (approx. 14 km north of the Study Area) (Figure 7A). As the field survey was undertaken outside of the species optimal survey period (July to November), suitable habitat was mapped based on the species habitat preferences (Figure 7C). Approximately 18.83 ha of suitable habitat ocurs within the Study Area associated with REs 11.3.4 and 11.3.25 (Figure 7C).

4.1.5.4 *Picris evae* (hawkweed)

Picris evae is an annual forb, 40 cm to 130 cm tall, with a reddish or green, hairy, ribbed (lengthwise) stem (Holzapfel, 1994). Basal leaves are 15 to 30 cm long, oblanceolate and dentate (toothed). Leaves along the stem are shorter, 8 to 22 cm long, oblanceolate to lanceolate and dentate, similar to the basal leaves (Holzapfel, 1994). Inflorescence is yellow with sepals covered in dense hairs (indumentum), 1.2 to 1.5 cm long and 1 to 1.2 cm wide, recorded typically flowering and fruiting from October to January (Holzapfel, 1994). The species occurs in eucalypt open woodland with a grassy understorey composed of *Dichanthium* spp., as well as disturbed habitats along roadsides and in cultivated areas, such as paddocks, containing black, dark grey or reddish clay-loams and clays. Associated species include *Eucalyptus melliodora*, *E. crebra*, *E. populnea*, *E. albens*, *Angophora subvelutina*, *Allocasuarina torulosa* and *Casuarina cunninghamiana* (Department of the Environment, Water, Heritage and the Arts, 2008d).

The species has been previously recorded in proximity to the Study Area in association with disturbed vegetation (i.e. roadside vegetation) the Condamine River and floodplain (approx. 14 km north of the Study Area) (DES, 2021e) (Figure 7A). As the field survey was undertaken outside of the species optimal survey period (October to January), suitable habitat was mapped based on the species habitat preferences (Figure 7D). Approximately 18.83 ha of suitable habitat occurs within the Study Area associated with REs 11.3.4 and 11.3.25 (Figure 7D).



Legend

- Road
- Railway
- Study Area
- Mineral Development Licence

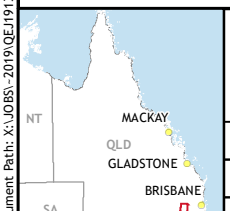
N

Scale 1:400,000 (A4)

0 5 10 15

Kilometres

Coordinate System: GCS GDA 1994



Notes:
MDL: © DoR 2021
Railway: © DoR 2021
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Watercourse: © DoR 2019
WildNet: © DES 2021

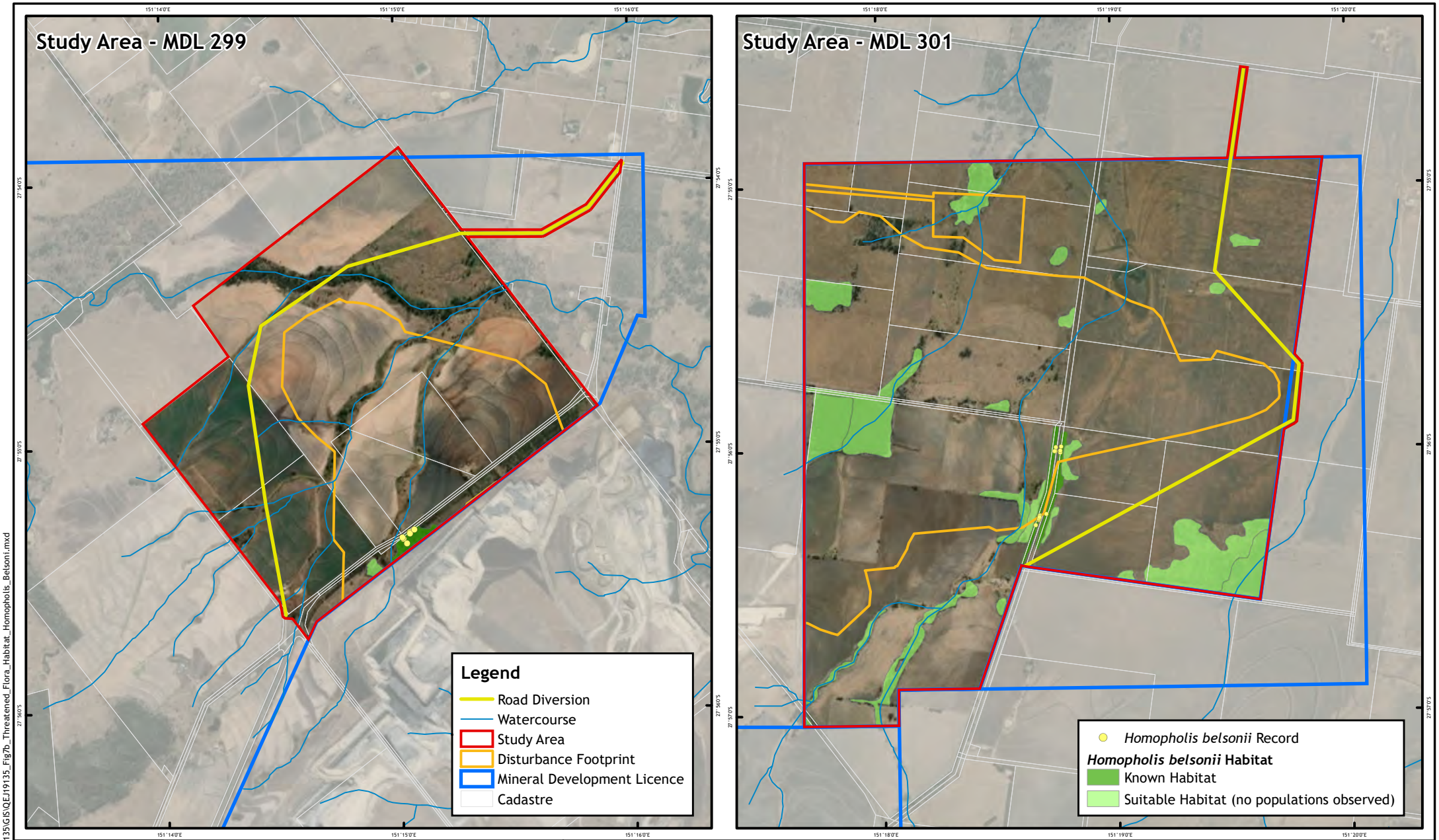
Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	05/04/2022
A	Issued for Review	PR	PW	28/05/2020

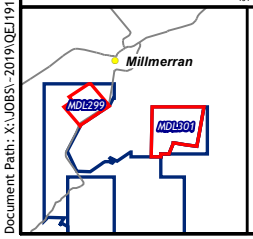
FIGURE 7A: THREATENED FLORA - DATABASE RECORDS

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 4	QEJ19135	B

Document Path: X:\JOBS\-2019\QEJ19135\GIS\QEJ19135_Fig7a_Threatened_Flora_Habitat_Records.mxd





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Metres

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
Aerial Imagery: © ESRI 2021
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Watercourse: © Geoscience Australia 2018
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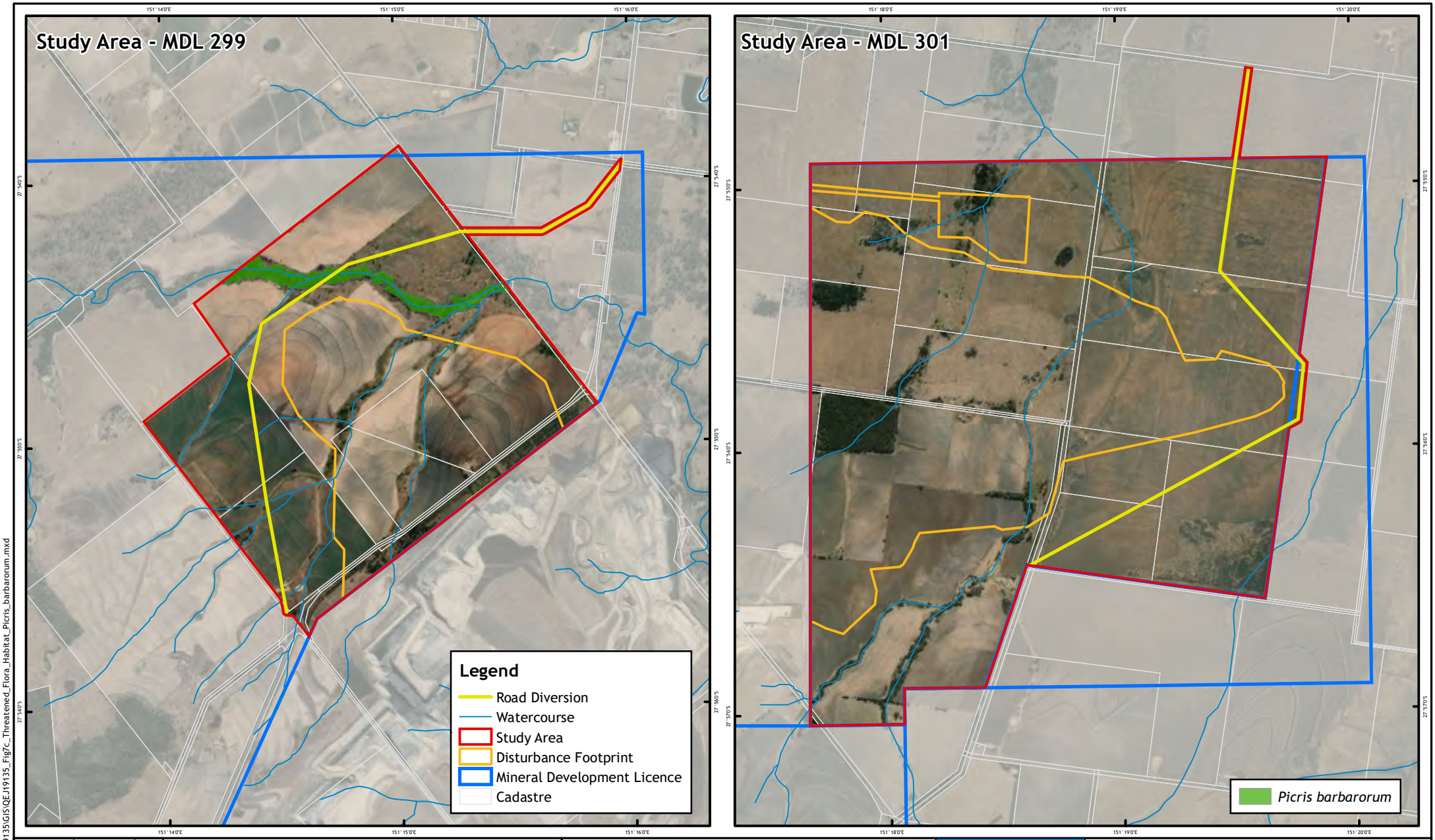
Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	04/04/2022
A	Issued for Review	PR	CO	28/05/2020

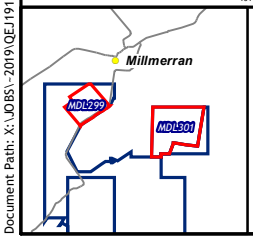
FIGURE 7B: THREATENED FLORA HABITAT - *Homopholis belsonii*

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
2 of 4	QEJ19135	B

Document Path: X:\JOBS\-2019\QEJ19135\GIS\QEJ19135_Fig7b_Threatened_Flora_Habitat_Homopholis_Belsoni.mxd





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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
Aerial Imagery: © ESRI 2021
Cadastre: © DoR 2021
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MDL: © DoR 2021

Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	05/04/2022
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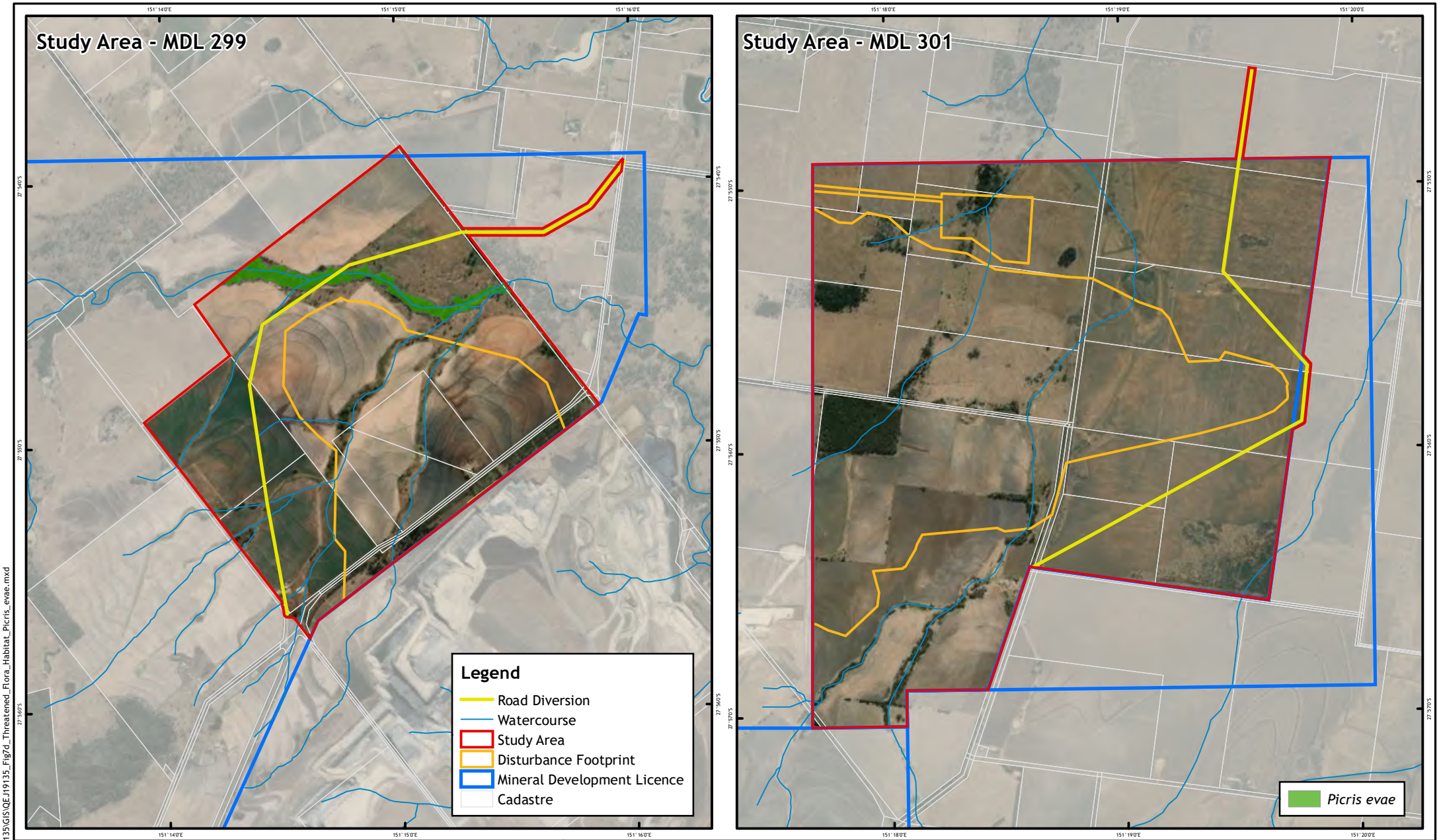
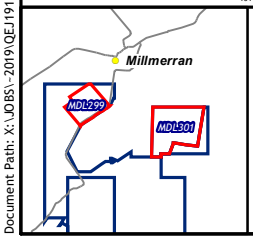
FIGURE 7C: THREATENED FLORA HABITAT - *Picris barbarorum*

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
3 of 4	QEJ19135	B

Document Path: X:\JOBS\~2019\QEJ19135\GIS\QEJ19135_Fig7c_Threatened_Flora_Habitat_Picris_barbarorum.mxd





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Metres

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
Aerial Imagery: © ESRI 2021
Cadastre: © DoR 2021
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Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	05/04/2022
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FIGURE 7C: THREATENED FLORA HABITAT - *Picris evae*

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
4 of 4	QEJ19135	B

Document Path: X:\JOBS\~2019\QEJ19135\GIS\QEJ19135_Fig7d_Threatened_Flora_Habitat_Picris_evae.mxd

4.1.6 Introduced/non-native flora

Three weed species listed as Weeds of National Environmental Significance (WONS) and/or under the Queensland *Biosecurity Act 2014*, were recorded within the Study Area (Table 8). These species are also identified under the *Toowoomba Region Biosecurity Plan for Invasive Plants and Animals* (Toowoomba Regional Council, 2020) (Table 8). All three species were observed as scattered individuals across the Study Area.

Other environmental weed species observed during the field survey include *Eragrostis curvula** (African lovegrass), *Vachellia farnesiana* (mimosa bush) and *Xanthium occidentale** (Noogoora burr).

Table 8: Non-native flora species recorded within the Study Area

Scientific name	Common name	WONS	Biosecurity Act category
*Harrisia martinii**	harrisia cactus	-	Category 3
*Opuntia stricta**	common prickly pear	WONS	Category 3
*Opuntia tomentosa**	velvety tree pear	WONS	Category 3

4.2 Fauna

4.2.1 Fauna diversity

Fauna observations were recorded throughout the field assessment and included species identified using motion detection cameras. Species observed during the field survey are provided in Appendix B.2. In total, 34 native fauna species were recorded with all listed as least concern under the NC Act.

4.2.2 Fauna habitat

The Study Area can be delineated into seven broad habitat types. The description of each fauna type is presented in Section 4.2.2.1 to Section 4.2.2.9, with habitat type distribution across the Study Area presented in Figure 8 and a summary of their associated REs provided in Table 9.

Table 9: Broad fauna habitat and associated REs

Broad fauna habitat type	Associated REs	Extent within Study Area (ha)
Habitat 1 – Riparian Eucalypt open-forest	Remnant 11.3.4, 11.3.25	18.82
Habitat 2a – *Casuarina cristata* open-forest	Remnant 11.4.3	23.40
Habitat 2b – *Casuarina cristata* low open-forest	Non-remnant regrowth 11.4.3 and 11.9.5	49.63
Habitat 3a – Eucalypt open -forest	Remnant 11.3.17	8.78
Habitat 3b – Eucalypt low open-forest	Non-remnant regrowth 11.3.17 and 11.5.1	14.33
Habitat 4 – *Acacia harpophylla* low forest / disturbed open-forest	Non-remnant regrowth 11.4.3	15.92

Broad fauna habitat type	Associated REs	Extent within Study Area (ha)
Habitat 5 - *Eucalyptus argophloia* windbreaks	N/A	12.41
Habitat 6 - Improved pasture and cropping land	N/A	1,527.21
Habitat 7 – Farm dams	N/A	17.96

4.2.2.1 Habitat 1: Riparian Eucalypt open forest

This habitat occurs as a single patch associated with the watercourse located within MDL 299 portion of the Study Area. This habitat type contains a large abundance of koala (*Phascolarctos cinereus*) habitat trees (i.e. *Eucalypt* and *Corymbia* spp.), a moderate abundance of tree hollows (of all sizes) and course woody debris, and an understorey dominated by exotic grasses. The tree hollows and mature eucalypts provide suitable refuge and foraging habitat for arboreal mammals, as well hollow dependent birds and microbats. The structurally diverse understorey provides suitable habitat for numerous least concern reptiles and small mammals, while areas within this community where ephemeral water occurs also provides suitable habitat for numerous amphibian species. This habitat is also highest connectivity of all the habitat types and provides a movement for various taxa within and through the Study Area.

4.2.2.2 Habitat 2a: Casuarina cristata open forest

This habitat occurs as multiple small to moderate sized patches within the MDL 301 portion of the Study Area. The habitat contains a high abundance of *Casuarina cristata*, scattered mature eucalypts containing a low abundance of hollows, a low abundance of woody debris and a low to moderately diverse ground layer. The abundance of *Casuarina cristata* provides a foraging resource for the threatened glossy-black cockatoo (*Calyptorhynchus lathami lathami*). The fragmented nature of the patches limits the potential fauna suitability of this habitat for numerous species, though it is still likely to provide habitat for numerous least concern species.

4.2.2.3 Habitat 2b: Casuarina cristata low open forest

This habitat occurs as multiple small to moderate sized patches across both the MDL 299 and MDL 301 portions of the Study Area. The habitat primarily consists of non-remnant regrowth dominated by *Casuarina cristata*. The habitat has low structural complexity across all strata including low abundance of woody debris and ground cover. While this habitat provides a foraging resource for glossy-black cockatoo and other woodland bird species, the low structural diversity limits the suitability of the habitat for reptiles, amphibians and small mammals. Patches of this habitat are also fragmented lowering the ecological value.

4.2.2.4 Habitat 3a: Eucalypt open forest

This habitat occurs as a single moderate size patch within the south-east corner of the MDL 301 portion of the Study Area. The habitat contains an abundance of mature eucalypts, with low to moderate abundances of arboreal hollows. The presence of hollows provides potential suitable habitat for arboreal mammals, as well as hollow dependent birds and microbats. The abundance of eucalypt trees also provides foraging resources for numerous other woodland birds. The shrub and ground layers are moderately complex with moderate shrub cover, moderate abundance of woody debris and low ground cover, providing suitable habitat for numerous least concern reptiles and small mammals.

4.2.2.5 Habitat 3b: Eucalypt low open forest

This habitat occurs as two patches within the north-west corner of the MDL 301 portion of the Study Area. This habitat was dominated by non-remnant regrowth *Casuarina cristata* and *Eucalyptus populnea*. The habitat has low structural complexity with a low shrub cover, low abundance of woody debris and low ground cover. The low structural complexity and fragmented nature of this habitat limits the fauna values provided, specifically reducing the likelihood of use by koala. The habitat primarily provides habitat for least concern woodland birds, reptiles and macropods. Small areas of ephemeral water may also provide suitable habitat for least concern amphibian species.

4.2.2.6 Habitat 4: Acacia harpophylla low forest/open forest

This habitat occurs as a both small, fragmented patches and narrow linear patches associated with drainage lines, within the MDL 301 portion of the Study Area. The habitat consists of both non-remnant regrowth and disturbed mature vegetation dominated by *Acacia harpophylla*. The habitat is structurally complex containing a dense low tree layer, a high abundance of woody debris, as well as a moderate abundance of soil cracks. The canopy and shrub species provide suitable foraging and nesting resources for numerous woodland bird species, while the complex ground layer provides suitable habitat for numerous least concern reptiles and amphibians.

4.2.2.7 Habitat 5: Eucalyptus argophloia windbreaks

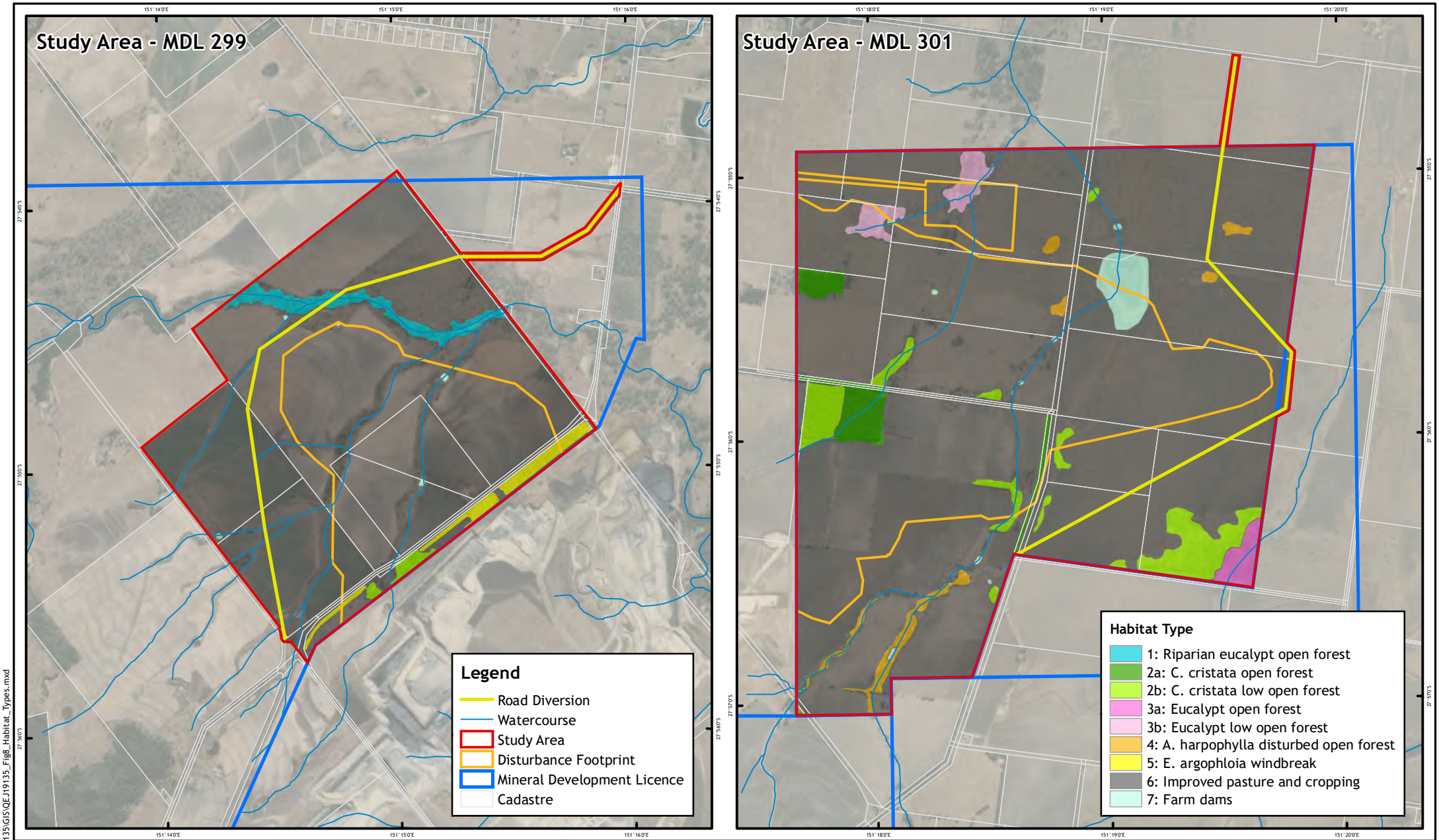
This habitat occurs as multiple linear patches along the south-east boundary of the MDL 299 portion of the Study Area. This habitat has low structural complexity due its uniform nature planted nature and absence of a shrub layer and woody debris. While the *Eucalyptus argophloia* provides a suitable foraging resource for numerous bird species, the low structural complexity and fragmented nature of the habitat reduces its suitability to generalist species.

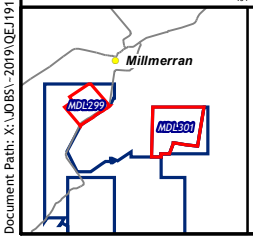
4.2.2.8 Habitat 6: Improved pasture and cropping land

This habitat occurs across the majority of the Study Area and provides limited habitat values. This community provides habitat only for generalist species due to lack of microhabitat features and exposure to ongoing disturbance.

4.2.2.9 Habitat 7: Farm dams

Numerous farm dams occur across the Study Area and provide a permanent supply of fresh water in an otherwise predominantly dry environment. As such, many fauna assemblages are found in proximity including amphibians, water birds, macropods and microbats.





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Metres

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
Aerial Imagery: © ESRI 2021
Cadastre: © DoR 2021
Watercourse: © Geoscience Australia 2018
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B	Issued for Review	PR	PW	05/04/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 8: GROUND-TRUTHED HABITAT TYPES

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

Document Path: X:\JOBS\~2019\QEJ19135\GIS\QEJ19135_Fig8_Habitat_Types.mxd

4.2.3 Threatened fauna

No threatened fauna species were recorded during the field survey. However, the likelihood of occurrence assessment determined five species are likely to occur based on previous records and the availability of suitable habitat within the Study Area:

- squatter pigeon (*Geophaps scripta scripta*) - Vulnerable (NC Act and EPBC Act)
- glossy black-cockatoo (*Calyptorhynchus lathami lathami*) – Vulnerable (NC Act)
- koala (*Phascolarctos cinereus*) – Endangered (EPBC Act) and Vulnerable (NC Act)
- white-throated needletail (*Hirundapus caudacutus*) – Vulnerable (NC Act and EPBC Act); and
- short-beaked echidna (*Tachyglossus aculeatus*) – Special Least Concern (non-migratory) (NC Act).

A further eight threatened species were considered possibly occurring within the Study Area (Appendix D.2). These species were not considered likely to occur due to lack of previous records within the desktop search extent and/or field assessment identifying no limited or degraded habitat within the Study Area.

4.2.3.1 Squatter pigeon (*Geophaps scripta scripta*)

Squatter pigeon occur across a wide range of habitats on the inland slope of the Great Dividing Range, extending from the Burdekin-Lynd Divide in central Queensland to Inverell in New South Wales (TSSC, 2015d). While the species was not observed during the field survey, the species has been previously recorded within ML 50151 as part of the initial field surveys for the CCM, located directly adjacent to the Study Area (SKM, 1999) (Figure 9A). The species has also been previously recorded within the surrounding area (Figure 9A), including:

- approx. 5 km north near the Millmerran township (recorded 1984 (DES), 2021e))
- 25 km south near Stonehenge Station (recorded 1997 (DES), 2021e)); and
- 32 km south near Mount Bodumba homestead (recorded 1997 (DES), 2021e)).

No records of the species have been identified within proximity to the Study Area within the last 20 years, suggesting the species, if still present, may occur at low densities within the local area.

Suitable breeding habitat for the species consists of remnant or regrowth open-forest to sparse, open woodland or low-woodland dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species on:

- well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e. land zone 5)
- lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e. land zone 7)
- consists of patchy, native, perennial tussock grasses, or a mix of perennial tussock grasses and low shrubs or forbs that does not cover more than 33%; and
- within 1 km of a suitable, permanent or seasonal waterbody (DAWE, 2021b; Squatter Pigeon Workshop, 2011).

Suitable foraging habitat comprises remnant or regrowth open-forests to open woodlands within 3 km of a suitable, permanent or seasonal waterbody (DAWE, 2021b; Squatter Pigeon Workshop, 2011).

The Study Area provides 6.31 ha of suitable breeding and foraging habitat within Habitat Type 3b comprising RE 11.5.1 (Figure 9B). Suitable foraging habitat within the Study Area comprised areas within Habitat Types 1, 3a and 3b, totalling 35.64 ha (Figure 9B).

4.2.3.2 Glossy black-cockatoo (*Calyptorhynchus lathami lathami*)

Glossy black-cockatoo subspecies has a patchy distribution, extending from Eungella in eastern Queensland to Mallacoota in Victoria (DPIE, 2019). The species prefer woodland areas dominated by *Allocasuarina* spp., or open sclerophyll forests and woodlands with a stratum of *Allocasuarina* spp. beneath *Eucalyptus, Corymbia* or *Angophora* (Glossy Black Conservancy, 2010). Glossy black-cockatoos have also been observed in mixed *Allocasuarina, Casuarina, Callitris* and *Acacia harpophylla* woodland assemblages (Glossy Black Conservancy, 2010).

While no individuals or evidence of glossy-black cockatoo were observed during the field survey, the species has been recorded at multiple locations within and surrounding Western Creek State Forest and Bulli State Forest, which are located 15 km west of the Study Area (Atlas of Living Australia, 2022) (Figure 9A). The Study Area supports suitable habitat in association with Habitat Types 1, 2a and 2b. While the dominance of *Casuarina cristata* within Habitat Types 2a and 2b provide suitable foraging resources for the species, potential suitable nesting habitat is restricted to Habitat Type 1 which contains large hollows for nesting. In total the Study Area contains 27.33 ha of potential breeding habitat and 73.09 ha of foraging habitat (Figure 9C).

4.2.3.3 Koala (*Phascolarctos cinereus*)

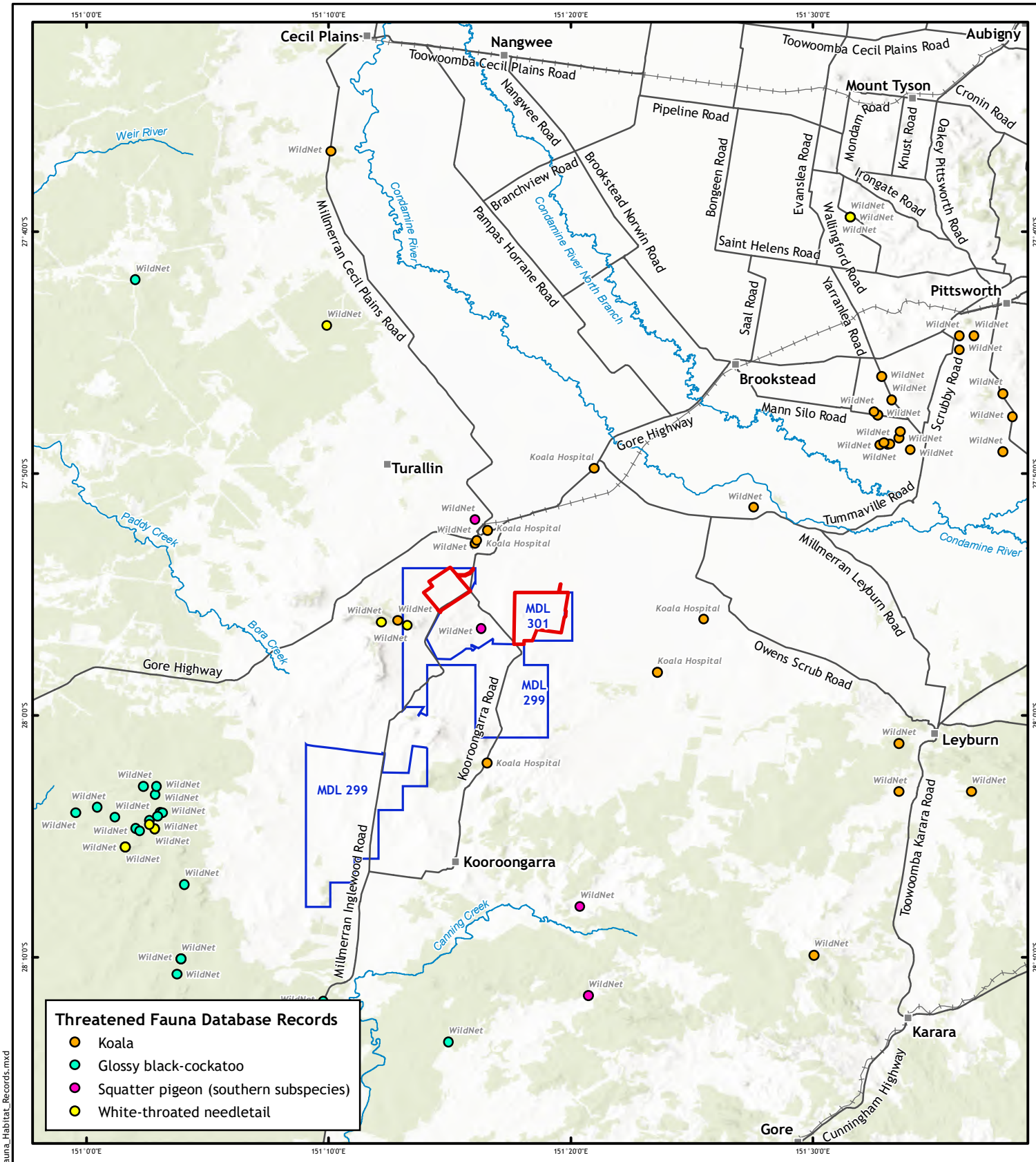
Koalas occur in a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by their diet; *Eucalyptus* species (preference varying regionally). Diet is thought to be a major determinant of habitat selection, with the use small remnants of original vegetation where suitable habitat is present (Department of Sustainability, Environment, Water, Population and Communities, 2012). While no individuals or evidence of koalas were observed during the field survey, the nearest record for the species is from Domville State Forest, located approximately 2.5 km south-west of the Study Area (Atlas of Living Australia, 2022) (Figure 9A). Additionally, Habitat 1 and Habitat 3a provides suitable habitat, with an abundance of preferred koala food trees (*Eucalypt, Corymbia* and *Angophora* spp.) and good connectivity to other areas of suitable habitat. In total 27.33 ha of suitable koala habitat occurs within the Study Area. While koala food trees are present within Habitat 3b, due to the isolated and fragmented nature these areas were considered unlikely to be utilised by the species.

4.2.3.4 White-throated needletail (*Hirundapus caudacutus*)

White-throated needletail occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest (Threatened Species Scientific Committee, 2019). When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (Threatened Species Scientific Committee, 2019). The Study Area provides suitable foraging habitat for the species aerially above the entirety of the Study Area. However, as the species does not breed within Australia, no suitable breeding habitat occurs.

4.2.3.5 Short-beaked echidna (*Tachyglossus aculeatus*)

Short-beaked echidna inhabits a range of habitats wherever ants and termites are found. The species usually seeks shelter under thick bushes, hollow logs and woody debris (Van Dyck & Strahan, 2008). The Study Area provides approximately 130.91 ha of suitable habitat in association with remnant and regrowth vegetation (Figure 9).



Legend

- Road
- Railway
- Study Area
- Mineral Development Licence

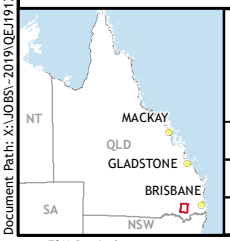
N

Scale 1:400,000 (A4)

0 5 10 15

Kilometres

Coordinate System: GCS GDA 1994



Notes:
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Road: © PSMA 2014
Watercourse: © DoR 2019
Wildnet: © DES 2021
Koala Hospital: © DES 2021

Rev	Description	Drawn	Approved	Date
B	Issued for Review	PR	PW	18/03/2022
A	Issued for Review	PR	PW	28/05/2020

FIGURE 9A: THREATENED FAUNA - DATABASE RECORDS

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 5	QEJ19135	B

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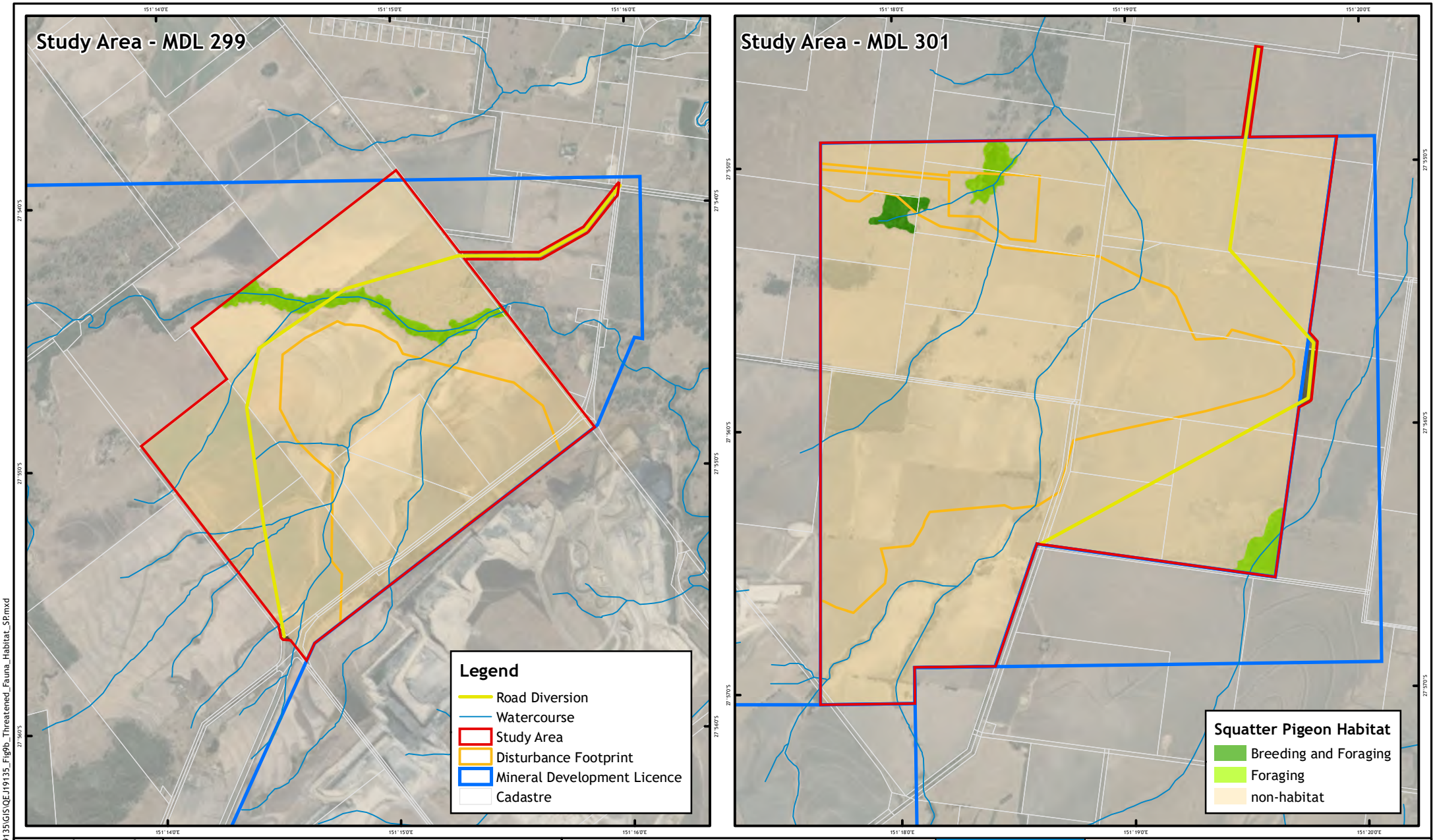

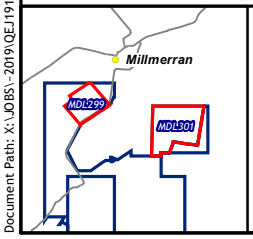

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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
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B	Issued for Review	PR	PW	18/03/2022
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FIGURE 9B: THREATENED FAUNA HABITAT - SQUATTER PIGEON

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
2 of 5	QEJ19135	B

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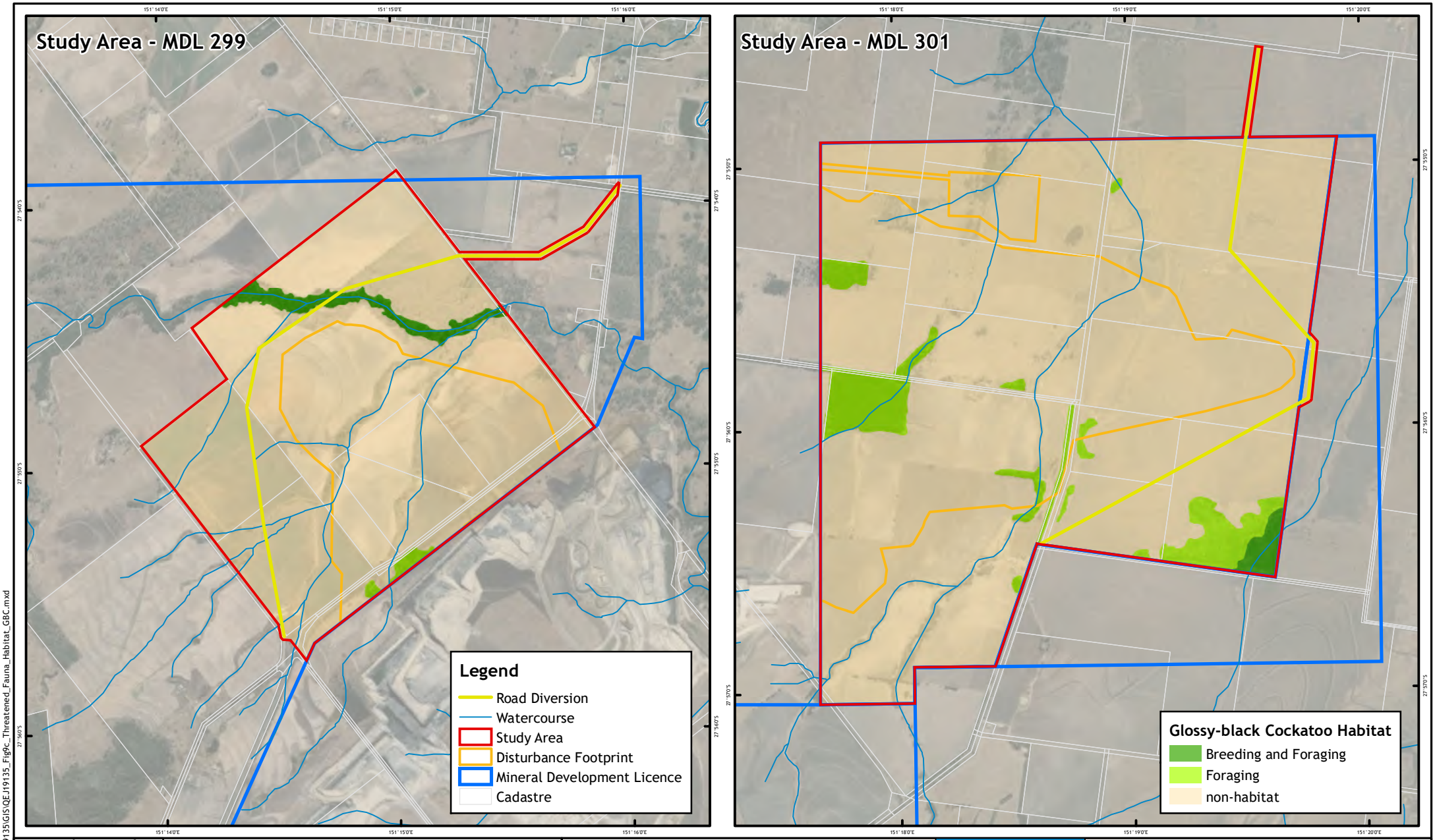

