Appendix F

Significant Impact Assessment

Accessibility Statement

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Please note there may be content within appendices to this report that are not fully accessible to individuals using assistive technology. This may be due to the technical nature of these documents, which can contain complex tables, graphics, and legal language that are not compatible with certain accessibility tools.

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Appendix F Significant Impact Assessment

1.1 Introduction

The *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (the Significant Impact Guidelines) (Department of the Environment, 2013) provides the framework to assess potential impacts to Matters of National Environmental Significance (MNES), as well as a process for determining the level of significance of impacts. In accordance with the Significant Impact Guidelines, impacts on MNES are assessed utilising the broadest scope of the proposed action, with consideration to both direct, indirect and facilitated impacts and proposed measures that may avoid and reduce impacts. Significance is tested through a set significant impact criteria stipulated in the Significant Impact Guidelines, which is tailored to each MNES and for some values, the conservation status of the MNES.

Following a two-step assessment process[1], the following ten (10) MNES have been assessed to have a potential risk of significant impact as a result of the proposed action, and therefore have undergone a Significant Impact Assessment (SIA):

- Critically Endangered/Endangered species and communities:
  - Regent honeyeater (Section 2.1)
  - Swift parrot (Section 2.2)
  - Subtropical floodplain eucalypt Threatened Ecological Community (TEC) (Section 3.1)
  - Greater glider (southern and central) (Section 3.2)
  - Koala (Section 3.3)
  - Angle-stemmed myrtle (Section 3.4)
- Vulnerable species:
  - South-eastern glossy black cockatoo (Section 4.1)
  - Grey-headed flying-fox (Section 4.2)
  - Yellow-bellied glider (south-eastern) (Section 4.3)
  - Macadamia nut (Section 4.4)

The conservation status of MNES listed under the EPBC Act at the time of the DCCEEW referral decision (9 March 2023) are considered within the SIAs detailed within this document.

Commonwealth guidelines used to support the assessment of MNES impacts include the DCCEEW's Species Profile and Threats Database and the latest approved conservation advice, national recovery plan or threat abatement plans as provided in Section 5.0 - References.

Results from the SIAs are outlined below in Table 1 below.

A letter by suitably qualified expert Andrew Franks (Technical Director – Botany) endorsing the technical accuracy and justification of the SIA outcome is provided in Attachment A – Suitably qualified expert TEC SIA endorsement.

[1] Outlined in Section 2.6 of the Supplementary Matters of National Environmental Significance Report.

Table 1 Summary of SIA results

Name	Impact area (ha)	SIA result
Critically Endangered Species		
Regent honeyeater	**42.28 total**	Unlikely
Swift parrot	**42.28 total**	Unlikely
Endangered Threatened Ecological Community and Species		
Subtropical floodplain eucalypt TEC	**1.30 total**	Unlikely
	4.80 buffer zone	
Greater glider (southern and central)	**34.89 total**	Unlikely
	7.26 buffer zone	
Koala	**107.74 total**	**Likely**
Angle-stemmed myrtle	**0 total**	Unlikely
Vulnerable Species		
South-eastern glossy black cockatoo	**41.74 total**	**Potential**
Grey-headed flying-fox	43.14 direct	**Potential**
	2.20 indirect	
	45.33[2] **total**	
Yellow-bellied glider (south-eastern)	**34.89 total**	Unlikely
	7.26 buffer zone	
Macadamia Nut	**0.016 total**	Unlikely

The SIA result indicates a significant impact to potential habitat for swift parrot and regent honeyeater is unlikely based on conservative assessment of habitat critical to survival of the species and based on an assessment against *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (DCCEEW, 2013). This is because both species only sporadically forage in south-east Queensland when food resources in Victoria and New South Wales are scarce, there have been infrequent records in the past two decades in the south-east Queensland region, and the proposed action's removal of relatively thin areas of marginal habitat, with the retention of habitat in the immediate surrounds is unlikely to significantly impact these highly mobile and wide-ranging species.

With the above said, due to the presence of potential foraging and dispersal habitat within the Impact area considered habitat critical to the survival of the species, DCCEEW considers the proposed action may have a significant impact on the swift parrot and regent honeyeater.

While the Proponent remains of the view that such an impact is unlikely, to ensure DCCEEW's response is adequately addressed, the Proponent has considered these species as if the proposed action will have a significant impact. This commitment is reflected within all relevant documents within the revised Preliminary Documentation.

[2] Due to rounding to two decimal places, rounding errors of < 0.01 ha may occur.

2.0 Critically endangered species

2.1 Regent honeyeater (*Anthochaera phrygia*)

2.1.1 Description and status under the EPBC Act

The regent honeyeater is listed as Critically Endangered under the EPBC Act.

The regent honeyeater is a striking, predominantly black and yellow bird. Its head and neck are black, with warty pink or yellow skin around the eyes. The upperparts of its body are black and heavily scalloped with pale yellow. The breast and upper belly are black with a pale yellow to white V-shaped pattern, and the lower belly is a pure pale yellow. The wing and tail feathers have broad yellow edges (Department of the Environment, 2015).

2.1.2 Distribution

The regent honeyeater is endemic to mainland south-eastern Australia. It has a patchy distribution which extends from south-east Queensland, through New South Wales (NSW) and the Australian Capital Territory (ACT), to central Victoria (VIC). Records are widely distributed across its range, but it is only found regularly at a few localities in NSW and VIC where most of the sightings have been recorded. There are four known key breeding areas: three in NSW and one in VIC (no breeding places in Queensland).

The species has an estimated population of 250 individuals (Department of the Environment, 2015), and is considered one of Australia's rarest birds. The species range and numbers have contracted greatly since about the 1940s. It previously ranged from near Rockhampton in Queensland to Wilmington in South Australia (Department of the Environment, 2015).

