

Isaac Downs – MNES Significant Species Management Plan

Stanmore IP South Pty Ltd



BASE/

Client

Stanmore IP South

Reference

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Glossary

Term	Definition
Action Area	This area is the Project area of the proposed action that is referred to in the Isaac Downs Project environmental impact statement (EIS) and amended EIS (AEIS). The Action Area is the same as the Project area.
Threatened Species	Prescribed to a threatened species under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).
EPBC Act conservation status	The EPBC Act lists threatened species in a range of categories including: Extinct in the wild: - Only known to survive in cultivation, in captivity or as a naturalised population well outside its past range; or - Not recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a timeframe appropriate to its life cycle and form. Critically Endangered: - It is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria. Endangered: - It is not critically endangered; and it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria. Vulnerable: - It is not critically endangered or endangered; and - It is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Project Area	The area defined on Figure 1 and Figure 2.
Disturbance Area	The areas shown on Figures 2-7.
Regional ecosystem	A vegetation community within a bioregion that is consistently associated with a particular combination of geology, landform and soils. Prescribed to regional ecosystems listed under the Queensland <i>Vegetation Management Act 1999</i> .
Regulated vegetation	Vegetation regulated through Queensland's <i>Planning Act 2016</i> and <i>Vegetation Management Act 1999</i> .
Remnant vegetation	Defined under the Queensland <i>Vegetation Management Act 1999</i> as, woody vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70 % of the height and >50 % of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.
Significant species and vegetation	Refers to: Species listed as Critically Endangered, Endangered or Vulnerable under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Threatened ecological community listed as Critically Endangered, Endangered or Vulnerable under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Regional ecosystems with an Endangered or Of Concern biodiversity status or <i>Vegetation Management Act 1999</i> status.
Threatened ecological community	A community listed under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .

Term	Definition
Vegetation Management Act status	This is a statutory classification under the Queensland <i>Vegetation Management Act 1999</i>. A regional ecosystem is listed as 'endangered' if: Remnant vegetation for the regional ecosystem is less than 10 % of its pre-clearing extent across the bioregion; or 10-30 % of its pre- clearing extent remains and the remnant vegetation for the regional ecosystem is less than 10,000 ha. A regional ecosystem is listed as 'of concern' if: Remnant vegetation for the regional ecosystem is 10-30 % of its pre- clearing extent across the bioregion; or more than 30 % of its pre- clearing extent remains and the remnant vegetation extent for the regional ecosystem is less than 10,000 ha. A regional ecosystem is listed 'least concern' if: Remnant vegetation for the regional ecosystem is over 30 % of its pre-clearing extent across the bioregion, and the remnant vegetation area for the regional ecosystem is greater than 10,000 ha.

1.0 Introduction

Base Consulting Group (Base) was commissioned by Stanmore IP South Pty Ltd (IP South), a wholly owned subsidiary of Stanmore Coal Ltd (Stanmore) to prepare this Significant Species Management Plan (SSMP) for potential impacts to listed Commonwealth fauna species from operations at the proposed Isaac Downs (ID) Project (the Project). This SSMP has been prepared to support a referral for the project under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). DAWE notified Stanmore that the ID would be a controlled action and assessed via the bilateral agreement with Queensland on 14 May 2019 (EPBC: 2019/8413).

Stanmore IP Coal Pty Ltd (IP Coal), a separate subsidiary of Stanmore, operates the Isaac Plains Mine (IPM) (Refer to Figure 1 and Figure 2) on granted mining lease (ML) 70342, ML 700016, ML 700017, ML 700018 and ML 700019, subject to an existing environmental authority (EA). These mining leases encompass the Isaac Plains Est (IPE) and Isaac Plains East Extension (IPEE) mining areas, and are located immediately to the north of ID.

As part of the Stanmore's existing IPE and IPEE projects and to address the Commonwealth's requirements, Significant Species Management Plans (SSMPs) were developed and approved. This ID SSMP has been developed as supporting information for the ID approval and to address the expectation that if approved, a SSMP would be required.

1.1 Background

The Project is located approximately 10 km south-east of Moranbah township in central Queensland (refer to Figure 1). ML applications 700046, 700047 and 700048 have been made for the Project. The Project MLs and EA will extend over parts of MDL 137, EPC 755, EPC 728 and EPC 548 and the Project area is shown on Figure 2.

The Project involves the following components:

- Open cut metallurgical coal mine;
- In-pit and out of pit spoil dumps;
- Flood protection levee;
- Mine infrastructure area (MIA);
- Water management infrastructure including mine water dam, sediment dams and clean water diversion;
- Access road from the Peak Downs Highway;
- Linear infrastructure corridors to connect the Project to the existing Isaac Plains Mine on ML 70342 (See Figure 2 and Figure 3) with a ROM coal haul road, power supply and water pipelines (linear infrastructure); and
- Use of existing Isaac Plains Mine CHPP, tailings management systems, and train load out facility.

1.2 Purpose

During the planning stage for the ID, site ecological investigations indicated that the Project has potential to impact on Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

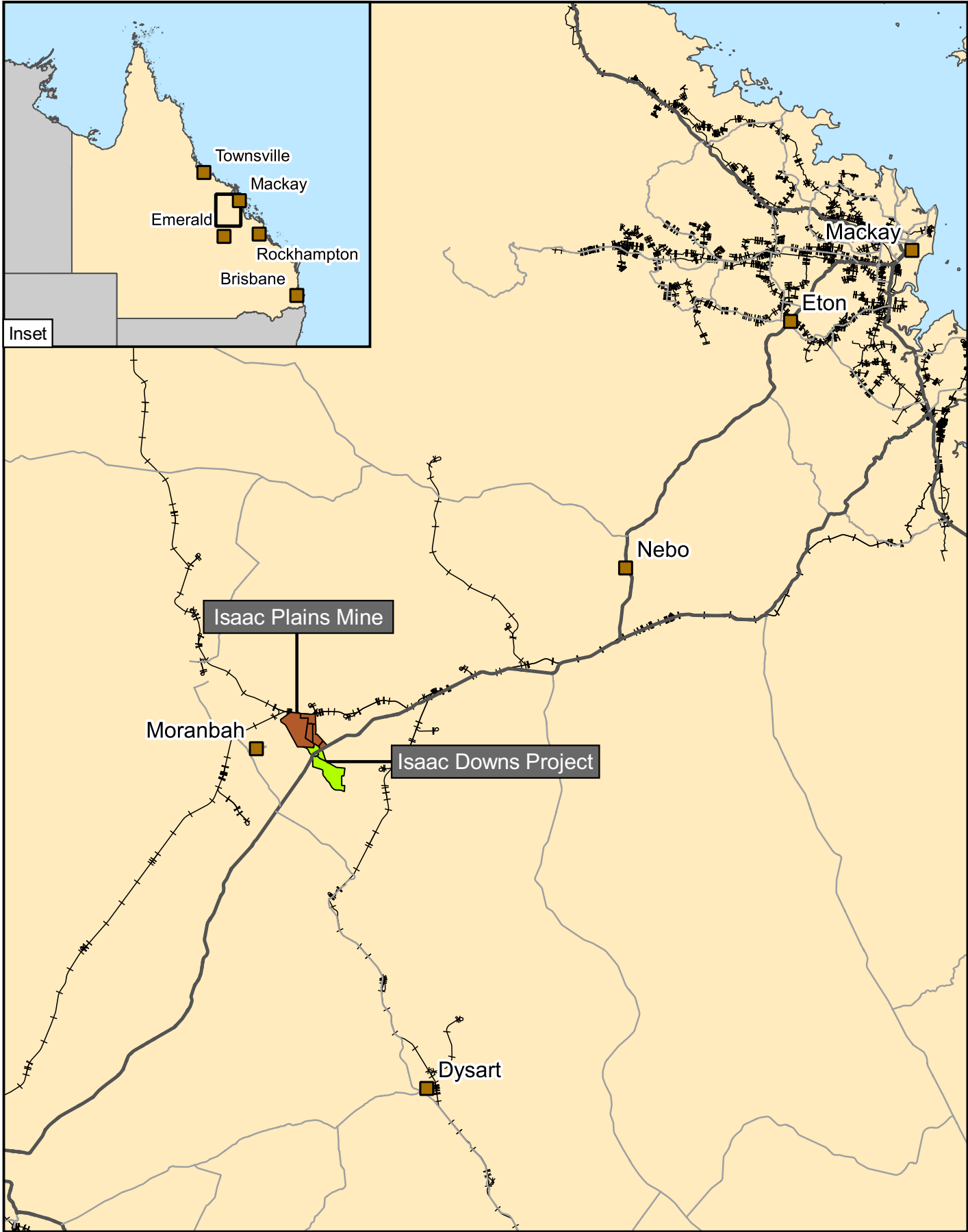
For the ID, Stanmore is required to provide appropriate management of the EPBC Act listed species within the Project area. Listed MNES identified as being present within the ID study area and for which this SSMP applies are shown in Table 1, along with the quantum of suitable habitat for each species that is proposed to be disturbed within the ID footprint.

Table 1: Disturbance areas for MNES identified as occurring within the ID footprint

MNES	EPBC Act status	Proposed disturbance area (ha)
Koala (<i>Phascolarctos cinereus</i>)	Vulnerable	131.9
Greater Glider (<i>Petauroides volans</i>)	Vulnerable	120.9
Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>)	Vulnerable	66.6 (breeding) 55.5 (foraging) 107.6 (dispersal)
Ornamental Snake (<i>Denisonia maculata</i>)	Vulnerable	173.5

This SSMP presents the management objectives and measures that are to be implemented within the Project footprint for species management and to minimise impacts to current biodiversity values of the site. As ID is immediately adjacent to the existing IPM, the MNES impacted are the same as those impacted by the previous IPM projects. Therefore, the previously approved SSMPs have been used as a basis for this SSMP and expanded on where relevant and necessary.

Although the ID Project has yet to be approved, this SSMP has been developed to support the approval process for the Project.



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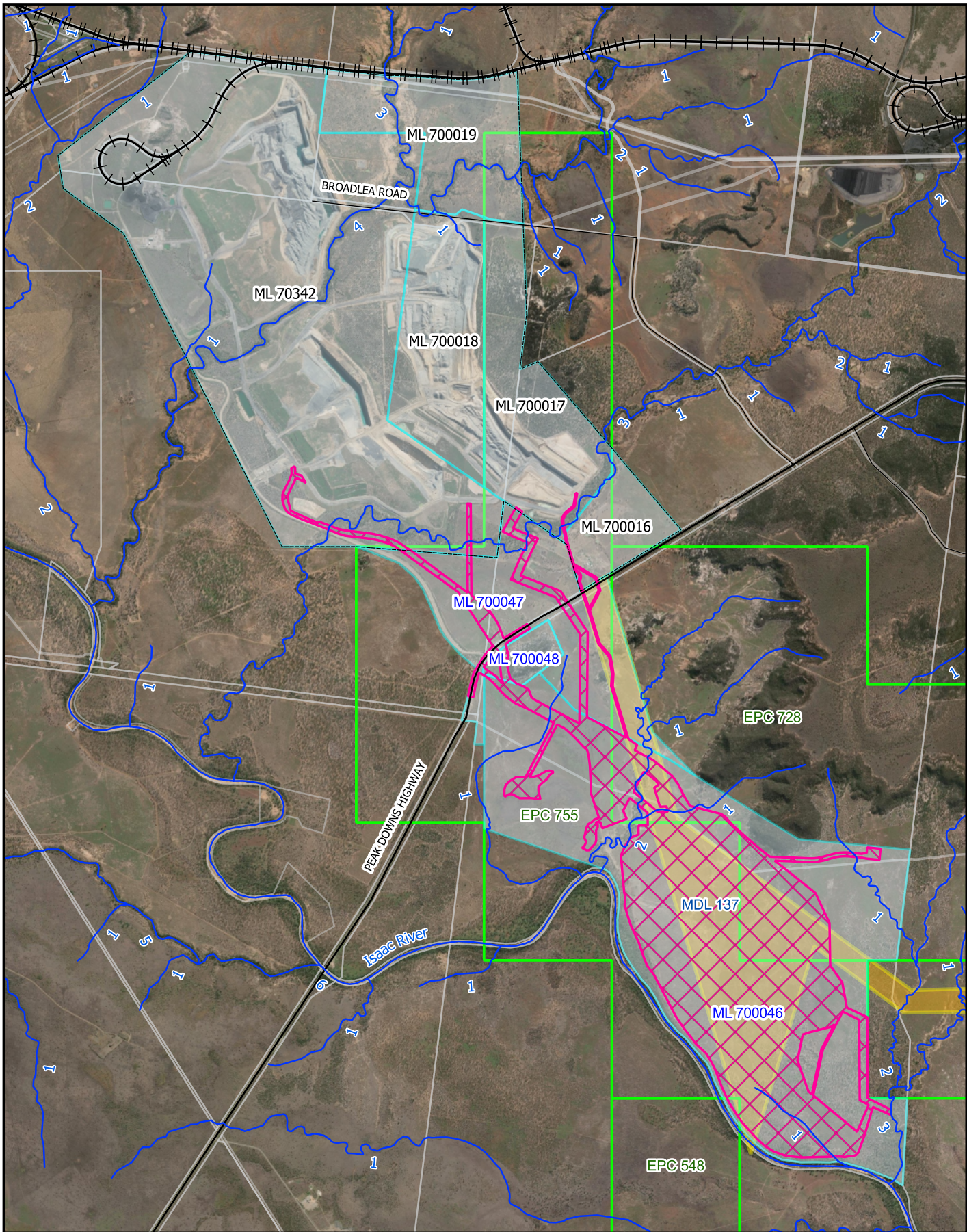
DATA SOURCE
BASE CONSULTING GROUP 2021;
QSPATIAL 2021; The State of Queensland
(Department of Natural Resource and
Mines) 2021;

Figure 1: Site Context

Legend

- Towns
- Highways
- Roads
- Rail Network
- Isaac Plains East
- Isaac Downs Project

BASE/



0 1 2 km

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Date: 08/03/2021
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2021; CSPTIAL 2021; The
State of Queensland (Department of Natural Resource
and Mines) 2021; Sources: Esri, DigitalGlobe, GeoEye, I-
cubed, USDA, USGS, AER, GeoMapping, Aerogrid, IGN,
IGN, swisstopo, and the GIS User Community

Figure 2: Project Setting

Legend

- | | | |
|---------------|------------------------|-------------------------------|
| — Watercourse | — Railway | ■ Mineral Development Licence |
| — Highway | □ Isaac Plains Complex | ■ Exploration Permits (Coal) |
| — Local Roads | ✱ ID Project Layout | □ Cadastral Boundaries |
| | ■ Mine Lease | |

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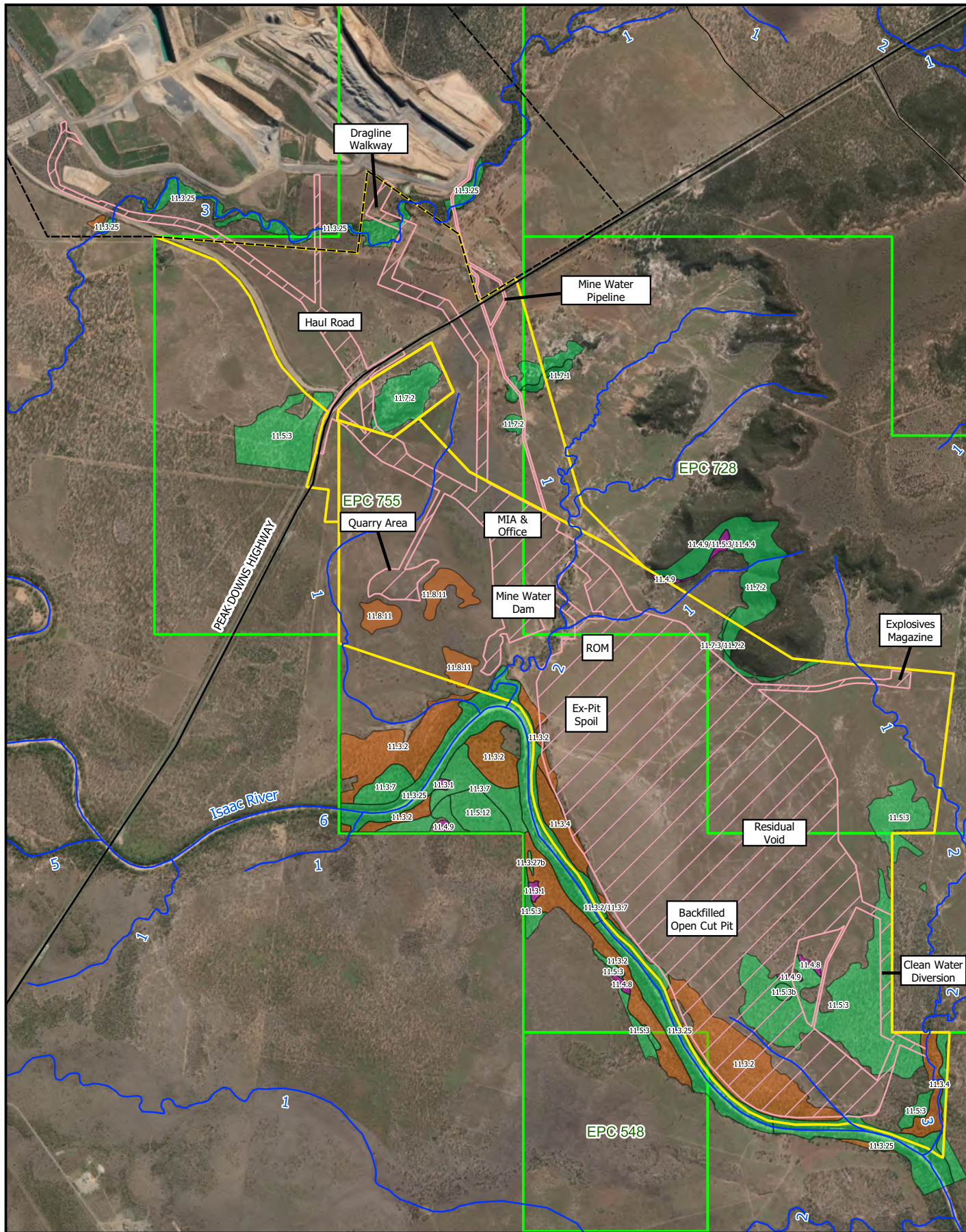


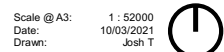
Figure 3: Project Layout and Disturbance Boundaries

Legend

- | | | | |
|---------------|------------------------|------------------------------|---|
| — Watercourse | — Local Road | □ ID Project Layout | Remnant Vegetation
<div style="display: inline-block; width: 10px; height: 10px; background-color: #f08080; border: 1px solid black; margin-right: 5px;"></div> Endangered
<div style="display: inline-block; width: 10px; height: 10px; background-color: #90ee90; border: 1px solid black; margin-right: 5px;"></div> Least Concern
<div style="display: inline-block; width: 10px; height: 10px; background-color: #ffa500; border: 1px solid black; margin-right: 5px;"></div> Of Concern |
| — Highway | □ Isaac Plains Complex | □ Exploration Permits (Coal) | |
| □ Mine Lease | | | |

BASE/

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DATA SOURCE
 BASE CONSULTING GROUP 2021; CSPTIAL 2021; The
 State of Queensland (Department of Natural Resource
 and Mines) 2021; Sources: Esri, DigitalGlobe, GeoEye, I-
 cubed, USDA, USGS, AER, GeoEye, AeroGRID, IGN,
 IGP, Swiretopo, and the GIS User Community

1.3 Relationships to other plans

Various other management plans will be implemented to address the requirements of Commonwealth and Queensland legislation and there will be some interaction among the plans during the construction and operation phases.

