



APPENDIX 23 – MNES SPECIES IMPACT MANAGEMENT PLAN

NEW LENTON COAL PTY LTD
NEW LENTON COAL PROJECT



MNES SPECIES IMPACT MANAGEMENT PLAN NEW LENTON COAL PROJECT



PREPARED FOR
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1 Introduction

AARC Environmental Solutions Pty Ltd (AARC) was commissioned by the Lenton Joint Venture to prepare a Matters of National Environmental Significance (MNES) Species Impact Management Plan for the New Lenton Coal Project (the Project).

Lenton Joint Venture (LJV) is an unincorporated joint venture between New Lenton Coal Pty Ltd (NLC) (ACN 095 390 079) and MPC Lenton Pty Ltd (MPC) (ACN 149 618 904). NLC is a wholly owned subsidiary of Bowen Coking Coal, as of July 2022.

This SIMP identifies the relevant MNES threatened ecological communities (TECs) and species under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) that are predicted to be significantly impacted by the Project and outlines the mitigation and management methods to be undertaken for the Project.

1.1 Project overview

The Project is located within the Northern Bowen Basin, approximately 65 km north of Moranbah and 120 km south west of Mackay (Figure 1) and is situated within the Isaac Regional Council local government area. The Project is located on mining lease (ML) 70337, ML 700053 and ML 700054 (referred to as the New Lenton MLs), held by LJV.

The New Lenton MLs are subject to the Environmental Authority (EA) EPML00475513, issued under the *Environmental Protection Act 1994* (Queensland) (EP Act)

The Project is a controlled action and requires approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act). An EPBC Act referral (2020/8778) was submitted to the Department of Agriculture, Water and the Environment (DAWE) (currently the Department of Climate Change, Energy, the Environment, and Water (DCCEEW)) on 3 September 2020. The referral decision in October 2020 states that the proposed action will be assessed via a public environment report (PER). A draft PER was submitted to DCCEEW in January 2024. DCCEEW requested a MNES Species Impact Management Plan, or a detailed overview of a MNES Species Impact Management Plan, as part of the adequacy review of the draft PER for the Project.

As part of the draft PER submission, AARC prepared the MNES Terrestrial Ecology Impact Assessment Report New Lenton Coal Project (Appendix 12 to the draft PER). This report has subsequently been updated in response to the adequacy review of the draft PER by DCCEEW (AARC 2024a and informs this MNES Species Impact Management Plan).

1.1.1 Project description

The proposed disturbance footprint for the Project is an estimated 886 ha, incorporating infrastructure and general mining disturbance (Figure 2). The proposed Project activities comprise:

- 2 mining pits, East Pit and West Pit;
- In-pit and out of pit overburden dumps;
- A mine infrastructure area (MIA);
- Haul roads, including haul road connection with the Burton Mine haul roads and a bed level crossing of the Isaac River;
- Suttor Developmental Road (a public road) realignment, with a new bridge over the Isaac River;
- Mine affected water dams;
- Clean water diversion drains;
- Mine affected water pipeline connecting with pipelines at Burton Mine;
- Diversion of Ti-Tree Creek;

- Levees along the Isaac River; and
- General infrastructure and construction working area.

1.2 Purpose and scope

The MNES Species Impact Management Plan prepared for the Project (hereafter referred to as the SIMP, or the Plan) identifies the relevant threatened ecological communities (TECs) and threatened species (listed as MNES under the EPBC Act); and describes the management, monitoring, reporting and corrective procedures to be implemented during each phase of the Project. The Project phases discussed in the SIMP are pre-construction, construction, operation, and maintenance and rehabilitation.

The SIMP aims to limit the impact of the Project's activities on MNES TECs and threatened species. Threatened species and TECs that are considered unlikely to occur within the proposed disturbance area are not likely to be impacted by the Project (AARC 2024a).

The Plan provides specific management and monitoring actions to address the relevant listed TECs and threatened species under the EPBC Act that are likely to be significantly impacted by the Project (AARC 2024a), namely:

- Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC);
- Greater Gilder (*Petauroides volans*);
- Koala (*Phascolarctos cinereus*); and
- Squatter Pigeon (Southern) (*Geophaps scripta scripta*).

1.3 Environmental management policy

The Project will operate under the Environmental Policy and environmental management systems for New Lenton.

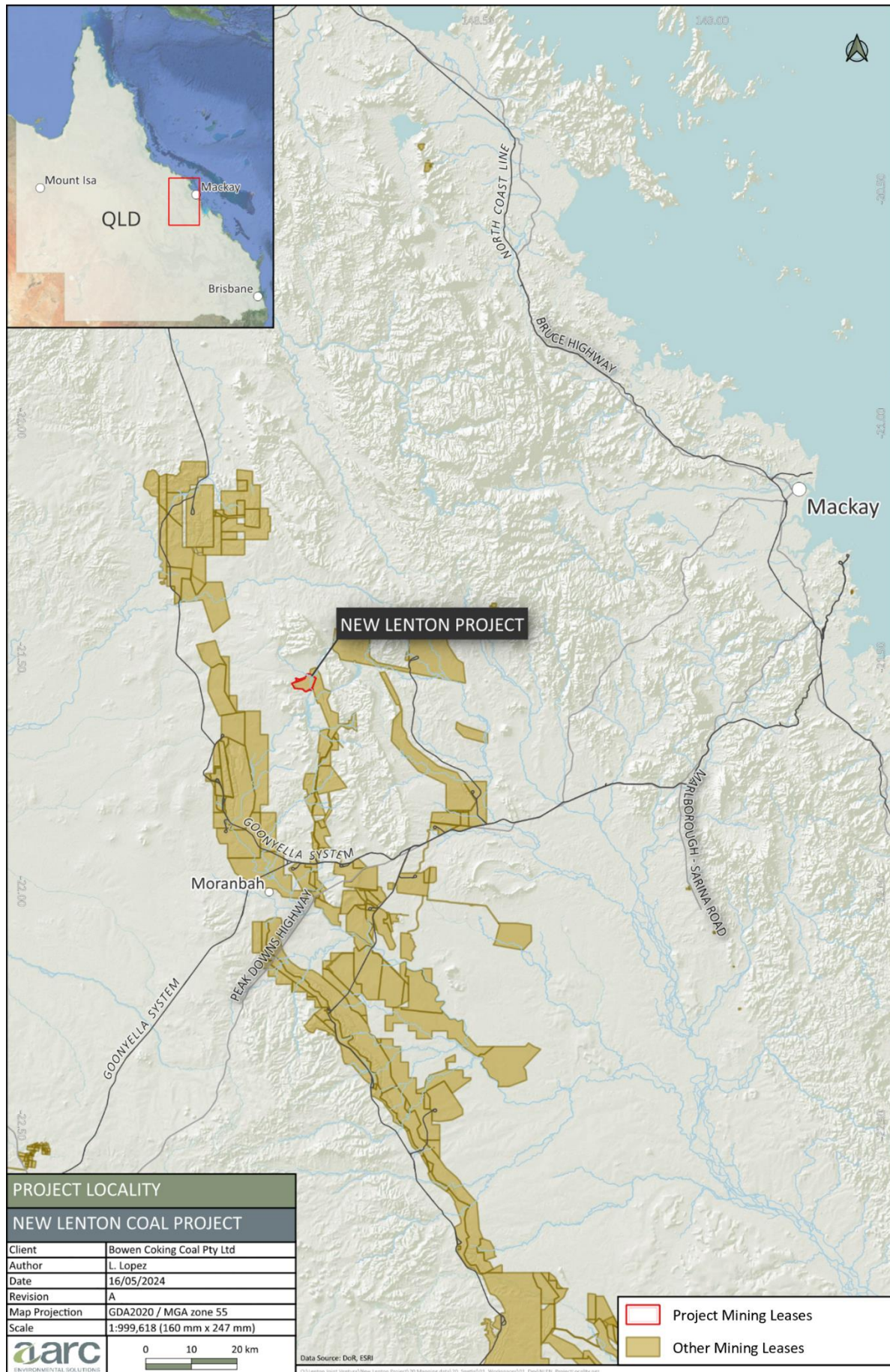


Figure 1: Regional location for the Project

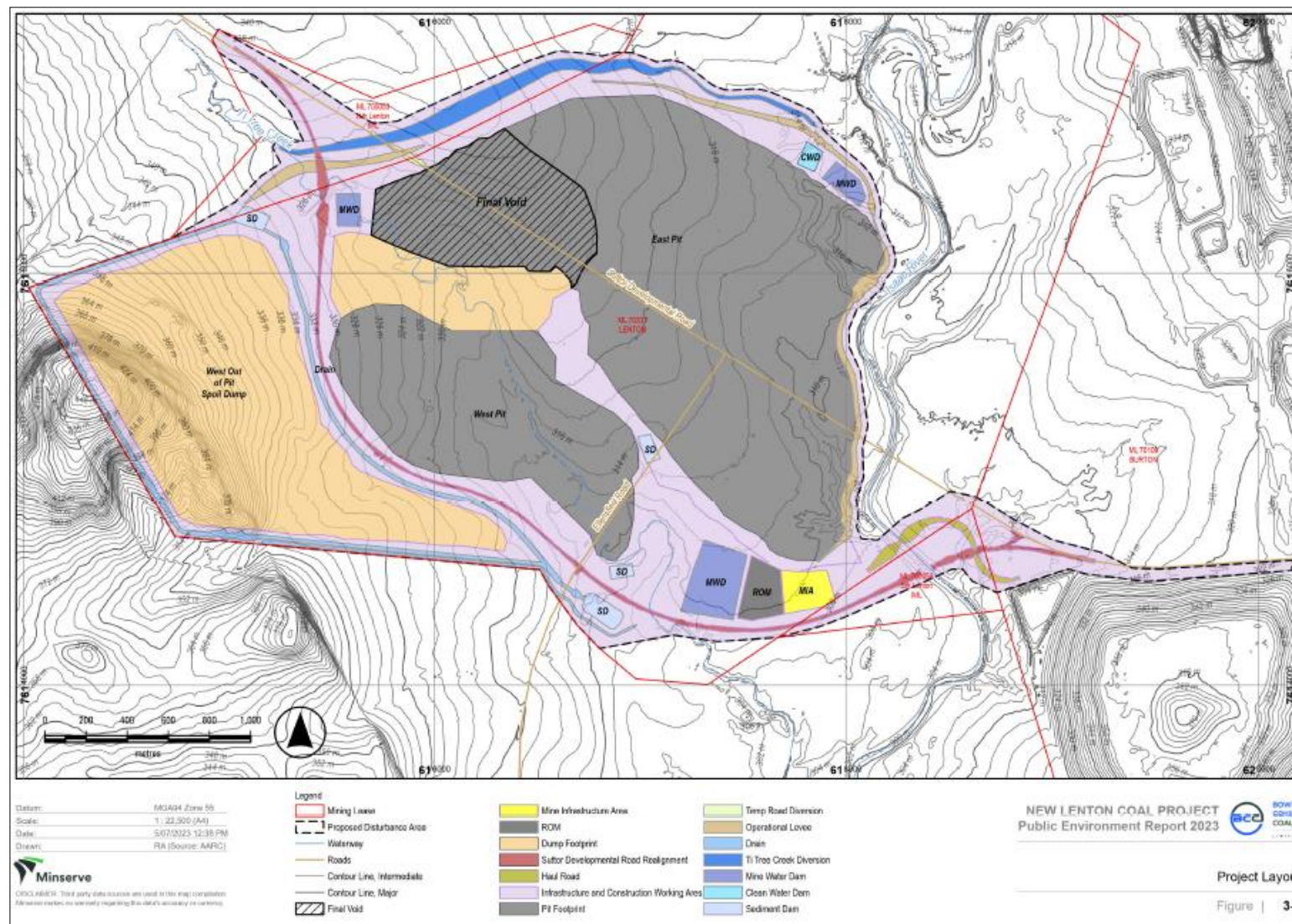


Figure 2: Project layout

2 Existing environment

The following subsections describe the pre-mining state of the New Lenton MLs recorded during terrestrial ecology surveys.

Multiple studies have been undertaken to identify existing environmental values of the Project. These studies incorporated a range of desktop assessments and field surveys, which are detailed in the MNES Terrestrial Ecology Impact Assessment Report (AARC 2024a) and summarised below.

2.1 Ecological baseline studies of the Project area

For the ecological baseline studies, desktop assessments used a range of available resources to collate information on the terrestrial ecological values known, likely, and of potential to occur within the Project area, including:

- the EPBC Act Protected Matters Search Tool;
- a review of Queensland government mapping; and
 - Department of Environment, Science and Innovation (DESI, formally DES) Vegetation map - Regional Ecosystems Biodiversity Status;
 - Department of Resources (DoR, previously the Department of Natural Resources Mines and Energy, DNRME) Regulated Vegetation Map;
 - DESI Protected Plants Flora Survey Trigger Map.
- database searches to identify known records:
 - DES Wildlife Online search and WildNet Wildlife Records;
 - Atlas of Living Australia Occurrence Records;
 - Australian Virtual Herbarium (AVH) Records.

Desktop assessments guided field survey techniques to target flora and fauna of conservation significance known from the region. A summary of the terrestrial ecology field surveys conducted for the Project is outlined in Table 1. The results of the surveys have been considered to determine the pre-existing state of the environment at the New Lenton MLs.