2.1.3 Habitat requirements

The species mostly inhabits inland slopes of the Great Dividing Range, in areas of low to moderate relief with moist, fertile soils. It is commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest, but also inhabits riparian vegetation such as sheoak (*Casuarina spp*) where it feeds on needle-leaved mistletoe and sometimes breeds. It sometimes utilises lowland coastal forest, which may act as a refuge when its usual habitat is affected by drought. It also uses a range of other habitats including remnant patches in farmland and urban areas, roadside reserves and travelling stock routes (Department of the Environment, 2015).

The regent honeyeater's diet primarily consists of nectar but also includes invertebrates (mostly insects) and their exudates (e.g. lerps and honeydew), and occasionally fruit. Its time spent foraging for nectar ranges from 10% to 90% depending on availability. It obtains nectar chiefly from eucalypts and mistletoe and appears reliant on select species which provide reliable nectar flows. It prefers taller and larger diameter trees for foraging, as these typically produce more nectar. The species' movement patterns are thought to be governed by the flowering of select eucalypt species (Department of the Environment, 2015).

The species roosts communally in small groups or large flocks, in trees with dense foliage. Foraging trees are rarely used as roosting sites. Regent honeyeater nests are usually placed in the canopy of mature trees with rough bark. A cup-shaped nest is constructed in which two to three eggs are laid. Nests may be near or far from food resources; one nest has been recorded 700 m from a resource tree (Department of the Environment, 2015).

2.1.4 Threats

Identified threats to the species are (Department of the Environment, 2015):

- Clearing, fragmentation and degradation of its habitat,
- Competition for resources with more aggressive honeyeaters, particularly the noisy miner (*Manorina melanocephala*) and noisy friarbird (*Philemon corniculatus*),
- Increased predation by native nest predators, such as pied currawongs (*Strepera graculina*), and
- Loss of genetic variability due to the rapid decline of the once large population (Department of the Environment, 2015).

2.1.5 Occurrence and potential habitat within the Impact Area

Refer to Section 4.8, Appendix B Figure 9 and Appendix B Figure 12 of the Matters of National Environmental Significance Supplementary Ecological Assessment Report (Supplementary MNES Report) for habitat and historic records.

2.1.6 Important Population

As this species is listed as Critically Endangered under the EPBC Act, 'important populations' do not apply.

2.1.7 Habitat critical to the survival of the species

The overall population is difficult to define due to the fluctuating numbers between years but is estimated at 350-400 mature individuals. As defined in the *National Recovery Plan for the Regent Honeyeater* (national recovery plan) habitat critical to the survival of the regent honeyeater includes (Department of the Environment, 2016):

- Any breeding or foraging habitat in areas where the species is likely to occur; and
- Any newly discovered breeding or foraging locations.

As per the species' national recovery plan, most records of regent honeyeaters come from box-ironbark eucalypt associations, where the species seems to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes (Department of the Environment, 2016).

Other forest types regularly utilised by regent honeyeaters include wet lowland coastal forest dominated by swamp mahogany (*Eucalyptus robusta*), spotted gum-ironbark associations and riverine woodlands (where it is known to feed on nectar from *Amyema cambagei*). This riparian habitat is also selected as breeding habitat in some years. Often this is adjacent to box-ironbark woodland. Remnant stands of timber, roadside reserves, travelling stock routes and street trees also provide important habitat for regent honeyeaters at certain times (Department of the Environment, 2016).

Four known key breeding regions include:

- Bundarra-Barraba region NSW
- Hunter Valley / Central Coast NSW
- Capertree Valley NSW
- Chiltern VIC.

Key tree and mistletoe species for the regent honeyeater include:

- Mugga (or Red) Ironbark (*Eucalyptus sideroxylon*)
- Yellow Box (*Eucalyptus melliodora*)
- White Box (*Eucalyptus albens*)
- Yellow Gum (*Eucalyptus leucoxylon*)
- Spotted Gum (*Corymbia maculata)*
- Swamp Mahogany (*Eucalyptus robusta)*
- Needle-leaf Mistletoe (*Amyema cambagei*) on River Sheoak (*Casuarina cunninghamiana)*
- Box Mistletoe (*Amenya miquelii)*
- Long-flower Mistletoe (*Dendropthoe vitellina)*

No individuals were observed during targeted surveys. The proposed action is not located within or in proximity to key breeding areas or surrounding subsidiary areas utilised by the species. The nearest breeding area to the proposed action is the Bundarra-Barraba area located approximately 400 km south of the Impact area. However, as per the national recovery plan habitat critical to the survival of the species includes any 'breeding or foraging habitat within the species 'likely to occur' distribution model

or any newly discovered breeding or foraging locations. As marginal foraging habitat (Eucalypt species) occur within the Impact area and the proposed action is located where the species is 'likely to occur' as per the recovery plan distribution model (Department of the Environment, 2016), habitat within the Impact area has conservatively been assessed as habitat critical to the survival of the species.

Due to the inherent limitations in surveying large areas, foraging resources for the regent honeyeater within the Impact area were unable to be individually counted. As such, the well-established Habitat Quality (HQ) method has been utilised whereby a representative survey site is selected within an area and data captured to represent the assessment unit (with repeated sites). Data was then extrapolated within each assessment unit for the whole Impact area. A 'habitat' approach (instead of individual feature approach) was undertaken when mapping regent honeyeater habitat.

Mistletoe was observed at two sites within the Impact area. Other foraging resources (food trees and flowering eucalypts physically counted within the Impact area (per HQ site) was extrapolated for the Impact area from average number of foraging resources per assessment unit (0.5 ha). Approximately 1,382 food trees > 30 cm Diameter at Breast Height (DBH) including approximately 843 flowering eucalypts occurs scattered throughout the Impact area. As such, the species may occasionally occur within the Impact area as foraging individuals/pairs during winter flowering events. On this basis, given no key tree species or box-ironbark communities occur in the Impact area, and two individual mistletoes were observed, mapped foraging and dispersal habitat within the Impact area is marginal and highly fragmented.