The following management plans and site procedures, amongst others, as developed for the IPM or specifically for the ID are relevant to this SSMP:

- Existing approved IPM Commonwealth Species Management Plans;
- Erosion and Sediment Control Plan;
- Dust Management Plan;
- Weed and Feral Animal Management Plan;
- Permit to Disturb;
- Rehabilitation Management and Monitoring Plan;
- Offsets Area Management Plan (OAMP); and
- Approved Species Management Program (for State listed fauna species)

Prior to the commencement of construction works, the Permit to Disturb process will be used to authorise clearing and the management commitments within this SSMP will be implemented through the Permit to Disturb process.

1.4 Responsibilities

This SSMP, once approved by the Commonwealth, will be implemented as part of construction, operational and decommissioning contracts for the mining activities including where vegetation clearing, or other activities will result in the disturbance of fauna habitat, vegetation and soil.

All employees, contractors or other agents will be required to operate in accordance with this SSMP, once approved, as part of the activity. The Project's Environmental Officer (EO) will be required to apply this SSMP to the activity areas and implement, where necessary, corrective actions outlined in Section 5.7.

2.0 Regulatory framework

2.1 *Environment Protection and Biodiversity Conservation Act 1999 – Commonwealth*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Commonwealth Government's principal piece of environmental legislation and is administered by the DAWE. The EPBC Act is designed to protect Matters of National Environmental Significance (MNES), which include threatened species of flora and fauna, threatened ecological communities (TECs), migratory species as well as other protected matters. The Act includes categories of threat for threatened flora and fauna, identifies key threatening processes to their survival and provides for the preparation of recovery plans for threatened flora and fauna.

Approval is required under the EPBC Act for any action (e.g. a development) that is likely to have a significant impact on MNES. Proponents of projects that are likely to have a significant residual impact refer the Project to the DAWE for a determination on whether the proposed activity requires assessment under the EPBC Act via a controlled action, and if so, the level of assessment required. For controlled actions, five different levels of assessment are possible and include assessment based on information provided in the referral, assessment by preliminary documentation, assessment by an Environmental Impact Statement (EIS), assessment by a Public Environment Report (PER) and assessment by public enquiry.

The ID Project was determined by DAWE determined be a controlled action on 14 May 2019 and assessed via an EIS under the under bilateral agreement between the Commonwealth and the Queensland Governments. This SSMP describes the management measures for listed species identified in the terrestrial ecology assessment for the Project as being present in the Project's study area as outlined in Table 23 of the EcoSM, 2020 report (included as Appendix 10 to the AEIS).

2.2 *Environmental Offsets Policy - Commonwealth*

Under the EPBC Act Environmental Offsets Policy 2012 (EPBC Act Environmental Offsets Policy), environmental offsets are actions taken to counterbalance significant residual impacts on MNES. Offsets are used as a last resort and only considered after all management actions have been considered and where significant residual impacts remains.

The EPBC Act Environmental Offsets Policy came into force in October 2012 and provides guidance on the role of offsets in environmental impact assessments and how DAWE considers the suitability of a proposed offset package (SEWPac 2012).

2.3 *Environmental Offsets Act 2014 – Queensland*

The *Environmental Offsets Act 2014* (EO Act), *Environmental Offsets Regulation 2014* (EO Regulation) and the Queensland Environmental Offsets Policy (Version 1.7) (QEOP) (DES, 2019) comprise the Queensland Environmental Offsets Framework. As per the offset's framework, offsets must be provided for any significant, residual impacts on Matters of State Environmental Significance (MSES). However, as stated in the EO Act, an offset for a prescribed environmental matter that has been assessed under the EPBC Act for impacts to MNES is not subject to offset conditions under the EO Act.

2.4 *Nature Conservation Act 1992 - Queensland*

The *Nature Conservation Act 1992* (NC Act) provides for the conservation of biodiversity and threatened species within Queensland. Specifically, critical habitat areas, management of protected areas, protection of wildlife and lists the protected flora and fauna species (extinct in the wild, endangered, vulnerable, near threatened), international wildlife and prohibited wildlife.

3.0 Matters of national environmental significance (MNES)

As part of the Project's State and Commonwealth approvals process, detailed ecological surveys and assessments have been undertaken across the ID Project area. These surveys and assessments were undertaken, to:

- Determine the presence/absence of listed flora and fauna species within the Project area;
- Assess the vegetation characteristics and the presence of ecological communities within the Project area;
- Describe the likely adverse impacts on MNES within the Project area;
- Describe measures that would be implemented to avoid and mitigate impacts on those MNES; and
- Assess the baseline habitat quality of the impact area.

This section provides a summary of the ecological assessments undertaken to determine the likelihood of occurrence of fauna MNES to occur within the ID Project area and to assess the potential impacts to those MNES. Detailed information including habitat quality within the Project area for each of the MNES is outlined in the EcoSM, 2020 report in Appendix 10 of the ID EIS.

3.1 Description of the survey area

The study area is situated within Exploration Permit Coal (EPC) 755, MDL137, EPC 548 and EPC 728 (Figure 3). The study area is bisected by the Peak Downs Highway and the IPM access road in the north. The Isaac River extends along the south-western and western boundaries of the study area. Two 3rd order watercourses occur within the study area and drain towards the Isaac River: Billy's Gully in the northern portion; and an unnamed tributary in the southern portion (referred to as Southern Gully). One second order watercourse, 5 Mile Gully, extends through the central portion of the study area in a southerly direction and discharges into the Isaac River. Two 1st order drainage channels also occur within the study area and flow in a south-easterly direction across the study area towards the Isaac River.

The majority of the study area has been cleared in the past to facilitate cattle grazing activities (Figure 3). Currently, remnant woodlands and open forests generally occur along the Isaac River, Billy's Gully and Southern Gully. Remnant wattle-dominated woodland communities are associated with the prominent jumpups in the northern portion of the study area, while natural grassland communities extend through the central-northern portion of the study area. Small pockets of Brigalow dominated vegetation occur throughout the southern portion of the study area. Several small wetland communities occur on alluvial plains on the western side of the Isaac River, with another associated with a broad depression on sand plains in the south-eastern portion of the study area.

The topography within the study area is relatively flat. However, steeper slopes are associated with jump-ups in the north and the low range that adjoins the eastern boundary of the study area. The study area drains broadly in a south-westerly direction towards the Isaac River. Areas of gilgai are located within lower-lying areas in the south-eastern portion of the study area. Small seasonal wetlands also occur within the southern portion of the study area.

3.2 Impact assessment ecological survey effort

The detailed ecological assessment to support the initial ID EPBC referral incorporated a dry season and a wet season fauna and flora survey. The dry season surveys were conducted over nine days in late-September and early October 2018 with the wet season surveys undertaken over eight days in late February and early March 2019 (EcoSM, 2020).

A variety of flora and fauna survey methods were used to detect MNES during the assessment surveys (EcoSM, 2020 as included in Appendix 10 of the ID EIS). Flora surveys were undertaken in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 4.0 (Nelder et al., 2017)*. Assessment sites were undertaken across the entire Project area and included both vegetation assessment sites and photo monitoring points within each vegetation community type as outlined below.

- 208 vegetation assessment sites in total comprising;
 - 38 detailed secondary sites
 - 48 tertiary sites
 - 74 modified quaternary sites
 - 48 photo monitoring sites
 - Targeted flora surveys
 - Random traverses

At 30 secondary sites detailed plots were installed and vegetation condition data collected in accordance with the Department and Environment and Science's (DES) '*Guide to determining terrestrial habitat quality, V1.2*' (EHP 2017a) (Habitat Quality Guide), which was in effect at the time of the surveys.

Fauna assessments were undertaken for the ID surveys undertaken in 2018 and 2019 and included systematic trap sites, spotlighting, call playback, infrared cameras, active searching, supplementary survey sites, harp traps, Anabat survey sites, Koala transects and observation (e.g. bird surveys and opportunistic observations). The field work consisted of systematic and supplementary survey sites and opportunistic observations and included:

- 800 Elliott A trap nights;
- 124 pitfall trap nights;
- 200 funnel trap nights;
- 41 hrs of spotlighting;
- 19 hrs nocturnal owl and Koala call playback sessions;
- 45 infrared camera trap nights;
- 58 hrs targeted diurnal bird survey hours;
- 205 hrs opportunistic incidental bird survey hours;
- 36 hrs active searching hours;
- 16 Anabat survey nights;
- 18 harp trap nights; and
- 12 Koala transects totalling 104.2 ha or survey area.

Survey methods undertaken were in accordance with applicable Commonwealth and Queensland threatened species and communities survey guidelines including:

- Commonwealth guidelines;
 - Survey guidelines for Australia's threatened birds (DEWHA, 2010a)
 - Survey guidelines for Australia's threatened bats (DEWHA, 2010b)
 - Survey guidelines for Australia's threatened reptiles (SEWPaC, 2011a)
 - Survey guidelines for Australia's threatened mammals (SEWPaC, 2011b)
 - EPBC Act referral guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DotE, 2014)
 - Draft referral guidelines for nationally listed Brigalow Belt reptiles (SEWPaC, 2011c)
 - SPRAT databases for relevant EPBC Act listed species and communities (as of July 2016)

- Queensland guidelines;
 - Flora Survey Guidelines – Protected Plants *Nature Conservation Act 1992* (EHP, 2014)
 - Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al., 2014).

The Commonwealth guidelines provide survey methodologies specifically for threatened flora and fauna species and ecological communities listed under the EPBC Act. The Queensland survey guidelines provide general guidance on survey methods and survey effort for assessing the presence of all species. The survey effort undertaken used a range of survey methods aimed at maximising the probability of detecting species, if they were present.

3.2.1 Threatened species habitat mapping

Habitat mapping was undertaken as part of the ecological assessment and was based on field verified vegetation mapping to assign areas of potential habitat based on known habitat preferences and field observations. Habitat preferences for the Greater Glider, Squatter Pigeon, Ornamental Snake and Koala are based DAWES's Species Profile and Threats Database (SPRAT) profiles and conservation advice, as well as the recent EPBC Act approvals for the current IPM projects and relevant published research and expert opinion. Habitat preferences for the Black-face Monarch and Sating Flycatcher are based on description in EcoSM, 2020, relevant conservation advice and general species profiles from published resources.

A summary of the ecological results from the ecological assessments are shown below.

Greater Glider

Greater Gliders were recorded at >20 locations in the study area along the Isaac River, Billy's Gully and a tributary of the Isaac River in the east of the study area (Figure 4). With the exception of one record, which was located in RE 11.3.4 along Southern Gully, all individuals were recorded within remnant Queensland Blue Gum/River Red Gum woodland (RE 11.3.25) along the Isaac River (Figure 4).

The approved conservation advice for this species (TSSC 2016) indicates that taller, moist eucalypt forest with relatively old trees and abundant hollows and a diversity of eucalypt species is favoured by this species. Using this description and in consideration of the communities in which the Greater Glider was observed in the study area and in other surveys conducted throughout Central Queensland, the riparian and alluvial communities were considered to provide the most suitable habitat for this species. These vegetation communities are considered to provide the greatest availability of large old hollow-bearing trees and provide the greatest connectivity with larger patches of remnant vegetation in the landscape.

As outlined in EcoSM, 2020 and recent EPBC Act approvals for the current IPM projects, all areas of eucalypt forests or woodlands that contain hollow-bearing trees (e.g. riparian vegetation and dry eucalypt woodland) are considered habitat for the Greater Glider. Based on this habitat definition and associated habitat mapping, there is 120.9 ha of potential Greater Glider habitat within the ID footprint (refer to Figure 4). Potential habitat conservatively includes all remnant and regenerating dry Eucalypt woodlands as well as riparian communities (EcoSM, 2020).

Squatter Pigeon (Southern)

Eight Squatter Pigeons were recorded from 1 location during the dry season survey period within the Popular Box woodland (RE 11.3.2). In accordance with the SPRAT profile and as outlined in recent EPBC Act approvals for the current IPM projects, the following habitat types have been identified for the species:

- Breeding habitat – Any remnant or regrowth open-forest to sparse, open- woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, on sandy or gravelly soils (but not limited to areas mapped as Queensland land zones 3, 5 or 7) and where groundcover vegetation is less than 33% of the ground area, within 1 km of a suitable, permanent or seasonal waterbody;
- Foraging habitat – Any remnant or regrowth open-forest to sparse, open- woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, on sandy or gravelly soils (but not limited to areas mapped as Queensland land zones 3, 5 or 7) and where groundcover vegetation is less than 33% of the ground area, within 3 km of a suitable, permanent or seasonal waterbody; and
- Dispersal habitat – Any forest or woodland occurring between patches of foraging or breeding habitat that facilitates movement between patches of foraging habitat, breeding habitat and/or waterbodies, and areas of cleared land less than 100 m wide linking areas of suitable breeding and/or foraging habitat.

Based on the above habitat definitions, there is a total of 122.1 ha of potentially suitable breeding and foraging habitat for the Squatter Pigeon in the study area which comprises (refer to Figure 5):

- 66.6 ha of breeding habitat;
- 55.5 ha of foraging habitat; and
- 107.6 ha of dispersal habitat.

Ornamental Snake

Two individuals of the Ornamental Snake were detected in the study area during both surveys. One individual was spotlighted during the dry season survey within a patch of non-remnant vegetation supporting well-developed gilgai at supplementary site S5 (refer to EcoSM, 2020 and Figure 6). The second individual was recorded during the wet season survey while active searching at supplementary site S18 (refer to EcoSM, 2020 and Figure 6). This individual was recorded from mid-mature Brigalow with small shallow gilgai formations that grade into a very broad overland flow path.

Habitat definitions in recent IPM approvals specifies that Ornamental Snake habitat consists of gilgai mounds and depressions with cracking-clay soils and moist areas (particularly within, or close to, habitat that is known to be favoured by its prey [frogs]) with microhabitat features (i.e. logs, woody debris and leaf litter), and Brigalow threatened ecological community.

Suitable habitat for the Ornamental Snake identified in the study area (Figure 6) encompasses areas of non-remnant vegetation supporting gilgai, seasonal wetland communities (i.e. REs 11.3.27b and 11.5.3b) and Brigalow communities supporting gilgai (i.e. REs 11.3.1, 11.4.8 and 11.4.9). Therefore, this habitat within the ID footprint is mapped as potential habitat for the Ornamental Snake resulting in 173.5 ha of Ornamental Snake habitat within the ID footprint (refer to Figure 6).

Koala

One Koala was identified during spotlighting along the Isaac River. Koala scats and scratch marks were also located in a number of locations along the Isaac River as well as Billy's Gully and Southern Gully.

All the areas of remnant vegetation within the study area, and particularly the riparian corridors of Isaac River, Billy's Gully and Southern Gully, are considered to provide habitat for the Koala due to the presence of the Koala feed trees. These Eucalypt and Corymbia Woodlands along the riparian zones primarily include RE 11.3.2, RE 11.3.4, RE 11.3.25, RE 11.5.3 and RE 11.5.9.

Based on the above definition, there is approximately 131.9 ha of suitable habitat for the Koala within the ID footprint (refer to Figure 7).

3.3 Threatened fauna

Fauna assessments undertaken in support of State and Commonwealth approvals identified three fauna species listed as vulnerable under the EPBC Act as being present on site (Greater Glider, Squatter Pigeon and Ornamental Snake), one species listed as vulnerable as having the potential to occur based on habitat availability (Koala) and two migratory species (Black-face Monarch and Sating Flycatcher).

Refer to the EcoSM, 2020 in Appendix 10 of the ID AEIS for detailed information on the habitat areas within the Project area for each of the MNES as well as the areas that will be impacted through direct habitat clearing.

3.3.1 Greater Glider (*Petauroides volans*)

This species was recorded at a number of locations in Queensland Blue Gum/River Red Gum woodland fringing the Isaac River, Southern Gully and Billy's Gully (Figure 4).

Description

EPBC Act = Vulnerable

The Greater Glider is the largest gliding possum in Australia, with a head and body length of approximately 35–46 cm and a long furry tail measuring approximately 45–60 cm. The Greater Glider has thick fur that is white or cream below and varies from dark grey, dusky brown through to light mottled grey and cream above (TSSC, 2016). The Greater Glider is nocturnal and uses tree hollows during the day to rest and/or nest (van Dyck & Strahan, 2008).



Distribution

Greater Gliders are restricted to eastern Australia between Windsor Tableland in north Queensland and Wombat State Forest in central Victoria and occur from sea level up to 1,200 m above sea level. Two isolated subpopulations exist in Queensland, one in the Gregory Range west of Townsville and another in the Einasleigh Uplands (TSSC, 2016).

General habitat preferences

The Greater Glider occurs in a range of eucalypt-dominated habitats, including low open forests along the coast to tall forests in the ranges and low woodland to the west of the Dividing Range. It does not use rainforest habitats (van Dyck & Strahan 2008; van Dyck et al., 2013). This species favours taller, montane, moist eucalypt forests with relatively old trees and abundant hollows and a diversity of eucalypt species (TSSC, 2016).

Foraging habitat

The Greater Glider has an almost exclusive diet of eucalypt leaves but also feeds on flowers or buds (van Dyck & Strahan, 2008; TSSC, 2016). Although the species is known to feed on a range of eucalypt species, in any area it is likely to only forage on a select number of species (van Dyck & Strahan, 2008).

Breeding habitat

Breeding occurs between March and June with only a single young born (van Dyck & Strahan, 2008; TSSC, 2016). The young stays with the mother or is left in the nest and becomes independent at about 9 months of age (Menkhorst & Knight, 2011).

Additional information

Greater Gliders can glide over distances of up to 100 m and appear to have low dispersal ability with small home ranges of approximately 1-4 ha which appear to be related to food and nest availability. In lower productivity forests, home ranges may be as large as 16 ha for males. In general, home ranges of males do not typically overlap (TSSC, 2016) which suggests a degree of territorial behaviour.

Nearest record

Greater Gliders were recorded within the ID study area at >20 locations five locations along the Isaac River, Billy's Gully and a tributary of the Isaac River in the east of the study area (refer to Figure 4 and EcoSM, 2020). However, no Greater Gliders were recorded within the disturbance footprint during the ecological surveys (EcoSM, 2020).

Suitable habitat within the project area

The approved conservation advice for the Greater Glider (TSSC, 2016) along with habitat definitions included in recent IPM approvals and EcoSM, 2020 suggests that all areas of Eucalypt forests or woodlands that contain hollow-bearing trees (e.g. riparian vegetation and dry eucalypt woodland) are potential Greater Glider habitat.

Impacted habitat within the project area

Based on the above habitat definition, it is estimated that residual impacts to approximately 120.9 ha of potential Greater Glider habitat are likely to occur from the proposed Project works.

