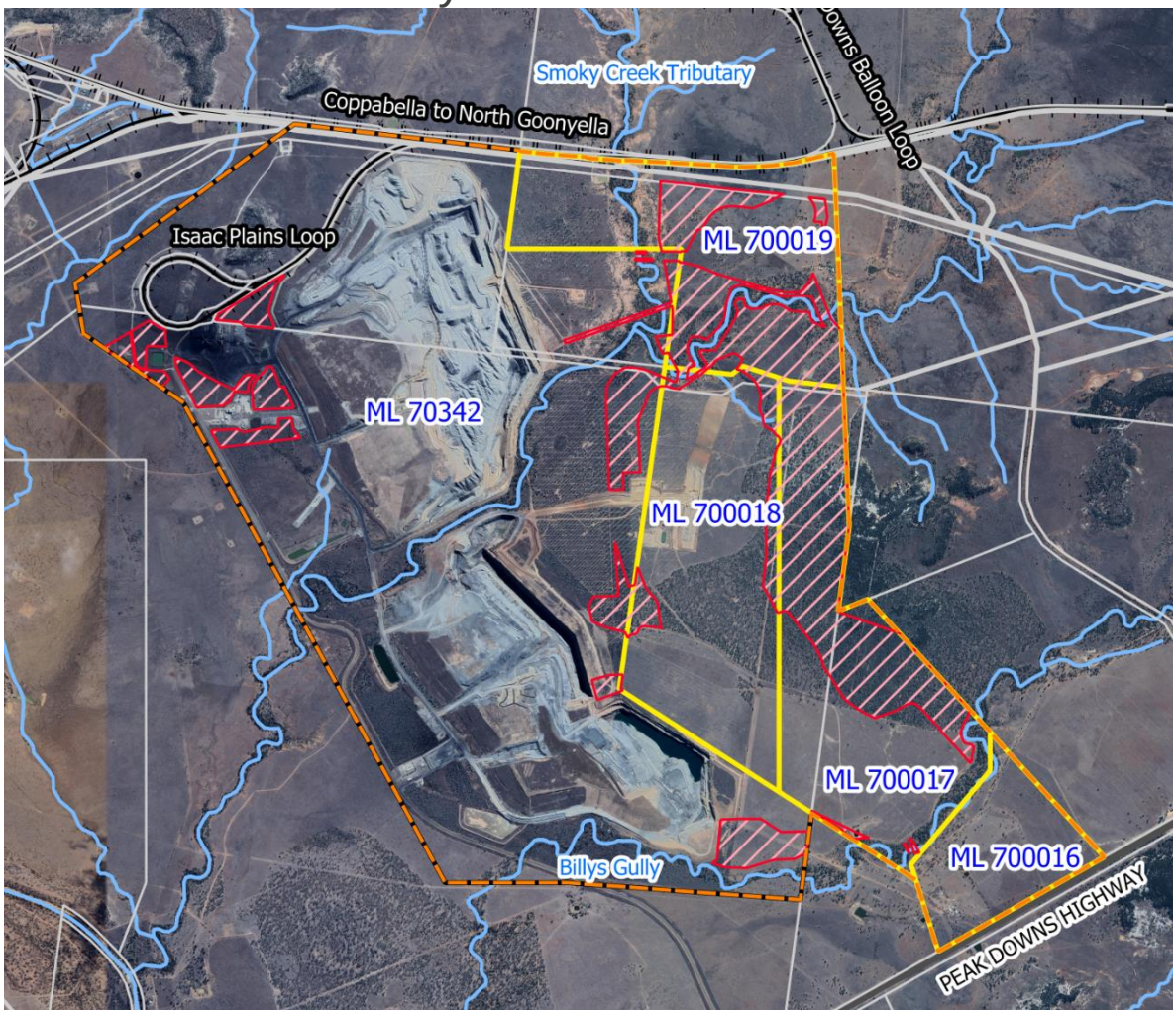
Isaac Plains East Extension – MNES Significant Species Management Plan

Stanmore IP Coal Pty Ltd



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Document Issue

Issue	Date	Prepared By	Reviewed/Approved By
Rev A DRAFT 1	1205/2020	Josh Tomarchio/Craig Streatfeild	Craig Streatfeild
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Rev 1 Final for PER	24/06/2020	Josh Tomarchio/Craig Streatfeild	Craig Streatfeild/Richard Oldham

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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 PER. The Action Area is the same as the Project area.
Threatened Species	Prescribed to a threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (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 as 'IPE Extension Project Area' 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 *Vegetation Management Act 1999.*
Regulated vegetation	Vegetation regulated through Queensland's *Planning Act 2016* and *Vegetation Management Act 1999.*
Remnant vegetation	Defined under the Queensland *Vegetation Management Act 1999* 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 *Environment Protection and Biodiversity Conservation Act 1999*. Threatened ecological community listed as Critically Endangered, Endangered or Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Regional ecosystems with an Endangered or Of Concern biodiversity status or *Vegetation Management Act 1999* status.
Threatened ecological community	A community listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Vegetation Management Act status	This is a statutory classification under the Queensland *Vegetation Management Act 1999*. 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 Coal Pty Ltd (Stanmore) to prepare this Significant Species Management Plan (SSMP) for potential impacts to listed Commonwealth fauna species from operations at the Isaac Plains East Extension (IPEE) Project (the Project, also referred to as the Extension). Stanmore is the operator of the Isaac Plains Complex (IPC), which comprises Isaac Plains Mine (IPM) and Isaac Plains East (IPE) mining areas. Stanmore is proposing to extend the mining area of the existing Isaac Plains East (IPE) mining area beyond the current approved disturbance footprint and increase production capacity at the IPM coal handling and preparation plant (CHPP).

The existing IPE Project was approved under the *Environmental Protection and Biodiversity Conservation Act 1999* (EBPC Act) (EPBC Approval 2016/7827), but the proposed extension area extends beyond the approved impact boundary. Therefore, the IPEE was referred to Commonwealth Department of Agriculture, Water and Environment (DAWE) for a determination as to whether the project required assessment and approval under the EPBC Act. DAWE notified Stanmore that the IPEE would be a controlled action and assessed via a Public Environment Report (PER).

As part of the existing IPE project and to address Conditions 3 and 4 of the IPE EPBC approval (EPBC 2016/7827), a Species Management Plan (SMP) was developed and approved by the then Department of Environment and Energy (DoEE). This SSMP has been developed as supporting information to the IPEE PER and to address the expectation that if approved, a SSMP would be required. This SSMP would operate in parallel with the approved SMP for the IPE Project.

1.1 Background

The IPC is an operating metallurgical open cut coal mine located approximately 5 km northeast of Moranbah in Central Queensland (see Figure 1). Mining operations are carried out under an existing State Government approved environmental authority (EA) and occurs across several approved mining leases (ML), namely ML 70342, ML 700016, ML 700017, ML 700018 and ML 700019.

The Isaac Plains Mine originally commenced operation in 2006 and produced approximately 2.8 million tonnes per annum (Mtpa) of coking coal for export to international markets. The Isaac Plains Mine was put into care and maintenance by the previous owners and was acquired by Stanmore in late 2015, who recommenced operations from the existing open cut pit. In 2018 approval was received from State and Commonwealth Governments for the IPE project which involved mining on ML 700016, ML 700017, ML 700018, ML 700019 (see Figure 2). State and Commonwealth approvals for the IPE Project limited the disturbance footprint of proposed activities within the approved mining leases.

The IPEE is immediately adjacent to the existing IPE mining area and involves additional disturbance areas, an increase to the total production volume and extends the duration of mining. The extension involves the expansion of the IPE open cut pits to the east which is estimated to extend the mining life by approximately four years. Additional supporting infrastructure such as haul roads, power lines and water management infrastructure are required to facilitate the extension and an existing upgrade to the CHPP and associated coal stockpiling areas within the IPM is proposed. While the IPEE footprint is located beyond the existing IPE mining area that has been approved under the EPBC Act, the extension areas are wholly contained within the existing mining leases (i.e. ML 70342, ML 700016, ML 700017, ML 700018 and ML 700019) (see Figure 2 and Figure 3 for disturbance footprints and existing habitat mapping).

1.2 Purpose

During the planning stage for the existing IPE and the proposed IPEE, 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). As such, the existing IPE Project was referred to the then Commonwealth Department of Environment and Energy (DoEE) in November 2016 (EPBC: 2016/7827) and approved by a delegate of the Minister with Conditions on 28 February 2018. Conditions 3 and 4 of the IPE approval required a SMP to be developed and approved by the Minister for management of impacts to listed Matters of National Environmental Significance (MNES). The SMP for the IPE Project was approved on 02 October 2018.