The Impact area is located within a highly urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas. Suitable habitat often occurs sporadically across the Impact area. In addition to manmade threats, potential habitat is threatened by competition from honeyeaters, Noisy miner (*Manorina melanocephala*) and Noisy friarbird (*Philemon conrniculatus*), as well as nest predators like Pied currawong (*Strepera graculina*).

The species is considered to have the 'potential to occur' based on the location of the proposed action, as well as one (1) recent record (dated 2020) occurring within 5 km of the Impact area. Although, this record has high spatial uncertainty (2000 m), with the individual located in an urban environment and which is likely a vagrant enroute to more suitable habitat. Given large areas of remnant eucalypt woodland, specifically within Karawatha Forest Park, are located to the west and outside of the Impact area, it is considered that vagrant individuals, if they were to occur within the locality, would preferentially utilise this vegetation outside of the Impact area.

2.1.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. Generally, the migration and movement of regent honeyeaters may be obstructed by the fragmentation and degradation of their habitat, predation and the potential competition of resources in an area.

2.1.9 Buffer zone

Consideration for the provision of buffer zones were assessed to compensate for indirect impacts on the species. Buffers were not considered ecologically relevant for the species given the following:

- A high level of conservatism has been applied for species habitat mapping whereby a 'habitat' approach (instead of individual feature approach) was undertaken. This approach includes large areas of fragmented landscape where pre-existing barriers (i.e. rail infrastructure, highways and public access roads) and high levels of disturbance (i.e. noise, light and weed infestations) are present. The high levels of disturbance and fragmentation will likely reduce the species preference for utilising habitat within this area as large suitable areas (i.e. Karawatha Forest Park and Gould Adams Park/Nealdon Park) occur outside of the Impact area
- The species is highly mobile, and capable of travelling large distances with unpredictable movements (Department of the Environment, 2016). It is considered that foraging individuals, if they were to occur within the locality would be able to disperse into the broader landscape avoiding indirect impacts.

- The Impact area is located within an urban environment and has largely been co-located or adjacent to the existing railway corridor, habitats have already been subjected to disturbance, fragmentation, weed incursion and edge effects, increased activity, light, noise, weeds, pests, pathogens and dust. The proposed action will not exacerbate pre-existing indirect impacts beyond current levels. Indirect impacts will be temporary and localised as the proposed action will be constructed in phases, allowing individuals to avoid impacted areas. Indirect impacts will be actively managed during phases as per the OEMP.
- No reference to buffer zones as a management measure against indirect impacts is outlined in the species Conservation Advice (Department of the Environment, 2015) or National Recovery Plan (Department of the Environment, 2016).

2.1.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.5 in relation to species-specific mitigation measures.

2.1.11 Significant impact assessment

The SIA result in Table 2 indicates a significant impact to potential habitat for regent honeyeater is unlikely based on conservative assessment of habitat critical to survival of the species and based on an assessment against *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (DCCEEW, 2013).

With the above said, due to the presence of 42.28 potential foraging and dispersal habitat within the Impact area considered habitat critical to the survival of the species, DCCEEW considers the proposed action may have a significant impact on the swift parrot and regent honeyeater.

While the Proponent remains of the view that such an impact is unlikely, to ensure DCCEEW's response is adequately addressed, the Proponent has considered these species as if the proposed action will have a significant impact. Except for the SIA outcome in Table 2, this commitment is reflected within all relevant documents within the revised Preliminary Documentation.

Table 2 Significant impact assessment – Regent honeyeater

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
Lead to a long-term decrease in the size of a population	**Unlikely.** As per the national recovery plan distribution map, the proposed action is located where the species is 'likely to occur' (Department of the Environment, 2016). However, despite targeted and seasonal survey effort being undertaken for the species which met survey requirements, no individuals were observed within the Impact area. The species has an estimated population of 250 individuals (Department of the Environment, 2015) and is considered one of Australia's rarest birds. However, due to the presence of an average of 1,382 individual food trees (>30 cm DBH) and one (1) desktop record within 5 km of the Impact area a cautionary approach has been taken with the species considered 'potential' to occur within the Impact area. In addition, given no key tree species or box-ironbark communities occur in the Impact area, two individual mistletoes were observed and food trees for the species occurs, mapped foraging and dispersal habitat within the Impact area has conservatively been assessed as habitat critical to the survival of the species. Potential habitat within the Impact area is considered marginal foraging and dispersal habitat only due to the low density of mistletoe (2 individuals observed during targeted field surveys) and lack of box-ironbark community commonly associated with the species. Approximately 1,382 food trees including ironbark *Eucalyptus crebra* and *Eucalyptus siderophloia* occur within the Impact area. Of these, approximately of 843 were reported flowering.