Key threats

Key threats to Greater Gliders are habitat loss leading to increased habitat fragmentation and loss of nesting habitat in tree hollows, predation by owls and frequent and intense bushfires. Loss of hollow bearing trees and distance between habitat patches in particular, is thought to have contributed to the decline of Greater Gliders in central Queensland over the last 20 years (TSSC, 2016).

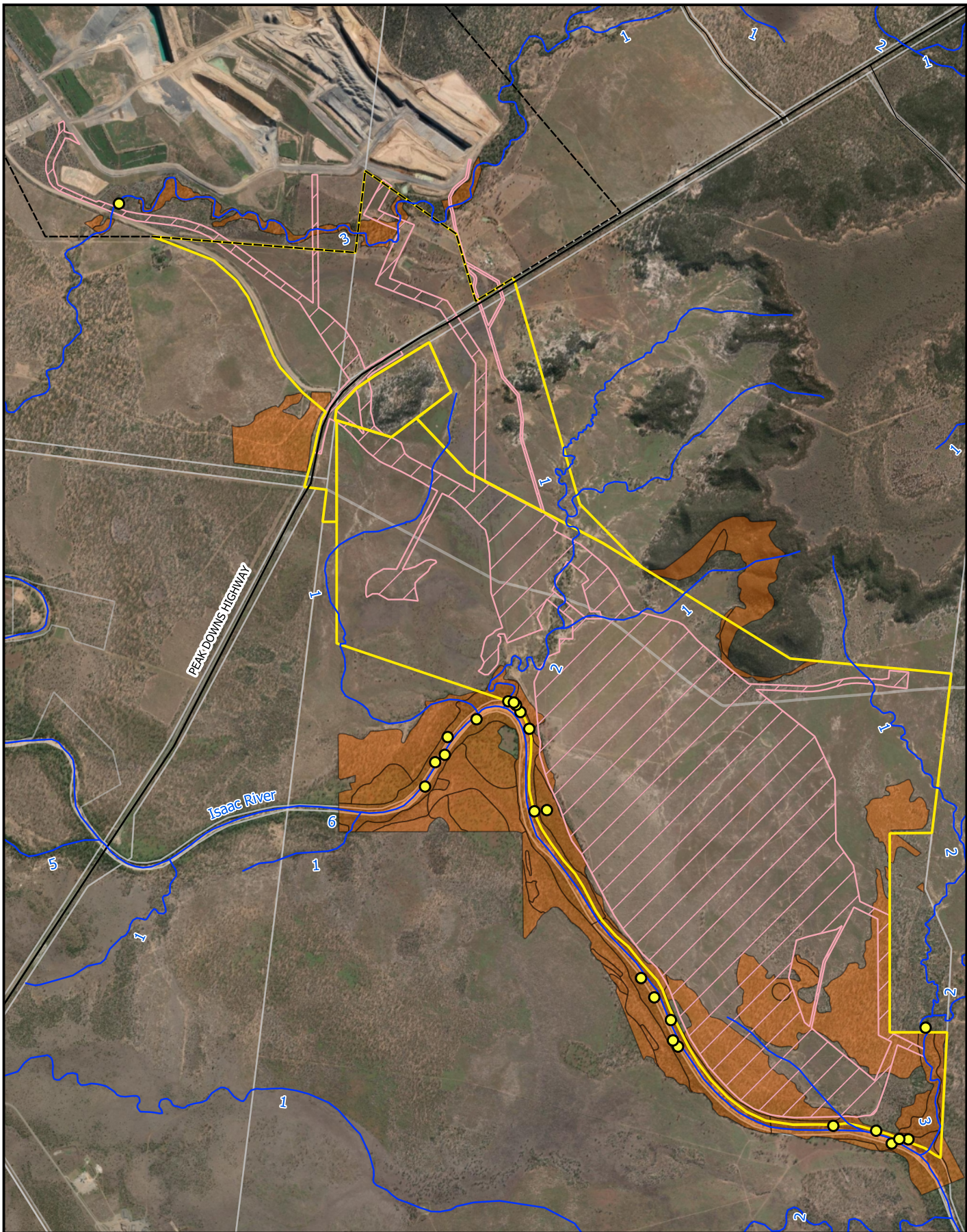


Figure 4: Greater Glider Habitat Impacted By Project

Legend

- Recorded Greater Glider
- Watercourse
- Highway
- Local Road
- Isaac Plains Complex
- Mine Lease
- ▨ ID Project Layout
- Cadastral Boundaries
- Greater Glider Habitat

0 1 km

Scale @ A3: 1 : 52000
 Date: 08/03/2021
 Drawn: Josh T

DATA SOURCE
 BASE CONSULTING GROUP 2021; CSPTAL 2021; The
 State of Queensland (Department of Natural Resource
 and Mines) 2021; Sources: Esri, DigitalGlobe, GeoEye, I-
 cubed, USDA, USGS, AER, GeoMapping, Aerogrid, IGN,
 IGN, swisstopo, and the GIS User Community

BASE/

3.3.2 Squatter Pigeon – southern sub-species (*Geophaps scripta scripta*)

The Squatter Pigeon was the only threatened avian species to be recorded within the ID footprint with eight individuals recorded at one location within remnant RE 11.3.2 (refer to Figure 5).

Description

EPBC Act = Vulnerable

The Squatter Pigeon (southern) is a medium-sized ground dwelling pigeon approximately 30 cm long. Adults of both sexes are generally grey-brown with black and white stripes on the face and throat, have iridescent green or violet patches on the wings, a blue-grey lower breast and white flanks and lower belly. The southern Squatter Pigeon sub-species has a patch of blue-grey skin around the eye, whereas the northern Squatter Pigeon has an orange-red orbital skin patch (TSSC, 2015).



Distribution

Squatter Pigeons are largely restricted to Queensland with the southern sub-species of the Squatter Pigeon known to occur north of the Burdekin River, east to Townsville and Proserpine and south to the Queensland-New South Wales Border and west as far as Longreach. Where Squatter Pigeon occurs, it can be locally abundant (Reis, 2012). The known distribution of the southern sub-species overlaps with the known distribution of the northern subspecies (DotEE, 2018a).

The estimated extent of occurrence is approximately 440,000 km² (DotEE, 2018a). The estimated total population of the species is an estimate as no systematic surveys have been undertaken. However, in 2000 the population was estimated at 40,000 breeding birds (Garnett & Crowley, 2000). Given the Squatter Pigeon's ubiquitous nature and relative abundance, the population is thought to be stable at present. It is also thought this species occurs as a single, contiguous (i.e. inter-breeding) population (DotEE, 2018a).

General habitat preferences

Squatter Pigeons can occur in tropical dry, open sclerophyll woodlands and occasionally in savannah habitats with overstorey species of *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris*. Patchy groundcover layer is typical and generally consists of native, perennial tussock grasses or a mix of grasses and low shrubs or forbs. The groundcover layer rarely exceeds 33% of the ground area. It appears to favour sandy soil dissected with low gravelly ridges and is less common on heavier soils with dense grass cover. Squatter Pigeons are regularly found in close proximity (within 3 km) to permanent water (DotEE, 2018a).

Foraging habitat

As per recent IPM approvals, Squatter Pigeon foraging habitat is any remnant or regrowth open-forest to sparse, open woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, on sandy or gravelly soils within (including, but not limited to, areas mapped as Queensland land zones 3, 5 or 7) and where groundcover vegetation is less than 33% of the ground area, within 3 km of a suitable, permanent or seasonal waterbody (DAWE, 2020). It feeds primarily on seeds of grasses, herbs and shrubs but is also known to consume legumes, herbs and forbs, acacia seeds, insects and ticks (DotEE, 2018a).

Breeding habitat

Squatter Pigeons nest on the ground, usually laying two eggs in sheltered positions amongst vegetation which are incubated for about 17 days. (Crome, 1976; Frith, 1982). Their breeding habitat is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, on sandy or gravelly soils (including, but not limited to, areas mapped as Queensland land zones 3, 5 or 7) and where groundcover vegetation is less than 33% of the ground area, within 1 km of a suitable, permanent or seasonal waterbody (DAWE, 2020).

Squatter Pigeons typically breed from April to October, although this is variable and highly dependent on food availability (Frith, 1982, Squatter Pigeon Workshop, 2011). Nests are depressions scraped into the ground beneath a tussock of grass, bush, fallen tree or log, and sparsely lined with grass

(Frith, 1982). Chicks remain in the nest for two to three weeks and are dependent on their parents for around four weeks (DotEE, 2018a).

Dispersal habitat

Any forest or woodland occurring between patches of foraging or breeding habitat that facilitates movement between patches of foraging habitat, breeding habitat and/or waterbodies, and areas of cleared land less than 100 m wide linking areas of suitable breeding and/or foraging habitat.

Nearest record

Squatter Pigeons were recorded at a single location during the ecological assessments. Individuals were recorded only within remnant RE 11.3.2 associated with the Isaac River (Figure 5; EcoSM, 2020).

Suitable habitat within the project area

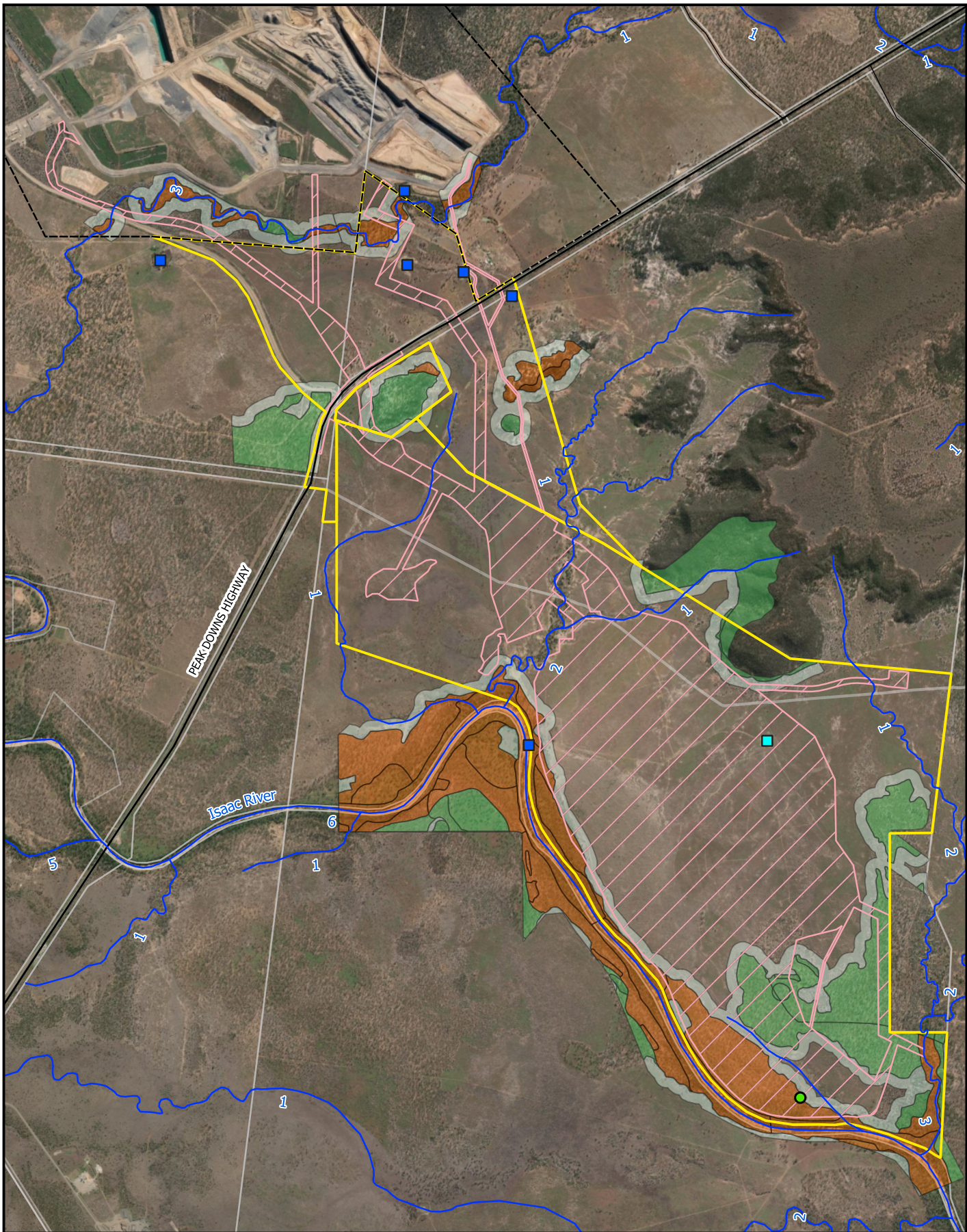
This species has a relatively broad habitat definition, i.e. grassy woodland habitat (DAWE 2020a). However, breeding habitat is more restricted and defined as any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species, on sandy or gravelly soils within 1 km of a suitable, permanent or seasonal waterbody (EcoSM, 2020). Within the Project area, all remnant vegetation on land zones 5 and 7 (that provide sandy gravelly soils) and within 1 km of a seasonal or permanent water source is the most likely breeding habitat (refer to EcoSM, 2020).

Impacted habitat within the project area

Based on the above habitat definitions, there is approximately 122.1 ha of suitable habitat for the Squatter Pigeon in the study area which comprises 66.6 ha of breeding habitat and 55.5 ha of foraging habitat (refer to Figure 5).

Key threats

The primary threats to the Squatter Pigeon (southern) are ongoing habitat clearing, overgrazing of habitat by livestock and feral herbivores such as rabbits, thickening of understorey vegetation, and predation by invasive mammals such as cats and foxes (TSSC, 2015). Their habit of remaining stationary when disturbed makes them particularly vulnerable to predation and vehicle strikes. Other known threats include fragmentation of habitat, trampling of nests by domestic stock and feral herbivores, invasion of habitat by weeds such as Buffel Grass (*Cenchrus ciliaris*) drought, and bushfires (TSSC, 2015). Changes in hydrological regimes can also affect Squatter Pigeons by changing the distance between water sources and feeding habitat; affecting their movement through the landscape (Reis, 2012).



0 1 km

Scale @ A3: 1 : 52000
 Date: 08/03/2021
 Drawn: Josh T

DATA SOURCE
 BASE CONSULTING GROUP 2021; CSPTAL 2021; The
 State of Queensland (Department of Natural Resource
 and Mines) 2021; Sources: Esri, DigitalGlobe, GeoEye, I-
 cubed, USDA, USGS, AER, GeoMapping, Aerogrid, IGN,
 IGN, swisstopo, and the GIS User Community

Figure 5: Squatter Pigeon Habitat Impacted By Project

Legend

- Recorded Squatter Pigeon
- Permanent Water Point
- Seasonal Water Point

- Watercourse
- Highway
- Local Road
- Isaac Plains Complex

- Mine Lease
- ID Project Layout
- Cadastral Boundaries

- Squatter Pigeon Habitat**
- Breeding Habitat
 - Dispersal Habitat
 - Foraging Habitat

BASE/

3.3.3 Ornamental Snake (*Denisonia maculata*)

The only threatened reptile to be recorded within the Project area was the Ornamental Snake, with a single individual recorded at two locations in the southern section of the ID footprint during the dry and wet season surveys in an area of non-remnant vegetation supporting well developed Gilga and from mid-mature Brigalow with small shallow gilgai formations that grade into a very broad overland flow path.

Description

EPBC Act = Vulnerable

The Ornamental Snake is a stout brown, grey-brown or grey-black snake with a darkly flecked or overall darker head with the lips distinctly barred in white/cream. The belly is white or cream with dark spots/flecks on the outer edges (TSSC, 2014). The iris is usually golden and the tail often grades to a lighter orange-brown at the tip. The Ornamental Snake is nocturnal, moving only at night. It is probably active year-round but can remain inactive in shelters for periods of months during dry conditions (SEWPaC, 2011c). Peak activity is likely to be late spring to early summer (SEWPaC, 2011c).



Distribution

The Ornamental Snake is only known from the Brigalow Belt North, and parts of the Brigalow Belt South Bioregions (DotEE, 2018b). The stronghold of this species is within the Fitzroy and Dawson River catchments (McDonald et al., 1991).

General habitat preferences

Ornamental Snakes are found in close association with frogs which form the majority of its prey and is known to favor woodlands and open forests associated with moist areas, particularly gilgais with clay soils but is also known from lake margins, wetlands and waterways. This species is most likely to be found in Brigalow (*Acacia harpophylla*), Gidgee (*Acacia cambagei*), Blackwood (*Acacia argyrodendron*) or Coolabah (*Eucalyptus coolabah*) – dominated vegetation communities or pure grassland associated with gilgais. Regional ecosystems where it has been recorded include: 11.4.3, 11.4.6, 11.4.8 and 11.4.9 and 11.3.3 and 11.5.16 (DotEE, 2018b).

Ornamental Snakes tend to shelter in logs, under coarse woody debris and in ground litter and seem to prefer a diversity of gilgai size and depth, with some fringing groundcover vegetation and timber debris, where soils are of a high clay content with deep-cracking characteristics. Habitat patches greater than 10 ha and connected to larger areas of remnant vegetation are preferred (DotEE 2018b). The IPM approvals described Ornamental Snake habitat as gilgai mounds and depressions with cracking-clay soils and moist areas (particularly within, or close to, habitat that is known to be favoured by its prey [frogs]) with microhabitat features (i.e. logs, woody debris and leaf litter), and Brigalow threatened ecological community. Further, the Draft Referral guidelines for the nationally listed Brigalow Belt reptiles describes gilgai depressions and mounds as being important habitat with habitat connectivity between gilgai and other suitable habitats also being important (SEWPaC, 2011c).

Foraging and refuge habitat

Soil cracks on the high ground of gilgai development provide shelter for Ornamental Snakes during dry periods, and an abundance of frogs in gilgai areas provide food resources during wet periods (Brigalow Belt Reptiles Workshop, 2010). Ornamental Snakes prefer areas with ground cover such as logs and coarse woody debris, and ground litter, which it uses for shelter (DotEE, 2018b).

Nearest record

This species was identified at two locations in the study area but only one location was within the Project's disturbance footprint (refer to Figure 6). Both locations supported gilgai or wetland formations that have the potential to hold water and support populations of prey species (i.e. frogs) during the wet season (EcoSM, 2020).

Suitable habitat within the project area

Ornamental Snakes prefer habitat that is in closely associated with its preferred prey such as moist areas within open woodlands but particularly gilgai and wetland habitat. Although the prey of Ornamental

Snakes were identified as occurring within the Project area including several of its preferred frog species including the Sotted Marsh Frog, Ornate Burrowing Frog and the Broad-palmed Rocket Frog, suitable habitat within the Project area, is limited. Suitable habitat for the Ornamental Snake identified in the study area (Figure 6) encompasses areas of non-remnant vegetation supporting Gilgai, seasonal wetland communities (i.e. REs 11.3.27b and 11.5.3b) and Brigalow communities supporting gilgai (i.e. REs 11.3.1, 11.4.8 and 11.4.9).