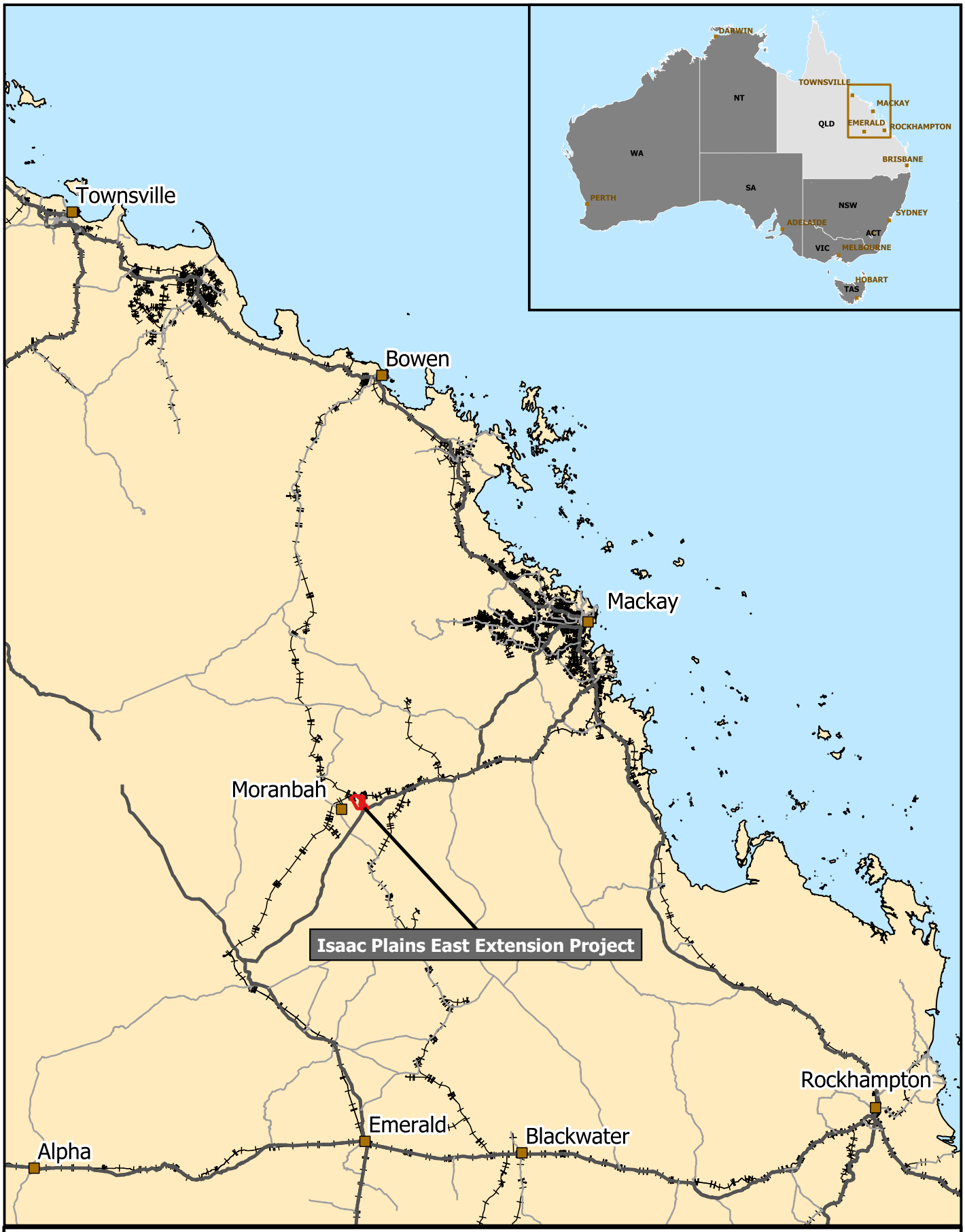
For the IPEE, Stanmore is required to provide appropriate management of the EPBC Act listed species within the Project area. Listed MNES occurring or potentially occurring within the IPEE footprint and for which this SSMP applies to are shown in Table 1, along with the quantum of habitat occurring within the IPEE footprint.

Table 1: Approved disturbance limits for MNES

MNES	EPBC Act status	Proposed disturbance limits offsets (ha)
Koala *(Phascolarctos cinereus)*	Vulnerable	207.8
Greater Glider *(Petauroides volans)*	Vulnerable	207.8
Squatter Pigeon (Southern) *(Geophaps scripta scripta)*	Vulnerable	117.1 (breeding) 63.6 (foraging) 38.6 (dispersal)
Ornamental Snake (*Denisonia maculata*)	Vulnerable	2.4
White-throated Needletail (*Hirundapus caudacutus*)	Vulnerable	188.1

This SSMP presents the management objectives and measures that are proposed to be implemented within the Project's mining leases for species management and to minimise impacts to current biodiversity values of the site. As the IPEE is immediately adjacent to the existing IPE, the MNES impacted are the same as those impacted by the IPE project. Therefore, the previously approved IPE SMP has been used as a basis for this SSMP and expanded on where necessary and relevant.

Although the IPEE Project has yet to be approved, this SSMP has been developed to support the PER for the project.



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Date: 15/05/2020
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Figure 1: Project Location

Legend

- Towns
- Railwork
- Highway
- Road
- Isaac Plains East Mine Boundary

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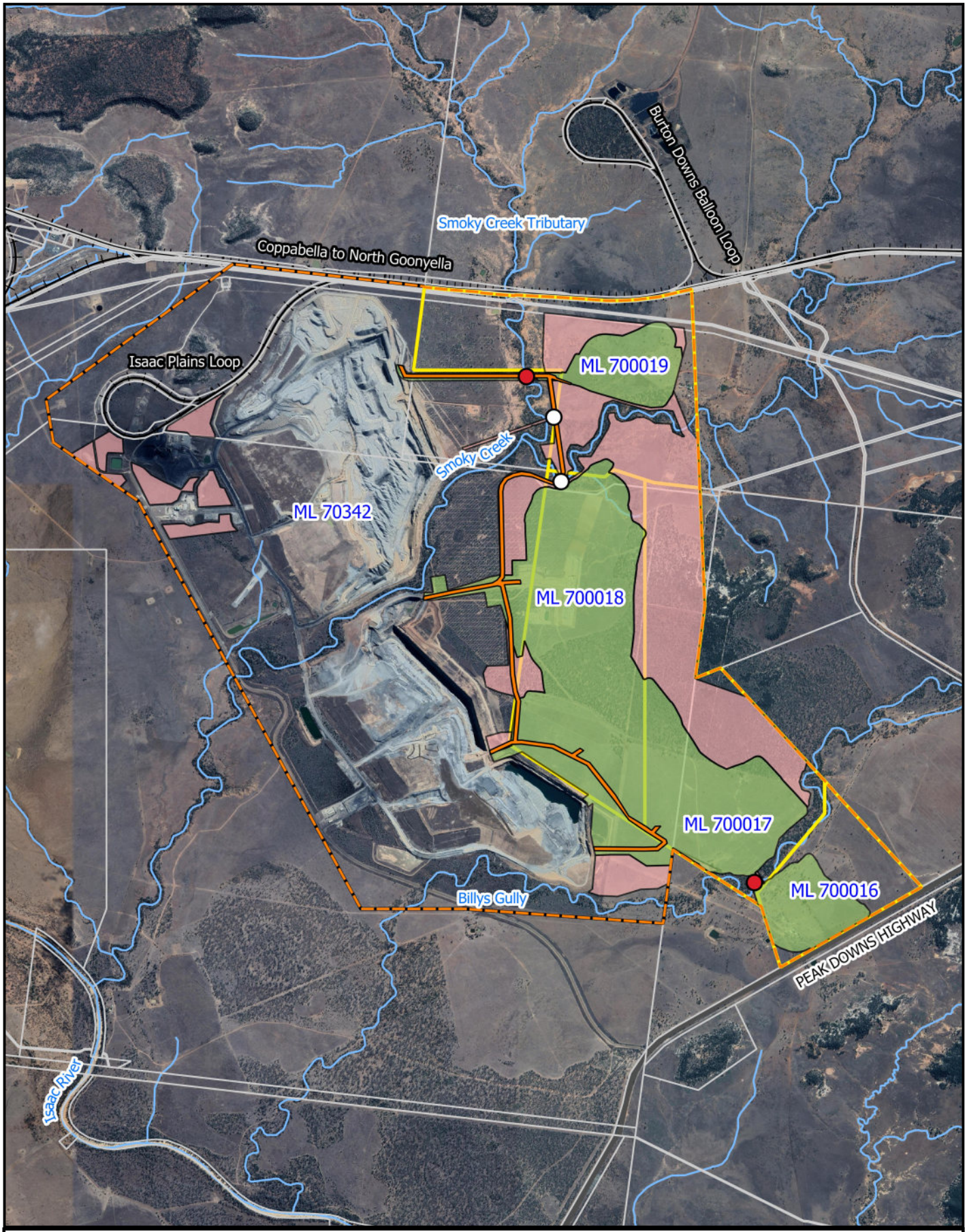

Figure 2: Project Layout and Disturbance Boundaries

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Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Legend

- New Culvert Crossing
- Upgraded Culvert Crossing
- Railway
- Watercourses
- Highways
- Isaac Plains Complex
- Existing Isaac Plains Mine
- IPE Mine Lease
- IPE Impact Area
- IPE Extension Project Area
- Haul Roads

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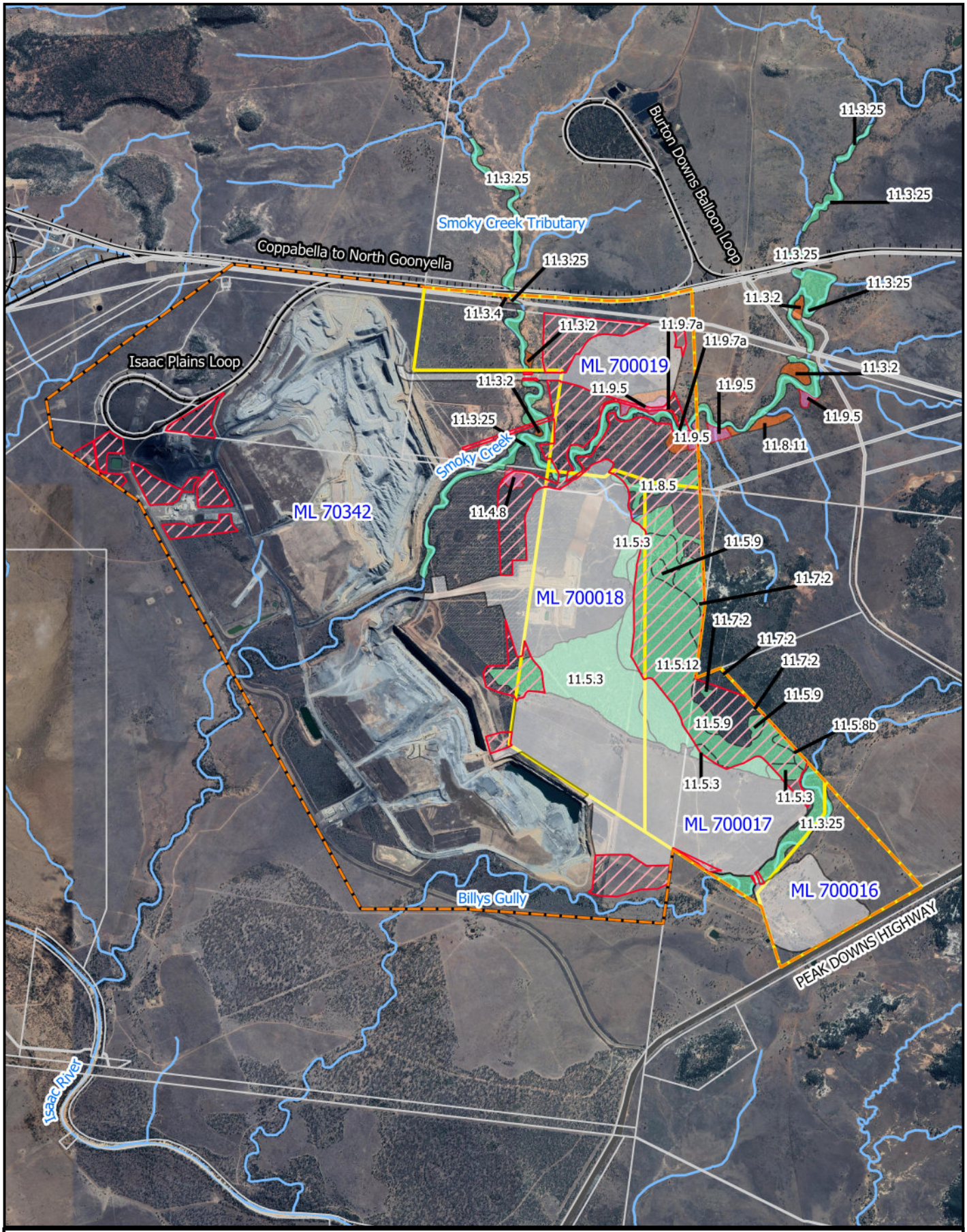