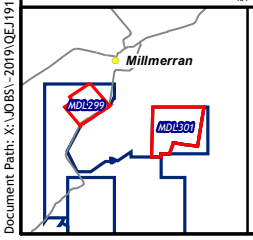

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Projection: Transverse Mercator

Notes:
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B	Issued for Review	PR	PW	05/04/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 9C: THREATENED FAUNA HABITAT - GLOSSY-BLACK COCKATOO

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Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
3 of 5	QEJ19135	B

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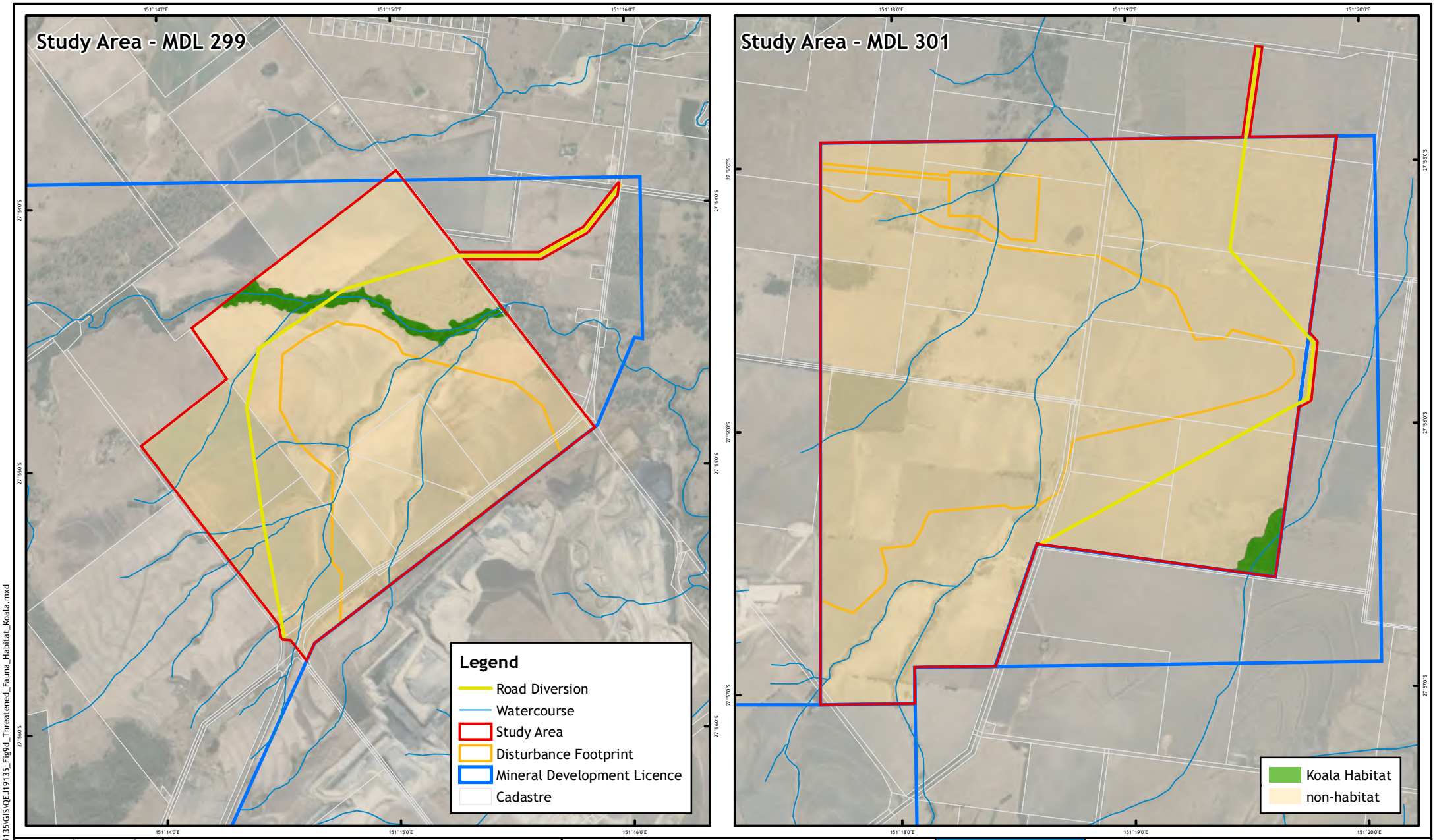

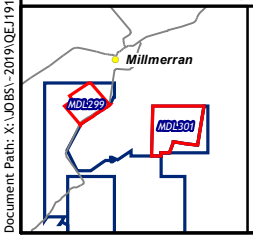

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Projection: Transverse Mercator

Notes:
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B	Issued for Review	PR	PW	05/04/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 9D: THREATENED FAUNA HABITAT - KOALA

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Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
4 of 5	QEJ19135	B

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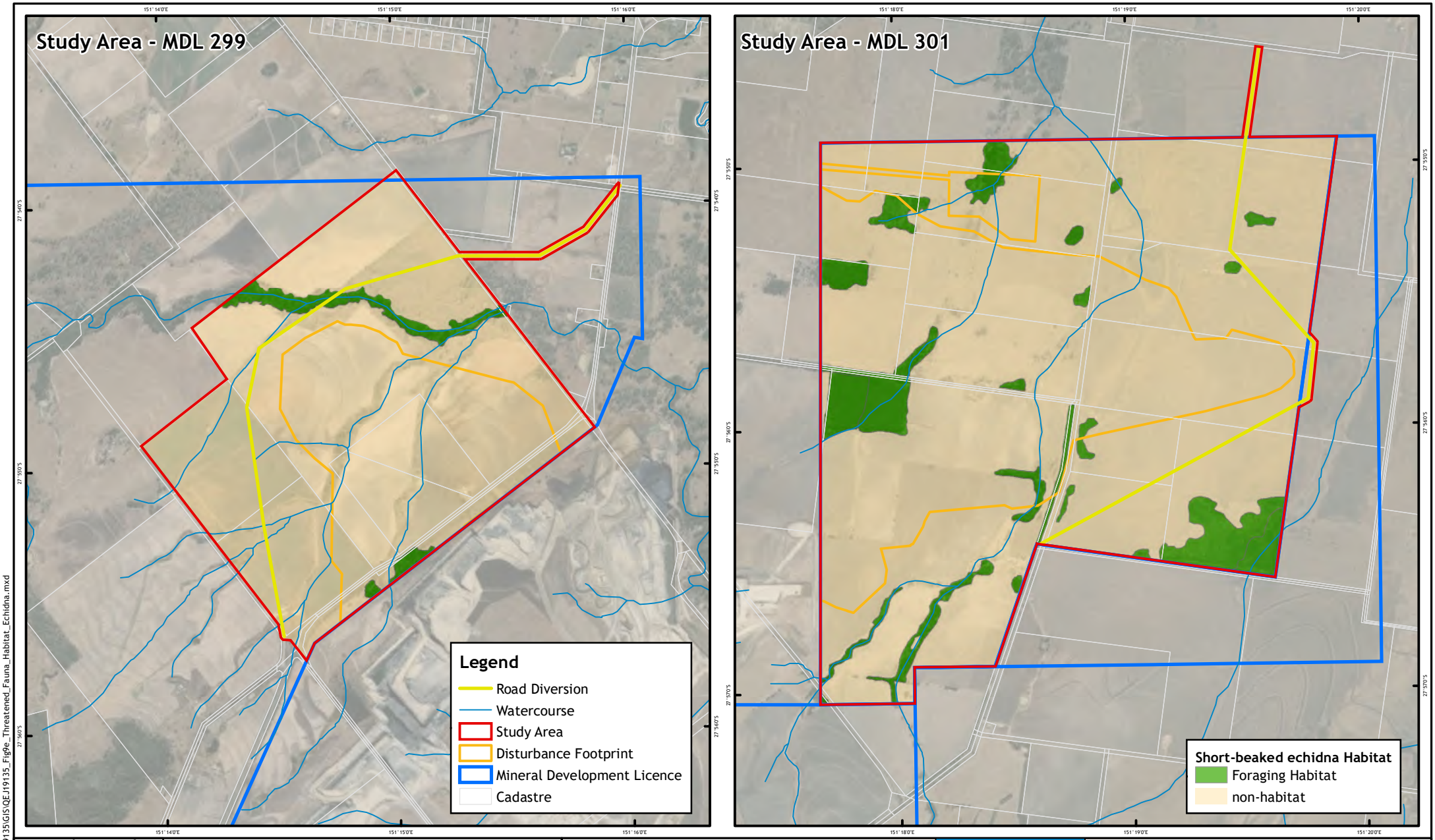

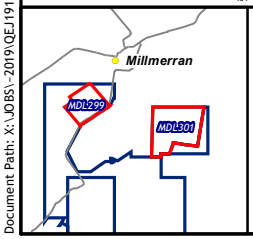

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Notes:
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B	Issued for Review	PR	PW	21/03/2022
A	Issued for Review	PR	CO	28/05/2020

FIGURE 9E: THREATENED FAUNA HABITAT - SHORT-BEAKED ECHIDNA

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Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
5 of 5	QEJ19135	B

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4.2.4 Migratory species

Desktop assessments identified 13 migratory species that were predicted to occur within 20 km of the Study Area (PMST) (refer to Appendix A). No migratory species were recorded during the field survey.

A project is required to seek approval under the EPBC Act for actions that are likely to have 'significant impact' on listed migratory species. 'Important habitat' for migratory species is a key factor for determining whether an action will result in a significant impact. Important habitat is defined in the significance criteria (DotE, 2013) as:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

The Study Area was located within a largely fragmented landscape containing disturbed vegetation with limited habitat values of critical importance to migratory species. As such, the Study Area is not considered to comprise important habitat, as defined above, for any migratory species listed under the EPBC Act.

4.2.5 Pest fauna

One threatened fauna species listed under the Queensland *Biosecurity Act 2014*, namely feral pig (*Sus scrofa**), was recorded during the field survey. The desktop assessment (DES, 2021d) identified three additional invasive pest species listed under the Biosecurity Act previously recorded in proximity to the Study Area are considered likely to occur. Pest fauna previously recorded include:

- European rabbit (*Oryctolagus cuniculus**)
- feral dog (*Canis lupus**); and
- European fox (*Vulpes vulpes**).

4.3 Ecological function

4.3.1 Watercourses and wetlands

Field assessment identified most watercourses and drainage lines present within the Study Area to be highly degraded through historical agricultural management practices. Degradation of watercourses includes historical clearing, extensive weed invasion and altered hydrology through construction of farm dams. The major watercourse located within the MDL 299 portion of the Study Area provides the highest ecological value of all the watercourses and drainage lines within the Study Area, containing remnant vegetation and multiple areas that are likely to hold water for an extended period following rain.

Wetland values within the Study Area were considered low, being restricted primarily to farm dams. As with the watercourses and drainage lines within the Study Area, farm dams were also highly degraded containing extensive weed invasion.

4.3.2 Corridors and connectivity

The Study Area is located within a highly disturbed and fragmented landscape. Vegetation associated with the major drainage line located in the MDL 299 portion of the Study Area provides the majority of the terrestrial connectivity values within the Study Area. Other small areas of retained vegetation associated with small ephemeral drainage lines may provide local connectivity values, while larger isolated patches have potential to provide stepping-stone connectivity values for larger fauna species, such as birds and macropod species.

4.3.3 Groundwater dependent ecosystems

PLACEHOLDER -Awaiting additional Groundwater Data

Areas of mapped High Potential Terrestrial GDEs are located within remnant vegetation identified by DoR as containing RE 11.3.2/11.3.25. These areas within MDL 299 were ground-truthed as containing REs 11.3.25 and 11.3.4 (refer to Figure 5). Low Potential Terrestrial GDEs are mapped within both MDL 299 and MDL 301 in association with DNRME mapped remnant vegetation on alluvials (land zone 3) and adjacent plains (land zones 4 and 5). These areas were ground-truthed as containing REs 11.3.17 and 11.4.3 (refer to Figure 5). One mapped low potential terrestrial GDE within MDL 299 did not contain any mature/remnant vegetation; however, was low-lying and likely to hold water following rain (i.e. unmapped palustrine wetland) (refer to Figure 5).

The determination of GDE communities can be supported by flora species composition and their relative dependence on groundwater for survival (Eamus *et al*. 2006). Particular flora species can be reliant on permanent access to groundwater and are considered to have 'obligate groundwater dependency' (Eamus et al., 2006). These species tend to occupy areas of the landscape that optimise access to groundwater, such on or below the lower banks of waterways. Obligate species may include *Eucalyptus camaldulensis* (River Red Gum), *Melaleuca leucadendra* and *M. fluviatilis* (O'Grady et al., 2006; Roberts & Marston, 2000). Species with an obligate dependence on groundwater may not require access to groundwater at all times; however, in order to survive long periods of drought access to groundwater is essential.

Other species have adapted to occasional access to groundwater, usually following floods when groundwater levels rise. These facultative groundwater dependent species can utilise groundwater when it is available; however, will survive without it (Eamus *et al*. 2006). Facultative groundwater dependent species are usually located on the upper banks and floodplains of waterways, such *Casuarina cunninghamiana* (River She-oak), *Eucalyptus populnea* (poplar box) and *E. coolabah* (Coolibah) (Eamus et al., 2006; Kath et al., 2014; Roberts & Marston, 2000).

Potential GDEs within and/or directly adjacent to the Study Area are likely to be confined to communities on land zone three, primarily RE 11.3.25 and 11.3.4, associated with un-named tributaries of Back Creek and floodplains (refer to Figure 9). The fringing sclerophyll community that comprises these REs comprises *E. camaldulensis*, a species known to have an obligate dependence on groundwater. As such, this community may be groundwater dependent.

Areas of RE 11.3.17 comprised woodlands dominated by *E. populnea* located on floodplains of tributaries of the Condamine River. These woodland canopy species, which may experience periodic inundation, do not necessarily rely on groundwater for continued survival. Consequently, while areas of RE 11.3.17 may be considered a GDE, the community's reliance may be facultative. While these communities may continue to persist during drought, general condition may deteriorate, particularly during prolonged periods without groundwater recharge.

5 MNES and MSES Summary

5.1 Summary of MNES

Four MNES were identified as known or likely to occur within Study Area, comprising Threatened Ecological Communities, terrestrial GDEs and suitable habitat for multiple threatened species. A summary of MNES identified within the Study Area is provided in Table 10. No World/National Heritage sites, Wetlands of International Importance, Great Barrier Reef Marine Parks or Commonwealth Marine Areas are located within proximity (20 km) to the Study Area.

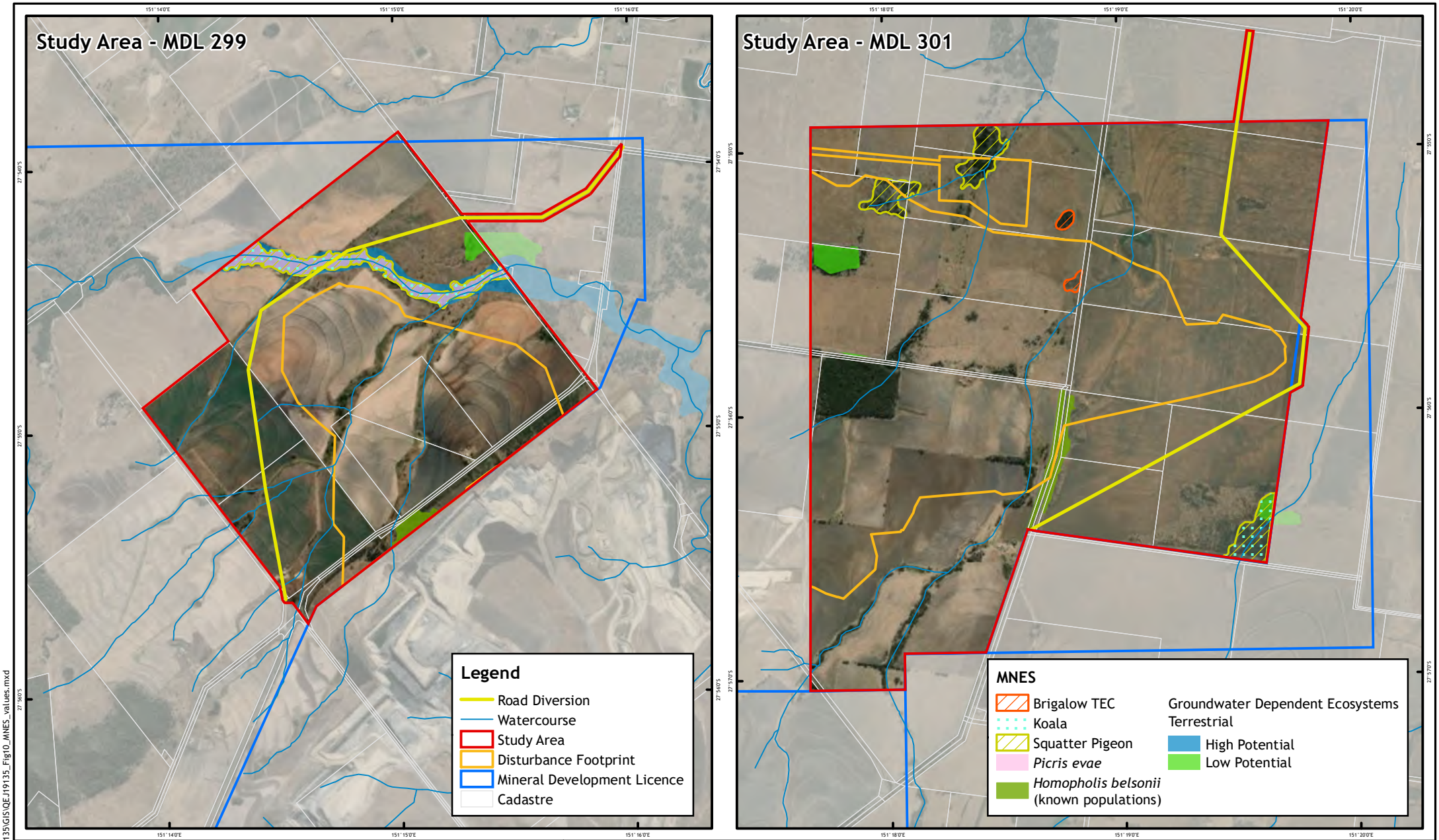
As discussed in Section 4.1.5.2, as individuals of *Eucalyptus argophloia* were within rehabilitation areas (planted rows), the population is located outside of the species natural distribution and not considered to be a 'wild' population. As such, the species has been excluded as a MNES.

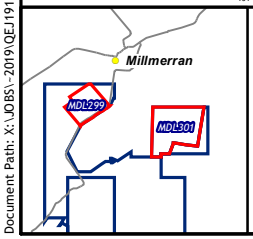
Similarly, as no important habitat for migratory species was identified within the Study Area, migratory species have not been included (refer to Section 4.2.4).

Table 10: MNES identified within the Study Area

MNES	EPBC Act status	Area within Study Area (ha)	Area within Disturbance footprint (ha)	Comment	Relevant section
Known to occur					
Brigalow dominant and co-dominant TEC	Endangered	2.27	1.08	Associated with certain patches of RE 11.4.3	Section 4.1.4.1
Homopholis belsonii **Belson's panic**	Endangered	10.05 (habitat containing known populations)	6.37 (habitat containing known populations)	Identified within patches of remnant RE 11.4.3 and non-remnant areas.	Section 4.1.5.1
Likely to occur					
Phascolarctos cinereus **koala**	Endangered	27.33	0.69	In association with REs 11.3.4 and 11.3.25.	Section 4.2.3.1
Picris evae **Hawkweed**	Vulnerable	18.83	0.69	In association with REs 11.3.4 and 11.3.25.	Section 4.1.5.4
Geophaps scripta scripta (southern subspecies) **squatter pigeon**	Vulnerable	6.31 breeding 35.64 foraging	4.63 breeding 4.38 foraging	In association with REs 11.3.4 and 11.3.25, 11.5.1 and 11.3.17.	Section 4.2.3.1

MNES	EPBC Act status	Area within Study Area (ha)	Area within Disturbance footprint (ha)	Comment	Relevant section
Hirundapus caudacutus **white-throated needle-tail**	Vulnerable	N/A (aerial species)	N/A (aerial species)	Airspace above the Study Area	Section 4.2.3.4
High Potential Terrestrial GDEs	N/A	28.51	0	Associated with REs 11.3.4 and 11.3.25	
Low Potential Terrestrial GDEs	N/A	32.83	5.59	Associated with REs 11.3.17 and 11.4.3	





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Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

Notes:
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B	Issued for Review	PR	PW	05/04/2022
A	Issued for Review	PR	PW	20/09/2021

FIGURE 10: MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE (MNES)

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 1	QEJ19135	B

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5.2 Summary of MSES

Assessment of MSES relevant to the Project identified a total of three MSES within the Study Area. The following environmental matters identified within the Study Area qualify as MSES:

- regulated vegetation
- connectivity; and
- protected wildlife habitat.

No MSES protected areas were identified within the Study Area.

5.2.1 Regulated vegetation

MSES Regulated Vegetation includes prescribed regional ecosystems (remnant), as defined under the *Environmental Offsets Regulation 2014* (EO Regulation). Non-remnant regrowth or regrowth vegetation is not applicable to this MSES. MSES Regulated Vegetation includes prescribed REs :

- that are 'endangered' REs
- that are 'of concern' REs
- that intersect with an area shown as a wetland on the vegetation management wetlands map (Wetland REs)
- that is an area of essential habitat on the essential habitat map for an animal that is critically endangered wildlife, endangered wildlife or vulnerable wildlife or a plant that is critically endangered wildlife, endangered wildlife or vulnerable wildlife
- for a prescribed activity mentioned in Schedule 1, Item 7(e), if the ecosystem is an area of essential habitat on the essential habitat map for an animal that is near threatened wildlife or a plant that is near threatened wildlife; or
- to the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature. In accordance with the *Queensland Environmental Offset Policy* (DES, 2021b), distances from the defining bank of the watercourse Stream order (SO) (non-coastal Bioregion) comprised:
  - 25 m for SO 1 and 2
  - 50 m for SO 3 and 4; and
  - 100 m for SO 5 or greater.

A summary of MSES Regulated Vegetation ground-truthed within the Study Area is provided within Table 11 and depicted in Figure 11A. MSES Regulated Vegetation within the Study Area comprised:

- one Endangered RE (RE 11.4.3)
- two Of Concern REs (RE 11.3.4 and 11.3.17)
- four REs within the defined distance of a mapped watercourse; and
- Essential habitat for one threatened fauna species (squatter pigeon).

Table 11: MSES Regulated Vegetation

MSES Regulated Vegetation	Broad Vegetation Group (BVG1M)	Structure category	Extent within Study Area (ha)	Extent within Disturbance footprint (ha)
Endangered and Of Concern REs (VM Act class)				
RE 11.3.4	16c	Sparse	8.21	0.69
RE 11.3.17	25a	Sparse	2.10	0
RE 11.4.3	25a	Mid-dense	23.40	22.44
Remnant REs within the defined distance of a mapped watercourse[2]				
RE 11.3.4	16c	Sparse	8.21	0.67
RE 11.3.17	25a	Sparse	2.10	0
RE 11.3.25	16a	Sparse	8.84	<0.01 (0.004)
RE 11.4.3	25a	Mid-dense	2.97	2.97
Essential Habitat				
Squatter pigeon (*Geophaps scripta scripta*)	-	-	7.91	0

[2] A 5 m buffer to the watercourse centreline was applied to determine watercourse banks.

5.2.2 Connectivity areas

Connectivity areas are defined under the EO Regulation as prescribed REs that contain remnant vegetation and an area of land that is required for ecosystem functioning. Within the Study Area 51.47 ha of vegetation (remnant RE) is considered to comprise MSES Connectivity areas.

5.2.3 Protected wildlife habitat

Under the EO Regulation, MSES protected wildlife habitat is defined as:

- a high risk area on the flora survey trigger map that contains plants that are critically endangered wildlife, endangered wildlife or vulnerable wildlife
- an area that contains plants that are critically endangered wildlife, endangered wildlife or vulnerable wildlife
- a mapped koala habitat area; and
- habitat for an animal that is critically endangered wildlife, endangered wildlife or vulnerable wildlife or a special least concern animal (non-migratory).

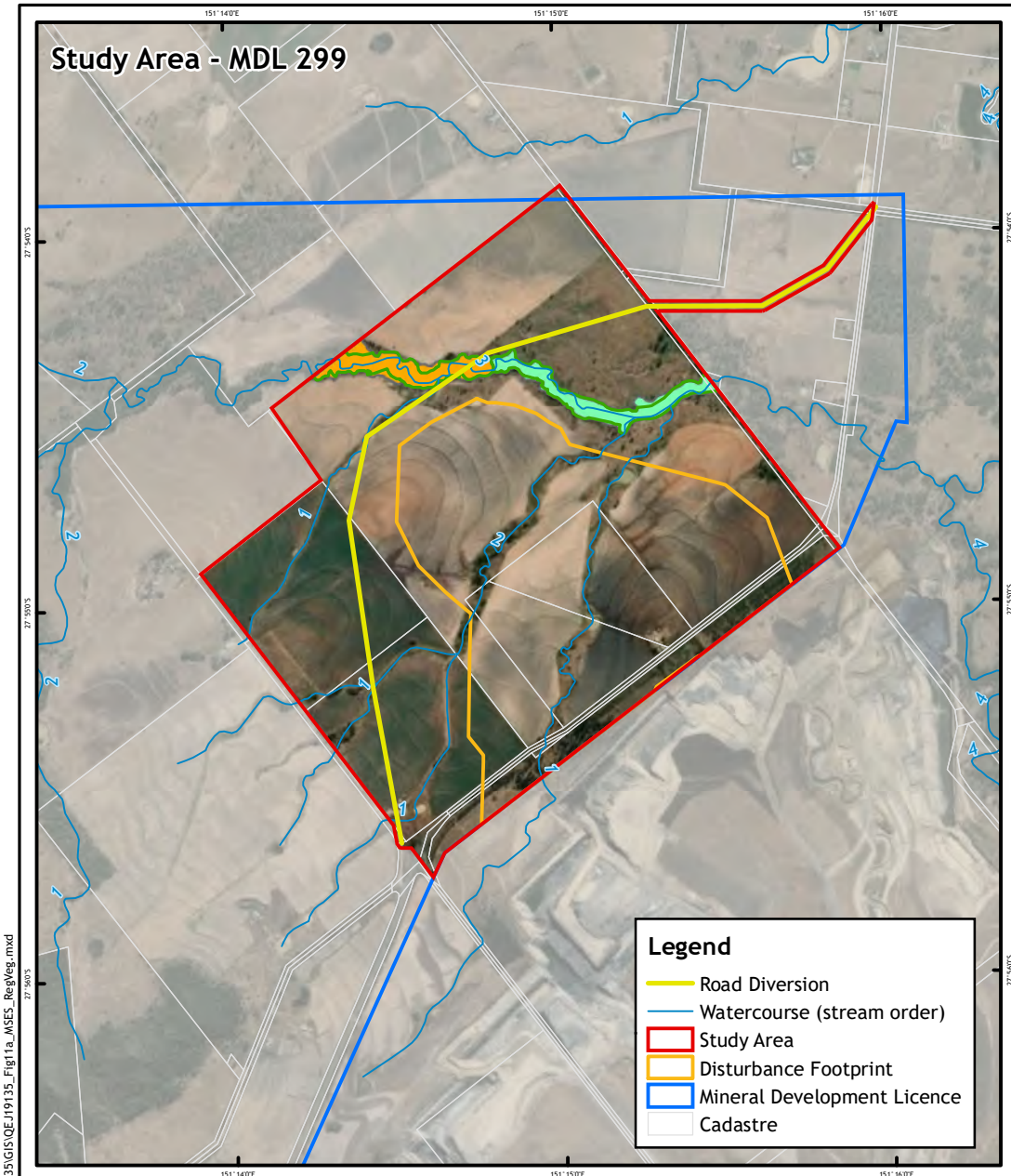
A summary of MSES Protected Wildlife Habitat for threatened flora (Figure 11B) and fauna (Figure 11C) species considered known or likely to occur within the Study Area is provided in Table 12.

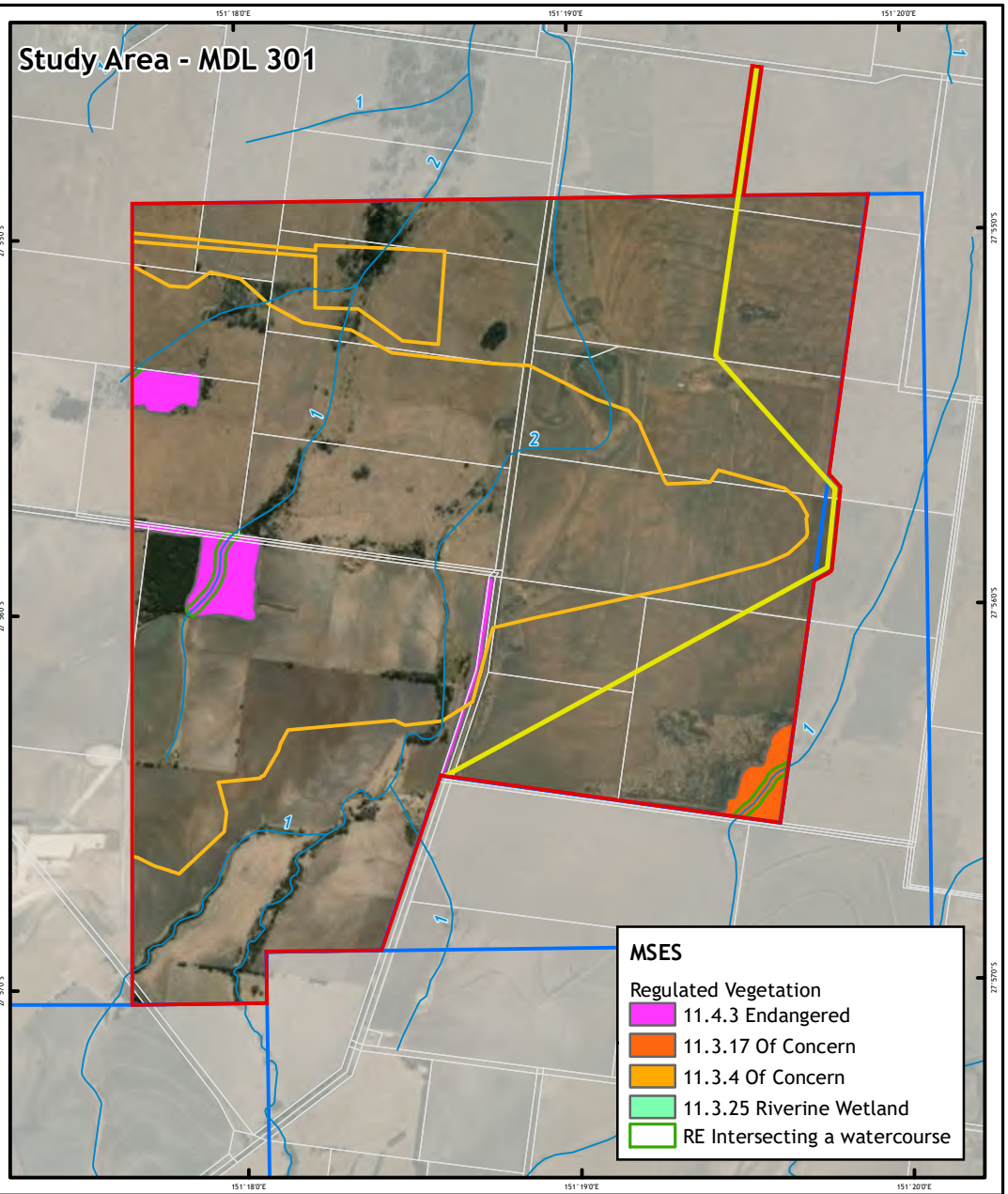
Table 12: MSES Protected Wildlife Habitat

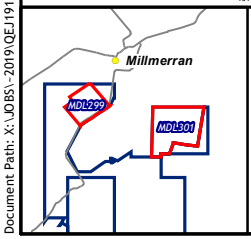
Species	NC Act status	Area of habitat within Study Area(ha)	Area of habitat within Disturbance footprint (ha)	Relevant section
Known to occur				
Homopholis belsonii **Belson's panic**	Endangered	10.05 (known habitat)	6.37 (known habitat)	Section 4.1.5.1
Likely to occur				
Picris barbarorum	Vulnerable	18.83	0.69	Section 4.1.5.3
Picris evae **hawkweed**	Vulnerable	18.83	0.69	Section 4.1.5.4
Geophaps scripta scripta (southern subspecies) **squatter pigeon**	Vulnerable	6.31 breeding 35.64 foraging	4.63 breeding 4.38 foraging	Section 4.2.3.1
Calyptorhynchus lathami lathami **glossy-black cockatoo**	Vulnerable	27.33 breeding 73.04 foraging	0.69 breeding 45.31 foraging	Section 4.2.3.2
Phascolarctos cinereus **koala**	Vulnerable	27.33 breeding	0.69	Section 4.2.3.3
Hirundapus caudacutus **white-throated needletail**	Vulnerable	N/A (aerial species)	N/A (aerial species)	Section 4.2.3.4
Tachyglossus aculeatus **short-beaked echidna**	Special Least Concern (non-migratory)	130.91 foraging	55.41 foraging	Section 4.2.3.5

5.2.4 Protected areas

MSES Protected areas encompasses those areas declared under the NC Act, including National Parks, regional parks and conservation areas. No Protected areas are located within or in proximity (20 km radius) to the Study Area.







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B	Issued for Review	PR	PW	21/03/2022
A	Issued for Review	PR	PW	20/09/2021

FIGURE 11A: MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE (MSES)

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Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
1 of 3	QEJ19135	B

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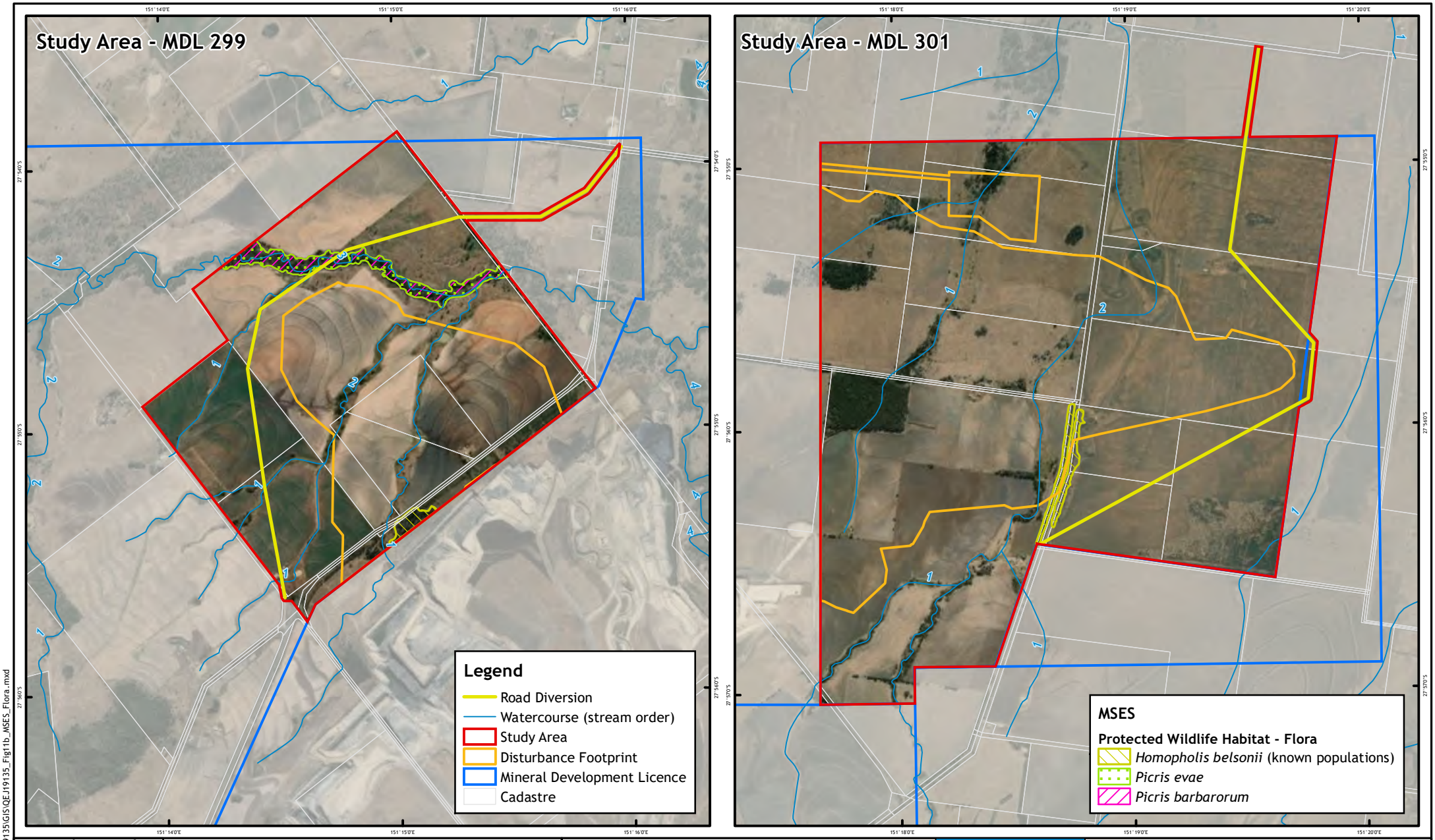

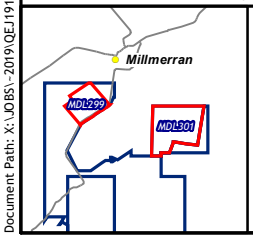

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B	Issued for Review	PR	PW	05/04/2022
A	Issued for Review	PR	PW	20/09/2021

FIGURE 11B: MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE (MSES)

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
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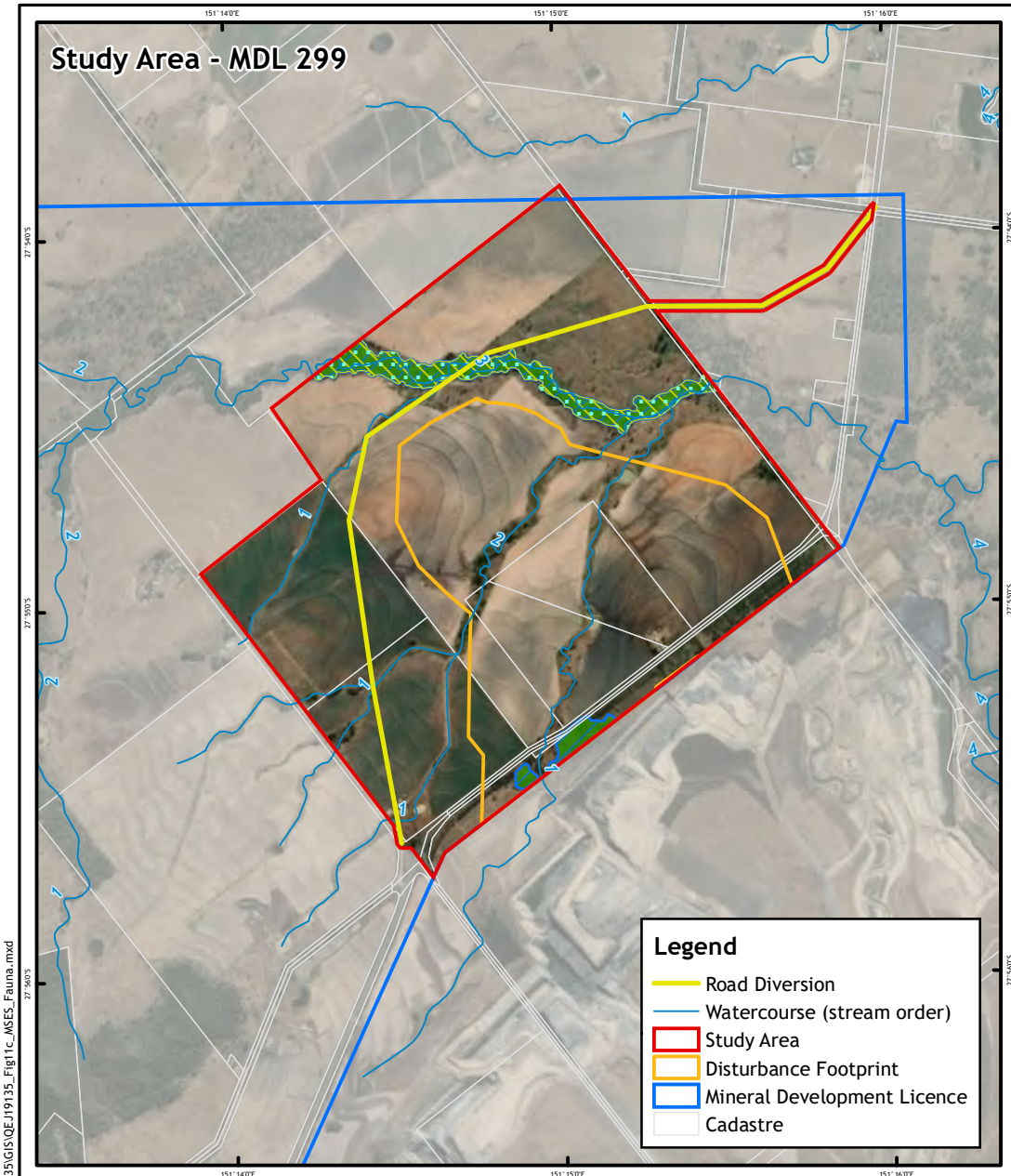

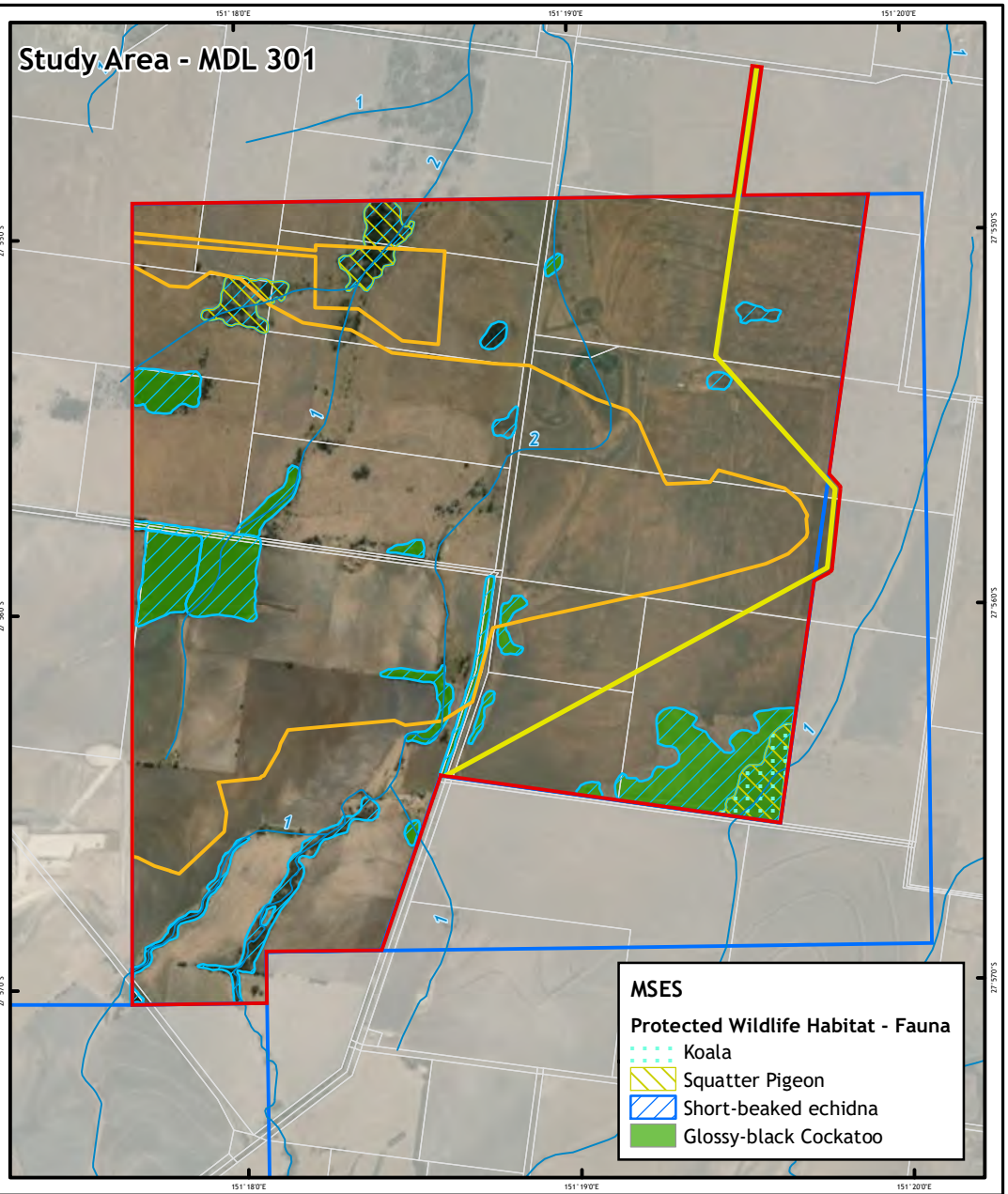

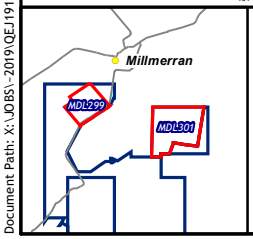

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B	Issued for Review	PR	PW	05/04/2022
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FIGURE 11C: MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE (MSES)

Millmerran Power Partners
Commodore Coal Mine Expansion Ecological Assessment

Map Number	Job Number	Rev
3 of 3	QEJ19135	B

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6 Potential impacts and mitigation measures

6.1 Summary of impacts

The Disturbance footprint within the Study Area spans approximately 797.79 ha, with the majority (774.66 ha, 97%) located within area that have been historically cleared for agricultural purposes (non-remnant vegetation incl. regrowth). A total of 23.13 ha of remnant vegetation is likely to be directly impacted by the Project.