Impacted habitat within the project area

There are approximately 173.5 ha of suitable habitat for the Ornamental Snake in the Project's footprint area consisting of remnant Brigalow and wetland habitat and cleared paddock supporting gilgai (Figure 6)

Key threats

The primary threats to the Ornamental Snake are historical broad-scale habitat clearing for grazing and habitat degradation by cattle (TSSC, 2014; Cogger et. Al., 1993) combined with ongoing habitat loss for agriculture and development (Cogger et. al., 1993). Feral pigs are also of great concern, given their degradation of wet areas, competition for frog prey (TSSC, 2014) and potential predation on snakes they encounter. Additional threats include alteration of landscape hydrology and water quality in gilgai environments (which affect the primary prey species of the Ornamental Snake), invasive weeds, and predation by feral predators (foxes and cats) (Eco Logical Australia, 2015).

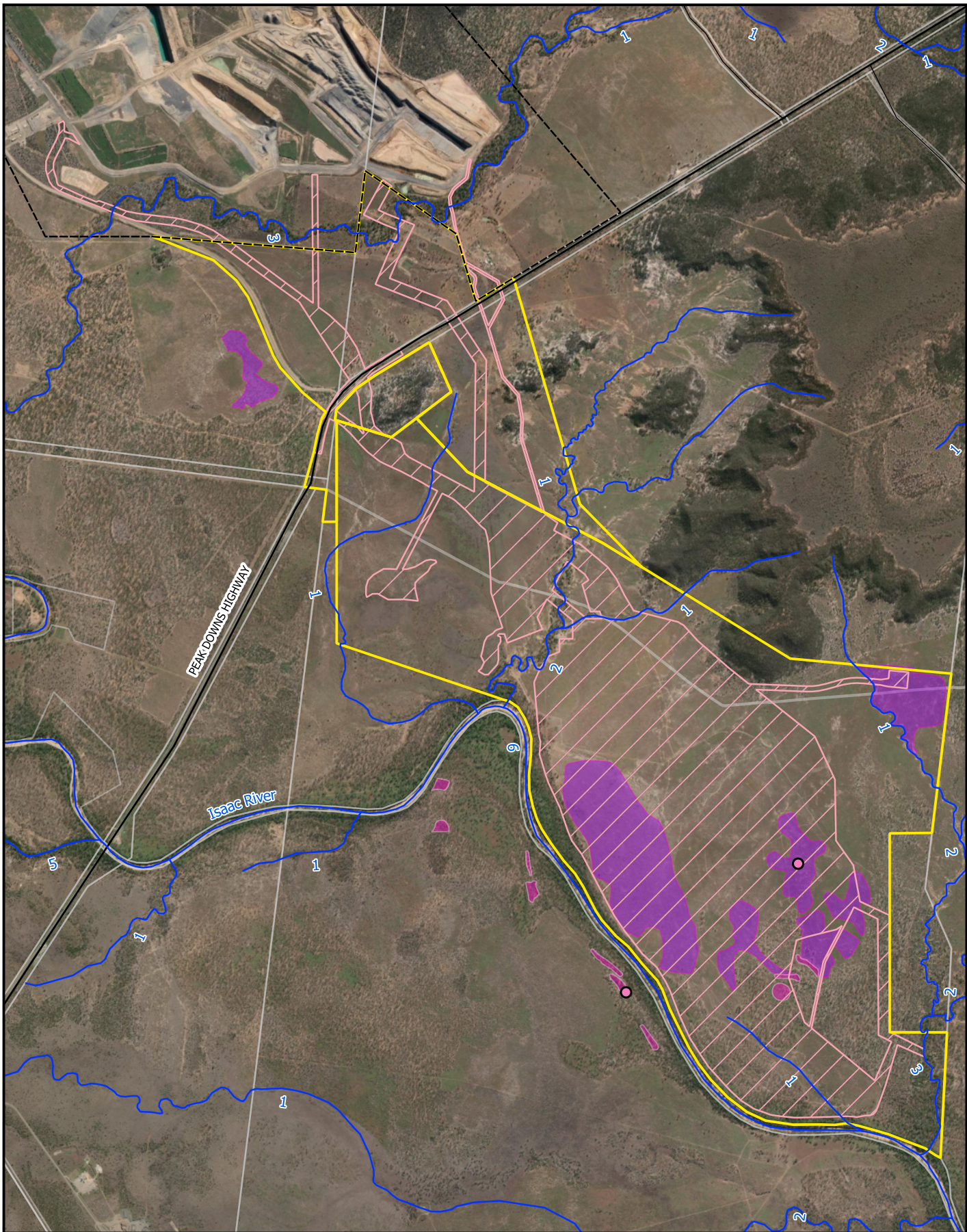


Figure 6: Ornamental Snake Habitat Impacted By Project

Legend

- Recorded Ornamental Snake
- Watercourse
- Highway
- Local Road
- Isaac Plains Complex
- Mine Lease
- ID Project Layout
- Cadastral Boundaries

- Ornamental Snake Habitat**
- Gilgai In Cleared Paddocks
 - Gilgai In Remnant Vegetation

0 1 km

Scale @ A3: 1 : 52000
 Date: 08/03/2021
 Drawn: Josh T

DATA SOURCE
 BASE CONSULTING GROUP 2021; CSPTAL 2021; The State of Queensland (Department of Natural Resource and Mines) 2021; Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AER, GeoMapping, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

BASE/

3.3.4 Koala (*Phascolarctos cinereus*)

One Koala was identified during spotlighting along the Isaac River. Koala scats and scratch marks were also located in a number of locations along the Isaac River as well as Billy's Gully and Southern Gully (Figure 7).

Description

EPBC Act = Vulnerable

The Koala is one of Australia's most distinctive wildlife species (TSSC, 2012). It is a large grey, arboreal mammal with woolly fur, long black claws, a large black nose, fluffy ears, and no tail (van Dyck & Strahan, 2008). They have a head and body length of approximately 65–74 cm depending on sex with males larger than females and they can weigh up to 9 kg (van Dyck & Strahan, 2008).

Distribution

The Koala is found in eastern Australia in fragmented populations, from the temperate south to the tropical north. In Queensland, the Koala is widespread in sclerophyll forest and woodlands on foothills and plains on both sides of the Great Dividing Range from about Chillagoe, Queensland to Mt Lofty Ranges in South Australia (Menkhorst & Knight, 2011).



General habitat preferences

Koalas use a range of habitats, including temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species. However, they are strongly associated with eucalypt forests which it feeds on (van Dyck & Strahan, 2008). Habitat quality for Koalas is based on the identification of local preferences for food tree species and quantification of the availability of those species (Phillips et al., 2000). Any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees provides potential Koala habitat. The Koala is also known to occur in modified or regenerating native vegetation communities (DoEE, 2017c).

Foraging and refuge habitat

Koalas rely on eucalyptus trees for food and shelter. This species feeds on approximately 50 different eucalypt species across its range, with food preferences varying locally and across regions (Krockenberger et al., 2012). The South East Queensland Koala Conservation State Planning Regulatory Provisions define Koala food trees as species of the *Corymbia*, *Melaleuca*, *Lophostemon* or *Eucalyptus* genera (DES, 2017; DoEE, 2017c).

It has been suggested that shelter (non-food) trees are important to Koalas, with Crowther et al. (2013) indicating that shelter trees are equally important as food tree. Shelter trees play an essential role in thermoregulation and are likely to be selected based on height, canopy cover and elevation, with large trees occurring in gullies being preferable (Crowther et al., 2013).

In the drier regions of the Burdekin, Isaac, Whitsunday and Charters Towers Shires, Koalas prefer to feed and shelter in Forest Red Gum (*Eucalyptus tereticornis*) and River Red Gum (*E. camaldulensis*) but are also known to feed on Brown's box (*E. 21rownie*), Dawson River blackbutt (*E. cambageana*), Coolabah (*E. coolabah*), Queensland peppermint (*E. exserta*), Gum-topped box (*E. moluccana*), Yapunyah (*E. ochrophloia*), Mountain coolabah (*E. orgadophila*) and Poplar Box (*E. populnea*).

Breeding habitat

In Queensland, Koalas breed between September and April (Krockenberger et al., 2012). Female Koalas can breed annually, from 2 years of age (van Dyck & Strahan, 2008). Koala joeys remain in the pouch for approximately 6 months and become independent at 12 months of age (van Dyck & Strahan, 2008).

Additional information

The Koala is solitary, mostly nocturnal and spends much of its time in distinct home ranges which vary in size depending on availability of food and shelter resources (van Dyck & Strahan, 2008). In areas of high quality habitat, home ranges overlap extensively and can be quite small (1–2 ha) but are discrete and larger (100 ha) at lower abundances and in less favourable habitat (van Dyck & Strahan, 2008). Young female Koala's often stay in similar areas as their mother, whereas males disperse to new areas

once they reach 2–3 years old. At Blair Athol in central Queensland, home ranges are estimated at 135 ha for males and 101 ha for females (Ellis et al., 2009).

The Koala is inactive for a large portion of the day (van Dyck & Strahan, 2008) with movements between feeding trees species generally occurring at dawn, dusk and night (Crowther et al. 2013). These moves can be several hundred metres making Koalas particularly vulnerable to attacks by wild and domestic dogs. Koala activity generally peaks between August and January, and breeding females with back-young are most easily observed at this time (DotEE, 2017c). Individuals tend to use the same set of trees, but generally not at the same time, and they change trees only a few times per day (TSSC, 2012).

Nearest record

One Koala was identified during spotlighting along the Isaac River within the study area; however, this location occurs outside the disturbance footprint (Figure 7). Koala scats and scratch marks were also located in a number of locations along the Isaac River as well as Billy's Gully and Southern Gully (refer to Figure 7).

Suitable habitat within the project area

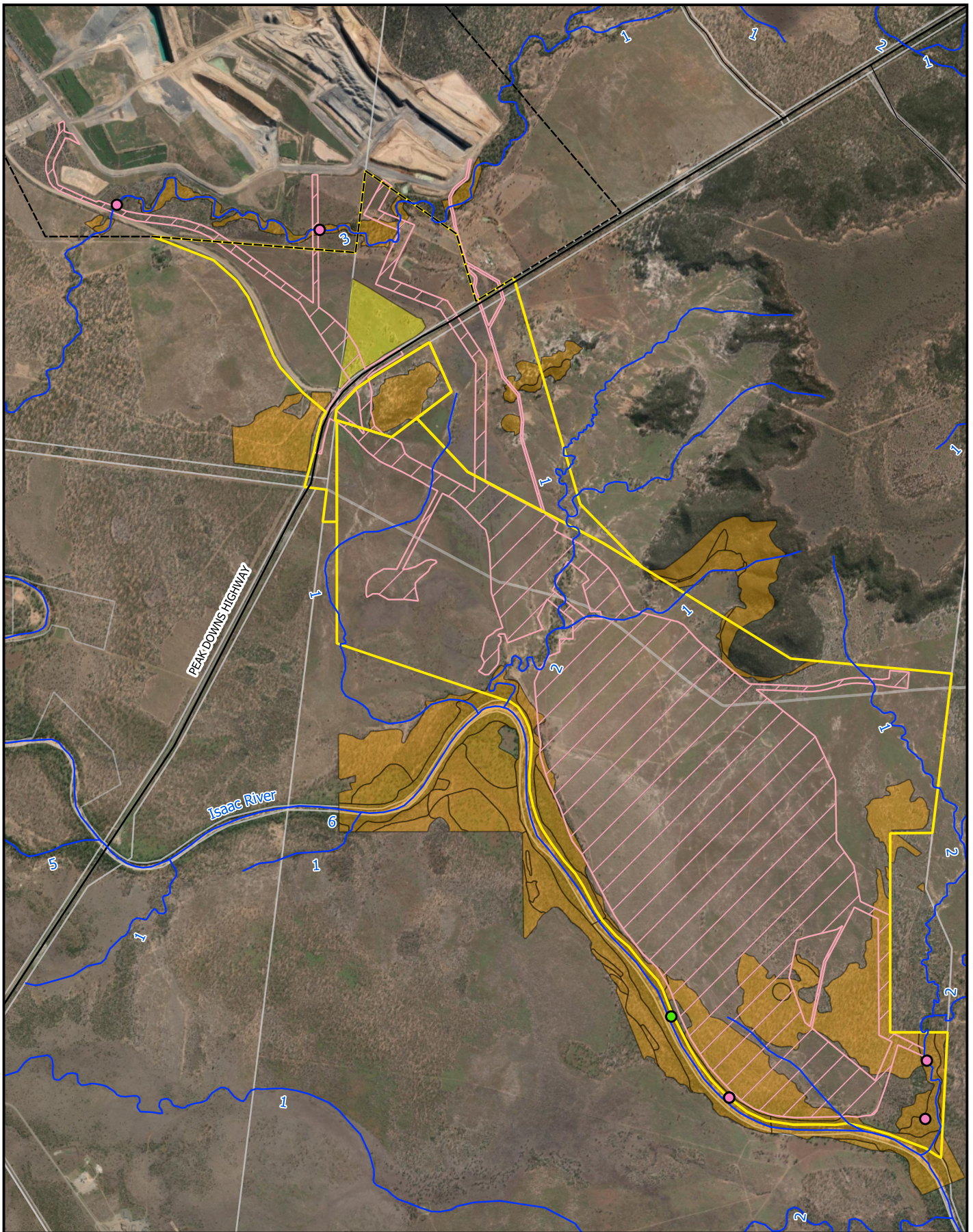
Based on the SPRAT habitat description and the habitat definition included in recent IPM approvals, any forest or woodland (including remnant, regrowth and modified vegetation communities) containing species that are Koala food trees or any shrubland with emergent Koala food trees are considered Koala habitat. This equates to regional ecosystems dominated by Eucalypt and Corymbia species and include 11.3.2, 11.3.25, 11.5.3, 11.5.8b, 11.5.9, 11.5.12, 11.7.2, 11.8.5 and 11.9.7a. Some areas of non-remnant vegetation with emergent food trees such as Narrow-leaved Red Ironbark also provide potential habitat (EcoSM, 2020).

Impacted habitat within the project area

Based on the above habitat definition, residual impacts to approximately 131.9 ha of Koala habitat are likely to occur from the proposed Project works (refer to Figure 7).

Key threats

Primary threats to the Koala are the loss and fragmentation of habitat resulting in loss of food and shelter trees, increased risk of vehicle strike, dog attacks and isolation of populations (TSSC, 2012). Habitat fragmentation results in isolated high-density population areas where the risk of disease transmission is increased and the potential to recolonise dryland areas post-drought is impeded (TSSC, 2012). Wildfire and drought are semi-natural processes that are also considered to threaten Koala populations, particularly in dryland areas where water sources and the availability of shelter trees have been anthropogenically altered (TSSC, 2012).



0 1 km

Scale @ A3: 1 : 52000
Date: 08/03/2021
Drawn: Josh T



DATA SOURCE
BASE CONSULTING GROUP 2021; CSPTAL 2021; The
State of Queensland (Department of Natural Resource
and Mines) 2021; Sources: Esri, DigitalGlobe, GeoEye, I-
cubed, USDA, USGS, AER, GeoEye, AeroGRID, IGN,
IGN, swisstopo, and the GIS User Community

Figure 7: Koala Habitat Impacted By Project

Legend

- Recorded Koala
- Recorded Evidence
Of Koala
- Watercourse

- Highway
- Local Road
- Isaac Plains
Complex

- Mine Lease
- ID Project
Layout
- Cadastral Boundaries

- Koala Habitat
- Marginal Koala
Habitat

BASE/

4.0 Impact assessment

This section of the report summarises the likely impacts of the Project on the EPBC Act listed fauna species outlined in Section 3.3 (refer to EcoSM, 2020 for a detailed impact assessment). Project activities that have the potential to impact vegetation communities and fauna habitat include:

- Direct impacts from vegetation clearing; and
- Indirect impacts such as the effects of the introduction or spread of invasive species, groundwater drawdown, habitat fragmentation, erosion and sedimentation, vehicle strike, noise and dust.

These impacts are described in this section and mitigation measures for these impacts are outlined in Section 5.7.

4.1 Direct impacts

The ID layout and disturbance footprint is shown in Figure 2 and Figure 3. The Project involves clearing of remnant and non-remnant vegetation for open cut mining activities and associated infrastructure including:

- Open cut pit mining activities;
- In-pit and out of pit spoil dumps;
- Mine infrastructure area;
- Access road from the Peak Downs Highway
- Linear infrastructure corridors to connect the Project to the existing IPM on ML 70342 with a coal haul road, power supply and water pipelines; and
- Quarrying areas for extraction of hard rock.

The proposed disturbance footprint encompasses an area of approximately 1,157.0 ha comprised of 1,135.0 ha within the proposed Isaac Downs MLs and 22.0 ha in the IPM MLs. The proposed disturbance footprint has been designed to avoid impacts to remnant vegetation and fauna habitat as much as practically possible. In areas where impacts to vegetation communities, flora species and fauna habitat cannot be avoided, control measures have been designed to minimise impacts on vegetation and habitat as far as practical. Clearing for mining activities will be undertaken gradually over a period of approximately 16 years as the open cut pit is progressed. Clearing will cause a direct impact by removing areas of vegetation that may also support habitat features for threatened species. Disturbed areas will be progressively rehabilitated during mining with final rehabilitation completed once mining has ceased. This will minimise the area of disturbed ground at any one time and encourage fauna to move away from the disturbance area of their own accord.

4.1.1 Impacts to threatened fauna species

The main impact to threatened fauna as a result of the Project will come from vegetation clearing which will result in the loss and reduction in species habitat. The majority of clearing associated with the Project will occur within non-remnant vegetation. However, approximately 122.2 ha of remnant vegetation will be cleared as a result of the Project. Further, some areas of non-remnant vegetation that will be impacted provide suitable habitat (e.g. gilgai) for various threatened species (refer to Figure 3 for the clearing footprint). The proposed clearing footprint includes some areas of endangered Brigalow woodland (which are also a part of the Brigalow TEC) vegetation, regulated vegetation (i.e. of concern REs, vegetation management wetlands and watercourse REs) and protected wildlife habitat (refer to EcoSM, 2020 in Appendix 10 of the ID EIS for further information).

As outlined in EcoSM, 2020 (Appendix 10 of the ID EIS) crossings of 5 Mile Gully and Billy's Gully will be required for linear infrastructure (i.e. haul roads, transmission line, water pipelines, dragline walk route) with potential for vegetation clearing, construction impacts, and changes to flow (depending on design criteria of the crossings). There will be no direct impacts to remnant vegetation associated with 5 Mile Gully. However, where linear infrastructure crosses Billy's Gully, impacts to remnant least concern vegetation (i.e. RE 11.3.25) will be required.

A summary of the potential fauna habitat areas proposed to be cleared for each EPBC Act listed species is outlined below in Table 2 and included in EcoSM, 2020. It is important to note that the impact areas are not additive as for example, Koala and Greater Glider habitats overlap.