Figure 3: Project Layout and Disturbance Footprint

0 1 km

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Date: 01/06/2020
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Legend

- Railway
- Watercourses
- Highways
- Isaac Plains Complex
- Existing Isaac Plains Mine
- IPE Mine Lease
- IPE Impact Area
- IPE Extension Project Area

Regional Ecosystem
- Remnant Vegetation: Least Concern
- Remnant Vegetation: Of Concern

High Value Regrowth
- Endangered

BASE/

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, are relevant to this SSMP:

- Existing approved IPE Commonwealth Species Management Plan;
- Erosion and Sediment Control Plan;
- Dust Management Plan;
- Weed and Feral Animal Management Plan;
- Permit to Disturb;
- Rehabilitation Management and Monitoring Plan;
- Biodiversity Offsets Management Plan (OMP); 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 Mattes 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 IPEE project was referred to the DAWE on 27 September 2019. The DAWE determined on 31 January 2020 that the IPEE project would be a controlled action and assessed via a PER with the PER guidelines issued on 14 April 2020 (DAWE, 2020). This SSMP describes the management measures for listed species identified in the terrestrial ecology assessment for the Project with a moderate or greater likelihood of occurrence (EcoSM, 2020), and therefore, provides relevant information about management measures as required by the PER.

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, a number of detailed ecological surveys and assessments have been undertaken across the IPEE project area and include studies undertaken as part of the IPE approval process. Surveys completed as part of the existing IPE project cover all areas of the IPEE footprint that are located to the east of the IPM (i.e. approximately 90% of the IPE extension footprint). Detailed and targeted ecological assessments were undertaken as part of the 2015/2016 IPE ecological surveys, which encompassed the majority of the IPEE footprint. Subsequent surveys undertaken in 2018 and 2019 focussed on habitat quality and habitat types. A consolidated assessment report by Ecological Survey and Management, 2020 (EcoSM, 2020) that includes all surveys and assessments undertaken to date is include in Appendix 11 of the PER

Collectively, 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 or potentially occur, within the IPEE 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 11 of the PER. The EcoSM, 2020 report is a consolidated ecological report that includes all relevant ecological assessments undertaken to date at the IPC.

3.1 Impact assessment ecological survey effort

The detailed ecological assessment to support the initial IPE EPBC referral incorporated a dry season and a wet season fauna survey. The dry season fauna survey was conducted over eight days in mid-October 2015 with the wet season survey undertaken over seven days in early March 2016 (EcoSM, 2020). An additional and supplementary survey of vegetation along Smoky Creek was also undertaken in early April 2018 for the purpose of obtaining data specific to a required State approval under Queensland's *Nature Conservation Act 1992*. These surveys are the most detailed ecological assessments undertaken across the IPC and approximately 90% of the IPEE area is located within the IPE survey boundary.

Habitat quality assessments were undertaken in April 2018 to provide preliminary data to support the OMP and EPBC offset calculator inputs for the IPE Project. These assessments also obtained initial baseline data on the habitat quality within the Project area including ground cover which is specifically related to Squatter Pigeon habitat types (EcoSM, 2020). A summary of the impact assessment results are provided below and the habitat quality assessment report is included in EcoSM, 2020.

Supplementary assessments of specific patches of vegetation within the Isaac Plains mining leases were undertaken in October 2019. The aim of the supplementary assessment was to field validate several polygons of existing vegetation against Threatened Ecological Community (TEC) thresholds and to assess regenerating habitat as potential habitat for MNES fauna species.

A variety of flora and fauna survey methods were used to detect MNES during the assessment surveys (EcoSM, 2020). Flora surveys were undertaken in accordance with the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 3.2 (Nelder et al., 2012). 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. Numbers in parentheses indicates the number of sites that fall within the IPEE footprint:

- 101 vegetation assessment sites in total comprising;

- 30 (12) detailed secondary sites
- 35 (21) tertiary sites
- 36 (17) modified quaternary sites
- 36 (19) photo monitoring sites

Fauna assessments were undertaken for the IPE surveys undertaken in 2015 and 2016 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 survey techniques were applied across eight systematic trap sites and a range of supplementary sites and involved a total of:

- 800 Elliott A trap nights;
- 112 pitfall trap nights;
- 224 funnel trap nights;
- 24.5 hrs of spotlighting;
- 10 hrs nocturnal owl and Koala call playback sessions;
- 207 infrared camera trap nights;
- 55 hrs targeted diurnal bird survey hours;
- 180 hrs opportunistic incidental bird survey hours ;
- 22 hrs active searching hours;
- 16 Anabat survey nights;
- 14 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.

3.1.1 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 DAWE's Species Profile and Threats Database (SPRAT) profiles and conservation advice, as well as the PER Guideline (DAWE, 2020) and relevant published research and expert opinion.

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

Greater Glider

Twelve occurrences of this species were identified at five locations during the 2015/2016 IPE ecological surveys, with all observations restricted to Smoky Creek and Billy's Gully in mixed eucalypt riparian woodland (RE 11.3.25). 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 the PER guideline (DAWE, 2020), 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 207.8 ha of potential Greater Glider habitat within the IPEE 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)

Squatter Pigeons were recorded on 15 occasions during both survey periods. Records comprised of individual birds and flocks with up to four individuals. Overall, 24 birds were recorded, although it is probable that some observations were repeat occurrences of the same bird. Recorded locations comprised both remnant vegetation and cleared areas, often along dirt vehicle tracks and usually within approximately 1 km of a dam. Water sources that still contained water at the time of the October 2015 (dry season) survey were considered permanent water points (typically farm dams) for the purpose of mapping Squatter Pigeon habitat.

In accordance with the SPRAT profile and as outlined in the PER guideline (DAWE, 2020), 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.

Data from the 2018 IPE habitat quality and 2018 IPE baseline riparian monitoring assessments was used to determine the percentage groundcover across land zones 3, 5, 7 and 9 within the Project area. Using the habitat quality groundcover data, land zone 3 communities associated with Smoky Creek were found to have >33% ground cover and were therefore excluded from habitat mapping for the Squatter Pigeon (EcoSM, 2020).

Based on the above habitat definitions, there is a total of 219.2 ha of potentially suitable habitat for the Squatter Pigeon in the study area which comprises (refer to Figure 5):

- 117.1 ha of breeding habitat;
- 63.6 ha of foraging habitat; and
- 38.6 ha of dispersal habitat.

Ornamental Snake

One individual of the Ornamental Snake was detected in the study area during the wet season survey. This individual was recorded on a vehicle track in a cleared area characterised by introduced species (Buffel Grass) and weeds (Parthenium). No gilgai or wetland habitats were recorded at this location, or indeed anywhere else within the project site. The location where the individual was recorded is approximately 400 m south of Smoky Creek (which has habitat for the Ornamental Snake). The observed record is likely a dispersing individual.

The PER Guideline ((DAWE, 2020) 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.

As noted in the Consolidated Ecology Report in (EcoSM, 2020), there are no gilgai or wetland habitats within the IPEE footprint. Areas of Brigalow TEC in the northern section of the IPEE footprint and adjacent to Smoky Creek (refer to Figure 6), are regrowth communities containing RE 11.9.5 that do not currently support any gilgai or wetland formations. In addition, the underlying geology of land zone 9 is unlikely to result in the development of moist habitat areas that would support preferred populations. Therefore, while these areas have been identified a Brigalow TEC, they are not considered to provide habitat for the Ornamental Snake as defined by the PER Guideline (DAWE, 2020). This finding is consistent with the habitat outlined in the SPRAT profile and Draft referral guidelines (SEWPaC 2011c), given that there are no gilgais and no vegetation representing REs 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9 or 11.5.16.

The Riparian Monitoring Program (included in EcoSM, 2020), undertaken to address condition 10 of the IPE EPBC approval, determined that potential habitat was assumed to be present within 200 m of Smoky Creek (a 4th order stream). Therefore, this habitat within the IPEE footprint is mapped as potential habitat for the Ornamental Snake resulting in 2.4 ha of Ornamental Snake habitat within the IPEE footprint (refer to Figure 6).

Koala

Any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees provides potential Koala habitat. Although Koala's were not identified in the study area during surveys, the EPBC Act referral guidelines for the vulnerable Koala explain that "Koalas do not necessarily have to be present" for Koala habitat to be present. Based on the habitat definitions contained in these guidelines and the records of the species from the region, the Koala has a high probability of occurrence in the Project Area.

All the areas of remnant vegetation within the study area, and particularly the riparian corridors of Billy's Gully and Smoky Creek, are considered to provide habitat for the Koala due to the presence of the Koala feed trees. These Eucalypt and Corymbia Woodlands include RE 11.3.2, RE 11.3.4, RE 11.3.25, RE 11.5.3, RE 11.5.8b, RE 11.5.9, RE 11.5.12, RE 11.7.2, RE 11.8.5, RE11.9.5 and RE 11.9.7a.

In addition, some areas of high-value regrowth (RE 11.9.5) and non-remnant habitat with emergent gums (such as Narrow-leaved Red Ironbark) are considered potential habitat for this species due to these habitats providing sufficient cover of habitat trees. Based on the above definition, there is approximately 207.8 ha of suitable habitat for the Koala within the IPEE footprint (refer to Figure 7).