Table 1: Summary of terrestrial flora and fauna surveys for the Project

Referred to in the Plan	Timing	Conducted by	Description
Spring (2004) survey	30 August – 7 September 2004	Central Queensland University	Baseline flora and fauna assessment.
Autumn (2017) survey	14–22 March 2017	AARC	Assessment of EPBC Act threatened and migratory species to support the EPBC Act referral.
Summer (2018) survey	22–27 February 2018	AARC	Assessment of aquatic ecological values (riparian birds and bats component).
Autumn (2018) survey	30 April – 4 May 2018	AARC	Assessment of ecological values identified during road realignment assessment, to support the change in Project design.

Referred to in the Plan	Timing	Conducted by	Description
Spring (2018) survey	29 October – 1 November 2018	AARC	Assessment of the Greater Glider to support the EPBC Act referral.
Autumn (2019) survey	2–8 April 2019	AARC	Assessment of ecological values to support the change in Project design and condition assessment of potential groundwater dependant ecosystems.
Autumn (2023) survey	28 February – 9 March 2023	AARC	Threatened Ecological Community (TEC) and habitat quality assessment survey within proposed disturbance area.

The Project survey area varied between surveys, with most limited to the New Lenton MLs. The survey in autumn 2018 was undertaken to the south and west of the New Lenton MLs to map the vegetation and habitat values adjacent to the Project (AARC 2024a). For the purposes of the Plan, the term ‘survey area’ refers to the consolidated area of all surveys undertaken, unless otherwise specified.

2.2 Vegetation communities

Fourteen vegetation communities have been identified across the survey area during the field surveys (AARC 2024a). They are based on field results and state government vegetation mapping. The vegetation communities within the survey area are summarised in Table 2. Nine out of these 14 vegetation communities are located within the proposed disturbance area.

Approximately 490 of the 886 ha, or over 55% of proposed disturbance area, is not associated with remnant or high value regrowth (HVR) vegetation (AARC 2024a).

Table 2: Field-verified vegetation communities within the survey area

Map unit	Vegetation community	Associated RE	VM Act status ¹	EPBC status ²
<i>Vegetation communities within the proposed disturbance area</i>				
VC1	Poplar box (<i>Eucalyptus populnea</i>) woodland on alluvial plains	11.3.2	Of Concern	Endangered
VC2	Moreton Bay ash (<i>Corymbia tessellaris</i>) woodland on alluvial plains	11.3.4	Of Concern	-
VC3	<i>Corymbia</i> spp. woodland with sparse shrub layer on sandy duplex soils	11.3.7	Least Concern	-
VC4	Blue gum (<i>Eucalyptus tereticornis</i>) open woodland fringing drainage lines on sandy-loam soils	11.3.25	Least Concern	-
VC5	Narrow-leaved ironbark (<i>Eucalyptus crebra</i>) woodland on alluvial plains	11.3.36	Of Concern	-
VC6	Mountain coolibah (<i>Eucalyptus orgadophila</i>) open woodland on basaltic clays	11.8.5	Least Concern	-
VC7	Shrubby Poplar box open woodland on fine-grained sedimentary soils	11.9.7a	Of Concern	-
VC8	Lancewood (<i>Acacia shirleyi</i>) low forest on sandstone escarpment	11.10.3	Least Concern	-

Map unit	Vegetation community	Associated RE	VM Act status ¹	EPBC status ²
VC9	<i>Eucalyptus</i> and <i>Corymbia</i> spp. with <i>Acacia</i> spp. woodland on coarse-grained sedimentary rocks	11.10.4a	Least Concern	-
NA	Cleared agricultural land	NA	NA	-
<i>Vegetation communities not in the proposed disturbance area</i>				
VC10	Brigalow (<i>Acacia harpophylla</i>) open woodland with emergent Dawson River Blackbutt (<i>Eucalyptus cambageana</i>) on weathered brown clays	11.9.1	Endangered	-
VC11	Mountain Coolibah woodland to open woodland on fine-grained sedimentary rocks	11.9.2	Least Concern	-
VC12	Poplar box open forest on weathered brown clays	11.9.10	Of Concern	-
VC13	Brigalow sucker regrowth on undulating clay soils	Non-remnant (NR) 11.9.5	NA	-
VC14	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks.	11.8.11	Of Concern	-

¹ Endangered; Of Concern; Least Concern. ² Endangered TEC - If meets the TEC thresholds

2.3 Flora

A total of 336 native flora species have been recorded during the field surveys (AARC 2024a); this represents 64 families. The dominant family group is Poaceae (83 species), followed by Fabaceae (49 species), Myrtaceae (21 species) and Malvaceae (18 species).

Despite extensive surveys over several years and seasons, no threatened flora species under the EPBC Act have been identified within the survey area (AARC 2024a).

Large sections of the survey area have previously undergone clearing to develop improved pastureland for cattle grazing, with areas of high disturbance adjacent to dams and old watering troughs. This has produced favourable conditions for weeds and led to a local dominance of exotic grasses and other weeds. *Parthenium hysterophorus* is the most common weed species within the survey area. It has been recorded throughout the survey area and occurs in higher densities within cleared agricultural areas and adjacent vegetation (AARC 2024a).

A total of 56 introduced flora species have been recorded during the field surveys, including 13 weed species (Table 3).

Priority weed species, in accordance with the Project's Weed and Pest Management Plan (AARC 2024b), are any of the following recorded within the New Lenton MLs (Table 3):

- six flora species included on the Weeds of National Significance (WoNS) list;
- seven flora species listed as a prohibited or restricted matter under the Queensland *Biosecurity Act 2014* (BC Act);
- flora species listed on the Isaac Regional Council invasive species priority list under the Isaac Regional Council Biosecurity Plan (IRCBP); and
- other invasive flora species with the potential to cause a substantial adverse environmental impact.

Table 3: Priority weed species recorded in the survey area

Weed	Status		
	WoNS ¹	BC Act ²	IRCBP ³
Rubber Vine (<i>Cryptostegia grandiflora</i>)	Yes	Restricted category 3	Yes
Parthenium (<i>Parthenium hysterophorus</i>)	Yes	Restricted category 3	Yes
Noogoora Burr (<i>Xanthium occidentale</i>)		Other invasive plant	
Bathurst Burr (<i>Xanthium spinosum</i>)		Other invasive plant	
Harrisia Cactus (<i>Harrisia martinii</i>)		Restricted category 3	Yes
Prickly Pear (<i>Opuntia stricta</i>)	Yes	Restricted category 3	Yes
Velvety Tree Pear (<i>Opuntia tomentosa</i>)	Yes	Restricted category 3	Yes
Castor Oil Plant (<i>Ricinus communis</i>)		Other invasive plant	Yes
Mimosa Bush (<i>Vachellia farnesiana</i>)		Other invasive plant	Yes
Prickly Acacia (<i>Vachellia nilotica</i>)	Yes	Restricted category 3	Yes
Stinking Passionflower (<i>Passiflora foetida</i>)		Other invasive plant	
Rhodes Grass (<i>Chloris gayana</i>)		Other invasive plant	
Lantana (<i>Lantana camara</i>)	Yes	Restricted category 3	Yes

¹ Listing under the Australian Weeds Strategy WoNS list (DAWR 2016). ² Status per the BC Act: prohibited matters, restricted matters (Categories 1–7) and other invasive plants not declared under schedule 1 or 2. ³ Listing under the Isaac Regional Council Biosecurity Plan (IRC 2024).

2.4 Fauna

Field surveys identified the following five major habitat types for fauna in the survey area (Figure 3):

- Eucalypt open forest along main creeks;
- Eucalypt dry woodlands on low land;
- Eucalypt dry woodlands on escarpments;
- Acacia woodlands; and
- cleared agricultural areas.

A total of 170 native vertebrate species were identified during the field surveys, comprising seven amphibians, 35 reptiles, 92 birds and 36 mammals (AARC 2024a). Two of these species are listed as threatened under the EPBC Act, namely the Greater Glider (*Petauroides volans*), and the Squatter Pigeon (*Geophaps scripta scripta*), and will be detailed in Section 3.2.2.

Six introduced fauna species have been recorded during surveys for the Project, by detection of scats, tracks, other traces (e.g., skulls), sensor camera detection and/or direct observation (AARC 2024a). All introduced fauna species recorded in the survey area are considered priority pest species for the purposes of the Plan. These species, and their State and local government status, are included in Table 4.

Priority pest species, in accordance with the Project's Weed and Pest Management Plan (AARC 2024b), are any of the following recorded within the New Lenton MLs (Table 4):

- fauna species listed as prohibited or restricted matters under the BC Act;
- fauna species listed on the Isaac Regional Council invasive species priority list under the IRCBP; or
- other invasive fauna species with the potential to cause a substantial adverse environmental impact.

Table 4: Priority pest species recorded in the survey area

Pest species	Status	
	BC Act ¹	IRCBP ²
Cane Toad (<i>Rhinella marina</i>)	Other invasive animal	
Dingo / Dog (<i>Canis familiaris</i>)	Restricted category 3, 4, 5, 6	Yes
Cat (<i>Felis catus</i>)	Restricted category 3, 4, 6	Yes
European Rabbit (<i>Oryctolagus cuniculus</i>)	Restricted category 3, 4, 5, 6	
House Mouse (<i>Mus musculus</i>)	Other invasive animal	
Feral Pig (<i>Sus scrofa</i>)	Restricted category 3, 4, 6	Yes

¹ Status as per the BC Act: prohibited matters, restricted matters (Categories 1–7) and other invasive animals not declared under schedule 1 or 2. ² Listing under the Isaac Regional Council Biosecurity Plan (IRC 2024).

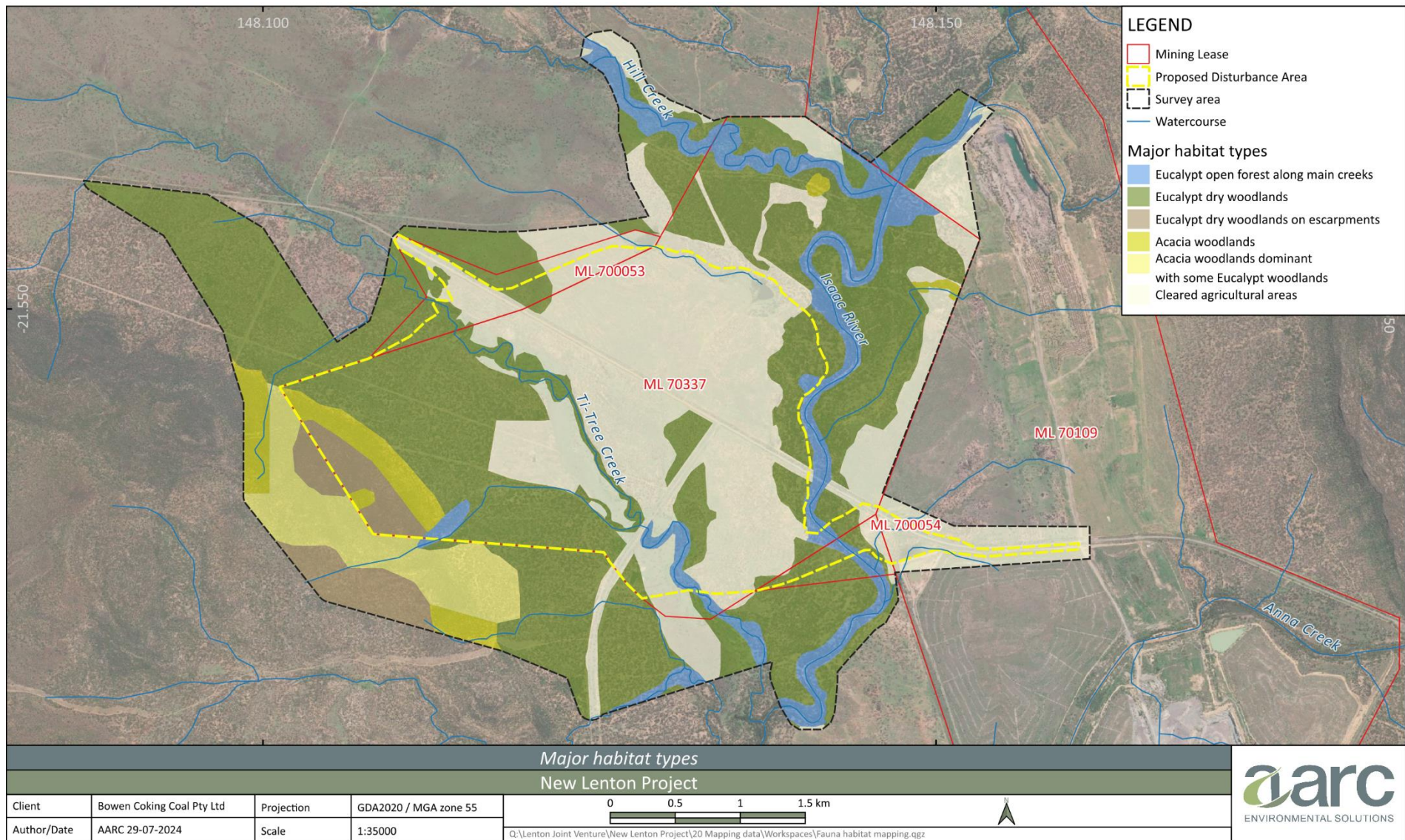


Figure 3: Major habitat types

3 Relevant MNES

The following sections address the MNES TEC and threatened species of conservation significance identified in the MNES Terrestrial Ecology Impact Assessment Report (AARC 2024a) as being potential, likely, known to occur within the survey area, and identified as significantly impacted by the Project. These MNES are, therefore, subject to management measures described in this SIMP. As the Project is unlikely to have a significant residual impact on the White-throated Needletail (AARC 2024a), management and mitigation have not been specifically developed to address this species.