Table 2: Fauna habitat within the disturbance footprint

Species	EPBC Act conservation status	Total area of potential suitable habitat within the ID footprint (ha)
Greater Glider	Vulnerable	131.9
Squatter Pigeon (southern)	Vulnerable	120.9 (breeding and foraging)
Ornamental Snake	Vulnerable	122.1
Koala	Vulnerable	173.5

4.2 Indirect impacts

The Project has potential to have indirect impacts on the ecological values of the remaining vegetation and habitat following the proposed clearing. The potential for indirect impacts to occur are primarily related to:

- Habitat fragmentation and associated habitat degradation such as edge effects;
- Potential spread and/or introduction of weeds and pest animals;
- Increased noise, vibration, dust and light;
- Potential fauna injury and/or mortality due to vehicle strikes; and
- Erosion of disturbed areas leading to increased sedimentation of waterways.

4.2.1 Habitat fragmentation

Vegetation clearing can result in fragmenting the remaining habitat which can have adverse impacts on fauna species by restricting or inhibiting fauna movement. Clearing for this Project will further fragment habitat.

The majority of the Project's footprint is located in non-remnant vegetation (Figure 3). However, fragmentation of remnant vegetation will result where linear infrastructure (i.e. roads, transmission lines, water pipelines, clean water diversion) intersects with remnant vegetation mapped in the southern portion of the Project and along Billy's Gully. This has the potential to fragment fauna habitat and create barriers (i.e. cleared corridors) which may impair movement of some species, and impact connectivity of habitat. In some areas, fragmentation may isolate some smaller vegetation polygons. However, many areas within the study area were found to already be cleared and fragmented due to cattle grazing, as well as the presence of existing roads.

The Project will result in a reduction in the width of remnant vegetation associated with Isaac River corridor. However, the connectivity of remnant riparian vegetation along the length of the Isaac River riparian corridor will be maintained, not severed by the Project layout. A 50 to 200 m setback between the proposed construction area for the levee and the high bank of the Isaac River has been included in the Project layout. This setback is consistent with the above recommendations to maintain terrestrial habitat associated with watercourses. The width of the setback and to some extent the levee itself, will reduce the penetration of indirect impacts such as light, dust and noise, generated from the mine into the Isaac River riparian corridor. In addition, a number of measures are proposed to manage these indirect impacts to the extent they will not have a significant impact on retained habitat adjacent to the mine. As shown in the detailed levee drawings in AEIS Chapter 4 and the RE mapping in Figure 10 of Appendix 10 to the ID AEIS, vegetation associated with RE 11.3.25 along the Isaac River riparian corridor will not be impacted. There are some small areas of vegetation clearing associated with RE 11.3.4 in the northern section of the levee, but the buffer zone in this area is up to 200 m, and was designed to maximise avoidance of impacts on RE 11.3.4. In the southern section of the levee, RE 11.3.2 is within the footprint of the Project, but this RE is described as Poplar Box woodland on alluvial plains, and is in an area subject to grazing, historical fragmentation and with a moderately degraded

groundcover with exotic pasture species. However, areas of RE 11.3.2 that fringe RE 11.3.25 remain within the buffer zone and will not be impacted.

It is unlikely that mining operations will deter fauna from using the riparian corridor and adjacent habitats. Further, the remnant vegetation communities and associated fauna habitat on the opposite side of the Isaac River to the Project, will be retained and are also unlikely to be significantly affected by indirect impacts. It is anticipated that the Isaac River riparian corridor will continue to provide safe movement opportunities for dispersing wildlife, as well as providing refuge during extended dry periods and natural disturbances such as bushfire.

4.2.2 Pest plants and animals

The ID is located within a highly modified landscape of grazing activities, and coal mining infrastructure. Hence, weeds, introduced plants and some feral predators are present. During the ecological assessments undertaken for the Project, eight Queensland declared pest plants were recorded with and included Mother of Millions, Rubber Vine, Harrisia Cactus, Bellyache Bush, Common Lantana, Common Prickly Pear, Velvety Tree Pear and Parthenium (EcoSM, 2020). Buffel Grass, although not a declared weed but a significant environmental weed, was also common throughout the Project area. Although the potential exists for the Project to introduce weeds through vehicles, plant, workers and materials that will enter site from various locations, it is unlikely as the Project area is already highly disturbed and as such, the proposed works are unlikely to increase the presence of weeds.

Several pest animals were recorded during the ecological surveys including the Cane Toad, Wild Dogs, Feral Cats, Feral Pig and European Rabbit. Although not seen, it is likely the European Fox and Black Rat are also present within the Project area. As these animals can readily move throughout the landscape, activities from the Project are unlikely to introduce new pest animals to the area (refer to Risk Assessment in Section 8.0).

Although the Project is unlikely to introduce new plant and animal pests or lead to an increase of pests, the Project has management measures in place at the adjacent IPM to manage plant and animal pests, and these will be extended to ID. These measures are outlined in Section 5.7.

Impacts from pest animals and plants have the potential to impact on all MNES species shown in Table 2.

4.2.3 Predation

The ecological assessments identified Wild Dogs and Feral Cats as being present in the Project area and the European Fox and Feral Pigs as likely to be present. The Greater Glider, Squatter Pigeon, Ornamental Snake and Koala all suffer from predation to varying degrees and predation is listed as a threat in the respective species EPBC Act conservation advice. Feral fauna pests as well as wild dogs all have the potential to prey on these species. Predation impacts will be mitigated through the implementation of plant and pest animal management and monitoring measures, based on the existing Isaac Plains Mine.

Predation from feral animals has the potential to impact on the Greater Glider, Squatter Pigeon, Koala and Ornamental Snake.

4.2.4 Noise and vibration

Noise and vibration will be generated from a range of sources including mining equipment and operations, excavators and blasting activities.

Noise from these activities may cause changes to the behavioural ecology of some species by modifying feeding, foraging and breeding activities (Francis & Barber, 2013). However, most fauna species exhibit a range of adaptive responses to noise impacts. Depending on the extent and duration of construction and operational noise generated, some species may respond by moving away from the areas where noise is being generated and where a decrease in the ecological values of these habitats has occurred such as within the riparian corridors.

The ID Project is adjacent to the existing IPM and will extend mining activities to the south of the Peak Downs Highway. Hence, mining activities will continue in a similar manner to that which is currently occurring including similar levels of operational noise. Any potential noise and vibration impacts are likely to be minimal as the Project area is already impacted by noise and vibration from the existing operation and the change in noise and vibration generated from this Project is not considered to be

significant. Further, the fauna species listed in Section 3.3 are already inhabiting the site or in the case of Koala, have the potential to inhabit the site.

Impacts on fauna from ground vibration (e.g. from blasting) will be similar to noise disturbance. It is possible that some species would move away from areas close to the vibration source, where the intensity of the vibration exceeds the tolerance of the species. This is likely to be greatest in the vicinity of the open cut pit but is also considered a temporary impact. The ecological values within the Project area are therefore not likely to be impacted, in the long term, by ground vibration from the ID Project.

In accordance with the existing IPM approvals, specific noise and vibration management actions are currently being implemented which are focused on impacts to humans and their place of residence (sensitive receptors). In the absence of specific fauna measures, these management actions will be extended to this Project and are outlined in Section 5.7.

Impacts from noise and vibration has the potential to impact on all MNES species shown in Table 2, although, with the proposed site management measures, this is not predicted to be a significant impact (EcoSM, 2020).

4.2.5 Dust

Mining activities, including construction and operation will generate dust which has the potential to impact on vegetation/fauna habitat through reducing the health of vegetation and foraging resources for fauna that are in close proximity to mined and/or disturbed areas.

The existing IPM immediately to the north of this Project, currently utilises dust minimisation and suppression management actions including watering of haul roads and air quality monitoring. These management actions will continue with this Project and are outlined in Section 5.7. Further, vegetation clearing will be progressive and gradual, which will minimise disturbance areas and areas of bare ground with the potential to generate dust. Mined areas will undergo progressive rehabilitation to further reduce dust generation and associated impacts to vegetation and fauna.

Impacts from dust has the potential to impact on all MNES species shown in Table 2, although, with the proposed site management measures, this is not predicted to be a significant impact (EcoSM, 2020).

4.2.6 Light

The Project has the potential to generate additional artificial light within and adjacent to the mine activity areas. Potential impacts from artificial light include altered behaviour with some species attracted to the new light source whereas others are repelled or unaffected (Stone et. al., 2012). Hence, the extent of impacts will vary between species and will depend on habitat being utilised and the direction and intensity of the artificial light (Bennie et. al., 2015). The fauna species present on site are likely to have some degree of habituation to artificial lighting as the current IPM currently generates light as does the Peak Downs Highway, Goonyella Rail Line and Millennium Mine.

The ID Project will have limited additional light sources, and these will be limited to operational areas within the open cut pits, overburden piles and vehicles. As the mining operation will be progressive, a relatively small proportion of the Project area will be operational at any one time as lights will only be used in the operating areas of the mine at night. Further, as lighting will be directed towards the open cut pits and existing buildings, light spill will be mainly confined to the light source with minimal glare into the surrounding vegetation and undisturbed areas. Lighting impacts from vehicles travelling along the haul road will also be transitory and irregular.

Light spill has the potential to impact on the Greater Glider, Squatter Pigeon, Koala and Ornamental Snake, although, with the proposed site management measures, this is not predicted to be a significant impact (EcoSM, 2020).

4.2.7 Vehicle strike

The construction and operation of mining haul roads have the potential to impact fauna through vehicle strikes that lead to injury or mortality. Ground dwelling or semi-arboreal mammals are more prone to vehicle strikes although birds and reptiles such as Squatter Pigeons and Ornamental Snakes may also be impacted. The dedicated ROM haul road is proposed to be located largely within cleared areas, which would reduce the incidence of vehicle strike (EcoSM, 2020). Nevertheless, some mortality of animals as a result of vehicle strike is likely, particularly in areas where haul roads cross through remnant vegetation. However, this impact is not expected to be significant and the impact would only occur for the duration of mining activities (approximately 16 years).

Vehicle strikes have the potential to impact on the Squatter Pigeon, Koala and Ornamental Snake, although, with the proposed site management measures, this is not predicted to be a significant impact (EcoSM, 2020).

4.2.8 Erosion and sediment control

The Project has the potential to cause erosion from vegetation clearing for the open cut pit, flood levee and the construction of haul roads and associated mining infrastructure. This is particularly relevant where linear infrastructure will be constructed across Billy's Gully. Erosion, if not managed, the associated surface runoff can lead to increased sediment loads within local waterways.

Erosion and sedimentation of waterways, in the absence of controls, has the potential to impact on the Squatter Pigeon and Ornamental Snake.

4.2.9 Fire

Fire has the potential to result in either temporary or permanent loss of vegetative cover, microhabitat and hollow bearing trees (particularly stags) which in turn, has the potential to impact on terrestrial fauna and ecological values. The Project is not expected to alter fire regimes.

The risk of fire associated with the Project is considered unlikely. Under Queensland's *Coal Mining Safety and Health Act 1999*, mining operations in general have detailed safety practices due to the operational health and safety implications of fire. The current fire management measures being implemented at the Isaac Plains Mine will be extended to this Project and updated where necessary as determined by the Senior Site Executive and the General Manager – Operations.

Impacts from fire has the potential to impact on all MNES species shown in Table 2.

4.2.10 Altered flood regimes

Surface drainage features in the ID ecology study area are the Isaac River to Billy's Gully in the northern portion; an unnamed tributary in the southern portion (referred to as Southern Gully) and 5 Mile Gully which extends through the central portion of the study area. These waterways are ephemeral and characterised by short-duration flows following periods of high rainfall.

Sustained changes to flow regimes can influence the riparian and floodplain ecosystems through influencing abiotic conditions (e.g. soil anoxia and toxicity) and life-cycle processes such as adult mortality, timing of flowering and fruit-set, recruitment and seedling survivorship. The main components of flow regime can be described as follows (WRM 2020):

- Timing – when water is present, can vary within and between years
- Frequency – how often does flooding and drying occur
- Duration – how long does inundation last
- Extent and depth – the area of inundation and depth of water
- Rate of change (variability) – how quickly flow changes from one magnitude to another (e.g. the slope of the rising or fallings limbs of a hydrograph). The minimal changes in hydrology will occur and therefore, have very low potential to impact on the Greater Glider, Squatter Pigeon, Koala and Ornamental Snake.

Timing, frequency and duration are primarily driven by rainfall, seasonality and climate patterns that will not be directly influenced by the Project. Therefore, the Project will not impact timing, frequency and duration of the flow regime. However, the extent and depth of water across the floodplain, and the rate of change (variability) may be changed as result of the levee during operations or the final landform post mining. Whilst changes in duration of flood events will not be affected by the Project, the rate of change over the duration of different flood events at different locations has been assessed (WRM 2020). It is noted that the levee will prevent areas to north of the Isaac River from experiencing flooding during the life of the Project. However, the majority of vegetation and fauna habitat in the pre-mining 1:1,000 flood extent area will be removed for construction and operation of the mine. Hence, these ecosystems are directly impacted by mining operations, not by changes to flow regime (EcoSM, 2020).

Hydrological and hydraulic modelling has been undertaken for the Project (WRM2020). Modelling for the operational and post-mining scenarios has demonstrated that changes to flow regime associated with Project for the 1 in 2 (39% AEP), 1 in 10 (10% AEP), 1 in 20 (5% AEP) year flood events remain generally confined to the channel of the Isaac River with little to no overbank flows occurring and no

predicted changes on flood depths and velocities for events up to and including the 5% AEP event (WRM 2020). As per the existing conditions, more substantial overtopping of the Isaac River banks occurs during the 1 in 50 year (2% AEP) flood event, and less frequent flood events (1 in 100 year and 1 in 1,000 year events) (EcoSM, 2020).

Modelling indicates that the flow regime parameters are generally similar, and often remain unchanged between the existing, operational and post-mining conditions for most flood events. Further, the ecosystems associated with the Isaac River riparian corridor and floodplain will experience negligible to minor change in the depth of inundation between the existing, operational and post-mining scenarios. Moreover, for the 1 in 20 year, 1 in 50 year and 1 in 100 year flood events, the depth of inundation remains largely unchanged between the three scenarios. Minor increases in the depth of flooding are modelled to occur during the 1 in 1,000 year event for the operational period. However, this scale of event is unlikely to occur during the life of the Project and the minor modelled increase in depth during operations is further reduced in the post-mining landform scenario (EcoSM, 2020).

A similar pattern is observed for peak velocities experienced by riparian corridor and floodplain ecosystems. The peak velocities modelled across the floodplain during the operational and post-mining periods are similar to the existing conditions, with peak velocities occurring along the centre of the Isaac River channel (i.e. not across the floodplain). In addition, modelling showed that the duration of inundation does not change between the existing, operational and post-mining scenarios (EcoSM, 2020).

The hydrological modelling shows negligible changes to the flow regime for regular flood events that are more likely to occur during the life of the Project (i.e. 1 in 20 year, 1 in 50 year); and negligible to minor changes for rarer (i.e. 1 in 100, 1 in 1,000 year) flood events. Localised and brief changes in depth and velocity during flood events that have been modelled during the operational period (i.e. 16 years); however, the duration of flood events experienced remains unchanged. Further, minor modelled changes in depth and velocity are further reduced during the post-mining period and return to being similar or unchanged from the existing scenario. It is therefore unlikely that the minor changes to depth and velocity modelled for the operational period will translate into major shifts in the structure and composition of riparian and floodplain vegetation and hence, impact on MNES.

4.3 Impact duration

The duration and timing of the Project's impacts has important effects on the magnitude of the overall impacts of the Project. Vegetation clearing for pit and infrastructure development is the principal direct impact from this Project to vegetation communities and fauna habitat. The Project is proposed to have a relatively short mine life of approximately 16 years. Clearing will take place progressively as pit development progresses. Progressive rehabilitation will occur, with final rehabilitation at completion of mining activities. Disturbed areas will be rehabilitated to a stable landform with a self-sustaining vegetation cover.

5.0 Mitigation and management measures

The objectives, performance criteria, mitigation and management measures and monitoring have been chosen based on practicalities of implementing the measures and programs, recent IPM approval conditions and anticipated EA conditions (using the IPM EA's as a reference) approval conditions, relevant coal mining legislative requirements and current approved management measures and monitoring programs for the existing and adjacent IPM.

Of particular importance are the *Coal Mining Safety and Health Act 1999* (CMSHA) and *Coal Mining Safety and Health Regulation 2017* (CMSHR) which govern all coal mining operations in Queensland. The CMSHA prescribes statutory obligations to ensure that coal mines operate under an acceptable level of risk. A major requirement is the development and implementation of a Safety and Health Management System (SHMS) for operation of the mine which is based on a risk assessment of all hazards present at the mine. Adherence to the requirements of the CMSHA and CMSHR is of particular relevance to this SSMP as it outlines statutory provisions for matters such as fire management, management of haul roads, vehicle speeds and dust suppression which are applicable to the management of impacts to MNES.

5.1 Management objectives

The main objectives of this SSMP are to:

- Ensure no clearing/disturbance to MNES habitats occurs beyond the disturbance limits of the ID footprint as outlined in the ID EIS and AEIS;
- Prevent injury or mortality of MNES fauna during construction, operation and decommissioning of the Project; and
- Manage remaining areas of MNES habitats to maintain condition and habitat quality for the threatened fauna species outlined in Section 3.3 through weed, pest and fire management and limiting disturbance to exclusion areas.

Specific management objectives to be achieved through the implementation of this SSMP and the associated performance criteria related to each management objective are shown in Table 3.

Table 3: Habitat management objectives and performance criteria

SMP management objectives	Performance criteria
Limit or avoid loss of MNES and/or habitat for MNES.	• Clearing of habitat for MNES does not occur outside of the approved and proposed disturbance footprints. • No net loss of habitat for the Koala and Greater Glider outside of the approved disturbance limits. • No net loss of permanent water sources for the Squatter Pigeon outside of the approved disturbance limits. • No net loss of habitat for the Squatter Pigeon outside of the approved disturbance limits. • No net loss of Ornamental Snake habitat outside of the approved disturbance limits. • Rehabilitation of disturbed areas will be rehabilitated in accordance with the Project's Rehabilitation Management Plan.
Prevent habitat degradation and a decline in habitat values within habitat adjacent to that within the Project area (i.e. habitat not proposed to be cleared for the Project or previously approved mining activities a IPC).	• Maintain habitat quality within the retained MNES habitat in relation to baseline habitat quality scores outlined in EcoSM, 2020). • Rehabilitation of disturbed areas will be rehabilitated in accordance with the Project's Rehabilitation Management Plan.

SMP management objectives	Performance criteria
Minimise risk of weed introduction and/or the spread of existing weed species in habitat area for MNES.	- No new weed species are established in areas of MNES habitat areas based on baseline data. - Spreading of weeds does not occur as in areas of retained MNES habitat compared to baseline habitat quality surveys.
Reduce habitat degradation and potential predation on MNES by pest animals.	- No new pest animal species are established in areas of MNES habitat in comparison to baseline data. - Reduction in pest animal numbers in areas of habitat for MNES to below baseline levels.
Minimise impact of dust deposition on habitat for MNES during construction and operation of the Project.	- Dust deposition does not exceed 120 mg per square metre per day, averaged over one month when measured at any sensitive receptor - Dust is monitored in accordance with the ID Dust Management Plan.
Minimise noise and vibration impacts in areas of MNES habitat.	When measured, noise and vibration levels at sensitive receptors do not exceed the general criteria set out in the ID Management Plan.
Minimise degradation of habitat for MNES from an increased risk of fire due resulting from Project activities.	No uncontrolled fires within the Project area resulting from Project related activities.
Minimise alteration of Squatter Pigeon and Ornamental Snake habitat from changes to water quality and hydraulic activity.	- Water quality is maintained within the ID Project area and does not exceed the receiving waters trigger levels at downstream monitoring sites listed in the IPM Receiving Environment Monitoring Program which will be updated to include the ID Project. - Water quality monitoring is undertaken in accordance with the ID Receiving Environment Monitoring Program.
Minimise potential for mortality or injury to MNES fauna from Project activities (e.g. habitat clearing, vehicle strikes etc).	- No mortality or injury to MNES fauna as a result of Project activities (e.g. from clearing activities, vehicle strikes etc). - Ensure vehicle speed limits are enforced. - Provide fauna recognition training to make staff aware of the local fauna species. - A fauna spotter/catcher will be present for all clearing activities. - Pre-clearance surveys will be undertaken.