White-throated Needletail

This species was not recorded during the previous ecological assessments. During the time of the previous assessments, the White-throated Needletail was listed as migratory under the EPBC Act. However, the species was upgraded to vulnerable under the EPBC Act in July 2019

The White-throated Needletail is almost exclusively aerial and occurs over forests, woodlands, farmlands, plains, lakes and towns (Pizzey et al. 2012). It is known from above mainly wooded areas, and larger tracts of vegetation, particularly forest.

There is a potential that that the White-throated Needletail could overfly the IPEE project area during foraging forays. However, remnant and high-value regrowth areas are considered to provide higher quality habitat than cleared areas. It is considered that the open and fragmented nature of habitats in the IPC and local landscape are unlikely to provide suitable roost habitat for this species. Higher quality habitat is offered by the more intact remnant areas present to the north and south, associated with the Denham, Peak Ranges, Carborough and Kerlong Ranges.

Using the field-validated vegetation mapping for the IPEE ecology study area (refer to Figure 3), and based on the above mentioned habitat requirements, approximately 188.1 ha of remnant and high-value regrowth vegetation within the IPEE footprint that provides potential forage habitat for this species.

3.2 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) and two species listed as vulnerable as having the potential to occur based on habitat availability (Koala and White-throated Needletail).

Refer to the EcoSM, 2020 in Appendix 11 of the PER 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.

3.2.1 Greater Glider (*Petauroides 13rowni*)

The Greater Glider was confirmed as present within and adjacent to the IPEE footprint and was recorded at five locations within mixed eucalypt riparian woodlands along Smoky Creek and Billy's Gully (refer to Figure 4). In addition, potential habitat that supports hollow bearing trees, both alive and dead, occur along Smoky Creek.

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 and adjacent to the IPEE footprint at five locations along Smoky Creek and Billy's Gully (refer to Figure 4 and EcoSM, 2020). Potential habitat that supports hollow bearing trees occur along Smoky Creek.

Suitable habitat within the project area

The approved conservation advice for the Greater Glider (TSSC, 2016) along with habitat definitions included in the PER guideline (DAWE, 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 207.8 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).

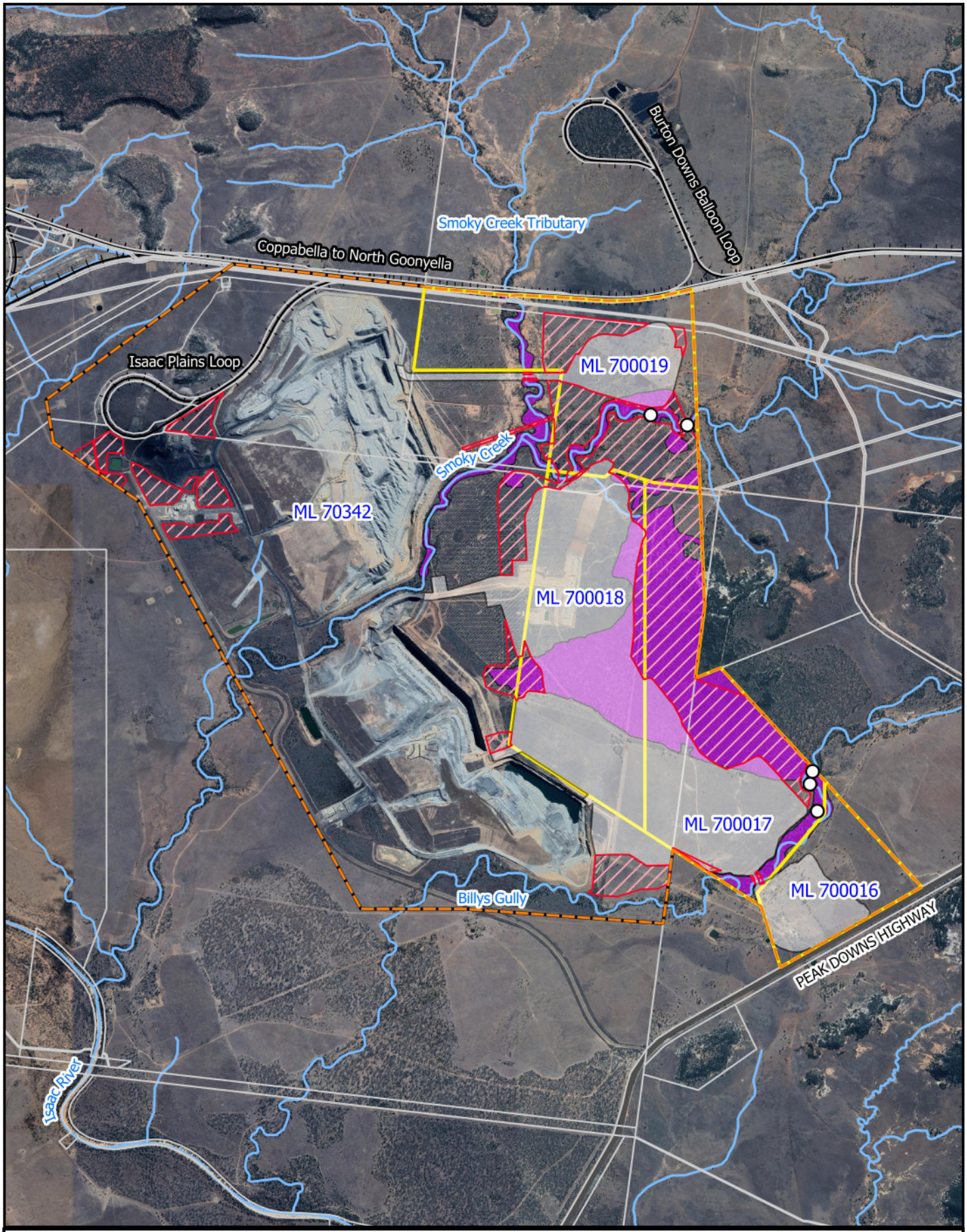


Figure 4: Greater Glider Habitat Impacted by the Project

0 1 km

Scale @ A3: 1 : 40000
Date: 01/06/2020
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Legend

- Greater Glider Recorded Location
- Railway
- Watercourses
- Highways
- Isaac Plains Complex
- Existing Isaac Plains Mine
- IPE Mine Lease
- IPE Impact Area
- IPE Extension Project Area
- Greater Glider Habitat

BASE/

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

The Squatter Pigeon was the only threatened avian species to be recorded within the IPEE footprint and was recorded at several locations within remnant woodland vegetation and cleared areas in relatively close proximity to water (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 km^2 (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 gravely 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 the PER guideline (DAWE, 2020), 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 (DAWE, 2020).

Nearest record

Squatter Pigeons were recorded at several locations during the IPE ecological assessments. Individuals were recorded in both remnant woodland vegetation and in cleared areas but within approximately 1 km of water (refer to EcoSM, 2020).

Suitable habitat within the project area

Squatter Pigeons potentially utilise a range of vegetated habitats along with adjacent cleared areas and vehicle tracks that are in close proximity to permanent water. Within the Project area, they are most likely found in regional ecosystems with land zones 3, 5, 7 and 9 within 1 km of a permanent water sources, mapped wetland or >3rd order stream (refer to EcoSM, 2020).

Impacted habitat within the project area

Based on the above habitat definitions, there is approximately 219.2 ha of suitable habitat for the Squatter Pigeon in the study area which comprises 117.1 ha of breeding habitat, 63.6 ha of foraging habitat and 38.6 ha of dispersal 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).

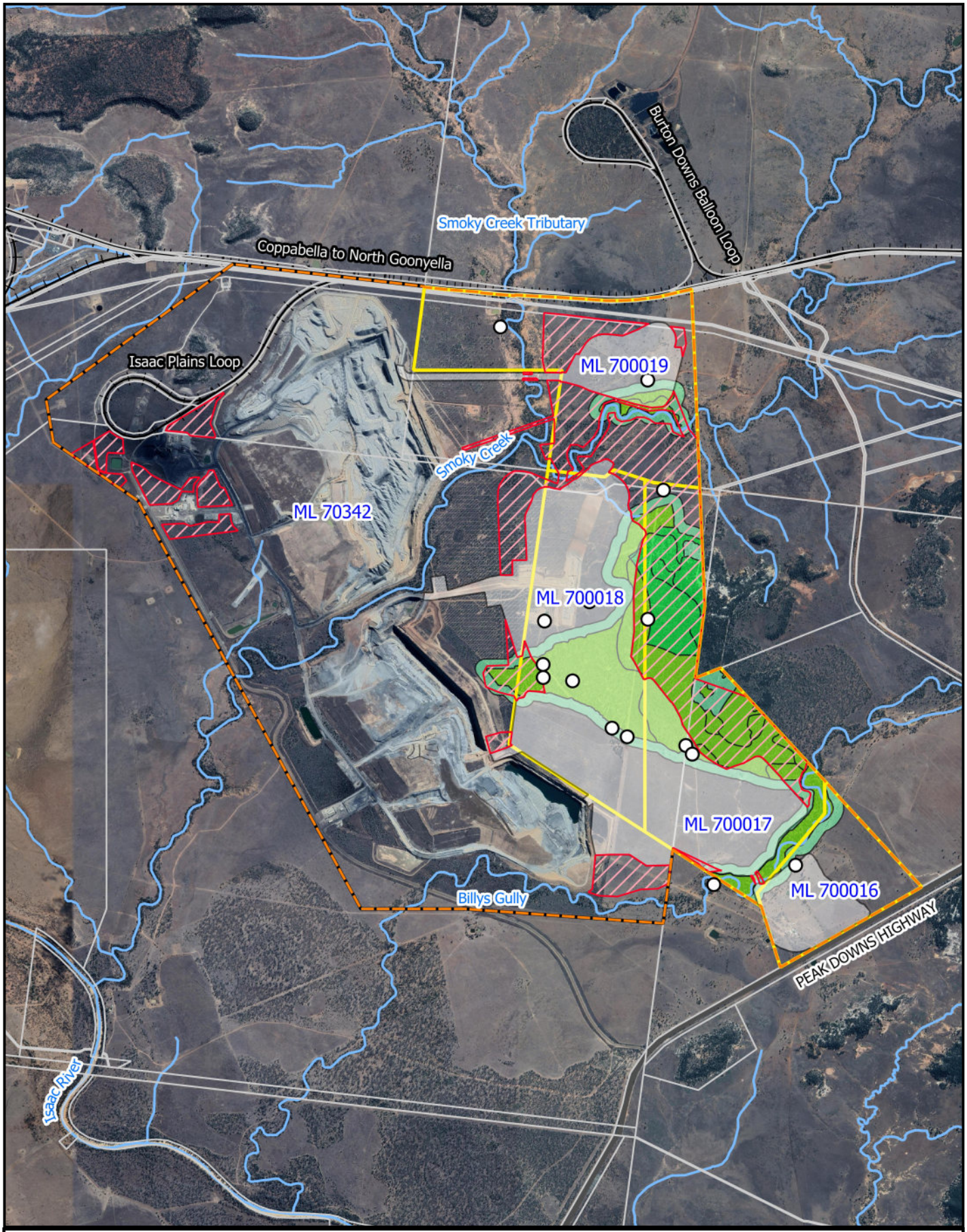


Figure 5: Squatter Pigeon Habitat Impacted by the Project

0 1 km

Scale @ A3: 1 : 40000
Date: 01/06/2020
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Legend