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
	Large contiguous areas of remnant vegetation specifically within Karawatha Forest Park dominated by ironbark's are located to the west and outside of the Impact area. It is considered that foraging individuals, if they were to occur within the locality would preferentially utilise this vegetation. Also, the species is highly mobile and capable of large movements. A long-term impact on regent honeyeater population may be linked to the removal of foraging habitat where fidelity has been demonstrated. The Impact area is not located within a mapped regular or subsidiary area used by regent honeyeater for breeding and foraging. Moreso, the Impact area is highly fragmented due to urban and industrial development. During targeted field surveys aggressive honeyeater species noisy minor *(Manorina melanocphala*) and noisy friarbird *(Philemon corniculatus)* as well as nest predators like the Pied currawong (*Strepera graculina*), were recorded. The presence of these species is likely to reduce overall suitability of the Impact area, due to increased competition for food resources A maximum of 42.28 ha of potential foraging and dispersal habitat will be impacted for the species. No breeding habitat is proposed to occur, since these areas are not mapped within the Impact area and a low density of mistletoe occurs. Potential indirect impacts to the species includes increased activity, light, noise, weeds, pests, pathogens and dust. However, these are unlikely to be significant as they will be temporary and localised, since the proposed action will be constructed in phases, allowing individuals to avoid impacted areas. Indirect impacts will be actively managed during phases as per the Overarching Environmental Mitigation Plan (OEMP). Additionally, the Impact area is located within an urban environment and adjacent the existing active rail corridor. Therefore, the proposed action is unlikely to exacerbate indirect impacts beyond current levels. As such, it is considered unlikely the proposed action will lead to a long-term decrease in the size of a population. In addition, the following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to regent honeyeater: <u>Construction phase:</u> • Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as and protocols relating to the protection of species and their habitat. For example, a contact list of nearby veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction. • Prior to construction works commencing, the fauna spotter catcher will confirm the presence of any individuals and/or breeding places that may be disturbed by the activity. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation • Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. • Domestic dogs are prohibited on site at all times.
Reduce the area of occupancy of the species	**Unlikely.**

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
	According to the species' conservation advice, the global area of occupancy for the species has previously been estimated at 300 km^2 and the extent of occurrence at 600 000 $km^{2,}$ with a low level of confidence, and with most of this area occurring in New South Wales. The species has an estimated population of 250 individuals (Department of the Environment, 2015), and can be considered one of Australia's rarest birds with an estimated population size between 350-400 birds spread across 600 000 km^2 according to the species recovery plan (Department of the Environment, 2016). Whilst the proposed action proposes to remove up to 42.28 ha of potential foraging/dispersal habitat in the form of winter flowering eucalypt species is considered marginal, and no individuals were recorded during targeted field surveys that met the species' survey effort requirements. In addition, during targeted field surveys, aggressive honeyeater species noisy minor *(Manorina melanocphala*) and noisy friarbird *(Philemon corniculatus)* as well as nest predators like the Pied currawong (*Strepera graculina*), were recorded. The presence of these species is likely to reduce overall suitability of the Impact area, due to increased competition for food resources. The proposed action will primarily impact non-remnant vegetation. In addition, the regent honeyeater is highly mobile and is likely to preferentially utilise large patches of suitable habitat which will remain to occur outside of the Impact area. It is considered any vagrant individuals within the Impact area would be temporary vagrants en-route to more suitable habitat, due to the Impact area's high level of disturbance and fragmentation, and the competition from noisy miner and noisy friarbird. Therefore, the proposed action is unlikely to significantly reduce the area of occupancy of the species.
Fragment an existing population into two or more populations.	**Unlikely.** The regent honeyeater is highly mobile and foraging habits of the species are hard to predict. The species has an estimated population of 250 individuals (Department of the Environment, 2015), and is considered one of Australia's rarest birds. Regent honeyeater populations are not considered likely to occur within the Impact area, only vagrant individuals en-route to more suitable habitat. In addition, the proposed action has been situated within an existing fragmented and disturbed environment and the proposed action is unlikely to create any new barriers to species movement. To limit habitat fragmentation impacts, the Impact area has largely been co-located within the existing cleared linear area (existing railway corridor). In addition, impacts to habitat will be reduced through future Detailed Design refinement and the control of land-availability to Design and Construction contractors through a Site Access Schedule (SAS). Given this, habitat connectivity for this species is likely to be maintained. As such, it is unlikely the proposed action will significantly fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species.	**Unlikely.** Habitat critical to the survival of the species has been identified as: • any breeding or foraging habitat in areas where the species is likely to occur; and • any newly discovered breeding or foraging locations The species has an estimated population of 250 individuals (Department of the Environment, 2015), and is considered one of Australia's rarest birds. The proposed action is not located within or in proximity to key breeding areas or surrounding subsidiary areas utilised by the species. The nearest

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
	breeding area to the proposed action is the Bundarra-Barraba area located approximately 400 km south of the Impact area. However, as per the distribution map for the species in the national recovery plan, the proposed action is located where the species is 'likely to occur' (Department of the Environment, 2016) and therefore has conservatively been assessed as habitat critical to the survival of the species. No individuals were observed during targeted field surveys. However, the species is considered 'potential to occur' based on the location of the proposed action, as well as one (1) recent record (dated 2020) occurring within 5 km of the Impact area. Although, the record has high spatial uncertainty (2000 m), with the individual located in an urban environment and which is likely a vagrant en-route to more suitable habitat. No key tree species dominated the Impact area (see Appendix E of the Supplementary MNES Report). Potential habitat within the Impact area is considered marginal foraging and dispersal habitat only due to the low density of mistletoe (2 individuals observed during targeted field surveys) and lack of box-ironbark community commonly associated with the species. Approximately 1,382 food trees including ironbark *Eucalyptus crebra* and *Eucalyptus siderophloia* occurs within the Impact area. Of these, approximately 843 were reported flowering. Potential habitat throughout the Impact area was highly fragmented and contained high incursions of weeds, including the presence of aggressive native bird species *Manorina melanocephala* (noisy miner) and *Philemon corniculatus* (noisy friarbird) which are likely to outcompete vagrant regent honeyeater individuals. Given the urban environment the presence of nest predators like the Pied currawong (*Strepera graculina*) and domestic cats is also likely, increasing the risk of predation. Given large areas of remnant eucalypt woodland, specifically within Karawatha Forest Park, are located to the west and outside of the Impact area, it is considered that vagrant individuals, if they were to occur within the locality, would preferentially utilise this vegetation outside of the Impact area. A long-term impact on a regent honeyeater population may be linked to the removal of foraging habitat where fidelity has been demonstrated (Department of the Environment, 2016). The site is not located within a regular or subsidiary area used by regent honeyeaters for foraging and breeding. Based on this, it is unlikely the proposed action will adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of a population.	**Unlikely.** The regent honeyeater has a patchy distribution of known breeding areas, located in New South Wales and Victoria. The species has an estimated population of 250 individuals (Department of the Environment, 2015), and is considered one of Australia's rarest birds. The proposed action, located in South East Queensland, is not considered to have a significant impact on the breeding cycle of the regent honeyeater.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** Direct impacts to the species are proposed to up to 42.28 ha to potential foraging/dispersal habitat, however the species was not identified during targeted field surveys that met the species' survey effort requirements. As the Impact area has been predominantly co-located with the existing rail corridor,

