

Wilton Coal Project

MNES Impact Assessment Report

March 2019

prepared for Wilton Coking Coal Pty Ltd

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Introduction

This report has been prepared as a supplementary document for the Wilton Coal Project EPBC Act referral (the referral) and provides detailed responses relevant to various sections of the referral. The Wilton Coal Project (the proposed action) is described in Section 1 of the referral. This report identifies matters of national environmental significance (MNES) with potential relevance to the proposed action and potential impacts to those matters as a result of conducting the action (Sections 2.4 and 2.5 of the EPBC Act referral). This report also details relevant measures to avoid or reduce any identified impacts to MNES, as relevant to Section 4 of the referral.

Relevant MNES have been identified through desktop and field-based assessments, and the methodology and outcomes of these assessments are summarised below. Relevant MNES have been determined through preparation of multiple technical reports that are also attached to the referral, and include:

- Wilton Coal (EPC1235) Flora and Fauna Technical Report conducted by Saunders Havill Group (SHG) for the late dry season period in 2011.
- Wilton Coal Project Terrestrial Flora and Fauna Technical Report conducted by Northern Resource Consultants Pty Ltd (NRC) for the wet season 2017 period.
- Wilton Coal Project Regional Ecosystem Mapping Amendments

This document summarises the relevant MNES identified through the assessments and technical reports listed above and utilised these documents as ground-truthed reference material to analyse potential impacts to MNES associated with the proposed action. These documents are also provided as attachments to the referral, as identified in Table 1. The attached documents provide greater detail on the desktop and field-based methodology and determination of MNES relevant to the proposed action. The sections below focus specifically on potential occurrence of MNES identified as relevant through these reports and the likelihood of significant impact to those matters as a consequence of the proposed action.

ATTACHMENT	DOCUMENT DETAILS
Attachment 2	SHG (2011) - Wilton Coal (EPC1235) Flora and Fauna Technical Report
Attachment 3	NRC (2017) - Wilton Coal Project Terrestrial Flora and Fauna Technical Report
Attachment 4	NRC (2018) – Wilton Coal Project Vegetation Mapping Amendment Request

Table 1: Summary of Flora and Fauna Technical Reports attached to the referral

Summary of Desktop Assessments

1. Desktop assessment methodology

The Australian Government Department of the Environment and Energy (DEE) Protected Matters Search Tool and the Queensland Government 'Wildlife Online' (WO) databases were utilised to determine species, communities and areas listed under the EPBC Act with potential relevance to the proposed action. Both searches included a 30km buffer around a central co-ordinate within the study area (-23.3528° S, 148.5668° E), which includes the entire study area as well as a large buffer incorporating similar habitat in the surrounding landscape. These searches (EPBC Act Protected Matters Report – See Appendix B) and WO database extract (DES, 2017b – See Appendix C) were performed as part of the report prepared by NRC (2017) and are included as appendices within that attachment.

NRC adopted a ranking approach for threatened species and communities recorded from desktop searches in terms of their likelihood of occurring within the study area. The approach was based on the presence of local records and the habitat requirements for each species, which are recommended criteria for desktop impact assessment in State published survey guideline documents, such as Eyre *et al.* (2017). Details of the criteria used to assess the likelihood of occurrence for threatened and near threatened species are provided in Table 2.

It is possible that some locally occurring threatened species may not be recorded in the databases. The comprehensive field surveys are therefore an important aspect of the impact assessment process to determine the presence of any threatened species that have not been previously recorded in the local area.

LIKELIHOOD OF OCCURRING	KEY CRITERIA	DEFINITION
Present	Present during survey or historical records in the study area	Species was recorded during field surveys or a historical record of the species was located in the study area
High	Known records (<30km) or within species known range AND Suitable habitat of high quality is present	Historical records of the species occur within a 30km radius of the study area or the study area is within the species known range Suitable habitat of high quality exists with the study area

Table 2: Key assessment criteria for occurrence likelihood of threatened and near threatened species

LIKELIHOOD OF OCCURRING	KEY CRITERIA	DEFINITION
Moderate	Known records (<30km) or within species known range AND Suitable habitat is present, but degraded	Historical records of the species occur within a 30km radius of the study area or the study area is within the species known range Suitable habitat is present but is significantly degraded or fragmented
Low	No records (<30km) and not within species known range OR Habitat present is unsuitable, absent, or highly degraded	No historical records of this species occur within a 30km radius of the study area or within the known range for this species or: OR The habitat within the study area is not suitable and/or is in extremely poor condition, or is absent for the species

2. Results of database searches

The results of the database searches are summarised below, with the WO database extract utilised to assess the number of records relevant to the study area for species listed under the EPBC Act. The Protected Matters Report and WO search identified three Threatened Ecological Communities (TECs), four listed flora species, 23 threatened fauna species and 11 migratory fauna species with potential relevance to the study area.

2.1 Threatened ecological communities

Three TECs were identified in the Protected Matters Report as potentially occurring within the study area or within a 30km radius:

- Brigalow (Acacia harpophylla dominant and co-dominant).
- Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin.
- Weeping Myall Woodlands.

2.2 Threatened flora species

The Protected Matters Report identified four listed threatened plant species potentially occurring within a 30km radius of the study area. The results of this search have been compiled in Table 3 to show all listed threatened flora species recorded from the database searches and their status under State and Commonwealth legislation, as well as their likelihood of occurring within the study area.

Justification for the likelihood of occurrence determination for each listed flora species is provided in Appendix D. Of the four threatened flora species returned in the desktop analyses, only one was considered to have a moderate to high likelihood of occurring within the study area; the remaining three species were considered to have a low likelihood of occurring. All

listed flora species that were considered to have a moderate or high likelihood of occurring within the study area are discussed in further detail in the Impact Assessment and Management section of this report. All listed flora species with a low likelihood of occurrence have been excluded from further assessment here.

2.3 Threatened fauna species

The Protected Matters Report and WO extract identified 23 listed threatened fauna species potentially occurring within a 30km radius of the study area The results of these searches have been combined in Table 4, which also provides an interpretation on the likelihood that each of these species would occur within the study area.

Justification for the likelihood of occurrence determination for each listed threatened fauna species is provided in Appendix D. Only six species were considered to have a moderate or high likelihood of occurring within the study area; the remaining 17 species were considered to have a low likelihood of occurring. All listed threatened fauna species that were considered to have a moderate or high likelihood of occurring within the study area are discussed in further detail in the Impact Assessment and Management section of this report. All listed threatened fauna species with a low likelihood of occurrence have been excluded from further assessment here.

2.4 Migratory species

The Protected Matters Search Tool identified 11 listed migratory species potentially occurring within 30km of the study area. The results of this search are included in Table 5 along with interpretation on the likelihood that each of these species would occur within the study area. Appendix D provides a justification for how the likelihood of occurrence was determined for each species.

Only one of the 11 species was considered to have a moderate or high likelihood of occurring within the study area; the remaining 10 species were considered to have a low likelihood of occurring. All listed migratory species that were considered to have a moderate or high likelihood of occurring within the study area are discussed in further detail in the Impact Assessment and Management section of this report. All listed migratory species with a low likelihood of occurrence have been excluded from further assessment here.

STATUS ¹							LIKELIHOOD OF
NCA	EPBC		SCIENTIFIC NAME		SOURCE	RECORDS	OCCURRENCE
LC	V	Myrtaceae	Eucalyptus raveretiana	Black Ironbox	PM	0	Low
V	E	Poaceae	Dichanthium queenslandicum	King Blue-grass	PM/WO	4	High
LC	V	Poaceae	Dichanthium setosum	Bluegrass	PM	0	Low
V	V	Surianaceae	Cadellia pentastylis	Ooline	PM/WO	1	Low

Table 3: Near threatened and threatened flora species identified from database searches

Status: LC = Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered, CE = Critically Endangered Source: WO = Wildlife Online Database, PM = EPBC Protected Matters Report 1.

2.

STATUS ¹					2011DCE2	WO	LIKELIHOOD OF
NCA	EPBC				SOURCE-	RECORDS	OCCURRENCE
		BIRDS					
Е	V	Accipitridae	Erythrotriorchis radiatus	Red Goshawk	PM/WO	1	Moderate
V	V	Columbidae	Geophaps scripta scripta	Squatter Pigeon	PM/WO	4	High
Е	Е	Estrildidae	Neochmia ruficauda ruficauda	Star Finch	PM	0	Low
Е	Е	Estrildidae	Poephila cincta cincta	Southern Black-throated Finch	PM	0	Low
V	V	Meliphagidae	Grantiella picta	Painted Honeyeater	PM	0	Low
V	Е, М	Rostratulidae	Rostratula australis	Australian Painted Snipe	PM	0	Low
LC	CE, M	Scolopacidae	Calidris ferruginea	Curlew Sandpiper	PM	0	Low
		MAMMALS					
LC	Е	Dasyuridae	Dasyurus hallucatus	Northern Quoll	PM	0	Moderate
Е	Е	Macropodidae	Onychogalea fraenata	Bridled Nailtail Wallaby	WO	1	Low
V	V	Megadermatidae	Macroderma gigas	Ghost Bat	PM	0	Low
V	V	Phascolarctidae	Phascolarctos cinereus	Koala	PM/WO	9	Moderate
LC	V	Pseudocheiridae	Petauroides volans	Greater Glider	PM	0	Low
LC	V	Pteropodidae	Pteropus poliocephalus	Grey-headed Flying-fox	PM	0	Low
V	V	Vespertilionidae	Chalinolobus dwyeri	Large-eared Pied Bat	PM	0	Low
V	V	Vespertilionidae	Nyctophilus corbeni	Corben's Long-eared Bat	PM	0	Low

Table 4: Near threatened and threatened fauna species identified from database searches

STATUS ¹						WO	LIKELIHOOD OF
NCA	EPBC				SUUNCE	RECORDS	OCCURRENCE
		Reptiles					
Е	CE	Chelidae	Elseya albagula	Southern Snapping Turtle	PM/WO	2	Low
V	V	Chelidae	Rheodytes leukops	Fitzroy River Turtle	PM/WO	7	Low
V	V	Elapidae	Denisonia maculata	Ornamental Snake	PM	0	Moderate
V	V	Elapidae	Furina dunmalli	Dunmall's Snake	PM	0	Low
V	V	Pygopodidae	Delma torquata	Collared Delma	PM	0	Low
V	V	Scincidae	Egernia rugosa	Yakka Skink	PM/WO	1	High
E	E	Scincidae	Lerista allanae	Retro Slider	PM	0	Low
		Fish					
LC	V	Percichthyidae	Maccullochella peelii	Murray Cod	PM	0	Low

1. Status: LC = Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory

2. Source: WO = Wildlife Online Database, PM = EPBC Protected Matters Report

STATUS ¹						WO	LIKELIHOOD OF
NCA	EPBC				SOURCE-	RECORDS ²	OCCURRENCE
SLC	М	Accipitridae	Pandion cristatus	Eastern Osprey	PM	0	Low
SLC	М	Apodidae	Apus pacificus	Fork-tailed Swift	PM	0	Low
SLC	М	Cuculidae	Cuculus optatus	Oriental Cuckoo	PM	0	Low
SLC	М	Monarchidae	Monarcha melanopsis	Black-faced Monarch	PM	0	Low
SLC	М	Monarchidae	Myiagra cyanoleuca	Satin Flycatcher	PM	1	Low
SLC	М	Motacillidae	Motacilla flava	Yellow Wagtail	PM	0	Low
SLC	М	Scolopacidae	Actitis hypoleucos	Common Sandpiper	PM	0	Low
SLC	М	Scolopacidae	Calidris acuminate	Sharp-tailed Sandpiper	PM	0	Low
SLC	CE, M	Scolopacidae	Calidris ferruginea	Curlew Sandpiper	PM	0	Low
SLC	М	Scolopacidae	Calidris melanotos	Pectoral Sandpiper	PM	0	Low
SLC	М	Scolopacidae	Gallinago hardwickii	Latham's Snipe	PM	3	Moderate

Table 5: EPBC Act listed migratory species from the Protected Matters Report

1. Status: SLC = Special Least Concern, LC = Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered, M = Migratory

2. WO = Wildlife Online Database, PM = EPBC Protected Matters Report

Summary of Field-based Assessments

1. Summary of surveys and technical reporting conducted

Three baseline terrestrial flora and fauna surveys have been completed that are relevant to the proposed action. SHG (2011; Attachment 2) completed a baseline flora and fauna survey throughout the Wilton EPC over a 5-day/4-night period in September 2011 with the aim of describing flora and fauna values present and assist in identifying high value ecological areas requiring consideration as part of mine site planning. The methodology for this program included:

- Systematic fauna trapping/survey program
- Standard vegetation community survey methods
- Targeted flora survey methods

NRC conducted a second baseline flora and fauna assessment in April 2017 with a focus on the project area for the proposed action (NRC, 2017; Attachment 3). The methodology for this program included:

- Systematic fauna trapping/survey program
- Targeted searches/survey techniques for threatened fauna species
- Standard vegetation community survey methods
- Targeted flora survey methods

NRC conducted an additional ground-truthing survey in July 2018, specifically focussed on resolving heterogenous vegetation community polygon shown on the Queensland State mapping (NRC 2018; Attachment 4). This vegetation community polygon included endangered regional ecosystem (RE) 11.9.1, which is a state-equivalent for the listed Brigalow TEC. This ground-truthing survey culminated in a vegetation community mapping amendment request to specifically delineate the extent of the endangered community in the locality of the proposed action.