- Squatter Pigeon Recorded Location
- Railway
- Watercourses
- Highways
- Isaac Plains Complex
- Existing Isaac Plains Mine
- IPE Mine Lease
- IPE Impact Area
- IPE Extension Project Area

Squatter Pigeon Habitat

- Breeding Habitat
- Foraging Habitat
- Dispersal Habitat

BASE/

3.2.3 Ornamental Snake (*Denisonia maculata*)

The only threatened reptile to be recorded within the Project area was the Ornamental Snake, with a single individual recorded in the northern section of the IPEE footprint on a vehicle track in a cleared area, dominated by introduced flora species including Buffel Grass and Parthenium (refer to Figure 6), and likely to be dispersing. No gilgai or wetland habitats or microhabitat features normally associated with Ornamental Snakes (cracking clay soils, coarse woody debris and hollow logs or tree stumps), were recorded in the vicinity of where the individual snake was found; however, potential prey species (frogs) were identified.

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 PER guideline (DAWE, 2020) 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

A single Ornamental Snake individual was recorded in the Project area during wet season field surveys. The individual was located adjacent to a vehicle track approximately 400 m south of Smoky Creek, and

likely to be dispersing. Desktop assessment revealed the next nearest record was approximately 5 km west of the Project area (EcoSM, 2020).

Suitable habitat within the project area

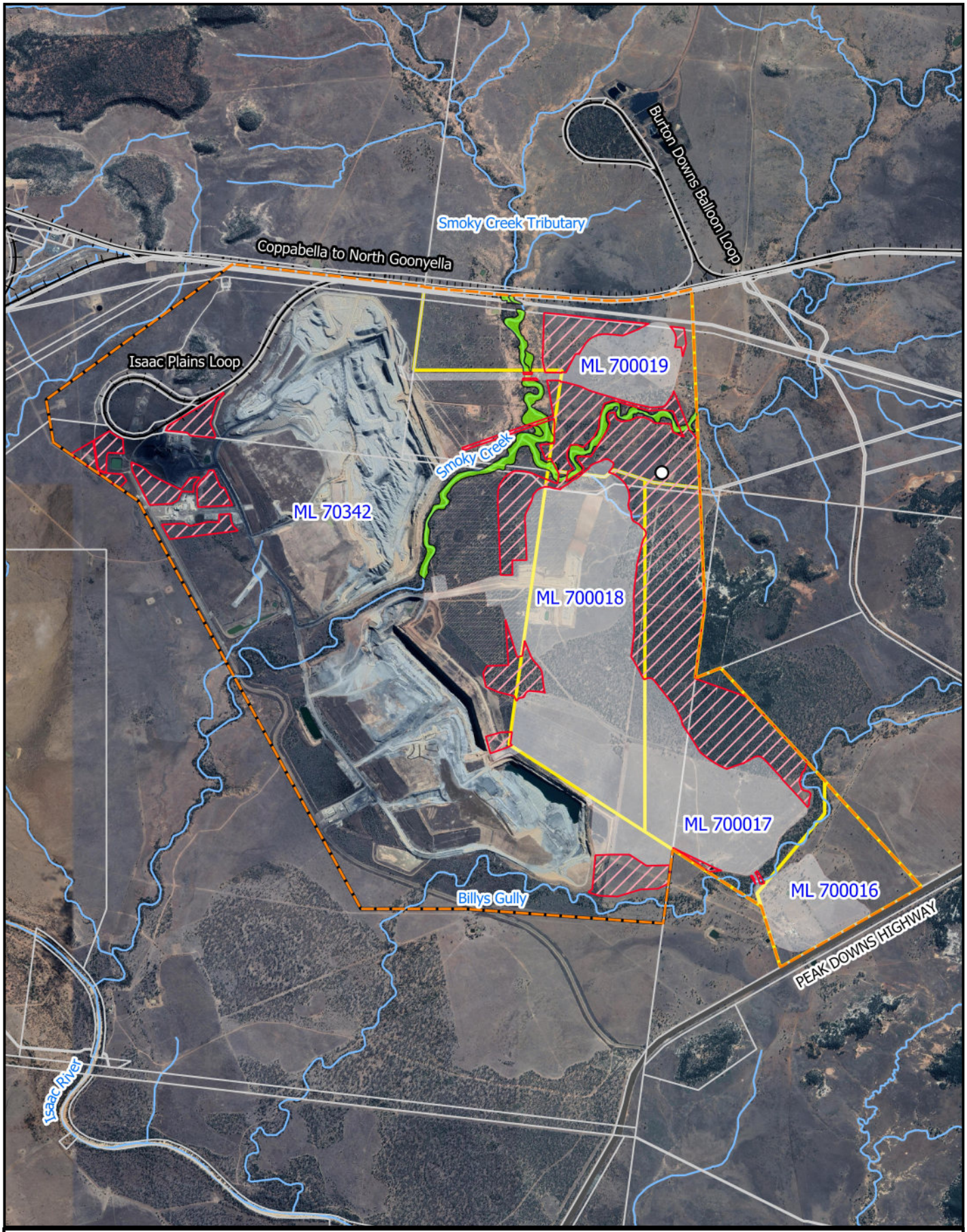
Ornamental Snakes prefer habitat that is in closely associated with its preferred prey such as moist areas within open woodlands but particularly gilgai and wetland habitat Although the prey of Ornamental Snakes were identified as occurring within the Project area including several of its preferred frog species including the Sotted Marsh Frog, Ornate Burrowing Frog and the Broad-palmed Rocket Frog, suitable habitat within the Project area that is of a quality that could sustain and support a viable population, such as gilgai habitat and wetlands with suitable microhabitat features, is limited. The observed record is likely a dispersing individual that was moving between habitat nearby to the Project area rather than residing in the Project area. However, riparian vegetation fringing Smoky Creek where ground timber is abundant may provide limited potential habitat for this species (refer to Figure 6).

Impacted habitat within the project area

Based on the above habitat definition and habitat availability within the Project area, there is limited habitat suitable to sustain a population of Ornamental Snakes. However, there is a potential that areas in close proximity to frog habitat may offer some habitat values to the species and as such, approximately 2.4 ha of potential habitat occurs within the IPEE footprint (refer to Figure 6 and EcoSM, 2020).

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).



0 1 km

Scale @ A3: 1 : 40000
Date: 01/06/2020
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Figure 6: Ornamental Snake Habitat Impacted by the Project

Legend

- Ornamental Snake Recorded Location
- Railway
- Watercourses
- Highways
- Isaac Plains Complex
- Existing Isaac Plains Mine
- IPE Mine Lease
- IPE Impact Area
- IPE Extension Project Area
- Ornamental Snake Habitat

BASE/

3.2.4 Koala (*Phascolarctos cinereus*)

The Koala was not recorded in the IPEE footprint or the wider IPC area. However, potential habitat occurs along Smoky Creek in the form of Eucalypt woodlands, which are connected to habitat in the broader region where Koala's have been recorded. Potential Koala habitat is outlined in 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; DotEE, 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. 22rownie*), 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

Koala was not recorded within the Project area. However, potential habitat does occur within the IPEE footprint (refer to Figure 7) and the wider IPC area (EcoSM, 2020). Further, the desktop assessment undertaken for the IPE and IPEE ecological assessments identified that surveys external to this Project have recorded the Koala within 7 km of the Project.

Suitable habitat within the project area

Based on the SPRAT habitat description and the habitat definition included in the PER guideline (DAWE, 2020), 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 tress 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 207.8 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).