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
	habitat proposed to be impacted is considered marginal due to high levels of disturbance, fragmentation, weed incursion and edge effects. Overall, this loss of habitat is not expected to affect the persistence of the species given the species is highly mobile, suitable habitat is likely widely available outside the Impact area, no key trees species were identified for the species, and only sporadic mistletoe (2 individuals) occur in low densities within the Impact area (see Appendix E of the Supplementary MNES Report). Potential indirect impacts to the species are unlikely to be significant as the proposed action will be temporary, localised, and constructed in phases, allowing individuals to avoid impacted areas. Additionally, the Impact area is located within an urban environment and adjacent the existing active rail corridor. Therefore, the proposed action is unlikely to exacerbate indirect impacts beyond current levels. As such, it is unlikely the proposed action will significantly modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Unlikely.** While competition for resources with more aggressive, invasive honeyeaters is identified as a threat to the species, it is considered unlikely that the proposed action will exacerbate invasive species beyond current levels. The OEMP to be developed for the proposed action will include mitigation and management measures to control the potential spread of pest flora and fauna species which may impact the species. As such, the proposed action is unlikely result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.
Introduce disease that may cause the species to decline.	**Unlikely.** Disease is not identified as a key threat to the species. In addition, biosecurity measures outlined in the OEMP for the proposed action will manage the introduction and spread of disease which has the potential to occur. As such, it is unlikely the proposed action will introduce a disease to the extent that this species would decline.

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
Interfere with the recovery of the species.	**Unlikely.** According to the species' national recovery plan, recovery objectives for the species are to: • Reverse the long-term population trend of decline and increase the numbers of regent honeyeaters to a level where there is a viable, wild breeding population, even in poor breeding years • Enhance the condition of habitat across the regent honeyeater range to maximise survival and reproductive success and provide refugia during periods of extreme environmental fluctuation. Long-term declines in the regent honeyeater are attributed to broad-scale removal of preferred habitats. As such, recovery objectives for the species have focused on the identifying and protecting habitat where the species is known or likely to occur. The species is considered as potential to occur yet would likely occur as vagrant individuals en route to more suitable habitat outside the Impact area. In addition, the national recovery plan highlights the importance of protecting high quality habitat and rehabilitating degraded habitats where the species is likely to occur. While the proposed action contains potential foraging/dispersal habitat for the species, this habitat is considered marginal, highly disturbed and fragmented, and the Impact area is dominated by aggressive species noisy minor and noisy friarbird. Given this, it is considered more likely that regent honeyeaters if present in the landscape, would occur in the larger area of more suitable habitat present outside of the Impact area. As such, the proposed action is unlikely to significantly interfere with the recovery of the species.

2.2 Swift parrot *(Lathamus discolor)*

2.2.1 Description and status under the EPBC Act

The swift parrot is listed as critically endangered under the EPBC Act (Department of Climate Change, Energy, the Environment and Water, 2024). The swift parrot is mostly bright green in colour, with dark-blue patches on the crown, a prominent red face, and the chin and throat are narrowly bordered with yellow. It is approximately 25 cm in length, the wingspan is 32 to 36 cm, and it weighs approximately 65 g. It is a slim, medium-sized parrot with angular pointed wings and a slender tail giving it the characteristic streamlined flight-silhouette (Threatened Species Scientific Committee, 2016b).

2.2.2 Distribution

The Swift Parrot breeds mostly on the east and south-east coast of Tasmania during summer and migrates to mainland Australia in autumn. During winter the species disperses across forests and woodlands, foraging on nectar and lerps mainly in Victoria and New South Wales. Small numbers of Swift Parrots are also recorded in the Australian Capital Territory, south eastern South Australia and southern Queensland. The area occupied during the breeding season varies between years, depending on food availability, but is typically less than 500 km^2 (Department of Climate Change, Energy, the Environment and Water, 2024).

2.2.3 Habitat requirements

Within Eucalypt woodland and forest habitat, Swift Parrots preferentially forage on lerps and in large, flowering mature trees that provide more reliable foraging resources than younger trees (DCCEEW, 2024). Key foraging species includes Yellow Gum (*Eucalytpus leucoxylon*); Red Ironbark (*Eucalyptus tricarpa*); Mugga Ironbark (*Eucalyptus sideroxylon*); Grey Box (*Eucalyptus macrocarpa*); White Box (*Eucalyptus albens*); Yellow Box (*Eucalyptus melliodora*); Swamp Mahogany (*Eucalyptus robusta*); Forest Red Gum (*Eucalyptus tereticornis*); Blackbutt (*Eucalyptus pilularis*); and Spotted Gum (*Corymbia maculata*). Other foraging species may be important at certain times of the year (Department of Climate Change, Energy, the Environment and Water, 2024).

DCCEEW also states *"Corymbia Citriodora* is a regionally relevant substitution of *C. maculata"* (Logan and Gold Coast Faster Rail (EPBC 2022/09439) PD adequacy review, 2024 (LGC Adequacy Review, 2024)), however is not referenced as such in the superseded or updated recovery plan (Department of Climate Change, Energy the Environment and Water, 2024).