Potential impacts identified as resulting from the Project comprise:

- removal of native vegetation
- fauna habitat removal and degradation, including edge effects, fauna injury and mortality
- introduction and spread of weeds and pests
- modification of hydrology; and
- proliferation of noise, light and dust.

The following sections provide further detail on each potential impacts resulting from the Project and associated controls and mitigation measures to avoid and reduce direct and indirect effects on environmental values. Significant residual impact assessments for MNES and MSES known of likely to occur within the Disturbance footprint are detailed in Section 7.

6.2 Summary of avoidance and mitigation measures

6.2.1 Impact avoidance

In order to avoid potential direct impacts to terrestrial ecological values, the following measures have been incorporated into the Project design:

- minimisation of the mine expansion footprint by optimising the backfilling of the open cut areas
- where possible, avoidance of riparian and remnant vegetation containing threatened species habitat; and
- minimisation of watercourse crossings.

6.2.2 Removal of native vegetation

6.2.2.1 Impacts

The Project will result in the disturbance to 55.42 ha of native vegetation comprising remnant and non-remnant regrowth vegetation. A total of 23.13 ha of ground-truthed remnant vegetation, comprising primarily REs 11.4.3 and 11.3.4, will require removal as a result of the Project. A summary of remnant ground-truthed REs located within the Disturbance footprint is provided Table 13.

An additional 32.27 ha on non-remnant regrowth vegetation consistent with four REs will also be directly impacted as a result of the Project. This includes 1.08 ha of Brigalow TEC associated with non-remnant regrowth containing RE 11.4.3.

Table 13: Summary of remnant vegetation removal

RE	VM Act class	Biodiversity status	Extent within Study Area (ha)	Extent within Disturbance footprint (ha)	Remnant extent (ha) within Inglewood sandstones Subregion†
Remnant					
11.3.4	OC	OC	9.31	0.69	3,665
11.3.25	LC	OC	9.52	<0.01	15,346
11.4.3	E	E	23.40	22.44	2,159
Non-remnant regrowth					
11.3.17	OC	E	8.02	3.69	NA
11.4.3	E	E	61.40	19.81	NA
11.5.1	LC	NC	6.31	4.63	NA
11.9.5	E	E	4.16	4.16	NA
			Total	**55.42**	-

† According to DES mapped 2019 remnant vegetation cover by Biogeographical subregion (DES, 2021).

6.2.2.2 Mitigation measures

While the Project would result in unavoidable impacts on native vegetation, a range of vegetation clearing measures would need to be implemented over both the construction and operational phases of the Project. These include the following:

- Vegetation clearing extents will be kept to the minimum area necessary for construction. Areas that must not be cleared or damaged would also be clearly identified on construction plans.
- Placement of temporary infrastructure is to be located outside of remnant vegetation, with areas previously cleared/degraded (non-remnant) to be prioritised.
- Boundaries of areas to be cleared, and those not to be cleared are to be clearly defined during clearing activities. Where necessary, signage, flagging and/or barricade fencing may be used to demarcate areas not to be cleared and clearly communicated to all necessary construction personnel.
- Implementation of weed hygiene protocols (e.g. wash-down, weed hygiene certification) for all vehicles, equipment and materials brought onto site.
- Development of a Rehabilitation Management Plan. All areas containing temporary infrastructure and cleared areas which are no longer required are to be rehabilitated as soon as practicable.
- Topsoil within areas for temporary infrastructure should be stockpiled for redistribution during rehabilitation activities.

6.2.3 Fauna habitat removal and degradation

6.2.3.1 Impacts

6.2.3.1.1 Habitat removal

Habitat within the Study Area was categorised into seven broad habitat types (refer to Section 4.2.2) based on vegetation type and structure. The total area of each habitat type located within the Study are and Disturbance footprint is summarised in Table 14.

The majority (approximately 90.8%, 714.99 ha) of the Disturbance footprint is located within improved pasture and cropping land containing limited fauna habitat values for common and threatened native species. The remaining 72.58 ha (9.2%) comprises regrowth, remnant vegetation communities and farm dams (Habitats 1 to 4 and 7) that were found to support values of fauna species, including breeding and foraging habitat. Impacts to aquatic fauna values are further described in the Aquatic Ecology Assessment (E2M, 2022) prepared for the Project.

Table 14: Fauna habitat impacted by the Project

Habitat type	Description	Extent within Study Area (ha)	Extent within Disturbance footprint (ha)
Habitat 1	Riparian Eucalypt open-forest	18.82	0.69
Habitat 2a	*Casuarina cristata* open-forest	23.40	22.44
Habitat 2b	*Casuarina cristata* low open-forest	49.63	22.88
Habitat 3a	Eucalypt open-forest	8.78	0
Habitat 3b	Eucalypt low open-forest	14.33	8.33
Habitat 4	*Acacia harpophylla* low forest / disturbed open-forest	15.92	1.08
Habitat 5	*Eucalyptus argophloia* windbreaks	12.41	8.89
Habitat 6	Improved pasture and cropping land	1,527.21	714.99
Habitat 7	Farm dams	17.96	8.27
	Total	1,688.49	787.57

6.2.3.1.2 Habitat degradation and edge effects

Construction activities and vegetation removal have the potential to result in indirect degradation of adjacent (edge effects) and downstream habitats. Edge effects occur where vegetation communities are subject to distinct ecotones, particularly those associated with vegetation clearing and active mine operations, resulting in changes in vegetation/habitat composition, and quality (Laurance & Yensen, 1991). Indirect influences associate with edge effects can include exposure to weeds, noise, light, dust, reduced foraging resources and species assemblages (Laurance & Yensen, 1991). Prolonged exposure to edge effects can degrade or reduce the quality of habitat.

As habitat within the Study Area and surrounds is largely fragmented from agricultural development and the existing mine area, edge effects are likely to be present within remnant vegetation to varying

intensities. As such, the Project is considered unlikely to increase the potential of edge effects within the greater landscape.

6.2.3.1.3 Habitat connectivity and fragmentation

Habitat connectivity within the Study Area is limited, attributed largely to the disturbance and fragmentation associated with historical and ongoing agricultural development and land use practices. Landscape connectivity values associated with remnant and regrowth riparian corridors, particularly within MDL 299, have been avoided by the Project. Patches of remnant and regrowth *Acacia* and *Casuarina* within the Study Area and surrounds are largely isolated with varying levels of disturbance (weed encroachment, livestock grazing etc.) and may provide stepping-stone connectivity values for local fauna assemblages.

The Project has largely avoided remaining vegetation corridors containing connectivity values identified within the Study Area. Where possible, temporary infrastructure areas should be rehabilitated when no longer required.

6.2.3.1.4 Fauna mortality and injury

Construction and operational activities have the potential to lead to fauna injury or mortality. Vehicles and machinery can cause injury or mortality to fauna if individuals are struck. Similarly, fauna that are unable to disperse away from areas under active clearing are also particularly susceptible to injury or mortality. Other causes of injury or mortality include animals becoming trapped in excavations/ trenches.

6.2.3.1.5 Animal breeding places

In accordance with the *Nature Conservation (Animals) Regulation 2020*, an 'animal breeding place' is defined as an '*animal breeding place of an animal, means a bower, burrow, cave, hollow, nest or other things that is commonly used by the animal to incubate or rear the animals' offspring*'. As such, animal breeding places may occur across the Study Area and Disturbance footprint, particularly within remnant and regrowth vegetation (refer to Figure 5) and are likely to be disturbed as a result of the Project. A high-risk Species Management Program, in accordance with the *Nature Conservation (Animals) Regulation 2020,* for approval by the DES prior to undertaking any activities that would disturb animal breeding places, including threatened fauna species known or likely to occur. Section 4.2.3 of this assessment describes the habitat features including breeding habitat for relevant threatened fauna species.

6.2.3.2 Mitigation measures

In order to mitigate unavoidable impacts on fauna habitat values associated with the Project, a range of vegetation clearing measures will be implemented over the course of the Project. Measures associated with the spread of environmental weeds, noise light and dust are discussed in sections 6.2.4 and 6.2.6 respectively. Mitigation measures include the following:

- Pre-clearance fauna surveys are be undertaken by suitably experienced and qualified persons to identify individual fauna at direct risk from clearing activities.
- A suitably experienced and qualified fauna spotter/catcher would be present during the clearing of to any structures that may serve as habitat or refugia for animals, particularly remnant and regrowth habitat areas.
- Prior to removal, all hollow-bearing trees approved for removal are to be thoroughly checked for fauna presence prior to felling. If presence is identified, it is recommended that the tree be left overnight to allow for self-dispersal.

- Management of fauna identified during clearing would include relocating individuals to adjacent habitat or treating injuries.
- In the event a koala is identified within areas to be cleared, the individual is to be left to vacate the area on its own accord.
- Select habitat features (e.g. hollow bearing trees, woody debris, logs and rocks) should be salvaged for re-use in rehabilitation areas or relocated into adjacent areas of habitat to be retained.
- Vegetation clearing should be carried out sequentially over the life of the Project to allow fauna species the opportunity to disperse away from clearing areas.
- Directional clearing towards retained vegetation would be undertaken where practical to enable the movement of fauna into retained vegetation.
- During construction works, work areas and excavations (trenches) are to be checked for fauna that may have become trapped.
- If trenches remain open after daily site works have been completed, fauna ramps would be put in place.
- Vehicles are to remain on designated access tracks and adhere to site rules relating to speed limits. Speed limits are to be clearly signposted to minimise potential fauna strike.
- Removal of roadkill should be undertaken to minimise the risk of attracting other fauna to the road corridor
- Contingencies and procedures for the treatment of injured fauna; and
- Where installation of fencing is required, considerations to facilitate movement of fauna around and/or through the fencing, except where fenced areas seek to protect fauna from threats such as active mine areas. Barbed wire should not be used on the top strand of wire fences unless necessary for security.

6.2.4 Introduction and spread of weeds and pests

6.2.4.1 Impacts

Introduced flora species disrupt ecosystems by outcompeting and replacing native species, resulting in altered ecosystem diversity and function. Proliferation and spread of environmental weeds and pests may occur with vegetation clearing, soil disturbance and increased movement of heavy machinery and vehicles. Three weed species listed as WoNS and/or restricted matters under the Biosecurity Act were recorded within the Study Area as scattered individuals. These species include:

- *Harrisia martinii*
- *Opuntia stricta; and*
- *Opuntia tomentosa.*

Weed seeds can be transported in contaminated landfill, seed and material on machinery, vehicles or personnel. Construction activities have the potential to spread or introduce weeds throughout adjacent environs, resulting in the reduction in vegetation/habitat quality and native species assemblages.

The Project may also result in an increase in the presence and abundance of feral animals through improper waste disposal and increased permanency of water sources (e.g. dams and troughs). These pests can result in adverse impacts to native fauna through increased competition of resources, predation and

habitat degradation. Environmental pests recorded during the field survey and desktop assessment included:

- European hare (*Lepus europaeus*)
- European rabbit (*Oryctolagus cuniculus*)
- house mouse (*Mus musculus*)
- pig (*Sus scrofa*); and
- wild dog (*Canis lupus*).

6.2.4.2 Mitigation measures

Management and control of environmental weeds and pests will be required during the construction and operational phases of the Project. Associated management measures will include:

- Weeds or soil removed as a result of construction activities are to be appropriately disposed of or stored separately to minimise potential spread and proliferation of weed species.
- Prior to vegetation clearing activities, a pre-clearance survey should be undertaken to identify and map infestations of biosecurity matter to minimise the spread during clearing works and operational phase; and
- Waste management measures, as detailed within the *Environmental Management Plan for the Commodore Mine* (4975-DM-SE-PLA2) and associated *Waste Management Procedure* (HSEP-263), to minimise occurrences of pest fauna.

The *Pest and Weed Management Plan for Commodore Mine* (8523-SE-PLA1012) is currently in place at the CCM and intends to be implemented for the Project. Associated mitigation measures within the plan include:

- All vehicles, equipment and materials (e.g. landfill, soil etc) brought to site are to be certified free of biosecurity matter and carry weed hygiene certification in accordance with the CCM Wash Down Procedure.
- Biannual rehabilitation monitoring to identify environmental weeds within rehabilitation areas
- Biosecurity monitoring to identify and assess the risk of weed and pest occurrences within the CCM. Target biosecurity species and associated weed and pest control are also detailed to reduce infestation/populations identified.

6.2.5 Modification of hydrology

6.2.5.1 Impacts

6.2.5.1.1 Surface water quality

Changes in the surface water quality and quantity may impact terrestrial ecosystems downstream of disturbance associated with the Project. Sedimentation and chemicals can enter downstream environments resulting from overland flow patterns (Evans, 2000). While no uncontrolled spills of mine-affected water from mine-affected water dam overflows are predicted, some overflow may occur when rainfall exceeds the design standard (e.g. flood events).

6.2.5.1.2 Groundwater drawdown

Changes to groundwater quality and quantity can have an indirect impact on ecosystems surrounding a development site, including ecosystems that are dependant or partially dependant on groundwater. The process of mining reduces water levels in the surrounding groundwater units. The extent of the zone affected is dependent on the properties of the aquifers/aquitards and is referred to as the zone of drawdown.

6.2.5.2 Mitigation measures

Mitigation measures to minimise potential impacts to hydrology and groundwater associated with the Project include:

- Erosion and sediment control monitoring in accordance with the *Commodore Coal Mine Site Water Management Plan* (4975-SE-PLA1007) to reduce the amount of sediment laden run-off entering downstream waterways. The following general principles should apply to the erosion and sediment controls:
  - minimise the surface disturbance areas
  - where possible, apply local temporary erosion control measures
  - intercept run-off from undisturbed areas and divert around surface disturbance areas, through the use of up-catchment diversions; and
  - where temporary measures are likely to be ineffective, direct surface water run-off from surface disturbance areas to sediment dams prior to release from the Project area.
- Active haul roads are to be regularly watered (or applied with dust suppressants) to minimise dust generation potential (as detailed within the *Dust Management Plan for Commodore Mine* (8523-SE-PLA1014)) .
- bunding and appropriate storage of fuels and other hazardous and flammable materials will be undertaken in accordance with AS1940:2004, and where practical, will be located away from any waterbodies.
- oil spill recovery equipment will be available when working adjacent to drainage channels with the ability to discharge off site. Spill kits will be located with construction crews conducting activities with the potential for significant spills.
- as soon as practical, disturbed areas will be rehabilitated to reduce the amount of exposed soils.
- Implement annual monitoring of groundwater quality and potential drawdown to identify trends and changes over time.

6.2.6 Proliferation of noise, light and dust

6.2.6.1 Impacts

Construction and operational activities can disrupt local fauna roosting, breeding and foraging activities as a result of increased exposure to artificial lighting, noise and vibration. Artificial lighting poses risks to fauna, as increased light allows predators to locate prey more easily. Additionally, noise and vibration can also lead to increased predation of some species, as it makes it harder for prey to detect approaching predators.

Excessive dust deposition on foliage can cause impacts to vegetation, including reducing photosynthetic processes, respiration, transpiration, health and growth rates. Potential dust impacts on vegetation are

concentrated near dust sources such as haul roads and areas with active mine pits and stockpile as a result of construction/operation activities and vehicle and heavy machinery.

As the landscape surrounding the Project is has been largely modified, it is considered unlikely that dust from the Project would cause significant degradation of surrounding native vegetation.

6.2.6.2 Mitigation measures

The *Dust Management Plan for Commodore Mine* (8523-SE-PLA1014) is currently in place at the CCM and intends to be implemented for the Project. Associated dust mitigation measures include:

- Dust suppression activities are to be carried out where required and managed in accordance with the limits and risk levels identified within the 8523-SE-PLA1014.
- Topsoil stockpiles are to be kept to a maximum height of 3 m and side slopes profiled to 3H:1V to decrease wind impact
- Active mining areas and haul roads are to be maintained in good condition to minimise emissions
- Blasting operations are to be monitored in relation to wind speed and direction to ensure that emissions do not adversely impact on sensitive receivers; and
- Completed mining areas and any other cleared areas should be rehabilitated as soon as possible after use.

To minimise potential impacts associated with proliferation of noise and light the following management measures should be implemented:

- Where artificial lighting is required, directional lighting should be implemented in a way to:
  - focus on disturbance/work areas
  - minimise/avoid lighting of remnant vegetation; and
  - implemented in accordance with Australian Standards.
- Regular maintenance of machinery and plant should be undertaken to minimise unnecessary noise

6.3 Cumulative impacts

6.3.1 Overview

The Project's impact on the environment is in addition to that from past and present grazing, agriculture and mining activities within the subregion. Evaluating the Project's impact on the target MNES and MSES in the context of surrounding local and regional disturbances can provide an indication of accumulative impacts to environmental values, as opposed the Project impacts in isolation.

Land use in the Inglewood Sandstones subregion consists primarily of agriculture, comprising cattle grazing and cropping, with selected areas of mining, associated with coal and petroleum gas. The majority of remnant vegetation within the Inglewood Sandstones subregion is located within State Forests (53.62%) with the remainder comprising Freehold land (38.99%), Other (2.82%), Leasehold land (2.48%) and National Parks (2.09%) (Queensland Herbarium, 2021b).

The existing CCM excavates coal for use at the 840 MW Millmerran Power Station, located approximately 4 km south-east, within MDL 299. The Project is an expansion of the existing CCM and will continue to supply coal to the adjacent power station. The water pipeline and associated infrastructure constructed as

part of the initial Millmerran Power Project (refer to SKM, 1998; 1999) will also continue to be utilised for the ongoing operation of the Project and adjacent power station. Any additional related infrastructure associated with the Project (e.g. sediment dams, haul roads, road diversions etc) has been included in the Disturbance footprint and subsequent impact assessment detailed in Sections 6 and 7.

The immediate surrounds of the Project comprises predominantly non-remnant vegetation with scattered patches of remnant and regrowth vegetation and agricultural land, primarily utilised for cattle grazing. Larger areas of broad-scale cropping are located to the north of the Project, in association with the Condamine River floodplain (north of the Project). No indirect development as a result of the Project is considered likely to occur within the surrounding landscape.

Although the Project is located in a predominantly agricultural landscape, a number of existing and approved developments are in proximity (50 km) to the CCM, including:

- Arrow Energy Expansion of Coal Seam Gas Fields (adjacent to the east and south east of the Project)
- Australia Pacific LNG Walloons gas fields in the Surat Basin
- Karara Wind Farm Project
- MacIntyre Wind Farm Project
- MacIntyre Wind Farm Overhead Transmission Line
- Bulli Creek Solar Farm
- Yarranlea Solar Farm; and
- Powerlink Millmerran to Middle Ridge Transmission Line.

A number of the developments identified in proximity to the Project are conditioned under the EPBC Act approval to provide offset areas for residual impacts on MNES (refer to DAWE, 2022). A number of these Project however were also assessed as 'not a controlled action' and were not required to provide offsets under the EPBC Act.

As discussed within Section 3.3, the EPBC Act and VM Act were not enacted at the time of the assessment and approval for the initial Commodore Coal Mine. As such, TECs, flora and fauna species protected at the time differed to those currently listed under the EPBC Act. Similarly, area of vegetation/habitat types were not provided within the EIS documentation (refer to (SKM, 1998, 1999).

The ARTC Inland Rail Border to Gowrie Project is also located within proximity to the Project. Impacts to identified MNES and MSES associated with the Inland Rail Border to Gowrie Project have not been quantified, subject to the EIS process (currently being undertaken). As such, impacts associated with this project have not been included in Table 17, however are considered likely to impact similar target MNES and MSES.

Available vegetation data for the Inglewood Sandstones subregion identified approximately 722,942 ha of remnant vegetation, around 59% of the pre-clearing extent (Queensland Herbarium, 2021b). A breakdown of remnant vegetation cover based on pre-clearing extent and over the last 25 years is provided in Table 15. Within the last 10 years, approximately 3,793ha of remnant vegetation has been cleared within the subregion, mainly associated with Least Concern (VM Act) remnant REs (3,468.42 ha; 91.4%).

The Project would result in the removal of 23.13 ha of remnant vegetation, with the majority of the Project impacting non-remnant vegetation (775.66 ha). The REs and fauna habitat types to be cleared as a result of the Project also occur throughout the surrounding landscapes and subregions. The general trends in vegetation clearing within the subregion has seen a decrease within the last 10 years, potentially in

response to the introduction and changes to State legislation regarding vegetation clearing. Due to the extent of remnant vegetation impacted by the Project (22.13 ha), the Project is considered unlikely to result in a significant increase in remnant vegetation clearing based on the current trends.

Table 15: Summary of remnant vegetation cover (ha) within the Inglewood Sandstones subregion

	Pre-clearing extent	1997 cover	2000 cover	2011 cover	2019 cover
Endangered (VM Act) remnant REs (ha)	107,454.27	9,654.11	8,543.14	8,447.34	8,304.71
Of Concern (VM Act) remnant REs (ha)	129,346.11	24,608.98	23,901.14	23,655.72	23,489.54
Least Concern (VM Act) remnant REs (ha)	981,768.83	717,084.74	702,269.24	694,319.45	690,851.03
Total remnant vegetation (ha)	**1,218,955 ha**	**751,661**	**735,026**	**726,735**	**722,942**
Percentage of pre-clear extent	**100%**	**61.66%**	**60.30%**	**59.62%**	**59.31%**

6.3.2 MNES

As discussed in Section 6.3.1, the Project is an extension of the existing CCM and will provide coal to the adjacent power station. All existing associated infrastructure constructed as part of the initial Millmerran Power Project (water pipeline etc.) continue to be utilised for the ongoing operation of the Project and adjacent power station. All additional related infrastructure associated with the mine extension (e.g. sediment dams, haul roads, road diversions etc) has been included within the Disturbance footprint for the Project.

The Project's immediate surrounds comprises predominantly non-remnant vegetation, associated with agricultural development. Indirect development within the surrounding landscape resulting from the initial Millmerran Power Project was limited. Based on the nature of the mine extension, no indirect development as a result of the Project is anticipated within the surrounding landscape. As such, the change in potential cumulative impacts on threatened species and communities arising from the Project is considered minimal due to the localised impacts associated with the Project.

The Project is likely to impact the following MNES:

- Brigalow TEC
- koala
- squatter pigeon; and
- *Picris evae*.

The landscape-scale impact on the MNES identified within the Project area was determined by comparing the Project's direct impact to the availability of habitat present within the Inglewood Sandstone subregion. The available habitat for each MNES was calculated for the subregion using habitat definitions (i.e. corresponding REs) identified within associated approved conservation advice (available on DAWE,

2022) and DoR Essential Habitat Factor mandatory REs for threatened species (DoR, 2021a). A summary of target MNES and MSES values and associated habitat types used for the cumulative impacts assessment is provided in Table 16.

For the Brigalow TEC, it was conservatively assumed that all remnant vegetation containing the relevant REs was of suitable quality and condition to meet the TEC criteria. For the threatened fauna and flora species, it was also assumed that all remnant vegetation contains the necessary microhabitat for each species. A number of threatened species have also been recorded within disturbed (non-remnant) areas; however, has not been included as part of the assessment for cumulative impacts.

The majority of surrounding developments impacting associated MNES have been conditioned for offsets as part of the associated EPBC Act approvals. While the impacts associated with agricultural development and individual species tolerance to disturbance makes the calculation of the true extent of habitat within the subregion difficult to determine, Project impacts within the subregion are considered minor, impacting <1% of estimated habitat within the subregion. Furthermore, due to the fragmented and disturbed nature of the Study Area, associated Project impacts will largely avoid disturbance to any key connectivity corridors within landscape.

Based on the localised nature of impacts associated with the Project, analysis of approved disturbance from nearby development projects (Table 17) and the available habitat in the region, the Project is predicted to have negligible cumulative impacts on terrestrial MNES. The following sections provide a detailed discussion of the subregional cumulative impacts to MNES from the Project and surrounding developments.

Table 16: Habitat types for target MNES and MSES

Target MNES/MSES	Habitat description (remnant cover)	Reference
MNES		
Brigalow TEC	REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14 and 11.12.21.	Approved Conservation Advice (DotE, 2013a)
Koala	Open forests and woodlands containing *Eucalyptus*, *Corymbia*, *Lophostemon* or *Melaleuca* trees having a trunk of a diameter of more than 10cm at 1.3m above the ground. For a full list of REs refer to DES Essential habitat factors for the species (Species Label 860).	Approved Conservation Advice (DAWE, 2022a) and Essential Habitat Factors (DoR, 2021a)
Squatter pigeon	Dry eucalypt woodland (including poplar box, spotted gum, yellow box, acacia and *Callitris*), with sparse short grass, often on sandy areas near to permanent water; grassy eucalypt woodlands. Nest on ground near or under grass tussock, log or low bush. For a full list of REs refer to DES Essential habitat factors for the species (Species Label 1785).	Approved Conservation Advice (TSSC, 2015d) and Essential Habitat Factors (DoR, 2021a).

Target MNES/MSES	Habitat description (remnant cover)	Reference
Picris evae	Grassy open forest to open woodland of *Eucalyptus orgadophila*, or *Eucalyptus melliodora*, *E. crebra*, *Angophora subvelutina*, *Casuarina torulosa*, or *Angophora subvelutina*, *Eucalyptus melliodora*, or *Eucalyptus melliodora*, *E. albens*; grassland with *Dichanthium sericeum*; open forest of *Casuarina cunninghamiana*, *Angophora floribunda*, *Eucalyptus tereticornis* and *E. nobilis*. For a full list of REs refer to DES Essential habitat factors for the species (Species Label 10604).	Approved Conservation Advice (DEWHA, 2008d) and Essential Habitat Factors (DoR, 2021a).
Homopholis belsonii	Woodland of *Acacia melvillei*, or *Eucalyptus populnea*, *Casuarina cristata*, *Acacia melvillei*, or *Acacia harpophylla*, *Geijera parviflora*, or *Eucalyptus populnea*, *Acacia harpophylla*, *Casuarina cristata*, or *Eucalyptus orgadophila, Geijera parviflora*; open forest of *Acacia harpophylla*, *Casuarina cristata*, or *Casuarina cristata,* with understorey of *Geijera parviflora* and *Alectryon diversifolius*. For a full list of REs refer to DES Essential habitat factors for the species (Species Label 10582).	Approved Conservation Advice (DEWHA, 2008a) and Essential Habitat Factors (DoR, 2021a).

Table 17: Cumulative impacts (direct) to relevant MNES within proximity to the Project.

Project/ Development	Proximity to the Project	MNES					
		Brigalow TEC	Koala	Squatter pigeon	*Picris evae*	*Homopholis belsonii*	White-throated Needle tail
Estimate of habitat/community within the Inglewood Sandstone subregion	-	7,664.60	695,450.80	575,642.98	2,844.46	227,676.32	N/A (aerial species)
The Project: Commodore Coal Mine Expansion and Road Diversion	-	1.08	0.69	9.01 (breeding and foraging)	0.69 (each)	6.37	N/A (aerial species)
APLNG Walloons gas field†	25km west	94.61*	N/A	N/A	N/A	N/A	N/A
Arrow Energy Surat Gas Expansion Project†	10 km north-west	106*	N/A	3,261*	120*	140*	N/A
Powerlink Millmerran to Middle Ridge Transmission Line	5-10 km north-west	N/A	Not listed at the time of approval	N/A	Nil (avoided)	Nil (avoided)	N/A
Karara Wind Farm Project†	50 km south-east	N/A	52.40*	12.10*	N/A	N/A	N/A

Project/ Development	Proximity to the Project	MNES					
		Brigalow TEC	Koala	Squatter pigeon	*Picris evae*	*Homopholis belsonii*	White-throated Needle tail
MacIntyre Wind Farm†	50 km south-east	N/A	498.10*	136.69*	N/A	N/A	N/A
MacIntyre Wind Farm Overhead Transmission Line†	35-50 km south-east	N/A	236.51*	126.65*	N/A	N/A	N/A
Bulli Creek Solar Farm	38 km south-west	N/A	N/A	N/A	N/A	N/A	N/A
Yarranlea Solar Farm	36 km north-east	N/A	N/A	N/A	N/A	0.94	N/A

* Conditioned for offset under project EPBC Act approval

† Based on EPBC Act Approval conditions provided on the DAWE EPBC Act Referrals List

6.3.2.1 Brigalow TEC

The Project will result in the removal of approximately 1.08 ha of Brigalow TEC, around 0.01% of the potential Brigalow TEC remaining within the Inglewood Sandstones subregion. Surrounding development, associated predominantly with coal seam gas projects, has resulted in the removal of 200.61 ha of Brigalow TEC, all of which has been conditioned for offsetting as part of the project approval. Within the context of the greater landscape, it is considered unlikely the Project will contribute to substantially to cumulative impacts of the Brigalow TEC within the subregion.

6.3.2.2 Homopholis belsonii

The Project will result in the removal of approximately 6.37 ha of known habitat for the species. Habitat identified within the Study Area comprised predominantly non-remnant vegetation. As such, due to the species tolerance to disturbance, the extent of potential habitat identified within Table 17. The removal of 6.37 ha of known *Homopholis belsonii* habitat conservatively equates to <0.0003% of potential habitat estimated for the Inglewood Sandstones subregion (Table 17).

Including the CCM Expansion Project, surrounding projects (as based on publicly available information) equate to approximately 147.31 ha, approximately 0.06% of potential habitat for the species within the subregion. The majority of surrounding projects impacting the species have been conditioned for offsets as part of the associated EPBC Act approval. While the species tolerance to disturbance makes the calculation of the true extent of *Homopholis belsonii* habitat difficult to determine, the Project is considered unlikely to contribute significantly to cumulative impacts to the species in the region.

6.3.2.3 Picris evae

The Project will result in the removal of approximately 0.69 ha of known habitat for the species. Suitable habitat identified within the Study Area comprised remnant vegetation associated with REs 11.3.4 and 11.3.25. The removal of 0.69 ha of suitable habitat conservatively equates to <0.001% of potential habitat estimated for the Inglewood Sandstones subregion (Table 17). Similar to *Homopholis belsonii*, *P. evae* is tolerant to disturbance and has been previously recorded within non-remnant vegetation (DES, 2021e), making it difficult to determine the true extent of suitable habitat within the subregion.

Including the CCM Expansion Project, surrounding projects (as based on publicly available information) equate to approximately 120.69 ha, approximately 4.24% of potential habitat for the species within the subregion. Based on the location of previous records within the region, primarily along the Condamine floodplain north of the Project, habitat loss associated with agricultural development is likely to be a primary threat to the species. As such, the cumulative impacts detailed within Table 17 is likely to be underestimated, with agricultural impacts difficult to calculate.

The majority of surrounding projects impacting the species, as detailed in Table 17, have been conditioned for offsets as part of the associated EPBC Act approvals. While the impacts associated with agricultural development and the species tolerance to disturbance makes the calculation of the true extent and subregional impacts to *P. evae* habitat difficult to determine, the Project is considered unlikely to contribute significantly to cumulative impacts to the species in the region.

6.3.2.4 Koala

Suitable koala habitat is largely confined to the remnant woodlands containing koala food tree species (*Eucalyptus*, *Corymbia*, *Lophostemon*, *Angophora* and *Melaleuca* spp.). The Project will be largely avoiding habitat for the species, with the exception of a small area (0.69 ha) associated with the road diversion

(Table 17). The Project is not expected to significantly inhibit movement along riparian corridors, with Project impacts considered unlikely to result in a significant impact on the species.

In a regional context, habitat within the Project impact area equates to a minor proportion of koala habitat within the Inglewood Sandstone subregion (~695,451 ha) (Table 17). While, surrounding projects have resulted in larger impacts to the species and its habitat, approx. 787 ha, associated projects have been conditioned to provide offsets as part of the project approvals. Furthermore, the nature of surrounding projects have not established any impenetrable barriers to the species movement or separated populations, with large areas of suitable habitat contained with State forests reserves. Koala habitat utilisation and associated densities within the region is not currently known.

However, based on the species habitat available across the subregion, the extent of habitat loss as a result of the Project, the cumulative impact on the species resulting from the Project is considered minimal.

6.3.2.5 Squatter pigeon

The Project will result in the removal of approximately 4.63 ha of breeding and 4.38 ha of foraging habitat for the squatter pigeon (southern subspecies). The habitat areas that will be impacted by the Project are fragmented, surrounded by the existing CCM and agricultural land. Previous records of the species were observed over 20 years ago, with no recent records available (DES), 2021e). The removal of 9.01 ha of fragmented squatter pigeon habitat conservatively equates to the loss of ~<0.002% of the squatter pigeon habitat estimated for the Inglewood Sandstones subregion (Table 17).

Including the CCM Expansion Project, surrounding projects (as based on publicly available information) equate to approximately 3,545.45 ha, approximately 0.6% of squatter pigeon habitat within the subregion. All of the surrounding projects impacting the species have been conditioned for offsets as part of the associated EPBC Act approval. While the true squatter pigeon habitat utilisation, is likely to less than the conservative estimate in Table 17, influenced by the availability of permanent water sources, the extent of habitat impacted by the Project is considered unlikely to contribute significantly to cumulative impacts to the species in the region.

7 Residual impacts to MNES and MSES

An environmental offset is required for any residual significant impacts on MNES and MSES that are likely as a result from the Project. For MNES and MSES values where threatened species were surveyed for during suitable conditions and confirmed present, only those areas containing known populations were included as part of the residual impact assessment (i.e. *Homopholis belsonii*).

Offsets would be required for the Project in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (SEWPaC, 2012) (EPBC Act Offsets Policy) and *Queensland Environmental Offsets Policy* (DES, 2021b) (Queensland EO Policy). This section describes the biodiversity offset requirements for the Project.

7.1 MNES Significant Impact assessment

The terrestrial ecological assessment identified that the Study Area contains one TEC and affords habitat for five threatened flora and fauna species listed under the EPBC Act. The Australian Government has produced the *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DotE, 2013) (MNES Referral Guidelines) and the *EPBC Act Referral Guidelines for the Vulnerable Koala* (DotE, 2014a) (Koala Referral Guideline) to assist in determining if significant impacts associated with a Project require referral to DAWE and associated offsetting. Self-assessments against the MNES Referral Guidelines and Koala Referral Guideline criteria are provided in Appendix E. An assessment against the MNES Referral Guidelines and Koala Referral Guideline determined the Project is likely to result in a significant impact on three MNES. In summary, a significant impact was considered likely to occur on:

- **Brigalow TEC:** The Project will result in the direct clearing of 1.08 ha of Brigalow TEC, adversely affecting habitat critical to the survival of an ecological community through the modification of abiotic factors and causing a substantial change in the species composition of an occurrence of an ecological community via vegetation clearing.
- ***Homopholis belsonii*:** The Project will result in the direct clearing of 6.37 ha of known habitat for the species. This is likely to result in a long-term decrease in the size of local populations and a reduction in the area of occupancy for a local population.
- **Squatter pigeon (southern subspecies) (*Geophaps scripta scripta*):** The Project will result in the direct clearing of 4.63 ha of breeding habitat and 4.38 ha of foraging habitat for the species. The Project will impact habitat critical to the survival of the species and reduce the area of occupancy for an important population.

The remaining three MNES identified within the Study Area were considered unlikely to result a significant impact from the Project. It was determined that a significant impact was unlikely for:

- ***Picris evae***: The Project will impact 0.69 ha of suitable habitat for the species. However, given to the extent of habitat disturbed and the unlikelihood of impediments to pollination or seed dispersal of the species, the Project is unlikely to significantly impact habitat critical to the survival of the species or an important population (if present). Furthermore, the Project is also considered unlikely to substantially interfere with the recovery of the species or increase potential threats to any populations present (if any).
- **koala:** The Project will impact 0.69 ha of suitable habitat for the species (associated with the road diversion). The proposed clearing represents a small proportion of suitable habitat available within the surrounding areas and will not create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor. No recent scats or scratches were observed during the field

survey and the species was not identified during a nocturnal survey, indicating a low species utilisation of the Study Area. Furthermore, the Project is unlikely to restrict movement of the species across the greater landscape or result in an increase of potential threats to the species. Specifically, the Project is considered unlikely to result in a significant impact to the species due to the:

  - Retention of koala movement corridors associated with riparian vegetation.
  - The likely low density or abundance of koalas within the region resulting from historical and ongoing land use practices
  - Implementation of fauna-friendly mitigation measures to minimise any potential indirect impacts resulting from the Project on the species, and
  - The action being unlikely to substantially interfere with the recovery of the species.

- **white-throated needletail:** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia and breeds in the northern hemisphere (DAWE, 2021b). The species is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2021b). As such, the clearing of vegetation associated with the Project is considered unlikely to lead to a long-term decrease in the species population, area of occupancy, quality of habitat or result in an invasive species or disease that may cause the species to decline. Furthermore, the Project is unlikely to interfere substantially with the recovery of the species.
- **Groundwater Dependent Ecosystems (Placeholder):**

7.2 MSES Significant Residual Impact assessment

The terrestrial ecological assessment identified that the Study Area contains three MSES identified under the Queensland *Environmental Offsets Act 2014* (EO Act). The Queensland Government has produced the *Queensland Environmental Offsets Policy – Significant Residual Impact Guideline* (DEHP, 2014) (SRI Guideline) to assist in determining if significant residual impacts associated with a Project will require offsetting. Self-assessments against the SRI Guideline are provided in Appendix F. An assessment against the SRI Guideline determined the Project is likely to result in a significant residual impact on two MSES. In summary, a significant residual impact was likely to result for:

- **MSES Regulated Vegetation:** vegetation clearing thresholds was exceeded for two Regulated Vegetation types, comprising:
  - 22.44 ha of Endangered RE 11.4.3 (BVG 25a)
  - 0.69 ha of Of Concern RE 11.3.4 (BG 16c)
  - 2.96 ha of RE 11.4.3 (BVG 25a) within the defined distance of a mapped watercourse; and
  - 0.67 ha of RE 11.3.4 (BVG 16c) within the defined distance of a mapped watercourse
- **MSES Protected Wildlife Habitat:** significant residual impact was considered unlikely for three threatened species, including:
  - 6.37 ha of known habitat for *Homopholis belsonii*
  - 4.63 ha of breeding habitat and 4.38 ha of foraging habitat for the squatter pigeon (southern subspecies) (*Geophaps scripta scripta*); and
  - 0.69ha of breeding and 45.31 ha of foraging habitat for the glossy black-cockatoo (*Calyptorhynchus lathami lathami*).

The remaining MSES identified within the Study Area were considered unlikely to result a significant residual impact from the Project. It was determined that a significant residual impact was unlikely for:

- **MSES Connectivity Areas:** In accordance with the SRI Guideline, the Landscape Fragmentation and Connectivity Tool was used to assess the associated impacts to connectivity areas resulting from the Project. Based on the Landscape Fragmentation and Connectivity Tool, the Project will not result in a significant residual impact on MSES connectivity areas. The two tests identified:
  - **Test 1:** The regional extent of core remnant areas is approximately 13.64%, resulting in a local impact threshold of 5%. The core remnant extent at the local scale pre-impact was calculated as 513.14 ha with a 0% change post impact. As such, Test 1 did not exceed the 5% threshold for change in core remnant ecosystem extent at the local scale.
  - **Test 2:** No core remnant areas were identified within the site. As such the loss or fragmentation of core remnant ecosystem at the site would not result.
- **MSES Protected Wildlife Habitat**: A significant residual impact was considered unlikely for four threatened species, including:
  - *Picris evae*: The Project will impact 0.69 ha of suitable habitat for the species. However, given to the extent of habitat disturbed and the unlikelihood of impediments to pollination or seed dispersal of the species, the Project is unlikely to significantly impact habitat to the extent it will lead to a long-term decrease of a local population (if present). Furthermore, the Project is unlikely to indirectly cause disruption to ecologically significant locations, substantially interfere with the recovery of the species or increase potential threats to any populations present (if any).
  - *Picris barbarorum*: The Project will impact 0.69 ha of suitable habitat for the species. However, given to the extent of habitat disturbed and the unlikelihood of impediments to pollination or seed dispersal of the species, the Project is unlikely to significantly impact habitat to the extent it will lead to a long-term decrease of a local population (if present). Furthermore, the Project is unlikely to indirectly cause disruption to ecologically significant locations, substantially interfere with the recovery of the species or increase potential threats to any populations present (if any).
  - koala (*Phascolarctos cinereus*): The Project will impact 0.69 ha of suitable habitat for the species (associated with the road diversion). The proposed clearing represents a small proportion of suitable habitat available within the surrounding areas and will not create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor. Implementation of fauna-friendly mitigation measures to minimise any potential indirect impacts resulting from the Project on the species. Furthermore, the Project is unlikely to restrict movement of the species across the greater landscape or result in an increase of potential threats to the species.
  - white-throated needletail (*Hirundapus caudacutus*): The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia and breeds in the northern hemisphere (DAWE, 2021b). As such, the clearing of vegetation associated with the Project is considered unlikely to lead to a long-term decrease in the species population, extent of occurrence, quality of habitat or result in an invasive species or disease that may cause the species to decline. Furthermore, the Project is unlikely to interfere substantially with the recovery of the species.

A number of offsetable matters relevant to the Project are protected under both Commonwealth and State legislation. As per Section 15 of the EO Act, an administering agency may impose an offset condition on an authority only if:

- the same, or substantially the same, impact has not been assessed under a relevant Commonwealth Act; and

- the same, or substantially the same, prescribed environmental matters has not been assessed under a relevant Commonwealth Act.

As such, MSES that are also a MNES (i.e. *Homopholis belsonii*, squatter pigeon (southern subspecies)) will not require any additional offsets under the EO Act for impacts on MSES if the Australian Government has assessed impacts for the same values under the EPBC Act.

In accordance with the Queensland EO Policy, a detailed assessment of the impacts the Project and the offset requirement would be conducted prior to providing the notice of election to DES.

8 Conclusion

The Project footprint spans approximately 798 ha, comprising predominantly non-remnant (historically cleared) vegetation (775 ha). The Project will require the removal of a total of 56 ha of remnant and non-remnant regrowth vegetation.

Where possible, the Project would avoid, mitigate and manage environmental impacts associated with the construction and operation, with the location of terrestrial environmental values incorporated in the Project design. Mitigation measures to be implemented to minimise unavoidable impacts would include but not be limited to:

- vegetation clearing measures
- fauna pre-clearance surveys
- weed/animal pest monitoring and management; and
- dust suppression, erosion and sediment controls.

Although terrestrial environmental values have been avoided where possible, there are a number of unavoidable impacts likely to result from the Project.

Assessment against the EPBC Act *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013) identified the following impacts to MNES:

- 1.08 ha of Brigalow TEC
- 6.37 ha of known habitat for *Homopholis belsonii*; and
- 4.63 ha of suitable breeding and 4.38 ha of foraging habitat for squatter pigeon (*Geophaps scripta scripta*).

Project impacts to MSES are likely to result in a significant residual impact to two matters, including:

- Regulated Vegetation comprising:
  - 22.44 ha of Endangered RE (BVG 25a)
  - 0.69 ha of Of Concern RE (BVG 16c)
  - 2.97 ha of prescribed RE (BVG 25a) and 0.67 ha of prescribed RE (BVG 16c) within the defined distance of a vegetation management watercourse
- Protected Wildlife Habitat for three threatened species including:
  - 6.37 ha of known habitat for *Homopholis belsonii*
  - 4.63 ha of suitable breeding and 4.38 ha of foraging habitat for squatter pigeon (*Geophaps scripta scripta*); and
  - 0.69 ha of breeding and 45.31 ha of foraging habitat for glossy-black cockatoo (*Calyptorhynchus lathami lathami*).

Residual impacts to MNES and MSES would be offset in accordance the *EPBC Act Environmental Offsets Policy* and *Queensland Environmental Offsets Policy*.