AARC (2024a) assigned a likelihood of occurrence for each MNES species of conservation significance identified during the desktop assessment; and TEC were confirmed to be occurring in the survey area. The likelihood assessment determination was based on the knowledge of ecologists, species' distribution, potential habitat suitability, known records and scientific literature prior to each survey to inform species requiring targeted surveys. Following the field assessments, a re-assessment of the likelihood of presence for each species was undertaken, considering the presence or absence of suitable habitat identified from field assessments.

3.1 Threatened ecological communities (TEC)

One TEC, Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC), has been recorded in the survey area (AARC 2024a). Field surveys identified an estimated total of 184.2 ha of the Poplar Box TEC in seven patches in the survey area (AARC 2024a). Three classes of vegetation quality were identified for the Poplar Box TEC in the survey area (DoEE 2019):

- **Category A2 (highest quality)**, in patches where the crown cover was recorded as over 10%, circa 80% of perennial vegetation cover in the ground was native and more than 30 native species were recorded within the patch;
- **Category B (good quality)**, in patches where the crown cover was recorded as over 10%, over 50% of perennial vegetation cover in the ground was native and more than 20 native species were recorded within the patch; and
- **Category C (moderate quality)**, in patches where the ground cover was dominated by non-native perennial species (>50%), but presented more than 20 native species in the ground layer, more than 10 mature trees per hectare over 30 cm diameter breast height (dbh), and evidence of Poplar Box (or hybrids of Poplar Box with other Eucalyptus species) periodic recruitment.

The distribution of the Poplar Box TEC patches is summarised in Table 5, and illustrated in Figure 4.

Table 5: Poplar Box TEC in the survey area

Patch	Description	Quality category	Current extent (ha)
P1	Large patch on the southwest of the survey area, west of the Ti-Tree Creek	Category A2	106.9
P2	Patch north of the Suttor Developmental Road, parallel to the Isaac River	Category C	12.4
P3	Patch north of the Suttor Developmental Road, parallel to the Isaac River, continuation of P2	Category C	5.1
P4	Patch between the Isaac River and Burton Mine, south of the Suttor Developmental Road	Category C	11.7
P5	Patch south of the Suttor Developmental Road, across from P3	Category C	5
P6	Patch north east of the proposed impact area	Category C	6.3
P7	Large patch to the north east of the survey area, between the Isaac River and Burton Mine pit	Category B	36.8

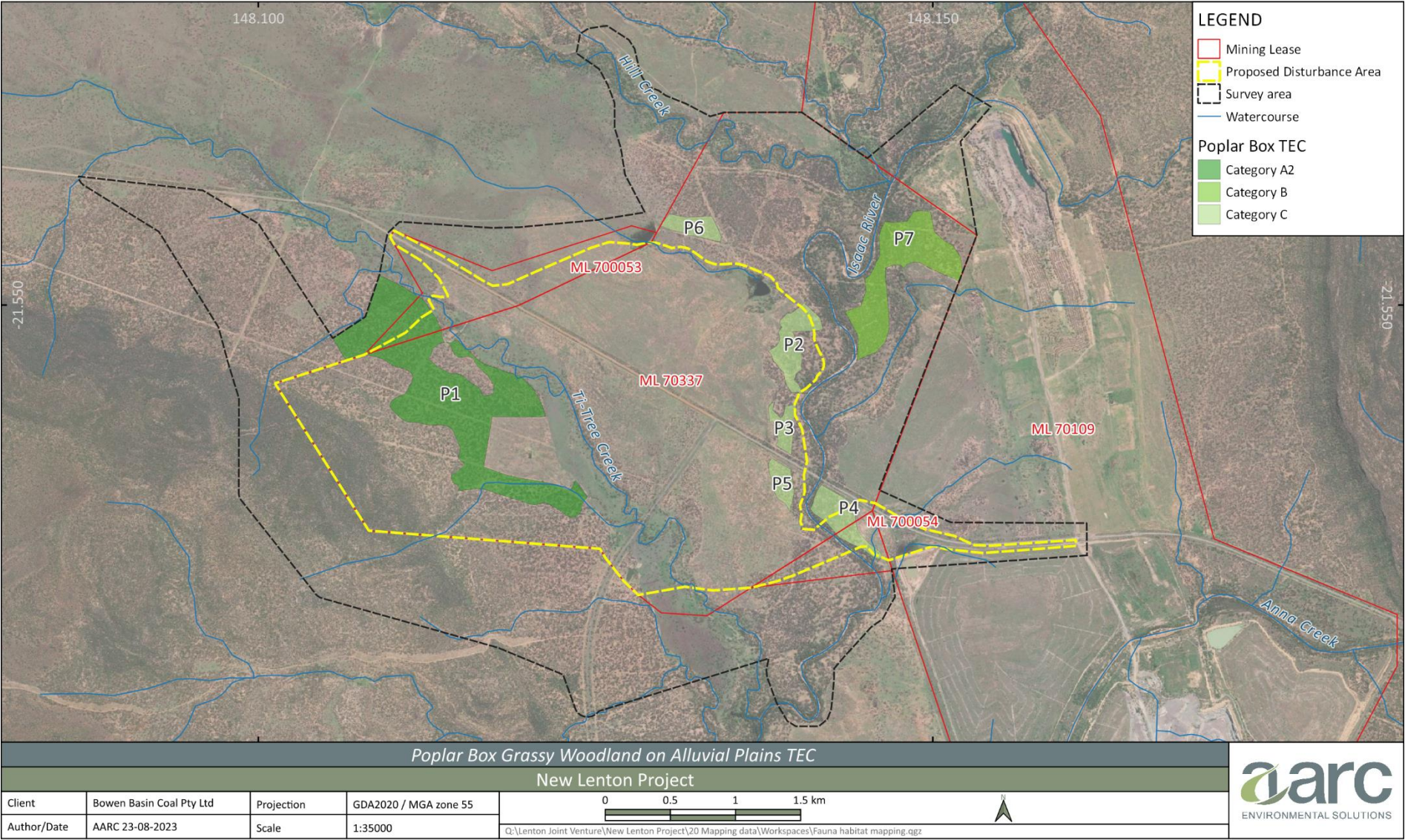


Figure 4: Poplar Box TEC in the survey area

3.2 MNES listed threatened species

3.2.1 Flora

Of the 10 EPBC listed threatened flora species identified within 50 km of the Project during desktop assessments, four species were assessed to have potential to occur within the survey area prior to the field assessments (AARC 2024a).

No threatened flora species have been identified in the survey area during the numerous surveys, despite targeted seasonal surveys across the survey area by experienced botanists including traverses (meanders) (Cropper 1993; DES 2020a) of potentially suitable habitat undertaken in the survey area. Following field assessments, no EPBC listed threatened flora species are considered known, likely, or have potential to occur in the proposed disturbance area (AARC 2024a).

3.2.2 Fauna

Of the 24 EPBC listed threatened fauna species originally identified during the desktop searches, seven were assessed as potentially occurring within the survey area prior to field assessments (AARC 2024a).

Only two fauna species listed as threatened under the EPBC Act have been recorded during field surveys of the proposed disturbance area, namely the Greater Glider and the Squatter Pigeon. Desktop records indicated the White-throated Needletail has been found within the survey area and the Koala has been recorded adjacent to the survey area. Although not identified during the field surveys, there is a reasonable likelihood that the survey area also provides suitable habitat for these two threatened species (AARC 2024a).

The remaining three species (Ornamental Snake, Northern Quoll and Ghost Bat) assessed as potentially occurring within the survey area following desktop assessment were assessed as unlikely to occur based on field survey findings (AARC 2024a).

Those species that are known or likely to occur, as well as a description of their habitat in the proposed disturbance area, is provided in Table 6.

Potential impacts of the Project and threats to relevant species are discussed in Section 5.

Table 6: MNES threatened fauna species likelihood of occurrence

Scientific Name Common Name	EPBC Act status ¹	Total habitat and likelihood of occurrence within the proposed disturbance area	Vegetation/Habitat Group/s
<i>Petauroides volans</i> Greater Glider	V	Known The species was recorded during several field assessments (AARC 2024a). It is therefore considered likely the species uses habitat in the proposed disturbance area. 293 ha of critical habitat (Figure 5).	Habitat critical to the survival of the species: - Preferred habitat (Figure 5) - riparian open forest along the Isaac River and the Hill Creek (RE 11.3.25); - Eucalypt grassy woodlands on alluvial plains (most of RE 11.3.2, RE 11.3.4, RE 11.3.36, one section of RE 11.3.7 near a drainage line to the southwest of the survey area, surrounded by preferred habitat); and - the area limited to the denser canopy along the Ti-Tree Creek that connects to the Isaac River, located south of Ellensfield Road. - Suitable habitat (Figure 5) - Eucalypt woodland with sparse canopy and dense understorey (corresponding with RE 11.3.7, RE 11.9.10 and most of RE 11.9.7a); and - the area limited to the denser canopy along the Ti-Tree Creek, north of Ellensfield Road.
<i>Phascolarctos cinereus</i> Koala	V	Likely The species was not recorded during the field assessments. However, desktop searches identified one record adjacent to the survey area, and habitat for the species has been identified within the proposed disturbance area (AARC 2024a). It is therefore considered likely the species uses habitat within the proposed disturbance area. 327 ha of critical habitat (Figure 6).	Habitat critical to the survival of the species: Preferred habitat Eucalypt open forest, with continuous canopy dominated by refuge trees (<i>Eucalyptus tereticornis</i>) have been identified as critical habitat. These areas have been identified in riparian habitat along the Isaac River and Hill Creek (Figure 6). Suitable habitat Remnant vegetation communities with high food or ancillary habitat trees density are considered to provide potential suitable habitat for the Koala. These communities include (Figure 6): - Eucalypt grassy woodlands on alluvial plains; - Eucalypt woodland with sparse canopy and dense understorey; - the area limited to the denser canopy along the Ti-Tree Creek, south of Ellensfield Road; and - non-remnant thin vegetated drainage line along Ti-Tree Creek north of the road. Other habitat (not critical) Within the survey area, areas mapped as remnant or non-remnant vegetation communities with food or ancillary tree species density lower than 6 per ha are not considered to provide habitat critical to the survival of the species. These communities include (Figure 6):

Scientific Name Common Name	EPBC Act status ¹	Total habitat and likelihood of occurrence within the proposed disturbance area	Vegetation/Habitat Group/s
			- Eucalypt and Acacia woodland (mostly Lancewood) on sandstone escarpment with no food or ancillary tree species; - Lancewood woodland on sandstone escarpment; and - one patch of very sparse regrowth vegetation of RE 11.8.5 to the East of the Suttor Developmental Road with dieback and very few food or ancillary tree species.
<i>Geophaps scripta scripta</i> Squatter Pigeon (Southern)	V	Known The species was recorded during the autumn 2023 field assessment (AARC 2024a). It is therefore considered likely the species uses habitat within the proposed disturbance area. 192.3 ha of breeding and foraging habitat (Figure 7).	Breeding habitat Areas mapped as remnant vegetation and HVR vegetation within the survey area provide suitable overstory and groundcover for the Squatter Pigeon (subject to weather and grazing pressure) (Figure 7). However, most areas of remnant and HVR within the site have been identified as having a dense ground cover vegetation (>33%) (subject to weather and grazing conditions). Permanent or semi-permanent water bodies identified within the survey area include all farm dams. Applying the 1 km buffer around these sources suggests breeding opportunity is possible within areas with the right substrate and <33% groundcover. Foraging habitat Areas mapped as remnant vegetation and HVR vegetation within the survey, that present <33% groundcover, have been considered as foraging habitat where the vegetation occurs within 3 km of suitable permanent, semi-permanent, or seasonal water sources (Figure 7). Dispersal habitat Dispersal habitat has been defined to include any remnant and regrowth open forest or woodland occurring between patches of foraging and breeding habitat and areas of cleared land (less than 100 m wide) that link areas of suitable habitat (Figure 7).
<i>Hirundapus caudacutus</i> White-throated Needletail	V, Mi	Known Desktop searches identify one record of the species in flyover habitat within the proposed disturbance area (Figure 8).	Foraging habitat The White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1,000 m above the ground (DCCEEW 2024). While the species forages above most habitat types, the White-throated Needletail is predominantly recorded above wooded areas (TSSC 2019). Habitat for the species corresponds with all the major habitat types within the Project except for cleared agricultural areas (Figure 8).

¹ EPBC Act conservation status at the time of the referral (2019): V = Vulnerable; Mi = migratory.