The following sections summarise the outcomes of the ground-truthing survey effort with respect to the identification of MNES relevant to the proposed action.

2. Ground-truthed MNES

2.1 Threatened ecological communities

Ground-truthing assessments revealed no vegetation communities consistent with any of the TECs listed under the EPBC Act to occur within the study area. There are no areas of 'natural grasslands' or 'Weeping Myall woodlands', and while habitats supporting Brigalow (*Acacia harpophylla*) are present, there are no areas of Brigalow vegetation that are consistent with the ecological community listed under the EPBC Act.

Brigalow occurs as a minor component in association with Thozet's Box (*Eucalyptus thozetiana*) in mapped areas of RE 11.7.1 (see further details on this RE below and RE maps in Appendix A). This RE is not equivalent to the Brigalow ecological community listed under the EPBC Act, as Brigalow forms only a minor part of the community. RE 11.7.1 is not listed as a state-equivalent in the Approved Conservation Advice for Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community.

RE 11.9.1, a state equivalent vegetation community for the endangered Brigalow TEC, was the only equivalent regional ecosystem (RE) for any of the listed TECs that is mapped within the disturbance footprint of the proposed action. Under the Regional Ecosystem Description Database (REDD) (Queensland Herbarium, 2018) RE 11.9.1 is described as *Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks.

The current Queensland RE mapping shows three areas comprising RE 11.9.1:

- A large mixed polygon of RE 11.9.2/11.9.1, which occurs in the north and east portions of the disturbance footprint and extend beyond the disturbance footprint to the east.
- Two small mixed polygons (<1ha) of RE 11.3.3/11.3.25/11.9.1 at the northern edge of the disturbance footprint.
- One small single-unit polygon of RE 11.9.1 at the northern limit of the disturbance footprint.

All areas that are mapped as supporting State-equivalent units of the Brigalow TEC were the subject of significant ground-truthing survey effort. A report was prepared to support a vegetation mapping amendment request with the Queensland Herbarium to support the outcomes of the ground-truthing assessment (NRC, 2018). The outcomes of this assessment and report are summarised below, and the report is included as an attachment to the EPBC Act referral.

The study area for this assessment encompassed the four remnant vegetation polygons supporting state-equivalent units for the Brigalow TEC, as shown on the current State-published RE Map.

Two distinct vegetation associations were observed within the study area:

- 1. A woodland community dominated by Brigalow (*Acacia harpophylla*) characteristic of RE 11.9.1 and equivalent to the Brigalow TEC.
- 2. An open woodland community dominated by Silver-leaved Ironbark (*Eucalyptus melanophloia*) and/or Mountain Coolabah (*Eucalyptus orgadophila*), with Red Bloodwood

(*Corymbia erythrophloia*) frequently present. – characteristic of RE 11.9.2. Not equivalent to the Brigalow TEC.

Through classification into these RE types, several changes to the state mapping were proposed:

- 1. The large mixed polygon of 11.9.2/11.9.1 was divided into several units, with three polygons of RE 11.9.1 proposed in the eastern section of the study area, and a number of polygons of RE 11.9.2 proposed over the remaining section and divided by the area previously determined as non-remnant.
- 2. The two small (<1ha) polygons shown on the State mapping as RE 11.3.3/11.3.25/11.9.1 were ground-truthed as RE 11.9.2 and were incorporated into the larger RE 11.9.2 polygons as part of the proposed changes.

No changes to the existing 11.9.1 polygon were proposed as the boundaries of this polygon accurately represent the spatial extent of an *Acacia harpophylla* community.

At the time of writing, confirmation from the Queensland Herbarium regarding the proposed changes had been provided verbally through the Queensland Department of Environment and Science.

The ground-truthed extent of this MNES is shown on the 'Matters of National Environmental Significant Map' in Appendix A.

The outcome of the ground-truthing assessments is that all areas that support habitat that equates the listed Brigalow community have been avoided by design. There will be no direct impacts to this community from the proposed action. Detailed impact assessment against the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* is provided in the Impact Assessment and Management section below.

2.2 Threatened flora species

No threatened flora species listed under the EPBC Act were recorded during baseline surveys. The majority of the habitat within the proposed disturbance area is highly degraded and low suitability for species listed under the EPBC Act that were identified to have potential to occur through the desktop assessments. Further details on species identified in the desktop assessment phase are provided in the impact assessment section below.

2.3 Threatened fauna species

Two threatened fauna species listed under the EPBC Act that were recorded during the field surveys. The Ornamental Snake (*Denisonia maculata*), which was captured at a trap site by SHG (2011). This trap site was located in RE 11.5.16 which is an open forest with numerous gilgai formations. This trap site was located approximately 7.8km north northwest of the disturbance area for the proposed action. The Squatter Pigeon (Southern) has been recorded outside the currently proposed project area on access tracks in the broader locality.

No other threatened fauna species have been recorded during the baseline surveys conducted. The significance of the habitats present for threatened species with potential to occur is discussed in the Impact Assessment and Management section below.

2.4 Migratory species

One migratory species, Latham's Snipe (*Gallinago hardwickii*), was recorded in baseline surveys. This individual was recorded on the edge of a large cattle dam located near the north west corner of the ML, approximately 9km from the proposed disturbance area. This species and potential impacts to it are described below.

All other migratory species were not recorded within the study area and were considered to have low likelihood of occurrence and therefore unlikely to be significantly impacted by the proposed action.

Impact Assessment and Management

1. Structure and intent of this section

The following sections detail the likelihood and significance of both direct and indirect impacts to MNES that were detected or deemed to have a moderate to high likelihood of occurring within the project area. The likelihood of impacts to MNES were assessed against the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance*. Additionally, a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action are also discussed, with respect to Section 4 of the referral.

This first part of this section includes at table of key terms and definitions that apply to the following impact assessments, as defined in the *Significant Impact Guidelines 1.1* (Table 6).

The following impact assessment sections are structured to provide a description of each matter, followed by a table providing assessment of potential impacts specifically against each relevant significant impact criterion.

2. Key terms and definitions

TERM	MATTER	DESCRIPTION
1. Population of a species	Critically endangered, endangered, or vulnerable threatened species	A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critical species, occurrences include but are not limited to:
		- A geographically distinct regional population, or collection of local populations
		- A population, or collection of local populations, that occurs within a particular region
2. Invasive species	Critically endangered, endangered, vulnerable threatened species, ecological communities	An 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native s native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species communities by direct competition, modification of habitat or predation.
3. Habitat critical to the survival of a	Critically endangered, endangered,	'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:
species or ecological community	vulnerable threatened species,	- For activities such as foraging, breeding, roosting, or dispersal
	ecological communities	- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the s 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 or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.
4. Important population	Vulnerable species	An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include popula 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
5. Important habitat	Migratory species	An area of 'important habitat' for a migratory species is:
		- Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant propo
		- 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
6. Ecologically significant proportion	Migratory species	Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecol- with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' popul specific behavioural patters (e.g., site fidelity and dispersal rates).
7. Population of a migratory species	Migratory species	'Population', in relation to migratory species, means the entire population or any geographically separate part of the population of proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

Table 6: Key terms and definitions relevant to MNES significant impact criteria (as defined in the Significant Impact Guidelines 1.1)

ally endangered, endangered or vulnerable threatened

species for space and resources or which is a predator of s may harm listed threatened species or ecological

survival of the species or ecological community, such as

critical for that species or ecological community; and/or

ations identified as such in recovery plans, and/or that

ortion of the population of the species, and/or

logically significant proportion' of the population varies ulation status, genetic distinctiveness and species-

any species or lower taxon of wild animals, a significant

3. Threatened ecological communities

Desktop surveys identified three listed TECs as potentially occurring within the local area, including Brigalow (*Acacia harpophylla* dominant and co-dominant), Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin, and Weeping Myall Woodlands. The baseline surveys and ground-truthing assessments confirmed the only TEC relevant to the proposed actions is the Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC (see map in Appendix A). There are no State-mapped equivalent communities present for the Natural grassland or Weeping Myall communities, and no evidence of any habitat supporting key diagnostic criteria for these other TECs was detected within the project area for the proposed action, or within the general locality.

Brigalow ecological community

The outcome of the ground-truthing assessments is that all areas that support habitat that equates the listed Brigalow community have been avoided by design (see MNES map in Appendix A). There will be no direct impacts to this community from the proposed action.

It was noted during the ground-truthing surveys that all areas equivalent to the Brigalow TEC were dominated by exotic pasture species in the ground layer. In which case, these areas are not consistent with the condition thresholds identified in the Approved Conservation Advice, whereby, exotic perennial plants comprised greater than 50% of the total vegetation cover of the patch. Nonetheless, as a precautionary approach all of these areas have been avoided by design to ensure risks of significant impacts to the listed community are avoided.

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Table 7: Assessment of critical habitat for the listed Brigalow community

DEFINITION		ASSESSMENT	IMPORTANT HABITAT PRESENT
Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:	 For activities such as foraging, breeding, roosting, or dispersal For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) To maintain genetic diversity and long term evolutionary development For the reintroduction of populations or recovery of the species or ecological community. 	The habitats associated with the proposed action are either highly modified non-remnant habitats or remnant habitats that do not support the key diagnostic criteria for the listed community. Given that the relevant habitat does not currently support any habitat for this community, it is unlikely that this habitat is critical to the survival of the ecological community.	Not present

Table 8: MNES significant impact criteria, with respect to the listed Brigalow community

IMPACT CRITERIA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES		
Reduce the extent of an ecological community	The proposed action does not involve any direct disturbance to this community and the full extent of its occurrence at the locality will be avoided by design. The proposed action is therefore unlikely to reduce the extent of the ecological community.	The proposed action is not likely to have a significant impact on the listed	N/A		
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The proposed action does not involve any direct disturbance to this community and the full extent of its occurrence at the locality will be avoided by design. The proposed action is therefore unlikely to fragment or increase fragmentation of the ecological community.	Brigalow community			
Adversely affect habitat critical to the survival of an ecological community	The habitat associated with the proposed action is not critical to the survival of the ecological community.				
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	Proposed infrastructure located in close proximity to the listed community is limited to a haul road and admin/workshop. This infrastructure is unlikely to modify abiotic factors in such a way that the community is likely to be significantly impacted.				
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	The proposed action does not involve any direct disturbance to this community and the full extent of its occurrence at the locality will be avoided by design. The are no aspects of construction or operation of the proposed action that are likely to cause a change in the species composition of the occurrence of the community at the locality.				
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:	The proposed action does not involve any direct disturbance to this community and the full extent of its occurrence at the locality will be avoided by design. The are no aspects of construction or operation of the proposed action that are likely to further reduce				
assisting invasive species, that are harmful to the listed ecological community, to become established, or	the quality or integrity of the community. The extent of disturbance from pasture improvement and grazing practices is such that the is a very low risk of further impacts to the quality or integrity from construction and operation of the mine.				
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					
Interfere with the recovery of an ecological community.	The proposed action does not involve any direct disturbance to this community and the full extent of its occurrence at the locality will be avoided by design. The proposed action is therefore unlikely to interfere with the recovery of the ecological community.				

4. Migratory species

One migratory species listed under the EPBC Act was identified to have a moderate to high likelihood of occurring within the project area. Potential direct and indirect impacts to this species as a result of the proposed action were assessed against the relevant significant impact criteria.

Under the MNES Significant Impact guidelines, an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

4.1 Latham's Snipe

Background information

Latham's Snipe is a migratory wader that breeds throughout Japan and Russia and spends the non-breeding season (summer months) in eastern Australia, however migration routes outside of these areas are poorly known (DEE, 2019 and referenced therein). Throughout the non-breeding season it is thought that the entire population (25 000 to 100 000 individuals) migrates to eastern Australia, where most individuals have been recorded to spend the non-breeding season at sites south of the Richmond River in New South Wales. However, birds have been recorded to utilise north-eastern Australia as a migratory passage. Throughout its Australian distribution, this species inhabits permanent and ephemeral wetlands at altitudes of up to 2000m. Preferred wetlands include open, freshwater wetlands with ample shelter (dense vegetation), however this species has also been noted to occupy saline or brackish water, modified or artificial habitats, and habitats located close to humans or human activity. Historically, the greatest threats to this species within Australia include the loss of habitat caused by drainage and modification of wetlands, and hunting. Currently, the major threat to this species is the ongoing loss of habitat due to several impacts such as water drainage and diversion, land development, and habitat modification through land management practices.

No individuals of this species were detected during the baseline flora and fauna survey (NRC, 2017). The only potentially suitable habitat was restricted to the north east of the study area, characterised by a stock water dam. However, the water body supports little to no suitable sheltering habitat for this species along its margins. Earlier baseline studies by SHG (2011) detected this species approximately 9km north northwest of the proposed action at a large cattle dam, within the broader Wilton EPC. On the basis of this record, there is a potential for this species to occur within potentially suitable habitats in the broader area. However, no habitat areas relevant to the proposed action support an ecologically significant proportion of the

population of this species and no area of important habitat for this species have been identified within or adjacent to the disturbance footprint of the proposed action. This species typically uses northern Australia as a migratory path and individuals may spend a short period of time foraging or resting in suitable areas in the broader area. Lake Maraboon is located approximately 60km to the southwest of the study area and likely supports more substantial habitat for this species as well as a greater array of micro-habitats for individuals to utilise. Overall, the low-quality habitat for this species within the proposed disturbance area is common within the broader region and does not support any 'important habitat' values, nor is it likely to support an 'ecologically significant proportion of the population'. Assessment against the relevant significant impact criteria is included in Table 9 and Table 10 below.