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Appendix A Database Search Results

A.1 EPBC Act Protected Matters Search Tool

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-Nov-2021

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	35
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	9
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site	In feature area
Narran lake nature reserve	400 - 500km upstream from Ramsar site	In feature area
Riverland	1100 - 1200km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1300 - 1400km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities			[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In feature area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area

Community Name	Threatened Category	Presence Text	Buffer Status
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In buffer area only
FISH			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maccullochella peelii			
Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Cadellia pentastylis			
Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dichanthium queenslandicum			
King Blue-grass [5481]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Dichanthium setosum](#) bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Eucalyptus virens](#) [10181]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Homopholis belsonii](#) Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area	In feature area
[Lepidium monoplocoides](#) Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
[Picris evae](#) Hawkweed [10839]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Rhaponticum australe](#) Austral Cornflower, Native Thistle [22647]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thesium australe](#) Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Tylophora linearis](#) [55231]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
[Anomalopus mackayi](#) Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Delma torquata](#) Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
[Egernia rugosa](#) Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Furina dunmalli](#) Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
[Tympanocryptis condaminensis](#) Condamine Earless Dragon [87888]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Uvidicolus sphyrurus](#) Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
SNAIL			
[Adclarkia cameroni](#) Brigalow Woodland Snail [83886]	Endangered	Species or species habitat likely to occur within area	In feature area
[Adclarkia dulacca](#) Dulacca Woodland Snail [83885]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals			[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
ARG Border Rail Project Moree to Toowoomba QLD	2013/7061	Controlled Action	Further Information Request	In feature area
Expansion Of Coal Seam Gas Operations	2010/5344	Controlled Action	Post-Approval	In buffer area only
Inland Rail Border to Gowrie Project, QLD	2018/8165	Controlled Action	Assessment Approach	In feature area
Overhead Transmission Line ??? MacIntyre Wind Energy Precinct	2020/8759	Controlled Action	Proposed Decision	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Inland Rail Border to Gowrie Geotechnical Investigations	2021/8911	Not Controlled Action	Completed	In feature area
Section Upgrade of Millmerran-Inglewood Road	2007/3309	Not Controlled Action	Completed	In buffer area only
Upgraded sewerage infrastructure in the Helensvale/Coombabah catchment	2004/1427	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Millmerran - Middle Ridge transmission line	2003/1103	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Maranoa-Balonne-Condamine	Northern Inland Catchments	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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EPBC Act Protected Matters Report

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Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	9
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site	In feature area
Narran lake nature reserve	400 - 500km upstream from Ramsar site	In feature area
Riverland	1100 - 1200km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1300 - 1400km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities			[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In feature area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In buffer area only
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area

Community Name	Threatened Category	Presence Text	Buffer Status
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans			
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
PLANT			
Androcalva procumbens			
[87153]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cadellia pentastylis			
Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat may occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus virens [10181]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Macrozamia machinii [64583]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Picris evae Hawkweed [10839]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Rhaponticum australe Austral Cornflower, Native Thistle [22647]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Tympanocryptis condaminensis Condamine Earless Dragon [87888]	Endangered	Species or species habitat may occur within area	In buffer area only
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
SNAIL			
Adclarkia cameroni Brigalow Woodland Snail [83886]	Endangered	Species or species habitat likely to occur within area	In feature area
Adclarkia dulacca Dulacca Woodland Snail [83885]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Bubulcus ibis as Ardea ibis](#) Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
ARG Border Rail Project Moree to Toowoomba QLD	2013/7061	Controlled Action	Further Information Request	In feature area
Expansion of Coal Seam Gas Fields	2009/4974	Controlled Action	Post-Approval	In buffer area only
Expansion Of Coal Seam Gas Operations	2010/5344	Controlled Action	Post-Approval	In feature area
Inland Rail Border to Gowrie Project, QLD	2018/8165	Controlled Action	Assessment Approach	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Inland Rail Border to Gowrie Geotechnical Investigations	2021/8911	Not Controlled Action	Completed	In feature area
Section Upgrade of Millmerran-Inglewood Road	2007/3309	Not Controlled Action	Completed	In buffer area only
Upgraded sewerage infrastructure in the Helensvale/Coombabah catchment	2004/1427	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Millmerran - Middle Ridge transmission line	2003/1103	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Maranoa-Balonne-Condamine	Northern Inland Catchments	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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A.2 DES WildNet and HERBRECS data

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: All
Records: Confirmed
Date: Since 1980
Latitude: -27.9228
Longitude: 151.3145
Distance: 20
Email: jacqui.gamack@e2mconsulting.com.au
Date submitted: Thursday 04 Nov 2021 16:17:09
Date extracted: Thursday 04 Nov 2021 16:20:02

The number of records retrieved = 731

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		1
animals	amphibians	Hylidae	*Cyclorana novaehollandiae*	eastern snapping frog		C		1
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		5
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		1
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		3
animals	amphibians	Hylidae	*Litoria peronii*	emerald spotted treefrog		C		2
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		3
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes salmini*	salmon striped frog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		1
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		1
animals	amphibians	Myobatrachidae	*Uperoleia rugosa*	chubby gungan		C		1
animals	birds	Acanthizidae	*Acanthiza apicalis*	inland thornbill		C		1
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		6
animals	birds	Acanthizidae	*Acanthiza lineata*	striated thornbill		C		1
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		4
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		2
animals	birds	Acanthizidae	*Acanthiza uropygialis*	chestnut-rumped thornbill		C		1
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		4
animals	birds	Acanthizidae	*Pyrrholaemus sagittatus*	speckled warbler		C		6
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		9
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		5
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		1
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		2
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		2
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		C		1
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		2
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		1
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		3
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		5
animals	birds	Anatidae	*Aythya australis*	hardhead		C		3
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		5
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		3
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		1
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	2
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		2
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		1
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		5
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		1
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		5
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		8
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		10
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		11
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		6
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		1
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		14
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		6
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		8
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		3
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		1
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		1
animals	birds	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel		C		1
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		1
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		2
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		1
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		6
animals	birds	Columbidae	*Columba livia*	rock dove	Y			2
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		8
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		7
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		10
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		2
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		3
animals	birds	Corcoracidae	*Corcorax melanorhamphos*	white-winged chough		C		1
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		7
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		2
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		20
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		1
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		1
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		1
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		1
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		1
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		5
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		4
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		1
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		2
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		2
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		5
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		4
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		1
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		1
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		7
animals	birds	Maluridae	*Malurus lamberti sensu lato*	variegated fairy-wren		C		2
animals	birds	Meliphagidae	*Acanthagenys rufogularis*	spiny-cheeked honeyeater		C		6
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		10
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		2

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animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		4
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		2
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		14
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		3
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		1
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		3
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		6
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		8
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		5
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		11
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		7
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		4
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		5
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		3
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		3
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		5
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		9
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		2
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		6
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			1
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		6
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		1
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		2
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		1
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		1
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		1
animals	birds	Podicipedidae	*Poliocephalus poliocephalus*	hoary-headed grebe		C		1
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		3
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		2
animals	birds	Psittacidae	*Alisterus scapularis*	Australian king-parrot		C		1
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		2
animals	birds	Psittacidae	*Northiella haematogaster*	blue bonnet		C		2
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		5
animals	birds	Psittacidae	*Psephotus haematonotus*	red-rumped parrot		C		9
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		2
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		2
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		1
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		1
animals	birds	Rallidae	*Tribonyx ventralis*	black-tailed native-hen		C		1
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		6
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		6
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		SL		1
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		1

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animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		1
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		1
animals	birds	Sturnidae	*Acridotheres tristis*	common myna	Y			7
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			2
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		1
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		1
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		1
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		1
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		1
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		7
animals	birds	Turdidae	*Turdus merula*	common blackbird	Y			1
animals	birds	Turnicidae	*Turnix pyrrhothorax*	red-chested button-quail		C		1
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		1
animals	birds	Tytonidae	*Tyto delicatula*	eastern barn owl		C		4
animals	insects	Aeshnidae	*Anax papuensis*	Australian Emperor				7
animals	insects	Coenagrionidae	*Ischnura aurora*	aurora bluetail				1
animals	insects	Coenagrionidae	*Ischnura heterosticta heterosticta*	common bluetail				1
animals	insects	Corduliidae	*Hemicordulia australiae*	Australian emerald				2
animals	insects	Corduliidae	*Hemicordulia tau*	tau emerald				1
animals	insects	Hesperiidae	*Hesperilla malindeva*	two-spotted sedge-skipper				3
animals	insects	Hesperiidae	*Hesperilla sp.*					1
animals	insects	Hesperiidae	*Toxidia parvula*	banded grass-skipper				1
animals	insects	Hesperiidae	*Toxidia peron*	dingy grass-skipper				2
animals	insects	Hesperiidae	*Trapezites eliena*	orange ochre				2
animals	insects	Hesperiidae	*Trapezites petalia*	black-ringed ochre				1
animals	insects	Libellulidae	*Diplacodes bipunctata*	wandering percher				2
animals	insects	Libellulidae	*Orthetrum caledonicum*	blue skimmer				5
animals	insects	Libellulidae	*Tramea loewii*	common glider				2
animals	insects	Lycaenidae	*Acrodipsas violacea*					5
animals	insects	Lycaenidae	*Candalides heathi heathi*	rayed blue				1
animals	insects	Lycaenidae	*Ogyris amaryllis*					1
animals	insects	Lycaenidae	*Ogyris amaryllis hewitsoni*	satin azure (Queensland subspecies)				2
animals	insects	Lycaenidae	*Ogyris amaryllis meridionalis*	satin azure (inland subspecies)				1
animals	insects	Lycaenidae	*Ogyris genoveva*					1
animals	insects	Lycaenidae	*Ogyris ianthis*	golden azure				3
animals	insects	Lycaenidae	*Paralucia pyrodiscus pyrodiscus*	fiery copper				1
animals	insects	Lycaenidae	*Theclinesthes miskini miskini*	wattle blue (Australian subspecies)				2
animals	insects	Lycaenidae	*Theclinesthes serpentatus serpentatus*	salt-bush blue				1
animals	insects	Lycaenidae	*Zizina otis labradus*	common grass-blue (Australian subspecies)				3
animals	insects	Nymphalidae	*Acraea andromacha andromacha*	glasswing				2
animals	insects	Nymphalidae	*Charaxes sempronius sempronius*	tailed emperor				2
animals	insects	Nymphalidae	*Danaus petilia*	lesser wanderer				8
animals	insects	Nymphalidae	*Danaus plexippus*	monarch	Y			2
animals	insects	Nymphalidae	*Euploea corinna*	common crow				7
animals	insects	Nymphalidae	*Hypocysta pseudirius*	grey ringlet				2

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animals	insects	Nymphalidae	*Junonia villida villida*	meadow argus				6
animals	insects	Nymphalidae	*Tirumala hamata hamata*	blue tiger				4
animals	insects	Nymphalidae	*Vanessa kershawi*	Australian painted lady				1
animals	insects	Papilionidae	*Cressida cressida cressida*	clearwing swallowtail				1
animals	insects	Papilionidae	*Papilio aegeus*					1
animals	insects	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)				5
animals	insects	Papilionidae	*Papilio anactus*	dainty swallowtail				2
animals	insects	Papilionidae	*Protographium leosthenes leosthenes*	four-barred swordtail				1
animals	insects	Pieridae	*Appias paulina ega*	yellow albatross				2
animals	insects	Pieridae	*Belenois java teutonia*	caper white				9
animals	insects	Pieridae	*Catopsilia gorgophone gorgophone*	yellow migrant				1
animals	insects	Pieridae	*Catopsilia pomona*	lemon migrant				1
animals	insects	Pieridae	*Catopsilia pyranthe crokera*	white migrant				1
animals	insects	Pieridae	*Cepora perimale*					2
animals	insects	Pieridae	*Delias aganippe*	spotted jezebel				1
animals	insects	Pieridae	*Delias argenthona argenthona*	scarlet jezebel				2
animals	insects	Pieridae	*Delias nysa nysa*	yellow-spotted jezebel (Australian subspecies)				1
animals	insects	Pieridae	*Elodina parthia*	striated pearl-white				2
animals	insects	Pieridae	*Eurema smilax*	small grass-yellow				1
animals	insects	Pieridae	*Pieris rapae*	cabbage white	Y			1
animals	mammals	Bovidae	*Bos taurus*	European cattle	Y			3
animals	mammals	Canidae	*Canis sp.*		Y			1
animals	mammals	Canidae	*Vulpes vulpes*	red fox	Y			1
animals	mammals	Dasyuridae	*Antechinus flavipes flavipes*	yellow-footed antechinus (south-east Queensland)		C		1
animals	mammals	Dasyuridae	*Sminthopsis macroura*	stripe-faced dunnart		C		1
animals	mammals	Dasyuridae	*Sminthopsis murina*	common dunnart		C		1
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			3
animals	mammals	Leporidae	*Oryctolagus cuniculus*	rabbit	Y			1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		5
animals	mammals	Macropodidae	*Notamacropus rufogriseus*	red-necked wallaby		C		6
animals	mammals	Macropodidae	*Osphranter robustus*	common wallaroo		C		2
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		4
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			4/2
animals	mammals	Muridae	*Rattus sordidus*	canefield rat		C		3/3
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		2
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	1
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		1
animals	mammals	Suidae	*Sus scrofa*	pig	Y			4
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		5
animals	mammals	Vespertilionidae	*Nyctophilus geoffroyi*	lesser long-eared bat		C		1
animals	mammals	Vespertilionidae	*Vespadelus vulturnus*	little forest bat		C		1
animals	ray-finned fishes	Ambassidae	*Ambassis agassizii*	Agassiz's glassfish				1

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animals	ray-finned fishes	Cyprinidae	*Carassius auratus*	goldfish	Y			1
animals	ray-finned fishes	Cyprinidae	*Cyprinus carpio*	European carp	Y			1
animals	ray-finned fishes	Eleotridae	*Hypseleotris sp.*					3
animals	ray-finned fishes	Poeciliidae	*Gambusia holbrooki*	mosquitofish	Y			4
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				4
animals	reptiles	Agamidae	*Amphibolurus burnsi*	Burns's dragon		C		1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		5
animals	reptiles	Agamidae	*Tympanocryptis condaminensis*	Condamine earless dragon		E	E	2
animals	reptiles	Diplodactylidae	*Nebulifera robusta*	robust velvet gecko		C		2
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		1
animals	reptiles	Elapidae	*Pseudechis guttatus*	spotted black snake		C		2
animals	reptiles	Elapidae	*Suta dwyeri*	Dwyer's snake		C		2/1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		2
animals	reptiles	Gekkonidae	*Gehyra versicolor*			C		1
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		2
animals	reptiles	Pygopodidae	*Pygopus schraderi*	eastern hooded scaly-foot		C		1
animals	reptiles	Scincidae	*Anomalopus leuckartii*	two-clawed worm-skink		C		1
animals	reptiles	Scincidae	*Carlia pectoralis*	open-litter rainbow skink		C		3
animals	reptiles	Scincidae	*Carlia tetradactyla*	southern rainbow-skink		C		1
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		3
animals	reptiles	Scincidae	*Egernia striolata*	tree skink		C		1
animals	reptiles	Scincidae	*Lerista punctatovittata*	eastern robust slider		C		2/2
animals	reptiles	Scincidae	*Lerista timida*	timid slider		C		2/2
animals	reptiles	Scincidae	*Morethia boulengeri*	south-eastern morethia skink		C		1
animals	reptiles	Scincidae	*Pygmaeascincus timlowi*	dwarf litter-skink		C		1
animals	reptiles	Scincidae	*Tiliqua rugosa*	shingle-back		C		2
animals	reptiles	Varanidae	*Varanus panoptes*	yellow-spotted monitor		C		2
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		7
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				28
fungi	lecanoromycetes	Parmeliaceae	*Flavoparmelia rutidota*			C		3/3
fungi	lecanoromycetes	Parmeliaceae	*Notoparmelia erumpens*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Usnea scabrida subsp. elegans*			C		3/3
fungi	lecanoromycetes	Pertusariaceae	*Pertusaria subcerussata*			C		1/1
fungi	lecanoromycetes	Physciaceae	*Physcia jackii*			C		2/2
fungi	lecanoromycetes	Teloschistaceae	*Teloschistes sieberianus*			C		2/2
plants	land plants	Acanthaceae	*Brunoniella australis*	blue trumpet		C		3/2
plants	land plants	Acanthaceae	*Rostellularia adscendens*			C		1
plants	land plants	Aizoaceae	*Tetragonia tetragonoides*	New Zealand spinach		C		1/1
plants	land plants	Amaranthaceae	*Alternanthera denticulata*	lesser joyweed		C		2/1
plants	land plants	Amaranthaceae	*Alternanthera nodiflora*	joyweed		C		1/1
plants	land plants	Amaranthaceae	*Amaranthus mitchellii*	Boggabri weed		C		1/1
plants	land plants	Amaranthaceae	*Deeringia amaranthoides*	redberry		C		1/1
plants	land plants	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			1
plants	land plants	Amaranthaceae	*Nyssanthes erecta*			C		3/3
plants	land plants	Anacardiaceae	*Schinus molle var. areira*	pepper tree	Y			1/1
plants	land plants	Apiaceae	*Coriandrum sativum*		Y			1/1

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plants	land plants	Apiaceae	*Daucus glochidiatus*	Australian carrot		C		2/1
plants	land plants	Apiaceae	*Eryngium paludosum*			C		2/2
plants	land plants	Apiaceae	*Platysace ericoides*	heath platysace		C		1
plants	land plants	Apocynaceae	*Alstonia constricta*	bitterbark		C		2/2
plants	land plants	Apocynaceae	*Carissa lanceolata*			C		1
plants	land plants	Apocynaceae	*Carissa ovata*	currantbush		C		3/1
plants	land plants	Apocynaceae	*Cynanchum viminale subsp. brunonianum*			C		1/1
plants	land plants	Apocynaceae	*Gomphocarpus physocarpus*	balloon cottonbush	Y			1
plants	land plants	Apocynaceae	*Leichhardtia viridiflora subsp. viridiflora*			C		1/1
plants	land plants	Apocynaceae	*Orbea variegata*		Y			1/1
plants	land plants	Apocynaceae	*Parsonsia eucalyptophylla*	gargaloo		C		1/1
plants	land plants	Apocynaceae	*Parsonsia lanceolata*	northern silkpod		C		2/2
plants	land plants	Araceae	*Pistia stratiotes*	water lettuce	Y			1
plants	land plants	Araliaceae	*Hydrocotyle acutiloba*			C		2/2
plants	land plants	Araliaceae	*Trachymene incisa subsp. incisa*			C		1/1
plants	land plants	Asparagaceae	*Asparagus officinalis*	asparagus	Y			2/2
plants	land plants	Asphodelaceae	*Bulbine semibarbata*	wild onion		C		1/1
plants	land plants	Aspleniaceae	*Asplenium subglandulosum subsp. subglandulosum*			C		2/2
plants	land plants	Asteraceae	*Arctotheca calendula*	Cape weed	Y			1/1
plants	land plants	Asteraceae	*Bidens pilosa*		Y			1
plants	land plants	Asteraceae	*Brachyscome basaltica*			C		3/3
plants	land plants	Asteraceae	*Brachyscome chrysoglossa*			C		1/1
plants	land plants	Asteraceae	*Brachyscome dalbyensis*			C		2/2
plants	land plants	Asteraceae	*Brachyscome dentata*			C		3/3
plants	land plants	Asteraceae	*Brachyscome multifida*			C		2/1
plants	land plants	Asteraceae	*Calotis cuneata*			C		3/3
plants	land plants	Asteraceae	*Calotis cuneifolia*	burr daisy		C		1/1
plants	land plants	Asteraceae	*Calotis dentex*	white burr daisy		C		1/1
plants	land plants	Asteraceae	*Calotis hispidula*	bogan flea		C		2/2
plants	land plants	Asteraceae	*Calotis lappulacea*	yellow burr daisy		C		3/2
plants	land plants	Asteraceae	*Calotis scabiosifolia var. scabiosifolia*			C		1/1
plants	land plants	Asteraceae	*Calotis scapigera*	tufted burr daisy		C		1/1
plants	land plants	Asteraceae	*Camptacra barbata*			C		1/1
plants	land plants	Asteraceae	*Cassinia laevis subsp. rosmarinifolia*			C		2/2
plants	land plants	Asteraceae	*Cassinia lepschii*			C		1/1
plants	land plants	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		6/4
plants	land plants	Asteraceae	*Cirsium vulgare*	spear thistle	Y			1
plants	land plants	Asteraceae	*Cotula australis*	common cotula		C		1/1
plants	land plants	Asteraceae	*Craspedia canens*			C		1/1
plants	land plants	Asteraceae	*Cyanthillium cinereum*			C		1/1
plants	land plants	Asteraceae	*Erigeron sumatrensis*		Y			2/1
plants	land plants	Asteraceae	*Euchiton sphaericus*			C		2/2
plants	land plants	Asteraceae	*Glossocardia bidens*	native cobbler's pegs		C		3/2
plants	land plants	Asteraceae	*Hypochaeris albiflora*		Y			1/1
plants	land plants	Asteraceae	*Leiocarpa brevicompta*			C		1/1
plants	land plants	Asteraceae	*Leiocarpa panaetioides*			C		1/1

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plants	land plants	Asteraceae	*Leiocarpa websteri*			C		1/1
plants	land plants	Asteraceae	*Leontodon rhagadioloides*		Y			1/1
plants	land plants	Asteraceae	*Leucochrysum albicans var. albicans*			C		1/1
plants	land plants	Asteraceae	*Minuria integerrima*	smooth minuria		C		2/1
plants	land plants	Asteraceae	*Myriocephalus pluriflorus*			C		1
plants	land plants	Asteraceae	*Olearia fulgens*			C		2/2
plants	land plants	Asteraceae	*Olearia microphylla*			C		1/1
plants	land plants	Asteraceae	*Picris barbarorum*			V		3/3
plants	land plants	Asteraceae	*Picris evae*			V	V	1/1
plants	land plants	Asteraceae	*Rhaponticum repens*		Y			1/1
plants	land plants	Asteraceae	*Schkuhria pinnata*		Y			2/2
plants	land plants	Asteraceae	*Senecio*					1
plants	land plants	Asteraceae	*Senecio brigalowensis*			C		1/1
plants	land plants	Asteraceae	*Senecio quadridentatus*	cotton fireweed		C		1/1
plants	land plants	Asteraceae	*Senecio queenslandicus*			C		2/2
plants	land plants	Asteraceae	*Sigesbeckia orientalis*	Indian weed		C		2/2
plants	land plants	Asteraceae	*Soliva sessilis*		Y			1/1
plants	land plants	Asteraceae	*Sonchus*					1
plants	land plants	Asteraceae	*Sphaeromorphaea australis*			C		1/1
plants	land plants	Asteraceae	*Symphyotrichum subulatum*		Y			1
plants	land plants	Asteraceae	*Tragopogon porrifolius*	salsify	Y			1
plants	land plants	Asteraceae	*Triptilodiscus pygmaeus*			C		1/1
plants	land plants	Asteraceae	*Verbesina encelioides var. encelioides*		Y			1/1
plants	land plants	Asteraceae	*Vittadinia cuneata var. hirsuta*			C		1/1
plants	land plants	Asteraceae	*Vittadinia dissecta var. hirta*			C		1/1
plants	land plants	Asteraceae	*Vittadinia pterochaeta*	rough fuzzweed		C		1/1
plants	land plants	Asteraceae	*Vittadinia pustulata*			C		2/1
plants	land plants	Asteraceae	*Vittadinia sulcata*	native daisy		C		1
plants	land plants	Asteraceae	*Vittadinia tenuissima*	western New Holland daisy		C		1/1
plants	land plants	Asteraceae	*Xanthium occidentale*		Y			1
plants	land plants	Asteraceae	*Xerochrysum bracteatum*	golden everlasting daisy		C		1
plants	land plants	Asteraceae	*Zinnia peruviana*	wild zinnia	Y			1/1
plants	land plants	Basellaceae	*Anredera cordifolia*	Madeira vine	Y			1/1
plants	land plants	Bignoniaceae	*Pandorea*					1/1
plants	land plants	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		1
plants	land plants	Boraginaceae	*Cynoglossum torvum*			C		1/1
plants	land plants	Brassicaceae	*Capsella bursa-pastoris*	shepherd's purse	Y			1/1
plants	land plants	Brassicaceae	*Lepidium bonariense*	Argentine peppercress	Y			1/1
plants	land plants	Brassicaceae	*Rapistrum rugosum*		Y			4/4
plants	land plants	Brassicaceae	*Rorippa laciniata*			C		1/1
plants	land plants	Brassicaceae	*Sisymbrium irio*	london rocket	Y			1/1
plants	land plants	Cactaceae	*Harrisia martinii*		Y			1
plants	land plants	Cactaceae	*Harrisia tortuosa*		Y			1
plants	land plants	Cactaceae	*Opuntia stricta*		Y			3/1
plants	land plants	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			3
plants	land plants	Caesalpiniaceae	*Senna artemisioides*			C		1/1

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plants	land plants	Caesalpiniaceae	*Senna artemisioides subsp. coriacea*			C		1/1
plants	land plants	Caesalpiniaceae	*Senna artemisioides subsp. zygophylla*			C		3/3
plants	land plants	Caesalpiniaceae	*Senna coronilloides*			C		1/1
plants	land plants	Caesalpiniaceae	*Senna sophera var. (40Mile Scrub J.R.Clarkson+ 6908)*			C		1/1
plants	land plants	Campanulaceae	*Isotoma axillaris*	australian harebell		C		3/3
plants	land plants	Campanulaceae	*Wahlenbergia*					2/1
plants	land plants	Campanulaceae	*Wahlenbergia capillaris*			C		2/2
plants	land plants	Campanulaceae	*Wahlenbergia glabra*	native bluebell		C		1/1
plants	land plants	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		C		3/3
plants	land plants	Campanulaceae	*Wahlenbergia tumidifructa*			C		1/1
plants	land plants	Capparaceae	*Capparis*					1
plants	land plants	Capparaceae	*Capparis anomala*			C		2/2
plants	land plants	Capparaceae	*Capparis lasiantha*	nipan		C		2/1
plants	land plants	Capparaceae	*Capparis mitchellii*			C		1/1
plants	land plants	Caryophyllaceae	*Polycarpaea corymbosa var. minor*			C		1/1
plants	land plants	Caryophyllaceae	*Polycarpon tetraphyllum*		Y			1/1
plants	land plants	Caryophyllaceae	*Spergularia levis*		Y			1/1
plants	land plants	Caryophyllaceae	*Spergularia media*		Y			1/1
plants	land plants	Casuarinaceae	*Allocasuarina inophloia*			C		5
plants	land plants	Casuarinaceae	*Allocasuarina luehmannii*	bull oak		C		4/4
plants	land plants	Casuarinaceae	*Casuarina cristata*	belah		C		4/3
plants	land plants	Casuarinaceae	*Casuarina cunninghamiana*			C		1
plants	land plants	Celastraceae	*Denhamia bilocularis*			C		2/2
plants	land plants	Celastraceae	*Elaeodendron australe var. integrifolium*			C		3/3
plants	land plants	Chenopodiaceae	*Dysphania carinata*			C		1/1
plants	land plants	Chenopodiaceae	*Dysphania pumilio*			C		1/1
plants	land plants	Chenopodiaceae	*Einadia hastata*			C		2/1
plants	land plants	Chenopodiaceae	*Einadia nutans*			C		1
plants	land plants	Chenopodiaceae	*Einadia nutans subsp. nutans*			C		2/2
plants	land plants	Chenopodiaceae	*Enchylaena tomentosa var. tomentosa*			C		4/3
plants	land plants	Chenopodiaceae	*Maireana microphylla*			C		2/2
plants	land plants	Chenopodiaceae	*Rhagodia parabolica*			C		1/1
plants	land plants	Chenopodiaceae	*Rhagodia spinescens*	thorny saltbush		C		2/1
plants	land plants	Chenopodiaceae	*Salsola australis*			C		2/2
plants	land plants	Chenopodiaceae	*Sclerolaena birchii*	galvanised burr		C		2/2
plants	land plants	Chenopodiaceae	*Sclerolaena tetracuspis*	brigalow burr		C		2/2
plants	land plants	Colchicaceae	*Wurmbea biglandulosa subsp. biglandulosa*			C		1/1
plants	land plants	Commelinaceae	*Commelina diffusa*	wandering jew		C		3/2
plants	land plants	Commelinaceae	*Commelina lanceolata*			C		1/1
plants	land plants	Convolvulaceae	*Dichondra*					1
plants	land plants	Convolvulaceae	*Dichondra sp. (Inglewood J.M.Dalby 86/93)*			C		1/1
plants	land plants	Crassulaceae	*Bryophyllum delagoense*		Y			1
plants	land plants	Crassulaceae	*Crassula sieberiana*			C		1/1
plants	land plants	Crassulaceae	*Crassula tetramera*			C		1/1
plants	land plants	Cupressaceae	*Callitris endlicheri*	black cypress pine		C		2/1

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plants	land plants	Cupressaceae	*Callitris glaucophylla*	white cypress pine		C		11/2
plants	land plants	Cyperaceae	*Carex appressa*			C		2/2
plants	land plants	Cyperaceae	*Carex inversa*	knob sedge		C		3/3
plants	land plants	Cyperaceae	*Cyperus aggregatus*		Y			3/3
plants	land plants	Cyperaceae	*Cyperus bifax*	western nutgrass		C		1
plants	land plants	Cyperaceae	*Cyperus bowmanni*			C		1/1
plants	land plants	Cyperaceae	*Cyperus concinnus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus fulvus*			C		3/3
plants	land plants	Cyperaceae	*Cyperus gracilis*			C		3/2
plants	land plants	Cyperaceae	*Cyperus isabellinus*			C		1/1
plants	land plants	Cyperaceae	*Cyperus squarrosus*	bearded flatsedge		C		2/1
plants	land plants	Cyperaceae	*Cyperus victoriensis*			C		1/1
plants	land plants	Cyperaceae	*Eleocharis cylindrostachys*			C		1/1
plants	land plants	Cyperaceae	*Eleocharis pallens*	pale spikerush		C		1/1
plants	land plants	Cyperaceae	*Fimbristylis*					1
plants	land plants	Cyperaceae	*Gahnia aspera*			C		2/1
plants	land plants	Cyperaceae	*Scleria mackaviensis*			C		1/1
plants	land plants	Dilleniaceae	*Hibbertia acicularis*			C		2/1
plants	land plants	Droseraceae	*Drosera burmanni*			C		1/1
plants	land plants	Droseraceae	*Drosera hookeri*			C		1/1
plants	land plants	Ericaceae	*Melichrus sp. (Inglewood A.R.Bean 1652)*			C		1/1
plants	land plants	Ericaceae	*Melichrus urceolatus*	honey gorse		C		1/1
plants	land plants	Ericaceae	*Styphelia biflora*			C		2/1
plants	land plants	Ericaceae	*Styphelia mutica*			C		1
plants	land plants	Ericaceae	*Styphelia viridis subsp. breviflora*			C		2/1
plants	land plants	Euphorbiaceae	*Euphorbia dallachyana*			C		1/1
plants	land plants	Euphorbiaceae	*Euphorbia laciniloba*			C		1/1
plants	land plants	Euphorbiaceae	*Euphorbia tannensis subsp. eremophila*			C		1/1
plants	land plants	Fabaceae	*Aotus subglauca var. filiformis*			C		1/1
plants	land plants	Fabaceae	*Cullen tenax*	emu-foot		C		1/1
plants	land plants	Fabaceae	*Daviesia filipes subsp. filipes*			C		1/1
plants	land plants	Fabaceae	*Desmodium brachypodum*	large ticktrefoil		C		2/1
plants	land plants	Fabaceae	*Desmodium gunnii*			C		1/1
plants	land plants	Fabaceae	*Glycine clandestina var. sericea*			C		1/1
plants	land plants	Fabaceae	*Glycine tabacina*	glycine pea		C		1/1
plants	land plants	Fabaceae	*Indigofera australis*			C		1
plants	land plants	Fabaceae	*Indigofera australis subsp. australis*			C		1/1
plants	land plants	Fabaceae	*Jacksonia scoparia*			C		2
plants	land plants	Fabaceae	*Lotononis bainesii*	lotononis	Y			1/1
plants	land plants	Fabaceae	*Medicago minima var. minima*		Y			1/1
plants	land plants	Fabaceae	*Melilotus indicus*	hexham scent	Y			1/1
plants	land plants	Fabaceae	*Swainsona galegifolia*	smooth Darling pea		C		3/2
plants	land plants	Fabaceae	*Vigna suberecta*			C		1/1
plants	land plants	Fabaceae	*Zornia dyctiocarpa var. dyctiocarpa*			C		1/1
plants	land plants	Geraniaceae	*Erodium crinitum*	blue crowfoot		C		1/1
plants	land plants	Goodeniaceae	*Goodenia bellidifolia subsp. argentea*			C		1

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plants	land plants	Goodeniaceae	*Goodenia fascicularis*			C		1/1
plants	land plants	Goodeniaceae	*Scaevola spinescens*	prickly fan flower		C		1/1
plants	land plants	Grimmiaceae	*Grimmia laevigata*			C		1/1
plants	land plants	Haloragaceae	*Haloragis heterophylla*	rough raspweed		C		1/1
plants	land plants	Haloragaceae	*Myriophyllum*					1/1
plants	land plants	Hemerocallidaceae	*Dianella caerulea*			C		1
plants	land plants	Hemerocallidaceae	*Dianella revoluta var. revoluta*			C		3/1
plants	land plants	Hemerocallidaceae	*Stypandra glauca*	nodding blue lily		C		3/2
plants	land plants	Hypoxidaceae	*Hypoxis arillacea*			C		1/1
plants	land plants	Juncaceae	*Juncus subglaucus*			C		2/2
plants	land plants	Juncaceae	*Juncus usitatus*			C		2/2
plants	land plants	Juncaginaceae	*Triglochin striata*	streaked arrowgrass		C		1
plants	land plants	Lamiaceae	*Coleus australis*			C		2/2
plants	land plants	Lamiaceae	*Coleus insularis*	Millmerran mint bush		CR		3/3
plants	land plants	Lamiaceae	*Mentha satureioides*	native pennyroyal		C		3/3
plants	land plants	Lamiaceae	*Prostanthera nivea*			C		1/1
plants	land plants	Lamiaceae	*Salvia reflexa*		Y			1/1
plants	land plants	Lamiaceae	*Scutellaria humilis*	dwarf skullcap		C		1/1
plants	land plants	Lamiaceae	*Teucrium daucoides*			C		2/2
plants	land plants	Lamiaceae	*Teucrium junceum*			C		3/3
plants	land plants	Laxmanniaceae	*Arthropodium minus*			C		1/1
plants	land plants	Laxmanniaceae	*Arthropodium strictum*			C		1/1
plants	land plants	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		3/3
plants	land plants	Laxmanniaceae	*Laxmannia gracilis*	slender wire lily		C		1/1
plants	land plants	Laxmanniaceae	*Lomandra filiformis subsp. filiformis*			C		2/2
plants	land plants	Laxmanniaceae	*Lomandra longifolia*			C		3/2
plants	land plants	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		2/1
plants	land plants	Loganiaceae	*Mitrasacme paludosa*			C		2/2
plants	land plants	Loranthaceae	*Amyema cambagei*			C		2/2
plants	land plants	Loranthaceae	*Amyema congener subsp. congener*			C		1/1
plants	land plants	Loranthaceae	*Amyema congener subsp. rotundifolia*			C		1/1
plants	land plants	Loranthaceae	*Amyema miquelii*			C		1/1
plants	land plants	Loranthaceae	*Amyema quandang var. bancroftii*	broad-leaved grey mistletoe		C		1/1
plants	land plants	Malvaceae	*Abutilon oxycarpum var. oxycarpum*			C		1/1
plants	land plants	Malvaceae	*Hibiscus sturtii*			C		1
plants	land plants	Malvaceae	*Malva parviflora*	small-flowered mallow	Y			1/1
plants	land plants	Malvaceae	*Malvastrum americanum var. stellatum*			C		1/1
plants	land plants	Malvaceae	*Sida*					1
plants	land plants	Malvaceae	*Sida corrugata*			C		1
plants	land plants	Malvaceae	*Sida hackettiana*			C		1/1
plants	land plants	Malvaceae	*Sida trichopoda*			C		2/1
plants	land plants	Marsileaceae	*Marsilea drummondii*	common nardoo		C		2/2
plants	land plants	Mimosaceae	*Acacia*					1
plants	land plants	Mimosaceae	*Acacia amblygona*	fan-leaf wattle		C		1/1
plants	land plants	Mimosaceae	*Acacia conferta*			C		2/2
plants	land plants	Mimosaceae	*Acacia crassa subsp. crassa*			C		1/1

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plants	land plants	Mimosaceae	*Acacia deanei*			C		2/2
plants	land plants	Mimosaceae	*Acacia decora*	pretty wattle		C		2/2
plants	land plants	Mimosaceae	*Acacia excelsa*			C		1
plants	land plants	Mimosaceae	*Acacia excelsa subsp. excelsa*			C		1
plants	land plants	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle		C		1/1
plants	land plants	Mimosaceae	*Acacia harpophylla*	brigalow		C		3/2
plants	land plants	Mimosaceae	*Acacia leiocalyx subsp. leiocalyx*			C		1/1
plants	land plants	Mimosaceae	*Acacia muelleriana*			C		1/1
plants	land plants	Mimosaceae	*Acacia neriifolia*	pechey wattle		C		5/1
plants	land plants	Mimosaceae	*Acacia pendula*	myall		C		2/1
plants	land plants	Mimosaceae	*Acacia penninervis var. penninervis*			C		1/1
plants	land plants	Mimosaceae	*Acacia pravifolia*	coil-pod wattle		C		2/2
plants	land plants	Mimosaceae	*Acacia salicina*	doolan		C		3/3
plants	land plants	Mimosaceae	*Acacia semilunata*	crescent-leaved wattle		C		1/1
plants	land plants	Mimosaceae	*Desmanthus pernambucanus*		Y			1/1
plants	land plants	Mimosaceae	*Neptunia gracilis forma gracilis*			C		1/1
plants	land plants	Molluginaceae	*Mollugo verticillata*		Y			1/1
plants	land plants	Myrsinaceae	*Lysimachia arvensis*		Y			1/1
plants	land plants	Myrtaceae	*Angophora floribunda*	rough-barked apple		C		3/1
plants	land plants	Myrtaceae	*Angophora leiocarpa*	rusty gum		C		46
plants	land plants	Myrtaceae	*Corymbia clarksoniana*			C		2/2
plants	land plants	Myrtaceae	*Corymbia erythrophloia*	variable-barked bloodwood		C		1
plants	land plants	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		1
plants	land plants	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		2
plants	land plants	Myrtaceae	*Eucalyptus albens*	white box		C		1/1
plants	land plants	Myrtaceae	*Eucalyptus blakelyi*	Blakely's red gum		C		1
plants	land plants	Myrtaceae	*Eucalyptus chloroclada*	Baradine red gum		C		1/1
plants	land plants	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		5
plants	land plants	Myrtaceae	*Eucalyptus dealbata*	tumble-down red gum		C		1/1
plants	land plants	Myrtaceae	*Eucalyptus elegans*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus melliodora*	yellow box		C		3
plants	land plants	Myrtaceae	*Eucalyptus moluccana*	gum-topped box		C		1
plants	land plants	Myrtaceae	*Eucalyptus populnea*	poplar box		C		3/1
plants	land plants	Myrtaceae	*Eucalyptus tereticornis*			C		1
plants	land plants	Myrtaceae	*Eucalyptus tereticornis subsp. tereticornis*			C		6
plants	land plants	Myrtaceae	*Eucalyptus terrica*			C		1
plants	land plants	Myrtaceae	*Eucalyptus woollsiana*			C		3/2
plants	land plants	Myrtaceae	*Leptospermum brevipes*			C		5/2
plants	land plants	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		1/1
plants	land plants	Myrtaceae	*Melaleuca diosmatifolia*	mauve honey myrtle		C		1/1
plants	land plants	Myrtaceae	*Melaleuca lanceolata*			C		5/4
plants	land plants	Nyctaginaceae	*Boerhavia dominii*			C		1
plants	land plants	Nyctaginaceae	*Boerhavia pubescens*			C		1/1
plants	land plants	Nyctaginaceae	*Boerhavia sp. (St George A.Hill AQ399299)*			C		1/1
plants	land plants	Oleaceae	*Jasminum dianthifolium*			C		1/1
plants	land plants	Oleaceae	*Jasminum didymum subsp. lineare*			C		1/1

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plants	land plants	Oleaceae	*Jasminum simplicifolium subsp. australiense*			C		1/1
plants	land plants	Oleaceae	*Notelaea linearis*			C		1
plants	land plants	Oleaceae	*Notelaea microcarpa*			C		4/2
plants	land plants	Ophioglossaceae	*Ophioglossum gramineum*			C		1/1
plants	land plants	Orchidaceae	*Caladenia fuscata*			C		2/2
plants	land plants	Orchidaceae	*Cyanicula caerulea*			C		1/1
plants	land plants	Orchidaceae	*Cymbidium canaliculatum*			C		2/2
plants	land plants	Orchidaceae	*Pterostylis boormanii*			C		2/2
plants	land plants	Orchidaceae	*Pterostylis longicurva*			C		1/1
plants	land plants	Orchidaceae	*Pterostylis mitchellii*			C		3/3
plants	land plants	Orchidaceae	*Pterostylis mutica*	midget greenhood		C		2/2
plants	land plants	Oxalidaceae	*Oxalis perennans*			C		2/2
plants	land plants	Oxalidaceae	*Oxalis radicosa*			C		1/1
plants	land plants	Phrymaceae	*Mimulus gracilis*	slender monkey flower		C		1/1
plants	land plants	Phyllanthaceae	*Breynia oblongifolia*			C		2/1
plants	land plants	Phyllanthaceae	*Phyllanthus filicaulis*			C		1/1
plants	land plants	Phytolaccaceae	*Phytolacca octandra*	inkweed	Y			1/1
plants	land plants	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		6/2
plants	land plants	Pittosporaceae	*Auranticarpa rhombifolia*			C		1/1
plants	land plants	Pittosporaceae	*Bursaria incana*			C		1
plants	land plants	Pittosporaceae	*Bursaria spinosa subsp. spinosa*			C		1
plants	land plants	Pittosporaceae	*Pittosporum angustifolium*			C		5/3
plants	land plants	Pittosporaceae	*Pittosporum spinescens*			C		3/3
plants	land plants	Plantaginaceae	*Misopates orontium*	lesser snapdragon	Y			3/3
plants	land plants	Plantaginaceae	*Plantago*					1
plants	land plants	Plantaginaceae	*Plantago cunninghamii*	sago weed		C		1/1
plants	land plants	Plantaginaceae	*Plantago debilis*	shade plantain		C		4/4
plants	land plants	Plantaginaceae	*Plantago lanceolata*		Y			1/1
plants	land plants	Plantaginaceae	*Stemodia glabella*			C		1/1
plants	land plants	Plantaginaceae	*Veronica plebeia*	trailing speedwell		C		1/1
plants	land plants	Poaceae	*Ancistrachne uncinulata*	hooky grass		C		3/1
plants	land plants	Poaceae	*Anthosachne scabra*			C		2/2
plants	land plants	Poaceae	*Aristida*					1
plants	land plants	Poaceae	*Aristida calycina*			C		1
plants	land plants	Poaceae	*Aristida calycina var. calycina*			C		3/2
plants	land plants	Poaceae	*Aristida caput-medusae*			C		2/2
plants	land plants	Poaceae	*Aristida gracilipes*			C		2/2
plants	land plants	Poaceae	*Aristida latifolia*	feathertop wiregrass		C		1/1
plants	land plants	Poaceae	*Aristida leptopoda*	white speargrass		C		1/1
plants	land plants	Poaceae	*Aristida lignosa*			C		1/1
plants	land plants	Poaceae	*Aristida queenslandica*			C		1
plants	land plants	Poaceae	*Aristida ramosa*	purple wiregrass		C		5/2
plants	land plants	Poaceae	*Austrostipa ramosissima*	bamboo grass		C		1
plants	land plants	Poaceae	*Austrostipa scabra*			C		2/2
plants	land plants	Poaceae	*Austrostipa verticillata*	slender bamboo grass		C		3/3
plants	land plants	Poaceae	*Avena fatua*	wild oats	Y			1/1

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plants	land plants	Poaceae	*Bothriochloa bladhii subsp. glabra*		Y			1/1
plants	land plants	Poaceae	*Bothriochloa decipiens*			C		2
plants	land plants	Poaceae	*Bothriochloa decipiens var. decipiens*			C		1/1
plants	land plants	Poaceae	*Bothriochloa insculpta*		Y			2/2
plants	land plants	Poaceae	*Bromus catharticus*	prairie grass	Y			1/1
plants	land plants	Poaceae	*Cenchrus spinifex*		Y			1/1
plants	land plants	Poaceae	*Chloris divaricata*			C		1
plants	land plants	Poaceae	*Chloris gayana*	rhodes grass	Y			1/1
plants	land plants	Poaceae	*Chloris truncata*			C		1/1
plants	land plants	Poaceae	*Chloris ventricosa*	tall chloris		C		2/1
plants	land plants	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			1
plants	land plants	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		4/1
plants	land plants	Poaceae	*Cynodon dactylon*		Y			1
plants	land plants	Poaceae	*Cynodon dactylon var. dactylon*		Y			1/1
plants	land plants	Poaceae	*Dichanthium sericeum*			C		1
plants	land plants	Poaceae	*Dichanthium sericeum subsp. sericeum*			C		1/1
plants	land plants	Poaceae	*Dichelachne crinita*	longhair plumegrass		C		1
plants	land plants	Poaceae	*Dichelachne rara*			C		1/1
plants	land plants	Poaceae	*Digitaria brownii*			C		2/1
plants	land plants	Poaceae	*Digitaria diffusa*			C		1/1
plants	land plants	Poaceae	*Digitaria diminuta*			C		2/2
plants	land plants	Poaceae	*Digitaria divaricatissima*	spreading umbrella grass		C		2
plants	land plants	Poaceae	*Digitaria eriantha*		Y			1/1
plants	land plants	Poaceae	*Digitaria porrecta*			NT		6/6
plants	land plants	Poaceae	*Dinebra decipiens var. asthenes*			C		3/3
plants	land plants	Poaceae	*Dinebra decipiens var. decipiens*			C		1/1
plants	land plants	Poaceae	*Dinebra divaricatissima*			C		1/1
plants	land plants	Poaceae	*Dinebra panicea var. brachiata*		Y			1/1
plants	land plants	Poaceae	*Dinebra retroflexa*		Y			1/1
plants	land plants	Poaceae	*Echinochloa colona*	awnless barnyard grass	Y			1/1
plants	land plants	Poaceae	*Enneapogon gracilis*	slender nineawn		C		1/1
plants	land plants	Poaceae	*Enteropogon paucispiceus*			C		1/1
plants	land plants	Poaceae	*Enteropogon ramosus*			C		1
plants	land plants	Poaceae	*Eragrostis*					1
plants	land plants	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		1
plants	land plants	Poaceae	*Eragrostis curvula*		Y			2/2
plants	land plants	Poaceae	*Eragrostis elongata*			C		1
plants	land plants	Poaceae	*Eragrostis leptostachya*			C		2
plants	land plants	Poaceae	*Eragrostis megalosperma*			C		3/2
plants	land plants	Poaceae	*Eragrostis parviflora*	weeping lovegrass		C		2/1
plants	land plants	Poaceae	*Eragrostis sororia*			C		1/1
plants	land plants	Poaceae	*Eriochloa crebra*	spring grass		C		1/1
plants	land plants	Poaceae	*Eriochloa procera*	slender cupgrass		C		1/1
plants	land plants	Poaceae	*Eriochloa pseudoacrotricha*			C		1
plants	land plants	Poaceae	*Eulalia aurea*	silky browntop		C		1
plants	land plants	Poaceae	*Homopholis belsonii*			E	V	158/12