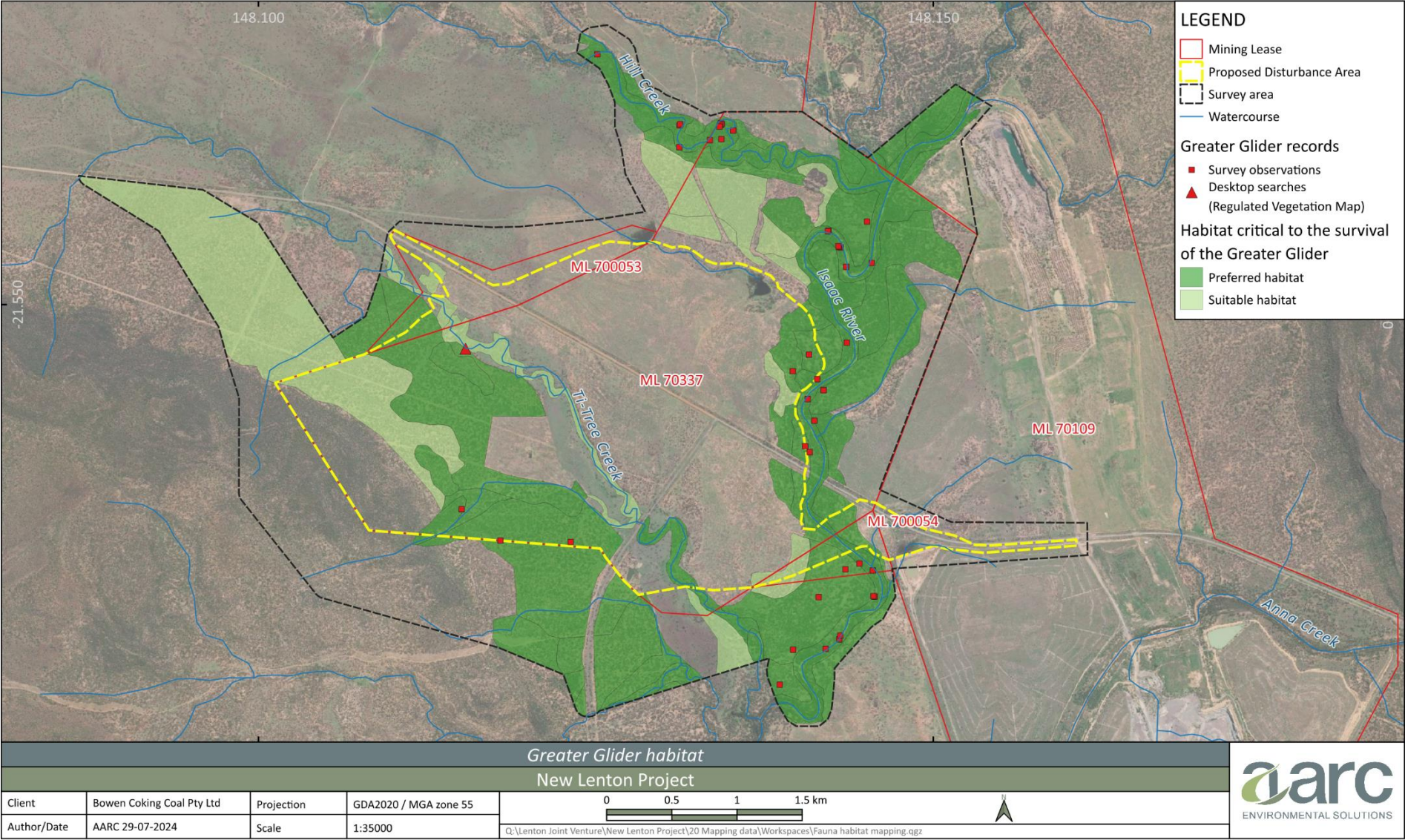


Figure 5: Greater Glider habitat

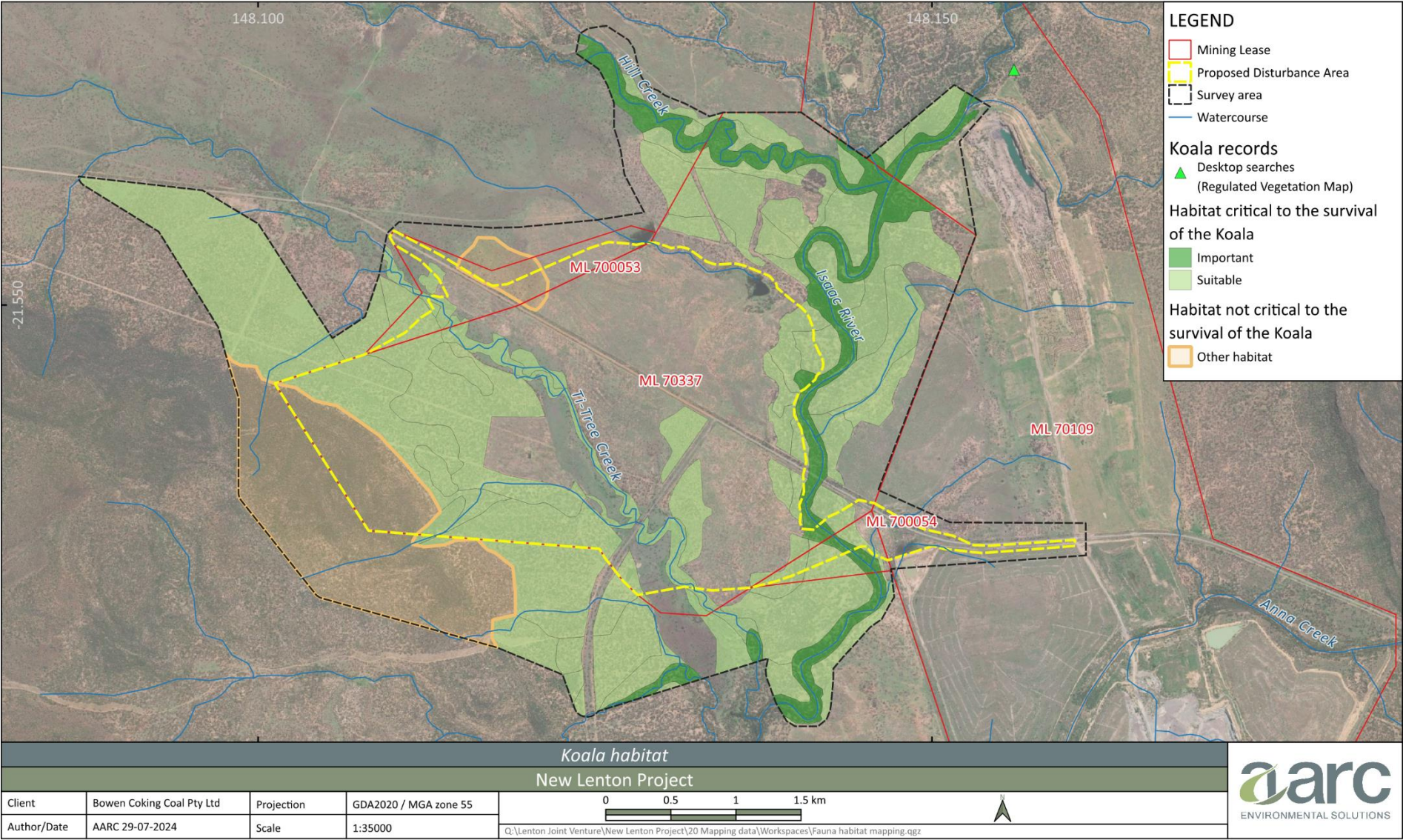


Figure 6: Koala habitat

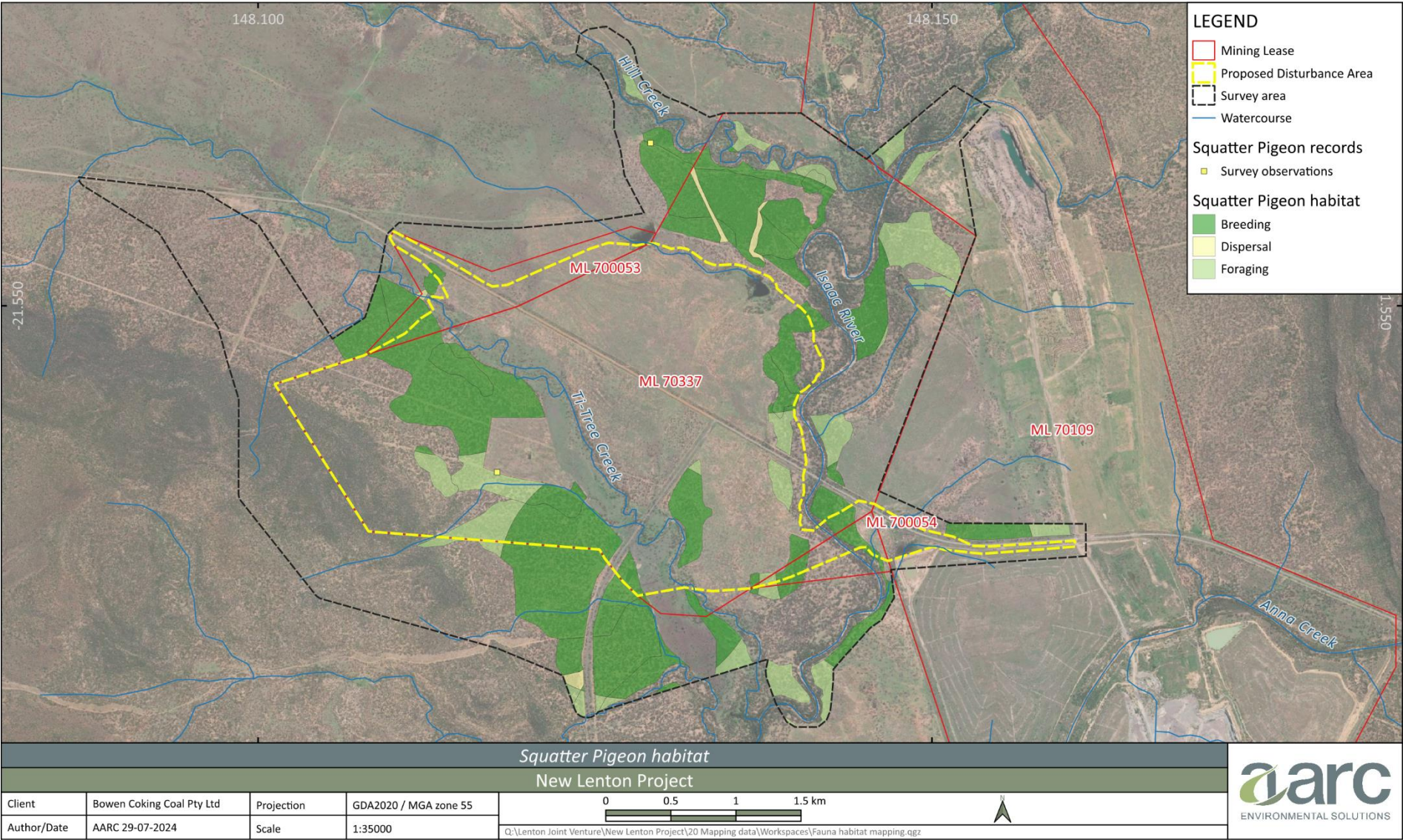


Figure 7: Squatter Pigeon habitat

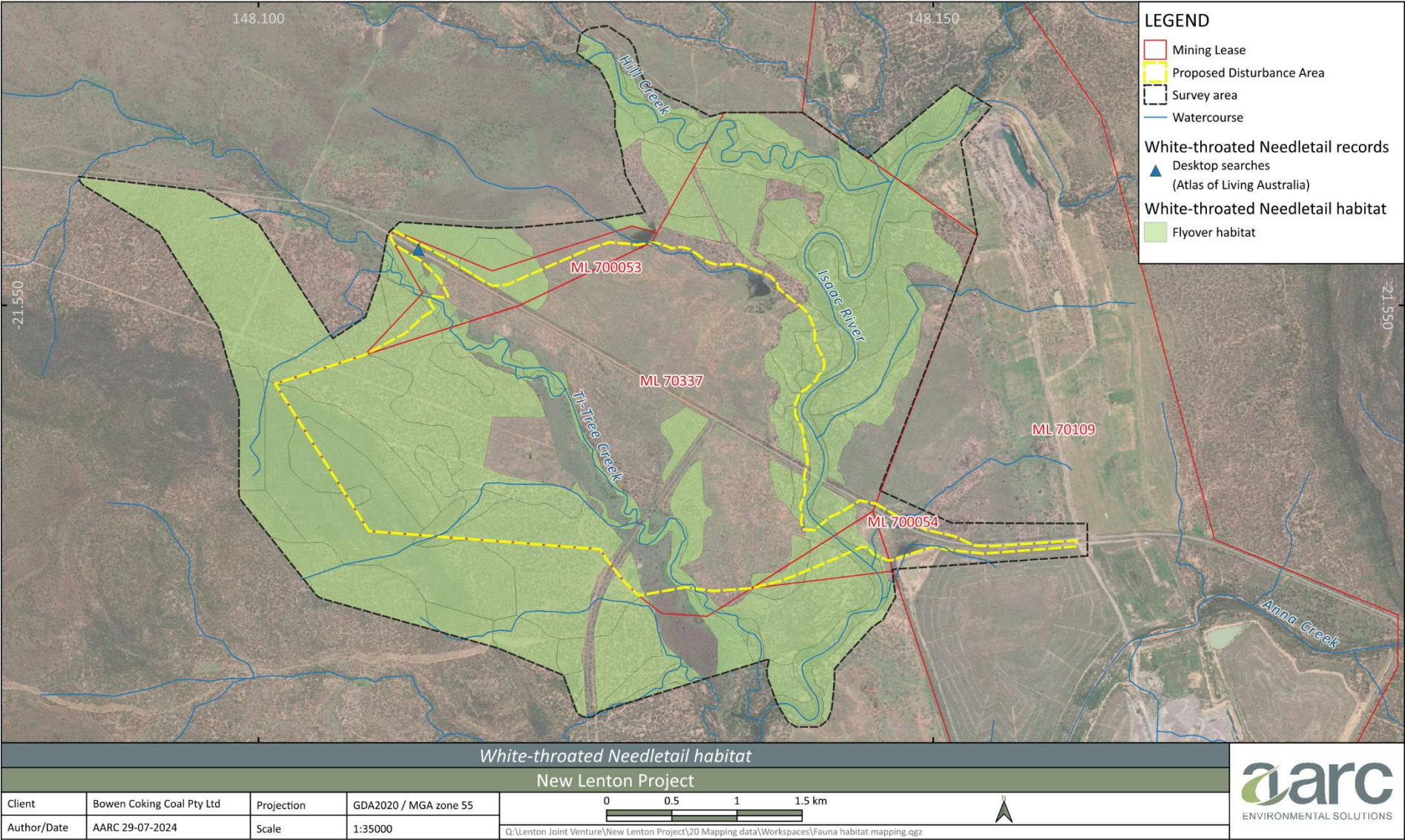


Figure 8: White-throated Needletail habitat mapping

4 Relevant plans and guidelines

A summary of the main threats for each relevant MNES species, identified as significantly impacted by the Project (AARC 2024a), and the relevant conservation advice and plans for each relevant species is provided in Table 7. Potential impacts and threats to the MNES species and TEC posed by the Project are discussed in greater detail in Section 5.