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Table 9: Assessment of important habitat for Latham's Snipe

DEFINITION	ASSESSMENT	IMPORTANT HABITAT PRESENT
Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species	No habitat with relevance to the proposed action supports an ecologically significant proportion of the population of this species	Not present
Habitat that is of critical importance to the species at particular life-cycle stages	The existing stock water dam located within the disturbance footprint of the proposed action may be used as an area of foraging or roosting as individuals of this species migrate through eastern Australia. However, preferred microhabitat for Latham's Snipe is not present around the margins of the dam, therefore it is unlikely that individuals would consistently utilise this site along migratory routes. The low quality of the habitat presents indicates this species would be highly unlikely to be relying on this as critical habitat for any stage of its life-cycle. The habitat does not support any of the values defined for critical habitat in Table 6.	Not present
Habitat utilised by a migratory species which is at the limit of the species range	The proposed action does not occur near the limit of distribution of Latham's Snipe.	Not present
Habitat within an area where the species is declining	The proposed action is not located within a specific area where this species is known to be declining.	Not present

Table 10: MNES Migratory species significant impact criteria, with respect to Latham's Snipe

IMPACT CRITERIA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	No areas of important habitat for this species have been identified within or adjacent to the disturbance footprint of the proposed action.	The proposed action is not likely to have a significant impact on Latham's Snipe	N/A
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	No areas of important habitat for this species have been identified within or adjacent to the disturbance footprint of the proposed action.		
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of	Details on an ecologically significant proportion of a migratory species population under the MNES significant impact guidelines are described in Table 6.		
a migratory species	Several records of Latham's Snipe occur within the local and broader area. The majority of the population, while in Australia, migrates to areas south of the Richmond River in New South Wales and it is unlikely the relatively small disturbance footprint associated with the proposed action accommodates a significant proportion of the population of Latham's Snipe. Furthermore, no local congregations of this species have been documented within the local area.		

5. Critically endangered and endangered species

Two species listed as endangered under the EPBC Act were identified to have a moderate to high likelihood of occurring within close proximity to the proposed action. Potential direct and/or indirect impacts to these species as a result of the proposed action were assessed against the relevant significant impact criteria, as defined within the MNES Significant Impact Guidelines.

Under the MNES Significant Impact Guidelines an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- Lead to a long-term decrease in the size of a population
- Reduce the area of occupancy of the species
- Fragment an existing population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of a population
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- Introduce disease that may cause the species to decline, or
- Interfere with the recovery of the species

5.1 King Bluegrass

Background information

This endangered flora species is endemic to central and southern Queensland where it occurs in three disjunct populations: 1) Hughenden district; 2) from Nebo to Monto and west to Clermont and Rolleston; and 3) Dalby district, Darling Downs. Its area of occupancy is unknown, however based on the extent of occurrence it is likely to be restricted. The main identified threats to this species are habitat loss through agricultural and mining activities, road construction and other infrastructure developments, and weed invasion resulting in competition and potential displacement (TSSC, 2013 and references therein). King Bluegrass is found on black cracking clay soils mainly in association with other *Dichanthium* species and in natural grassland communities.

Despite desktop analyses identifying this species as having a high likelihood of occurring within the project area, NRC (2017) did not detect this species during the targeted surveys in the field survey program. Additionally, SHG (2011) did not detect this species during baseline studies within the broader EPC. No native grassland communities were identified within the study area. All grasslands recorded were severely impacted by cattle grazing and dominated almost exclusively by highly palatable introduced species including Buffel Grass (*Cenchrus ciliarus*) and Indian Bluegrass (*Bothriochloa pertusa*).

Impact assessment

As this species was not detected within the study area or the broader EPC, and the habitat relevant to the project is highly modified and/or unsuitable for this species, is unlikely that the proposed action will lead to a long-term decrease in the size of a population or fragment an existing population. No native grasslands were recorded during baseline surveys within the study area and grasslands that were recorded were dominated almost entirely with exotic species and degraded due to cattle grazing. Based on this, no suitable habitat for King Bluegrass is found within the study area and the proposed action will not significantly amplify impacts to, or the quality of, habitat currently available to this species. Through the implementation of industry-standard biosecurity measures, it is unlikely the proposed action will introduce additional invasive species or any disease into the vicinity of the project area that may cause King Bluegrass to decline.

Table 11: Assessment of critical habitat for King Bluegrass

DEFINITION		ASSESSMENT	RESULT
'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:	 For activities such as foraging, breeding, roosting, or dispersal For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) To maintain genetic diversity and long term evolutionary development For the reintroduction of populations or recovery of the species or ecological community 	No evidence of this species was detected during baseline flora and fauna studies. The habitat within the disturbance area of the proposed action does not support any native grasslands. The habitat is highly modified and degraded and dominated by exotic pasture species. The habitat is also subject to known threats in the form of environmental pest species (e.g. Parthenium) and cattle grazing. The lack of suitable habitat and presence of known threats is such that it is unlikely the habitat represents 'habitat critical to the survival of the species'	Not critical

Table 12: MNES critically endangered and endangered species significant impact criteria, with respect to King Bluegrass

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of a population	Details on 'population' under the MNES significant impact guidelines are described in Table 6. No individuals or populations of this species were detected within the disturbance footprint of the proposed action or broader Wilton EPC. Therefore, it is unlikely a local population of this species occurs within the disturbance footprint of the proposed action.	No significant impact	N/A
Reduce the area of occupancy of the species	Throughout its distribution the area of occupancy of King Bluegrass is sparse and scattered in three disjunct populations within natural grassland communities. Portions of the proposed action occur within highly disturbed grassland communities dominated by improved pasture species such as Buffel Grass and Indian Bluegrass. As these grassland areas do not support critical habitat for this species (Table 11) and no individuals of this species were detected during baseline surveys it is unlikely that the proposed action will reduce the area of occupancy of this species.	No significant impact	N/A
Fragment an existing population into two or more populations	Details on 'population' under the MNES significant impact guidelines are described in Table 6. Despite the presence of local records of this species within 30km of the proposed action, no individuals or populations of this species were detected within the study area or broader Wilton EPC. As the extent of occurrence of this species is likely to be restricted, and no individuals were detected within the disturbance footprint of the proposed action, it is unlikely any populations will be fragmented due to the proposed action.	No significant impact	N/A
Adversely affect habitat critical to the survival of a species	No habitat of critical importance to King Bluegrass was identified within the disturbance footprint or surrounding area relevant to the proposed action (Table 11).	No significant impact	N/A
Disrupt the breeding cycle of a population	No individuals or populations of this species were detected within the disturbance footprint of the proposed action or broader Wilton EPC. Therefore, it is unlikely the breeding cycle of a population will be impacted by the proposed action.	No significant impact	N/A
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Grasslands within the study area are utilised for cattle grazing and are dominated by introduced pasture improving species that directly compete with native grasses. As the habitat within the study area is previously impacted and/or modified it is unlikely that the proposed action will significantly amplify existing impacts to, or the quality of, habitat currently available to this species	No significant impact	N/A
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No areas of critical habitat (Table 11) for King Bluegrass were identified to occur within the disturbance footprint of the proposed action. Industry- standard invasive species management practices will be implemented throughout the construction and operational phases of the proposed action to reduce the threats to biodiversity values associated with invasive species.	No significant impact	N/A
Introduce disease that may cause the species to decline	There are no known diseases to impact King Bluegrass	No significant impact	N/A

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Interfere with the recovery of the species	As no individuals or populations of this species were detected within the disturbance footprint of the proposed action or broader Wilton EPC the proposed action is not likely to impact the recovery of this species.	No significant impact	N/A

5.2 Northern Quoll

Background information

Historically common across northern Australia and occurring almost continuously from the Pilbara to near Brisbane, the Northern Quoll now occurs in five regional populations across Queensland, the Northern Territory and Western Australia. In Queensland, this species is known to occur as far south as Gracemere and Mt Morgan, south of Rockhampton, as far north as Weipa and extends west to the vicinity of Carnarvon Range National Park. This species' distribution is highly fragmented in the state and surveys indicate severe reductions from the species' former distribution. This species occupies a diversity of habitats across its range, including rocky areas, forests, woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (DoE, 2016; DEE, 2019, and references therein).

Due to the study area being within the species modelled distribution and potentially suitable habitat occurring within the vicinity of the project area, the likelihood of occurrence for this species was deemed as moderate. However, the nearest record of this species with respect to the proposed action is approximately 90km west of the study area. This species was specifically targeted during the flora and fauna baseline survey (NRC, 2017) using multiple survey techniques (e.g. cage traps and camera traps), as recommended in the 'EPBC Act referral guideline for endangered northern guoll' (DoE, 2016), and no evidence of this species was detected within the study area. The study area includes several habitat types consistent with the broad spectrum of habitats that this species is known to occupy. However, during baseline flora and fauna studies, no microhabitat qualities of intrinsic value to this species were identified. Given the lack of local records, current distribution of identified fragmented populations, and the absence of evidence of this species occurring within the study area during baseline flora and fauna surveys it is unlikely that this species occurs within habitat in the vicinity of the proposed action. The Northern Quoll is not known from the remnant habitat areas associated with the proposed action. The relevant habitats associated with the proposed action area are highly isolated from remnant areas where the Northern Quoll is known to occur, through vast areas of cleared grazing land. Therefore, the local area supports limited connectivity to surrounding remnant areas and a reduced likelihood of Northern Quoll immigrating into habitat in the vicinity of the proposed action.

Impact assessment

Table 13: Assessment of critical habitat for the Northern Quoll

DEFINITION		ASSESSMENT	RESULT
'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:	For activities such as foraging, breeding, roosting, or dispersal	The Northern Quoll is known to occupy a broad range of habitats throughout its distribution and the proposed project occurs within the modelled distribution of the species (DoE, 2016). Therefore, habitats within the disturbance footprint of the proposed action may support habitat that could be used for activities such as foraging, breeding, roosting, or dispersal by the Northern Quoll. However, the project area is only in the 'may occur' category of the distribution model (Map 1 and 2 in DoE, 2016) and no evidence of this species was detected during baseline flora and fauna studies and the closest record occurring approximately 90km away. Therefore, any potentially suitable habitat for this species is not likely to be occupied or providing critical habitat for the species.	Not critical
	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)	The Northern Quoll is known to occupy a broad range of habitats throughout its distribution (DoE, 2016). However, as no evidence of this species was detected during a reconnaissance survey for the northern quoll using recommended methods (Section 5 of DoE, 2016; NRC, 2017), any potentially suitable habitat for this species is not likely to be utilised and not critical to the survival of the Northern Quoll. Therefore, although potentially suitable habitat may occur, it is not necessary for the survival of the Northern Quoll.	Not critical
	To maintain genetic diversity and long term evolutionary development	Any habitat that may be impacted by the proposed action occurs as a highly isolated fragment surrounded by non- remnant improved pasture utilised for cattle grazing. Due to the highly fragmented nature of this habitat and the absence of evidence of Northern QuoII during reconnaissance surveys (baseline flora and fauna assessments), the area does is not necessary to maintain genetic diversity or long-term evolutionary development for this species.	Not critical
	For the reintroduction of populations or recovery of the species or ecological community	Remnant habitat within the disturbance footprint of the proposed action is isolated from other significant remnant areas with limited dispersal corridors to larger contiguous sections of remnant vegetation within the local and broader area. Because of this, connectivity to other populations and suitable habitat within the landscape is limited for the Northern Quoll. These limiting factors restrict the immigration, emigration, and genetic flow of this species. Therefore, any potential habitat that is to be disturbed by the proposed action is unlikely to act as strategic recovery habitat. The habitat is not identified as important habitat for the reintroduction of populations or the overall recovery of the Northern Quoll in the National Recovery Plan for the Northern Quoll.	Not critical

Table 14: MNES critically endangered and endangered species significant impact criteria, with respect to the Northern Quoll

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of a population	No evidence of Northern Quoll was detected within the disturbance footprint of the proposed action during reconnaissance surveys (baseline flora and fauna studies). The proposed project will not introduce inappropriate fire regimes or increase grazing regimes or invasive species presence in the area. The loss of a relatively small area of marginal habitat that is not known to support a Northern Quoll population is unlikely to significantly impact a population of this species.	No significant impact	N/A
Reduce the area of occupancy of the species	No evidence of Northern Quoll was detected within the disturbance footprint of the proposed action during reconnaissance surveys (baseline flora and fauna studies). The loss of a relatively small area of marginal habitat that is not known to support a Northern Quoll population is unlikely to significantly impact a population of this species.	No significant impact	N/A
Fragment an existing population into two or more populations	Any habitat that may be impacted by the proposed action occurs as a highly isolated fragment surrounded by non-remnant grassland communities utilised for cattle grazing. Due to the highly fragmented nature of this habitat and the absence of evidence of Northern Quoll during reconnaissance surveys (baseline flora and fauna assessments), it is highly unlikely the area supports a local population, serves as a dispersal corridor or interlinks a broader population of Northern Quoll. The loss of a relatively small area of marginal habitat on the edge of a larger remnant area that is not known to support a Northern Quoll populations is unlikely to fragment an existing population into two or more populations.	No significant impact	N/A

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Adversely affect habitat critical to the survival of a species	No habitat critical to the survival of this specie was identified to occur within the vicinity of the proposed action (Table 13)	No significant impact	N/A
Disrupt the breeding cycle of a population	No evidence of Northern Quoll was detected within the disturbance footprint of the proposed action during reconnaissance surveys (baseline flora and fauna studies). The loss of a relatively small area of marginal habitat that is not known to support a Northern Quoll population is unlikely to disrupt the breeding cycle of a population of Northern Quoll.	No significant impact	N/A
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As no evidence of Northern Quoll was detected within the disturbance footprint of the proposed action during reconnaissance surveys (baseline flora and fauna studies), it is unlikely that any impacts to local habitat are likely to impact Northern Quoll to the extent that the species is likely to decline.	No significant impact	N/A
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	No habitat critical to the survival of this specie was identified to occur within the vicinity of the proposed action (Table 13). Industry-standard invasive species management practices will be implemented throughout the construction and operational phases of the proposed action to reduce the threats to biodiversity values associated with invasive species.	No significant impact	N/A
Introduce disease that may cause the species to decline	As no individuals or populations of this species were detected within the disturbance footprint of the proposed action or broader Wilton EPC the proposed action is not likely to introduce disease that may cause this species to decline.	No significant impact	N/A
Interfere with the recovery of the species	As no individuals or populations of this species were detected within the disturbance footprint of the proposed action or broader Wilton EPC the proposed action is not likely to impact the recovery of this species. The habitat is not identified as important habitat for the reintroduction of populations or the overall recovery of the Northern Quoll in the National Recovery Plan for the Northern Quoll.	No significant impact	N/A

6. Vulnerable species

Several EPBC Act listed vulnerable species were identified to have a moderate to high likelihood of occurring within the project area. Any potential direct and/or indirect impacts to these species as a result of the proposed action were assessed against the relevant significant impact criteria, as defined within the MNES Significant Impact Guidelines. In addition to the assessment of any impacts a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action are also discussed, with respect to Section 4 of the EPBC referral submission.