5.2 Relevant plans and guidelines

Table 4 lists the conservation advice and plans relevant to each of the MNES species covered by this SMP. These documents have been reviewed in preparing the SSMP to capture those management objectives and measures outlined in Table 5 that are specific to each of the threatened species and to address the key threatening processes to each MNES.

Table 4: Relevant conservation advice, recovery plans and threat abatement plans, and relationships to management objectives and measures outlined in Table 5

MNES	Relevant conservation advice and plans	Main threats	Management objectives for this SMP
Koala (<i>Phascolarctos cinereus</i>)	Approved Conservation Advice for <i>Phascolarctos cinereus</i> , Koala (combined populations in Queensland, New South Wales and the Australian Capital Territory), (SEWPaC, 2012).	Habitat loss/fragmentation, vehicle strike and predation.	- Limit or avoid loss of MNES and/or habitat for MNES. - Prevent habitat degradation and a decline in habitat values within the retained habitat adjacent to the Project area and mining areas. - Reduce habitat degradation and potential predation on MNES by pest animals. - Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc).
Greater Glider (<i>Petauroides volans</i>)	Conservation Advice for <i>Petauroides Volans</i> , Greater Glider (TSSC, 2016).	Habitat loss/fragmentation, fires and predation from owls.	- Limit or avoid loss of MNES and/or habitat/connectivity for MNES. - Prevent habitat degradation and a decline in habitat values within the retained habitat adjacent to the Project area and mining areas. - Reduce habitat degradation and potential predation on MNES by pest animals. - Minimise risk of degradation of habitat for MNES through onsite fire management and prevention practices for the Project.
Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>)	- Approved Conservation Advice for <i>Geophaps scripta scripta</i> (Squatter Pigeon (southern)) (TSSC, 2015); - Threat abatement plan for predation	- Habitat clearing. - Livestock and feral herbivore grazing. - Predation, by Feral Cats and European Foxes. - Feral Cat control strategies.	- Limit or avoid loss of MNES and/or habitat for MNES. - Reduce habitat degradation and potential predation on MNES by pest animals. - Minimise impacts of dust deposition on habitat for

MNES	Relevant conservation advice and plans	Main threats	Management objectives for this SMP
	by feral cats (Commonwealth of Australia, 2015). - Threat abatement plan for competition and land degradation by rabbits (Commonwealth of Australia, 2016). - Threat abatement plan for predation by the European red fox (DEWHA 2008a).	European Fox control strategies.	MNES during construction and operation of the Project. Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc).
Ornamental Snake (<i>Denisonia maculata</i>)	Approved Conservation Advice for <i>Denisonia maculata</i> (Ornamental Snake) (DotE, 2014).	Habitat clearing and degradation of habitat including wetland and frog habitat by Feral Pigs.	- Limit or avoid loss of MNES and/or habitat for MNES. - Prevent habitat degradation and a decline in habitat values within the retained habitat adjacent to the Project area and mining areas. - Reduce habitat degradation and potential predation on MNES by pest animals. - Minimise impacts of dust deposition on habitat for MNES during construction and operation of the Project. - Minimise habitat alteration from changes to water quality and hydraulic activity. - Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc).

Management and mitigation measures have been specified to address the general requirements of these plans (refer to Table 5) in relation to:

- Avoid loss of MNES habitat through unauthorised vegetation and habitat clearing (all species)
- Minimising the risk of direct harm to threatened fauna during vegetation clearing and construction of the Project (all species)
- Staff and contractor awareness of threatened fauna in the Project area (all species)

- Minimising the risk of vehicle strike to threatened fauna during construction, operation and decommissioning of the Project (primarily Koala, Squatter Pigeon and Ornamental Snake)
- Fire management to minimise risk of fire (all species)
- Pest plant and animal management within the Project area to minimise predation and the spread of weeds and reduce the extent of weed species and pest animals within and in habitats adjacent the Project area (all species)
- Appropriate rehabilitation that returns habitat features and food resources to the Project area (all species).

5.3 General management actions

Planning and management of disturbances for the proposed mine extension were assessed taking into consideration the expected requirements of approval conditions as well as a set of hierarchical management principles as outlined in State and Commonwealth offset policies. These actions are designed to avoid impacts, minimise impacts and mitigate impacts to the environmental values including threatened fauna.

This SSMP has been developed considering these management principles (in order of preference) with relevance to impacts on threatened fauna species:

- *Avoidance:* Avoiding direct and indirect adverse impacts where possible through Project design
- *Minimise:* Minimising direct and indirect adverse impacts where impacts cannot be avoided through modifying design, the timing of construction or employing specialist clearing and construction methods
- *Mitigate:* Implement mitigation and management actions to unavoidable impacts, through design management actions and rehabilitation
- *Remediation and rehabilitation:* Actively and progressively remediate and rehabilitate impacted areas to promote and maintain long-term recovery
- *Provide offsets:* Stanmore will be required to provide suitable offsets for activities that result in unavoidable significant residual adverse impacts to MNES. These offsets will be provided in accordance with the final EPBC approval conditions.

The hierarchy of management actions will be applied to all activities with the aim of minimising impacts to threatened MNES fauna species.

5.4 Design phase strategy

The Project aimed at utilising existing infrastructure where possible to minimise impacts to MNES. Where this has not been possible such as additional access tracks and haul roads, the designs have minimised the overall footprint as much as practicable.

5.5 Pre-construction and construction phase strategy

As part of the vegetation clearing and soil disturbance phases of the activity, pre-clearance surveys undertaken by suitably qualified ecologists will assess the presence of EPBC Act listed threatened fauna species within 48 hours of the disturbance activities and relocate any detected native fauna to suitable habitat outside of the disturbance areas. Qualified Fauna Spotter/Catchers will oversee all vegetation clearing works, with the most suitable ratio of Fauna Spotter/Catcher per machine undertaking clearing activities to be determined by the Qualified Fauna Spotter prior to commencement of clearing activities. This will allow animals to be relocated away from the disturbance area if necessary and for disturbance activities to cease until any danger to the health and wellbeing of fauna has passed.

5.6 Rehabilitation, operation and maintenance phase strategy

To minimise impacts to terrestrial fauna caused by habitat loss, habitat degradation and erosion, rehabilitation of disturbed areas will occur, including the riparian corridor crossings. Rehabilitation and decommissioning will be undertaken in accordance with the rehabilitation requirements of the final EPBC

approval conditions and the final ID conditions including a Rehabilitation Management Plan, with the aim of providing a stable landform with a self-sustaining vegetation cover.

The final ID approval and Rehabilitation Management Plan will include rehabilitation goals, objectives, indicators and completion criteria for the Project for each mine domain. The mine domains are split into mine infrastructure, overburden emplacement areas and final void. Other than the final void, all domains have a post mining grazing land use. Completion criteria, including foliage and ground cover, soil quality, plant regeneration, presence of key plant species, weed abundance, and achievement of grazing land use classification in accordance with Queensland Guideline for Agricultural Land Evaluation, are conditioned to demonstrate the suitability of rehabilitation areas.

The final ID approval and Rehabilitation Management Plan will also set milestones for when the rehabilitation schedule must be completed, including progressive rehabilitation of overburden emplacement areas, and reshaping to final landform design, topsoiling and seeding. Rehabilitation monitoring will be undertaken in accordance with the requirements of the yet to be approved EA (it is expected this will be similar to the IPM EA) to identify if rehabilitation goals, objectives, indicators and completion criteria are being achieved, and to take remedial action where monitoring shows this is required.

5.7 Management measures

This section of the SSMP outlines a series of management measures designed to avoid and/or mitigate potential impacts to threatened fauna species, based on known threats to each species identified in Section 3.3. Table 5 outlines relevant management measures that will be undertaken to mitigate, manage and monitor the impacts of the Project on MNES, and achieve the objectives for habitat management.

The management objectives, performance criteria, management and monitoring activities outlined in Table 5 have been developed based on baseline field surveys and considering operational practicalities. Development has also been undertaken in accordance with the key threats and recommended priority actions as outlined in the species-specific recovery plans, threat abatement plans and conservation advice.

Table 5: Measures to avoid/mitigate impacts to EPBC Act listed threatened fauna

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
Limit or avoid loss of MNES and/or habitat for MNES.	- Clearing of habitat for MNES does not occur outside of approved disturbance limits and does not exceed the disturbance limits detailed in Table 1 of this SSMP. - No loss of habitat for the Koala, Greater Glider, Ornamental Snake outside of the approved disturbance limits. - No loss of habitat and permanent water sources for the Squatter Pigeon outside of the approved disturbance limits. - Rehabilitation of disturbed areas will be rehabilitated in accordance with the Project's Rehabilitation Management Plan.	- Infrastructure will be sited in accordance with the State and Commonwealth approval conditions. - Areas requiring vegetation removal will be clearly delineated to ensure disturbance to areas being retained is avoided. Limits of clearing are to be delineated using barricading or temporary fencing and signage prior to works commencing. Exclusion areas are to be clearly shown and labelled on all operational and management drawings and plans. GIS shapefiles will be provided to clearing personnel and/or contractors prior to the commencement of clearing operations. - Where exclusion fencing is required, consideration shall be given to fauna movement, current land uses and worker safety requirements. - Permanent water sources for retention such as farm dams outside of the disturbance limits will be clearly delineated and shown and labelled on all operational and management drawings and plans. - Avoid where possible and within the constraints of the mining schedule, impacting on MNES habitat during breeding periods through timing of clearing and creek disturbance activities to avoid the main breeding season of impacted MNES (i.e. mid dry season to wet season for Squatter Pigeon).	- Clearing of MNES habitat exceeds the approved disturbance limits in Table 1 of this SSMP and/or occurs outside of any approved disturbance limits. - Disturbance to permanent water sources, which may provide habitat for Squatter Pigeons and Ornamental Snakes, outside of the disturbance areas. - Rehabilitation and decommissioning fails to meet the objectives of the Rehabilitation Management Plan.	- Fauna Spotter will monitor, and record clearing activities and all fauna encountered. - The Environmental Officer (EO) will monitor and record the total area of MNES habitat cleared every quarter and assess against the disturbance limits outlined in Table 1 of this SSMP. - Auditing of the Permit to Disturb will be undertaken quarterly by the EO to ensure any disturbance has been undertaken in accordance with the requirements of the Permit to Disturb, this SSMP and approval conditions and to ensure no unauthorised disturbance has occurred. - Rehabilitation monitoring will be undertaken in accordance with Rehabilitation Monitoring Plan that will be required by the final approval conditions.	- Should clearing of habitat for MNES exceed the approved disturbance limits in Table 1 of this SSMP and/or occur outside of the Project footprint, clearing, works are to cease immediately, and DAWE notified of the incident within five business days. The incident will be recorded in the Project's environmental and incident reporting system register. - Following clearing, the area will be assessed within 20 business days by a suitably qualified expert with corrective actions provided to the DAWE via a Corrective Action Contingency Plan. - The Plan will include a schedule to implement the corrective actions. - Should rehabilitation and decommissioning fail to meet the objectives, completion criteria and schedule of the Rehabilitation Management Plan, the reasons of the failure will be investigated.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		• Prior to entry to the Project area, all site personnel including contractors shall be made aware via toolbox talks and site information sheets, of the sensitive environs they will be working in and around and be advised of specific limitations to construction works being undertaken in or adjacent to threatened fauna habitat. All staff and contractors will be required to report sightings of relevant fauna in the activity area to the EO immediately. • An internal 'Permit to Disturb' system will be used by the EO to ensure that all clearing activities are authorised prior to disturbance. Conditions listed in the Permit to Disturb must be implemented. • The EO or delegate will routinely inspect the disturbance limit boundaries to ensure that no clearing or disturbance of vegetation or habitat beyond the approved limits has taken place. • Temporary stockpile sites for soil and equipment, access routes, laydown areas and other associated infrastructure will, as far as reasonably practical, be located in cleared areas and will not be situated in areas of MNES habitat. • Prior to construction activities commencing, signage, including speed limits, will be erected in the vicinity of exclusion areas to warn of the potential presence of threatened fauna in the area. • Pre-clearance surveys will be undertaken by a suitably qualified ecologist using approved			Corrective Actions: • The Corrective Actions identified in the Corrective Action Contingency Plan and approved by DAWE will be implemented and may include additional rehabilitation or offsets or provision of additional permanent water sources for the Squatter Pigeon and/or Ornamental Snake prey. • Within 20 business days of a rehabilitation trigger being activated, a Contingency Plan will be developed by a suitably qualified expert to address the reason for the failure and identify appropriate Corrective Actions.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		State and Commonwealth survey guidelines within 48 hours before clearing activities commencing. - The pre-clearance survey will be undertaken in order to: - Record the location of all hollow bearing trees, log piles and nests using a GPS. Features of tree hollows (diameter, number and whether active/inactive) will be recorded in the Environmental Diary/Register; and - Relocate all captured non-breeding animals to suitable habitat adjacent to the disturbance area and within the Project Area. - A Fauna Spotter will be present for all clearing activities and will conduct a walk-through survey prior to commencement of clearing and prior to clearing works each day to check vegetation and other fauna habitats. - The Fauna Spotter will reinspect the area of cleared vegetation immediately after clearing to locate any potentially injured fauna that will then be taken to a wildlife carer or veterinarian. - Vegetation clearing will be undertaken progressively and trees will be felled in the direction of the clearance zone to avoid impacts to adjoining retained vegetation and habitat. - Hollow bearing trees will be clearly flagged and surrounding vegetation removed with			

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		the hollow bearing tree left standing for at least one night to encourage fauna to relocate of its own accord. Hollow bearing trees will be inspected to determine if hollows are occupied. • If after one night the resident fauna have not moved on, the hollow entrance will be blocked with a towel or similar and the hollow removed by cutting below the hollow section. The hollow with the animal inside will then be installed in nearby similar and adjoining vegetation to be retained at a similar height and orientation with the entrance unblocked at dusk. • If the procedure described above is not possible for any reason, hollow-bearing trees will be felled using a tree grab or similar that can remove the tree in a controlled fashion. If possible and safe to do so, hollow trees will be felled at dusk to allow fauna the opportunity to disperse during their normal activity period. These trees will be felled away from hollow openings. The tree will be knocked at the base several times prior to felling to encourage fauna to relocate of their own accord. Once the tree is felled, it will be inspected for any fauna and any injured fauna rescued and taken to a wildlife carer or veterinarian. • Any fauna that is captured will be relocated into the adjacent habitat at least 200 m from the clearing area if clearing works are yet to be completed. • Where threatened fauna is identified and delaying the clearing of area is not feasible,			

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		(i.e. the clearing is critical to the activity schedule), a 50 m exclusion zone will be established and the area must not be disturbed for a minimum of 24 hours while clearing is undertaken around the exclusion zone. After 24 hours, a Fauna Spotter/Catcher may relocate the breeding animal to suitable habitat at least 200 m away from the disturbance area. Where survival of young or eggs is unlikely as a result of the disturbance, these are to be handed over to a previously identified wildlife carer or veterinarian.			
Prevent habitat degradation and a decline in habitat values within the retained habitat adjacent to the Project area and mining areas.	Maintain habitat quality scores within the retained MNES habitat in relation to baseline habitat quality scores.	• Areas of MNES habitat adjacent to the disturbance footprint and within mining leases, will be clearly delineated and shown and labelled on all operational and management drawings and plans. GIS shapefiles will be provided to clearing personnel and/or contractors prior to the commencement of clearing operations. • Site access is only to occur along designated site access tracks. No unauthorised access is permitted. • Prior to commencement of the action signage, including speed limits, will be erected to warn of the potential presence of threatened fauna in the area. • Posters will be developed and displayed in meeting areas that reminds staff and contractors about the MNES present in the Project area. • Prior to entry to the Project area, all site personnel including contractors shall be	The habitat quality score in areas of retained MNES are not maintained (e.g. habitat falls below the baseline habitat quality score).	• Habitat quality assessments will be integrated with the existing IPM monitoring program. Specific ID monitoring will be undertaken every two (2) years in retained vegetation that provides habitat for MNES. Monitoring will be undertaken in accordance with relevant Commonwealth survey guidelines and the State guidelines guide for determining terrestrial habitat quality.	• Where inadvertent disturbance to MNES habitat occurs, an investigation will be undertaken. • Should a decline in the habitat quality scores be observed, the cause will be investigated, and a Corrective Actions Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the decline being detected. The Plan will include appropriate corrective actions and an implementation schedule for those actions. The DAWE will be notified within 20 business days of

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		made aware via toolbox talks and site information sheets, of the sensitive environs they will be working in and around and be advised of specific limitations to construction and/or operational works being undertaken in or adjacent to threatened fauna habitat. All staff and contractors will be required to report sightings of MNES fauna to the EO immediately - Where tree hollows that are suspected as being used by Greater Gliders are identified from within the disturbance area, they are to be salvaged to the greatest extent possible and relocated within retained vegetation. As far as practical, the site of the relocation is to be within retained vegetation (within gliding distance of other trees) and replicate the height and orientation of the original breeding or nesting structure. Sections of hollow branch or log will be secured in the new location by mechanical means deemed appropriate by the Fauna Spotter/Catcher (e.g. bolts, metal bands). Relocation is to be undertaken under the supervision of a spotter/catcher. - Selected trees and/or logs will be salvaged and reused as fauna habitat to enhance retained vegetation habitat values (Riparian areas). Trees and other habitat features to be salvaged will be identified and flagged by the Fauna Spotter/Catcher during the walk-through survey and/or clearance activities. - If an occupied tree hollow cannot be relocated the breeding habitat should be replaced nearby and in retained vegetation			the decline in habitat quality. Corrective Actions: - Corrective actions identified in the Plan will be implemented within 30 days of the trigger being detected. Depending on the cause of the decline in habitat quality scores, potential corrective actions may include: - Rehabilitation of MNES habitat. - Additional environmental awareness training to workers regarding MNES. - Increasing pest animal and weed control measures or revising the type of measures implemented. - Increasing the frequency of dust suppression techniques. - Repair fences if damaged, or installation of new fencing.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		(but at least 200 m away from the disturbance area) in undisturbed habitat, with an artificial nesting structure at a ratio of 1:1 using current best practice nest box design. - Implementation of dust suppression techniques in accordance with the Dust Management Plan and the CMSHA and the CMSHR. - Maintenance of existing fences. - Maintenance of existing water management infrastructure and erosion and sediment control devices. - Pest animals and weeds will be managed in accordance with the Project's Weed and Pest Management Plan. - Light spill will be directed to the open cut pits to minimise light spill. - The use of low wattage lighting with light spill guards.			Provision of additional offsets if required.
Minimise risk of weed introduction and/or the spread of existing weed species in habitat area for MNES.	- No new weed species are established in areas of MNES habitat based on baseline data. - Spreading of weeds does not occur relative to baseline data.	- Weeds will be managed in accordance with the existing Project's Weed and Pest Management Plan. - The Plan includes the following: - A site induction program that provides weed management information to staff, contractors and visitors. - Detailed control measures aimed at eradicating where possible, or otherwise reducing the extent of weeds in accordance with the Queensland Department of Agriculture and Fisheries	- An increase in the average percent (%) cover score of weed species from baseline and/or previous monitoring events. - Detection of weed species not previously recorded in the Project area during baseline and/or previous monitoring events.	- Monitoring of weeds outside of the disturbance areas will be undertaken during the habitat quality assessment surveys. - Monitoring will be undertaken every two years (refer to Section 6.1.3).	Should an increase in weed cover or presence of new weed species be observed, an investigation will be undertaken to determine the cause. This will involve reviewing adherence to the Weed and Pest Management Plan and an assessment of the distribution of weeds within the Project area in relation to baseline to