2.2.4 Threats

Identified threats to the species are:

- Habitat loss and alteration
- Predation by sugar glider *(Petaurus breviceps*)
- Collision mortality associated with collisions with wire netting, mesh fences and cars.
- Competition for resources from invasive species European honeybee (*Apis mellifera*), large earth bumblebee (*Bombus terrestris*) and European starlings (*Sturnus vulgaris*). Native species that may compete with/predate the species include rainbow lorikeet (*Trichoglossus haematodus*) and noisy miner (*Manorina melanocephala*) (Threatened Species Scientific Committee, 2016b).
- Climate variability and change
- Illegal wildlife capture and trading
- Cumulative impacts of identified threats.

2.2.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.8, Appendix B Figure 9 and Appendix B Figure 12 of the (Supplementary MNES Report) for habitat and historic records.

2.2.6 Populations

The Swift Parrot occurs as a single, panmictic migratory population which has since declined from approximately 2,000 mature individuals in the wild to an estimated 750 (range 300-1,000) mature individuals (Department of Climate Change, Energy, the Environment and Water, 2024).

As this species is listed as Critically Endangered under the EPBC Act, 'important populations' therefore do not apply.

2.2.7 Habitat critical to the survival of the species

As per the *National Recovery Plan for the Swift Parrot* (national recovery plan) (Department of Climate Change, Energy, the Environment and Water, 2024), habitat critical to the survival of the swift parrot within South East Queensland refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.

Foraging habitat critical to the survival for the Swift Parrot on Mainland Australia includes:

All preferred foraging species within known and likely foraging habitat on the mainland include Yellow Gum (*Eucalyptus leucoxylon*); Red Ironbark (*Eucalyptus tricarpa*); Mugga Ironbark (*Eucalyptus sideroxylon*); Grey Box (*Eucalyptus macrocarpa*); White Box (*Eucalyptus albens*); Yellow Box (*Eucalyptus melliodora*); Swamp Mahogany (*Eucalyptus robusta);* Forest Red Gum (*Eucalyptus tereticornis*); Blackbutt (*Eucalyptus pilularis*); and Spotted Gum (*Corymbia maculata*).

DCCEEW also states *"Corymbia citriodora* is a regionally relevant substitution of *Corymbia maculata"* (LGC Adequacy Review, 2024)*,* however is not referenced as such in the superseded or updated recovery plan (Department of Climate Change, Energy, the Environment and Water, 2024). Despite this, data for *Corymbia citriodora* was collected during targeted field surveys within the Impact area and encapsulated in the habitat mapping for the swift parrot.

No individuals were observed during targeted field surveys and the proposed action is not located within or in proximity to breeding areas. Additionally, no large proportions of the swift parrot population or evidence of site fidelity have been observed from recent ALA and WildNet records in the last 10 years. Moreso, the proposed action is not located within a Key Biodiversity Area (KBA) as outlined in the Recovery Plan (Department of Climate Change, Energy, the Environment and Water, 2024). However, as per the national recovery plan, habitat critical to the survival of the species includes "all preferred foraging species within known and likely foraging habitat on the mainland" (Department of Climate Change, Energy, the Environment and Water, 2024). The Impact area is mapped where the "species or species habitat known or likely to occur" as per Figure 1 - Indicative distribution of the Swift Parrot in Australia (Department of Climate Change, Energy, the Environment and Water, 2024). Also, marginal foraging and dispersal habitat (including *Eucalyptus tereticornis, Eucalyptus robusta, Corymbia henryi* and *Corymbia citriodora*) occurs within the Impact area.

As such, swift parrot habitat within the Impact area has conservatively been assessed as habitat critical to the survival of the species.

Due to the inherent limitations in surveying large areas, foraging resources for the swift parrot within the Impact area were unable to be individually counted. As such, the well-established Habitat Quality (HQ) method has been utilised whereby a representative survey site is selected within an area and data captured to represent the assessment unit (with repeated sites). Data was then extrapolated within each assessment unit for the whole Impact area. A 'habitat' approach (instead of individual feature approach) was undertaken when mapping swift parrot habitat.

The number of foraging resources physically counted within the Impact area (per HQ site) has been extrapolated to an average number of foraging resources per assessment unit (0.5 ha). Approximately 1,140 food trees > 30 cm DBH as well as approximately 1,261 *Corymbia citriodora* > 30 cm DBH occur

scattered throughout the Impact area. As such, the species may occur as a vagrant and may sporadically/temporarily occur during winter flowering events.

The species is considered 'potential to occur' based on the location of the proposed action, as well as 2 ALA records dated 2014 occur within the Study area. These records are located within Gould Adams Park, situated approximately 537 m from the Impact area. As no records within the last 10 years occur and given large areas of remnant eucalypt woodland, specifically within Karawatha Forest Park, are located to the west and outside of the Impact area, it is considered that vagrant individuals, if they were to occur within the locality, would preferentially utilise this vegetation outside of the Impact area.

The Impact area is located in a highly urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas. Suitable habitat often occurs sporadically across the Impact area. In addition, a high level of threats occurs within potential habitat, such as competition from Noisy miner (*Manorina melanocephala*) and Noisy friarbird (*Philemon conrniculatus*), Rainbow lorikeet (*Trichoglossus moluccanus*) and introduced bees.

2.2.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. Generally, obstructions and barriers to movement include wire netting, mesh fences and cars, habitat fragmentation, abundant presence of predators, abundant presence of native resource competitors and introduced species (Threatened Species Scientific Committee, 2016b). However, due to the highly mobile nature of this species, migration and movement pathways are generally less susceptible to impacts.