Table 7: Main threats, conservation advice and plans for conservation significant species

MNES	Main threats (manageable)	Conservation advice and plans
Greater Glider	• Inappropriate fire regimes • Habitat clearing and fragmentation • Timber harvesting • Barbed wire fencing • Predation by feral cats and European foxes	• Conservation Advice for <i>Petauroides volans</i> (greater glider (southern and central)) (DCCEEW 2022) • Threat abatement plan for predation by Feral Cats (DoE 2015) • Threat abatement plan for predation by the European Red Fox (DEWHA 2008) • Queensland Invasive Plants and Animals Strategy 2019–2024 (DAF 2019)
Koala	• Inappropriate fire regimes • Clearing, fragmentation and degradation of Koala habitat • Encounter mortality with vehicles and dogs • Koala retrovirus (KoRV) and Chlamydia (<i>Chlamydia percorum</i>)	• Conservation Advice for <i>Phascolarctos cinereus</i> (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE 2022) • Koala-Sensitive Design Guideline (DES 2022)
Squatter Pigeon (Southern)	• Habitat clearing and fragmentation • Livestock and feral herbivore grazing • Trampling by livestock • Introduction of weeds • Inappropriate fire regimes • Predation by feral cats and European Foxes	• Conservation Advice for <i>Geophaps scripta scripta</i> (Squatter Pigeon (southern)) (TSSC 2015) • Threat abatement plan for predation by Feral Cats (DoE 2015) • Threat abatement plan for competition and land degradation by Rabbits (DoEE 2016) • Threat abatement plan for predation by the European Red Fox (DEWHA 2008) • Queensland Invasive Plants and Animals Strategy 2019–2024 (DAF 2019)

5 Potential impacts and threats

Potential direct and indirect impacts to the relevant MNES species and TEC, as a result of Project activities, are described in the following sections.

5.1 Vegetation clearing

Clearing of TEC and threatened species habitat will occur during the construction and operational phase of the Project. Much of the Project footprint has been historically cleared of remnant wooded vegetation for cattle grazing purposes (AARC 2024a). The remainder is comprised of open forest to woodlands dominated by *Eucalyptus* and *Acacia* spp. (AARC 2024a); part of which is considered critical habitat for Greater Glider (Figure 5), critical habitat for the Koala (Figure 6), potential breeding and foraging habitat for the Squatter Pigeon (Southern) (Figure 7); and habitat above which White-throated Needletail may utilise for aerial feeding (Figure 8).

The Projects activities, including vegetation clearing, will likely have a direct significant residual impact on the Poplar Box TEC, Greater Glider, Koala and Squatter Pigeon (AARC 2024a); and are expected to require offsets in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy. Offset requirements are not discussed further within this SIMP.

Vegetation clearing in habitat has the potential to cause the following impacts:

- mortality and injury of individuals;
- indirect impacts to juveniles through parent mortality or abandonment;
- loss of habitat and reduction of species extent;
- loss of foraging, breeding and nesting sites;
- loss of movement corridors; and
- habitat fragmentation and decreasing the integrity and connectivity of the habitat.

5.2 Habitat fragmentation

Vegetation clearing can result in a variety of environmental consequences, including fragmenting habitat and reducing connectivity and habitat value (from the impact of edge effects). Fragmenting habitat can impact both flora and fauna species. Often clearing activities form barriers that restrict and impair movement of fauna species, resulting in lowered habitat connectivity.

Habitat fragmentation also applies to areas identified as refuges under future climate changes scenarios. In particular, the Isaac River could be considered a climatically suitable refugia for species (e.g., Koala) during periods of environmental stress including droughts, heatwaves, and long-term climate change.

Edge effects are impacts that occur along the boundary of natural or remnant vegetation and cleared or developed land. This boundary is exposed to increased light, wind shear and weed invasions, augmenting the local environment (e.g., altered species and structural composition).

The west portion of the survey area contains a large contiguous area of remnant vegetation that provides fauna with significant dispersal opportunities. It is considered likely that a level of habitat fragmentation will be induced through vegetation clearing as part of the Project, however, the effects of fragmentation may be diminished due to the abundance of suitable habitat within the surrounding area. Vegetation connectivity within the wider region will be maintained through the Carborough Range, to the east, and Burton Range, to the west.

Riparian corridors associated with Isaac River and Hill Creek, provide north–south fauna movement opportunities through the landscape for movement and dispersal, in particular the Koala and Greater Glider. The riparian vegetation along the Isaac River is mapped as state significant corridor. The infrastructure associated with the Project includes two crossings on the Isaac River that can potentially compromise the species' ability to disperse along the riparian corridor, these include:

- bed level crossing of the Isaac River; and
- Suttor Developmental Road (a public road) realignment, with a new bridge over the Isaac River.

5.3 Vehicle strike

The movement of vehicles on the Project site has the potential to increase the incidence of fauna mortality via vehicular strike. Ground-dwelling fauna are most susceptible to this potential impact.

Contributing risk factors for vehicle strike are the speed of vehicles on roads and tracks, visibility of tracks and frequency of use by fauna.

The risk of injury or mortality from vehicle strike, particularly for Koala, is greatest where roads cross fauna movement corridors, such as the Isaac River. Squatter Pigeon (Southern) are at risk of vehicle strike along unsealed roads and tracks where they rest and dust-bathe, or where favourable conditions are adjacent to roads with high vehicular activity (DCCEEW 2024).

5.4 Weeds

Introduced flora species are effective competitors for resources and have the potential to reduce the floristic structure and diversity of native plant communities.

As detailed in Section 2.3, a total of 56 introduced flora species have been recorded within the survey area (AARC 2024b).

Activities that could introduce or spread weeds include soil disturbance and vehicle movements. Vegetation clearing can also result in 'edge effects', when the clearing activities cause modifications to the interface with natural habitats. A large percentage of areas to be directly disturbed by the Project are predominantly associated with cleared agricultural areas, where introduced plants (such as Buffel grass) dominate the ground layer (AARC 2024b).

The Project has the potential to increase the presence of weeds, particularly Parthenium, through the disturbance of remnant and HVR areas.

5.5 Pests

Introduced fauna species present risk to native fauna and their habitat. Six introduced fauna species have been recorded within the survey area (Section 2.4), some of which pose direct threats to species of conservation significance.

Feral cats and foxes are considered likely to pose the greatest risk of predation for the Squatter Pigeon (Southern) (DCCEEW 2024).

Feral cats and foxes have also been recorded to predate Greater Glider, with increased susceptibility to predation following fires (DCCEEW 2022). Predation from feral cats and foxes is, however, considered a minor threat to Greater Glider as a species.

Wild dog can predate Koala, however, this is considered a minor threat to the species. Domestic dog attacks, on the other hand, are considered a significant threat to Koala in areas adjacent to peri-urban and residential areas (DAWE 2022).

5.6 Bushfire

While plants and animals have a range of mechanisms to survive individual fires, accidental bushfires could potentially occur if mine activities are not appropriately managed. On the other hand, the build-up of fire load through infrequent burning over time can lead to more severe and detrimental fires in the long-term.

Increased intensity and/or frequency of bushfires is a severe threat to Koala and has historically been detrimental to Koala populations (DAWE 2022).

5.7 Livestock

Livestock presence associated with the Project (i.e., movement of livestock from areas within the disturbance area to surrounding area or within retained vegetation within the disturbance footprint) has the potential to impact habitat quality by grazing of plants; introduction or spreading of weeds; inducing erosion and direct mortality and/or injuries of fauna. This threat is greatest in areas previously ungrazed.

There were 72 cases of Koala admittance to Queensland Wildlife Hospitals from 1997 to 2019 due to livestock incidents (i.e., cattle and horses trampling Koala) (Jiang *et al.* 2021). Overall, this contributes a very low proportion of Koala admittances compared to vehicle strike or dog attacks.

5.8 Fencing

Barbed wire fencing presents a potential means of entanglement for many fauna species. Entrapment in barbed wire fencing is a known cause of mortalities for Greater Glider (DCCEEW 2022). Barbed wire fencing, as well as other solid fencing forms, can prevent fauna movements and ultimately limit connectivity for a variety of fauna species, including Koala.

5.9 Timber harvesting

Timber harvesting presents a particular threat to Greater Glider by loss of breeding habitat and it can reduce connectivity and foraging potential by limiting gliding ability and food availability (DCCEEW 2022).

5.10 Hydrological changes

Due to the location of the deposit, it is proposed to divert Ti-Tree Creek around the open cut mine pit workings. The diverted Ti-Tree Creek will flow into the Isaac River approximately 4.7 km upstream of the current Ti-Tree Creek and Isaac River confluence, maintaining a similar bed grade of the existing Ti-Tree Creek. This design aims to control the flood velocities to mimic the existing channel and thereby minimise subsequent impacts on Ti-Tree Creek and the Isaac River. The diversion releases through an engineered structure to control water flows and velocity, into a natural drainage channel approximately 400 m before the Isaac River.

A levee is also required on the Isaac River floodplain to protect the eastern and southern extent of East Pit from flood ingress from the Isaac River. The Isaac River levee will merge with the Ti-Tree Creek levee. The levees will be a fully engineered structure and covered to minimise the potential for erosion.

The predicted changes in key hydraulic parameters for watercourses as a result of the Project are identified in the Project 'Surface Water and Flood Impact Assessment' (WRM 2023). The results of detailed flood modelling show that the impacts of the Project on the hydraulic characteristics (such as velocity, bed shear stress and stream power) of the Isaac River are minimal. For other key drainage features potentially impacted by the Project, hydraulic parameters are generally within the range of existing values along these drainage features for operational and postmining conditions. Ongoing monitoring of the performance of the diversion will be undertaken and, if necessary, mitigation measures will be implemented to prevent excessive erosion or sediment deposition. Potential mitigation measures would include minor earthworks, such as filling scour areas, reprofiling banks or removing accumulated sediment, and revegetation of areas subject to erosion.

The predicted changes to the flooding regime as a result of the Project are identified in the Project's Surface Water and Flood Impact Assessment (WRM 2023). This study modelled changes to flood depth and velocities for the 50%, 10%, 2% and 1% Annual Exceedance Probability (AEP) flood events. The results indicated insignificant level changes to areas subject to flooding for the 10% AEP and minor to insignificant changes for the 1% AEP in the Isaac River. Flood velocities were also shown to be nil to insignificant (10% and 2% AEP) and minor for the 1% AEP.

For Ti-Tree Creek and Ti-Tree diversion, there is predicted to be flood level increases between 2.2 m to 3 m (10% AEP), dissipating within 600 m upstream of the diversion and levee. Similarly, there is predicted to be water level increases of 2.3 m for a range of modelled flood events. The diversion is also predicted to reduce water levels along Ti-Tree Creek by 2.8 m to 3.5 m. Velocities will increase in some areas and be reduced in others.

The variation in the flood velocities is predicted to have insignificant to minor impact on the Isaac River geomorphology (WRM 2023) and therefore riparian vegetation and fauna habitat.

Variation in the flood depths is expected to be temporary, localised and dissipate quickly, therefore not significant to the environmental values present in the area. The model shows that the event duration that produces peak flows in Ti-Tree Creek and the Isaac River is less than 24 hours under existing conditions. An assessment of potential changes in flood hydrographs (i.e. duration and flow volumes) due to Project activities was undertaken for a section of the Isaac River adjacent the Project. It was determined that any change in duration in developed conditions is negligible. Therefore, the duration of flooding for developed conditions is similar to existing conditions, which in both cases demonstrates that flood events in the region around the Project have a very short duration for minor to extreme rainfall events.

Any changes to flood hydrology are not predicted to result in any significant impacts on terrestrial ecology values due to the insignificant to minor changes in flood levels, velocities, duration and extent of inundation. The function of flood regimes is expected to be retained for vegetation and habitat features, including areas of floodplains adjacent to the Isaac River that undergo inundation in periodic flood conditions.

5.10.1 Groundwater dependent ecosystems (GDE)

The GDE field study for the Project by 3D Environmental (2023) used multiple lines of evidence to assess the groundwater dependence of vegetation. Based on the results of the field survey, it was concluded that riparian vegetation associated with the Isaac River floodplain and alluvium (Terrestrial GDEs (TGDEs)) presents the only GDEs identified within the survey area.