Under the MNES Significant Impact guidelines an action is likely to have a significant impact on a vulnerable species if there is a real change or possibility that it will:

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species
- Disrupt the breeding cycle of an important population
- Modify, destroy, remove or isolate or decrease the availability or quality 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
- Introduce disease that may cause the species to decline, or
- Interfere substantially with the recovery of the species

6.1 Red Goshawk

Background information

This species is very sparsely distributed from the western Kimberly area in Western Australia to north-eastern New South Wales (Marchant & Higgins, 1993). It typically occurs in coastal and sub coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins, 1993). It nests in large trees, typically less than one kilometre from a permanent water source (Aumann & Baker-Gabb, 1991). The home range for this species is very large, between 50 and 220km² (Debus & Czechura, 1988) and the study area is within the known distribution of this species. Several threats have been identified for the Red Goshawk, which include a reduction in prey abundance through overgrazing, the degradation of wetland habitats and the loss of hollow bearing trees. Other recognised threats to the Red Goshawk include altered fire regimes, disease, and habitat fragmentation and degradation from agriculture, urban development and forestry operations (DEE, 2019).

Despite one local record of this species identified during desktop studies, no evidence of this species was detected during any of the baseline flora and fauna surveys. Given that this species is sparsely distributed and occupies large home ranges, it is possible that this species

may utilise airspace over the study area or use local vegetation as part of a much larger home range. However, the baseline flora and fauna study did not detect any unique habitat features for the Red Goshawk. Rather, the vegetated parts of the study area are characteristic of habitats in the surrounding landscape.

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Table 15: Assessment of the presence of an important population or critical habitat to Red Goshawk

DEFINITION		ASSESSMENT	RESULT
An 'important population' is 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	The distribution of this species is overall widespread, however locally patchy, across eastern and northern Australia. Several historical records from the 19 th and early 20 th century occur within the broader area around the proposed action, however only one of these was recorded within 30km of the proposed action. A lack of recent sightings of this species across New South Wales and south east Queensland has resulted in suggestions that the distribution of this species has contracted to the north in recent years. As no recent records of this species occur within close proximity to the proposed action and no evidence of this species was detected during baseline flora and fauna assessments it is unlikely areas to be impacted by the proposed action support a key source population, either for breeding or dispersal, of Red Goshawk.	Not present
	Populations that are necessary for maintaining genetic diversity	Several historical records from the 19 th and early 20 th century occur within the broader area around the proposed action, however no recent records with respect to the proposed action are documented. As no recent records of this species occur within close proximity to the proposed action and no evidence of this species was detected during baseline flora and fauna assessments it is unlikely areas to be impacted by the proposed action support a population of Red Goshawk that is necessary for maintaining genetic diversity.	Not present
	Populations that are near the limit of the species range	The proposed action occurs towards the western edge of the distribution of this species within central Queensland. However, as no recent records of this species occur within close proximity to the proposed action and no evidence of this species was detected during baseline flora and fauna assessments it is unlikely habitat associated with the proposed action is supporting a population that is near the limit of the species range.	Not present
'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:	For activities such as foraging, breeding, roosting, or dispersal	Due to the presence of historical records there is a potential that habitat impacted by the proposed action may be have been utilised by this species for foraging, breeding, roosting, or dispersal. However, as there are no recent records of this species within the local area and no evidence of this species was detected during baseline flora and fauna studies it is unlikely that any critical habitat necessary for the survival of this species will be impacted by the proposed action. Furthermore, with an estimated home range of up 220km ² , the relatively small area of marginal habitat on the edge of a larger remnant area that is not known to support a Red Goshawk population is unlikely to be critical for activities such as foraging, breeding, roosting, or dispersal.	Not critical
	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)	The habitat associated with the proposed action does not support any unique or limited habitat values that would be important for the long-term maintenance of the species. Rather, the proposed project area is characteristic of the fragmented landscape that has been highly modified for grazing activities.	Not critical
	To maintain genetic diversity and long term evolutionary development	As no recent records of this species occur within close proximity to the proposed action and no evidence of this species was detected during baseline flora and fauna assessments it is unlikely areas to be impacted by the proposed action support that is necessary for maintaining genetic diversity.	Not critical
	For the reintroduction of populations or recovery of the species or ecological community	As no recent records of this species occur within close proximity to the proposed action and no evidence of this species was detected during baseline flora and fauna assessments it is unlikely the habitat represents critical habitat for the reintroduction or recovery of this species. The habitat is not identified as important habitat for the reintroduction of populations or the overall recovery of the Red Goshawk in the National Recovery Plan for the Red Goshawk.	Not critical

Table 16: MNES vulnerable species significant impact criteria, with respect to the Red Goshawk

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of an important population of a species	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 15).	No significant impact	N/A

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Reduce the area of occupancy of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 15).	No significant impact	N/A
Fragment an existing important population into two or more populations	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 15).	No significant impact	N/A
Adversely affect habitat critical to the survival of a species	No evidence of habitat critical to the survival of this species was identified within the disturbance footprint of the proposed action (Table 15).	No significant impact	N/A
Disrupt the breeding cycle of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 15).	No significant impact	N/A
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As no important habitat critical to the survival of this species was identified within the disturbance footprint of the proposed action (Table 15) any impacts to habitat as a result of the proposed action are not likely to impact this species to the extent that it is likely to decline.	No significant impact	N/A
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No evidence of habitat critical to the survival of this species was identified within the disturbance footprint of the proposed action (Table 15). Industry-standard invasive species management practices will be implemented throughout the construction and operational phases of the proposed action to reduce the threats to biodiversity values associated with invasive species.	No significant impact	N/A
Introduce disease that may cause the species to decline	Disease is an identified threat to the Red Goshawk. However, as no recent evidence of individuals or populations were identified to occur within the local or broader area of the proposed action it is unlikely that the proposed action would introduce any disease that may cause the species to decline.	No significant impact	N/A
Interfere substantially with the recovery of the species	As no evidence of individuals or local populations of Red Goshawk were detected during desktop or baseline flora and fauna assessments, and no habitat critical to the survival of Red Goshawks was identified to be impacted by the proposed action it is unlikely the proposed action will substantially interfere with the recovery of this species. The habitat is not identified as important habitat for the reintroduction of populations or the overall recovery of the Red Goshawk in the National Recovery Plan for the Red Goshawk.	No significant impact	N/A

6.2 Squatter Pigeon (southern)

Background information

The distribution of this species extends southwards from the Burdekin-Lynd divide to southeast Queensland, southwest to Stanthorpe, near the Queensland-NSW border, south along the western slopes of the Great Dividing Range to the area around Glenn Innes, NSW, west through the Gwydr River region to Bellata, and north-westwards through Goondiwindi and the Brigalow Belt in Queensland to Charleville. The subspecies was once widespread and abundant throughout NSW and QLD, however substantial range contractions have occurred throughout much of NSW since the 1870s. Therefore, the majority of the population of this subspecies currently occurs within QLD.

Habitat for this species is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated in the overstorey by *Eucalyptus, Corymbia, Acacia* or *Callitris* species (DEE, 2019, and references therein). The species is nearly always found near permanent water such as rivers, creeks and waterholes. Sandy areas dissected by gravel ridges, which have open and short grass cover allowing easier movement are preferred. It is less commonly found on heavier soils with dense grass. It often occurs in burnt areas and is sometimes found on tracks and roadsides (TSSC, 2015a). Breeding for this species occurs mostly in the dry season, however may be opportunistic with abundant rainfall. This species nests on the ground in an area somewhat hidden by overhanging grass, bushes, or logs (Morcombe, 2003). The greatest threat to this species is through predation from invasive species such as feral cats and foxes. Additional threats to this species include the loss, fragmentation, and degradation of habitat for agricultural purposes and the introduction of invasive weeds such as Buffel Grass. This species was considered to have a high likelihood of occurrence within the vicinity of the proposed action due to the presence of local records and locally suitable habitat.

This species was not recorded within the project area or immediate locality for the proposed action during the baseline surveys. The baseline flora and fauna studies conducted by NRC (2017) identified an incidental observation to the north of the proposed action. This observation was on the side of a track >3 km from the proposed action in habitat not associated with the proposed action. Nonetheless, the presence of local records of this species and the incidental observation in neighbouring habitat indicates this species has some potential to occur within the project area of the proposed action.

General observations on the habitat values within the project area indicate these values are of limited value for the Squatter Pigeon. Much of the project area is located on areas of improved pasture, with dense grass cover on relatively heavy soils. These areas do not support preferred feeding or breeding habitat for Squatter Pigeons. Where the project area overlaps with remnant habitats, these habitats are typically located on slopes that are not consistent with the description for breeding and foraging habitat provided in DEE (2019): *In Queensland, Squatter Pigeon (southern) foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills.* In general, the habitats recorded within the disturbance footprint for the project are of low value for the Squatter Pigeon,

and this is reflected by the absence of observations during the field surveys. Higher value habitat for this species occurs on the top of the ridge/plateau in habitat supporting regional ecosystem 11.5.9b. This habitat has been avoided by design, and therefore it is unlikely there will be any significant direct impacts to this species or species habitat as a consequence of the proposed action. The potential for indirect impacts to this species is primarily related to disturbances that may occur in adjacent habitats, such as vehicle strike. Impact mitigation strategies for such impacts are provided in the section below.

Impact assessment

Table 17: Assessment of the presence of an important population or critical habitat to the Squatter Pigeon

DEFINITION		ASSESSMENT	RESULT
An 'important population' is 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	Due to a notable northward contraction of this species range from NSW since the 1870s it is likely that key source populations of this species occur along the current southern margin of its distribution within Queensland. As the proposed action occurs within central Queensland, well north of the current southern distribution of the Squatter Pigeon, it is unlikely that areas encompassed by the proposed action support a key source population of Squatter Pigeon for either breeding or dispersal.	Not present
	Populations that are necessary for maintaining genetic diversity	As the proposed action occurs within the core of the distribution of this subspecies and there are multiple records of this species occurring within the local and broader area it is unlikely that any population within the vicinity of the proposed action is necessary for maintaining genetic diversity for this species or subspecies.	Not present
	Populations that are near the limit of the species range	The proposed action lies within the central portion of the species distribution within Queensland. Therefore, any populations within the local area do not occur near the limit of the species range.	Not present
'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:	For activities such as foraging, breeding, roosting, or dispersal	Remnant woodland habitats within the disturbance footprint of the proposed action do not support suitable habitat for the Squatter Pigeon. Non-remnant areas of improved pasture with a sparse coverage of trees may support low-value habitat for activities such as foraging, breeding, roosting, or dispersal that may be used on occasion, particularly if the species is moving between areas of higher value habitats. As this species was incidentally recorded to the north of the proposed action during baseline flora and fauna assessments, and there are multiple local records for this species, there is a potential for the non-remnant habitats within the disturbance footprint to be utilised by this species, particularly those areas in close proximity to permanent water. However, these habitat features are not unique or limited in the local area or throughout the region. Rather, they are characteristic of the highly modified landscape utilised for cattle grazing activities throughout the region. Given the habitat values associated with the proposed action are of low value for this species, that squatter pigeons have not been recorded within the project area, and the prevalence of similar habitat within the local area and broader region, it is unlikely the habitat is 'critical to the survival of the species'.	Not Present
	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)	Potentially suitable habitat for this species within areas likely to be impacted by the proposed action is widely represented within the local and broader region of the proposed action. Because of this, any impacted habitat is not likely to be necessary for the long-term maintenance of the Squatter Pigeon.	Not critical
	To maintain genetic diversity and long term evolutionary development	Potentially suitable habitat for this species occurring within areas likely to be impacted by the proposed action is widely represented within the local and broader region of the proposed action. Because of this, any habitats impacts within the disturbance footprint of the proposed action are not likely to be necessary in maintaining genetic diversity and long-term evolutionary development of the Squatter Pigeon. Furthermore, as the proposed action occurs within the core of the distribution of this subspecies within Queensland, it is likely that the genetic diversity of any individuals that may be locally impacted by the proposed action is broadly represented within the local population of the Squatter Pigeon.	Not critical
	For the reintroduction of populations or recovery of the species or ecological community	As habitat likely to be impacted by the proposed action predominantly comprises non-remnant grassland and woodlands with an absence of a notable grassy understory these areas do not support the preferred habitat or ecological communities for the Squatter Pigeon. Furthermore, potentially suitable habitat for this species that may be impacted by the proposed action is broadly represented within the local and broader area. Therefore, habitat within the disturbance footprint of the proposed action is not critical or necessary for the reintroduction of populations or recovery of the species.	Not critical