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	*Hyparrhenia hirta*	coolati grass	Y			2/1
plants	land plants	Poaceae	*Iseilema membranaceum*	small flinders grass		C		1/1
plants	land plants	Poaceae	*Lolium perenne*	perennial ryegrass	Y			1/1
plants	land plants	Poaceae	*Megathyrsus maximus*		Y			1
plants	land plants	Poaceae	*Megathyrsus maximus var. pubiglumis*		Y			1/1
plants	land plants	Poaceae	*Microlaena stipoides var. stipoides*			C		1/1
plants	land plants	Poaceae	*Oplismenus imbecillis*			C		1/1
plants	land plants	Poaceae	*Panicum decompositum var. decompositum*			C		1/1
plants	land plants	Poaceae	*Panicum decompositum var. tenuius*			C		1/1
plants	land plants	Poaceae	*Panicum effusum*			C		3/1
plants	land plants	Poaceae	*Paspalidium albovillosum*			C		1/1
plants	land plants	Poaceae	*Paspalidium caespitosum*	brigalow grass		C		2
plants	land plants	Poaceae	*Paspalidium constrictum*			C		4/2
plants	land plants	Poaceae	*Paspalidium criniforme*			C		2/2
plants	land plants	Poaceae	*Paspalidium globoideum*	sago grass		C		1/1
plants	land plants	Poaceae	*Rytidosperma*					1
plants	land plants	Poaceae	*Rytidosperma indutum*			C		1/1
plants	land plants	Poaceae	*Rytidosperma longifolium*			C		1/1
plants	land plants	Poaceae	*Rytidosperma tenuius*			C		1
plants	land plants	Poaceae	*Schizachyrium fragile*	firegrass		C		1/1
plants	land plants	Poaceae	*Setaria pumila*		Y			1
plants	land plants	Poaceae	*Sporobolus caroli*	fairy grass		C		4/3
plants	land plants	Poaceae	*Sporobolus creber*			C		2/1
plants	land plants	Poaceae	*Sporobolus mitchellii*	rat's tail couch		C		1/1
plants	land plants	Poaceae	*Themeda triandra*	kangaroo grass		C		1
plants	land plants	Poaceae	*Tragus australianus*	small burr grass		C		1/1
plants	land plants	Poaceae	*Tripogon loliiformis*	five minute grass		C		2/2
plants	land plants	Poaceae	*Triticum aestivum*	wheat	Y			2/2
plants	land plants	Poaceae	*Urochloa foliosa*			C		1/1
plants	land plants	Polygonaceae	*Fallopia convolvulus*	black bindweed	Y			1/1
plants	land plants	Polygonaceae	*Rumex brownii*	swamp dock		C		1
plants	land plants	Polygonaceae	*Rumex dumosus*	wiry dock		C		1/1
plants	land plants	Portulacaceae	*Calandrinia pickeringii*			C		2/2
plants	land plants	Portulacaceae	*Calandrinia remota*			C		1
plants	land plants	Portulacaceae	*Portulaca filifolia*			C		2/2
plants	land plants	Portulacaceae	*Portulaca pilosa*		Y			2/2
plants	land plants	Proteaceae	*Hakea lorea subsp. lorea*			C		5/3
plants	land plants	Proteaceae	*Petrophile canescens*			C		2/2
plants	land plants	Proteaceae	*Xylomelum cunninghamianum*			C		9/3
plants	land plants	Pteridaceae	*Adiantum atroviride*			C		1/1
plants	land plants	Pteridaceae	*Cheilanthes*					1
plants	land plants	Pteridaceae	*Cheilanthes distans*	bristly cloak fern		C		2/2
plants	land plants	Pteridaceae	*Cheilanthes sieberi subsp. sieberi*			C		2/2
plants	land plants	Pteridaceae	*Pellaea calidirupium*			C		1/1
plants	land plants	Ptychomitriaceae	*Ptychomitrium australe*			C		2/2
plants	land plants	Ranunculaceae	*Ranunculus meristus*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		2
plants	land plants	Rubiaceae	*Asperula conferta*			C		1/1
plants	land plants	Rubiaceae	*Asperula geminifolia*			C		4/4
plants	land plants	Rubiaceae	*Galium terrae-reginae*			C		1/1
plants	land plants	Rubiaceae	*Pomax umbellata*			C		2/1
plants	land plants	Rubiaceae	*Psydrax odorata forma buxifolia*			C		1
plants	land plants	Rubiaceae	*Psydrax odorata forma subnitida*			C		2/2
plants	land plants	Rutaceae	*Geijera parviflora*	wilga		C		4/2
plants	land plants	Santalaceae	*Exocarpos cupressiformis*	native cherry		C		1/1
plants	land plants	Santalaceae	*Santalum lanceolatum*			C		2/2
plants	land plants	Sapindaceae	*Alectryon pubescens*			C		1/1
plants	land plants	Sapindaceae	*Atalaya hemiglauca*			C		4/1
plants	land plants	Sapindaceae	*Dodonaea sinuolata subsp. sinuolata*			C		2/2
plants	land plants	Sapindaceae	*Dodonaea tenuifolia*			C		1
plants	land plants	Sapindaceae	*Dodonaea viscosa subsp. angustifolia*			C		2/2
plants	land plants	Sapindaceae	*Dodonaea viscosa subsp. spatulata*			C		1/1
plants	land plants	Scrophulariaceae	*Eremophila debilis*	winter apple		C		2/2
plants	land plants	Scrophulariaceae	*Eremophila deserti*			C		1
plants	land plants	Scrophulariaceae	*Eremophila mitchellii*			C		2
plants	land plants	Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla		C		2/1
plants	land plants	Solanaceae	*Nicotiana megalosiphon subsp. megalosiphon*			C		1/1
plants	land plants	Solanaceae	*Physalis lanceifolia*		Y			1/1
plants	land plants	Solanaceae	*Solanum americanum*		Y			1/1
plants	land plants	Solanaceae	*Solanum coracinum*			C		7/7
plants	land plants	Solanaceae	*Solanum ellipticum*	potato bush		C		2/2
plants	land plants	Solanaceae	*Solanum esuriale*	quena		C		2/2
plants	land plants	Solanaceae	*Solanum jucundum*			C		1
plants	land plants	Solanaceae	*Solanum nemophilum*			C		3/3
plants	land plants	Solanaceae	*Solanum parvifolium subsp. parvifolium*			C		8/8
plants	land plants	Solanaceae	*Solanum semiarmatum*	prickly nightshade		C		1
plants	land plants	Sterculiaceae	*Brachychiton populneus subsp. populneus*			C		3/2
plants	land plants	Sterculiaceae	*Brachychiton populneus subsp. trilobus*			C		1/1
plants	land plants	Thymelaeaceae	*Pimelea microcephala subsp. microcephala*			C		1/1
plants	land plants	Thymelaeaceae	*Pimelea trichostachya*	flaxweed		C		1/1
plants	land plants	Verbenaceae	*Glandularia aristigera*		Y			5/3
plants	land plants	Verbenaceae	*Phyla canescens*		Y			2/2
plants	land plants	Verbenaceae	*Verbena gaudichaudii*			C		1/1
plants	land plants	Violaceae	*Pigea stellarioides*			C		1/1
plants	land plants	Viscaceae	*Viscum articulatum*	flat mistletoe		C		1/1
plants	land plants	Vitaceae	*Causonis clematidea*			C		1/1
plants	land plants	Vitaceae	*Clematicissus opaca*			C		2/2
plants	land plants	Xanthorrhoeaceae	*Xanthorrhoea glauca subsp. glauca*			C		1/1
plants	land plants	Xanthorrhoeaceae	*Xanthorrhoea johnsonii*			C		1
plants	land plants	Zygophyllaceae	*Tribulus micrococcus*	yellow vine		C		4/4
plants	land plants	Zygophyllaceae	*Zygophyllum apiculatum*	gall weed		C		2/2
plants		Papilionoideae	*Desmodium varians*	slender tick trefoil		C		1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

A.3 DES MSES report

Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest
mdl: 301

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

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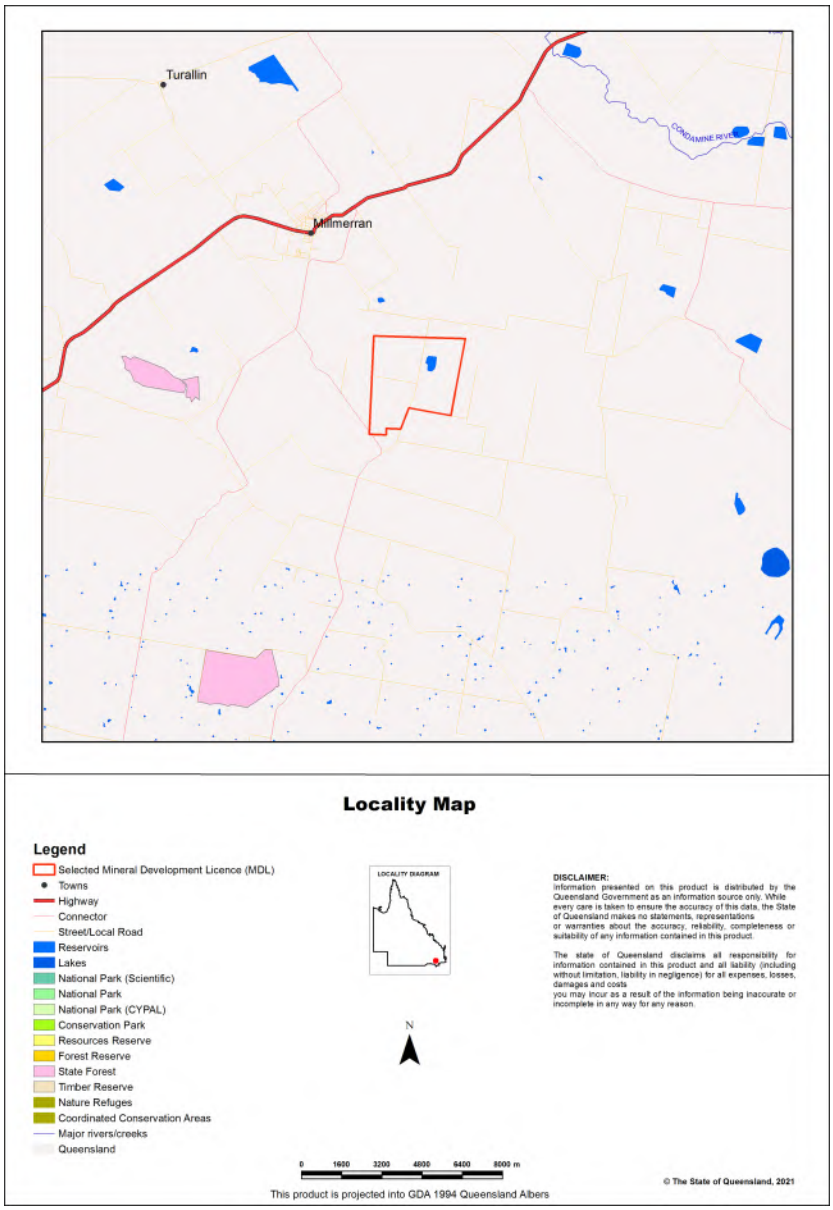
Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI mdl: 301

Size (ha)	1,128.86
Local Government(s)	Toowoomba Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Inglewood Sandstones
Catchment(s)	Balonne-Condamine



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	7.91 ha	0.7%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	23.14 ha	2.0%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	13.77 ha	1.2%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.0 ha	0.0 %
8d Regulated Vegetation - Essential habitat	7.91 ha	0.7%
8e Regulated Vegetation - intersecting a watercourse **	11.7 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

1c. Protected Areas - special wildlife reserves

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii		V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Melaleuca irbyana		E	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	V	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Xeromys myoides	Water Mouse	V	None

**For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.*

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	

Special least concern animal species records

(no results)

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/
For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:
https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.25/11.5.20/11.4.3	E-subdom	rem_end
11.3.2	O-dom	rem_oc
11.5.20/11.4.3	E-subdom	rem_end

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.4.3/11.5.20/11.3.25	E-dom	hvr_end

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Not applicable

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

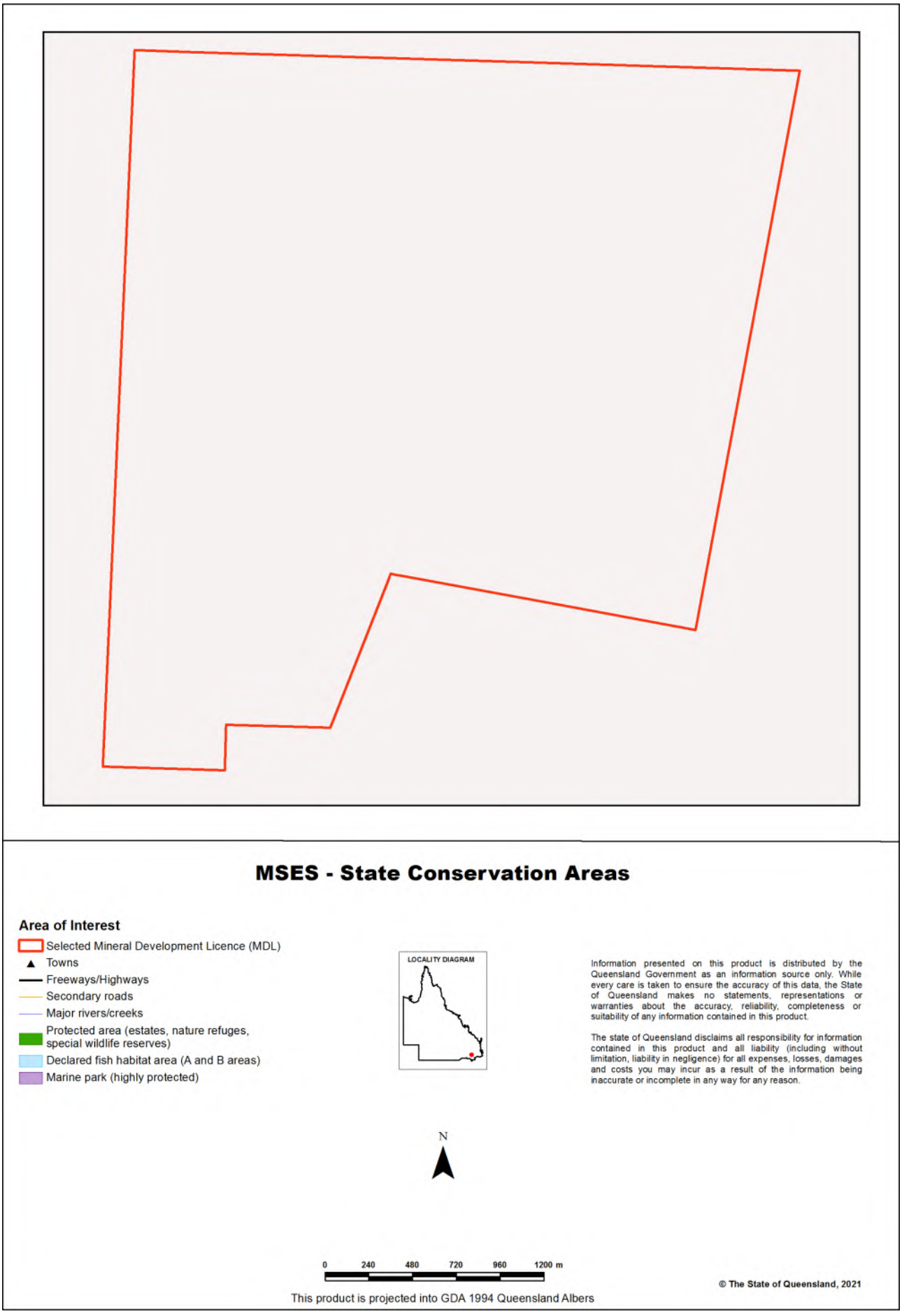
(no results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

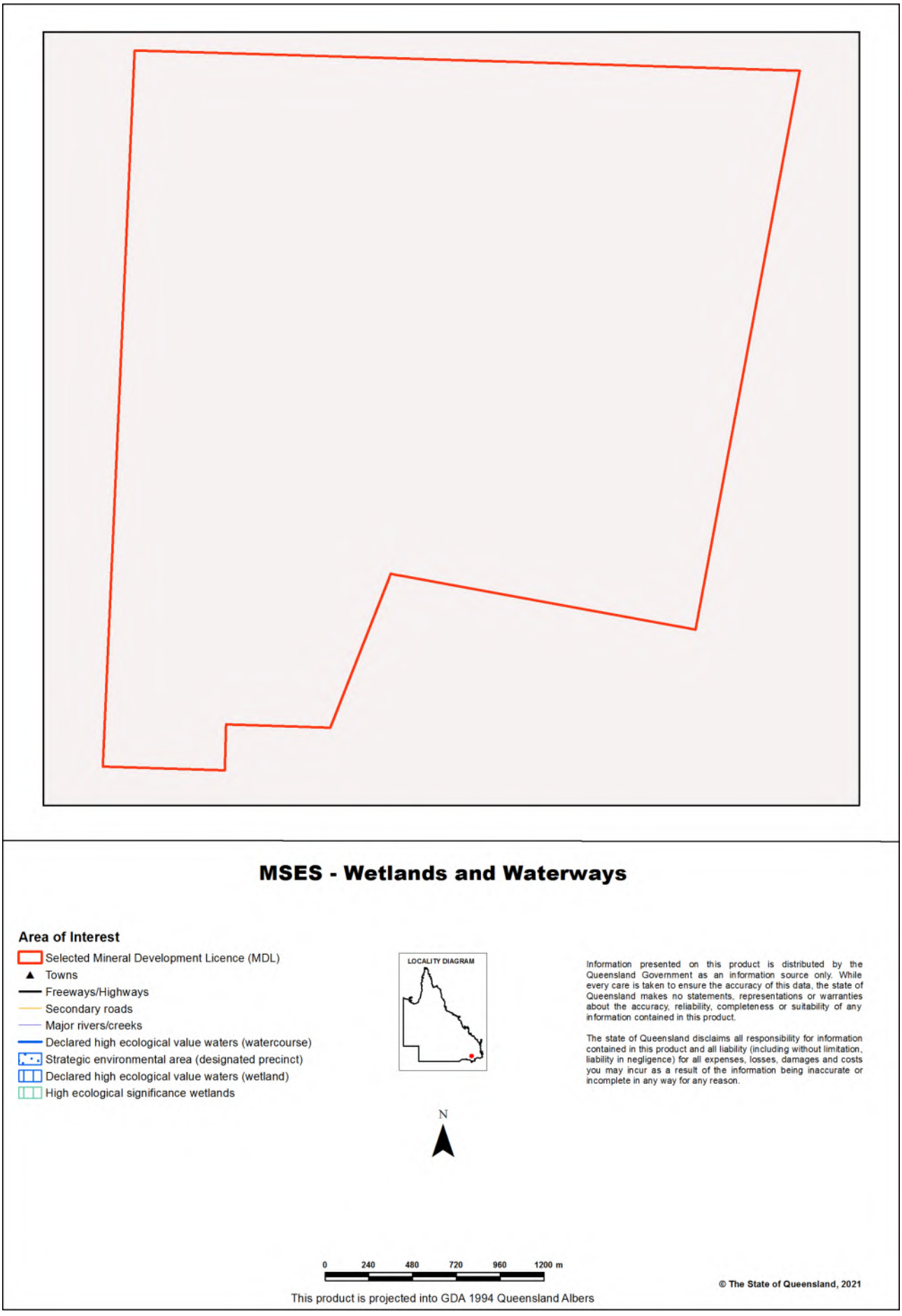
(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

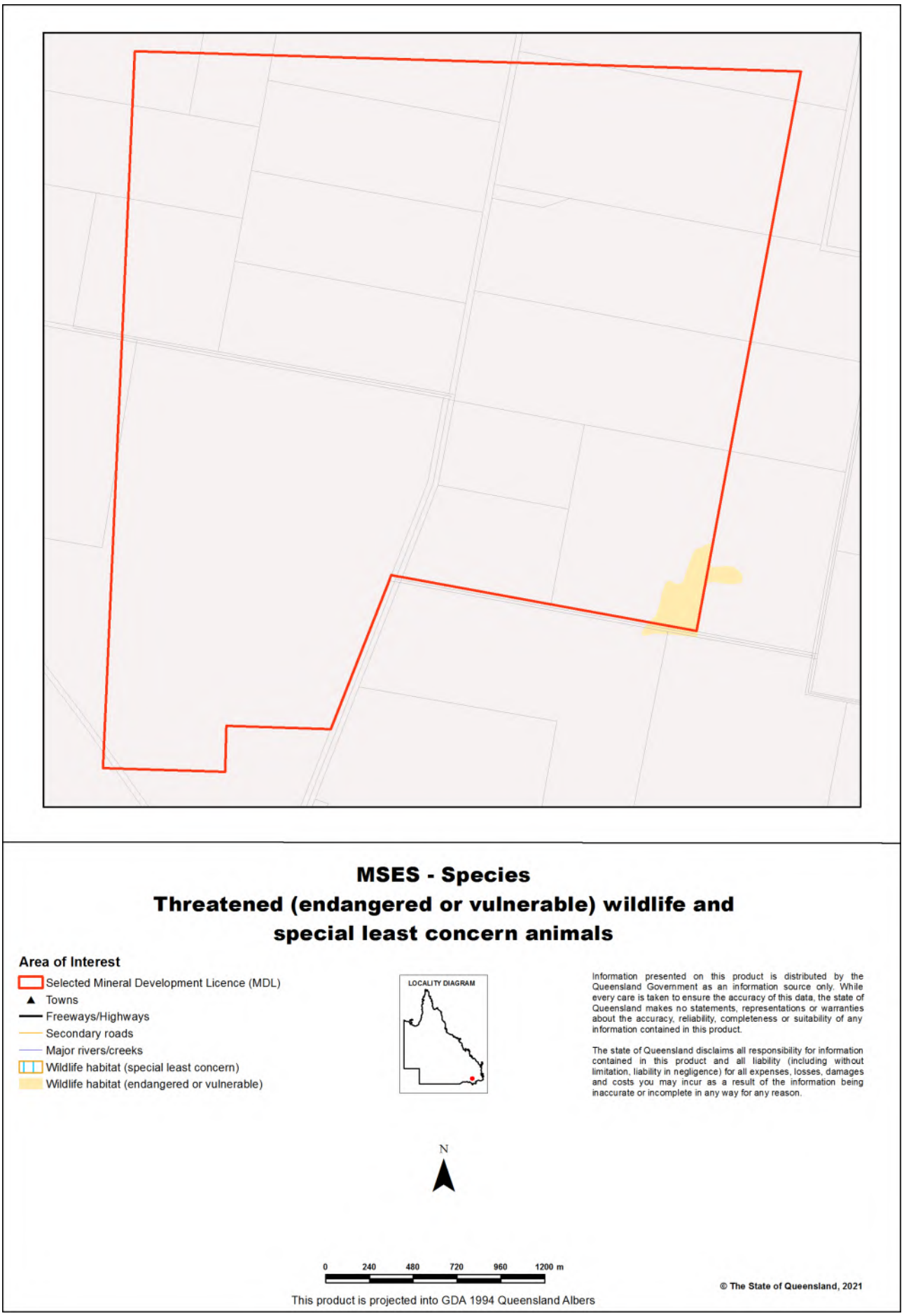
Map 1 - MSES - State Conservation Areas



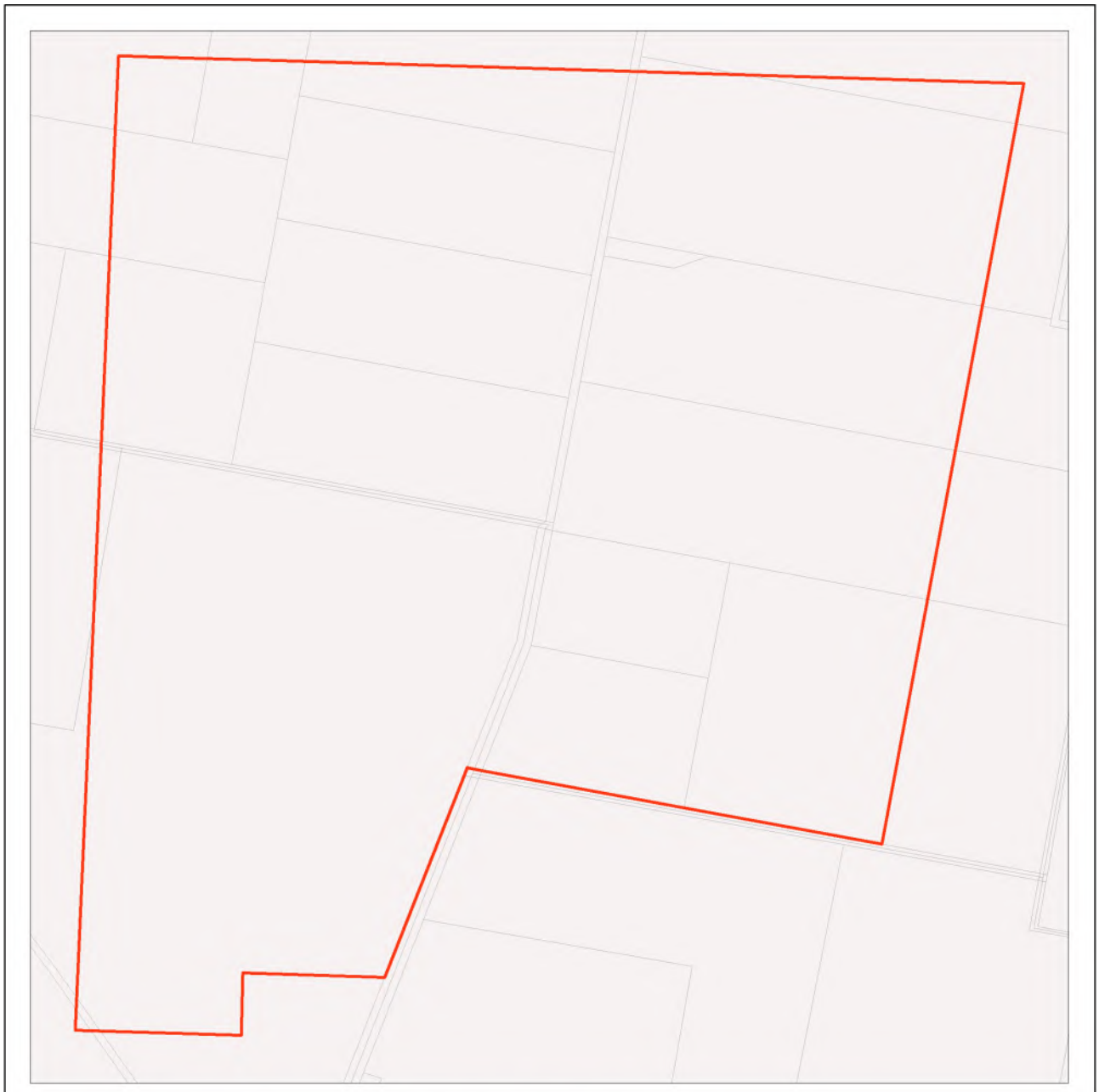
Map 2 - MSES - Wetlands and Waterways



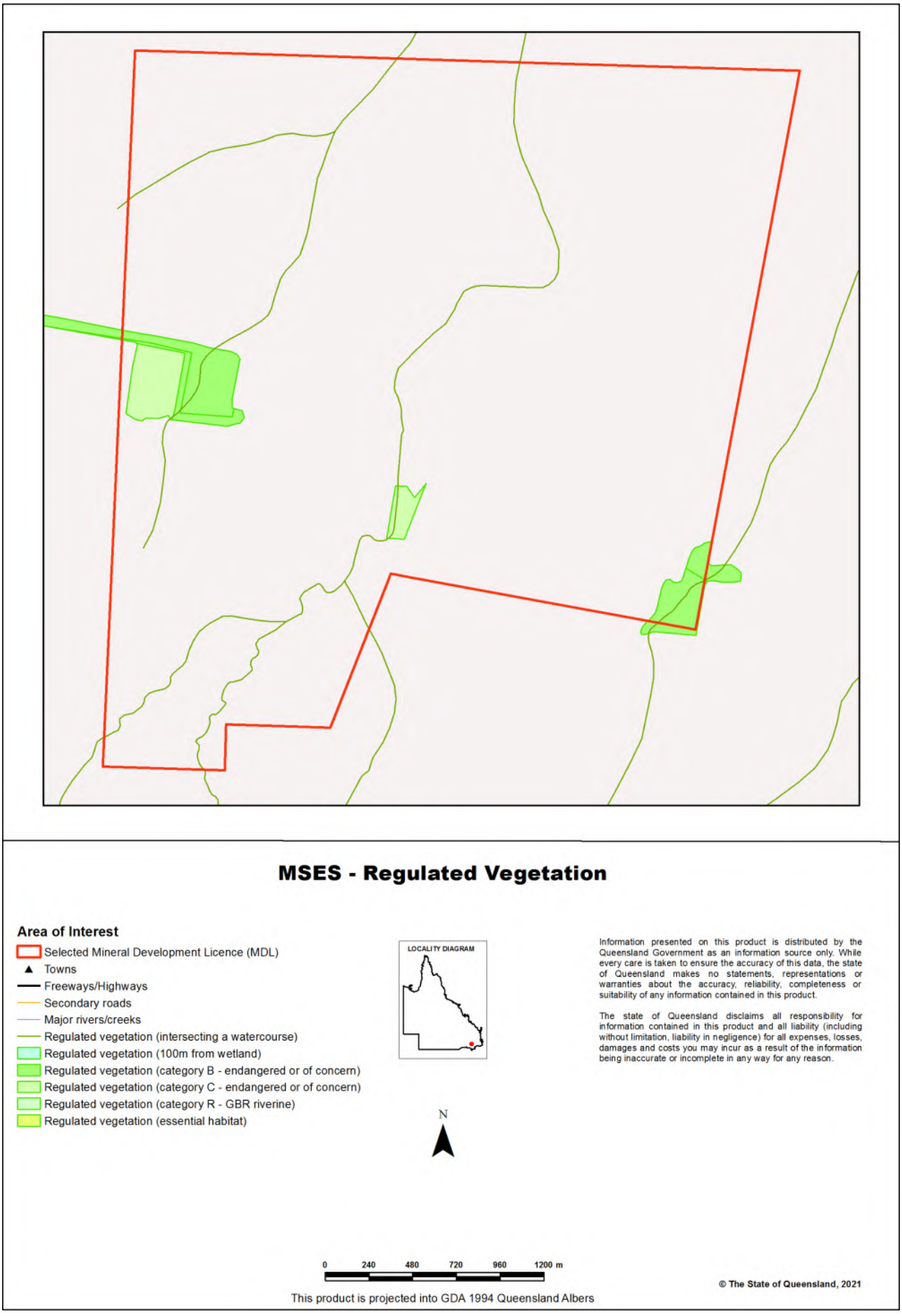
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



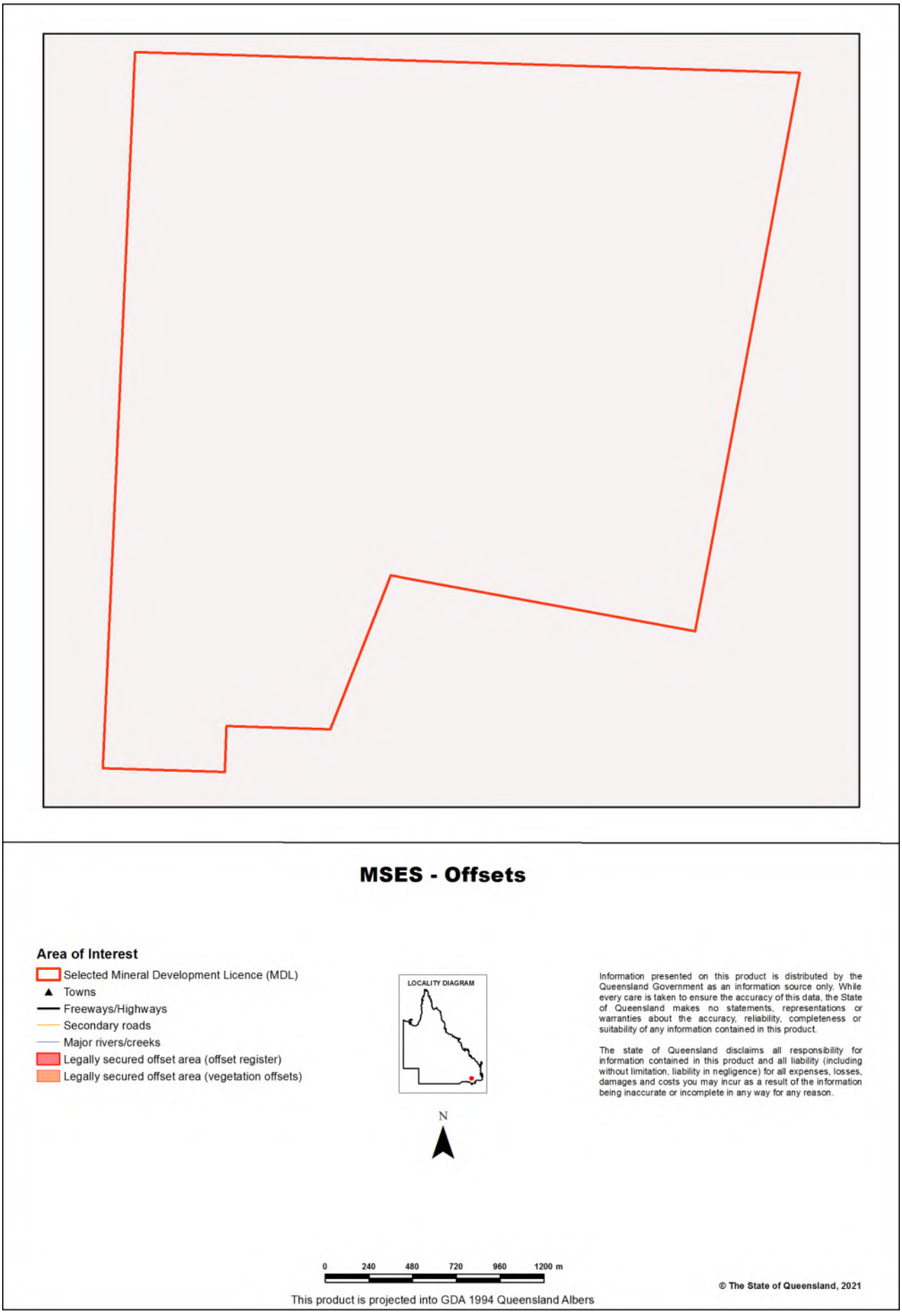
Map 3b - MSES - Species - Koala habitat area (SEQ)



Map 4 - MSES - Regulated Vegetation



Map 5 - MSES - Offset Areas



Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

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- Matters of State environmental significance

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MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
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Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- *Environmental Protection Act 1994*
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- *Nature Conservation Act 1992*
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- *Vegetation Management Act 1999*

Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest
mdl: 299

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

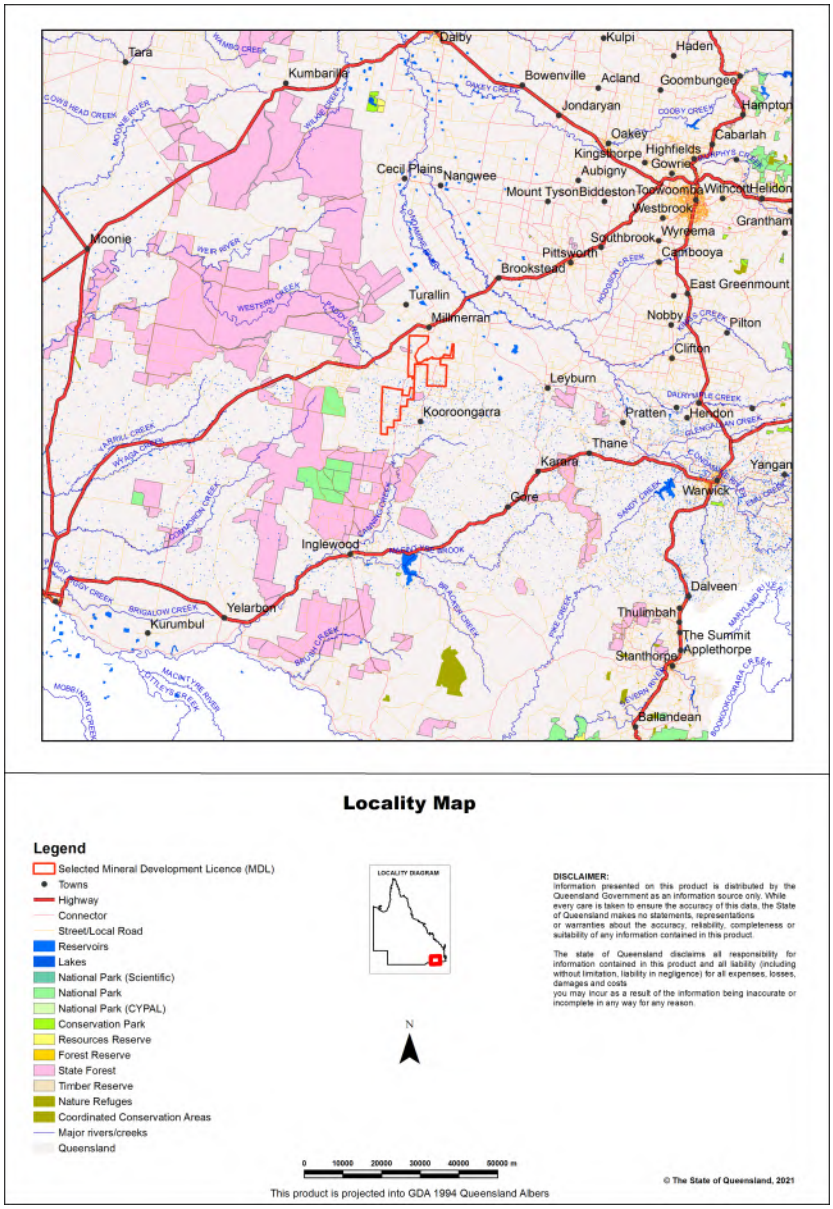
Table of Contents

Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI mdl: 299

Size (ha)	12,490.78
Local Government(s)	Toowoomba Regional
Bioregion(s)	Brigalow Belt
Subregion(s)	Inglewood Sandstones
Catchment(s)	Balonne-Condamine, Border Rivers



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	129.74 ha	1.0%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	593.16 ha	4.7%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	61.92 ha	0.5%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	0.0 ha	0.0 %
8d Regulated Vegetation - Essential habitat	185.01 ha	1.5%
8e Regulated Vegetation - intersecting a watercourse **	189.4 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0.0 ha	0.0 %
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

1c. Protected Areas - special wildlife reserves

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii		V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Melaleuca irbyana		E	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	V	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Xeromys myoides	Water Mouse	V	None

**For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.*

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
Homopholis belsonii		E	V	
Phascolarctos cinereus	koala	V	V	
Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	V	

Special least concern animal species records

(no results)

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:
https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/
For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:
https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.25/11.5.20/11.4.3	E-subdom	rem_end
11.4.3/11.5.20/11.3.25	E-dom	rem_end
11.3.2/11.9.5	E-subdom	rem_end
11.3.2/11.3.4/11.3.25	O-dom	rem_oc
11.9.5/11.3.18/11.3.4	E-dom	rem_end
11.9.5/11.9.7/11.3.25	E-dom	rem_end
11.8.3	O-dom	rem_oc
11.3.2	O-dom	rem_oc
11.3.2/11.3.4	O-dom	rem_oc
11.3.2/11.3.25	O-dom	rem_oc
11.9.9a/11.9.5	E-subdom	rem_end
11.4.3	E-dom	rem_end
11.5.20/11.4.3	E-subdom	rem_end

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.9.5/11.3.18/11.3.4	E-dom	hvr_end
11.9.5/11.9.7/11.3.25	E-dom	hvr_end
11.9.5	E-dom	hvr_end
11.3.2	O-dom	hvr_oc
11.3.2/11.9.5	E-subdom	hvr_end
11.3.2/11.3.4/11.3.25	O-dom	hvr_oc

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Not applicable

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

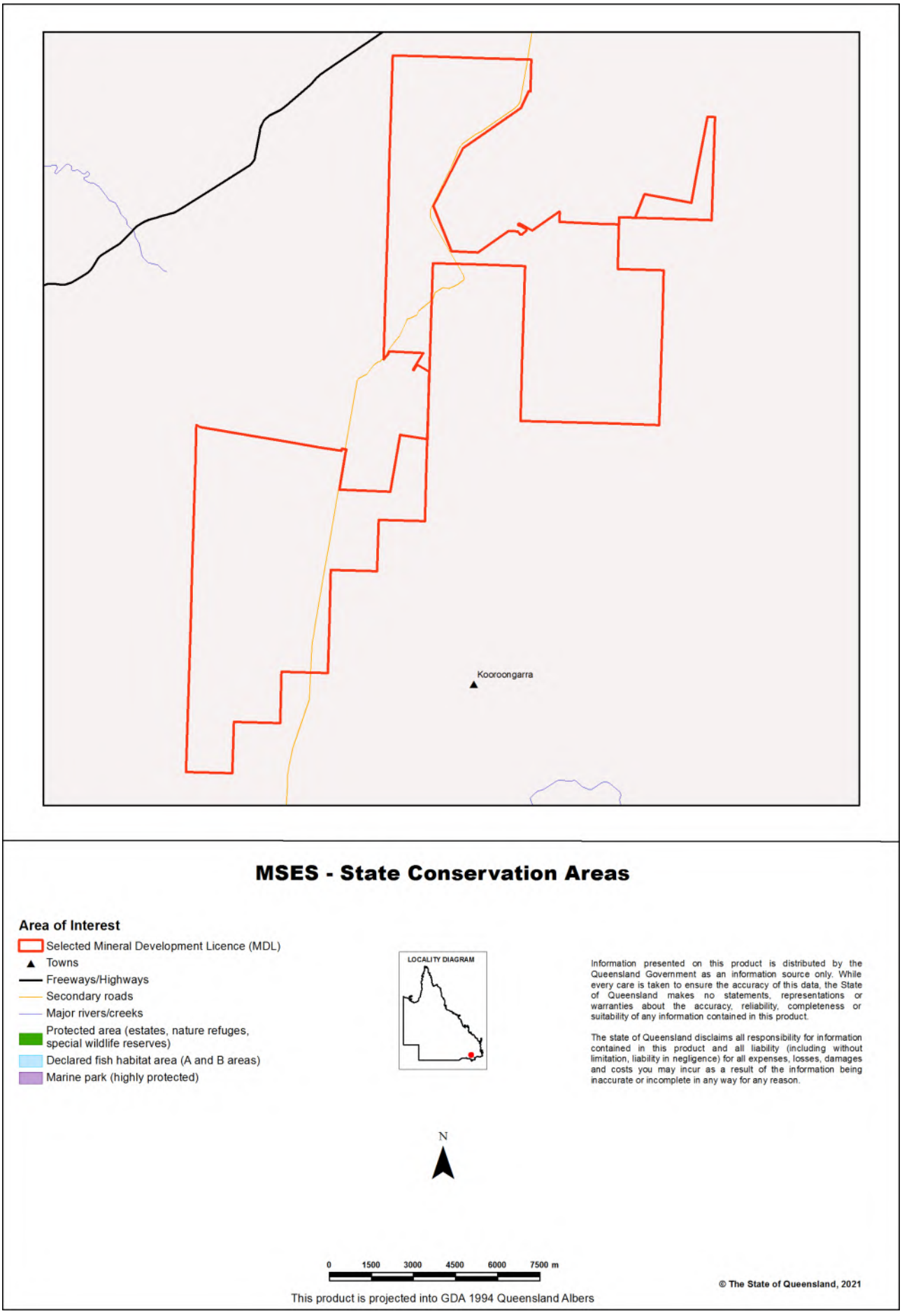
(no results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