2.2.9 Buffer zone

Consideration for the provision of buffer zones were assessed to compensate for indirect impacts on the species. Buffers were not considered ecologically relevant for the species given the following:

- A high level of conservatism has been applied for species habitat mapping whereby a 'habitat' approach (instead of individual feature approach) was undertaken. This approach includes large areas of fragmented landscape where pre-existing barriers (i.e. rail infrastructure, highways and public access roads) and high levels of disturbance (i.e. noise, light and weed infestations) are present. The high levels of disturbance and fragmentation will likely reduce the species preference for utilising habitat within this area as large suitable areas (i.e. Karawatha Forest Park and Gould Adams Park/Nealdon Park) occur outside of the Impact area
- The species are migratory, only occurring on mainland Australia during winter and disperses widely across the mainland (Department of Climate Change, Energy, the Environment and Water, 2024). It is considered that foraging individuals, if they were to occur within the locality would be able to disperse into the broader landscape avoiding indirect impacts.
- The Impact area is located within an urban environment and has largely been co-located or adjacent to the existing railway corridor, habitats have already been subjected to disturbance, fragmentation, weed incursion and edge effects, increased activity, light, noise, weeds, pests, pathogens and dust. The proposed action will not exacerbate pre-existing indirect impacts beyond current levels. Indirect impacts will be temporary and localised as the proposed action will be constructed in phases, allowing individuals to avoid impacted areas. Indirect impacts will be actively managed during phases as per the OEMP.
- No reference to buffer zones as a management measure against indirect impacts is outlined in the species Conservation Advice ((Threatened Species Scientific Committee, 2016)or National Recovery Plan (Department of Climate Change, Energy, the Environment and Water, 2024).

2.2.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

2.2.11 Significant impact assessment

The SIA result in Table 3 indicates a significant impact to potential habitat for swift parrot is unlikely based on conservative assessment of habitat critical to survival of the species, and based on an

assessment against *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (DCCEEW, 2013).

With the above said, due to the presence of 42.28 potential foraging and dispersal habitat within the Impact area considered habitat critical to the survival of the species, DCCEEW considers the proposed action may have a significant impact on the swift parrot.

While the Proponent remains of the view that such an impact is unlikely, to ensure DCCEEW's response is adequately addressed, the Proponent has considered these species as if the proposed action will have a significant impact. Except for the SIA outcome in Table 3, this commitment is reflected within all relevant documents within the revised Preliminary Documentation.

Table 3 Significant impact assessment – Swift parrot

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Lead to a long-term decrease in the size of a population	**Unlikely.** Despite targeted and seasonal survey effort being undertaken for the swift parrot that met species' survey requirements, no individuals or indirect evidence for this species was observed within the Impact area. In addition, the species does not breed within Queensland and the Impact area is not located within a KBA. However, due to the presence of foraging resources and given the Impact area is located within mapped area where "species or species habitat known or likely to occur" (Department of Climate Change, Energy, the Environment and Water, 2024),foraging/dispersal habitat within the Impact area has conservatively been assessed as habitat critical to the survival of the species. Approximately 1,140 food trees > 30 cm DBH and approximately 1,261 *Corymbia citriodora* were observed throughout the survey program. However, as the Impact area is highly fragmented due to urban and industrial development, the majority of the food trees occur in parklands or are sporadically scattered throughout the Impact area. During targeted field surveys, the competing species Noisy miner *(Manorina melanocephala*) and Rainbow lorikeet (*Trichoglossus moluccanus*) were recorded. The presence of these species is likely to reduce overall habitat suitability for the species within the Impact area, due to increased predation/competition for food resources. Since swift parrot is migratory from Tasmania to Victoria, South Australia, New South Wales and Queensland, the species may occur in low densities throughout the Impact area and habitat is likely to be used on a temporary/intermittent basis. However, the Impact area is not located within an area known to have demonstrated foraging fidelity for the species. Whilst species records occur within 5 km of the Impact area (2014), no records of individuals occur within the last 10 years. The lack of species records within the past 10 years may be correlated with the increase in vegetation clearing, disturbance and urbanisation within the Impact area. Given the swift parrot is known to have high site fidelity to wintering foraging sites (Saunders and Heinsohn, 2008) the likelihood of species presence may be temporary, sporadic or in low densities. According to the species conservation advice, the most recent population estimate from 2011 for the swift parrot was 2,000 birds. It is expected that 13 years later this number has further reduced. The population estimate suggests that the ongoing decline of breeding habitat in Tasmania is the limiting factor for the species, in contrast to foraging habitat on the mainland,

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	that can be considered substantial when comparing it to the low number of swift parrots. A maximum of 42.28 ha of potential foraging and dispersal habitat is proposed to be disturbed for the proposed action. However, the species is highly mobile and has a large distribution range capable of large movements. Also, higher quality foraging habitat is likely to be common in the wider local area surrounding the Impact area. As such, this reduction in potential habitat as a result of the proposed action is expected to have a low impact as the availability of key resources (specifically, flowering eucalypt species) is lower, and competition with large honeyeaters higher in the impact area than in surrounding areas like Karawatha State Forest. Collision mortality through cars, fencing and windows is not expected to increase as a result of the proposed action as the Impact area is already heavily built on and traffic is already frequent. Indirect impacts to the species include increased activity, light, noise, weeds, pests, pathogens and dust. Indirect impacts are unlikely to be significant as the proposed action will be temporary, localised, and constructed in phases, allowing individuals to avoid impacted areas. Potential indirect impacts will be actively managed during phases as per the OEMP. Additionally, the Impact area is located within an urban environment and adjacent the existing active rail corridor. Therefore, the proposed action is unlikely to exacerbate indirect impacts beyond current levels. As such, the proposed action is unlikely to lead a long-term decrease in the size of a population. In addition, the following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to swift parrot: <u>Construction phase:</u> • Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as and protocols relating to the protection of the species and their habitat. For example, a contact list of nearby veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction. • Prior to construction works commencing, the fauna spotter catcher will confirm the presence of any individuals and/or breeding places, or key habitat features that may be disturbed by the activity. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. • Domestic dogs are to be prohibited on site at all times.
Reduce the area of occupancy of the species.	**Unlikely.** The extent of occurrence for the swift parrot is 57,000 km^2 and the average area of occupancy 425 km^2. It is also noted the species has temporally and spatially variable long-distance movements within eastern Australia. No individuals or indirect evidence for this species was observed within the Impact area and the species may occur in low densities and/or on a