Table 18: MNES vulnerable species significant impact criteria, with respect to the Squatter Pigeon

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of an important population of a species	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 17).	No significant impact	N/A
Reduce the area of occupancy of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 17).	No significant impact	N/A
Fragment an existing important population into two or more populations	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 17).	No significant impact	N/A
Adversely affect habitat critical to the survival of a species	No habitat identified as critical to the survival of the Squatter Pigeon was identified within the direct disturbance area for the proposed action (Table 17).	No significant impact	See Table 19
	Impact mitigation and/or management strategies for potential indirect impacts are provided in Table 19.		
Disrupt the breeding cycle of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 17).	No significant impact	N/A
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Potentially suitable habitat for this species within areas likely to be impacted by the proposed action is widely represented within the local and broader region of the proposed action. Because of this, the proposed action is not likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No significant impact	N/A
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Overgrazing from domesticated herbivores and habitat degradation through invasive pasture improving species are recognised as current threats for this species. However, as the proposed action occurs within areas currently utilised for cattle grazing and grassland habitats are already dominated by pasture improving species it is unlikely that the proposed action will emphasize these impacts on the Squatter Pigeon. Industry-standard approaches to pest management will be implemented to reduce the threat to local biodiversity values from invasive pest species.	No significant impact	NA
Introduce disease that may cause the species to decline	No diseases are currently identified as a threat to this species; therefore it is unlikely the proposed action will introduce disease that may cause the species to decline.	No significant impact	N/A
Interfere substantially with the recovery of the species	As habitat likely to be impacted by the proposed action predominantly comprises non-remnant grassland and woodlands with an absence of a notable grassy understory these areas do not support the preferred habitat or ecological communities for the Squatter Pigeon. Furthermore, potentially suitable habitat for this species that may be impacted by the proposed action is broadly represented within the local and broader area. Therefore it is unlikely the proposed action will interfere substantially with the recovery of the species.	No significant impact	N/A

Table 19: Management strategies to mitigate impacts to the Squatter Pigeon

IMPACT	MANAGEMENT STRATEGIES
Indirect impacts associated with vehicle strike on roadsides and tracks in adjacent habitats (or potential incidental occurrences in non- preferred habitats in the project area.	 Vehicle strike represents a general threat to native fauna species, but is particularly relevant to the Squatter Pigeon, which is a ground-dwelling species that often occurs of to minimise the likelihood of vehicle strike in general, with a focus on reducing the likelihood of death or injury to Squatter Pigeons within the project area and surrounds: Site inductions or toolbox meetings will include information about sensitive aspects of the environment in which personnel are working, including the risk of injury or death or the ground dwelling nature of the species, all vehicles will remain on existing access tracks and roads wherever possible. Where possible, clearing works will be carried out in a sequential manner that allows fauna to escape to natural areas away from construction works. Speed limits will be implemented as appropriate for the condition of the roads and access tracks on site. Locations of Squatter Pigeon sightings will be recorded speed within 200m of locations where Squatter Pigeons have been regularly observed.

on roads and tracks. The following controls are proposed

ath to Squatter Pigeons from vehicles.

limits (20km/hr recommended) will be implemented

6.3 Koala

Background information

Koalas habitat can be broadly defined as any forest of woodland containing species that are known food trees. The diet of the Koala is mainly restricted to foliage of *Eucalyptus* spp.; however, it may also consume foliage of related genera, including *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp. (DEE, 2019). The proposed action is within the modelled distribution for Koala and the WO database extract returned nine records within a 30km radius of the study area. The study area contains some habitats that support Koala food trees, mainly Thozet's Box woodland (RE 11.7.1) and Narrow-leaved Ironbark open woodland (RE 11.5.9). These REs form part of a mosaic of habitats in a relatively large remnant unit associated with the plateau to the west of the proposed action.

Remnant vegetation within the proposed disturbance area that supports potentially suitable habitat for the Koala is limited to the RE 11.7.1 community that occurs on the margin of the remnant unit. Targeted surveys were conducted in areas supporting food trees, including searches for scats and claw marks. No evidence of the Koala was observed anywhere within the study area.

Habitat assessment

A habitat assessment was conducted in accordance with the *EPBC Act Referral Guidelines for the vulnerable Koala* (2014). The outcome of this assessment was that, while there are no records of the Koala that are of significant relevance to the study area, the site contains habitat that may be important to the Koala (Table 20). Key outcomes from the habitat assessment tool were:

- There is no evidence of any Koalas within 2km of the edge of the impact area within the last 10 years.
- Emergent trees of at least two species that are known as Koala food trees are present.
- The study area is part of a contiguous landscape.
- The study area has some degree of dog or vehicle threat present.
- Habitat within the study area is potentially important for achieving the interim recovery objective.

Table 20: Koala habitat assessment

ATTRIBUTE	SCORE	HABITAT A	ASSESSMENT		
Koala occurrence	0	Desktop studies	The EPBC Act Protected Matters Report states that Koalas or Koala habitat is likely to occur within a 30km radius from the centre point of the proposed disturbance area (see Appendix B) A search of the Queensland Government WO database shows nine records of Koalas within 30km from the centre point of the proposed disturbance area. All records were over 16 years old with no new records in the local area.		
			There are no records within 2km of the study area within the last 10 years.		
		Field studies	Targeted searches throughout the study area revealed no evidence of Koalas inhabiting the area		
			Field studies included spotlighting, examining trees for signs of Koala activity and scat searches.		
Vegetation structure and composition	2	Desktop studies	The Queensland RE and Essential Habitat mapping reveals there is no mapped Koala essential habitat within 10km of the study area.		
			The RE mapping within the impact area for the proposed action shows vegetation communities that contain at least one known preferred Koala food tree in the canopy (<i>Eucalyptus thozetiana</i>).		
		Field studies	The vegetation surveys identified one community present within the proposed impact area that contains a preferred food tree that forms >50% of the vegetation in the canopy stratum (<i>Eucalyptus thozetiana</i>).		
Habitat connectivity	2	Both deskto part of a cor	p and field studies reveal that the proposed impact area is tiguous landscape above 1000ha in size		
Key existing threats	1	No Koala sig landscape ir vehicle strike	ghtings have occurred in the study area or the surrounding the recent past, therefore no records of Koala mortality from e or dog attack exist.		
		Traffic threat respect to th	ts are not quantified, but are unlikely to be significant with e relevant remnant unit.		
		Dingos and/or feral dogs were commonly recorded within the during the field survey program and may predate on any loca of Koala. Feral dogs were recorded regularly at almost all site systematic trapping programs (including motion sensing infra cameras) were established.			
		Key existing threats has been scored as 1 (medium), due to the significance of the threat from the local feral dog population recorded during the field studies.			

Recovery value	1	The habitat within the study area is part of a large remnant unit, but this unit is surrounded by cleared open pastures and coal mine operations. At the broader scale, the remnant unit has poor connectivity values.
		The study area does not support any remnant habitats that form a distinct riparian unit that may provide refugia for the Koala.
		Due to the lack of recent records, there is no information available on disease prevalence for the local area.
Total Score	6	Decision: Habitat potentially critical to the survival of the Koala – assessment of significance required.

Impact assessment

Table 21: Assessment of the presence of an important population or critical habitat to the Koala

DEFINITION		ASSESSMENT	RESULT
An 'important population' is 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	Due to the isolation of the remnant vegetation unit at the broader scale and no evidence of this species during baseline flora and fauna assessments (NRC, 2017) it is highly unlikely that the disturbance footprint of the proposed action supports a key source population of Koala for either breeding or dispersal. Furthermore, only 9 records of this species occur within 30km of the proposed action, all of which are over 16 years old. No records of this species have been detected within 2km of the proposed project within the past 10 years. If this species is present, the density of the population is likely to be very low and would not form a key source population.	Not present
	Populations that are necessary for maintaining genetic diversity	No population of Koala containing notable genetic diversity is recognised within the local area of the proposed action. Additionally, no evidence of this species was detected during baseline flora and fauna assessments (NRC, 2017). Therefore, the disturbance footprint of the proposed action is unlikely to support a population of Koala necessary for maintaining genetic diversity.	Not present
	Populations that are near the limit of the species range	The proposed action occurs within a central portion of the distribution of listed population of the Koala. Therefore, any population occurring within the local or broader area of the proposed action does not occur near the limit of this species range.	Not present
'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:	For activities such as foraging, breeding, roosting, or dispersal	Habitats within the vicinity of the proposed action support a moderate habitat value (Score of 6) for the foraging, breeding, and roosting habitat of the Koala (Table 20). However, as the remnant vegetation unit to be impacted by the proposed action is isolated from other larger contiguous units, it is unlikely that Koalas would utilise this area for dispersal.	Not critical
		Habitat value scores associated with remnant vegetation likely to be impacted by the proposed action are based entirely on habitat suitability, however no relevant records of Koala within the local area occur. Therefore, despite the presence of habitat with a moderate value to Koalas, habitat likely to be impacted by the proposed action is not necessary to the survival of this species within the local or broader area.	
	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)	Despite the presence of habitat with a moderate value to Koalas, no relevant historical records were identified for this species and no evidence of this species was detected during baseline flora and fauna assessments within the disturbance footprint of the proposed action (NRC, 2017). Therefore, the small area of moderate habitat values identified within the disturbance footprint of the proposed action are unlikely to be necessary for the long-term maintenance of the Koala within the local area.	Not critical
	To maintain genetic diversity and long term evolutionary development	As no population of Koala containing notable genetic diversity is recognised within the local area of the proposed action and no evidence of this species was detected during baseline flora and fauna assessments (NRC, 2017) habitat located within the disturbance footprint of the proposed action is not necessary in maintaining genetic diversity and the long-term evolutionary development of the Koala.	Not critical
	For the reintroduction of populations or recovery of the species or ecological community	Remnant habitat within the disturbance footprint of the proposed action occurs as an isolated fragment with limited riparian vegetation corridors to larger contiguous sections of remnant vegetation within the local and broader area. Because of this, connectivity to other populations and suitable habitat within the landscape is limited for the Koala. These limiting factors restrict the immigration, emigration, and genetic flow of this species. The habitat assessment (Table 20) scored 1 for values associated interim recovery objectives as a precautionary approach, but it is unlikely the habitat supports any significant features important for recovery of the species. The proposed clearing would impact upon approximately 5.0% of this large tract of vegetation but no substantial riparian refugia were found within the proposed clearing area. Clearing of this area would not further decrease the quality of the connectivity values or the extent of habitat refuges. Therefore, any habitat that is to be disturbed by the proposed action is not critical for the reintroduction of populations or the recovery of the Koala.	Not critical

Table 22: MNES vulnerable species significant impact criteria, with respect to the Koala

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of an important population of a species	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 21).	No significant impact	N/A
Reduce the area of occupancy of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 21).	No significant impact	N/A
Fragment an existing important population into two or more populations	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 21).	No significant impact	N/A
Adversely affect habitat critical to the survival of a species	Despite the presence of moderate habitat values for the Koala within the disturbance footprint of the proposed action no habitat critical to the survival of this species is likely to be impacted by the proposed action (Table 18). Furthermore, habitat clearing associated with the proposed action would occur on the outer margin of the large remnant unit and would not result in fragmentation or isolation of any habitats. Approximately 165ha of remnant vegetation, as shown on the current regional ecosystem map, is proposed as being impacted which is part of a large tract of similar remnant vegetation comprising approximately 2,330ha, and the proposed impact therefore represents 7% of the total remnant unit. Although there is no known current occurrence of Koalas in the local area, if Koalas are present proposed action will not impact the habitat to the extent that essential life history stages would be compromised within the larger remnant unit.	No significant impact	N/A
Disrupt the breeding cycle of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 21).	No significant impact	N/A
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Despite the presence of moderate habitat values for the Koala within the disturbance footprint of the proposed action will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline (Table 21).	No significant impact	N/A
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	As no evidence of this species was detected within the disturbance footprint of the proposed action during baseline flora and fauna assessments (NRC, 2017) it is unlikely that the establishment of invasive species as a direct result of the proposed action will impact the Koala.	No significant impact	N/A
Introduce disease that may cause the species to decline	Throughout the entirety of the species distribution, with the exception of populations from South Australia and French Island (Victoria), Koalas are impacted by chlamydia. Another disease identified to impact Koalas is the Koala Retrovirus (KoRV) and up to 100% of Koalas in Queensland and New South Wales are identified to have KoRV (SEWPC, 2011).	No significant impact	N/A
	Due to the lack of recent records, there is no information available on disease prevalence for the local area of the proposed action. However, as chlamydia and KoRV is identified to be impact populations of Koala across significant portions of its overall range it is unlikely that the proposed action will introduce further disease that would cause the species to decline within the local or broader area.		
Interfere substantially with the recovery of the species	The habitat assessment (Table 20) scored 1 for values associated interim recovery objectives as a precautionary approach, but it is unlikely the habitat supports any significant features important for recovery of the species. The proposed clearing would impact upon approximately 7% of this large tract of vegetation but no substantial riparian refugia were found within the proposed clearing area. Clearing of this area would not further decrease the quality of the connectivity values or the extent of habitat refuges. Therefore, any habitat that is to be disturbed by the proposed action is not critical for the reintroduction of populations or the recovery of the Koala. The proposed action is therefore unlikely to interfere substantially with the recovery of the Koala.	No significant impact	N/A