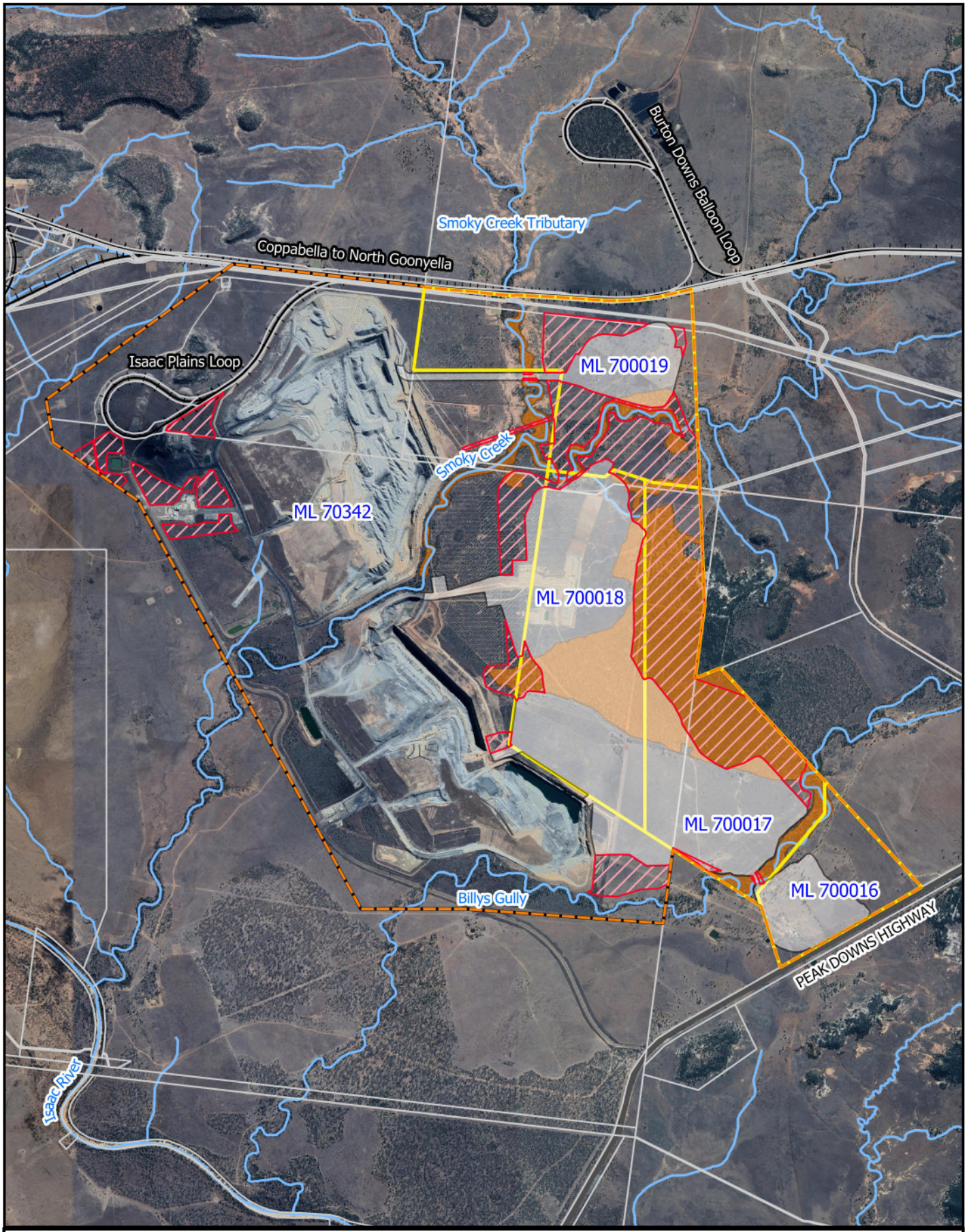


Figure 7: Koala Habitat Impacted by the Project

0 1 km

Scale @ A3: 1 : 40000
Date: 01/06/2020
Drawn: Josh T

DATA SOURCE
BASE CONSULTING GROUP 2020; QSPATIAL 2020
The State of Queensland (Department of Natural Resource and Mines) 2020

Legend

- Railway
- Watercourses
- Highways
- Isaac Plains Complex
- Existing Isaac Plains Mine
- IPE Mine Lease
- IPE Impact Area
- IPE Extension Project Area
- Koala Habitat

BASE/

3.2.5 White-throated Needletail (*Hirundapus caudacutus*)

The White-throated Needletail was not recorded in the IPEE footprint or the wider IPC area. However, there is a moderate likelihood that the species could overfly the IPEE footprint (as part of a wider foraging range) and surrounds in the form of remnant and high-value regrowth areas. Potential White-throated Needletail foraging habitat is outlined in Figure 3. The Project area is unlikely to provide roost habitat (EcoSM, 2020)

Description

EPBC Act = Vulnerable

The White-throated Needletail is a large swift with a thickset, cigar-shaped body, stubby tail and long pointed wings (20 cm in length and approximately 115–120 g in weight; TSSC, 2019; DAWE, 2020). Adults have a dark-olive head and neck, with an iridescent gloss on the crown; the mantle and the back are paler, greyish; and the upperwings are blackish, sometimes with a greenish gloss, with a contrasting white patch at the base of the trailing edge; the uppertail is black with a greenish gloss (TSSC, 2019; DAWE, 2020).

Distribution

The nominate subspecies caudacutus of the White-throated Needletail is a trans-equatorial migrant, breeding in the Northern Hemisphere and flying south for the Southern Hemisphere summer The White-throated Needletail is widespread in eastern and south-eastern Australia (Barrett et al. 2003). In eastern Australia, it is recorded in all coastal regions of Queensland. Within Australia, White-throated Needletail's are generally gregarious when in Australia, sometimes occurring in large flocks, comprising hundreds or thousands of birds, though they are occasionally seen singly (DAWE, 2020).

General habitat preferences

In Australia, the White-throated Needletail is almost exclusively aerial, occurring from heights of less than 1 m up to more than 1000 m above the ground (DAWE, 2020). Because of their aerial habits, it has been suggested that conventional habitat descriptions are unsuitable. Nonetheless, White-throated Needletail's are most often observed above wooded areas, including open forest and rainforest, but less often over treeless areas, such as grassland or swamps (DAWE, 2020).

Foraging and refuge habitat

In Australia, White-throated Needletails almost always forage while airborne above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats (DAWE, 2020). They also sometimes forage over recently disturbed areas or above paddocks as they are being ploughed or slashed (DAWE, 202). They rarely perch on the ground or vertical substrates to catch insects (DAWE, 2020).

The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows (DAWE, 2020).

Breeding and feeding habitat

White-throated Needletails do not breed in Australia and spend the non-breeding season in Australasia (DAWE, 2020).

Additional information

During the non-breeding season in Australia, the White-throated Needletail has been recorded eating a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers (DAWE, 2020). After reaching Australia, White-throated Needletails move south along both sides of the Great Divide in Queensland and NSW in October and November, usually arriving in southern parts of their range in November, with numbers increasing from December and peaking in March. Population sizes in Queensland and NSW appear to increase in February and March as individuals begin moving from the southern parts of their range (DAWE, 2020).

Nearest record and suitable habitat within the project area

The White-throated Needletail was not recorded within the IPC Project area or the IPEE footprint. However, there is a moderate likelihood that the species could overfly the IPEE footprint (as part of a wider foraging range) and surrounds in the form of remnant and high-value regrowth areas. Potential

White-throated Needletail foraging habitat is outlined in Figure 3. The Project area is unlikely to provide roost habitat (EcoSM, 2020).

Impacted habitat within the project area

Based on the above habitat definition, there are approximately 188.1 ha of potential overfly habitat for the White-throated Needletail habitat in the proposed Project area.

Key threats

There are generally considered to be few threats to populations of the White-throated Needletail (DAWE, 2020). However, in Australia, potential threats include (TSSC, 2019):

- Collision with wind turbines, overhead wires, lighthouses, windows
- Insecticide use
- Loss of roosting sites.

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 3.2 (refer to EcoSM, 2020 for a detailed impact assessment). Potential impacts for each species constitute direct impacts such as vehicle strikes and vegetation and habitat clearing and indirect impacts such as, increased noise and vibration, increased dust, lighting, erosion and sediment control, altered hydrology regimes and the spread or introduction of invasive species.

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

4.1 Direct impacts

The IPEE 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 including the extension of the some existing IPE pits;
- A powerline corridor with switchyards;
- Haul roads and access roads connecting the pits to the existing haul road network;
- Water management infrastructure including operational levees along Smoky's Creek and Billy's Gully, sediment dams, and clean water diversion; and
- Modular upgrade to the IPM CHPP and expansion of the associated stockpiles.

The proposed IPEE disturbance footprint encompasses approximately 472 ha comprised of 424.8 ha within the IPE MLs and 47.2 ha around the IPM CHPP. 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 will be undertaken gradually as extension of the IPE open cut pits are progressed and 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 impact areas supporting non-remnant vegetation. However, approximately 181.5 ha of remnant *Eucalyptus* and *Corymbia* woodland and riparian habitat and 6.6 ha of high-value regrowth is proposed to be cleared over the life of the Project (refer to Figure 2 for the IPEE disturbance areas in relation to the vegetation areas). A further 19.7 ha of non-remnant regenerating shrubby woodland with emergent gums will also be cleared which constitutes potential Greater Glider and Koala habitat.

Upgrades to the existing crossings of the Smoky Creek northern tributary and Billy's Gully will be required for haul roads and the transmission line which has the potential to require vegetation clearing depending on the final design of the crossings (refer to Figure 2). Impacts associated with construction with the transmission line across the northern tributary to Smoky Creek is expected to be minimal, with transmission poles being placed either side of the watercourse and outside of the riparian vegetation. However, there may be some selective vegetation removal and trimming within the disturbance corridor.

The haul road crossing of the northern tributary to Smoky Creek and Billy's Gully is proposed to expand from the current width of 40 m (as allowed under current approvals) to 80 m in width. This is required for the dragline to be walked across the creeks in these locations. A new haul road is proposed across Smoky Creek to connect Pit 5 and the expanded Pit 4 (refer to Figure 2). Overall clearing associated with the construction of the new haul roads and expansion of the existing crossings across Smoky Creek and Billy's Gully will be limited as far as practicable and is expected to be less than 0.5 ha.

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 proposed to be cleared (ha)
Greater Glider	Vulnerable	207.8
Squatter Pigeon (southern)	Vulnerable	180.7[1]
Ornamental Snake	Vulnerable	2.4
Koala	Vulnerable	207.8
White-throated Needletail	Vulnerable	188.1

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.

Approximately 60% IPE extension footprint overlays areas of non-remnant vegetation. However, the pattern of clearing will not substantially fragment remnant vegetation communities within the IPEE footprint as the IPEE involves a continuation of clearing in areas already impacted by the existing IPE activities and approved clearing. The riparian vegetation along Smoky Creek and Billy's Gully provides habitat corridors in the Project area and 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.

Although some clearing is required within these corridors, it has been minimised by constraining the clearing width where possible. Further, many areas within the IPC have already been cleared and fragmented through historic clearing to facilitate cattle grazing, as well as the creation of various infrastructure corridors, e.g. roads, railway lines, transmission lines.

Approximately 21 ha of vegetation between the high wall and the powerline corridor in the eastern extent of the IPEE footprint, will be retained to a large degree. Nonetheless, this area will become isolated and fragmented as a result of the IPEE works. This 21 ha of vegetation has been included in the direct impacts associated with the project, to account for impacts associated with fragmentation and isolation of this vegetation.

Habitat fragmentation and degradation has the potential to impact on the Squatter Pigeon and Ornamental Snake.

[1] Includes breeding and foraging habitat as outlined in EcoSM, 2020. Dispersal habitat comprises an additional 38.6ha.

4.2.2 Pest plants and animals

The IPC 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 initial ecological assessment undertaken for the IPE project, seven Queensland declared pest plants were recorded with Parthenium Weed, Harrisia Cactus and Velvety Tree Pear being relatively common. Buffel Grass, although not a declared weed but a significant environmental weed, was also common throughout the IPEE Project area. Although the potential exists for the IPE extension to result in the introduction of weeds through vehicles, plant, workers and materials that will enter site from various locations, it is unlikely as the IPC 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 2015/2016 IPE ecological surveys including the Cane Toad, Feral Dogs, Feral Cats and European Rabbit. Although not seen, it is likely the European Fox, Black Rat and Feral Pigs are also present within the IPEE 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 (refer to Section 4.2.2), the Project has existing management measures in place to manage plant and animal pests. 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

Previous ecological assessment identified Feral 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 the existing Isaac Plains Mine plant and pest animal management and monitoring measures.