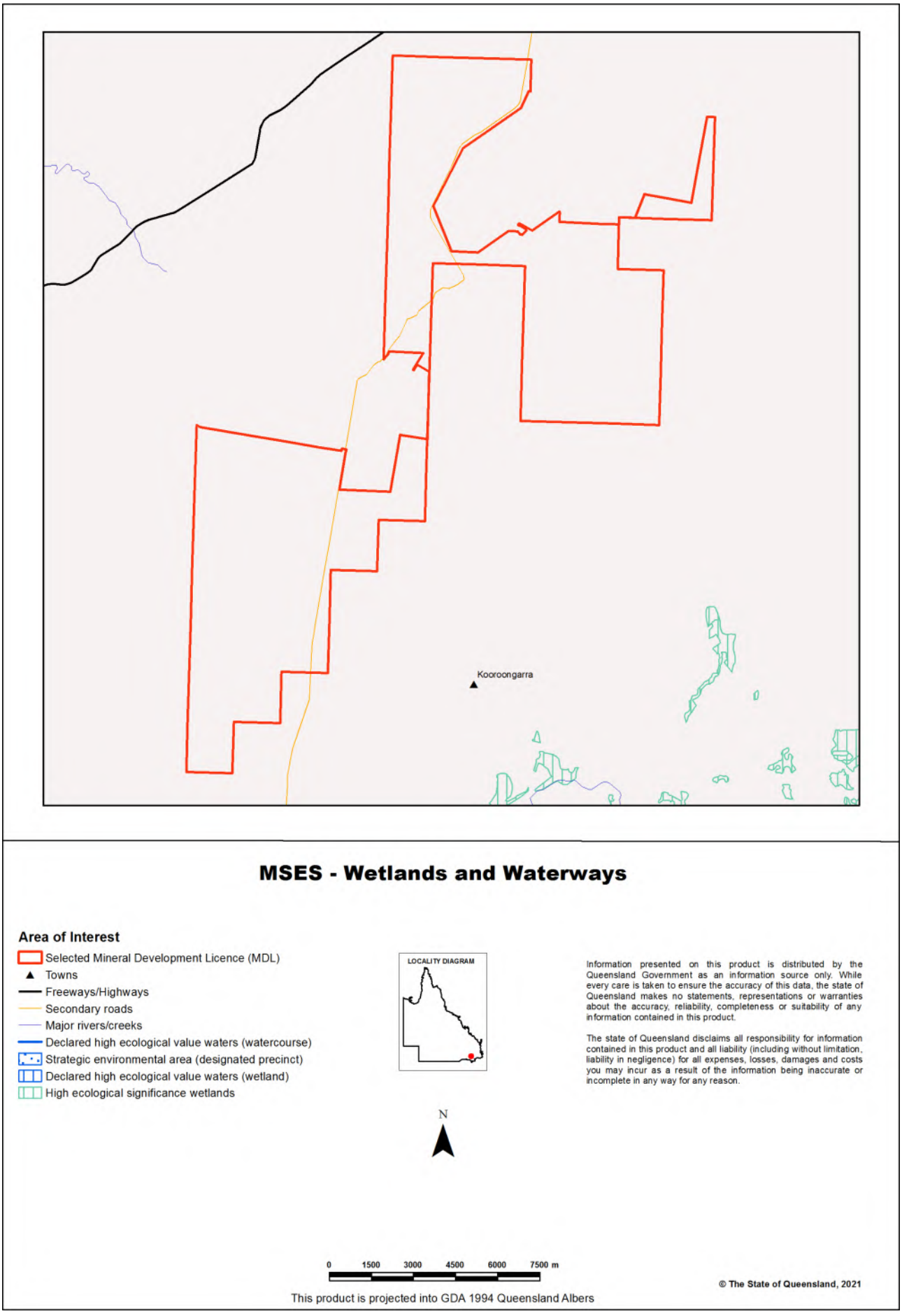
(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

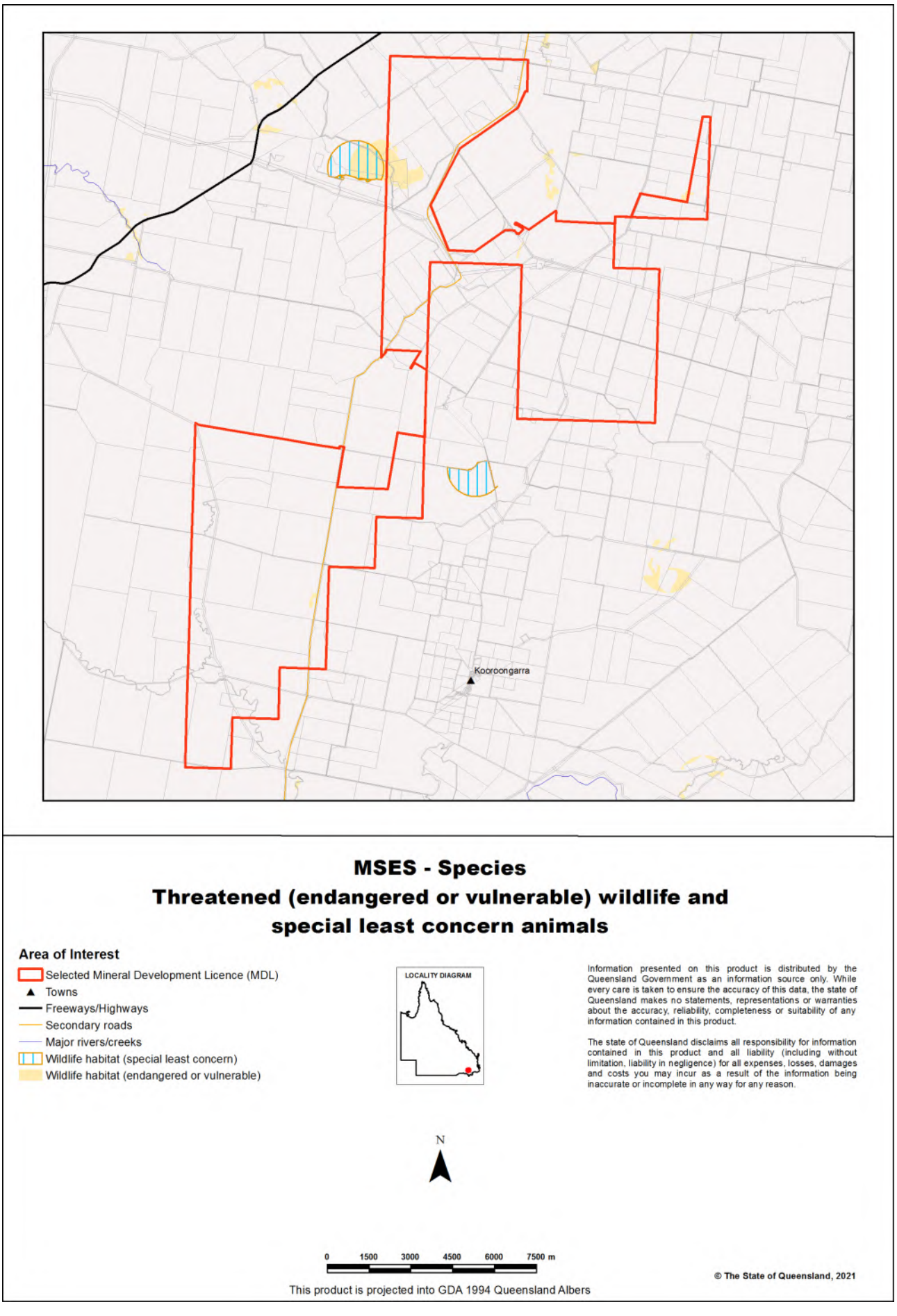
Map 1 - MSES - State Conservation Areas



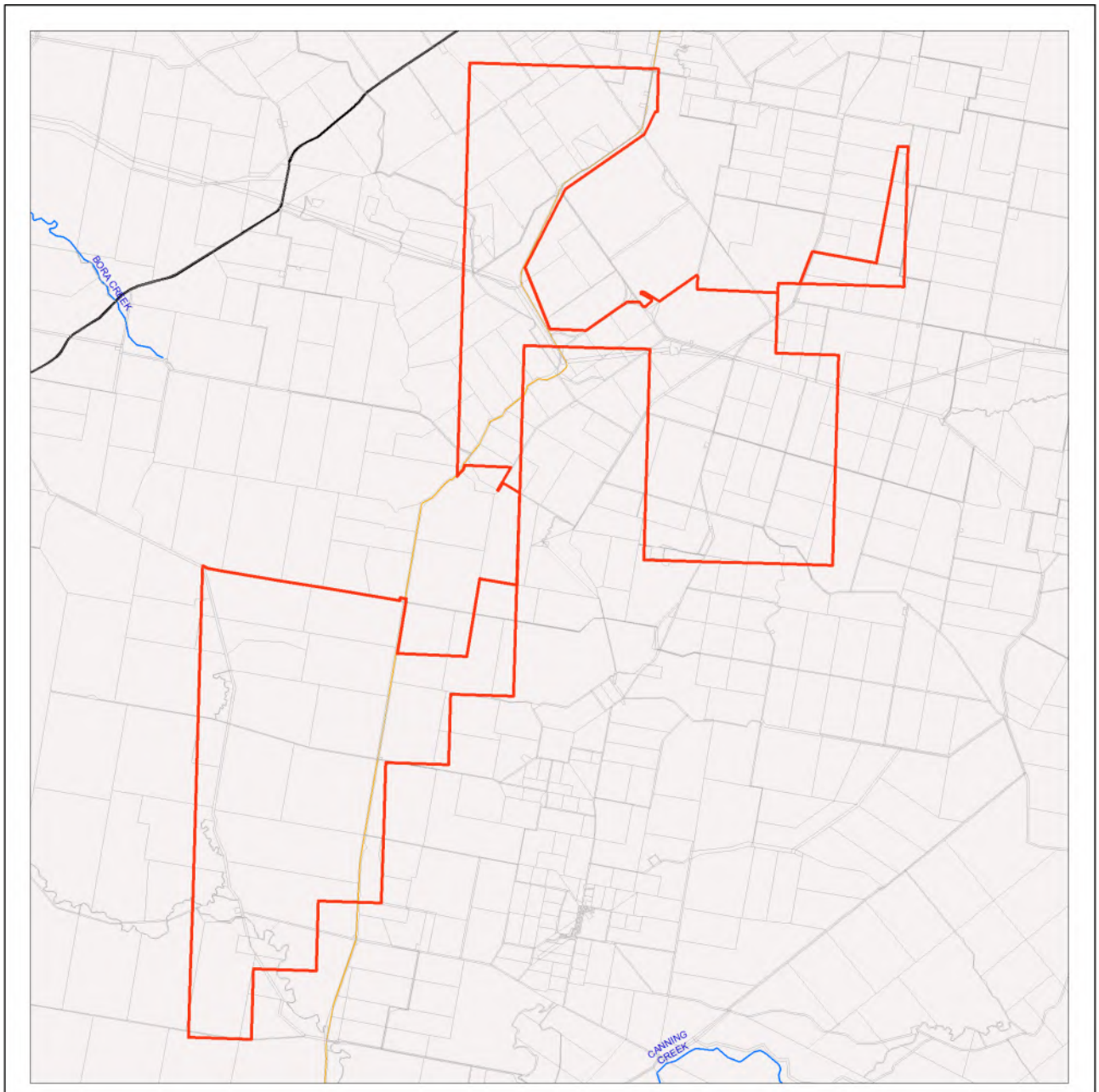
Map 2 - MSES - Wetlands and Waterways



Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

Area of Interest
- Selected Mineral Development Licence (MDL)
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)

LOCALITY DIAGRAM

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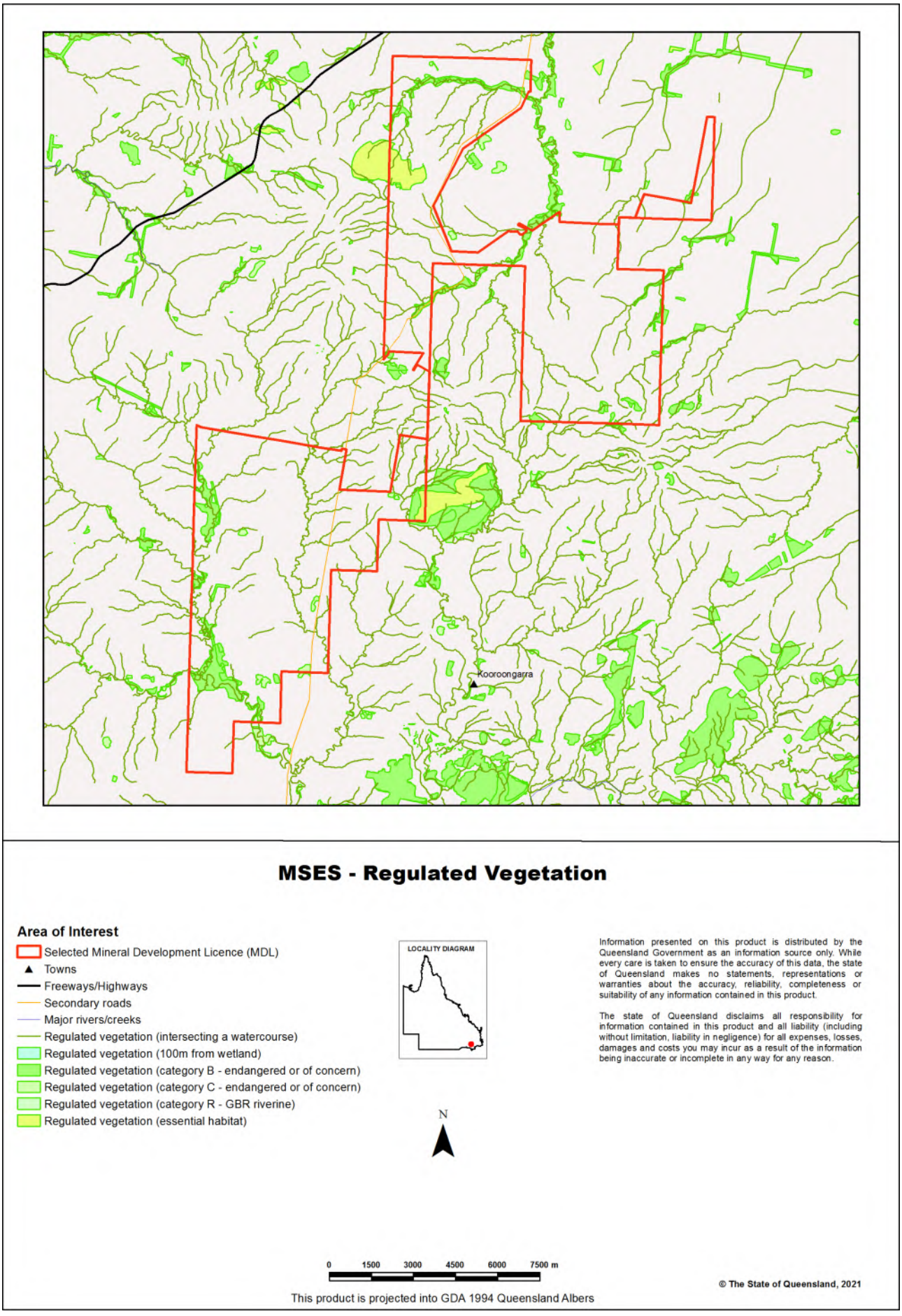
The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

0 1,400 2,800 4,200 5,600 7,000 m

This product is projected into GDA 1994 Queensland Albers

Map 4 - MSES - Regulated Vegetation



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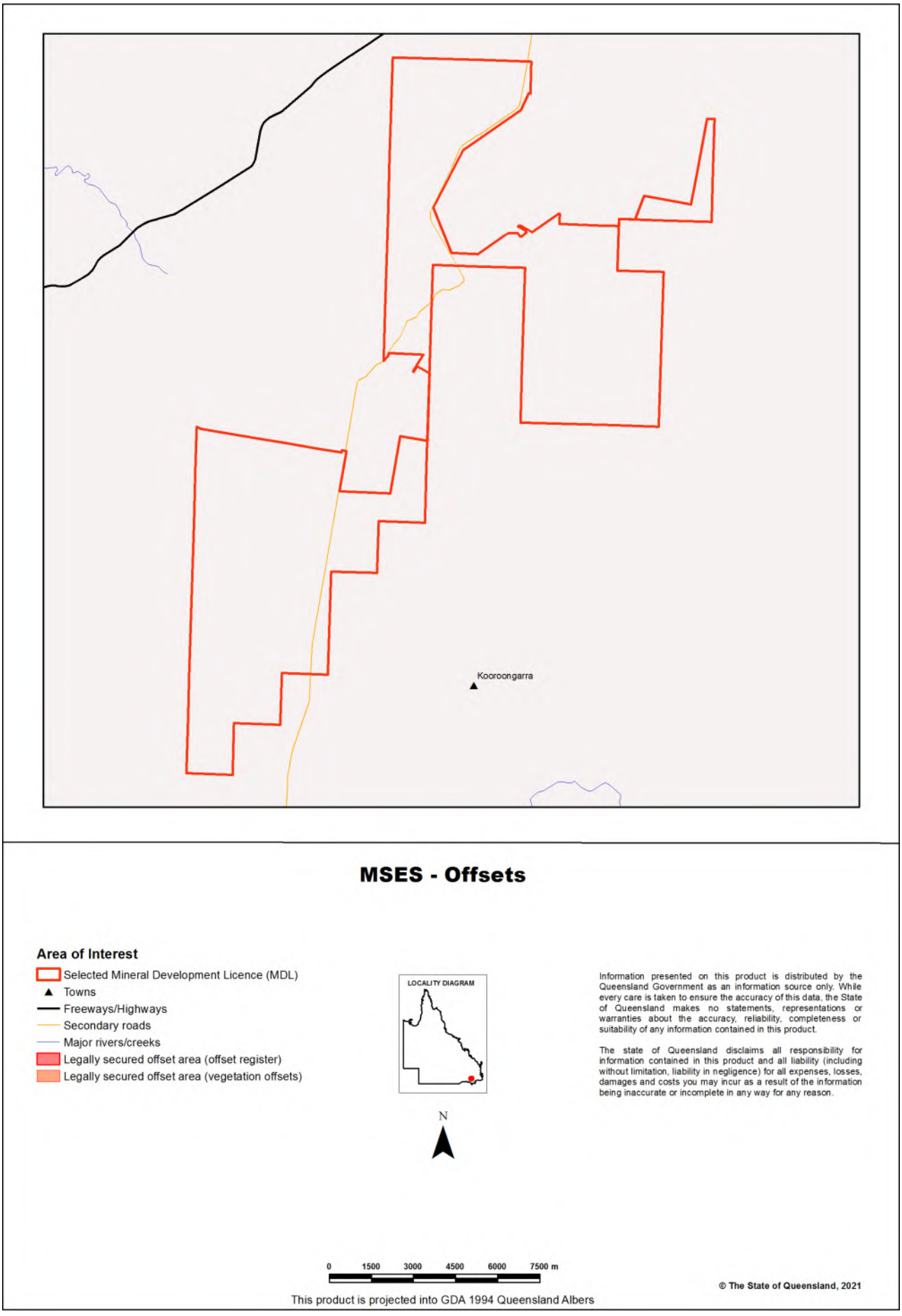

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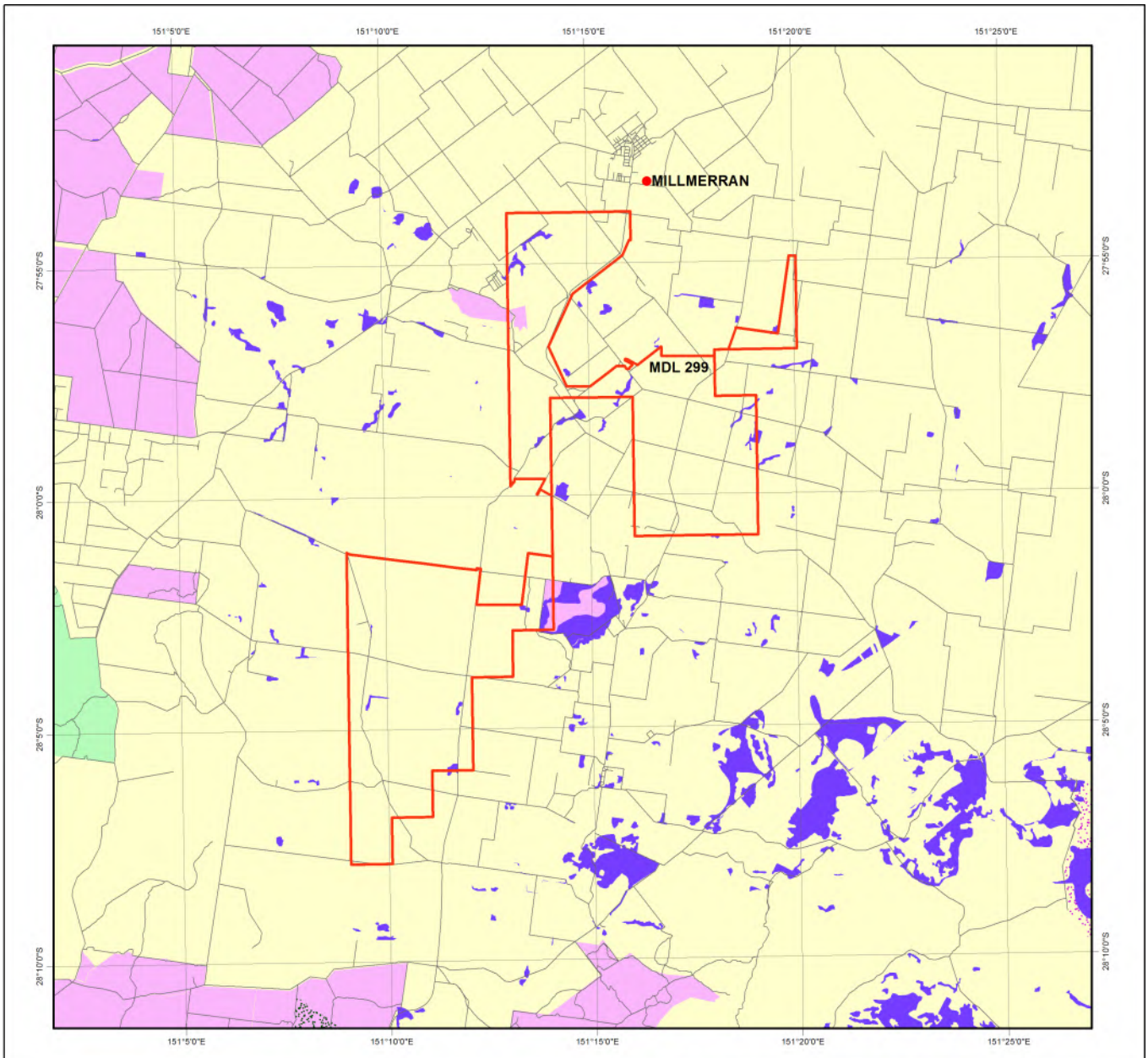
SPP	- State Planning Policy
VMA	- *Vegetation Management Act 1999*

A.4 DES ESA maps



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

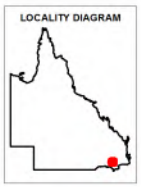
- Selected Mineral Development Licence (MDL)

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Special Wildlife Reserve
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland



N

0 2,200 4,400 6,600 8,800 11,000 m

This product is projected into GDA 1994 MGA Zone 56

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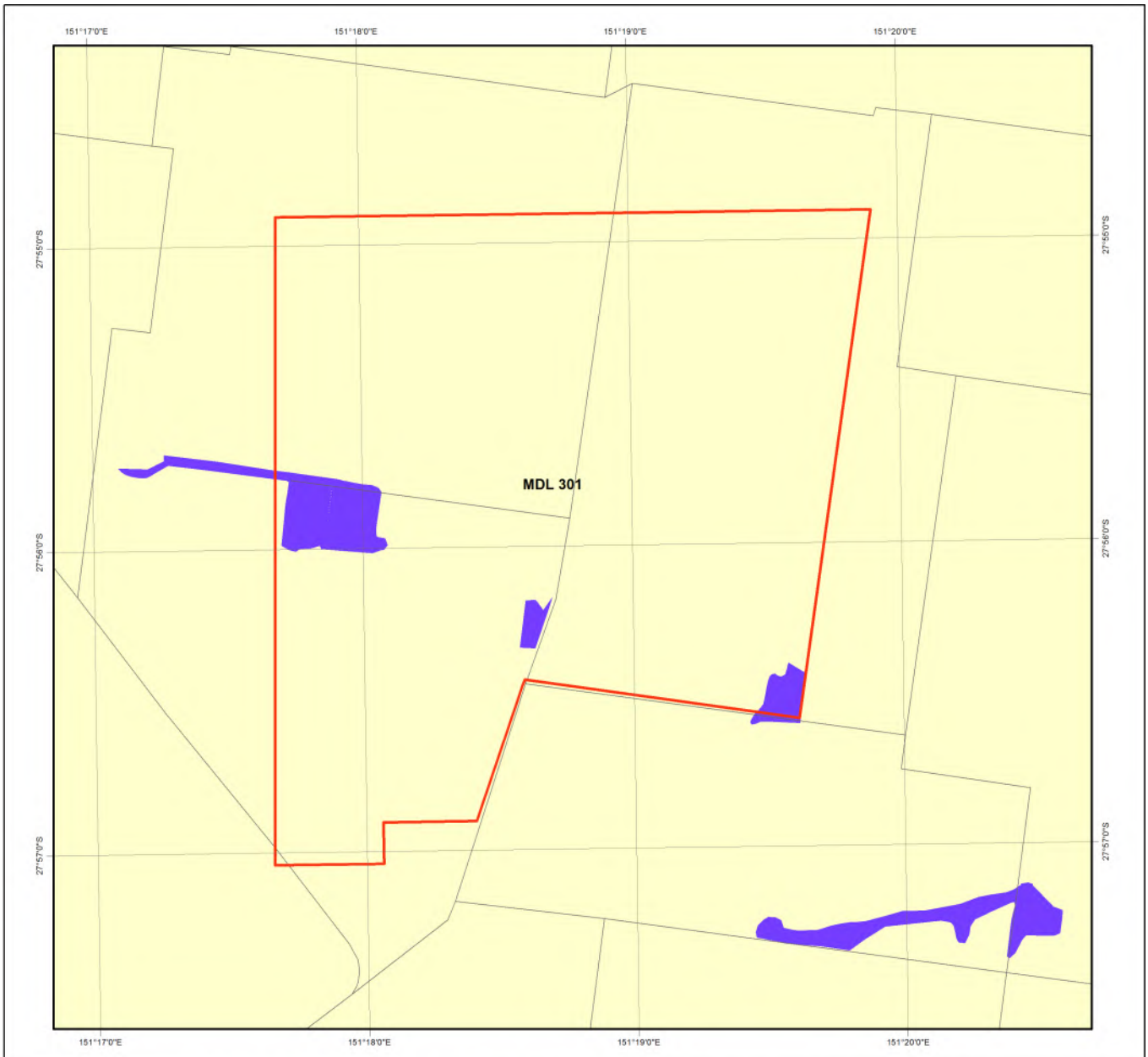
The State of Queensland disclaims all responsibility for information contained in this product and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc).

The user should be aware that due to multiple overlapping themes/ layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

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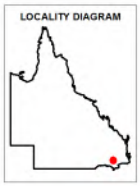
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM



N

0 340 680 1,020 1,360 1,700 m

This product is projected into GDA 1994 MGA Zone 56

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

The user should note that some boundaries and indicated values are ambient and may change over time (e.g. regional ecosystem boundaries and conservation status, watercourse mapping etc).

The user should be aware that due to multiple overlapping themes/ layers present, some themes/layers may be obscured by others. Ordering in the Legend does not accurately reflect the order by which themes/layers are displayed.

Appendix B Species Lists

B.1 Flora species list

Family	Scientific name	Common name	NC Act Status[Δ]	EPBC Act Status[Δ]
Acanthaceae	*Brunoniella australis*	blue trumpet	LC	-
Aizoaceae	*Tetragonia tetragonoides*	New Zealand spinach	LC	-
Amaranthaceae	*Alternanthera denticulata*	lesser joyweed	LC	-
	Gomphrena celosioides	gomphrena weed	I	-
	Ptilotus exaltatus	-	LC	-
Apocynaceae	*Alstonia constricta*	bitterbark	LC	-
	Carissa ovata	currant bush	LC	-
Asteraceae	*Bidens pilosa**	-	I	-
	Chrysocephalum apiculatum	yellow buttons	LC	-
	Schkuhria pinnata	-	I	-
	Silybum marianum	variegated thistle	I	-
	Sphaeromorphaea australis	-	LC	-
	Xanthium occidentale	noogoora burr	I	-
Brassicaceae	*Rapistrum rugosum*	-	I	-
Cactaceae	*Harrisia martinii**	Harrisia cactus	I	-
	Opuntia stricta	common prickly pear	I	-
	Opuntia tomentosa	velvety tree pear	I	-
Capparaceae	*Capparis lasiantha*	nipan	LC	-
	Capparis mitchellii	wild orange	LC	-
Casuarinaceae	*Casuarina cunninghamiana*	river she-oak	LC	-
	Casuarina cristata	belah	LC	-
Chenopodiaceae	*Atriplex nummularia*	old man saltbush	LC	-
	Einadia nutans	nodding saltbush	LC	-
	Enchylaena tomentosa	ruby saltbush	LC	-
	Maireana microphylla	small-leaf bluebush	LC	-
	Salsola australis	-	LC	-

Family	Scientific name	Common name	NC Act Status[Δ]	EPBC Act Status[Δ]
	Sclerolaena bicornis	goathead burr	LC	-
	Sclerolaena birchii	galvanised burr	LC	-
	Sclerolaena tetracuspis	brigalow burr	LC	-
Combretaceae	*Terminalia oblongata*	yellowwood	LC	-
Commelinaceae	*Commelina diffusa*	wandering jew	LC	-
Cupressaceae	*Callitris glaucophylla*	white cypress pine	LC	-
Cyperaceae	*Cyperus difformis*	rice sedge	LC	-
	Cyperus exaltatus	tall flatsedge	LC	-
	Eleocharis cylindrostachys	drooping spike-rush	LC	-
	Eleocharis plana	ribbed spikerush	LC	-
	Gahnia aspera	saw sedge	LC	-
Fabaceae	*Glycine latifolia*	-	LC	-
Lamiaceae	*Mentha sp.*	-	LC	-
Laxmanniaceae	*Eustrephus latifolius*	wombat berry	LC	-
	Lomandra longifolia	spiny-headed mat-rush	LC	-
Malvaceae	*Hibiscus verdcourtii*	-	LC	-
	Malvastrum americanum	-	I	-
	Sida cordifolia	-	I	-
	Sida hackettiana	-	LC	-
Mimosaceae	*Acacia deanei*	green wattle	LC	-
	Acacia decora	pretty wattle	LC	-
	Acacia excelsa	ironwood	LC	-
	Acacia harpophylla	brigalow	LC	-
	Acacia implexa	lightwood	LC	-
	Acacia pendula	myall	LC	-
	Acacia salicina	doolan	LC	-
	Vachellia farnesiana	mimosa bush	I	-
Myrtaceae	*Angophora floribunda*	rough-barked apple	LC	-
	Corymbia tessellaris	Moreton Bay ash	LC	-

Family	Scientific name	Common name	NC Act Status[Δ]	EPBC Act Status[Δ]
	Eucalyptus camaldulensis	river red gum	LC	-
	Eucalyptus crebra	narrow-leaved red ironbark	LC	-
	Eucalyptus microcarpa	inland grey box	LC	-
	Eucalyptus populnea	poplar box	LC	-
	Melaleuca bracteata	black tea-tree	LC	-
Poaceae	*Aristida calycina*	white spear grass	LC	-
	Aristida leptopoda	white spear grass	LC	-
	Austrostipa verticillata	slender bamboo grass	LC	-
	Bothriochloa bladhii	forest blue grass	LC	-
	Bothriochloa decipiens	pitted blue grass	LC	-
	Cenchrus ciliaris	-	I	-
	Chloris gayana	Rhodes grass	I	-
	Chloris ventricosa	tall chloris	LC	-
	Chloris virgata	feather-top Rhodes grass	I	-
	Cymbopogon refractus	barbed-wire grass	LC	-
	Cynodon dactylon	-	I	-
	Dactyloctenium radulans	button grass	LC	-
	Dichanthium sericeum	Queensland blue grass	LC	-
	Digitaria divaricatissima	spreading umbrella grass	LC	-
	Echinochloa colona	awnless barnyard grass	I	-
	Enneapogon nigricans	niggerheads	LC	-
	Enteropogon acicularis	curly windmill grass	LC	-
	*Eragrostis curvula**	African lovegrass	I	-
	Eragrostis sororia	woodland lovegrass	LC	-
	Eragrostis trichophora	-	I	-
	Eriochloa pseudoacrotricha	early spring grass	LC	-
	Homopholis belsonii	-	E	V

Family	Scientific name	Common name	NC Act Status[Δ]	EPBC Act Status[Δ]
	Leptochloa digitata	umbrella canegrass	LC	-
	Megathyrsus maximus	-	I	-
	Panicum coloratum	-	I	-
	Panicum decompositum	native millet	LC	-
	Panicum queenslandicum	Yadbila grass	LC	-
	Paspalidium sp.	-	I	-
	Paspalum sp.	-	I	-
	Sorghum halepense	Johnson grass	I	-
	Sporobolus actinocladus	katoora grass	LC	-
	Sporobolus caroli	fairy grass	LC	-
	Sporobolus creber	western rat's tail grass	LC	-
	Urochloa mosambicensis	sabi grass	I	-
	Urochloa panicoides	-	I	-
Portulacaceae	*Portulaca australis*	-	LC	-
	Portulaca oleracea	pigweed	I	-
Rubiaceae	*Psydrax oleifolia*	myrtle tree	LC	-
Rutaceae	*Citrus glauca*	lime bush	LC	-
	Geijera parviflora	wilga	LC	-
	Geijera salicifolia	brush wilga	LC	-
Sapindaceae	*Alectryon diversifolius*	scrub boonaree	LC	-
	Atalaya hemiglauca	whitewood	LC	-
	Dodonaea viscosa	sticky hopbush	LC	-
Scrophulariaceae	*Eremophila debilis*	winter apple	LC	-
	Eremophila mitchellii	false sandalwood	LC	-
Solanaceae	*Solanum nigrum*	-	I	-
Sterculiaceae	*Brachychiton populneus*	kurrajong	LC	-
Verbenaceae	*Glandularia aristigera*	-	I	-

Δ -LC = Least Concern; I = Introduced; E = Endangered; V = Vulnerable.

B.2 Fauna species list

Family	Common name	Scientific name	NC Act Status[Δ]
Amphibians			
Hylidae	broad palmed rocketfrog	*Litoria latopalmata*	LC
Birds			
Acanthizidae	yellow-rumped thornbill	*Acanthiza chrysorrhoa*	LC
Accipitridae	wedge-tailed eagle	*Aquila audax*	LC
Anatidae	Australian wood duck	*Chenonetta jubata*	LC
Ardeidae	white-necked heron	*Ardea pacifica*	LC
	white-faced heron	*Egretta novaehollandiae*	LC
Artamidae	pied butcherbird	*Cracticus nigrogularis*	LC
	Australian magpie	*Cracticus tibicen*	LC
	grey butcherbird	*Cracticus torquatus*	LC
	pied currawong	*Strepera graculina*	LC
Cacatuidae	galah	*Eolophus roseicapilla*	LC
	cockatiel	*Nymphicus hollandicus*	LC
Campephagidae	black-faced cuckoo-shrike	*Coracina novaehollandiae*	LC
Columbidae	bar-shouldered dove	*Geopelia humeralis*	LC
	crested pigeon	*Ocyphaps lophotes*	LC
Corcoracidae	white-winged chough	*Corcorax melanorhamphos*	LC
	apostlebird	*Struthidea cinerea*	LC
Corvidae	Torresian crow	*Corvus orru*	LC
Estrildidae	double-barred finch	*Taeniopygia bichenovii*	LC
	zebra finch	*Taeniopygia guttata*	LC
Maluridae	superb fairy-wren	*Malurus cyaneus*	LC
Meliphagidae	spiny-cheeked honeyeater	*Acanthagenys rufogularis*	LC
	noisy miner	*Manorina melanocephala*	LC
Monarchidae	magpie-lark	*Grallina cyanoleuca*	LC
Motacillidae	Australasian pipit	*Anthus novaeseelandiae*	LC
Oriolidae	Australasian figbird	*Sphecotheres vieilloti*	LC
Phalacrocoracidae	little pied cormorant	*Microcarbo melanoleucos*	LC
Psittacidae	pale-headed rosella	*Platycercus adscitus*	LC

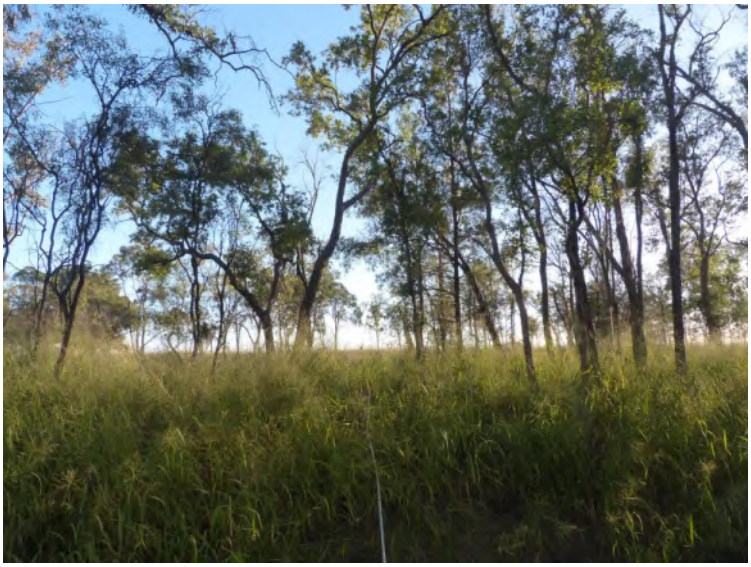
Family	Common name	Scientific name	NC Act Status[Δ]
Rhipiduridae	willie wagtail	*Rhipidura leucophrys*	LC
Sturnidae	common myna	*Acridotheres tristis**	I
Mammals			
Leporidae	European brown hare	*Lepus europaeus**	I
Macropodidae	eastern grey kangaroo	*Macropus giganteus*	LC
	red-necked wallaby	*Macropus rufogriseus*	LC
	swamp wallaby	*Wallabia bicolor*	LC
Phalangeridae	common brushtail possum	*Trichosurus vulpecula*	LC
Suidae	feral pig	*Sus scrofa**	I
Reptiles			
Varanidae	lace monitor	*Varanus varius*	LC

Δ -LC = Least Concern; I = Introduced.

Appendix C Regional Ecosystem Summaries

C.1 RE 11.3.4

Sites:
BC01, BC02 and T3



Recorder: Chays Ogston

Landform: alluvial channel

Geology/Soils: Qa/ alluvial sands

Land zone: 3

Description: *Corymbia tessellaris* riparian woodland with associated *Eucalyptus camaldulensis, Angophora floribunda* and *E. populnea*.

Ecologically Dominant Layer (EDL): T1 **VM Act class/BD status:** Of Concern/Of Concern

T1

Median height: 16 m **Estimated cover density:** Sparse

T1 species: *Corymbia tessellaris* (dominant), *Eucalyptus camaldulensis, Angophora floribunda, Eucalyptus populnea, Callitris glaucophylla, Acacia salicina* and *Casuarina cristata*.

T2

Median Height: 9 m **Estimated cover density:** Very sparse

T2 species: *Callitris glaucophylla, Acacia salicina, Acacia excelsa, Casuarina cristata, Psydrax oleifolia, Eremophila mitchellii, Brachychiton populneus, Corymbia tessellaris, Eucalyptus camaldulensis* and *Angophora floribunda*.

Shrubs

Median height: 2.5 m **Estimated cover density:** Very sparse

Species: *Geijera parviflora, Acacia excelsa, Carissa ovata, Psydrax oleifolia* and *Angophora floribunda*.

Groundcover

Estimated cover density: 83-92 %

Species: *Megathyrsus maximus*, Austrostipa verticillata, Enteropogon acicularis, Aristida calycina, Bothriochloa decipiens, Chloris ventricosa, Eriochloa pseudoacrotricha, Dactyloctenium radulans, Cymbopogon refractus, Cyperus difformis, Epaltes australis, Enchylaena tomentosa, Glycine latifolia, Gahnia aspera, Eragrostis curvula*, Glandularia aristigera** and *Schkuhria pinnata**.

C.2 RE 11.3.17

Sites:
BC08, BC11, BC14 and T14.

Recorders: Chays Ogston

Landform: alluvial channel

Geology/Soils: Quaternary sands (Qs)/ alluvial sands

Land zone: 3

Description: *Casuarina cristata* open forest with associated *Eucalyptus populnea* on alluvial sands.

Ecologically Dominant Layer (EDL): T1 **VM Act class/BD status:** Of Concern/Endangered

T1

Median height: 12 m **Estimated cover density:** Sparse

T1 species: *Casuarina cristata* (dominated), *Eucalyptus populnea* and *Terminalia oblongata*

T2

Median height: 6 m **Estimated cover density:** Very sparse

T2 species: *Casuarina cristata, Geijera parviflora, Capparis mitchellii, Eremophila mitchellii* and *Terminalia oblongata*

Shrubs

Median height: 2 m **Estimated cover density:** Very sparse

Species: *Geijera parviflora, Eremophila mitchellii, Eucalyptus populnea, Acacia deanei, Casuarina cristata* and *Opuntia tomentosa**.

Groundcover

Estimated cover density: 5-20%

Species: *Aristida leptopoda, Sporobolus caroli, Dichanthium sericeum, Enteropogon acicularis, Paspalidium sp., Aristida calycina, Panicum queenslandicum, Austrostipa verticillata, Enneapogon sp., Cyperus sp., Hibiscus verdcourtii, Mentha sp., Eremophila debilis, Sida sp., Enchylaena tomentosa, Urochloa mosambicensis*, Chloris gayana** and *Portulaca oleracea**.

C.3 RE 11.3.25

Sites:
T12, Q17, BC03 and BC04.

Recorders: Chays Ogston

Landform: alluvial channel

Geology/Soils: Quaternary sands (Qs)/ alluvial sands

Land zone: 3

Description: *Eucalyptus camaldulensis* fringing riparian woodland

Ecologically Dominant Layer (EDL): T1 **VM Act status/BD:** Least concern/Of concern

T1

Median height: 18 m **Estimated cover density:** Sparse

T1 species: *Eucalyptus camaldulensis, Angophora floribunda, Eucalyptus populnea, Casuarina cunninghamiana* and *Corymbia tessellaris*.

T2

Median height: 9 m **Estimated cover density:** Very sparse

T2 species: *Casuarina cunninghamiana, Acacia salicina, Corymbia tessellaris, Dodonaea sp., Eucalyptus camaldulensis* and *Eucalyptus populnea*.

Shrubs

Median height: 2 m **Estimated cover density:** Very sparse

Species: *Casuarina cristata, Alectryon diversifolius, Acacia excelsa, Lomandra longifolia* and *Maireana microphylla*

Groundcover

Estimated cover density: 70-80%

Species: *Megathyrsus maximus*, Dactyloctenium radulans, Aristida leptopoda, Eriochloa pseudoacrotricha, Austrostipa verticillata, Enteropogon acicularis, Chloris ventricosa, Aristida calycina, Bothriochloa bladhii, Bothriochloa decipiens, Cyperus difformis, Portulaca australis, , Eragrostis curvula*, Opuntia tomentosa*, Chloris gayana*, Glandularia aristigera** and *Schkuhria pinnata**.

C.4 RE 11.4.3

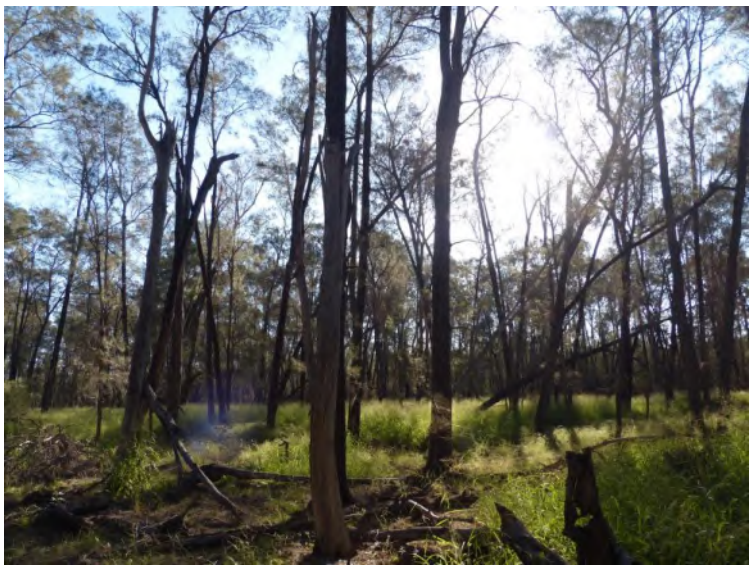
Sites:
BC06, BC07, BC10, BC12, BC13, BC15, BC16, T1, T2, T7, T8, T9, T10, T11, T15, Q2, Q3, Q5, Q6, Q8, Q10, Q11, Q12, Q14, Q16 and Q19.

Recorder: Chays Ogston

Landform: undulating clay plains

Geology/Soils: Quaternary sands (Qs)/ clay soils

Land zone: 4



Description: *Acacia harpophylla* and/or *Casuarina cristata* open forest to woodlands on gently undulating, clay plains.

Ecologically Dominant Layer (EDL): T1 **VM Act class/BD status:** Endangered/Endangered

T1

Median height: 15 m **Estimated cover density:** Mid-dense

T1 species: *Casuarina cristata, Acacia harpophylla, Eucalyptus populnea* and *Eucalyptus crebra.*

T2

Median height: 5 m **Estimated cover density:** Sparse

T2 species: *Acacia harpophylla, Casuarina cristata, Geijera parviflora, Acacia pendula, Alectryon diversifolius, Eremophila mitchellii* and *Atalaya hemiglauca.*

Shrubs

Median height: 1.5 m **Estimated cover density:** Very sparse

Species: *Geijera parviflora, Eucalyptus populnea, Maireana microphylla, Melaleuca bracteata, Opuntia tomentosa** and *Opuntia stricta**.