6.4 Ornamental Snake

Background information

The Ornamental Snake species is known only from the Brigalow Belt North and parts of the Brigalow Belt South biogeographical regions. The core of the species' distribution occurs within the drainage system of the Fitzroy and Dawson Rivers. The preferred habitat of this species is within, or close to, habitat that is favoured by its prey – frogs. The species is known to prefer woodlands and open forests associated with moist areas, particularly gilgai mounds and depressions, but also lake margins and wetlands (DEE, 2019, and references therein). This otherwise sparsely occurring species is recorded to be easily detectable (DEE, 2019) and occur in high population densities in suitable habitats (Wilson, 2015). One record on the Atlas of Living Australia, is located approximately 20km to the southeast of the study area (ALA, 2019). Additionally, baseline flora and fauna surveys conducted by Saunders Havill Group (SHG, 2011) detected an individual of this species within the broader Wilton EPC, approximately 8km to the northwest of the proposed action. Several threats have been identified for this species and include: habitat loss, fragmentation and degradation, alteration of landscape hydrology in and around gilgai environments, impacts to water guality and sediment pollution, contact with Cane Toads, predation by feral species, and invasive weeds (DEE, 2019). Due to the presence of local records and suitable habitat occurring to the north of the study area there is a moderate likelihood of this species occurring within the study area.

Potentially suitable habitat within the proposed disturbance footprint is marginal for this species, with the project area being characterised by rocky slopes or cleared open pasture. Some heavily degraded areas with very minor gilgai microrelief and minor drainage features are present within the eastern portion of the footprint of the proposed action. Several species of frog – the preferred prey item of the Ornamental Snake – were located around the stock water dam and other water small water bodies with relevance to the proposed action. These areas provide some low-value isolated foraging habitats for this species; however, no individuals were detected during baseline flora and fauna surveys by NRC (NRC, 2017). Given these modified or degraded areas are impacted through agricultural practices they are unlikely to provide critical habitat for the species.

Impact assessment

Table 23: Assessment of the presence of an important population or critical habitat to the Ornamental Snake

DEFINITION		ASSESSMENT	RESULT		
An 'important population' is 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	SHG (2011) detected this species in association with gilgai habitat within remnant Brigalow open forest approximately 8km to the northwest of the proposed action, within the broader Wilton EPC. However, NRC (2017) did not detect any evidence of this species during baseline flora and fauna studies within the disturbance footprint of the proposed action. Records of this species are patchy throughout its modelled distribution (ALA, 2019) and the occurrence of this species is noted to be determined by the presence of prey species (frogs), particularly in woodlands and open forests with moist gilgai areas and wetlands on cracking <i>clay</i> soils (DEE, 2019). Therefore, the occurrence of this species is likely to be highly localised within throughout the distribution of this species. Habitats associated with the proposed action generally do not support significant values for this species; however, no individuals were detected during baseline flora and fauna surveys by NRC (NRC, 2017). All of these potential foraging habitats are located within highly disturbed non-remnant habitats. Given this species has not been observed in habitat associated with the proposed action, and these modified or degraded areas are impacted through agricultural practices, they are unlikely to support a key source population for breeding or dispersal for the Ornamental Snake.			
	Populations that are necessary for maintaining genetic diversity	Given this species has not been observed in habitat associated with the proposed action, and these modified or degraded areas are impacted through agricultural practices, they are unlikely to support a population of Ornamental Snake that is necessary for maintaining genetic diversity.			
	Populations that are near the limit of the species range	The proposed action occurs within the central portion of the modelled distribution of this species.	Not present		
'Habitat critical to the survival of a species or ecological	For activities such as foraging, breeding, roosting, or dispersal	Several habitats have been identified as important habitat for this species within the 'Draft Referral guidelines for the nationally listed Brigalow Belt reptiles' document. These habitats include gilgai depressions and mounds and other suitable habitats serving as connectivity corridors to surrounding gilgai habitats. Vegetation types where suitable habitat for this species may be found include RE 11.4.3, RE 11.4.6, RE 11.4.8, RE 11.4.9, RE 11.3.3, and RE 11.5.16 (DEE, 2019). The habitat that occurs between the record obtained by SHG (2011) and the location of the proposed action are generally not evideble habitate for the operation of the proposed action are generally.			
community refers to areas that are necessary:	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	In the suitable habitat for the of manifestal shake, and do not support the relevant regional ecosystems of gigar incorrective features. As no evidence of Ornamental Snake was detected within the disturbance footprint of the proposed action and no direct connectivity values were identified between the nearest known location of Ornamental Snake it is unlikely that this species would naturally disperse to potentially suitable habitat within the vicinity of the proposed action. Given this species has not been observed in habitat associated with the proposed action, these modified or degraded areas are impacted through agricultural practices and isolated from known habitat areas, they are unlikely to support critical habitat for:			
	For the reintroduction of populations or recovery of the species or ecological community				
		- various life history stages of the Ornamental Snake,			
		- the long-term maintenance of the species,			
		- maintaining genetic diversity and long-term evolutionary development,			
		 reintroduction of populations or the recovery of this species. 			

Table 24: MNES vulnerable species significant impact criteria, with respect to the Ornamental Snake

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of an important population of a species	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 23).	No significant impact	N/A

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Reduce the area of occupancy of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 23).	No significant impact	N/A
Fragment an existing important population into two or more populations	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 23).	No significant impact	N/A
Adversely affect habitat critical to the survival of a species	No evidence of habitat critical to the survival of this species was identified within the disturbance footprint of the proposed action (Table 23).	No significant impact	N/A
Disrupt the breeding cycle of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 23).	No significant impact	N/A
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As no important habitat critical to the survival of this species was identified within the disturbance footprint of the proposed action (Table 23) any impacts to habitat as a result of the proposed action are not likely to impact this species to the extent that it is likely to decline.	No significant impact	N/A
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Several invasive species, including the Cane Toad, were identified during baseline flora and fauna assessments and these species are common and widespread in the region. The proposed action is unlikely to result in changes to invasive species population in such a way that any local Ornamental Snake populations would be impacted. Further, as no evidence of the Ornamental Snake was detected within the disturbance footprint of the proposed action during baseline flora and fauna assessments (NRC, 2017) it is unlikely that the establishment of invasive species as a result of the proposed action will significantly impact the Ornamental Snake.	No significant impact	N/A
Introduce disease that may cause the species to decline	The Ornamental Snake is not known to be impacted by disease. Furthermore, as no evidence of this species was detected within the disturbance footprint of the proposed action the proposed action is not likely to introduce an unknown disease that may cause this species to decline.	No significant impact	N/A
Interfere substantially with the recovery of the species	Habitat associated with the proposed action predominantly comprises non-remnant grassland and woodlands with an absence of preferred habitat for the Ornamental Snake. Furthermore, potentially suitable habitat for this species that may be impacted by the proposed action is broadly represented within the local and broader area. Therefore it is unlikely the proposed action will interfere substantially with the recovery of the Ornamental Snake.	No significant impact	N/A

6.5 Yakka Skink

Background information

This species is found from the Queensland/New South Wales border north to southern Cape York Peninsula (TSSC, 2014a), occurring in a variety of habitat types including woodlands and open forests of Poplar Box, Brigalow, Ironbark, Cypress Pine, Mulga, Bendee, and Lancewood (DEE, 2019). Preferred habitats are areas that contain large logs, tree stumps or rocks under which burrows can be created. This extremely secretive species produces live young and co-inhabits an area in family groups. Family groups may occupy several sites during the year. This species retreats to the communal burrow at the first sign of disturbance, however occupied cavities can be identified by scat piles near the entrance. These scat piles aid in detecting this species within an area in the absence of visual confirmation of individuals.

Several threats have been identified for this species, including: habitat reduction and degradation, predation from feral animals such as cats and foxes, as well as other impacts from rabbits. Additionally, this species exhibits high site-fidelity, low fecundity and are long-lived. The combination of these biological factors makes this species susceptible to potential population crashes or local extinctions given prolonged unfavourable conditions or sudden, large environmental disturbances.

During the baseline flora and fauna study by NRC (NRC, 2017) potentially suitable habitat for this species was identified in remnant vegetation within the western portion of the proposed action disturbance footprint. Potentially suitable habitat was characterised by woodland dominated by Thozet's Box as basally hollowed/fissured sections of trees were commonly observed. In addition to this, large woody debris was observed in some areas, however areas of large rocks were absent. Despite potentially suitable habitat for this species being identified within the vicinity of the proposed action disturbance footprint, no evidence of this distinctive but cryptic species was detected during baseline flora and fauna surveys (NRC, 2017).

Impact assessment

Table 25: Assessment of the presence of an important population or critical habitat to the Yakka Skink

DEFINITION		ASSESSMENT	RESULT			
An 'important population' is 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	As no evidence of this species was detected during baseline flora and fauna studies (NRC, 2017) it is highly unlikely that the disturbance footprint of the proposed action supports a key source population of Yakka Skink for either breeding or dispersal.	Not present			
	Populations that are necessary for maintaining genetic diversity	As no evidence of this species was detected during baseline flora and fauna studies (NRC, 2017) it is highly unlikely that the disturbance footprint of the proposed action supports a population necessary for maintaining genetic diversity.				
	Populations that are near the limit of the species range	The proposed action occurs within the central portion of the central Queensland population of this species. Therefore, any population within the local area does not occur near the limit of the species range.				
'Habitat critical to the survival of a species or ecological	For activities such as foraging, breeding, roosting, or dispersal	The 'Draft Referral guidelines for the nationally listed Brigalow Belt reptiles' identifies important habitat for the	Not critical			
community' refers to areas that are necessary:	For the long-term maintenance of the species or ecological	Yakka Skink as any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified, or any microhabitat were colonies are likely to be found.				
	community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)	Some areas of potential habitat value for the Yakka Skink were detected within the disturbance footprint of the				
	To maintain genetic diversity and long term evolutionary development	proposed action during baseline flora and fauna assessments (NRC, 2017). These areas were characterised by sparse fallen logs in remnant vegetation stands and tree cavities in Thozet's Box (<i>Eucalyptus thozetiana</i>) woodland. However, despite targeted surveys, no evidence of this species was detected during these assessments. The high site-fidelity, low fecundity and long-lived nature of this species results in localised populations being susceptible to potential population crashes or local extinctions given prolonged unfavourable conditions or sudden large environmental disturbances.				
		Given this species has not been detected during the field survey programs and the disturbance to remnant habitat with suitable habitat values to this species is restricted to a relatively small area on the margin of a large remnant unit, it is unlikely the habitat associated with the proposed action is critical Yakka Skink habitat for:				
		- activities such as foraging, breeding, roosting, or dispersal,				
		- the long-term maintenance of the Yakka Skink,				
		- maintaining genetic diversity and the long-term evolutionary development of the Yakka Skink.				
	For the reintroduction of populations or recovery of the species or ecological community	Remnant habitat within the disturbance footprint of the proposed action occurs as an isolated fragment from larger contiguous sections of remnant vegetation within the local and broader area. Because of this, connectivity to other populations and suitable habitat within the landscape is limited for the Yakka Skink. These limiting factors restrict the immigration, emigration, and genetic flow of this species and also compounds intraspecific impacts associated with the life history traits of this species. Therefore, any habitat that is to be disturbed by the proposed action is not critical for the reintroduction of populations or the recovery of the Yakka Skink.				