The GDE Assessment (3D Environmental 2023) concluded that with implementation of a GDE Monitoring and Management Plan (GDEMMP), it is considered that the risk to GDEs posed by Project development, other than the small area of direct clearing, ranges from low to insignificant. A Groundwater Dependent Ecosystems Habitat Quality Monitoring Program (GDEHQMP) (AARC 2024c) will provide habitat quality monitoring procedures to be implemented for New Lenton, to complement the GDEMMP. The GDEHQMP will enable habitat quality to be assessed against potential groundwater impacts on GDEs, assisting to determine whether there are significant Project-related impacts to associated TECs and listed species under the EPBC Act.

5.11 Erosion and sedimentation

Vegetation clearing and land disturbance may result in topsoil exposure and erosion. In addition, disturbance within proximity to the Isaac River, such as the crossings, may also reduce bank stability and increase soil erosion and elevated sediment levels in downstream receiving waters.

The Project has the potential to result in erosion of disturbed areas and sedimentation of waterways through the clearing of vegetation for the development of open cut pits and the construction of haul roads and other infrastructure.

5.12 Dust

Open cut mining operations and exposed surface areas (e.g., windblown emissions from ROM stockpiles) have potential to generate and disperse atmospheric dust.

Studies have shown that excessive dust generation can impact the health and viability of surrounding vegetation. However, studies on the impacts of dust from unsealed roads on vegetation and fauna (Cumberland Ecology 2015; Jones *et al.* 2016) found no evidence that dust has any detrimental impacts on vegetation or fauna abundance.

5.13 Artificial lighting

Artificial lighting will be established for the Project, including in the MIA, and infrastructure corridor. Project lighting has the potential to affect behavioural patterns of some species. Some bird and bat species, for example, are attracted to insects around lights and could become prey for larger predators (e.g., owls). Artificial lighting can also attract predators and invasive pests, both of which may pose a threat to native fauna (DoEE 2020).

5.14 Noise and vibration

Noise and vibration associated with construction and operation of the Project has the potential to disrupt the routine activities of fauna species in close proximity to the operations.

Potential sources of noise or vibration in the proposed mining area include vehicle movements and operating equipment (e.g., haulage trucks, loaders, dozers, drill rigs, compressors and other drilling-related equipment).

Noise impacts on the different habitats from mining activities proposed to be undertaken will be minor given fauna often readily habituate in close proximity to continuous noise. While sudden noise (e.g., blasting activities) has the potential to startle native fauna, animals are likely to adapt to the disturbance and/or move to similar habitats in the surrounding landscape.

6 Mitigation and management measures

6.1 Management objectives

The management actions for the Project aim to limit potential impacts on native flora and fauna and they specifically address management and mitigation for the Poplar Box TEC, Greater Glider, Koala and Squatter Pigeon. No specific management actions are proposed for the White-throated Needletail as the Project is unlikely to have a significant impact on the species (AARC 2024a).

The DCCEEW mitigation hierarchy (i.e., avoid, mitigate and offset MNES) has been incorporated into planning, design, construction, operation, maintenance and rehabilitation phases of the Project, wherever possible. Avoidance is most prominent during the design and pre-construction phase of the Project (Table 9). Techniques to mitigate impacts have been prescribed for the phases from construction to rehabilitation (Table 10 to Table 12). Significant residual impacts to MNES are to be offset as described in the MNES Terrestrial Ecology Impact Assessment Report (AARC 2024a).

The main objectives for management actions are to:

- ensure no clearing/disturbance to MNES habitat/vegetation occurs beyond the proposed disturbance area (Figure 2);
- prevent injury or mortality of MNES fauna during construction, operation, maintenance and rehabilitation (decommissioning) of the Project; and
- monitor and manage retained areas of MNES habitat to maintain habitat quality for MNES relevant species, outlined in Section 3.

Section 6.2 provides specific objectives and actions to help meet the three main objectives listed, guided by the potential impacts and threats prescribed in Section 5.

6.2 Management actions, monitoring and corrective actions

Management actions are to be implemented during all phases (from pre-construction to rehabilitation) of the Project. General and phase-specific managed actions are detailed in Table 8 to Table 12.

Table 8: General management actions

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and/or corrective actions	Monitoring, reporting and adaptive management
Ensure all employees and contractors are aware of environmental values, company policy and management plans	Employees are to be informed about species and communities of conservation significance during inductions. This should include details of threats and management actions that are relevant to all employees (such as tidy workspaces, vehicle speeds and the need to report fauna strikes). Inductions should make clear that employees and contractors are to report any observations or incidents involving species of conservation significance to the Site Environmental Officer.	Throughout life of Project Induction prior to commencing on site An annual presentation to update staff and contractors	Site Environmental Officer Site Environmental/ HSE Officer / Supervisor responsible for staff/contractor inductions	Records of staff/contractors who have received induction. Presentation available for review. Records, photos of MNES relevant species, or good practices internally reported by staff/contractors	Annual review of employee inductions and site familiarisation to ensure currency. Observations of MNES relevant species are to be reported in the annual environment reports.
Reduce potential for increased pest presence and actively control pest populations to prevent predation on MNES relevant species	All waste will be disposed of in accordance with the site's waste management procedures for non-mining waste.	As per the site's waste management procedures	As per the site's waste management procedures	As per the site's waste management procedures	As per the site's waste management procedures
	Pests have the greatest potential of impacting native wildlife, including Squatter Pigeon and Koala, during and immediately following vegetation clearance works. Active pest control methods are implemented in accordance with the Weed and Pest Management Plan (AARC 2024b). Management measures include: • baiting; • trapping; • shooting; • biological control; and/or • habitat manipulation. Implementation of pest control measures will be coordinated with surrounding land managers, as per the Weed and Pest Management Plan Annual Prioritisation Schedule (AARC 2024b).	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and/or corrective actions	Monitoring, reporting and adaptive management
	Consistent monitoring of pests is to be undertaken by personnel on site in accordance with the Weed and Pest Management Plan (AARC 2024b). Annual pest monitoring is to be undertaken per the Weed and Pest Management Plan to evaluate pest population densities and the effectiveness of control methods (AARC 2024b). Monitoring of control sites will occur following implementation of pest control measures, to assess the management measures employed, determine if follow-up control is required, and provide estimates of the population density, where possible (AARC 2024b).	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)
Prevent increased weed presence as a result of the Project	Management actions are to be implemented in accordance with the Weed and Pest Management Plan to help prevent introducing and/or spreading of weeds (AARC 2024b). This includes: • use of Weed and Seed certificates for contractor vehicles or other vehicles being introduced to sites and use of a wash-down facility; • vehicle wash-down procedures/timing; • controlling plant material, soil and related equipment movement; • establishing exclusion zones; • a procedure for weed disposal; and • annual monitoring requirements. Weed densities are to be measured through the continued monitoring of habitat quality for Greater Glider, Koala and Squatter Pigeon, as described in Section 7.	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)	As per the Weed and Pest Management Plan (AARC 2024b)

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and/or corrective actions	Monitoring, reporting and adaptive management
Reduce risk of vehicle strike for fauna of conservation significance	Speed limits will be imposed on Project roads and tracks to reduce the risk of vehicle strike on native fauna, particularly Koala and Squatter Pigeon, with a maximum of 80 km/hr on haul roads and 50 km/hr on dirt tracks/ other roads. The bed level crossing for mine haul trucks will also be subject to speed controls (e.g. maximum speed limit of 40 km/h). Safe driving procedures will be incorporated into site inductions to increase awareness of the risk of vehicle strike to native fauna.	Throughout life of Project	Site Superintendent Site Environmental Officer / HSE Officer	Corrective actions such as reduced vehicle speeds, speed bumps, are to be implemented should any injuries, fatalities or near misses of MNES relevant species occur	Any injuries, fatalities or near misses of MNES relevant species are to be included in the annual environment reports.
Reduce the potential risk of accidental bushfire events on the MNES relevant species habitat	Bushfire prevention and management measures will be implemented for the Project, and fire awareness will be included in the induction of personnel and contractors to minimise the risk of bushfire. This is also a critical health and safety requirement for mining activities. Management actions to prevent accidental bushfires are to be specified within an Emergency Response Plan.	As per the Emergency Response Plan	As per the Emergency Response Plan	As per the Emergency Response Plan	As per the Emergency Response Plan.
Reduce the potential risk of severe bushfire events on MNES relevant habitat	Controlled burns will be undertaken to reduce fuel load and prevent severe bushfire events, where required. Prior to any controlled burns, a fire management plan will be prepared by a suitably qualified contractor. All relevant permits and consultation must be included in a management plan and obtained prior to burning.	As per fire management plan for specific controlled burns	As per fire management plan for specific controlled burns	As per fire management plan for specific controlled burns	As per fire management plan for specific controlled burns.
Prevent potential impacts to habitat for MNES relevant species by installing or utilising exclusion fencing	Any fencing to be erected as part of the mine is to be fauna friendly (with the exception of fauna exclusion fencing, where required) and will be consistent with recommendations for “Koala permeable fencing” from the Koala-Sensitive Design Guideline (DES 2022).	Throughout life of mine	Site Environmental Officer	Fauna friendly fencing used for any additional fencing for the mine	Ensure fauna friendly fencing is implemented within mining areas.

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and/or corrective actions	Monitoring, reporting and adaptive management
Prevent potential impacts of timber harvesting on MNES relevant species habitat	Vegetation clearing to be undertaken through an actively monitored process described in Table 8 and Table 9. The proponent will not engage in selective timber harvesting during any phases of the Project.	Throughout life of mine	All personnel are to report any sightings of timber harvesting within the New Lenton MLs	No selective timber harvesting by proponent occurs. Should timber harvesting be identified, an investigation will be undertaken to identify if this is has resulted from mining activities	Incidental monitoring is to be undertaken during other monitoring activities (such as pest/weed and habitat quality monitoring).
Limit potential impacts of vegetation clearing in communities of conservation significance (Poplar Box TEC) and habitat of MNES relevant species	The Project will incorporate the DCCEEW's offset mitigation hierarchy (i.e., avoid, mitigate and offset MNES) during planning phases for infrastructure construction, mining activities (e.g. pit and dump development), tracks, roads and all potential disturbances of the environment in the Project disturbance area. The Project is largely located in previously cleared land and designed to avoid and/or minimise impacts to remnant vegetation within corridors. Impacts within the Isaac River corridor have been limited to two road crossings. Clearing within areas of Poplar Box TEC and habitat for relevant MNES species will be minimised to that required for safe operations, and as authorised by conditions of approval. A 'Permit to Disturb' is required to be obtained for all vegetation clearing areas. Clearing will only occur within the authorised disturbance area and in accordance with clearing procedures described in Table 10. A process for internal site approval of disturbance by contractors will be implemented.	Incorporated into Project design, and during clearing activities throughout life of mine	Project planning team Site Environmental Officer	No vegetation clearing beyond that authorised	Record evidence of avoidance, minimising and mitigating actions undertaken for the Project.
Limit potential impacts of artificial lighting on surrounding fauna	Exterior lighting will be designed to provide a safe working environment. To minimise potential impacts of artificial lighting on surrounding fauna, the placement, configuration and direction of lighting for the Project will be implemented in consideration of AS 4282:2019 Control of the obtrusive effects of outdoor lighting (Standards Australia 2019).	To be incorporated into Project designs, and for construction and any permanent /	Project planning team Construction contractors	Lighting installed conforms to the Australian Standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting (Standards Australia 2019).	Site Environmental Officer is to verify best practice lighting design principles have been incorporated into construction lighting.

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and/or corrective actions	Monitoring, reporting and adaptive management
	Where lighting is required, directional lighting will be used to reduce light spill into surrounding areas. Lighting is to incorporate the best practice lighting design principles from the National Light Pollution Guidelines for Wildlife (DCCEEW 2023).	semi-permanent lighting		Records kept	

Table 9: Pre-construction phase management actions

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and/or corrective actions	Monitoring, reporting and adaptive management
Avoid direct and indirect adverse impacts on MNES relevant species and habitat and communities of conservation significance	Implement process for internal site approval of disturbance by contractors. Pre-clearance surveys are to be undertaken by appropriately qualified personnel prior to any clearance works to identify general habitat values aligned to State guidelines, and more specifically any threatened species as well as their breeding or shelter habitat, where appropriate.	Development process for approval and any future amendments Prior to any vegetation clearing activities	Project planning team Site Environmental Officer to employ fauna spotter catcher or otherwise appropriately qualified personnel	No incremental vegetation clearing beyond that authorised Undertaking of pre-clearance surveys, with personnel given ample time to cover proposed areas to be cleared and identify specific values to be avoided, relocated or carefully removed prior to clearing works. Pre-clearance surveys should be used to further refine infrastructure locations wherever possible and used to update constraint mapping. Corrective actions include increasing pre-clearance survey durations should a relevant MNES species conservation significant species injury, fatality or near miss be experienced during clearing works (i.e., felling of a tree with Greater Glider present in hollows)	Record evidence of avoidance, minimising and mitigating actions undertaken for the Project. Annual audits are to ensure pre-clearance surveys align with the ground-truthed areas of clearing. The results of pre-clearance surveys will be maintained. Greater time is to be allowed for pre-clearance work. Increased direction of clearing activities (i.e., implementation of fauna friendly fencing or signage to demarcate areas yet to be surveyed) and a greater number of fauna spotter catchers will also be implemented during clearing activities.