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		(DAF) guidelines and the requirements of the <i>Biosecurity Act 2014</i>. ○ Weed washdown procedures for all vehicles brought to site that will be traveling beyond the site office carpark. ○ Targeted weed control measures within the Project area.			determine the cause of the incursions. • From the investigation, a Corrective Action Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the trigger being detected. The Contingency Plan will include appropriate corrective actions and an implementation schedule for those corrective actions. Corrective Actions: • Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected. • Potential corrective actions may include: ○ Increasing the frequency and/or duration of weed control efforts. ○ Investigating and/or implementing alternate weed management control actions. ○ Amending weed hygiene practices.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
					Updating the Weed and Pest Management Plan.
Reduce habitat degradation and potential predation on MNES by pest animals.	- No new pest animal species are established in areas of MNES habitat in comparison to baseline data. - Reduction in pest animal numbers in areas of habitat for MNES to below baseline levels.	- Pest animals will be managed in accordance with the ID Weed and Pest Management Plan. - The Weed and Pest Management Plan will include requirements for: - Appropriate waste management and waste disposal. - A reporting framework to ensure sightings of pest animals are recorded. - Site inductions to include information on pest animals including control requirements, importance of appropriate waste management and reporting requirements when pest animals are observed within the Project area during construction and operation activities. - Control of pest animals. - Pest management actions outlined in the Weed and Pest Management Plan will primarily focus on those pest animals identified within the Project area and include Cane Toads, Feral Cats, Wild Dogs, House Mice and European Rabbits and that have a potential to impact on MNES and their habitat. Additional pests will be included as necessary if identified as occurring within the Project area during the habitat quality monitoring program (e.g. European Foxes and Feral Pigs).	- Observed increase in sightings/signs and/or the relative abundance of pest animals in areas of retained MNES habitat above baseline levels. - Direct observation, or signs of, a pest animal not identified as occurring within the Project area during the baseline surveys.	- Monitoring of weeds outside of the disturbance areas will be undertaken during the habitat quality assessment surveys. - Monitoring will be undertaken every two years (refer to Section 6.1.4).	- Should evidence of pest animals show an increase compared to baseline, undertake an investigation to assess possible reasons for the increase (e.g. inappropriate waste management leading to increased pest animals). - Should predation of MNES be observed, undertake an investigation to assess possible reasons for the incident(s). - Review adherence to the Project's Weed and Pest Management Plan. - From the investigation, a Corrective Actions Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the trigger being detected. The Contingency Plan will include appropriate corrective actions and an implementation schedule for those corrective actions. Corrective Actions:

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting and will be undertaken in accordance with site safety and health requirements, and DAF guidelines and the requirements of the <i>Biosecurity Act 2014</i> and as permitted under the SHMS.			- Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected. - Potential corrective actions may include: - Increasing the frequency and/or duration of pest animal control efforts. - Investigating and/or implementing alternate pest animal control methods in consultation with Queensland Department of Agriculture and Fisheries (DAF). - Updating the exiting Weed and Pest Management Plan to include new species where relevant.
Minimise impacts of dust deposition on habitat for MNES during construction and operation of the Project.	- Dust deposition does not exceed 120 mg per square metre per day, averaged over one month when measured at any sensitive receptor. - Dust is monitored in accordance with the	- Dust suppression will be undertaken in accordance with the Dust Management Plan and include the following actions: - Staging vegetation clearing to minimise areas of disturbed and bare ground. - Progressively rehabilitating disturbed areas.	- Dust deposition levels exceed 120 mg per square metre per day when averaged over one month at sensitive receptors. - Visual inspections of vegetation adjacent to the disturbance areas show	- Monitoring of dust deposition will be undertaken in accordance with EA approval conditions and the Project's Dust Management Plan. - Existing monitoring includes visual inspections	If dust deposition monitoring exceeds the trigger value of 120 mg per square metre averaged over one month, Stanmore must investigate whether the exceedance is a result of Project activities and notify the administering

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	Dust Management Plan.	- Removal and dumping of overburden as soon as reasonably practical following blasting activities - Regular watering of haul roads and access tracks in accordance with the CMSHR. - Dust suppression spraying of stockpiles. - Limiting grading and/or dozing in high dust generating areas. - Limiting overburden drilling. - Enforcing speed limits in accordance with the requirements of the CMSHA and CMSHR.	visible signs of dust deposition.	of vegetation adjacent to the disturbance areas.	authority within seven days of the exceedance occurring. - Should an exceedance of dust deposition levels be attributed to Project activities Stanmore will implement dust abatement measures. Corrective Actions: - Corrective actions identified in the Dust Management plan will be implemented within 10 days of the trigger being detected.
Minimise noise and vibration impacts in areas of MNES habitat.	When measured, noise and vibration levels do not exceed criteria set out in the approval conditions.	- Regularly maintaining and servicing all plant equipment to minimise machinery noise. - All engine covers will be kept closed while equipment is operating. - Blasting will only occur between 9am and 7pm.	- When measured at sensitive receptors noise and vibration levels exceed criteria set out in the approval conditions. - When blasting occurs outside of the approved blast times.	Noise and vibration monitoring will be undertaken in accordance with monitoring requirements set out in the approval conditions.	- If noise and vibration monitoring exceed the trigger values outlined, Stanmore must investigate whether the exceedances are the result of the mining activities and notify the administering authority within seven days of the exceedance occurring. - Should exceedance levels be attributed to mining activities, noise and vibration abatement measures will be implemented. Corrective Actions:

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
					Corrective actions identified during investigations will be implemented within 10 days of the trigger being detected.
Minimise risk of degradation of habitat for MNES through onsite fire management and prevention practices for the Project.	No uncontrolled fires within the Project area resulting from Project related activities.	- Fire management for coal mining operations in Queensland is governed by the CMSHA and the CMSHR with the CMSHR prescribing management of fires for coal mines. - Section 37 of the CMSHR prescribes that the coal mines Safety and Health Management System (SHMS) must include standard operating procedures for action to be taken when a fire is discovered at the mine. - Buffers will be maintained around potential ignition sources such as plant and machinery, haul roads and mine infrastructure areas. - Prior to site entry, all relevant site personnel, including contractors, will be made aware of fire safety and risks. - Fuel loads will be minimised and managed through the weed control measures outlined in the ID Weed and Pest Management Plan.	- An uncontrolled fire occurs within the Project area that is due to mining activities. - Weed cover exceeds baseline levels and groundcover biomass (e.g. vegetation) exceeds benchmark levels.	- Compliance with the SHMS will be monitored in accordance with the requirements of the CMSHA and CMSHR. - Monitoring of biomass (groundcover including organic litter) for fire management will be undertaken during the habitat quality assessments that will occur every two (2) years thereafter (refer to Section 6.1.2).	- Should an uncontrolled fire occur within the Project area, the existing IPM Emergency Response Plan will be enacted. Should any corrective actions and changes to fire management be required, they will be done in accordance with the CMSHA and CMSHR and incorporated into the SHMS. - Should biomass monitoring indicate that there is a risk of an uncontrolled fire occurring, biomass control measures will be assessed by a suitably qualified ecologist within 20 business days and Corrective Actions suggested. Biomass control measures aimed at reducing fuel loads may include controlled burns, strategic grazing or modified weed management measures.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
					Corrective Actions: Any corrective actions identified will be implemented within 30 days of the trigger being detected.
Minimise alteration of MNES riparian habitat from changes to water quality, hydraulic activity.	- Water quality, as a result of the Project, does not exceed the receiving waters trigger levels at downstream monitoring sites listed in the approval conditions. - Water quality monitoring is undertaken in accordance with the Receiving Environment Monitoring Program (REMP). - Erosion and sediment control is undertaken in accordance with the Erosion and Sediment Control Plan (ESCP). - Maintain riparian habitat quality scores within the retained MNES habitat in relation to baseline	- Site stormwater management will be undertaken in accordance with the management plans and programs required by the approval conditions including a REMP. - The site specific WMP, REMP and ESCP as well as other water management requirements as outlined in the approval conditions. - Required management plans will be implemented with the aim of minimising alterations to receiving environment water quality erosion, minimising mobilisation of sediments and minimising erosion related disturbances to the current hydrological regime. - The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters. - Spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.	- Water quality monitoring exceeds the approved receiving environment trigger levels outlined in the approval conditions. - Visual inspections of water management infrastructure show signs of failure. - The habitat quality score in areas of retained riparian vegetation are not maintained (e.g. habitat falls below the baseline habitat quality score).	- Water quality monitoring will be undertaken in accordance with the approval conditions and REMP. - Monitoring of the effectiveness of the erosion and sediment control devices and water management infrastructure will be undertaken in accordance with approval conditions. - Habitat quality assessments will be undertaken every two (2) years in retained vegetation that provides habitat for MNES.	- If water quality characteristics of the downstream monitoring point exceed those trigger levels outlined in the final EA, and these levels are higher than upstream monitoring locations, Stanmore must investigate the exceedance and the potential for environmental harm and provide a written report to the administering authority as part of the Project's Annual Return. - Should an exceedance of water quality trigger levels be attributed to Project activities, an assessment on the effectiveness of the WMP and REMP will be undertaken and appropriate Corrective Actions included in Plan revisions and the Annual reports in accordance with approval conditions. - Should a decline in the riparian habitat quality scores be observed, the

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	habitat quality scores.				cause will be investigated, and a Corrective Actions Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the decline being detected. The Plan will include appropriate corrective actions and an implementation schedule for those actions. The DAWE will be notified within 20 business days of the decline in habitat quality. Corrective Actions: Corrective actions identified will be implemented within 10 days of the trigger being detected.
Minimise potential for mortality or injury to MNES fauna from Project activities (e.g. habitat clearing, vehicle strikes etc).	No mortality of, or injuries to, MNES fauna as a result of Project activities (e.g. from clearing activities, vehicle strikes etc).	- Environmental awareness training will be provided to all workers as part of site induction and will include specific topics on MNES, risks and protective measures, and identification of the MNES fauna. - Pre-clearance surveys will be undertaken within 48 hours prior to clearing activities to assess the presence of MNES fauna within the disturbance area to be cleared. - At least one qualified Fauna Spotter/Catcher will be present during clearing activities.	Injury or mortality to an MNES fauna.	- All personnel will be required to report any interactions between vehicles and/or machinery and MNES fauna in the Project area. - Visual observations during normal working hours. - Incidental observations during habitat quality assessments.	- Should there be an injury to, or mortality of, an MNES fauna, an investigation will be undertaken to ascertain the cause of the injury or mortality. - Should the injury or mortality be attributed to mining activities, a Contingency Plan will be developed by a suitably qualified ecologist within 20

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		• A wildlife carer will be called to collect any injured fauna. • Speed limits of 60 km/hr will be set and enforced on all internal roads including haul roads, with the exception of creek crossings at night which will have 40 km/hr limits. • Vehicles must abide by vehicle speed limits and access to any restricted areas or exclusion zones must be limited to critical site-specific activities to minimise threats to MNES fauna. • All injured fauna encountered during the construction and operation of the activity will be taken to a wildlife carer/facility or veterinarian within 24 hours. • Where injured fauna is encountered, and it is unsafe to handle the animals, the following should be undertaken: ○ The location of the injured animal will be identified so it can be located again ○ The species of animal will be identified if possible and its sex and approximate size determined ○ The type of injury sustained will be identified if possible ○ The EO shall immediately contact Queensland's Department of Environment and Science (DES) and report the animal and arrange for its capture and transportation to a wildlife carer or veterinarian.			business days and will include Corrective Actions and an implementation schedule for the Corrective Actions. Corrective Actions: • Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected.

6.0 Monitoring

Stanmore has implemented a monitoring program for the existing IPM Projects. Monitoring required specially for the ID Project will be based on the existing monitoring program as the ID Project is immediately adjacent to the IPM project area. The aim of the monitoring program is to assess the effectiveness of the management measures outlined in the approved ID SSMP. A review of the existing monitoring program will be undertaken to ensure its applicability to the management measures outlined in Section 5.7 and to ensure the corrective actions and performance criteria outlined in Section 5.1 and Section 5.7 are achieved.

The monitoring methods are:

- Specific to the performance criteria being assessed and will determine whether the performance criteria have been achieved or whether corrective actions needed; and
- Quantitative and repeatable such that each monitoring event can be compared to each other to allow changes over time to be. Monitoring to assess the presence of weeds and pest animals was undertaken during the ecological surveys to support the Project approvals to establish a baseline for comparison against subsequent monitoring events. Ongoing monitoring will be outlined in the ID monitoring program and be undertaken every two (2) years as outlined in Section 6.1.2.

The overarching objectives of the monitoring program are to:

- Evaluate performance of the SSMP against performance criteria;
- Identify triggers requiring further action;
- Develop corrective actions if required; and
- Inform subsequent reviews and amendments to the SSMP and associated management plans.

6.1.1 General site inspections

General site inspections of the retained MNES habitat, erosion and sediment control devices, water storages, diversion drains and rehabilitated areas (once commenced) will be undertaken at least twice yearly to assess:

- Signs of erosion;
- Visible changes to water quality;
- Signs of damaged erosion and sediment control devices;
- Confirmation that all exclusion fencing and signage are intact;
- Seepage from water storages;
- Signs of dust deposition on vegetation adjacent to disturbance area;
- Any injured or dead MNES fauna; and
- Incidental observations of weeds and pest animals.

6.1.2 Habitat quality monitoring

Baseline ecological surveys were undertaken in September/October 2018 (dry season) and February/March 2019 as part of the ID approval process. Ongoing habitat quality monitoring will be undertaken at the monitoring points which were established during the baseline ecological surveys and specific monitoring for this Project will be include in a standalone ID monitoring program or combined into an overarching IPM monitoring program.

Habitat quality assessments undertaken by suitably qualified ecologists include the following methods as required by State and Commonwealth fauna survey guidelines:

- Infrared cameras;
- Funnel traps;
- Spotlighting;
- Diurnal bird surveys;

- Active searches;
- Koala/Greater Glider transects and scat searches; and
- Koala call playbacks.

The habitat quality assessments also include assessments of weed abundance and distribution and an assessment on the presence and relative abundance of pest animals.

Photo monitoring is undertaken at each monitoring location during the habitat quality assessments to allow habitat changes to be visually assessed over time. Photos at each photo monitoring point are taken in a north, east, south and westerly direction with a permanent feature included within the photo frame to provide a fixed reference point. A record of the photographs is maintained, including GPS co-ordinates, date, time, direction and the height above the ground the photograph was taken.

Data from habitat quality assessments and photo monitoring are recorded on survey sheets and these are attached to the monitoring reports that are included in the annual compliance reports.

6.1.3 Weed monitoring

The presence and distribution of weeds was initially assessed during the baseline ecological surveys that were undertaken in September/October 2018 and February/March 2019.

Ongoing weed surveys within the ID footprint will be undertaken every two years for the life of the ID approval and will be undertaken in conjunction with the habitat quality monitoring outlined in Section 6.1.2.

In addition to the permanent weed monitoring sites, all incidental observations of weeds are recorded from within the wider Project area, including through quarterly inspections of access points, access tracks and roads. This will provide instances of weed infestations that occur away from the permanent weed monitoring sites. If ID trigger levels for weeds are met or exceeded, additional monitoring will be undertaken and will occur in conjunction with appropriate management measures until the presence and distribution of weeds reduces to baseline levels or below.

6.1.4 Pest animals

An initial assessment of the presence and distribution of pest animals was undertaken during the baseline ecological surveys that were undertaken in September/October 2018 and February/March 2019.

Existing and ongoing pest animal surveys will be undertaken every two years for the life of the ID approval in conjunction with the habitat quality assessment surveys.

Pest animals are also opportunistically surveyed throughout the year outside of monitoring times, including observations for potential new pest animal species that have not been previously recorded, and which are known to prey on MNES or degrade MNES habitat. Any evidence of mortality or injury to MNES because of pest animals are being recorded during the surveys. If ID trigger levels for any pest animal species are met or exceeded, additional monitoring will be undertaken and will occur in conjunction with appropriate management measures until pest animal presence reduces to baseline levels or below.

6.1.5 Dust

Dust deposition is monitored in accordance with approval conditions and the Dust Management Plan. Dust monitoring will continue to be undertaken at all dust monitoring locations and the monitoring undertaken within the retained vegetation is to assess the impact of dust on retained MNES habitat. Dust within the retained vegetation is also being assessed for visual dust deposition during general site inspections including through quarterly inspections of access points, access tracks and roads.

Where monitoring is requested by the administering authority or because of a complaint, the administering authority must be notified of the results 14 days following completion of the monitoring.

6.1.6 Noise and vibration

Noise generated by mining activities is monitored in accordance with approval conditions.

Where monitoring is requested by the administering authority or because of a complaint, the administering authority must be notified of the results 14 days following completion of the monitoring. If the monitoring identifies an exceedance of the relevant noise limits at a sensitive receptor (that will be outlined in the approval conditions), the administering authority must be notified within seven (7) days of the exceedance occurring.

6.1.1 Water and erosion and sediment control

Water quality is monitored in accordance with the approval conditions and the required management plans, which includes locations, frequencies and monitoring criteria (trigger levels). Approval conditions are expected to outline water release points, the release limits and the contaminant trigger levels that must be monitored. Approval conditions are also expected to provide notification timeframes associated with the start and cessation of release events and stipulate reporting requirements and outline requirements for monitoring of water storages including monitoring locations and frequencies. Monitoring will be undertaken in accordance with all approval conditions and the REMP.

Visual inspection monitoring will also be undertaken for all erosion and sediment control devices and water storages immediately prior to the wet season (e.g. August – October) and following rainfall events >70 mm in 24 hours, unless approval conditions determine otherwise.

6.1.2 Fire

Fire management within the Project area is currently undertaken in accordance with the requirements of the CMSHA, CMSHR and the SHMS to mitigate fires from mining activities that have the potential to spread to MNES habitat. The CMSHR includes monitoring and review requirements for the SHMS.