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 proposed extension will allow mining to advance to the extension area once the current mining in the program has been exhausted. Hence, mining operations 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 extension Project is not considered to be significant. Further, the fauna species listed in Section 3.2 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 of the IPC are therefore not likely to be impacted, in the long term, by ground vibration from the IPEE.

In accordance with the existing IPE 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 Isaac Plains Mine 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 IPEE 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 Isaac Plains Mine currently generates light as does the adjacent Peak Downs Highway and Goonyella Rail Line.

The IPEE will have limited additional light sources, and these will be limited to operational areas within the open cut pits, overburden piles, crib huts 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 proposed haul roads associated with the IPE extension, will be located largely within cleared areas (refer to Figure 2) with recommended speed limits of 40 km/hr at creek crossings at night, which would reduce the incidence of vehicle strike. However, some vehicle strikes may occur from vehicles traversing access and haul roads, particularly when these roads cross the riparian corridors of Smoky Creek, the northern tributary of Smoky Creek and Billy's Gully where fauna are known to inhabit.

As the Project is an extension to the existing operation, the current traffic and safety management measures will continue be enforced and include speed limits, safe driving practices and fauna crossing awareness (refer to Table 6 for key management measures).

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

An Erosion and Sediment Control Plan is currently in place for the IPM and IPE and this plan will be implemented for the IPEE. The Erosion and Sediment Control Plan includes methods to managing storm water to separate clean and dirty water, diverting clean water around disturbed areas and using appropriate sediment control structures for both the construction and operational phases of the Project.

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 IPEE ecology study area are limited to Smoky Creek, Smoky Creek northern tributary and Billy's Gully. These waterways are highly ephemeral and characterised by short-duration flows following periods of high rainfall. The IPEE will result minor change to flood height and flow velocities within Smoky Creek (WRM, 2020).Altered flood extents have been minimised by the construction of a levee along Smoky Creek. However, the levee will lead to minor changes in velocity along parts of Smoky Creek ranging between a decrease 0.1m/s to an increase of 0.25 m/s (WRM, 2020). Mining near Billy's Gully will remain outside the 1:1,000 year flood level, and hence no interact with floodwaters or alter the floodplain in this area.

The additional surface disturbance areas are minimal with the IPEE representing approximately 1.7% of the total catchment area of Smoky Creek and approximately 3.2% of the total catchment area of Billy's Gully. Therefore, potential impacts on the quantity of water entering these two systems, and hence the associated impacts, is negligible (WRM, 2020).

Modelled changes (see WRM, 2020) to flood depth and velocity associated with IPEE project show that flood depth and flow during more frequent events (i.e. 1 in 20 year events) will be confined to the channel section of waterways within the IPEE footprint within limited overbank topping expected. The duration of flood events is also unlikely to significantly increase from the IPEE works. Therefore, it is unlikely the riparian habitat associated with Smoky Creek, Smoky Creek and its tributaries and Billy's Gully will be significantly impacted by changes in predicted flood levels and flow velocities. Further, given the operational life of the project is 4 years, the probability of more extreme events occurring is relatively low.

Post mining the haul road crossings will be decommissioned and recontoured to a stable landform. The flood protection levee will be integrated into the rehabilitated final landform of the overburden emplacement such that the minor changes in velocity, of these watercourses will be even further reduced. Changes in flood levels and velocities in Smoky Creek and Billy's Gully are generally confined to small zones upstream and downstream of the removed haul road crossings.

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.

4.3 Impact duration

Vegetation clearing is the primary activity that will directly impact fauna and fauna habitat. Clearing will be undertaken progressively over the four-year mine life and as the mining operation progresses. Progressive rehabilitation will be undertaken as each mining stage is completed which will minimise the area and duration of disturbed and unvegetated land. 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, the current Commonwealth IPE approval conditions, the current IPEE Queensland Environmental Authority (EA) approval conditions issued on 26 February 2020, relevant coal mining legislative requirements and current approved management measures and monitoring programs for the existing IPE project.

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 outlined in the approved IPEE EA issued on 26 February 2020 by the Queensland Government and as outlined in the IPEE PER
- Prevent injury or mortality of MNES fauna during construction, operation and decommissioning of the Project
- Manage remaining areas of MNES habitats to maintain condition and habitat quality for the threatened fauna species outlined in Section 3.2 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 4.

Table 4: 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 (see Queensland EA conditions issued 26 February 2020) 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 foraging resources outside of the approved disturbance limits. • No net loss of foraging habitat for the White-throated Needletail outside of the approved disturbance limits. • Rehabilitation of disturbed areas will be rehabilitated in accordance with the Project's Rehabilitation Management Plan.
Prevent injury or mortality of MNES fauna	• Ensure vehicle speed limits are enforced. • Provide fauna recognition training to make staff aware of the local fauna species.

SMP management objectives	Performance criteria
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 scores 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.
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 as outlined in Condition B2 of the IPEE EA issued on 26 February 2020. • Dust is monitored in accordance with the Dust Management Plan in accordance with Condition B5 of the IPEE EA issued on 26 February 2020.
Minimise noise and vibration impacts in areas of MNES habitat.	• When measured, noise and vibration levels at sensitive receptors do not exceed criteria set out in Tables 15 and 16 of the IPEE EA issued on 26 February 2020.
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, as a result of the Project, does not exceed the receiving waters trigger levels at downstream monitoring sites listed in Condition C – Water of the IPEE EA issued on 26 February 2020 • Water quality monitoring is undertaken in accordance with the Receiving Environment Monitoring Program which has been prepared in accordance with Condition C22 of the IPEE EA issued on 26 February 2020.
Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc).	• No mortality or injury to MNES as a result of Project activities (e.g. from clearing activities, vehicle strikes etc).

5.2 Relevant plans and guidelines

Table 5 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 6 that are specific to each of the threatened species and to address the key threatening processes to each MNES.

Table 5: Relevant conservation advice, recovery plans and threat abatement plans, and relationships to management objectives and measures (Table 6)

MNES	Relevant conservation advice and plans	Main threats and recommended actions	Management objectives for this SMP
Koala *(Phascolarctos cinereus)*	Approved Conservation Advice for *Phascolarctos cinereus*, Koala (*combined* populations in Queensland, New South Wales and the Australian Capital Territory), (SEWPaC, 2012.	Habitat 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 IPC 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 *(Petauroides volans)*	Conservation Advice for *Petauroides Volans*, Greater Glider (TSSC, 2016).	Habitat loss, fires and predation from owls.	• 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 IPC 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) *(Geophaps scripta scripta)*	• Approved Conservation Advice for *Geophaps scripta scripta* (Squatter Pigeon (southern)) (TSSC, 2015); • Threat abatement plan for predation by feral cats	• 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 during

MNES	Relevant conservation advice and plans	Main threats and recommended actions	Management objectives for this SMP
	(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.	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 (*Denisonia maculata*)	Approved Conservation Advice for *Denisonia maculata* (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 IPC 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).
White-throated Needletail (*Hirundapus caudacutus*)	Conservation Advice *Hirundapus caudacutus* (White-throated Needletail), TSSC, 2019	Collision with infrastructure including wind turbines, overhead wires and windows as well as pesticides.	• Limit or avoid loss of MNES and/or habitat for MNES. • Prevent habitat degradation and a decline in habitat values within the retained habitat within the Project area.

Management and mitigation measures have been specified to address the general requirements of these plans (refer to Table 6) 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 existing requirements and approvals of the IPE Project 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 PER guidelines as a Biodiversity Offset Strategy and subsequent Biodiversity Offset Management Plan (BOMP).

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, and in particular the haul road crossings that traverse Smoky Creek and Billy's Gully, 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 Smoky Creek and Billy's Gully. Rehabilitation and decommissioning will be undertaken in accordance with the rehabilitation requirements of the IPEE EA including the Rehabilitation Management Plan, with the aim of providing a stable landform with a self-sustaining vegetation cover.

The IPEE EA and Rehabilitation Management Plan 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, final voids and in-pit tailings storage. Other than final voids, 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 IPEE EA and Rehabilitation Management Plan 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 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 3.2. Table 6 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 6 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 advices.

Table 6: 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 net loss of habitat for the Koala, Greater Glider and White-throated Needletail outside of the approved disturbance limits. • No net 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 is required to be prepared in accordance with Condition F13 of the IPEE EA.	• Should clearing of habitat for MNES exceeds the approved disturbance limits in Table 1 of this SSMP and/or occurs 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 required by IPEE EA,

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 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, as afar 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			the reasons of the failure will be investigated. **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 nest using a GPS. Features of tree hollows (diameter, number and whether active/inactive) should 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 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			

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 IPC 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 exiting IPE monitoring program. Specific IPEE monitoring will be undertaken every two (2) years in retained vegetation that provides habitat for MNES. Monitoring will be undertaken in accordance with the 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 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. within Smoky Creek, northern tributary of Smoky Creek and Billy's Gully). 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			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: o Rehabilitation of MNES habitat. o Additional environmental awareness training to workers regarding MNES. o Increasing pest animal and weed control measures or revising the type of measures implemented. o Increasing the frequency of dust suppression techniques. o 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
		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. • 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 we be directed to the open cut pits to minimise light spill. • The use of low wattage lighting with list 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: o A site induction program that provides weed management information to staff, contractors and visitors. o Detailed control measures aimed at eradicating where possible, or otherwise reducing the extent of weeds in accordance with the Queensland	• 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 using similar methodology to the existing habitat quality assessment methodology that is being used for the current IPE monitoring program.	• 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

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		Department of Agriculture and Fisheries (DAF) guidelines and the requirements of the *Biosecurity Act 2014*. ○ 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.		• IPEE specific monitoring will be undertaken every two years (refer to Section 6.1.3).	relation to baseline to 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.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
					○ Amending weed hygiene practices. ○ 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 existing IPE Weed and Pest Management Plan. • The existing Weed and Pest Management Plan includes 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	• 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 using similar methodology to the existing habitat quality assessment methodology that is being used for the current IPE monitoring program. • IPEE specific monitoring will be undertaken every two years (refer to Section 6.1.4). • Potential predation of MNES will also be assessed during the existing IPE habitat quality scoring assessment and the riparian monitoring program.	• 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.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		monitoring program (European Foxes and Feral Pigs). • Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting in and will be undertaken in accordance with site safety and health requirements, and DAF guidelines and the requirements of the *Biosecurity Act 2014* and as permitted under the SHMS.			**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 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 IPE 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 as	• 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.	• 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	• Monitoring of dust deposition will be undertaken in accordance with Condition B2 and the Project's Dust Management Plan as	• In accordance with Conditions B3 and B4 of the IPEE EA, if dust deposition monitoring exceed the trigger value of 120 mg per square metre averaged over one month, Stanmore must investigate