Table 26: MNES vulnerable species significant impact criteria, with respect to the Yakka Skink

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Lead to a long-term decrease in the size of an important population of a species	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 25).	No significant impact	N/A
Reduce the area of occupancy of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 25).	No significant impact	N/A

IMPACT CRITERA	IMPACT ASSESSMENT	RESULT	MANAGEMENT STRATEGIES
Fragment an existing important population into two or more populations	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 25).	No significant impact	N/A
Adversely affect habitat critical to the survival of a species	No evidence of habitat critical to the survival of this species and no evidence of a local colony was identified within the disturbance footprint of the proposed action (Table 25). It is therefore unlikely there will be significant impact to habitat critical to the survival of this species.	No significant impact	N/A
Disrupt the breeding cycle of an important population	No evidence of an important population of this species was identified within the disturbance footprint of the proposed action (Table 25).	No significant impact	N/A
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	As no important habitat critical to the survival of this species was identified within the disturbance footprint of the proposed action (Table 25) any impacts to habitat as a result of the proposed action are not likely to impact this species to the extent that it is likely to decline.	No significant impact	N/A
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species identified to be a threat to the Yakka Skink include feral cats and foxes and rabbits. These invasive species are common and widespread throughout the surrounding region. As no evidence of the Yakka Skink was detected during baseline flora and fauna assessments (NRC, 2017), and these invasive species are common throughout the surrounding region, it is unlikely that the proposed action will directly result in invasive species impacts to the Yakka Skink.	No significant impact	N/A
Introduce disease that may cause the species to decline	There are currently no diseases identified that are likely to cause this species to decline. Therefore, it is unlikely that the proposed action will introduce disease that may cause the species to decline.	No significant impact	N/A
Interfere substantially with the recovery of the species	Remnant habitat within the disturbance footprint of the proposed action occurs as an isolated fragment from larger contiguous sections of remnant vegetation within the local and broader area. Because of this, connectivity to other populations and suitable habitat within the landscape is limited for the Yakka Skink. These limiting factors restrict the immigration, emigration, and genetic flow of this species and also compounds intraspecific impacts associated with the life history traits of this species. Therefore, it is unlikely disturbance to the habitats associated with the proposed action will interfere substantially with the recovery of the species.	No significant impact	N/A

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Appendix summary

Appendix A	Mapping
Appendix B	EPBC Act Protected Matters Report
Appendix C	Wildlife Online Database Extract
Appendix D	Potential Occurrence of EVNT Species

Appendix A

Mapping

Appendix B

EPBC Act Protected Matters Report

Appendix C

Wildlife Online Database Extract

Appendix D

Potential Occurrence of EVNT Species

STA	ATUS ¹	FAMILY	SCIENTIFIC NAME	COMMON NAME	SOURCE ²	wo	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC					RECORD S	
LC	V	Myrtaceae	Eucalyptus raveretiana	Black Ironbox	РМ	0	Low – This species has a wide distribution in coastal and sub-coastal areas Rockhampton and areas 100km west of the city. It has been recorded from a Nebo to Ayr and Aps Creek to Rockhampton. The majority of sites are on ro also present in both state forests and national parks. This species usually gr open woodland. Soil varies from sand through to heavy clay. Black Ironbox of other species (DEE 2019, and references therein). The nearest records of the the study area. Due to the lack of local records it is considered a low likeliho
V	E	Poaceae	Dichanthium queenslandicum	King Blue-grass	PM/WO	4	High – This species has been recorded numerously to the immediate west of southern Queensland where it occurs in three disjunct populations: 1) Hugh Clermont and Rolleston; and 3) Dalby district, Darling Downs. It has been re extent of occurrence has reduced significantly. Its area of occupancy is unkr restricted. The main identified threats to this species are habitat loss through other infrastructure developments, and weed invasion resulting in competition references therein). Given the presence of local records within 30km of the soccur within the study area.
LC	V	Poaceae	Dichanthium setosum	Bluegrass	РМ	0	Low – The nearest records of this species occur approximately 100km to the perennial, and commences growing in spring, flowers in summer and becom basaltic black soils and red-brown loams with clay subsoil. It is often found in grassy roadside remnants and highly disturbed pasture. It is often collected tablelands, where the habitat has been variously grazed, nutrient-enriched a from disturbance; otherwise, disturbance is indicative of threatening process to the lack of local records and patchy distribution of this species it is considered.
V	V	Surianaceae	Cadellia pentastylis	Ooline	PM/WO	1	Low – This species occurs on the northwest slopes of New South Wales and Ooline occurs from Balcomba south to the New South Wales border and we vine thickets and sclerophyll vegetation on undulating terrain of varying geol (DEE 2019, and references therein). Given the spatial uncertainty (11600m) area, and the nearest other records occurring approximately 100km to the e species to occur within the study area.

Table D1: Potential of Near Threatened and Threatened Flora identified in Protected Matters Search Tool (PMST) and Queensland Government Wildlife Online (WO) searches to occur within the study area

1. Status: LC = Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered.

2. WO = Queensland Government Wildlife Online Database Extract, PM = EPBC Act Protected Matters Report.

of Queensland, from south of Townsville to Nebo, around about 23 sites throughout its range, in two main areas: badsides, freehold land and leasehold land. However, it is rows along watercourses, and sometimes on river flats or does not occur in pure stands, but is co-dominant with he species occur in an area approximately 180km east of bod that this species occurs within the study area.

of the study area. This species is endemic to central and enden district; 2) from Nebo to Monto and west to ecorded to occur within the Brigalow Belt, however its nown, but based on the extent of occurrence is likely to be h agricultural and mining activities, road construction and on and potential displacement (TSSC 2013, and study area there is a high likelihood for this species to

e south of the study area. This species is a warm season nes dormant in late autumn. It is associated with heavy n moderately disturbed areas such as cleared woodland, from disturbed open grassy woodlands on the northern and water-enriched. This species may tolerate or benefit ses in its habitat (DEE 2019, and references therein). Due lered a low likelihood for this species to occur within the

d in central and southern Queensland. In Queensland, est to near Blackalll. This species grows in semi-evergreen logy; including sandstone, conglomerate and claystone) of the local record, occurring to the south of the study east of the study area there is a low likelihood for this

STA	ATUS ¹	FAMILY	SCIENTIFIC NAME	COMMON NAME	SOURCE ²	WO	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC					RECORDS	
		BIRDS					
E	V	Accipitridae	Erythrotriorchis radiatus	Red Goshawk	PM/WO	1	Moderate – There is one record of a Red Goshawk within 30km of the study mosaic of vegetation types, particularly near riverine systems and permane (DoE 2019, and references therein). The home range in northern Australia may be even larger (Aumann & Baker-Gabb, 1991). Given the large home local record (64000m), this species has a moderate likelihood of occurring
V	V	Columbidae	Geophaps scripta scripta	Squatter Pigeon	PM/WO	4	High – There are four local records of this species within 30km of the study from the Burdekin-Lynd divide to south-east Queensland, south-west to Stathe western slopes of the Great Dividing Range to the area around Glenn In Bellata, and north-westwards through Goondiwindi and the Brigalow Belt in occurs in are generally defined as open-forests to sparse, open-woodlands <i>Eucalyptus, Corymbia, Acacia</i> or <i>Callitris</i> species (DEE, 2019, and reference habitat within the study area results in a high likelihood of this species to open-
E	E	Estrildidae	Neochmia ruficauda ruficauda	Star Finch	РМ	0	Low – This species occurs only in central Queensland and the overall distristication of the species is believed to extensive the term of t
E	E	Estrildidae	Poephila cincta cincta	Southern Black-throated Finch	РМ	0	Low – This species occurs mainly in grassy, open woodlands and forests, the <i>Melaleuca</i> , and occasionally in tussock grasslands or other habitats, often a (DEE, 2019, and references therein). This species has a limited distribution Charters Towers in central eastern Queensland (DEE, 2019). Due to the limit within the study area it has a low likelihood of occurring.
V	V	Meliphagidae	Grantiella picta	Painted Honeyeater	РМ	0	Low - This species is sparsely distributed from south-eastern Australia to no The greatest concentrations and almost all records of breeding come from a Grampians, Victoria and Roma, Queensland. This species exhibits seasona fruiting of mistletoe. Many birds move after breeding to semi-arid regions su Queensland, and central Northern Territory (DEE 2019). The nearest record of the study area. Due to the absence of local records and the study area fr that this species occurs within the study area.
V	Ε, Μ	Rostratulidae	Rostratula australis	Australian Painted Snipe	РМ	0	Low - This species has been recorded at wetland sites throughout much of Australian Painted Snipe is a distinct species, but its cryptic and crepuscula typically occurs in shallow freshwater wetlands and other permanently or te tussocks of grasses, sedges, rushes or reeds are present (DEE, 2019, Mor distribution for this species, however limited suitable foraging habitat and no this species occurring within the study area.
LC	CE, M	Scolopacidae	Calidris ferruginea	Curlew Sandpiper	PM	0	Low - This species typically inhabits intertidal mudflats in sheltered coastal ephemeral and permanent lakes, dams, waterholes and bore drains as well are no records of this species within 30km of the study area and the neares considered that this species is unlikely to occur within the study area, as the study area.

Table D2: Potential of Near Threatened and Threatened Fauna identified in Protected Matters Search Tool (PMST) and Queensland Government Wildlife Online (WO) searches to occur within the study area

ly area. This species prefers forest and woodland with a ent water, where there is an abundance of prey species has been reported as up to 200km²; with indications it range of this species and the spatial uncertainty of the within the site.

area. The distribution of this species extends southwards anthorpe, near the Queensland-NSW border, south along nnes, NSW, west through the Gwydr River region to Queensland to Charleville. Habitats that this species and scrub that are mostly dominated in the overstorey by ces therein). The presence of local records and suitable ccur within the study area.

ibution of this species is very poorly known. Based on the nd north to Bowen, west to beyond Winton and, based on ends farther north to Mount Surprise and the Cloncurry-Mt N. r. subclarescens. This species occurs mainly in water. It also occurs in cleared or suburban areas such as the lack of local records and the nearest record occurring within the study area.

typically dominated by *Eucalyptus, Corymbia* and along or near watercourses, or in the vicinity of water and is currently only found between Ingham and mited distribution and no records of this species occurring

orth-western Queensland and eastern Northern Territory. inland slopes of the Great Dividing Range between the al north-south movements governed principally by the uch as north-eastern South Australia, central and western rd of this species is approximately 80km to the southeast ringing the edge of this species distribution it is unlikely

Australia, but is most common in the eastern States. The ar behaviour can make it difficult to detect. This species emporarily inundated areas, particularly where rank rcombe, 2003). The study area is located within the known o local records of this species results in a low likelihood of

areas, however have also been recorded inland around l as around floodplains (Higgins & Davies, 1996). There st being at Lake Maraboon, south of Emerald. It is ere is limited suitable habitat for this species within the

STA	TUS ¹	FAMILY	SCIENTIFIC NAME	COMMON NAME	SOURCE ²	WO	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC					RECORDS	
		MAMMALS					
LC	E	Dasyuridae	Dasyurus hallucatus	Northern Quoll	РМ	0	Moderate – Historically common across northern Australia, occurring almost near Brisbane, Queensland, the Northern Quoll now occurs in five regional and Western Australia. In Qld, this species is known to occur as far south a far north as Weipa and extends west to the vicinity of Carnarvon Range Na and surveys indicate severe reductions from the species' former distribution range, including rocky areas, forests, woodlands, rainforests, sandy lowlan 2019, and references therein). The nearest record of this species is approx area being within the species known distribution, and scattered records are within the study area is moderate.
E	E	Macropodidae	Onychogalea fraenata	Bridled Nailtail Wallaby	WO	1	Low - This species is confined to Taunton National Park near Dingo. This s preferring areas with the most fertile soil (DEE 2019, and references therei 1845 with a spatial uncertainty of 1.8km. As the study area is situated outs recent local records are available it is unlikely this species occurs within thi
V	V	Megadermatidae	Macroderma gigas	Ghost Bat	РМ	0	Low - This species has a patchy distribution through rainforest, deciduous grasslands. It has been recorded to roost in caves, boulder piles, shallow e unsuitable roosting habitat within the study area and the nearest recording considered unlikely that this species occurs within the study area.
V	V	Phascolarctidae	Phascolarctos cinereus	Koala	PM/WO	9	Moderate – This species range includes the eastern half of Queensland in 2011). While being widespread, suitable feed species and leaf moisture are 2019). Numerous records of this species occur within 30km of the study are there are no recent records of this species within the surrounding region ar moderate likelihood that this species occurs in the study area.
LC	V	Pseudocheiridae	Petauroides volans	Greater Glider	РМ	0	Low - This species occurs in eastern Australian states from Cairns to Victo coast to tall forests in the ranges and low woodlands west of the Great Divior of this species within 30km of the study site and the nearest records are wi away from the study area. Due to the lack of local records it is unlikely this
LC	V	Pteropodidae	Pteropus poliocephalus	Grey-headed Flying-fox	РМ	0	Low - This species occurs in the coastal belt from Rockhampton in central small proportion of this range is used at any one time, as the species select patterns of occurrence and relative abundance within its distribution vary w requires foraging resources and roosting sites. It is a canopy-feeding frugiv communities including rainforests, open forests, closed and open woodland 2019, and references therein). Due to there being no local records of this s to the east of the study area, and this species varied distribution it is unlike
V	V	Vespertilionidae	Chalinolobus dwyeri	Large-eared Pied Bat	РМ	0	Low – This species is poorly known. There are records from Shoalwater Ba 2019). The majority of records of this species are known from sandstone en habitat around Blackdown Tablelands and Carnarvon National Park. There sandstone escarpments and associated dense woodland are known high of of this species near the study area and no high quality habitat is known from likelihood that this species occurs within the study area.

est continuously from the Pilbara, Western Australia, to al populations across Queensland, the Northern Territory as Gracemere and Mt Morgan, south of Rockhampton, as ational Park. This species is highly fragmented in the state on. This species occupies a diversity of habitats across its nds and beaches, shrubland, grasslands and desert (DEE ximately 90km west of the study area. Due to the study ound the study area, likelihood of this species occurring

species occurs in woodland, particularly in Brigalow scrub, in). The one local record of this species was recorded in side of the confined distribution for this species and no is study area.

vine thicket, open woodland, spinifex, black soil and escarpments and mines (Van Dyck *et al.* 2013). Due to being approximately 170km east of the study area it is

sclerophyll forest and woodland (Menkhorst & Knight, e the primary determinants of habitat suitability (DEE, rea, however these records are all at least 30 years old. As nd habitat for this species is fragmented there is a

bria, inhabiting Eucalypt-dominated low open forests on the riding Range (Van Dyck *et al.*, 2013). There are no records ithin the Blackdown Tableland National Park, over 70km species occurs within the study area.