Groundcover

Estimated cover density: 10-20%

Species: *Enteropogon acicularis**, *Urochloa mosambicensis**, *Megathyrsus maximus**, *Chloris gayana**, *Bidens pilosa**, *Chloris ventricosa, Portulaca oleracea**, *Sporobolus caroli, Homopholis belsonii, Sporobolus creber, Enneapogon sp., Aristida calycina, Brunoniella australis, Sida sp., Enchylaena tomentosa* and *Alternanthera denticulata.*

C.5 RE 11.5.1

Sites:
BC09 and T13.

Recorders: Chays Ogston

Landform: sandy plain

Geology/Soils: Quaternary sands (Qs)/ sandy plains.

Land zone: 5

Description: *Eucalyptus populnea* open woodland with associated *Casuarina cristata*.

Ecologically Dominant Layer (EDL): T1	**VM Act class/BD status:** Least concern/No concern at present
T1	
Median height: 11 m	**Estimated cover density:** Sparse
T1 species: *Eucalyptus populnea, Casuarina cristata* and *Callitris glaucophylla*.	
T2	
Median height: N/A	**Estimated cover density:** N/A
T2 species: N/A	
Shrubs	
Median height: 1.5 m	**Estimated cover density:** Very sparse
Species: *Geijera parviflora Maireana microphylla, Casuarina cristata and Eucalyptus populnea, Geijera parviflora*	
Groundcover	
Estimated cover density: 15-30%	
Species: *Aristida calycina, Dichanthium sericeum, Enteropogon acicularis, Cymbopogon refractus, Eriochloa pseudoacrotricha, Eragrostis sororia, Panicum queenslandicum, Aristida sp., Brunoniella australis, Gonocarpus sp., Sida sp., Eremophila debilis, Cyperus sp., Malvastrum americanum*, Eriochloa colona*, Glandularia aristigera*, Gomphrena celosioides*, Portulaca oleracea** and *Schkuhria pinnata**.	

C.6 RE 11.9.5

Sites:
BC05, T6 and Q18.

Recorders: Chays Ogston

Landform: alluvial channel

Geology/Soils: Jurassic Walloon Coal Measures (Jw)/ clay

Land zone: 9

Description: *Casuarina cristata* open forest to woodland overlying fine-grained sedimentary rocks

Ecologically Dominant Layer (EDL): T1 **VM Act class/BD status:** Endangered/Endangered

T1

Median height: 11 m **Estimated cover density:** Very sparse to sparse

T1 species: *Casuarina cristata, Acacia harpophylla, Eucalyptus microcarpa* and *Callitris glaucophylla*.

T2

Median height: 4 m **Estimated cover density:** Very sparse

T2 species: *Casuarina cristata, Acacia harpophylla, Alstonia constricta, Capparis sp.* and *Acacia decora*.

Shrubs

Median height: 1.3 m **Estimated cover density:** Very sparse

Species: *Casuarina cristata, Geijera parviflora, Citrus glauca, Maireana microphylla, Carissa ovata* and *Capparis sp*.

Groundcover

Estimated cover density: 25-30%

Species: *Aristida calycina, Aristida leptopoda, Digitaria sp., Dichanthium sericeum, Panicum decompositum, Homopholis belsonii, Enchylaena tomentosa, Eragrostis trichophora*, Sclerolaena muricata, Malvastrum americanum** and *Portulaca oleracea**.

Appendix D Likelihood of Occurrence Assessment

D.1 Flora Likelihood of Occurrence

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Androcalva procumbens	V	LC	The species is endemic to New South Wales, occurring from the from the Dubbo–Medooran–Gilgandra region, Cobar region and the upper Hunter Valley (DEWHA, 2008b). The species has been record on sandy soils, including disturbed habitats such as road verges, quarries, gravel stockpiles and power line easements (DEWHA, 2008b). The species is often found within *Eucalyptus dealbata–E. sideroxylon* woodlands, *Melaleuca uncinata* shrubland and mallee eucalypt with *Calytrix tetragona* understorey (DEWHA, 2008b).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent (or within Queensland) and suitable habitat does not occur within the Study Area.
Cadellia pentastylis **ooline**	V	V	This species grows in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. Soils generally have low to medium nutrient content and are normally associated with upper and mid-slopes in the landscape. The altitude is generally 300-460 metres above sea-level. The species forms a closed or open canopy, as a dominant or commonly with *Eucalyptus albens* and *Callitris glaucophylla*, with an open understorey and leaf litter dominating the forest floor (Department of Environment, Water, Heritage and the Arts, 2008b).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Coleus insularis	-	CR	The species has a highly restricted distribution, recorded within the Millmerran State Forest, located approximately 20 km south of the township of Millmerran (Forster, 2011). The species occurs on granite outcrops and pavements containing low eucalypt woodlands and shrublands (Forster, 2011).	**Unlikely to occur:** Although the species has been previously recorded within the desktop search extent, suitable habitat containing granite pavements and outcrops was not observed within the Study Area. The species also has a restricted distribution, recorded only within Millmerran State Forest (approx. 14 km south)
Dichanthium queenslandicum **king blue-grass**	E	V	This species occurs on black cracking clay in tussock grasslands mainly in association with other species of blue grasses (*Dichanthium spp.* and *Bothriochloa spp.*). It is mostly confined to natural grassland on the heavy black clay soils (basalt downs, basalt cracking clay, open downs) on undulating plains. Other species recorded in the grasslands include *Aristida leptopoda, Bothriochloa erianthoides, Moorochloa eruciformis, Corchorus trilocularis, Cyperus bifax, Dichanthium sericeum, Digitaria brownii, Digitaria divaricatissima, Eulalia fulva, Ipomoea lonchophylla, Iseilema vaginiflorum, Panicum decompositum, Panicum queenslandicum, Paspalidium globoideum, Parthenium hysterophorus* and *Thellungia advena*. Other communities where *Dichanthium queenslandicum* can be found include *Acacia salicina* thickets in grassland and eucalypt woodlands (i.e. *Corymbia dallachiana, C. erythrophloia, E. orgadophila*) (Department of Sustainability, Environment, Water, Population and Communities, 2013)	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent. Suitable habitat within the Study Area is limited, with most areas subject to historical clearing (cropping/grazing) and ongoing agricultural production, reducing the species likelihood of occurrence..

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Dichanthium setosum	V	LC	This species is associated with heavy basaltic black soils and red-brown loams with clay subsoil. Associated species include *Eucalyptus albens*, *Eucalyptus melanophloia*, *Eucalyptus melliodora*, *Eucalyptus viminalis*, *Myoporum debile*, *Aristida ramosa*, *Themeda triandra*, *Poa sieberiana*, *Bothriochloa ambigua*, *Bothriochloa decipiens*, *Macrozamia stenomera*, *Medicago minima*, *Leptorhynchos squamatus*, *Lomandra longifolia*, *Ajuga australis*, *Calotis hispidula* and *Austrodanthonia spp.*, *Dichopogon spp.*, *Brachyscome spp.*, *Vittadinia spp.*, *Wahlenbergia spp.* and *Psoralea spp.* This species is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. It is often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched (Threatened Species Scientific Committee, 2008).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. Suitable habitat within the Study Area is limited.
Digitaria porrecta **finger panic grass**	-	NT	Occurs within disjunct areas of Queensland, including in the Nebo district, south-west of Mackay; the Central Highlands between Springsure and Rolleston; and from Jandowae south to Warwick (Threatened Species Scientific Committee, 2013c). *Digitaria porrecta* occurs in natural grasslands on extensive basaltic plains, undulating woodlands and open forests with an underlying basaltic geology. It prefers dark and fine textured soils with some degree of seasonal cracking (DES 2019b). It also persists in disturbed habitats, such as fallow paddocks, but its capability to maintain a viable population is unknown (DES 2019b).This species occurs in habitats possessing heavy soils, including tussock grassland or open woodland of poplar box or forest red gum, invariably on heavy, cracking clays, sometimes of alluvial origin. It occurs in climate is subtropical and seasonal, often with extended periods of drought (Threatened Species Scientific Committee, 2013c).	**Possible occurrence:** The species has previously been recorded within the desktop search extent in association with the Condamine floodplain (approx. 17 km northeast). Although suitable habitat was observed within the Study Area, comprehensive surveys during optimal survey period failed to detect the species, reducing the likelihood of occurrence.

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Eucalyptus virens **shiny-leaved ironbark**	V	V	This species has a very limited distribution in southern Queensland and is currently known from five locations scattered over a distance of approximately 500 km (DES, 2021b). Locations include near Inglewood, Tara, north-east of Eidsvold and a scarp in proximity to Maranoa River near Mt Moffatt, east-south-east of Brovinia and north-west of Injune. This species occurs on sandy soils on low rises, hillslopes, sandstone escarpments and scree slopes (DES, 2021b). The species grows in woodland communities and is commonly associated with *Angophora leiocarpa*, *Corymbia trachyphloia*, *Eucalyptus exserta*, *Allocasuarina inophloia* and *Lysicarpus angustifolius* (DES, 2021b).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and no suitable habitat occurs within the Study Area.
Eucalyptus argophloia **Chinchilla white gum**	-	V	*Eucalyptus argophloia* grows in association with *Acacia harpophylla* or *Eucalyptus microcarpa* on flat terrain of brown to black clay or clay-loam soils (Department of the Environment, Water, Heritage and the Arts, 2008a).	**Known to occur:** The species was recorded in planted rows within the Study Area. Planted individuals are not considered to be 'in the wild' or in an 'independent state of natural liberty'.
Homopholis belsonii **Belson's panic**	V	E	This species is known to occur in dry woodland habitats on poor soils, such as those derived from basalt. It occurs on rocky hills supporting *Eucalyptus albens* and in *Geijera parviflora* woodland; flat to gently undulating alluvial areas supporting *Casuarina cristata* forest; and soils and plant communities of *Eucalyptus populnea* woodlands. It may also be associated with shadier areas of *Acacia harpophylla, Acacia melvillei* and *Acacia pendula* communities; in *Eucalyptus orgadophila* communities; and on roadsides. It is generally found among fallen timber at the base of trees or shrubs, among branches and leaves of trees hanging to ground level or along the bottom of netting fences. It occurs at elevations ranging from 200 m to 520 metres above sea level (Department of Environment, Water, Heritage and the Arts, 2008a).	**Known to occur:** The species was recorded at multiple locations within the Study Area, with a total area of 10.05 ha of known habitat. Suitable habitat (101.56 ha) for the species occurs was also observed within REs 11.3.17, 11.4.3 and 11.9.5

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Lepidium monoplocoides **winged pepper-cress**	E	LC	The species occurs in seasonally moist to waterlogged areas, on heavy fertile soils within mallee scrub (DAWE, 2021b). Canopy vegetation present includes open woodlands dominated by *Allocasuarina luehmannii*, *Eucalyptus largiflorens* and *E. populnea* (DAWE, 2021b). The ground layer is typically dominated by tussock grasses and moisture dependent herbs such as *Marsilea* spp. (DAWE, 2021b).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat within the Study Area was limited.
Macrozamia machinii	V	V	The species has been recorded near Inglewood in the southern Darling Downs (DEWHA, 2008b). *M. machinii* has been recorded on sandy soils comprising remnant woodlands to open forests (DEWHA, 2008b). Canopy species include *Angophora leiocarpa*, *Allocasuarina inophloia*, *Callitris glaucophylla*, *Lysicarpus angustifolius*, *Eucalyptus panda* and *E. apothalassica* with an altitude between 320-460 m (DEWHA, 2008b).	**Unlikely to occur:** Although the species has been previously recorded within the desktop search extent, suitable habitat within the Study Area was limited and comprehensive searches did not detect the species.
Picris barbarorum	-	V	Heavy black soil. Growing in a small patch of *Eucalyptus tereticornis* trees. Grassland with *Dichanthium sericeum*, adjacent to cultivated paddock. Floodplain, black cracking clay (The Australasian Virtual Herbarium, 2020)	**Likely to occur:** The species has previously been recorded within the desktop search extent and the Study Area contains suitable habitat for the species primarily within REs 11.3.4 and 11.3.25. As field surveys were undertaken outside of the optimal survey period (July to November), a conservative assessment was adopted.

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]
Picris evae **hawkweed**	V	V	This species occurs in *Eucalyptus* open woodland with a grassy understorey composed of *Dichanthium* spp. Collections have been made along roadsides and in cultivated areas, such as paddocks, on black, dark grey or red-brown soils, reddish clay-loam or medium clay soils. Associated species include *Eucalyptus melliodora, E. crebra, E. populnea, E. albens, Angophora subvelutina*, *Allocasuarina torulosa*, and *Casuarina cunninghamiana* (Department of the Environment, Water, Heritage and the Arts, 2008d).	**Likely to occur:** The species has previously been recorded within the desktop search extent and the Study Area contains suitable habitat for the species primarily within REs 11.3.4 and 11.3.25. As field surveys were undertaken outside of the optimal survey period (October to January), a conservative assessment was adopted.
Rhaponticum australe **austral cornflower**	V	V	The species usually grows on heavy black or red-brown clay, or clay loams derived from basalt. Populations are often confined to roadsides and cultivation headlands. Locations where the species occurs range in altitude up to 480 m above sea level (Department of the Environment, Water, Heritage and the Arts, 2008h).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and the Study Area does not contain soils derived from basalt.
Thesium australe **austral toadflax**	V	V	The species is semi-parasitic on roots of a range of grass species, particularly *Themeda triandra*. It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams (Threatened Species Scientific Committee, 2013a).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable soils are limited within the Study Area.
Tylophora linearis	E	E	This species grows in dry scrub, open forest and woodlands associated with Melaleuca uncinata, *Eucalyptus fibrosa, E. sideroxylon, E. albens, Callitris endlicheri, C. glaucophylla, Allocasuarina luehmannii, Acacia hakeoides, A. lineata, Myoporum* spp., and *Casuarina* spp. (Department of Agriculture, Water and the Environment, 2022)	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.

[1] EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; NC Act = Queensland *Nature Conservation Act 1992*. CR-Critically Endangered, E-Endangered, V-Vulnerable, NT-Near Threatened, LC-Least Concern

[2] **Known** to occur: species were recorded during field surveys. **Likely** to occur: suitable habitat to support the species is present and the species has previously been recorded within the desktop search extent. **Possible** occurrence: The site is within the species known distribution and suitable habitat to support the species is present; however, the species has not previously been recorded within the desktop search extent; and/or, suitable habitat is degraded or of limited extent, thereby reducing the likelihood of the species occurrence. **Unlikely** to occur: the site does not comprise suitable habitat for the species, or is outside of the species known distribution.

D.2 Fauna Likelihood of Occurrence

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
Birds				
Australian painted snipe *Rostratula australis*	E; Marine	V	Generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. The species has been recorded to utilise areas lined with trees, or that have some scattered fallen or washed-up timber. Breeding occurs in shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby, typically from or near small islands in fresh water wetlands (Threatened Species Scientific Committee, 2013b).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat is limited within the Study Area.
black-breasted button-quail *Turnix melanogaster*	V	V	Habitat considered critical to the survival of the black-breasted button-quail includes vine thickets and rainforest vegetation types, particularly semi-evergreen vine thicket, low microphyll vine forest, Araucarian microphyll vine forest, Araucarian notophyll vine forest and Brachychiton scrubs; Low thickets or woodlands with a dense understorey but little ground cover, typically dominated by *Acacia* spp.; and in littoral situations, dry vine scrubs, acacia thickets and areas densely covered in shrubs, particularly *Austromyrtus dulcis* and *Lantana camara** (Threatened Species Scientific Committee, 2015e)	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat is limited within the Study Area.
curlew sandpiper *Calidris ferruginea*	CE; Marine; Migratory	E	This species usually forages and roosts in intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (Threatened Species Scientific Committee, 2015b).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
glossy black-cockatoo *Calyptorhynchus lathami* lathami	-	V	This species prefers woodland areas dominated by she-oak *Allocasuarina*, or open sclerophyll forests and woodlands with a stratum of Allocasuarina beneath *Eucalyptus, Corymbia* or *Angophora*. Glossy black-cockatoos have also been observed in mixed *Allocasuarina, Casuarina, Callitris* and *Acacia harpophylla* woodland assemblages(Glossy Black Conservancy, 2010).	**Likely to occur:** The species has previously been recorded within the desktop search extent and the Study Area contains suitable habitat for the species within areas of Habitat Type 1, 2a and 2b.
grey falcon *Falco hypoleucos*	V	V	Habitat for the species is generally timbered lowland plains that are crossed by tree-lined watercourses and adjacent to treeless areas, grasslands and open woodlands that are used for foraging (Garnett et al., 2011). Key habitat is identified as *Acacia* shrublands that are crossed by tree-lined watercourses (Garnett et al., 2011).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable habitat containing remnant and regrowth communities along and adjacent to watercourses.
painted honeyeater *Grantiella picta*	V	V	The species forages on mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes (Department of the Environment, 2015).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable habitat across all remnant and regrowth communities.
red goshawk *Erythrotriorchis radiatus*	V	E	The species prefers landscapes containing a mosaic of habitats including coastal and sub-coastal tall open forest, woodland and rainforest edges. Forests of intermediate density are particularly favoured, as are ecotones between variably dense habitats. Habitat utilisation is influenced by the location of large populations of birds (primary prey). It is rarely encountered over agricultural land as it avoids open habitats. Nesting occurs in tall trees within one kilometre of permanent water, generally in open, biologically rich forest or woodland. The species is sparsely dispersed across 15% of coastal and sub-coastal Australia (Threatened Species Scientific Committee, 2015c).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat is limited within the Study Area.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
regent honeyeater *Anthochaera Phrygia*	CE	E	Inhabits wet, fertile sites such as along creek valleys associated with box-ironbark eucalypt woodland and dry sclerophyll forest and also inhabits riparian vegetation. Other known habitats range from lowland coastal forest (in drought season), urban or farm remnant patches, roadside reserves and travelling stock routes. Favoured species includes *Eucalyptus sideroxylon, E. albens, E. melliodora, E. robusta*, or *Corymbia maculata* or *Casuarina cunninghamiana* with associated *Amyena cambagei* (Threatened Species Scientific Committee, 2015a).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat is limited within the Study Area.
squatter pigeon (southern subspecies) *Geophaps scripta scripta*	V	V	The species is locally abundant within the northern part of its range (i.e. Brigalow Belt (North) and Desert Uplands Bioregions). It is considered to be common in grazing country north of the Tropic of Capricorn. The species occurs in a wide range of habitats wherever there is a grassy understorey of an open eucalypt woodland (and less often savannas). It is often found within close proximity of water bodies (Threatened Species Scientific Committee, 2015d).	**Likely to occur:** The species has previously been recorded within the desktop search extent and suitable foraging habitat occurs within all Habitat Types 1, 3a and 3b. However, the Study Area is considered unlikely to be utilised for breeding due to the limited availability of suitable land zones (land zones 5 and 7).

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
white-throated needletail *Hirundapus caudacutus*	V; Marine; Migratory	V	Conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species (Threatened Species Scientific Committee, 2019). Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (Threatened Species Scientific Committee, 2019). They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps (Threatened Species Scientific Committee, 2019). When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (Threatened Species Scientific Committee, 2019). In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes (Threatened Species Scientific Committee, 2019).	**Likely to occur:** The species has been previously recorded within the desktop search extent and is likely to occur aerially above the entirety of the Study Area. However, the species does not breed within Australia so suitable habitat is restricted to providing a foraging resource.
Insects				
bulloak jewel *Hypochrysops piceatus*	-	E	The habitat requirements of the bulloak jewel are complex. It requires a single species of tree, bull oak *Allocasuarina luehmannii*, an undescribed ant, *Anonychomyrma* sp., and possibly also the presence of eriococcid scale insects *Rhyzococcus* sp. Only older trees appear to be used by the bulloak jewel as these are riddled with the xyloryctid moth tunnels which encourage nesting colonies of the ant and provide shelter sites for the nocturnal butterfly larvae (Department of Environment and Science (DES), 2020a)	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
pale imperial hairstreak *Jalmenus eubulus*	-	V	The species is restricted to brigalow-dominated open forests and woodlands (Braby, 2016; Eastwood et al., 2008). The species breeds only in old-growth forest and does not colonise regrowth habitats following clearing or areas that have been disturbed (Braby, 2016; Eastwood et al., 2008). The preferred habitat is dominated by *Acacia harpophylla* and *Casuarina cristata* on clay soils comprising Quaternary alluvial systems or Tertiary clay deposits, on flat to gently undulating plains with poorly developed drainage systems, usually with scattered emergent eucalypts such as *Eucalyptus populnea* and low trees of *Geijera parviflora* in the understorey (Braby, 2016; Eastwood et al., 2008).	**Possible occurrence:** Although the species has been previously recorded within the desktop search extent, potential habitat within the Study Area is fragmented and disturbed from historical and ongoing land use practices, reducing the species likelihood of occurrence.
Mammals				
large-eared pied bat *Chalinolobus dwyeri*	V	V	Habitat preferences include fertile woodland valleys or rainforest and moist eucalypt forests within close proximity to sandstone cliffs stretching from Blackdown Table and in central eastern Qld, to Woollongong in NSW. Roosting sites have also been observed within disused mineshafts, caves, overhangs and tree hollows (where suited) (Department of Environment and Resource Management, 2011).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.
northern quoll *Dasyurus hallucatus*	E	LC	The species diverse range of habitats includes Eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. The species is also known to occupy non rocky lowland habitats such as beachscrub communities in central Queensland. Rocky areas provide prime habitat for northern quolls (Threatened Species Scientific Committee, 2005).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
spot-tailed quoll *Dasyurus maculatus maculatus*	E	V	The species prefers mature, unlogged wet forest habitat; however, the species has been recorded from a wide range of other habitats including wet sclerophyll forest, lowland forests, open and closed eucalypt woodlands, inland riparian and *Eucalyptus camaldulensis* forests and coastal heathlands. The species has been occasionally sighted from open country, grazing land, rocky outcrops and other treeless areas (Department of Environment, Land, Water and Planning, 2016).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat is limited within the Study Area.
south-eastern long-eared bat *Nyctophilus corbeni*	V	V	The species is found in a wide range of inland woodland vegetation types, these include box/ironbark/cypress pine woodlands, Bulloak woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee. The species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches (Threatened Species Scientific Committee, 2015f).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable habitat within Habitat Types 1, 2a, 3a.
brush-tailed rock-wallaby *Petrogale penicillate*	V	V	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks and also uses tree limbs. While it appears that most colonies are on north-facing slopes and cliff lines, colonies have been found on south-facing cliffs in Kangaroo Valley, in the Macleay River Gorge, in the Warrumbungles and at Mt Kaputar, although usually in lower densities (Department of the Environment, 2020).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
koala (combined populations of Qld, NSW and the ACT) *Phascolarctos cinereus*	E	V	Koalas occur in a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by their diet; Eucalyptus species (preference varying regionally). Diet is thought to be a major determinant of habitat selection, with the use small remnants of original vegetation where suitable habitat is present. Koalas are also known to occur in modified or regenerating native vegetation communities, as well as urban and rural landscapes where food trees or shelter trees may be highly scattered (Department of Sustainability, Environment, Water, Population and Communities, 2012).	**Likely to occur:** The species has previously been recorded within the desktop search extent and the Study Area contains suitable habitat for the species within Habitat Type 1.
greater glider *Petauroides volans*	V	V	The species is generally restricted to eucalypt forests and woodlands, particularly favouring forest with a diversity of eucalypt species (DAWE, 2021b). During the day the species shelters in tree hollows, with a particular selection for large hollows in large, old trees (DAWE, 2020b). Modelling suggests that they require native forest patches of at least 160 km2 to maintain viable populations (Eyre, 2004).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat is largely isolated and fragmented within the Study Area, reducing the species likelihood of occurrence.
grey-headed flying-fox *Pteropus poliocephalus*	V	LC	The species feeds on canopy fruits and nectar within rainforests, open forests, closed and open woodlands, melaleuca swamps and banksia woodlands. Their primary food source is *Eucalypt* blossoms however due to a discontinuous supply throughout the year, migrates between suitable habitats. Roosting sites are typically located within rainforests, riparian vegetation and *Melaleuca* woodlands near water sources, such as lakes, rivers and dams. The species has also been recorded using highly modified vegetation in urban and suburban areas (Department of Environment and Resource Management, 2010).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable foraging habitat within all remnant and regrowth areas.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
short-beaked echidna *Tachyglossus aculeatus*	-	SLC	The species occurs throughout Australia in a wide variety of habitats; wherever there is a supply of ants and termites, upon which it feeds. The species usually seeks shelter under thick bushes, in hollow logs, under piles debris, or occasionally in a rabbit burrow (Van Dyck & Strahan, 2008).	**Likely to occur:** The species has been previously recorded within the desktop search extent and the Study Area contains suitable habitat for the species across remnant and regrowth areas.
Reptiles				
five-clawed worm-skink *Anomalopus mackayi*	V	E	The species is known to occur in both remnant and non-remnant woodlands and grasslands. In areas modified by agriculture and other human activities, the species has been found sheltering under artificial materials lying flat on the ground, such as discarded railway sleepers, sheet metal and hay bales. In Queensland, it occurs in *Dichanthium sericeum* and/or Mitchell Grass dominated grasslands (Department of the Environment, Water, Heritage and the Arts, 2008f).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable across all remnant and regrowth areas.
collared delma *Delma torquata*	V	V	The species normally inhabits dry eucalypt dominated woodlands and open-forests on stony soils or rocky ridges with an understorey of grasses and *Lantana montevidensis*. This also includes alluvial river and creek flats, undulating country on fine-grained sedimentary rocks and sandstone ranges. The species lives in permanent deep tunnel-like burrows and deep soil cracks, using fallen logs and timber as sheltering sites on the surface (Department of the Environment, Water, Heritage and the Arts, 2008e).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable habitat within Habitat Type 1.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
yakka skink *Egernia rugosa*	V	V	The species is known to occur in open dry sclerophyll forest, woodland and scrub, including on Land Zones 3, 4, 5, 7, 9 and 10. Common woodland and open forest types include *Acacia harpophylla, A. aneura, A. catenulata, A. shirleyi, Casuarina cristata, Eucalyptus populnea, Eucalyptus spp.* and *Callitris glaucophylla*. This species will often take refuge among dense ground vegetation, large hollow logs, cavities in soil-bound root systems of fallen trees and beneath rocks (Department of the Environment, 2014b).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable habitat within all remnant communities.
dunmall's snake *Furina dunmalli*	V	V	The species range of habitats includes forests and woodlands on black alluvial cracking clay and clay loams dominated by *Acacia harpophylla* (brigalow), other wattles *(A. burowii, A. deanii, A. leiocalyx*), *Callitris spp.* or *Allocasuarina luehmannii*; and *Corymbia citriodora*, *Eucalyptus crebra, E. melanophloia, Callitris glaucophylla* and bulloak open forest and woodland associations on sandstone derived soils (Threatened Species Scientific Committee, 2014).	**Possible occurrence:** The species has not been previously recorded within the desktop search extent. However, the Study Area contains suitable habitat within Habitat Type 2a.
Condamine earless dragon *Tympanocryptis condaminensis*	E	E	The species is observed in cropland and remnant native grassland and exotic grassland. Predominately found in the grasslands on black cracking clays of Condamine River (Threatened Species Scientific Committee, 2016a).	**Possible occurrence:** The species has been previously recorded within the desktop search extent. However, the species is currently only known from a distinct area between the Condamine River and east to Toowoomba.

Fauna Species[1]	EPBC Act Status[2]	NC Act Status[2]	Habitat	Likelihood of occurence[3]
border thick-tailed gecko *Uvidicolus sphyrurus*	V	LC	Habitat is typically rocky outcrops in dry sclerophyll open forest and woodland. It is most commonly found in undisturbed habitat remnants on rocky outcrops and stony hills within eucalypt and cypress-pine open forest or woodland between 500-1100 m elevation. Occupied sites often have a dense tree canopy that creates a sparse grass/herb ground cover and abundant litter. It often occurs on steep rocky or scree slopes, especially on granite and it may prefer sites with easterly aspects and the base of rock scarps (Department of the Environment, Water, Heritage and the Arts, 2008g).	**Unlikely to occur:** The species has not been previously recorded within the desktop search extent and suitable habitat does not occur within the Study Area.
Snails				
brigalow woodland snail *Adclarkia cameroni*	E	V	It is known to occur under logs and leaf litter, where it likely feeds on fungi, lichen, algae and other detritus/biofilm growing on forest debris, thereby recycling nutrients into the soil. The species needs both canopy and on-ground timber cover for survival and egg-laying (Threatened Species Scientific Committee, 2016b).	**Unlikely to occur:** The Study Area occurs outside of the species known distribution.
Dulacca woodland snail *Adclarkia dulacca*	E	E	The species inhabits a variety of remnant and scattered habitats; vine thicket and *Acacia harpophylla* woodland patches on rocky outcrops with clay to loam soils, Eucalyptus (ironbark) species and *Acacia shirleyi* woodlands on ridges (with and without rock), and *Eucalyptus woollsiana* woodland (Threatened Species Scientific Committee, 2016c).	**Unlikely to occur:** The Study Area occurs outside of the species known distribution.

[1] EPBC Act = Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; NC Act = Queensland *Nature Conservation Act 1992*. CR-Critically Endangered, E-Endangered, V-Vulnerable, NT-Near Threatened, SLC-Special Least Concern, LC-Least Concern

[2] **Known** to occur: species were recorded during field surveys. **Likely** to occur: suitable habitat to support the species is present and the species has previously been recorded within the desktop search extent. **Possible** occurrence: The site is within the species known distribution and suitable habitat to support the species is present; however, the species has not previously been recorded within the desktop search extent; and/or, suitable habitat is degraded or of limited extent, thereby reducing the likelihood of the species occurrence. **Unlikely** to occur: the site does not comprise suitable habitat for the species, or is outside of the species known distribution. The Protected Matters Search

identified numerous marine, pelagic and shorebird species. These species have not been considered in this report due to the lack of marine and shoreline environment and the site being located approximately 180 km from the coast.

Appendix E EPBC Act MNES Significant Impact Assessments

E.2 EPBC Act MNES Significant Impact self-assessment

Definitions and terminology

Term	Definition under the EPBC Act
Habitat critical to the survival of the species	Areas that are necessary: for activities such as foraging, breeding, roosting, or dispersal for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) to maintain genetic diversity and long term evolutionary development, or for the reintroduction of populations or recovery of the species or ecological community. Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.
Important population	A population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: key source populations either for breeding or dispersal populations that are necessary for maintaining genetic diversity; and/or populations that are near the limit of the species range.
Invasive species	an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.
Significant impact	As per the EPBC Act *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b), a significant impact is determined with regard to whether an impact is 'important, notable or of consequence, having regard to its context or intensity'

E.1 Brigalow TEC

To determine if the Project is likely to have a significant impact on the Brigalow TEC, an assessment in accordance with the EPBC Act *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b) (MNES Referral Guidelines) is required.

Assessments identified that the Project is likely to have a significant impact on 1.07 ha of Brigalow dominant and co-dominant TEC.

MNES significant impact assessment for Brigalow TEC

Assessment criteria	Response
Reduce the extent of an ecological community	**Significant impact unlikely** The Brigalow TEC community occurs throughout Queensland and New South Wales, largely in association with the Brigalow Belt Bioregion (DotE, 2013a). The Project, situated within the southern Brigalow Belt bioregion, is not located near the edge of the known distribution of this ecological community. Furthermore, the extent of Brigalow TEC within the disturbance footprint is limited to a small (1.07 ha), isolated patch. As such, the extent of occurrence for Brigalow TEC across the ecological community extent and local landscape is considered to remain largely unchanged as a result of the Project.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	**Significant impact unlikely** The Project would require the clearing of 1.07 ha of the Brigalow TEC, comprising a single small (1.07 ha), isolated patch. The disturbance footprint will not result in the fragmentation of an existing area of Brigalow TEC, with the whole patch to be cleared. The remaining Brigalow TEC patch identified within the Study Area will not require removal. As such, the Project is considered unlikely to fragment or increase fragmentation of the TEC within the landscape.
Adversely affect habitat critical to the survival of an ecological community	**Significant impact likely** As per the listing advice for the Brigalow ecological community (Butler, 2007), the areas considered critical to the survival of the Brigalow TEC includes all patches that meet the key diagnostic characteristics and condition thresholds for the ecological community. As such, the Project is considered likely to affect habitat critical to the survival of an ecological community. Indirect impacts on the Brigalow TEC area to be retained in the Study Area and surrounds are considered to be minimal. Implementation of mitigation measures (refer to Section 6), such as weed hygiene and erosion and sediment controls, will minimise any potential indirect impacts on ecological function and composition within the retained TEC area.

Assessment criteria	Response
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Significant impact likely** The Project will result in the direct removal of 1.07 ha of Brigalow TEC. Indirect impacts on the Brigalow TEC area to be retained in the Study Area and surrounds are considered to be minimal. Although associated impacts on groundwater levels are still being assessed, the community is considered to be facultative and unlikely to require the access to groundwater for long-term survival. While the Brigalow TEC are located within a largely disturbed and modified landscape, resulting from historical and ongoing land uses, the Project is likely to alter current hydrological flows and surface water drainage. However, Brigalow TEC to be retained within the Study Area are not located along a watercourse and largely dependent on overland flows. As such, the Project is considered unlikely to modify abiotic factors of Brigalow TEC communities to be retained within the Study Area or surrounds.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**Significant impact likely** The Project will result in the direct removal of 1.07 ha of Brigalow TEC. Indirect impacts on the Brigalow TEC area to be retained in the Study Area and surrounds are considered to be minimal. Implementation of mitigation measures (refer to Section 6), such as weed hygiene and erosion and sediment controls, will minimise any potential indirect impacts on ecological function and composition within the retained TEC area. The Project is unlikely to result in the changes to existing fire regimes or harvesting of native species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	**Significant impact unlikely** Indirect impacts on the Brigalow TEC area to be retained in the Study Area and surrounds are considered to be minimal. Implementation of mitigation measures (refer to Section 6), such as weed hygiene and erosion and sediment controls, will minimise any potential indirect impacts on ecological function and composition within the retained TEC area.

Assessment criteria	Response
Interfere with the recovery of an ecological community	**Significant impact unlikely** A draft national recovery plan has been developed for the Brigalow TEC (refer to *Recovery plan for the "Brigalow (Acacia harpophylla dominant and co-dominant" endangered ecological community* (Butler, 2007)). Key objectives of the national recovery plan include: • increasing the area of the Brigalow ecological community and its representation in conservation reserves • improving knowledge of the Brigalow ecological community and its condition as habitat for native species; and • mitigating key threats to the Brigalow ecological community by controlling fire, weeds and animal pests. While the Project would require clearing of 1.07 ha of Brigalow TEC, the identified community is isolated and located within a largely modified and disturbed landscape with limited connectivity with surrounding remnant vegetation or conservation areas. Furthermore, indirect impacts on the Brigalow TEC area to be retained in the Study Area will be minimised through the implementation of mitigation measures (refer to Section 6), such as weed hygiene and erosion and sediment controls. As such, it is considered the Project is unlikely to significantly interfere with the recovery actions identified within the national recovery plan.
Conclusion	The Project is <u>likely to result in a significant impact</u> on 1.07 ha of Brigalow TEC due to: • adversely affecting habitat critical to the survival of an ecological community • modification or destruction of abiotic (non-living) factors (vegetation clearing); and • causing a substantial change in the species composition of an occurrence of an ecological community (vegetation clearing).

E.2 *Homopholis belsonii*

To determine if the Project is likely to have a significant impact on *Homopholis belsonii* (Belson's panic), an assessment in accordance with the MNES Referral Guidelines is required. The assessment is contained within the table below.

Assessment criteria	Response
Lead to a long-term decrease in the size of a population	**Significant impact likely** Approximately 200 *Homopholis belsonii* (belson's panic) individuals were recorded within the Study Area, spanning approximately 10.05 ha. The Project will result in the removal of 6.37 ha of known habitat for the species, approximately 63% of the recorded population extents. The disturbance will comprise the removal of the local population recorded within MDL 299 Study Area and partial disturbance to the population recorded in MDL 301 Study Area. While mitigation measures will be implemented to minimise potential indirect impacts to areas/individuals to be retained, the direct removal of 6.37 ha of known habitat is considered likely to result in a long-term decrease in the size of local populations of the species.
Reduce the area of occupancy of the species	**Significant impact likely** The species distribution is within the southern Brigalow Belt, extending from Miles and Chinchilla in Queensland to the north-western slopes and plains, located north of Narrabri in New South Wales (DAWE, 2021b). The Project will result in the direct removal of approximately 6.37 ha of known habitat for the species, comprising local populations. Areas to be disturbed are unlikely to be rehabilitated until the closure of the CCM. The direct removal of 6.37 ha of known habitat for the species is likely to reduce area of occupancy for local populations. However, the Project is considered unlikely to significantly reduce the extent of the species within the greater region.
Fragment an existing population into two or more populations	**Significant impact unlikely** The Project will result in the removal of 6.37 ha of known habitat for the species across two local populations. The Project will result in the removal of the entirety of the population identified within the MDL 299 Study Area and partial disturbance to the population within the MDL 301 Study Area. The method of pollination/seed dispersal for this species occurs via wind (DAWE, 2021b). As such, although the habitat of the species will be disturbed by the Project, it is considered unlikely to result in the fragmentation of an existing population into two or more populations.

Assessment criteria	Response
Adversely affect habitat critical to the survival of a species	**Significant impact likely** Due to the recorded occurrences of the species within the Disturbance footprint, the 6.37 ha of known habitat is considered to be 'habitat critical to the survival of the species' as defined under the MNES Significant Impact Guidelines (DotE, 2013b). As such, the Project will result in the direct loss of 6.37 ha of habitat critical for the survival of the species. Indirect impacts on populations/habitat to be retained in the Study Area and surrounds is considered to be minimal. Implementation of mitigation measures (refer to Section 6), such as weed hygiene and erosion and sediment controls, will minimise any potential indirect impacts on populations and habitat within the undisturbed areas.
Disrupt the breeding cycle of a population	**Significant impact unlikely** The Project will result in the direct loss 6.37 ha of habitat critical for the survival of the species and known to comprise individuals. The method of pollination/seed dispersal for this species occurs via wind (DAWE, 2021b). As such, although the habitat of the species will be disturbed by the Project, it is considered unlikely to disrupt the breeding cycle of undisturbed populations within and surrounding the Study Area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Significant impact possible** The Project will result in the removal of approximately 6.37 ha of known habitat for the species. While the species has been previously recorded at various locations surrounding the Study Area (refer to Figure 7a), the extent of existing local populations within areas outside of the Study Area is not currently known. Applying the precautionary principle, suitable habitat within the Study Area may be important to a local population. As such, the removal of habitat resulting from the Project will potentially result in the isolation or destruction of habitat may result in a decline of a local population. Within the greater landscape context, the removal of habitat is considered unlikely lead in the long-term decline of the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Significant impact unlikely** The Project is unlikely to increase the abundance of invasive species currently present or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the species to decline	**Significant impact unlikely** It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact *H. belsonii*.

Assessment criteria	Response
Interfere with the recovery of the species	**Significant impact unlikely** Although there is no current recovery plan for the species, priority actions are identified within the 'Approved Conservation Advice' for the species (DEWHA, 2008a). Associated recovery and abatement strategies target reduction in habitat loss and disturbance, management of weeds, disturbance by livestock and community awareness (DEWHA, 2008a). The Project will impact 6.37 ha of known habitat for the species. Due to the extent of habitat to be cleared, it is considered unlikely that the Project will interfere significantly with the recovery of the species.
Conclusion	The Project is likely to result in a significant impact on 6.*belsonii* due to: • the direct removal of 6.37 ha of known habitat is considered likely to result in a long-term decrease in the size of local populations of the species. • reduction in the area of occupancy for a local population • adversely affecting habitat critical to the survival of the species; and • potential for the Project to result in the isolation or destruction of habitat that may result in a decline of a local population.

MNES assessment for EPBC Act listed vulnerable species (excluding koala)

To determine if the Project is likely to have a significant impact to vulnerable species, the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b) require an assessment of whether an 'important population' of vulnerable species occurs within the Action area and an assessment against the significant impact criteria for listed vulnerable species.

Assessments identified that the Project is likely to have a significant impact on the following three vulnerable species:

- *Picris evae* (hawkweed)
- squatter pigeon (southern subspecies); and
- white-throated needle-tail

Detailed assessments are contained within the assessment tables below

Important population assessment for listed vulnerable species

Assessment criteria	Response
Key source populations either for breeding or dispersal, and/or	• ***Picris evae* (hawkweed):** While 'important populations' of *Picris evae* (hawkweed) have not been formally identified (DEWHA, 2008d), this species occurs in the NSW northern tablelands and the pastoral districts of south-east Queensland. An occurrence of known habitat for this species is a surrogate for an important population. • **Squatter pigeon (southern subspecies)**: The population of the squatter pigeon (southern subspecies) within the region is considered to be an important population. Important populations of squatter pigeon (southern subspecies) occur south of the Carnarvon Ranges in Central Queensland (TSSC, 2015d). • **White-throated needletail:** As the species' total population is unknown, the population of this migratory species in Australia is considered an important population.
Populations that are necessary for maintaining genetic diversity, and/or	• ***Picris evae* (hawkweed):** While 'important populations' of *Picris evae* (hawkweed) have not been formally identified (DEWHA, 2008d), this species occurs in the New South Wales northern tablelands and the pastoral districts of south-east Queensland. An occurrence of known habitat for this species is a surrogate for an important population. • **Squatter pigeon (southern subspecies):** Important populations of squatter pigeon (southern subspecies) occur south of the Carnarvon Ranges in Central Queensland (TSSC, 2015a). • **White-throated needletail:** As the species' total population is unknown, the population of this migratory species in Australia is considered an important population.

Assessment criteria	Response
Populations that are near the limit of the species range.	• ***Picris evae* (hawkweed):** The Project is located near the limit of the species range (DAWE, 2020). • **Squatter pigeon (southern subspecies)**: The Project is located near the limit of the species range (DAWE, 2020). • **White-throated needletail**: The Project is not located near the limit of the species range (DAWE, 2020).

E.3 *Picris evae*

To determine if the Project is likely to have a significant impact on *Picris evae* (hawkweed), an assessment in accordance with the MNES Referral Guidelines is required. The assessment is contained within the table below.

Assessment criteria	Response
Lead to a long-term decrease in the size of an important population of a species	**Significant impact unlikely** No individuals were observed during the field survey. As the field survey was undertaken outside of the species optimal survey period (October to January), suitable habitat was mapped in association with remnant REs 11.3.4 and 11.3.25. Suitable habitat may contain an important population (or part of). Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. Given the small area of suitable habitat to be cleared (<1 ha) and no individuals have been recorded within the Disturbance footprint, the Project is considered unlikely to lead to a long-term decrease in the size of an important population (if present).
Reduce the area of occupancy of an important population	**Significant impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. Given the small area of suitable habitat to be cleared (<1 ha) and no individuals have been recorded within the Disturbance footprint, the Project it is considered unlikely that the Project will reduce the area of occupancy of an important population (if present).
Fragment an existing important population into two or more populations	**Significant impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. While, the road corridor will dissect the area of suitable habitat, due to the extent of habitat disturbed and the nature of the disturbance (road), it is unlikely to impede pollination or seed dispersal of the species. Following construction of the watercourse crossing, areas temporarily disturbed will also be rehabilitated. As such, it is considered unlikely the Project would fragment an existing important population (if present) into two or more populations.

Assessment criteria	Response
Adversely affect habitat critical to the survival of a species	**Significant impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. While, the road corridor will dissect the area of suitable habitat, due to the extent of habitat disturbed and the nature of the disturbance (road), it is unlikely to impede pollination or seed dispersal of the species. Following construction of the watercourse crossing, areas temporarily disturbed will also be rehabilitated. To avoid the indirect impacts to *Picris evae* outside of the Disturbance Footprint, mitigation and management measures (refer to Section 6) will also be implemented, including weed hygiene protocols and control of pests and weed species. Based on the extent of suitable habitat disturbed (<1 ha) and the implementation of mitigation measures for indirect impacts, it is considered unlikely the Project will adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	**Significant impact unlikely** No individuals were recorded during the field survey. Suitable habitat within the Study Area may contain an important population (or part of). While the Project will impact 0.69 ha of suitable habitat in association with the road diversion, it is unlikely to impede pollination or seed dispersal of the species. Pollination is usually carried out by insect vectors, with seed dispersal by wind and water (Holzapfel, 1994). To avoid the indirect impacts to *Picris evae* outside of the Disturbance Footprint, mitigation and management measures (refer to Section 6) will also be implemented, including weed hygiene protocols and control of pests and weed species. Due to the nature of the disturbance (road) and the extent of habitat impacted (<1 ha), direct and indirect impacts associated with the Project are considered unlikely impact on the breeding cycle of any populations within or surrounding the Study Area (if present).
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Significant impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. While, the road corridor will dissect the area of suitable habitat, due to the extent of habitat disturbed and the nature of the disturbance (road), it is unlikely to interrupt the dynamics of a population (if present). Following construction of the watercourse crossing, areas temporarily disturbed will also be rehabilitated. Furthermore, the Project is located within a largely fragmented landscape with the Project unlikely to further isolate suitable habitat within the landscape. As such, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained suitable habitat within the Study Area.