Table 10: Construction phase management actions

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
Ensure clearing of native vegetation and habitat for relevant MNES threatened species and communities is limited to the approved disturbance footprint	Have precisely defined areas of clearing and ensure personnel responsible for clearing works, fauna spotter catchers present, and any other site personnel involved or potentially impacted by activities are informed of where the works are restricted to. Clearly demarcate areas to be cleared or retained, where necessary. This may include demarcating areas to be retained/cleared through signage, fencing or spray paint. Clearing works should not be undertaken outside of areas where pre-clearance surveys have been undertaken by appropriately qualified personnel.	Prior to and following all clearing works, as required throughout the Project lifetime	Site Environmental Officer	No clearing of native vegetation and habitat outside of authorised areas. Corrective actions should be employed such as demarcation of areas to be retained/cleared through signage, fencing or spray paint, if land disturbance/vegetation clearing is undertaken within the approved disturbance footprint. Rehabilitation works are to take place in any areas of accidental clearing outside of the approved disturbance footprint. Rehabilitation is to include an appropriate selection of native ground, shrub and tree species reflective of the original environment (i.e. the RE mapped during baseline assessments).	The extent of clearing is to be verified by the Site Environmental Officer and recorded in the annual environment reports.

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
Reduce incidental fatalities, injuries and near misses of relevant MNES species of conservation significance during clearance works	Vegetation/habitat adjoining proposed clearance areas will be delineated and clearly marked to prevent accidental damage through a 'Permit to Disturb' process. A licensed fauna spotter catcher is to be present during all clearing works. Sequential vegetation clearing is to be undertaken towards vegetation being retained. This is to prevent isolating fauna and allowing them to move away from the clearing area. Trees to be removed that are adjacent to retained vegetation will be felled in the direction of the clearance zone to avoid impacts to adjoining habitat. All vegetation to be cleared is to have been included in pre-clearance surveys (Table 9). A daily morning discussion is to be held with all staff and contractors involved with clearing work, addressing areas to avoid and fauna to be aware of. All clearance works are to cease should a relevant MNES species of conservation significance be identified. A buffer of 100 m from the animal/s is to be established before clearing in woodland recommences. Clearing is to retain vegetation so that the animal is allowed to move on naturally. If after three days, the animal has not moved on, a licensed fauna spotter catcher may relocate the animal to appropriate nearby habitat. Any injured animals are to be taken to an appropriate wildlife facility, treated as appropriate or euthanised by the licensed fauna spotter catcher during clearing activities.	All clearing work	Site Environmental Officer / Construction Supervisor	No near misses, injuries or fatality of relevant MNES species during clearing activities. Corrective actions are required if a near miss, injury or fatality of a relevant MNES species of conservation significance occurs. Corrective actions are to be undertaken straight away and incorporated into future clearing events. Suitable corrective actions include: - increasing the number of licensed fauna spotter catchers present; - increasing pre-clearance times for fauna spotter catchers; and - reducing speed of clearing activities or personnel involved with clearing works.	All relocations, near misses, injuries and fatalities of species of conservation significance are to be recorded.

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
Reduce potential for habitat fragmentation	The Project has the potential of limiting dispersal capabilities of Greater Glider and Koala along riparian corridors being impacted by infrastructure. This includes the: • Bed level crossing of the Isaac River; and • Suttor Developmental Road (a public road) realignment, with a new bridge over the Isaac River. Arborists are to be consulted to help retain large trees (particularly hollow-bearing trees) through this area, wherever practicable. Glide poles are to be erected either side of the bed level crossing and bridge to help maintain connectivity for Greater Glider. The height, distances and widths of the glide poles are to be guided by manufactures specifications, ensuring poles can be utilised by Greater Glider. Access along the Isaac River will continue to be maintained for Koala with the bridge being installed. The riverbed provides a natural under-road bridge crossing point for wildlife, during dry conditions, consistent with principles from the Koala-Sensitive Design Guideline (DES 2022).	Glide poles are to be installed directly after construction and before rehabilitation works.	Project planning team Contractors Site Environmental Officer	Completion of glide poles in combination with appropriate restoration works along the Isaac River associated with the bed level crossing and bridge. Corrective actions will be implemented as required.	Reporting of design and construction methods.
Reduce potential entrapment of fauna such as Koala in drains / trenches	Temporary fencing or bunding will be installed around construction sites and areas that present hazards to fauna. Barbed wire fencing will not be utilised. Install logs/branches in drains and trenches to enable egress of trapped fauna. Ensure temporary open trenches and pits are monitored for fauna.	During or immediately following construction	Site Environmental Officer	No death or injury of fauna in temporary trenches or drains / trenches. Corrective actions may include rectification of any damaged fences or bunds, as required.	Fencing to be regularly checked by the Site Environmental Officer and rectified where required. Reporting of fauna incidents and injury during construction phase.

Table 11: Operational phase management actions

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
Limit potential impacts of erosion and sedimentation in downstream habitat of relevant MNES species of conservation significance	Erosion and sediment control measures will be implemented to minimise potential impacts (WRM 2023). These sediment control measures, primarily sediment drains and sediment dams, are to be designed in accordance with International Erosion Control Association (IECA) guidelines and will minimise impacts from dump runoff (WRM 2023). An Erosion and Sediment Control Plan will be implemented.	Throughout operation	Site Supervisor	Installed as per the Erosion and Sediment Control Plan Maintenance to ensure erosion and sediment control measures are correctly installed after rainfall events and wet season.	Erosion and sediment control measures are inspected after significant rainfall events and at the end of the wet season.
Limit potential impacts of dust on surrounding fauna in Project area and surrounding the Project site	An air quality impact assessment was undertaken for the Project as part of the State environmental approval process, and predictions of dust deposition rates comply with the condition limits at all sensitive receptors (SLR 2019). Notwithstanding, dust control measures will be employed, including: - Personnel and contractors will be required to observe speed limits when driving on access roads within the New Lenton MLs and surrounds to minimise the generation of dust. - Watering of potential dust generating surfaces will be undertaken, as required. Given the predicted dust deposition associated with the Project and the suggested control measures, the health and viability of surrounding vegetation and local fauna will not be deleteriously affected.	Throughout operation	Site Superintendent Site Environmental Officer	Air quality monitoring results at receptors do not exceed EA criteria.	Frequency of watering surfaces, or other dust suppression methods, is increased.

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
Limit potential impacts of noise on surrounding fauna	A noise and vibration impact assessment was undertaken for the Project as part of the State environmental approval process, and predictions of noise and vibration comply with the condition limits at all sensitive receptors (SLR 2019). Noise and vibration impacts are predicted to be minor given fauna often readily habituate in close proximity to continuous noise (see Section 5.14). As noise management measures are already required under the EA for the Project, no additional measurements are proposed under the SIMP.	Noise monitoring in accordance with EA requirements	Site Environmental Officer Site Superintendent	Compliance with EA noise and vibration criteria. No noise or vibration complaints. Corrective actions (e.g., change in noise generating equipment or change in blasting methods) will be implemented should there be exceedances of EA criteria.	Monitoring and reporting of noise and vibration will comply with requirements set in the EA.

Table 12: Rehabilitation phase management actions

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
Rehabilitation of Project disturbance areas	Rehabilitation works are to be undertaken, as identified in the approved Progressive Rehabilitation and Closure plan (PRCP) schedule for the Project's MLs. Progressive rehabilitation of disturbance areas (such as mine waste rock emplacements) will be conducted. The bed level crossing of the Isaac River will be rehabilitated in accordance with the PRCP schedule, which includes removal of the crossing and revegetation using a seed mix containing eucalypt species (such as river red gum) found along the Isaac River (i.e., based on the occurrence of species within RE 11.3.25).	As per the PRCP schedule.	As per the PRCP schedule.	Success criteria are to be defined within a PRCP schedule.	Rehabilitation monitoring, as per PRCP.
Rehabilitate area surrounding bridge (to be part of a public road) over the Isaac River	Appropriate vegetation, that provides shelter but will not compromise integrity of the bridge, is to be restored to encourage fauna use of the underpass. Flora selection is to align with RE 11.3.25 species, as identified in the PRCP for the Project. Glide poles are to be erected either side of the bridge to ensure the movement of Gliders is maintained throughout the operation period of the mine. Greater Glider boxes are to be installed on glide poles..	Areas either side of the Isaac River bridge are to be rehabilitated after construction.	Project planning team Contractors Site Environmental Officer	Installation of glider boxes verified after rehabilitation works are completed.	A camera trap may be installed to monitor use of the underpass during the breeding period of the Koala (August–November).

7 Relevant MNES species management and monitoring

The following habitat quality and species monitoring are to be undertaken for the Poplar Box TEC, Greater Glider, Koala and Squatter Pigeon, as detailed in Table 13 to Table 17.

Table 13: Poplar Box TEC mapping

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
To prevent a decline in the quality of retained Poplar Box TEC	Four transect sites within Poplar Box TEC habitat are to be established within each area of retained TEC vegetation outside of the Project disturbance. The sites will be part of the GDE monitoring for habitat quality (GDEHQMP, AARC 2024c), as they are located within the predicted drawdown for the Project. Consistent monitoring of the Poplar Box TEC habitat quality is to be undertaken by appropriately qualified personnel in accordance with the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c). The methodology proposed is a habitat quality assessment adapted from the 'Guide to Determining Terrestrial Habitat Quality Version 1.3' (DES 2020b). The assessment methodology will include: • site based attributes (from the BioCondition methodology); and • species habitat attributes. The GDEHQMP consists of a pre-activity condition/ baseline assessment that accounts for natural variation, which information will be used to establish a habitat quality threshold level; followed by ongoing monitoring (AARC 2024c). Monitoring data is to be reported in the annual environment reports.	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)

Table 14: *Habitat quality monitoring*

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
To prevent a decline in the quality of habitat, for relevant MNES conservation significant species, surrounding the proposed development footprint	Several transect sites within the MNES species habitat, are to be established within retained vegetation outside of the Project disturbance that provide critical habitat for Koala, Greater Glider or the Squatter Pigeon (Southern). The sites will be part of the GDE monitoring for habitat quality (GDEHQMP, AARC 2024c), as they are located within the predicted drawdown for the Project. Some transects will be located downstream of the Project area to monitor the potential hydrological or hydrogeological impacts on habitat quality. Consistent monitoring of the MNES species habitat quality is to be undertaken by appropriately qualified personnel in accordance with the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c). The methodology proposed is a habitat quality assessment adapted from the 'Guide to Determining Terrestrial Habitat Quality Version 1.3' (DES 2020b). The assessment methodology will include: • site based attributes (from the BioCondition methodology); and • species habitat attributes. The GDEHQMP consists of a pre-activity condition/ baseline assessment that accounts for natural variation, which information will be used to establish a habitat quality threshold level; followed by ongoing monitoring (AARC 2024c). Monitoring data is to be reported in the annual environment reports.	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)	As per the Groundwater Dependent Ecosystem Habitat Quality Monitoring Program (AARC 2024c)

Table 15: Greater Glider monitoring

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
To monitor the Greater Glider population adjacent to the proposed disturbance area	Greater Glider monitoring is to be undertaken in critical habitat adjacent to the proposed disturbance footprint. A minimum of three spotlighting transects are to be conducted during each monitoring event to target Greater Gliders (Figure 9). All spotlighting transects, approximately 1,200 m long, are to be slowly walked, for a minimum search effort of two person hours. More than one observer can spotlight the site at one time (e.g., two observers spotlight the site for one hour). Surveys are to be commenced a minimum of 30 minutes after dusk. Surveys are not to be undertaken during inclement weather, as this reduces detection rates. If this is unavoidable, record prevailing conditions on the datasheets (Eyre <i>et al.</i> 2022). Carry binoculars to assist with species identification and consider torch light strength as an ethical consideration, avoiding prolonged exposure of animals.	Biennial monitoring is to be undertaken from August–January, throughout the life of the Project.	Appropriately qualified personnel	Species presence is confirmed. Monitoring numbers are consistent throughout the life of the mine. Corrective actions should include an investigation into potential threats which could have impacted the population (e.g., a recent fire, loss of breeding places, high count of predatory species (owls)). A corrective action may include installing additional breeding places (Greater Glider boxes).	Monitoring results are to be reported following the monitoring event.