Monitoring of biomass for fire management is undertaken during the habitat quality assessments as outlined in Section 6.1.2. The habitat quality monitoring attributes associated with ground covers such as grass cover, organic litter, coarse woody debris and weeds are surrogates for biomass. Should these surrogates show an increase beyond benchmark values, suitable management actions aimed at reducing biomass loads will be investigated by a suitably quantified expert in consultation with the site senior executive and within the requirements of the CMSHA, CMSHR and the SHMS.

7.0 Data management, reporting, implementation and auditing

7.1 Data management

The EO will be responsible for overseeing and managing all the monitoring activities and programs required as part of this SSMP, including maintaining data records.

7.2 Reporting

The results of all monitoring programs will be documented in stand-alone progress reports and combined into an annual compliance report. The annual report will be provided to DAWE and DES as required. The required compliance reports will include as a minimum an introduction, purpose, activities undertaken in the reporting period and a compliance table outlining compliance with approval conditions but also compliance with the management actions outlined in Table 5.

7.3 Implementation

Stanmore will not commence clearing of habitat for the MNES listed Table 1 of this SSMP until the ID Project (the action) has been approved by the Minister and all pre-construction approval conditions have been met. Following approval, this SSMP will be implemented and will remain effective for the life of the Project.

Habitat quality assessments including monitoring for the presence and distribution of weeds and pest animals will be undertaken at the habitat quality plots established during the baseline ecological surveys. Table 6 outlines an indicative monitoring implementation schedule.

Table 6: Proposed monitoring implantation schedule

	Year												
	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042	2044	2046
Ecological monitoring program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

7.4 Auditing and review

Internal audits/reviews of management and monitoring activities will be undertaken in response to a trigger for further action being detected (refer to Table 5) and potential non-compliance with SSMP requirements. External auditing will be undertaken in accordance with approval conditions and if directed by the Minister.

The effectiveness of actions within this SSMP will be reviewed two years after approval and implementation and the SSMP will be adapted to include additional or revised actions where necessary. This SSMP will then be reviewed every two years and immediately prior to the decommissioning phase of the Project.

The reviews will also assess the available monitoring data to determine the effectiveness of the management measures and the corrective actions outlined in Section 5.7 and Table 5. All monitoring data will be reviewed by suitably qualified ecologists and analysed using appropriate analytical methodologies as determined by the ecologist to assess any non-compliances with the actions outlined in Table 5.

8.0 Risk assessment

A risk assessment was undertaken using the risk assessment process provided by the DAWE to assess risks associated with failing to achieve the management objectives outlined in this SSMP for mitigating impacts to MNES. For each identified risk, the potential consequence of the risk (Table 7) was assessed against the likelihood of that risk occurring (Table 8) to determine an overall risk rating using the matrix in Table 9.

The consequence and likelihood of each risk occurring was assessed following the implementation of the management and mitigation measures (i.e. control measures) to provide a residual risk rating (Table 10).

Table 7: Consequence classification

Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Minor risk of failure to achieve the SMPs objectives. Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.
Moderate	Moderate risk of failure to achieve the SMPs objectives. Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.
High	High risk of failure to achieve the SMPs objectives. Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
Major	The SMPs objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.
Critical	The SMPs objectives are unable to be achieved, with no evidenced mitigation strategies.

Table 8: Likelihood classification

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)	
Highly likely	Is expected to occur in most circumstances.
Likely	Will probably occur during the life of the project.
Possible	Might occur during the life of the project.
Unlikely	Could occur but considered unlikely or doubtful.
Rare	May occur in exceptional circumstances.

Table 9: Risk Rating Matrix

		Consequence				
Likelihood		1. Minor	2. Moderate	3. High	4. Major	5. Critical
	5. Highly Likely	Medium	High	High	Severe	Severe
	4. Likely	Low	Medium	High	High	Severe
	3. Possible	Low	Medium	Medium	High	Severe
	2. Unlikely	Low	Low	Medium	High	High
	1. Rare	Low	Low	Low	Medium	High

For the purposes of this risk assessment, the risk levels are defined as follows:

- Severe: Unacceptable risk that must not proceed until suitable and comprehensive control measures have been adopted to reduce the level of risk.
- High: Moderate to critical consequences. Works should not proceed without considerations of additional actions to minimising the risk.
- Medium: Acceptable with formal review. Medium level risks require active monitoring due to the level of risk being acceptable.
- Low: Acceptable with active management not considered required.

Table 10: Risk assessment and management

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
Limit or avoid loss of MNES and/or habitat for MNES.	- Clearing of habitat for MNES occurs outside of the approved disturbance limits. - A loss of habitat for the Koala, Greater Glider and/or Ornamental Snake outside of the approved disturbance limits. - A loss of habitat and/or permanent water sources for the Squatter Pigeon outside the approved disturbance limits. - Disturbed areas are not rehabilitated in accordance with the Rehabilitation Management Plan.	- Clearing contractors unaware of the disturbance limits or MNES habitat. - Clearing occurs outside of the disturbance limits. - Rehabilitation is not undertaken in accordance with the Rehabilitation Management Plan	- Infrastructure will be sited in accordance with the State and Commonwealth approval conditions. - Areas requiring vegetation removal will be clearly delineated to ensure disturbance to areas being retained is avoided. Limits of clearing are to be delineated using barricading or temporary fencing and signage prior to works commencing. Exclusion areas are to be clearly shown and labelled on all operational and management drawings and plans. GIS shapefiles will be provided to clearing personnel and/or contractors prior to the commencement of clearing operations. - Where exclusion fencing is required, consideration shall be given to fauna movement, current land uses and worker safety requirements. - Permanent water sources for retention such as farm dams outside of the disturbance limits will be clearly delineated and shown and labelled on all operational and management drawings and plans - Avoid where possible and within the constraints of the mining schedule, impacting on MNES habitat during breeding periods through timing of clearing and creek disturbance activities to avoid the main breeding season of impacted MNES (i.e. late dry season to wet season). - Prior to entry to the Project area, all site personnel including contractors shall be made aware via	2	2	L

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			toolbox talks and site information sheets, of the sensitive environs they will be working in and around and be advised of specific limitations to construction works being undertaken in or adjacent to threatened fauna habitat. All staff and contractors will be required to report sightings of SMP relevant fauna in the activity area to the EO immediately. • An internal 'Permit to Disturb' system will be used by the EO to ensure that all clearing activities are authorised prior to disturbance. Conditions listed in the Permit to Disturb must be implemented. • The EO or delegate will routinely inspect the disturbance limit boundaries to ensure that no clearing or disturbance of vegetation or habitat beyond the approved limits has taken place. • Temporary stockpile sites for soil and equipment, access routes, laydown areas and other associated infrastructure will be located in cleared areas and will not be situated in areas of MNES habitat. • Prior to construction activities commencing, signage, including speed limits, will be erected in the vicinity of exclusion areas to warn of the potential presence of threatened fauna in the area. • Pre-clearance surveys will be undertaken by a suitably qualified ecologist using approved State and Commonwealth survey guidelines within 48 hours of clearing activities commencing. • The pre-clearance survey will be undertaken in order to:			

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			- Record the location of all hollow bearing trees, log piles and nests using a GPS. Features of tree hollows (diameter, number and whether active/inactive) will be recorded in the Environmental Diary/Register; and - Relocate all captured non-breeding animals to suitable habitat adjacent to the disturbance area and within the footprint area. - A Fauna Spotter will be present for all clearing activities and will conduct a walk-through survey prior to commencement of clearing and prior to clearing works each day to check vegetation and other fauna habitats. - The Fauna Spotter will reinspect the area of cleared vegetation immediately after clearing to locate any potentially injured fauna that should then be taken to a wildlife carer or veterinarian. - Vegetation clearing will be undertaken progressively, and trees will be felled in the direction of the clearance zone to avoid impacts to adjoining retained vegetation and habitat. - Hollow bearing trees will be clearly flagged, and surrounding vegetation removed with the hollow bearing tree left standing for at least one night to encourage fauna to relocate of its own accord. Hollow bearing trees will be inspected to determine if hollows are occupied. - If after one night the resident fauna have not moved on, the hollow entrance will be blocked with a towel or similar and the hollow removed by cutting below			

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			the hollow section. The hollow with the animal inside will then be installed in nearby similar and adjoining vegetation to be retained at a similar height and orientation with the entrance unblocked at dusk. • If the procedure described above is not possible for any reason, hollow-bearing trees will be felled using a tree grab or similar that can remove the tree in a controlled fashion. If possible and safe to do so, hollow trees will be felled at dusk to allow fauna the opportunity to disperse during their normal activity period. These trees will be felled away from hollow openings. The tree will be knocked at the base several times prior to felling to encourage fauna to relocate of their own accord. Once the tree is felled, it will be inspected for any fauna and any injured fauna rescued and taken to a wildlife carer or veterinarian. • Any fauna that is captured will be relocated into the adjacent habitat at least 200 m from the clearing area if clearing works are yet to be completed. • Where threatened fauna is identified and delaying the clearing of area is not feasible, (i.e. the clearing is critical to the activity schedule), a 50 m exclusion zone will be established and the area must not be disturbed for a minimum of 24 hours while clearing is undertaken around the exclusion zone. After 24 hours, a Fauna Spotter/Catcher may relocate the breeding animal to suitable habitat at least 200 m away from the disturbance area. Where survival of young or eggs is unlikely as a result of the			

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			disturbance, these are to be handed over to a previously identified wildlife carer or veterinarian.			
Prevent habitat degradation and a decline in habitat values within the retained habitat adjacent to the Project area and mining areas.	Habitat quality score within the retained MNES habitat falls below the baseline habitat quality score.	- Increased weed abundance or an introduction of new weed species due to mining activities. - Increased pest animal abundance or new pest animal species occur due to mining activities. - Uncontrolled fire from mining activities. - Increased dust deposition resulting from mining activities. - Altered flooding regimes impacts riparian vegetation.	- Areas of MNES habitat adjacent to the disturbance footprint and within the mining lease will be clearly delineated and shown and labelled on all operational and management drawings and plans. GIS shapefiles will be provided to clearing personnel and/or contractors prior to the commencement of clearing operations. - Site access is only to occur along designated site access tracks. No unauthorised access is permitted. - Prior to commencement of the action signage, including speed limits, will be erected to warn of the potential presence of threatened fauna in the area. - Posters will be developed and displayed in meeting areas that reminds staff and contractors about the MNES present in the Project area. - Prior to entry to the Project area, all site personnel including contractors shall be made aware via toolbox talks and site information sheets, of the sensitive environs they will be working in and around and be advised of specific limitations to construction and/or operational works being undertaken in or adjacent to threatened fauna habitat. All staff and contractors will be required to report sightings of MNES fauna to the EO immediately - Where tree hollows that are suspected as being used by Greater Gliders are identified from within the disturbance area, they are to be salvaged to the greatest extent possible and relocated within	3	2	M

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			retained vegetation. As far as practical, the site of the relocation is to be within retained vegetation (within gliding distance of other trees) and replicate the height and orientation of the original breeding or nesting structure. Sections of hollow branch or log will be secured in the new location by mechanical means deemed appropriate by the Fauna Spotter/Catcher (e.g. bolts, metal bands). Relocation is to be undertaken under the supervision of a spotter/catcher. - Selected trees and/or logs will be salvaged and reused as fauna habitat to enhance retained vegetation habitat values (e.g. riparian areas). Trees and other habitat features to be salvaged will be identified and flagged by the Fauna Spotter/Catcher during the walk-through survey and/or clearance activities. - If an occupied tree hollow cannot be relocated the breeding habitat should be replaced nearby and in retained vegetation (but at least 200 m away from the disturbance area) in undisturbed habitat, with an artificial nesting structure at a ratio of 1:1 using current best practice nest box design. - Implementation of dust suppression techniques in accordance with the Dust Management Plan and the CMSHA and the CMSHR. - Maintenance of existing fences. - Pest animals and weeds will be managed in accordance with the Project's Weed and Pest Management Plan.			

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			- Light spill we be directed to the open cut pits to minimise light spill. - The use of low wattage lighting with light spill guards.			
Minimise risk of weed introduction and/or the spread of existing weed species in habitat area for MNES.	- Spread of existing weed species within Project area. - New weed species being established in areas of MNES habitat.	- Weed management not undertaken for the Project or a Weed and Pest Management Plan not developed. - Vehicle weed washdowns not occurring. - Targeted weed control not undertaken or ineffective.	- Weeds will be managed in accordance with the Project's Weed and Pest Management Plan. - The Plan will include the following: - A site induction program that provides weed management information to staff, contractors and visitors. - Detailed control measures aimed at eradicating where possible, or otherwise reducing the extent of weeds in accordance with the Queensland DAF guidelines and the requirements of the <i>Biosecurity Act 2014</i>. - Weed washdown procedures for all vehicles brought to site that will be traveling beyond the site office carpark. - Targeted weed control measures within the Project area.	2	2	L
Reduce habitat degradation and potential predation on MNES by pest animals.	- Increase in the relative abundance of (or signs of) pest animals in habitat for MNES. - Observation of (or signs of) a pest animal species not previously recorded in the Project site.	Pest animal management not undertaken for the Project or a Weed and Pest Management Plan not developed.	- Pest animals will be managed in accordance with the Project's Weed and Pest Management Plan. - The Project's Weed and Pest Management Plan includes requirements for: - Appropriate waste management and waste disposal.	2	2	L

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
	Predation of MNES by pest animals.	Pest animals within the Project area are not controlled.	- A reporting framework to ensure sightings of pest animals are recorded. - Site inductions to include information on pest animals including control requirements, importance of appropriate waste management and reporting requirements when pest animals are observed within the Project area during construction and operation activities. - Control of pest animals. - Pest management actions outlined in the Weed and Pest Management Plan will primarily focus on those pest animals identified within the Project area and include Cane Toads, Feral Cats, Wild Dogs, House Mice and European Rabbits and that have a potential to impact on MNES and their habitat. Additional pests will be included as necessary if identified as occurring within the Project area during the habitat quality monitoring program (e.g. European Foxes and Feral Pigs). - Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting and will be undertaken in accordance with site safety and health requirements, and DAF guidelines and the requirements of the <i>Biosecurity Act 2014</i> and as permitted under the SHMS.			
Minimise impacts of dust deposition on habitat for MNES during construction and	Dust deposition exceeds 120 mg per square meter per day, averaged over one	Vegetation not progressively cleared and excessive	Dust suppression will be undertaken in accordance with the Dust Management Plan and include the following actions:	3	1	L

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
operation of the Project.	month when measured at any sensitive receptor.	disturbed areas left exposed. - Progressive rehabilitation not undertaken. - Requirements of the Dust Management Plan not implemented. - Speed limits not observed or enforced.	- Staging vegetation clearing to minimise areas of disturbed and bare ground. - Progressively rehabilitating disturbed areas. - Removal and dumping of overburden as soon as reasonably practical following blasting activities - Regular watering of haul roads and access tracks in accordance with the CMSHR. - Dust suppression spraying of stockpiles. - Limiting grading and/or dozing in high dust generating areas. - Limiting overburden drilling. - Enforcing speed limits in accordance with the requirements of the CMSHA and CMSHR.			
Minimise noise and vibration impacts in areas of MNES habitat.	When measured, noise and vibration levels exceed criteria set out in the approval conditions.	- Mining operations not undertaken to minimise night time noise. - Machinery is poorly maintained. - Engines covers are left off or open during operation. - Blasting occurs outside the approved timeframes.	- Regularly maintaining and servicing all plant equipment to minimise machinery noise. - All engine covers will be kept closed while equipment is operating. - Blasting will only occur between 9am and 7pm.	2	1	L

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
Minimise risk of degradation of habitat for MNES through onsite fire management and prevention practices for the Project.	An uncontrolled fire occurs because of Project activities.	- Fire prevention as outlined in the SHMS is not adhered to. - Fire prevention mechanism are faulty or not maintained. - Buffers around ignition sources are not maintained. - Groundcover fuel loads increase past benchmark levels and are not managed.	- Fire management for coal mining operations in Queensland is governed by the CMSHA and the CMSHR with the CMSHR prescribing management of fires for coal mines. - Section 37 of the CMSHR prescribes that the coal mines Safety and Health Management System (SHMS) must include standard operating procedures for action to be taken when a fire is discovered at the mine. - Buffers will be maintained around potential ignition sources such as plant and machinery, haul roads and mine infrastructure areas. - Prior to site entry, all relevant site personnel, including contractors, will be made aware of fire safety and risks. - Fuel loads will be minimised and managed through the weed control measures outlined in the Weed and Pest Management Plan.	2	2	L
Minimise alteration of MNES riparian habitat from changes to water quality and hydraulic activity.	- Water quality, as a result of the Project, does not exceed the receiving waters trigger levels at downstream monitoring sites as outlined in the approval conditions. - Water quality monitoring is not undertaken as required by the REMP.	- Water releases exceed trigger levels. - ESCP devices not functional or damaged. - Water management not undertaken in accordance with the REMP or WMP.	- Site stormwater management will be undertaken in accordance with the management plans and programs required by the as outlined in the approval conditions and a Receiving Environment Monitoring Program (REMP). - The site specific WMP, REMP and ESCP as well as other water management requirements as outlined in approval conditions, will be implemented by a suitably qualified person - Required management plans will be implemented with the aim of minimising alterations to receiving	2	2	L

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
	Riparian vegetation decreases in quality.		environment water quality erosion, minimising mobilisation of sediments and minimising erosion related disturbances to the current hydrological regime. - The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters. - Spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.			
Minimise potential for mortality or injury to MNES fauna from Project activities (e.g. habitat clearing, vehicle strikes etc).	Injury or mortality of an MNES fauna occurs because of Project activities.	- MNES fauna are injured and/or killed from mining related activities. - Speed limits not adhered to.	- Environmental awareness training will be provided to all workers as part of site induction and will include specific topics on MNES fauna, risks and protective measures, and identification of the MNES fauna. - Pre-clearance surveys will be undertaken within 48 hours prior to clearing activities to assess the presence of MNES fauna within the disturbance area to be cleared. - At least one qualified Fauna Spotter/Catcher will be present during clearing activities. - A wildlife carer will be called to collect any injured fauna. - Day time speed limits of 60 km/hr will be set and enforced on all internal roads including haul roads.	2	2	L

Objectives for MNES Management	Risk	Event or Circumstance	Control Strategies	Residual Risk Rating		
				Likelihood	Consequence	Overall Risk Rating.
			- Night time speed limits at creek crossing at night will be limited to 40 km/hr. - Vehicles must abide by vehicle speed limits and access to any restricted areas or exclusion zones must be limited to critical site-specific activities to minimise threats to MNES fauna. - All injured fauna encountered during the construction and operation of the activity will be taken to a wildlife carer/facility or veterinarian within 24 hours. - Where injured fauna is encountered, and it is unsafe to handle the animals, the following should be undertaken; - The location of the injured animal will be identified so it can be located again - The species of animal will be identified if possible and its sex and approximate size determined - The type of injury sustained will be identified if possible - The EO shall immediately contact Queensland's Department of Environment and Science (DES) and report the animal and arrange for its capture and transportation to a wildlife carer or veterinarian.			

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