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	outlined in Condition B2 of the IPEE EA. • Dust is monitored in accordance with the Dust Management Plan which must be developed in accordance with Condition B5 of the IPEE EA.	○ 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.	disturbance areas show visible signs of dust deposition.	required under Condition B5 of the IPEE EA. • Existing monitoring includes visual inspections of vegetation adjacent to the disturbance areas.	whether the exceedance is a result of Project activities and notify the administering 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 Tables 15 and 16 of the IPEE EA at sensitive receptors.	• 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 Table 15, Table 16 and Table 17 of the IPEE EA. • When blasting occurs outside of the approved blast times.	• Noise and vibration monitoring will be undertaken in accordance with monitoring Conditions outlined in Section D of the IPEE EA.	• In accordance with Conditions under Section D of the IPEE EA, 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

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
					activities, noise and vibration abatement measures will be implemented. **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 existing IPE 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 IPE 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

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
					reducing fuel loads may include controlled burns, strategic grazing or modified weed management measures. **Corrective Actions:** Any corrective actions identified will be implemented within 30 days of the trigger being detected.
Minimise alteration of Squatter Pigeon, Ornamental Snake 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 Condition C – Water of the IPEE EA. • Water quality monitoring is undertaken in accordance with the Receiving Environment Monitoring Program (REMP) which must be developed in accordance with Condition C22 of the IPEE EA. • Erosion and sediment control is	• Site stormwater management will be undertaken in accordance with the management plans and programs required by the IPEE EA including a REMP required under Condition C22, Water Management Plan (WMP) required under Condition C31 and an ESCP required under Condition C38. • The site specific WMP, REMP and ESCP as well as other water management requirements outlined in Section C of the IPEE EA will be implemented by a suitably qualified person. • 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	• Water quality monitoring exceeds the approved receiving environment trigger levels outlined in the REMP and in Table 7 of the IPEE EA and mine affected water quality levels exceed the limits and/or trigger levels outlined in Table 2, 3 and 4 of the IPEE EA. • 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 REMP as required by Conditions C22 and C23 of the IPEE EA. • Monitoring of the effectiveness of the erosion and sediment control devices and water management infrastructure will be undertaken in accordance with Conditions C32 of the IPEE EA. • Riparian habitat quality assessments will be integrated with the existing IPE monitoring program. Specific IPEE monitoring will be undertaken every two (2) years in retained vegetation that provides habitat for MNES.	• In accordance with Condition C21 of the IPEE EA, if water quality characteristics of the downstream monitoring point exceed trigger levels outlined in Table 7 of the 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

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	undertaken in accordance with the Erosion and Sediment Control Plan (ESCP) as required by Condition C38 of the IPEE EA. • Maintain riparians habitat quality scores within the retained MNES habitat in relation to baseline habitat quality scores	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.			Actions included in Plan revisions and the Annual reports as required under Conditions C24 and C33 of the IPEE EA. • Should a decline in the riparian 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 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 from Project activities (e.g.	No mortality of, or injuries to, MNES as a result of Project activities (e.g.	• Environmental awareness training will be provided to all workers as part of site induction and will include specific topics on	Injury or mortality to an MNES	• All personnel will be required to be report any interactions between vehicles and/or /machinery	• Should an injury to, or mortality of, an MNES, an investigation will be undertaken to ascertain the

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
habitat clearing, vehicle strikes etc).	from clearing activities, vehicle strikes etc).	MNES, risks and protective measures, and identification of the MNES. • Pre-clearance surveys will be undertaken within 48 hours prior to clearing activities to assess the presence of MNES 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. • 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/he 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. • 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 o The location of the injured animal will be identified so it can be located again o The species of animal will be identified if possible and its sex and approximate size determined		and MNES in the Project area. • Visual observations during normal working hours. • Incidental observations during habitat quality assessments.	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 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.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
		○ 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.			

6.0 Monitoring

Stanmore has implemented a monitoring program for the existing IPE Project. Any additional monitoring required specially for this IPEE project will be incorporated into the existing monitoring program as the IPEE footprint is largely adjacent to the initial IPE project area. The aim of the IPE monitoring program was to assess the effectiveness of the management measures outlined in the approved IPE SMP. 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 has commenced and includes the Riparian Monitoring Program undertaken to address Condition 10 of the IPE EPBC approval and to assess the baseline habitat quality scores of the impact (disturbance) site. These data were originally collected to inform the IPE Offset Management Plan. The data are still relevant and will inform the IPEE Biodiversity Offset Management Plan. Monitoring to assess the presence of weeds and pest animals was undertaken prior to the commencement of the IPE Project to establish a baseline for comparison against subsequent monitoring events. These monitoring events have been combined into an overarching IPE ecological monitoring program that was being undertaken annually for the first three (3) years of the IPE operation but is now being undertaken every two (2) years as outlined in Section 6.1.2 and as per the approved IPE SMP. This existing IPE monitoring program will now encompass the IPEE.

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.
- 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.
- Incidental observations of weeds and pest animals.

6.1.2 Habitat quality monitoring

Baseline ecological surveys were undertaken in September/October 2015 (dry season) and February/March 2016 as part of the IPE approval process and generally during the timing of the riparian monitoring program required for Conditions 10-14 of the IPE EPBC Act approval. Subsequent habitat quality assessments were also undertaken as follows:

- April 2018 for all vegetation communities within the Project area (mine lease boundary) to assess baseline habitat quality for input into the EPBC offsets calculator and the IPE Offset Management Plan (OMP) as required by EPBC Condition 5 of the IPE approval; and
- April 2018 for the riparian monitoring area as required by Condition 10 of the IPE EPBC approval.

The first post IPE SMP approval habitat quality monitoring event was undertaken at the end of the 2018/2019 wet season (i.e. March/April depending on rainfall) and will continue to be undertaken. Habitat quality monitoring will be undertaken at the monitoring points which were established during the April 2018 riparian monitoring event and the April 2018 habitat quality assessment. Specific monitoring for this IPEE will be incorporated into the existing IPE 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;
- 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 IPE baseline ecological surveys that were undertaken in September/October 2015 and February/March 2016.

Ongoing weed surveys within the IPE footprint (which incorporates approximately 90% of the IPEE footprint are undertaken every two years for the life of the IPE EPBC Approval and are undertaken in conjunction with the habitat quality monitoring outlined in Section 6.1.2. These surveys will be extended through to the life of the IPEE EPBC approval.

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 IPEE 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 IPE baseline ecological surveys that were undertaken in September/October 2015 and February/March 2016.

Existing and ongoing pest animal surveys are undertaken every two years for the life of the IPE EPBC Approval in conjunction with the habitat quality assessment surveys. These surveys will be extended through to the life of the IPEE EPBC approval.

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 IPEE 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 Conditions B3 and B4 of the IPEE EA and the existing IPE 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 Condition D2 of the IPEE EA.

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 shown in Table 15 of the IPEE EA, 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 IPEE EA and the required management plans, which includes locations, frequencies and monitoring criteria (trigger levels). Condition C5 of the IPEE EA outlines water release points, the release limits and the contaminant trigger levels that must be monitored. Conditions C13 – C16 of the IPEE EA provide notification timeframes associated with the start and cessation of release events and stipulate reporting requirements. Condition C17 of the IPE EA also provides for monitoring of water storages including monitoring locations and frequencies. Monitoring will be undertaken in accordance with existing IPE REMP which is a requirement of Condition C22 of the IPEE EA. The REMP also includes additional water quality monitoring points requested by the then DoEE in Condition 7 of the IPE EPBC Act approval.

Visual inspection monitoring is also 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 as outlined the existing IPE ESCP.

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 6.

7.3 Implementation

Stanmore will not commence clearing of habitat for the MNES listed Table 1 of this SSMP until the IPEE (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 IPE Riparian Monitoring Program in addition suitable and yet to be determined monitoring sites within retained vegetation. Table 7 outlines an indicative monitoring implementation schedule.

Table 7: Proposed monitoring implantation schedule

	Year												
	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042	2044
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 6) 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, along with the actions in the IPE SMP, 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, along with the IPE SMP 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 6. 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 6.

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 8) was assessed against the likelihood of that risk occurring (Table 9) to determine an overall risk rating using the matrix in Table 10.

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 11).

Table 8: 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 9: 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 10: Risk Rating Matrix

		Consequence				
		1. Minor	**2. Moderate**	**3. High**	**4. Major**	**5. Critical**
Likelihood	**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 11: 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 White-throated Needletail outside of the approved disturbance limits. • A loss of habitat and 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 nest using a GPS. Features of tree hollows (diameter, number and whether active/inactive) should 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 IPEE 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 IPC 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 IPEE 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 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. within Smoky Creek and Billy's Gully). 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 list 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 wed 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: o A site induction program that provides weed management information to staff, contractors and visitors. o 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 *Biosecurity Act 2014*. o Weed washdown procedures for all vehicles brought to site that will be traveling beyond the site office carpark. o 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: o 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 (European Foxes and Feral Pigs). • Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting in and will be undertaken in accordance with site safety and health requirements, and DAF guidelines and the requirements of the *Biosecurity Act 2014* 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 Tables 15 and 16 of the IPEE EA.	• 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 Squatter Pigeon, Ornamental Snake 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 listed in Condition C – Water of the IPEE EA. • 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 IPEE EA including a Receiving Environment Monitoring Program (REMP) required under Condition C22, Water Management Plan (WMP) required under Condition C31 and an ESCP required under Condition C38. • The site specific WMP, REMP and ESCP as well as other water management requirements outlined in Section C of the IPEE EA will be implemented by a suitably qualified person	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.		• 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.			
Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc).	Injury or mortality of an MNES occurs because of Project activities.	• MNES 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, risks and protective measures, and identification of the MNES. • Pre-clearance surveys will be undertaken within 48 hours prior to clearing activities to assess the presence of MNES 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. • 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; o The location of the injured animal will be identified so it can be located again o The species of animal will be identified if possible and its sex and approximate size determined o The type of injury sustained will be identified if possible o 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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