Assessment criteria	Response
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Significant impact unlikely** The Project is unlikely to increase the abundance of invasive species currently present or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the species to decline	**Significant impact unlikely** It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact the species (DEWHA, 2008d).
Interfere substantially with the recovery of the species	**Significant impact unlikely** Although there is no current recovery plan for the species, priority actions are identified within the 'Approved Conservation Advice' for the species (DEWHA, 2008d). Although the Project will impact approx. 0.69 ha of suitable habitat, the extent of habitat impacted coupled with the unlikely interruption of pollination and seeding of a population (if present), it is not considered likely interfere substantially with the recovery of the species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained suitable habitat within the Study Area.
Conclusion	The Project is unlikely to result in a significant impact on *Picris evae*.

E.4 Squatter pigeon (*Geophaps scripta scripta*)

To determine if the Project is likely to have a significant impact on squatter pigeon (southern subspecies) (*Geophaps scripta scripta*), an assessment in accordance with the MNES Referral Guidelines is required. The assessment is contained within the table below.

Assessment criteria	Response
Lead to a long-term decrease in the size of an important population	**Significant Impact unlikely** No individuals were observed within the Study Area during the field survey. Squatter pigeon was previously recorded within ML during the field surveys undertaken for the initial assessments for the CCM (SKM, 1999). The species has also been previously recorded within the surrounding area, including • approx. 5 km north Near the Millmerran township (recorded 1984 (DES), 2021e)) • 25 km south near Stonehenge Station (recorded 1997 (DES), 2021e)) • 32 km south near Mount Bodumba homestead (recorded 1997 (DES), 2021e)). No records of the species have been recorded within proximity to the Study Area within the last 20 years, suggesting the species, if still present, may occur at low densities within the local area. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded squatter pigeon (southern subspecies) within the Project area and surrounding landscape. Approximately 4.63 ha of breeding habitat and 3.69 ha of foraging habitat will be disturbed as a result of the Project. As the Study Area is located near the edge of its likely distribution, any population (if present) would be considered an 'important population'. Habitat impacted by the Project comprises isolated patches of vegetation within predominantly agricultural land. Based on the extent of habitat to be cleared (<10 ha), time since last recorded and isolated nature of habitat within the Study Area, it is considered unlikely that the Project would lead to a long-term decrease in the size of an important population of the species (if present).
Reduce the area of occupancy of an important population	**Significant impact likely** The population (if present) within the Study Area is considered to be an important population. Approximately 4.63 ha of breeding habitat and 3.69 ha of foraging habitat will be disturbed as a result of the Project. Although the removal of <10 ha of habitat is unlikely to reduce the area of occupancy of the species on a broader landscape scale, due to the fragmented nature of habitat within the Study Area and surrounds, the removal of habitat is likely to reduce the area of occupancy of a local population (if present).

Assessment criteria	Response
Fragment an existing important population into two or more populations	**Significant Impact unlikely** The Project will result in the removal of 4.63 ha of breeding habitat and 3.69 ha of foraging habitat. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded squatter pigeon (southern subspecies) within the Project area and surrounding landscape. Due to the existing fragmentation within the landscape, in conjunction with the mobile nature of the species, it is considered unlikely that the Project would result in the fragmentation of an important population (if present) into two or more populations.
Adversely affect habitat critical to the survival of a species	**Significant impact likely** The Project will result in the removal of 4.63 ha of breeding habitat and 3.69 ha of foraging habitat. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded squatter pigeon (southern subspecies) within the Project area and surrounding landscape. Habitat within the Study Area is considered 'habitat critical to the survival of the species' due the presence of habitat (including breeding) that occurs within the Study Area. As such, the Project is considered likely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	**Significant impact possible** The population within the Study Area is considered to be an important population. Of the 6.31 ha of suitable breeding habitat within the Study Area, the Project will result in the removal of 4.63 ha (~73%). The extent of breeding habitat within the surrounding landscape is relatively unknown. Due to the fragmented nature of the Study Area and surrounds, removal of breeding habitat may disrupt the breeding cycle of an important population (if present).
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Significant impact unlikely** The Project will result in the removal of 4.63 ha of breeding habitat and 3.69 ha of foraging habitat. No records of the species have been recorded within proximity to the Study Area within the last 20 years, suggesting the species, if still present, may occur at low densities within the local area. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded squatter pigeon (southern subspecies) within the Project area and surrounding landscape. Based on the extent of habitat to be cleared (<10 ha), time since last recorded and the isolated nature of habitat within the Study Area, it is considered unlikely that the Project would result in the destruction or removal of habitat to the extent the species is likely to decline. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential introduction or spread of exotic species in retained habitat within the Study Area.

Assessment criteria	Response
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Significant impact unlikely** The Project is unlikely to increase the abundance of invasive species (i.e. feral dogs, cats and foxes) above their current levels or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management, pest control and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the species to decline	**Significant impact unlikely** The Project is unlikely to introduce a disease that may cause the species to decline, given there are no known diseases that impact the species (TSSC, 2015d).
Interfere substantially with the recovery of the species	**Significant impact unlikely** Although there is currently no national recovery plan developed for the species, key threat abatement and recovery objectives provided within the approved listing advice (TSSC, 2015d) and include: • Determining the population size and distribution of the Squatter Pigeon (southern) in southern Queensland and New South Wales, and assess the pigeon's conservation status and requirements. • Undertaking studies in North and Central Queensland to determine the relationship between pigeon abundance, tree density and stocking rates. • Establish sites for sub-population monitoring. If possible, these sites should be established with the cooperation of local land-owners and/or conservation organisations. • Develop and implement public education programs and community based tree planting schemes to revegetate favoured habitat types. • Establish control measures for predators (especially cats and foxes) at important sites. • Establish conservation measures to protect grassy woodlands and forests. While the Project would require clearing of 4.63 ha of breeding habitat and 3.69 ha of foraging habitat, the surrounding landscape is largely fragmented and subject to ongoing agricultural development with limited connectivity with surrounding remnant vegetation or conservation areas. Furthermore, potential indirect impacts on suitable habitat to be retained in the Study Area will be minimised through the implementation of mitigation measures (refer to Section 6), such as weed and pest control and erosion and sediment controls. As such, it is considered the Project is unlikely to significantly interfere with the recovery actions identified for the species.

Assessment criteria	Response
Conclusion	The Project is likely to result in a significant impact on 4.63 ha of breeding habitat and 3.69 ha of foraging habitat for the squatter pigeon (southern subspecies) due to: • adversely affecting habitat critical to the survival of the species • reduction in the area of occupancy for an important population; and • potentially disrupting the breeding cycle of an important population.

E.5 Koala (*Phascolarctos cinereus*)

A review the status of the koala (*Phascolarctos cinereus*) under the EPBC Act was undertaken by DAWE which resulted in a change from Vulnerable status to Endangered effective of 10 February 2022 (refer to *List of Threatened Species Amendment (Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory) (280)) Instrument 2022*). Following the change in status, the *EPBC Act referral guidelines for the vulnerable koala* (DotE, 2014a) (Koala Referral Guideline) was repealed and the self-assessment against the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013b) (MNES Referral Guideline) for Endangered species was applied. Although the Koala Referral Guideline has been repealed, the definition of 'habitat critical to the survival of the species' outlined within the guideline was used the purposes of the impact assessment for the koala. As such, habitat critical to the survival of the species (for inland habitat) is defined as an impact area that scores **five or more** using the habitat assessment tool.

The koala habitat assessment tool (Score of 4/10, see Table below) indicates that koala habitat within the Study Area is not critical to the species survival.

Koala Habitat Assessment Tool

Attribute	Score	Definition	Comment
Koala occurrence	+2	Evidence of one or more koalas within the last 2 years.	No individuals or evidence of koala was observed during the field survey. A review of the WildNet Data (DES, 2021e) and the Koala Hospital Data (DES, 2020c) has previously recorded six individuals of koala within 20 km of the Study Area, ranging from 1980 – 2019. The nearest record for the species is at Domville State Forest, located approximately 2.5 km south-west of the Study Area which was recorded in 2013.
	+1	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.	
	0	None of the above.	
Vegetation composition	+2	Has forest or woodland with 2 or more known koala food tree species, OR 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata	The field assessment identified the Study Area contains preferred foraging species for koala, including *Eucalyptus tereticornis, E. camaldulensis, Corymbia tessellaris* and *Angophora floribunda*.
	+1	Has forest or woodland with only 1 species of known koala food tree present.	
	0	None of the above.	
Habitat connectivity	+2	Area is part of a contiguous landscape ≥ 500 ha.	Koala habitat within the Study Area is located within a highly fragmented landscape and is limited to riparian vegetation associated with watercourses (i.e. <300 ha).
	+1	Area is part of a contiguous landscape < 500 ha, but ≥ 300 ha.	
	0	None of the above.	

Attribute	Score	Definition	Comment
Key existing threats	+2	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present.	No individuals or evidence of koala mortality was observed within the Study Area. A review of the Koala Hospital Data (DES, 2020c) identified that the closest evidence of koala mortality due to vehicle strike occurred approximately 5 km north of the Study Area in 2015 near the township of Millmerran. The Study Area is located between Millmerran-Inglewood Road, which intercepts areas of suitable koala habitat. As such, it is likely that the existing road corridors and connective habitat that facilitate koala movement may pose some degree of potential vehicle strike.
	+1	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, OR Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.	
	0	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the Study Area at present, OR Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1 of the koala guidelines[4].	It is uncertain whether the habitat within the Study Area and surrounds is important for achieving the interim recovery objectives of the koala. The Study Area is located within a highly fragmented landscape, with the remaining habitat and movement corridors largely associated with fringing riparian woodlands and scattered

[4] • Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are:
- of sufficient size to be genetically robust /operate as a viable sub-population; OR
- free of disease or have a very low incidence of disease; OR
- breeding.

Attribute	Score	Definition	Comment
	+1	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1 of the koala guidelines[4].	reserves/State forests. The vegetation occurs within a riparian zone which may protect the species during extreme droughts and periods of extreme heat as stated in the guidelines.
	0	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1 of the koala guidelines[4].	
SCORE	**4**	-	Based on the koala habitat assessment tool, suitable habitat within the Study Area came to as score of 4. As such, suitable habitat within the Study Area is not considered to contain 'habitat critical to the survival of the species'.

- Maintain corridors and connective habitat that allow movement of koalas between large areas of habitat.

To determine if the Project is likely to have a significant impact on koala an assessment in accordance with the MNES Referral Guidelines is required. The assessment is contained within the Table below.

Assessment criteria	Response
Lead to a long-term decrease in the size of a population of a species	**Significant impact unlikely** While the Project will require the removal of approximately 0.69 ha of suitable habitat for the species, a long-term decrease in the species population is unlikely as: • the proposed clearing represents a small proportion of suitable habitat available within the surrounding areas • no recent scats or scratches were observed during the field survey and the species was not identified during a nocturnal survey, indicating a low species utilisation of the Study Area • The proposed road diversion is unlikely to create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor; and • Management and mitigation measures in accordance with the *Nature Conservation (Koala) Conservation Plan 2017* will assist in reducing potential impact to the species. As such, the Project is considered unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of the species	**Significant impact unlikely** While the Project will require the removal of approximately 0.69 ha of suitable habitat for koala, a significant reduction to the occupancy of the species is unlikely as: • the proposed clearing represents a small proportion of suitable habitat available within the surrounding areas; and • no recent scats or scratches were observed during the field survey and the species was not identified during a nocturnal survey, indicating a low species utilisation of the Study Area • the proposed road diversion is unlikely to create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor; and • management and mitigation measures will be implemented to minimise impacts to surrounding habitat and species movement. As such, it is considered unlikely that the Project will reduce the area of occupancy of an important population (if present).
Fragment an existing population into two or more populations	**Significant impact unlikely** The Project is located within a largely fragmented landscape. While the Project will dissect suitable habitat, associated with a riparian corridor, the proposed watercourse crossing will still facilitate movement of individuals along the riparian corridor. The proposed watercourse crossing will not create an impenetrable barrier for the species. As such, it is considered unlikely to fragment an existing population into two or more populations and will not result in the isolation of areas of koala habitat.

Assessment criteria	Response
Adversely affect habitat critical to the survival of a species	**Significant impact unlikely** Suitable habitat within the disturbance footprint (refer to previous table) did not meet the definition of 'habitat critical to the survival of the koala', as defined under the MNES Referral Guidelines and the repealed Koala Referral Guideline (DotE, 2014). While the Project will require the removal of approximately 0.69 ha of suitable habitat, significant impact to the habitat is unlikely as: • the proposed clearing represents a small proportion of suitable habitat available within the surrounding areas; and • the Project will not result in broad scale clearing of surrounding habitat nor reduce the opportunities for species movement to surrounding habitat.
Disrupt the breeding cycle of a population	**Significant impact unlikely** The Project is unlikely to substantially reduce the foraging resources available within the area. No recent scats or scratches were observed during the field survey and the species was not identified during a nocturnal survey, indicating a low species utilisation of the Study Area. Management and mitigation measures in accordance with the *Nature Conservation (Koala) Conservation Plan 2017* have been identified to mitigate potential disruption to individual koalas during clearing works.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Significant impact unlikely** The proposed clearing comprises the removal of 0.69 ha of suitable habitat and represents a small proportion of habitat available within the Study Area and surrounds. The proposed road diversion is also unlikely to create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor. As such, the Project is considered unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline. The implementation of mitigation measures, including weed management, pest control and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat	**Significant impact unlikely** The Project is unlikely to increase the abundance of invasive species above their current levels or result in the introduction of new invasive species. The implementation of mitigation measures outlined in this report, including weed management, pest control and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.

Assessment criteria	Response
Introduce disease that may cause the species to decline	**Significant impact unlikely** The proposed disturbance is unlikely to introduce or facilitate the spread of disease or pathogens for the species (i.e. Koala retrovirus or Chlamydia). Management measures have been identified within this report to mitigate the potential to introduce pest and pathogens to the area.
Interfere with the recovery of the species	**Significant impact unlikely** A draft National Koala Recovery Plan is under development. Key objectives identified of the recovery Plan comprise: 1. The area of occupancy and size of populations that are declining, suspected to be declining, and predicted to decline are increased 2. Metapopulation processes are maintained or improved; and 3. Communities and individuals have a greater role and capability in Koala conservation and management Based on the extent of habitat to be disturbed (0.69 ha) and no establishment of impenetrable barriers to movement, the Project is unlikely to significantly interfere with the actions identified within the Draft National Recovery Plan for the Koala (DAWE, 2021a) to support the recovery of the species.
Conclusion	The Project is unlikely to result in a significant impact on the koala.

E.6 White-throated needletail (*Hirundapus caudacutus*)

To determine if the Project is likely to have a significant impact on white-throated needletail (*Hirundapus caudacutus*), an assessment in accordance with the MNES Referral Guidelines is required. The assessment is contained within the table below.

Assessment criteria	Response
Lead to a long-term decrease in the size of an important population of a species	**Significant impact unlikely** The key subspecies of white-throated needletail (Hirundapus caudacutus caudacutus) that occur within Australia, are usually observed flying singly or in scattered flocks (DAWE, 2022b). As the species migrate to the northern hemisphere during the breeding season (May to October), all individuals within Australia are considered to be part of an important population. In Australia, the species is a wide-ranging nomadic species that is almost exclusively aerial (DAWE, 2022b). Because the species is aerial, it has been suggested that conventional habitat descriptions are inapplicable (DAWE, 2022b). As such, the aerial space above the Study Area is considered to comprise foraging habitat (general) for the species. The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). As such, the Project is considered unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	**Significant impact unlikely** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE, 2022b). The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). As such, the Project is unlikely to reduce the area of occupancy of the species.
Fragment an existing important population into two or more populations	**Significant impact unlikely** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE 2020). The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). Due to the mobile nature of the species (i.e. flies), the Project is unlikely to fragment an important population of the species into two or more populations.
Adversely affect habitat critical to the survival of a species	**Significant impact unlikely** While the species migrates to the northern hemisphere during the breeding season, within Australia the species is known to forage aerially. As such, the aerial space would be considered habitat critical to the survival of the species. The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b).Consequently, the Project is considered unlikely to affect habitat critical to the survival of the species.

Assessment criteria	Response
Disrupt the breeding cycle of an important population	**Significant impact unlikely** The species breeds in the northern hemisphere (DAWE, 2022b). As such, The Project is considered unlikely to disrupt the breeding cycle of the species.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Significant impact unlikely** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE, 2022b). As the species is known to occur over a wide range of habitats, including cleared habitats, clearing of vegetation within the Project is considered unlikely to modify, destroy, remove or isolate or decrease the availability of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Significant impact unlikely** No invasive species are currently identified as a threat to the species (TSSC, 2019). The Project is considered unlikely to result in the introduction or spread of invasive or native species that may be harmful to the species via predation or competition for prey. As such, the Project is considered unlikely to result in an invasive species becoming established in the area.
Introduce disease that may cause the species to decline	**Significant impact unlikely** No diseases are currently identified as a threat to the species (DAWE, 2022b). The Project is unlikely to result in the introduction or spread of a disease that may cause the species to decline.
Interfere substantially with the recovery of the species	**Significant impact unlikely** Due to the limited threats to the species in Australia and its mobility, there are currently no threat abatement or recovery actions in place or for the species (DAWE, 2022b). As the species is known to occur over a wide range of habitats, including cleared habitats, clearing of vegetation for the Project is considered unlikely to interfere substantially with the recovery of the species.
Conclusion	The Project is unlikely to result in a significant impact on the white-throated needletail.

Appendix F MSES Significant Residual Impact Assessments

F.1 MSES Regulated Vegetation

MSES Regulated Vegetation identified within the Disturbance footprint has been assessed against the *Queensland Environmental Offsets Policy: Significant Residual Impact Guideline* (DEHP, 2014) below.

MSES Regulated Vegetation type	RE	Structure category	Assessment criteria	Self Assessment
Endangered REs	11.4.3	Mid-dense	For clearing other than linear infrastructure, the area is not greater than 0.5 ha	Clearing of remnant RE 11.4.2 will comprise approximately 22.44 ha associated with the mine expansion (non-linear). This is greater than the proposed threshold of 0.5 ha
Of Concern REs	11.3.4	Sparse	For clearing for linear infrastructure, the clearing cannot be greater than 20m wide	Clearing of remnant RE 11.3.4 will comprise approximately 0.69 ha associated with the road diversion (linear), comprising a 40 m wide corridor. This is greater than the proposed width threshold of 20 m
Conclusion				**Significant residual impact likely to result.**
Remnant REs within the defined distance of a mapped watercourse	11.4.3	Mid-dense	For clearing other than linear infrastructure, the area is not greater than 0.5 ha AND Clearing within 5 m of the defining bank	Clearing of remnant RE 11.4.2 within the defining bank of a watercourse comprise approximately 2.96 ha associated with the mine expansion (non-linear). Furthermore, clearing is within 5 m of the defining bank.
	11.3.4	Sparse	For clearing for linear infrastructure, the clearing cannot be greater than 20m wide AND Clearing within 5 m of the defining bank	Clearing of remnant RE 11.3.4 will comprise approximately 0.67 ha associated with the road diversion (linear), comprising a 40 m wide corridor. Furthermore, clearing is within 5 m of the defining bank.

MSES Regulated Vegetation type	RE	Structure category	Assessment criteria	Self Assessment
	11.3.25	Sparse	For clearing for linear infrastructure, the clearing cannot be greater than 20m wide AND Clearing within 5 m of the defining bank	Clearing of remnant RE 11.3.25 will comprise approximately 0.004 ha associated with the road diversion (linear), comprising a 40 m wide corridor. Furthermore, clearing is within 5 m of the defining bank.
Conclusion				**Significant residual impact likely to result.**

F.2 MSES Protected Wildlife Habitat

MSES Protected Wildlife Habitat identified within the Disturbance footprint has been assessed against the *Queensland Environmental Offsets Policy: Significant Residual Impact Guideline* (DEHP, 2014) below.

Term	Definition under the EO Act
Habitat	An area occupied, or periodically or occasionally occupied, by any species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their life cycles.
Essential Habitat	A Category B area shown on the regulated vegetation management map under the *Vegetation Management Act 1999*: a) that has at least three essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or b) in which the protected wildlife, at any stage of its life cycle, is located. **Please Note:** Under the *Queensland Environmental Offsets Policy: Significant Residual Impact Guideline* (DEHP, 2014), Essential Habitat is assessed in accordance with the MSES Protected Wildlife assessment criteria.
Long-term decrease	Any decline in a local population that is greater than which would be apparent without the action being present
Population	An occurrence of the species in a particular area. In relation to Endangered, Vulnerable and Special Least Concern species, occurrences include but are not limited to: • a geographically distinct regional population, or collection of local populations; or • a population, or collection of local populations, that occurs within a particular bioregion.

Homopholis belsonii

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact likely** Approximately 200 *Homopholis belsonii* (belson's panic) individuals were recorded within the Study Area, spanning approximately 10.05 ha. The Project will result in the removal of 6.37 ha of known habitat for the species, approximately 63% of the recorded population extents. The disturbance will comprise the removal of the local population recorded within MDL 299 Study Area and partial disturbance to the population recorded in MDL 301 Study Area. While mitigation measures will be implemented to minimise potential indirect impacts to areas/individuals to be retained, the direct removal of 6.37 ha of known habitat is considered likely to result in a long-term decrease in the size of local populations of the species.
Reduce the extent of occurrence of the species	**Significant residual impact likely** The species distribution is within the southern Brigalow Belt, extending from Miles and Chinchilla in Queensland to the north-western slopes and plains, located north of Narrabri in New South Wales (DAWE, 2021b). The Project will result in the direct removal of approximately 6.37 ha of known habitat for the species, comprising local populations. Areas to be disturbed are unlikely to be rehabilitated until the closure of the CCM. The direct removal of 6.37 ha of known habitat for the species is likely to reduce the extent of occurrence of local populations. However, the Project is considered unlikely to significantly reduce the extent of occurrence of the species within the greater region.
Fragment an existing population	**Significant residual impact unlikely** The Project will result in the removal of 6.37 ha of known habitat for the species across two local populations. The Project will result in the removal of the entirety of the population identified within the MDL 299 Study Area and partial disturbance to the population within the MDL 301 Study Area. The method of pollination/seed dispersal for this species occurs via wind (DAWE, 2021b). As such, although the habitat of the species will be disturbed by the Project, it is considered unlikely to result in the fragmentation of an existing populations.
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** The Project will result in the removal of 6.37 ha of known habitat for the species across two local populations. The method of pollination/seed dispersal for this species occurs via wind (DAWE, 2022b). As such, although the habitat of the species will be disturbed by the Project, it is considered unlikely to increase isolation that would result in genetically distinct populations forming. for the recorded species.

MSES Significant Residual Impact Guideline criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant residual impact unlikely** The Project is unlikely to increase the abundance of invasive species currently present or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the population to decline	**Significant residual impact unlikely** It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact *H. belsonii*.
Interfere with the recovery of the species	**Significant residual impact unlikely** Although there is no current State or Commonwealth recovery plans for the species, priority actions are identified within the 'Approved Conservation Advice' for the species (DEWHA, 2008a). Associated recovery and abatement strategies target reduction in habitat loss and disturbance, management of weeds, disturbance by livestock and community awareness (DEWHA, 2008a). The Project will impact 6.37 ha of known habitat for the species. Due to the extent of habitat to be cleared, it is considered unlikely that the Project will interfere significantly with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant residual impact unlikely** The Project will result in the removal of 6.37 ha of known habitat for the species across two local populations. A number of mature individuals will be retained within the adjacent supporting habitat. Suitable habitat will also be retained within adjacent areas. The proposed works will not require clearing of vegetation that will result in the fragmentation of recorded populations or impede pollination or seed dispersal of the species. As such the proposed works are considered unlikely to cause disruption to ecologically significant locations for the species.
Conclusion	The Project is likely to result in a significant residual impact on *Homopholis belsonii* due to: • the direct removal of 6.37 ha of known habitat is considered likely to result in a long-term decrease in the size of local populations of the species and • reduction in the extent of occurrence for a local population.

Picris evae

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact unlikely** No individuals were observed during the field survey. As the field survey was undertaken outside of the species optimal survey period (October to January), suitable habitat was mapped in association with remnant REs 11.3.4 and 11.3.25. Suitable habitat may contain an important population (or part of). Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. Given the small area of suitable habitat to be cleared (<1 ha) and no individuals have been recorded within the Disturbance footprint, the Project is considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	**Significant residual impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. Given the small area of suitable habitat to be cleared (<1 ha) and no individuals have been recorded within the Disturbance footprint, it is considered unlikely that the Project will reduce the extent of occurrence of a local population (if present).
Fragment an existing population	**Significant residual impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. While, the road corridor will dissect the area of suitable habitat, due to the extent of habitat disturbed and the nature of the disturbance (road), it is unlikely to impede pollination or seed dispersal of the species. Following construction of the watercourse crossing, areas temporarily disturbed will also be rehabilitated. As such, it is considered unlikely the Project would fragment an existing local populations (if present).
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** No individuals were recorded during the field survey. Suitable habitat within the Study Area may contain a local population (or part of). While the Project will impact 0.69 ha of suitable habitat in association with the road diversion, it is unlikely to impede pollination or seed dispersal of the species. Pollination is usually carried out by insect vectors, with seed dispersal by wind and water (Holzapfel, 1994). Due to the nature of the disturbance (road) and the extent of habitat impacted (<1 ha), direct and indirect impacts associated with the Project are considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.

MSES Significant Residual Impact Guideline criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant residual impact unlikely** The Project is unlikely to increase the abundance of invasive species currently present or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the population to decline	**Significant residual impact unlikely** It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact the species (DEWHA, 2008d).
Interfere with the recovery of the species	**Significant residual impact unlikely** Although there is no current State or Commonwealth recovery plans for the species, priority actions are identified within the 'Approved Conservation Advice' for the species (DEWHA, 2008d). Although the Project will impact approx. 0.69 ha of suitable habitat, the extent of habitat impacted coupled with the unlikely interruption of pollination and seeding of a population (if present), it is not considered likely interfere substantially with the recovery of the species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained suitable habitat within the Study Area.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant residual impact unlikely** No individuals were recorded during the field survey. Suitable habitat within the Study Area may contain a population (or part of). Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. The implementation of mitigation measures (refer to Section 6), including weed management and erosion and sediment controls, will assist in reducing any potential indirect impacts on suitable habitat retained within the Study Area. Given the small area of suitable habitat to be cleared (<1 ha) and the dispersal mechanisms of the species, the Project is considered unlikely to cause disruption to ecologically significant locations of the species (if present).
Outcome	The Project is unlikely to result in a significant residual impact on *Picris evae*.

Picris barbarorum

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact unlikely** No individuals were observed during the field survey. As the field survey was undertaken outside of the species optimal survey period (July to November), suitable habitat was mapped in association with remnant REs 11.3.4 and 11.3.25. Suitable habitat may contain a local population (or part of). Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. Given the small area of suitable habitat to be cleared (<1 ha) and no individuals have been recorded within the Disturbance footprint, the Project is considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	**Significant residual impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. Given the small area of suitable habitat to be cleared (<1 ha) and no individuals have been recorded within the Disturbance footprint, it is considered unlikely that the Project will reduce the extent of occurrence of a local population (if present).
Fragment an existing population	**Significant residual impact unlikely** Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. While, the road corridor will dissect the area of suitable habitat, due to the extent of habitat disturbed and the nature of the disturbance (road), it is unlikely to impede pollination or seed dispersal of the species. Following construction of the watercourse crossing, areas temporarily disturbed will also be rehabilitated. As such, it is considered unlikely the Project would fragment an existing local populations (if present).
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** No individuals were recorded during the field survey. Suitable habitat within the Study Area may contain a local population (or part of). While the Project will impact 0.69 ha of suitable habitat in association with the road diversion, it is unlikely to impede pollination or seed dispersal of the species. Pollination is usually carried out by insect vectors, with seed dispersal by wind and water (Holzapfel, 1994). Due to the nature of the disturbance (road) and the extent of habitat impacted (<1 ha), direct and indirect impacts associated with the Project are considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.

MSES Significant Residual Impact Guideline criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant residual impact unlikely** The Project is unlikely to increase the abundance of invasive species currently present or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the population to decline	**Significant residual impact unlikely** It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact similar species (e.g. DEWHA, 2008d).
Interfere with the recovery of the species	**Significant residual impact unlikely** Although there is no current State or Commonwealth recovery plans for the species, priority actions are identified for similar species, such as for *P. evae* within the 'Approved Conservation Advice' for the species (DEWHA, 2008d). Although the Project will impact approx. 0.69 ha of suitable habitat, the extent of habitat impacted coupled with the unlikely interruption of pollination and seeding of a population (if present), it is not considered likely interfere substantially with the recovery of the species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained suitable habitat within the Study Area.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant residual impact unlikely** No individuals were recorded during the field survey. Suitable habitat within the Study Area may contain a population (or part of). Approximately 0.69 ha of suitable habitat is located within the Disturbance footprint in association with the road diversion. Following construction of the watercourse crossing, areas temporarily disturbed will be rehabilitated. The implementation of mitigation measures (refer to Section 6), including weed management and erosion and sediment controls, will assist in reducing any potential indirect impacts on suitable habitat retained within the Study Area. Given the small area of suitable habitat to be cleared (<1 ha) and the dispersal mechanisms of the species, the Project is considered unlikely to cause disruption to ecologically significant locations of the species (if present).
Outcome	The Project is unlikely to result in a significant residual impact on *Picris barbarorum*.

Squatter pigeon (southern subspecies) *(Geophaps scripta scripta)*

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact unlikely** No individuals were observed within the Study Area during the field survey. Squatter pigeon was previously recorded within ML during the field surveys undertaken for the initial assessments for the CCM (SKM, 1999). The species has also been previously recorded within the surrounding area, including • approx. 5 km north Near the Millmerran township (recorded 1984 (DES), 2021e)) • 25 km south near Stonehenge Station (recorded 1997 (DES), 2021e)) • 32 km south near Mount Bodumba homestead (recorded 1997 (DES), 2021e)). No records of the species have been recorded within proximity to the Study Area within the last 20 years, suggesting the species, if still present, may occur at low densities within the local area. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded squatter pigeon (southern subspecies) within the Project area and surrounding landscape. Approximately 4.63 ha of breeding habitat and 3.69 ha of foraging habitat will be disturbed as a result of the Project. Habitat impacted by the Project comprises isolated patches of vegetation within predominantly agricultural land. Based on the extent of habitat to be cleared (<10 ha), time since last recorded and isolated nature of habitat within the Study Area, it is considered unlikely that the Project would lead to a long-term decrease in the size of a local population of the species (if present).
Reduce the extent of occurrence of the species	**Significant residual impact likely** Approximately 4.63 ha of breeding habitat and 3.69 ha of foraging habitat will be disturbed as a result of the Project. Although the removal of <10 ha of habitat is unlikely to reduce the extent of occurrence of the species on a broader landscape scale, due to the fragmented nature of habitat within the Study Area and surrounds, the removal of habitat is likely to reduce the extent of occurrence of a local population of the species (if present).

MSES Significant Residual Impact Guideline criteria	Response
Fragment an existing population	**Significant residual impact unlikely** The Project will result in the removal of 4.63 ha of breeding habitat and 3.69 ha of foraging habitat. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded squatter pigeon (southern subspecies) within the Project area and surrounding landscape. Due to the existing fragmentation within the landscape, in conjunction with the mobile nature of the species, it is considered unlikely that the Project would result in the fragmentation of an existing population (if present).
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** Of the 6.31 ha of suitable breeding habitat within the Study Area, the Project will result in the removal of 4.63 ha (~73%). The extent of breeding habitat within the surrounding landscape is relatively unknown. Due to the mobile nature of the species, it is considered unlikely that the Project would result in the isolation of an existing population (if present) to the extent it would become genetically distinct.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant residual impact unlikely** The Project is unlikely to increase the abundance of invasive species (i.e. feral dogs, cats and foxes) above their current levels or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management, pest control and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the population to decline	**Significant residual impact unlikely** The Project is unlikely to introduce a disease that may cause the species to decline, given there are no known diseases that impact the species (TSSC, 2015d).

MSES Significant Residual Impact Guideline criteria	Response
Interfere with the recovery of the species	**Significant residual impact unlikely** Although there is currently no State or Commonwealth recovery plan developed for the species, key threat abatement and recovery objectives provided within the approved listing advice (TSSC, 2015d) and include: • Determining the population size and distribution of the Squatter Pigeon (southern) in southern Queensland and New South Wales, and assess the pigeon's conservation status and requirements. • Undertaking studies in North and Central Queensland to determine the relationship between pigeon abundance, tree density and stocking rates. • Establish sites for sub-population monitoring. If possible, these sites should be established with the cooperation of local land-owners and/or conservation organisations. • Develop and implement public education programs and community based tree planting schemes to revegetate favoured habitat types. • Establish control measures for predators (especially cats and foxes) at important sites. • Establish conservation measures to protect grassy woodlands and forests. While the Project would require clearing of 4.63 ha of breeding habitat and 3.69 ha of foraging habitat, the surrounding landscape is largely fragmented and subject to ongoing agricultural development with limited connectivity with surrounding remnant vegetation or conservation areas. Furthermore, potential indirect impacts on suitable habitat to be retained in the Study Area will be minimised through the implementation of mitigation measures (refer to Section 6), such as weed and pest control and erosion and sediment controls. As such, it is considered the Project is unlikely to significantly interfere with the recovery actions identified for the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant residual impact possible** Of the 6.31 ha of suitable breeding habitat within the Study Area, the Project will result in the removal of 4.63 ha (~73%). The extent of breeding habitat within the surrounding landscape is relatively unknown. Due to the fragmented nature of the Study Area and surrounds, removal of breeding habitat may disrupt the breeding cycle of a population (if present).

MSES Significant Residual Impact Guideline criteria	Response
Outcome	The Project is likely to result in a significant residual impact on 4.63 ha of breeding habitat and 3.69 ha of foraging habitat for the squatter pigeon (southern subspecies) due to: • reduction in the extent of occurrence of a local population (if present); and • potentially disrupting ecologically significant locations for a local population (if present).

Koala *(Phascolarctos cinereus)*

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact unlikely** Six individuals have been recorded within 20 km of the Study Area (DES, 2020c). No individuals or evidence of the species was identified during field surveys. Suitable habitat for the koala comprises remnant vegetation analogous with REs 11.3.4 and 11.3.25, which contains a number of preferred koala food trees (*Eucalyptus, Corymbia* and *Angophora* spp.) and limited connectivity to other areas of suitable habitat. The Disturbance footprint is predominantly located within previously disturbed areas for agricultural and cropping purposes; however 0.69 ha of suitable habitat will be impacted in association with the road diversion. The proposed road diversion is unlikely to create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor. Given the extent of habitat to be disturbed (<1ha) and the nature of the disturbance (road), the Project will not result in the removal of suitable habitat to the extent it will lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	**Significant residual impact unlikely** While 0.69 ha of suitable habitat identified within the Study Area will require removal as a result of the Project, a significant reduction to the area of occupancy for the species is considered unlikely as: • the proposed clearing represents a small proportion of suitable habitat available within the surrounding areas; and • no recent scats or scratches were observed during the field survey and the species was not identified during a nocturnal survey, indicating a low species utilisation of the Study Area • the proposed road diversion is unlikely to create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor; and • management and mitigation measures will be implemented to minimise impacts to surrounding habitat and species movement. As such, it is considered unlikely that the Project will significantly reduce the extent of occurrence of the species.
Fragment an existing population	**Significant residual impact unlikely** The Project is located within a largely fragmented landscape. While the Project will dissect suitable habitat, associated with a riparian corridor, the proposed watercourse crossing will still facilitate movement of individuals along the riparian corridor. The proposed watercourse crossing will not create an impenetrable barrier for the species. As such, it is considered unlikely that the Project will fragment an existing population.

MSES Significant Residual Impact Guideline criteria	Response
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** Although approximately 0.69ha of suitable habitat will be impacted as a result of the Project, the proposed road diversion is unlikely to create an impenetrable barrier for the species, allowing the movement of individuals along the riparian corridor. Due to the limited extent of habitat disturbed (<1 ha) and the Project will maintain existing movement corridors associated with the riparian environs (though fragmented), it is considered unlikely that the Project will result in genetically distinct populations forming from habitat isolation.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant residual impact unlikely** A review of the Wildlife Online (DES, 2021c) identified that invasive species including feral dog, cat and fox have been previously recorded in in proximity to the Study Area. The Project is unlikely to increase the abundance of invasive species above their current levels or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management, pest control and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area. Therefore, the Project is considered unlikely to result in the spread or introduction of invasive species within the Study Area or surrounds.
Introduce disease that may cause the population to decline	**Significant residual impact unlikely** There are a number of strains of Chlamydia and Koala Retrovirus which are identified as key threats to the species (DAWE, 2022b). The diseases/viruses spread through the interaction of infected individuals. The Project is unlikely to introduce a disease and/ or be a vector for disease that may cause the species to decline.

MSES Significant Residual Impact Guideline criteria	Response
Interfere with the recovery of the species	**Significant residual impact unlikely** A draft national recovery plan (refer to *National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory*) (DAWE, 2021)) has been developed for the species. Key objectives identified of the recovery Plan comprise: 1. The area of occupancy and size of populations that are declining, suspected to be declining, and predicted to decline are increased 2. Metapopulation processes are maintained or improved; and 3. Communities and individuals have a greater role and capability in Koala conservation and management Based on the extent of habitat to be disturbed (0.69 ha) and no establishment of impenetrable barriers to movement, the Project is unlikely to significantly interfere with the recovery of the species. Furthermore, the implementation of mitigation measures (refer to Section 6), including weed management, pest control and weed hygiene protocols, will assist in reducing any potential indirect impacts to adjacent habitat. As such, it is considered unlikely that the Project will interfere with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant residual impact unlikely** The Project is unlikely to substantially reduce the foraging resources available within the area. No recent scats or scratches were observed during the field survey and the species was not identified during a nocturnal survey, indicating a low species utilisation of the Study Area. Management and mitigation measures in accordance with the *Nature Conservation (Koala) Conservation Plan 2017* have been identified to mitigate potential disruption to individual koalas during clearing works. The implementation of mitigation measures (refer to Section 6), including weed management, pest control and weed hygiene protocols, will also assist in reducing any potential indirect impacts (e.g. noise, lighting, habitat degradation) to habitat or breeding for the species. As such, it is considered unlikely that the Project will cause any disruption to ecologically significant locations of the species.
Outcome	The Project is unlikely to result in a significant residual impact on the koala.

Glossy black-cockatoo *(Calyptorhynchus lathami lathami)*

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact unlikely** No Glossy black-cockatoos were identified during the field survey, however the species has been previously recorded in proximity to the Study Area (DES, 2021e), including State forests and Wondul Range National Park. As such the species is considered likely to occur within the Study Area. The Project will impact 45.31 ha of foraging and 0.69 ha of breeding habitat for the species. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded glossy black-cockatoo within the Project area and surrounding landscape. While areas of foraging habitat will be impacted as a result of the Project, scattered patches of foraging habitat will be retained within the surrounding landscape, providing 'stepping stones' to larger tracts of habitat to the west of the Study Area. Although transient individuals may utilise foraging habitat within the Study Area, the loss of foraging habitat associated with the Project is considered unlikely to result in a long-term decrease in the size of a local population. Due to the limited disturbance to breeding habitat (>1ha), coupled with mitigation measures detailed in Section 6 (i.e. fauna spotter catcher during clearing activities), impacts to breeding habitat Is also considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	**Significant residual impact likely** The Project will impact 45.31 ha of foraging and 0.69 ha of breeding habitat for the species. Although the removal of foraging habitat and a small (<1ha) of breeding habitat is unlikely to reduce the extent of occurrence of the species on a broader landscape scale, due to the fragmented nature of habitat within the Study Area and surrounds, the removal of habitat is likely to reduce the extent of occurrence of a local population.
Fragment an existing population	**Significant residual impact unlikely** The Project will impact 45.31 ha of foraging and 0.69 ha of breeding for the species. Historical vegetation clearing and land development for agricultural practices have increasingly fragmented and degraded habitat for the species within the Project area and surrounding landscape. However, as glossy black-cockatoos are an aerial and highly mobile species with the capability to fly across fragmented landscapes, the Project is considered unlikely to fragment an existing population.

MSES Significant Residual Impact Guideline criteria	Response
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** Of the 73.04 ha of suitable foraging habitat within the Study Area, the Project will result in the removal of 45.31 ha (~62%). Similarly, of the 18.03 ha of breeding habitat within the Study Area, the Project will result in the removal of 0.69 ha (<4%). Areas of foraging and breeding habitat within the surrounding landscape will be retained. Due to the mobile nature of the species, coupled with mitigation measures detailed within Section 6, it is considered unlikely that the Project would result in the isolation of an existing population (if present) to the extent it would become genetically distinct.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant residual impact unlikely** The Project is unlikely to increase the abundance of invasive species (i.e. feral dogs, cats and foxes) above their current levels or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management, pest control and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Study Area.
Introduce disease that may cause the population to decline	**Significant residual impact unlikely** The Project is unlikely to introduce a disease that may cause the species to decline, given there are no known diseases that impact the species (DDPIE, 2019).

MSES Significant Residual Impact Guideline criteria	Response
Interfere with the recovery of the species	**Significant residual impact unlikely** Although there is no State recovery plan for the glossy black-cockatoo, a conservation guideline has been produced by the Glossy Black Conservancy (2010) (refer to *Glossy Black-cockatoo Conservation Guidelines for South-eastern Queensland and far North-eastern New South Wales*). Key conservation guidelines include: • Identification and conservation of foraging habitat • Identification of new nest sites • Encourage ecological research • Survey populations on a regular basis • Promote and facilitate community interest • Promote and facilitate community participation; and • Adopt a strategic planning approach. Although the Project will impact on 45.31 ha of foraging and 0.69ha of breeding habitat for the species, the surrounding landscape is largely fragmented and subject to ongoing agricultural development with limited connectivity with surrounding remnant vegetation or conservation areas. Furthermore, potential indirect impacts on suitable habitat to be retained in the Study Area will be minimised through the implementation of mitigation measures (refer to Section 6), such as weed and pest control and erosion and sediment controls. As such, it is considered the Project is unlikely to significantly interfere with the recovery actions identified for the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant residual impact possible** Of the 73.04 ha of suitable foraging habitat within the Study Area, the Project will result in the removal of 45.31 ha (~62%). Similarly, of the 18.03 ha of breeding habitat within the Study Area, the Project will result in the removal of 0.69 ha (<4%). Areas of foraging and breeding habitat within the surrounding landscape will be retained. Due to the fragmented nature of the Study Area and surrounds, removal of breeding and foraging habitat may disrupt the breeding cycle of a local population.
Outcome	The Project is likely to result in a significant residual impact on 45.31 ha of foraging and 0.69 ha of breeding habitat for the glossy black-cockatoo due to: • reduction in the extent of occurrence of a local population; and • potentially disrupting ecologically significant locations for a local population.

White-throated needletail *(Hirundapus caudacutus)*

MSES Significant Residual Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a local population	**Significant residual impact unlikely** The key subspecies of white-throated needletail (*Hirundapus caudacutus caudacutus*) that occur within Australia, are usually observed flying singly or in scattered flocks (DAWE, 2022b).In Australia, the species is a wide-ranging nomadic species that is almost exclusively aerial (DAWE, 2022b). Because the species is aerial, it has been suggested that conventional habitat descriptions are inapplicable (DAWE, 2022b). As such, the aerial space above the Study Area is considered to comprise foraging habitat (general) for the species. The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). As such, the Project is considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	**Significant residual impact unlikely** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE, 2022b). The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). As such, the Project is unlikely to reduce the extent of occurrence of the species.
Fragment an existing population	**Significant residual impact unlikely** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE 2020). The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). Due to the mobile nature of the species (i.e. flies), the Project is unlikely to fragment a population of the species.
Result in genetically distinct populations forming as a result of habitat isolation	**Significant residual impact unlikely** The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE 2020). The clearing of vegetation is considered largely inconsequential to the species, as the species is almost exclusively aerial and is known to occur over a wide range of habitats, including cleared habitats (DAWE, 2022b). Furthermore, the species migrates to the northern hemisphere during the breeding season. Due to the mobile nature of the species and that breeding takes place outside of Australia, the Project is unlikely to result in a genetically distinct population from habitat isolation.

MSES Significant Residual Impact Guideline criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**Significant Residual impact unlikely** No invasive species are currently identified as a threat to the species (TSSC, 2019). The Project is considered unlikely to result in the introduction or spread of invasive or native species that may be harmful to the species via predation or competition for prey. As such, the Project is considered unlikely to result in an invasive species becoming established in the area.
Introduce disease that may cause the population to decline	**Significant Residual impact unlikely** No diseases are currently identified as a threat to the species (DAWE, 2022b). The Project is unlikely to result in the introduction or spread of a disease that may cause the species to decline.
Interfere with the recovery of the species	**Significant Residual impact unlikely** Due to the limited threats to the species in Australia and its mobility, there are currently no threat abatement or recovery actions in place or for the species (DAWE, 2022b). As the species is known to occur over a wide range of habitats, including cleared habitats, clearing of vegetation for the Project is considered unlikely to interfere substantially with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	**Significant Residual impact unlikely** The species breeds in the northern hemisphere (DAWE, 2022b). As such, The Project is considered unlikely to disrupt the breeding cycle of the species. The species is a wide-ranging nomadic species that is almost exclusively aerial in Australia (DAWE, 2022b). As the species is known to occur over a wide range of habitats, including cleared habitats, clearing of vegetation within the Project is considered unlikely to cause disruption to ecologically significant locations for the species.
Outcome	The Project is unlikely to result in a significant residual impact on the white-throated needletail.