Queensland to Melbourne in Victoria, however only a ctively forages where food is available. As a result, videly between seasons and between years. This species vore and nectarivore, which utilises vegetation ds, *Melaleuca* swamps and *Banksia* woodlands (DEE, species and the nearest record being approximately 200km ely this species occurs within the study area.

ay, QLD south to the vicinity of Ulladulla in NSW (DEE, escarpments in NSW with some records from similar e are no known maternity sites in QLD but areas with large quality habitat for this species. There are no local records im the study area or in the local area. There is low

STA	TUS ¹	FAMILY	SCIENTIFIC NAME	COMMON NAME	SOURCE ²	wo	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC					RECORDS	
V	V	Vespertilionidae	Nyctophilus corbeni	Corben's Long-eared Bat	РМ	0	Low – This species is found in southern central Queensland, central wester South Australia, where it is patchily distributed, with most of its range in the this distribution and is rarely recorded, except in some areas including the South Wale and Queensland. It is found in a wide range of inland woodland common in box/ironbark/cypress pine vegetation that occurs in a north-sour Wales and southern Queensland. This species is more abundant in extens woodland patches, suggesting its home range is probably large (TSSC, 20 on the northern edge of this species distribution, with the nearest record be records, it is unlikely this species occurs within the study area.
		REPTILES					
E	CE	Chelidae	Elseya albagula	Southern Snapping Turtle	PM/WO	2	Low – This species is found only in Queensland in the Fitzroy, Mary and Bo southeastern Queensland (TSSC, 2014b). This species has been recorded study area. Due to there being no permanent waterways within the study a
V	V	Chelidae	Rheodytes leukops	Fitzroy River Turtle	PM/WO	7	Low – This species is only found in the drainage system of the Fitzroy River Glenroy Crossing, Theodore, Baralba, the Mackenzie River, the Connors F species is found in rivers with large deep pools with rocks, gravelly or sand have high water clarity, and are often associated with Ribbonweed beds (D this species occur within 30km of the study area, however the spatial uncer approximately 10km. Due to there being no permanent waterways within the
V	V	Elapidae	Denisonia maculata	Ornamental Snake	РМ	0	Moderate - The species is known only from the Brigalow Belt North and pa The core of the species' distribution occurs within the drainage system of th this species is within, or close to, habitat that is favoured by its prey – frogs forests associated with moist areas, particularly gilgai mounds and depress references therein). This species was recorded at a trap site in the northwe surveys by Saunders Havill in 2011. It was found to be associated with gilg harpophylla open-forest (RE 11.5.16). The species has not been recorded on the Atlas of Living Australia is located to approximately 20km to the sou potentially suitable habitat occurring to the north of the study area there is a study area.
V	V	Elapidae	Furina dunmalli	Dunmall's Snake	РМ	0	Low - This species occurs primarily in the Brigalow Belt region in the south elevations between 200-500m asl. The snake is very rare or secretive with broad range of habitats, including; Forests and woodlands on black alluvial other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, and woodland association on sandstone derived soils (DEE, 2019). Due to nearest record being approximately 120km away there is a low likelihood to
V	V	Pygopodidae	Delma torquata	Collared Delma	РМ	0	Low – This species has been recorded within the Bunya Mountains, Black Creek near Millmerran, and in the Toowoomba Range. This species norma forests in Queensland (DEE 2019, and references therein). One record of t situated approximately 75km from the study area. Due to the lack of local r to occur within the study area.

ern New South Wales, north-western Victoria and eastern e Murray Darling Basin. This species is uncommon within Nandewar and Brigalow Belt South bioregions in New ad vegetation types, but in Queensland is distinctly more uth belt along the western slopes and plains of New South sive stands of vegetation in comparison to smaller 015b, and references therein). The study area is situated eing over 200km away. Because of the lack of local

ournett Rivers, and associated smaller drainages in d in permanent waterways to the south and east of the area, a requirement for this species, it is unlikely to occur.

er, Queensland. Known sites include Coolburra, Gainsford, River, Duaringa, Marlborough Creek, and Gogango. This dy substrates, connected by shallow riffles. Preferred areas DEE 2019, and references therein). Numerous records of ertainty of these records is very high, with most being he study area it is unlikely to occur.

arts of the Brigalow Belt South biogeographical regions. the Fitzroy and Dawson Rivers. The preferred habitat of s. The species is known to prefer woodlands and open sions, but also lake margins and wetlands (DEE 2019, and est of the Wilton North mine lease during the baseline gais in an isolated patch of remnant Brigalow Acacia within the study area for the current survey. One record utheast of the study area. Due to these local records and a moderate likelihood of this species occurring within the

n-eastern interior of Queensland. Records indicate sites at limited records existing. This species has been found in a l cracking clay and clay loams dominated by Brigalow, Ironbark, White Cypress Pine and Bull-oak open forest there being no local records of this species and the his species occurs within the study area.

down Tablelands, Expedition National Park, Western ally inhabits eucalypt-dominated woodlands and openthis species occurs within the Blackdown tableland, records and patchy distribution of this species it is unlikely

STA	TUS ¹	FAMILY	SCIENTIFIC NAME	COMMON NAME	SOURCE ²	wo	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC					RECORDS	
V	V	Scincidae	Egernia rugosa	Yakka Skink	PM/WO	1	High – The known distribution of this species extends from the coast to the This vast area covers portions of the Brigalow Belt, Mulga Lands, South-ea Cape York Peninsula biogeographical regions. This species is known to occ The core habitat of this species is within the mulga lands and Brigalow Belt under and between partly buried rocks, logs or tree stumps, root cavities ar refuge in large hollow logs and has been known to excavate deep burrow s cleared habitat, this species can persist where there are shelter sites such a and rabbit warrens (DEE 2019, and references therein). The local record of study area. In general, records of the species are sparse and scattered, how close proximity to the study area and with suitable habitat occurring through
E	E	Scincidae	Lerista allanae	Retro Slider	PM	0	Low – The range of this species is believed to occur within the Clermont are black soil downs of the Oxford land system in the Brigalow Belt North Bioge records and restricted nature of this species distribution it is unlikely to occu
			FISH				
LC	V	Percichthyidae	Maccullochella peelii	Murray Cod	РМ	0	Low – This species naturally occurs in the Murray-Darling Basin from south species has been introduced to the Burnett and Fitzroy River systems in QL clear rocky streams to turbid lowland rivers and billabongs. Preferred habitat snags, large rocks, overhanging stream banks, vegetation and woody debri <i>camaldulensis</i> woodlands forms complex habitat for this species. There are is found within the study are for this species. This species has a low likelihood to the study are for this species.

1. Status: LC = Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory.

2. WO = Queensland Government Wildlife Online Database Extract, PM = EPBC Act Protected Matters Report.

e hinterland of sub-humid to semi-arid eastern Queensland. ast Queensland, Einasleigh Uplands, Wet Tropics and ccur in open dry sclerophyll forest, woodland and scrub. t South bioregions. It is more commonly found in cavities nd abandoned animal burrows. This species often takes systems, sometimes under dense ground vegetation. In as raked log piles, deep gullies, tunnel erosion/sinkholes of this species is approximately 30km to the east of the owever due to it being recorded to occur within relatively hout the area it has a high likelihood of occurring.

rea in eastern Central Queensland. It is known only from eographic Region (DEE 2019). Due to the lack of local our within the study area.

hern Queensland south through NSW (DEE, 2019). This QLD. The Murray Cod uses a diverse range of habitats from at consists of complex structural features in streams like ris. In particular, riparian vegetation like *Eucalyptus* e no local records of this species in the are and no habitat ood of occurring on site.

STATUS ¹		FAMILY	SCIENTIFIC NAME		SOURCE ²	WO RECORDS	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC						
		BIRDS					
SLC	М	Accipitridae	Pandion cristatus	Eastern Osprey	РМ	0	Low - Found on the coasts, interior, and many offshore islands of Aust terrestrial wetlands of tropical and temperate Australia. This species m distribution (DEE 2019). A lack of local records and suitable habitat ma area.
LC	М	Apodidae	Apus pacificus	Fork-tailed Swift	РМ	0	Low – this species is a non-breeding visitor to all states and territories the Gulf Country, and a few records on Cape York Peninsula (DEE, 20 of the Great Divide from near Cooktown and south to Townsville. They south-eastern region of Queensland. They are more widespread west line joining Chinchilla and Hughenden. In Australia, they mostly occur coastal areas. They often occur over cliffs and beaches and also occur local records within 30km of the study area with only scattered records nature of this species it is unlikely to occur within the study area or utili
SLC	М	Cuculidae	Cuculus optatus	Oriental Cuckoo	РМ	0	Low - This species is widespread in the northern and eastern parts of vine scrubs, riverine thickets, wetter, densely canopied eucalypt forest Due to the habitat requirements of this species not being met within the 100km away it is unlikely this species occurs within the study area.
SLC	М	Monarchidae	Monarcha melanopsis	Black-faced Monarch	РМ	0	Low – This species is widespread in eastern Australia in a variety of ra drier habitats, especially during winter or during passage. There are no study area and the study area is on the periphery of the known distribut of this species occurring within the study area.
SLC	М	Monarchidae	Myiagra cyanoleuca	Satin Flycatcher	PM	1	Low – This species occurs across Australia and inhabits temperate for (Morcombe, 2003). There are no records of this species occurring with area is of low suitability for this species. It is considered a low likelihoo
SLC	М	Motacillidae	Motacilla flava	Yellow Wagtail	PM	0	Low – This species is a rare but regular migrant to coastal areas withir water, and occasionally on drier inland plains (Morcombe, 2003). Due habitat requirements within the study site being suboptimal it is unlikely
SLC	CE, M	Scolopacidae	Calidris ferruginea	Curlew Sandpiper	РМ	0	Low - This species typically inhabits intertidal mudflats in sheltered coar around ephemeral and permanent lakes, dams, waterholes and bore of 1996). There are no records of this species within 30km of the study a Emerald. It is considered that this species is unlikely to occur within the species within the study area.
SLC	М	Scolopacidae	Gallinago hardwickii	Latham's Snipe	РМ	3	Moderate - This species is distributed along the east coast of Australia Australia. Occurs in permanent and ephemeral wetlands with low to de 2019). This species is known to occur close to humans and human act study area on three occasions and ephemeral wetlands have been rec moderate likelihood of this species occurring within the study area.
SLC	М	Scolopacidae	Actitis hypoleucos	Common Sandpiper	PM	0	Low – This species is found along coastlines of Australia and in inland foreshore and South-eastern Gulf of Carpentaria (DEE, 2019). This sp salinity around muddy margins or rocky shores. There are no local rec suitable habitat is found for this species within the study area. It is a low area.

Table D3: Potential for terrestrial migratory fauna identified in Protected Matters Search Tool (PMST) and Queensland Government Wildlife Online (WO) searches to occur within the study area

tralia. This species occurs in coastal habitats and nay travel inland along major rivers in its northern ake it unlikely that this species occurs within the study

of Australia. There are scattered records of this species in 019). In the north-east region, there are many records east are also widespread but scattered in coastal areas in the of the Great Divide and are commonly found west of the over inland plains but sometimes over foothills or in r islands and sometimes well out to sea. There are no s throughout the surrounding landscape. Due to the aerial ize the area for an extended period of time.

Australia, inhabiting rainforest margins, monsoon forest, s, paperbark swamps and mangroves (Morcombe, 2003). e study area, and the nearest local record being over

ainforest ecosystems (DEE 2019), but can also occur in o local records of this species occurring within 30km of the ution for this species. As a result, there is a low likelihood

rests and subtropical and tropical moist lowland forests nin 30km of the study site and the habitat within the study d that this species could occur in the study area.

Australia. It typically inhabits open habitats, often near to sporadic and scattered occurrences of this species and y to occur.

astal areas, however have also been recorded inland drains as well as around floodplains (Higgins & Davies, rea and the nearest being at Lake Maraboon, south of e study area, as there is limited suitable habitat for this

a from Cape York Peninsula south to south eastern ense vegetation up to 2000 m above sea-level (DEE, tivity. This species has been recorded within 30km of the corded north of the study area. As a result, there is a

areas. In Queensland areas of importance include Cairns becies typically inhabits wetlands with varying levels of ords of this species in the local or broader area. No w likelihood that this species would occur within the study

STATUS ¹		FAMILY	SCIENTIFIC NAME	COMMON NAME	SOURCE ²	WO RECORDS	POTENTIAL TO OCCUR IN THE STUDY AREA
NCA	EPBC						
SLC	Μ	Scolopacidae	Calidris acuminata	Sharp-tailed Sandpiper	РМ	0	Low – This species is found flying over the majority of Australia with sig (DEE, 2019). The study area is within the may occur distribution of this species prefers muddy edges of shallow fresh or brackish wetlands with preferred habitat is present within the study and this species has a low
SLC	М	Scolopacidae	Calidris melanotos	Pectoral Sandpiper	РМ	0	Low – In Queensland most records of this species are from Cairns (DE of records occurring to the east of the great diving range. This species but occasionally inland. There are no records of this species in the loca any high-quality habitat for this species. This species has a low likelihood of the species has a low

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ignificant populations found in NT, NSW, WA and SA s species but there are few records in the local area. This ith sedges, grass, saltmarsh or other low vegetation. No v likelihood of occurring within the study area.

EE, 2019). There are few records inland with the majority s prefers shallow fresh to saline wetlands near the coast cal or broader area and the study area does not contain ood of occurring within the study area.