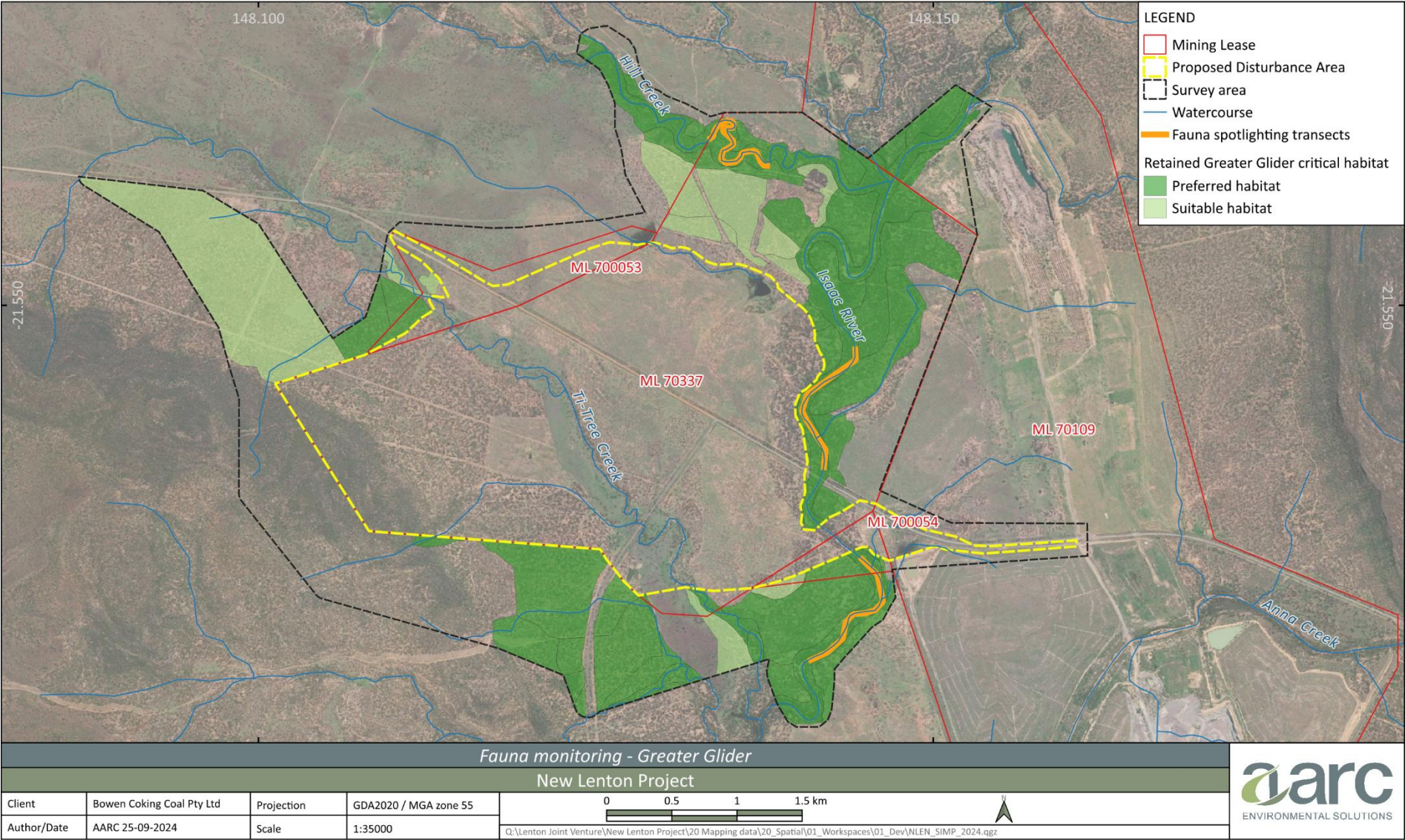


Figure 9: Fauna monitoring - Greater Glider

Table 16: Koala monitoring

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
To monitor the Koala population adjacent the proposed disturbance area	Koala monitoring is to be undertaken in critical habitat adjacent to the proposed disturbance footprint. Surveys should be undertaken between August and January, when Koala activity is generally at a peak, and resident breeding females with back-young are most easily observed. Spotlighting surveys for Koala are to be undertaken simultaneously with Greater Glider surveys along waterways (i.e. both species are to be targeted during these surveys) (Figure 10). Addition methods such as diurnal searches, Koala call playback, thermal drones and Spot assessment technique (SAT) surveys can help detect the presence of Koala (ANU 2021) and may be considered.	Biennial monitoring is to be undertaken from August–January, throughout the life of the Project.	Appropriately qualified personnel	Koalas were not identified during the baseline survey, though desktop searches have identified records within the vicinity of the Project area. It is likely that the density of Koala present within the survey area and broader landscape is very low. As detectability will be low, corrective actions for Koala will be implemented based on habitat monitoring results (Table 14).	Monitoring results are to be reported following the monitoring event.

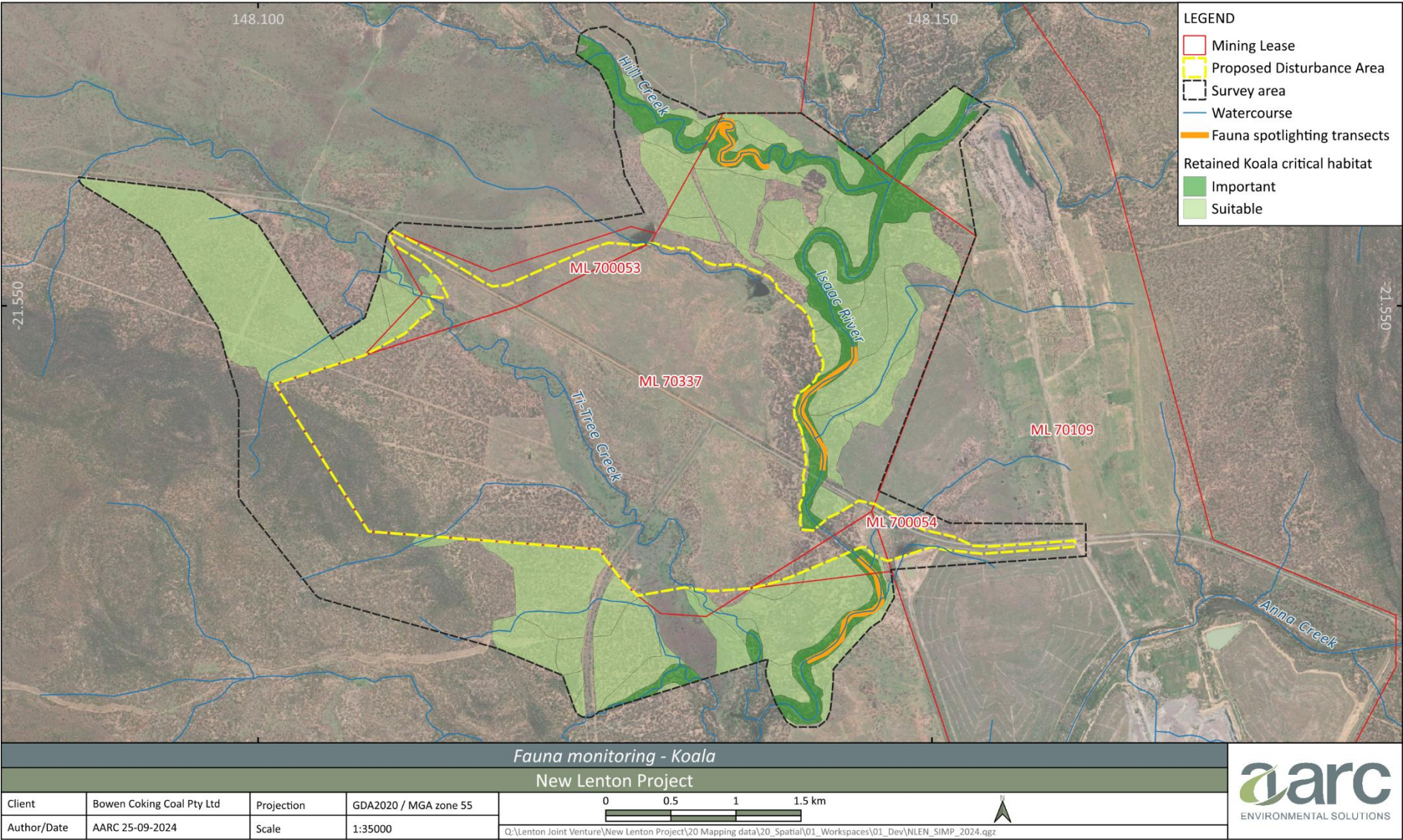


Figure 10: Fauna monitoring - Koala

Table 17: Squatter Pigeon monitoring

Objective	Management action	Timing and frequency	Responsible person(s)	Success criteria and corrective actions	Monitoring, reporting and adaptive management
To monitor the Squatter Pigeon population adjacent to the proposed disturbance area	Squatter Pigeon monitoring is to be undertaken in suitable habitat adjacent to the proposed disturbance footprint. Surveys for the Squatter Pigeon should be conducted on two consecutive days and will include: - Driving along unsealed roads and dusty areas within the New Lenton MLs, with a morning route commencing at sunrise and an afternoon route completed prior to sunset. Driving is to be at a constant slow speed (approximately 20 km/hour) and will return along the same route before proceeding to another road (DCCEEW 2024). - Meander surveys within 1km of a water source (e.g. farm dam or water troughs) at dusk and dawn, in areas of mapped suitable habitat for the species. The optimal season for the surveys is the mid to late dry season from May to the end of October when the subspecies are most actively foraging for grass seed (DCCEEW 2024) and more dependent on water sources. Opportunistic surveys will also be utilised when travelling within the general survey area and to Greater Glider and Koala monitoring sites, where appropriate.	Biennial monitoring is to be undertaken from May to the end of October, throughout the life of the Project.	Appropriately qualified personnel.	Species presence is confirmed. Monitoring numbers are consistent throughout the life of the mine. Corrective actions should include an investigation into potential threats which could have impacted the population. Potential corrective actions include enhanced weed control and active pest management.	Monitoring results are to be reported following the monitoring event.

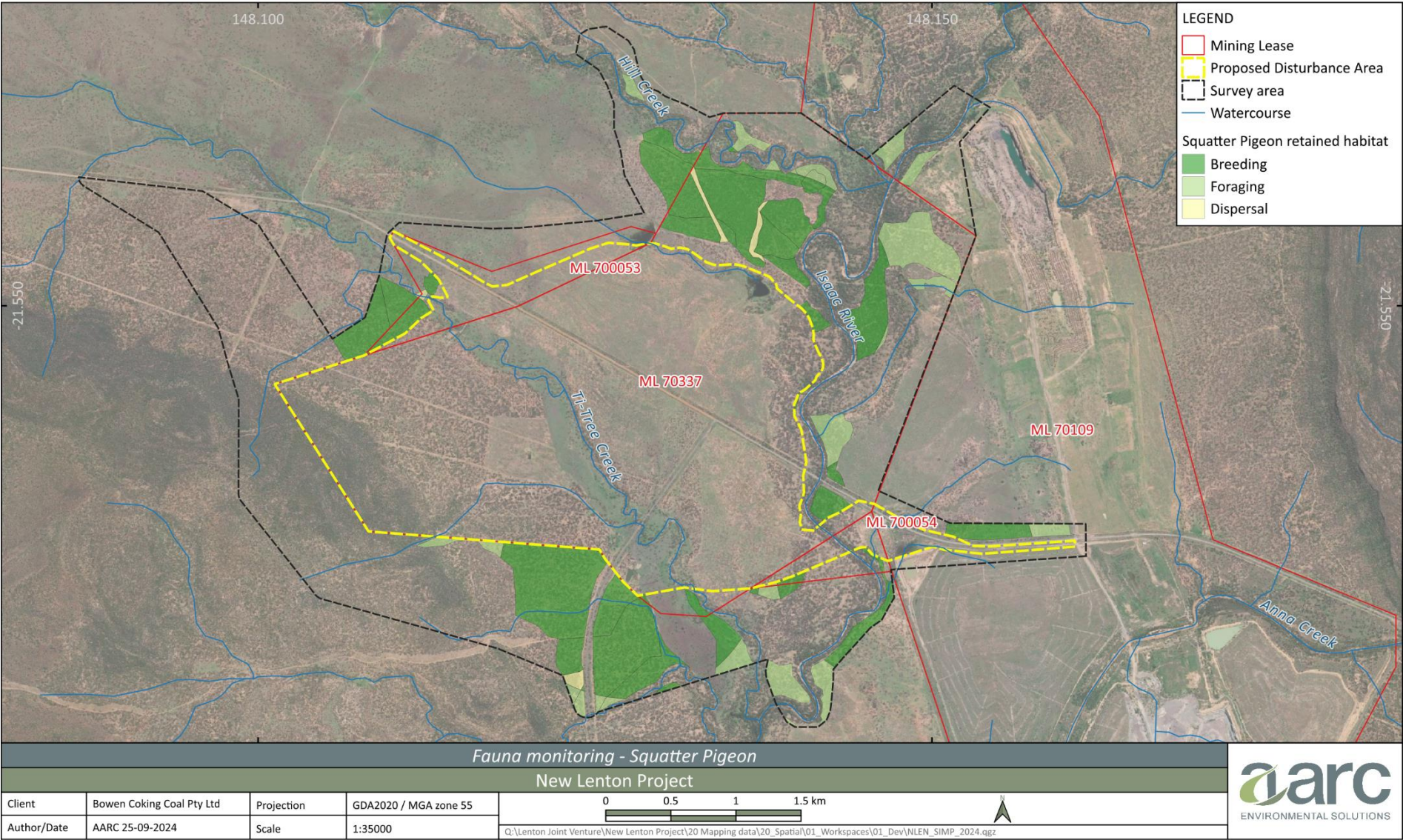


Figure 11: Fauna monitoring – Squatter Pigeon

8 Data management, reporting, implementing and auditing

All baseline data, monitoring data and species information for threatened species, is to be collected and retained.

Internal audits are to be conducted as required, as well as any legislative or regulatory audits.

Annual environment reports are to be prepared in accordance with approval requirements and may include the following information (as described in Section 6 and Section 7):

- any observations or incidents involving relevant MNES species;
- annual pest management actions and results of pest monitoring;
- annual weed management actions and results of weed monitoring;
- location and timing of burn back events;
- results of internal audits ensuring pre-clearance surveys align with actual vegetation clearing;
- extent of clearing works;
- Poplar TEC and monitoring results; and
- relevant MNES fauna and habitat quality monitoring results.

8.1 Review

This report will be reviewed every five years, to ensure management actions align with the other plans, including the GDE Monitoring and Management Plan (GDEMMP).

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