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	temporary/intermittent basis. A maximum of 42.28 ha of potential habitat likely used on an intermittent basis is proposed to be impacted, which is unlikely to affect the persistence of the species in the region. Due to the highly mobile nature of the species, swift parrot habitat is also available surrounding the Impact area. Based on this, it is unlikely that the proposed action will significantly reduce the species' area of occupancy.
Fragment an existing population into two or more populations.	**Unlikely.** The swift parrot is migratory and may occur in low densities and/or on a temporary/intermittent basis within the Impact area. The environment within the Impact area has already experienced prolonged fragmentation and disturbance. Furthermore, the species is highly mobile and expected to utilise remaining habitats outside the Impact area, based on available resources and less competition through Noisy miner (*Manorina melanocephala*) and Rainbow lorikeet (*Trichoglossus moluccanus*). To limit habitat fragmentation impacts, the Impact area has largely been co-located within the existing railway corridor. In addition, impacts to habitat will be reduced through future Detailed Design refinement and the control of land-availability to Design and Construction contractors through a Site Access Schedule (SAS). Given this, habitat connectivity for this species is likely to be maintained. It is not anticipated the proposed action will significantly fragment potential habitat or construction of infrastructure will create new barriers to species movement. As such, the proposed action is unlikely to significantly fragment an existing swift parrot population into two or more populations.
Adversely affect habitat critical to the survival of a species.	**Unlikely.** Habitat critical to the survival of the species occurs within the Impact area in the form of foraging and dispersal habitat. However, the Impact area is not located within an area known to have demonstrated foraging fidelity for the species. Whilst species records occur within 5 km of the Impact area (2014), no records of individuals occur within the last 10 years. The lack of species records within the past 10 years may be correlated with the increase in vegetation clearing, disturbance and urbanisation within the Impact area. Given the swift parrot is known to have high site fidelity to wintering foraging sites (Saunders and Heinsohn, 2008) the likelihood of species presence may be temporary, sporadic or in low densities. While potential foraging and dispersal habitat occurs, the Impact area is not located within a KBA for conservation management for the species, as per the national recovery plan. High densities of Rainbow lorikeet *(Trichoglossus moluccanus)* and Noisy miner *(Manorina melanocephala)* were observed within the Impact area that may compete with the species. Secondly, given the urban environment the presence of domestic cats is likely, which may increase the risk of predation. In addition, the species is migratory and may occur in low densities and/or on a temporary/intermittent basis. It is also highly mobile and is expected to utilise remaining habitat outside the Impact area, based on available resources.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	As such, the proposed action is unlikely to adversely affect habitat critical to the survival of the swift parrot.
Disrupt the breeding cycle of a population.	**Unlikely.** The swift parrot breeds in Tasmania during the summer and the population migrates north to mainland Australia for the winter for the non-breeding season. The breeding range of the swift parrot is largely restricted to the east and south-east coast of Tasmania and closely mirrors the distribution of Tasmanian blue gum (*Eucalyptus globulus*). Since the Impact area is located within the species overwinter non-breeding habitat, the proposed action is unlikely to significantly disrupt the breeding cycle of the species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** A maximum of 42.28 ha of potential foraging and dispersal habitat is proposed to be disturbed for the proposed action. However, given the Impact area is highly disturbed and fragmented, the species is highly mobile and has a large distribution, it is expected to utilise higher quality habitats outside the Impact area. As such, the proposed reduction in potential habitat as a result of the proposed action is expected to have a low impact on the overall availability of key resources for the species (specifically, flowering eucalypt species). Despite targeted and seasonal survey effort being undertaken for the swift parrot, no individuals or indirect evidence for this species was observed within the Impact area. Given this, the proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Unlikely.** Invasive species identified as a potential threat within the swift parrot's national recovery plan are European honeybee *(Apis mellifera),* large earth bumblebee *(Bombus dahlbomii)* and European starlings *(Starnus vulgaris).* Additionally, native species that may compete with/predate the species within south east Queensland include Rainbow lorikeet *(Trichoglossus moluccanus)* and Noisy miner *(Manorina melanocephala).* While Noisy miners *(Manorina melanocephala)* and Rainbow lorikeet *(Trichoglossus moluccanus)* were observed during targeted field surveys (refer to Appendix E of the Supplementary MNES report), the proposed action is unlikely to increase the presence of this species and will not cause exacerbation of pressures that are harmful to the swift parrot becoming established in its habitat. Furthermore, the Impact area is not located within a priority habitat area as per the species' national recovery plan. In addition, the OEMP include measures to control potential direct and indirect impacts related to weeds, pest and pathogens that may be harmful to the species. Given this, the proposed action is unlikely to result in invasive (or native) species that are harmful to the swift parrot becoming established in its habitat.
Introduce disease that may cause the species to decline.	**Unlikely.** Psittacine Beak and Feather Disease (PBFD) is a disease that may directly impact the swift parrot. In addition, phytophthora (*Phytophthora cinnamomi*)

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	and myrtle rust (*Austropuccinia psidii*) are pathogens which may indirectly impact the species by affecting its vegetation and complexity of habitats. Provided disease and pathogen management measures are implemented for these abovementioned diseases within the OEMP, the proposed action is unlikely to significantly introduce disease that may cause the species to decline.
Interfere with the recovery of the species.	**Unlikely.** The swift parrot's national recovery plan (Department of Climate Change, Energy, the Environment and Water, 2024)outlines the following overall strategies: • Maintain known Swift Parrot breeding and foraging habitat at the local, regional and landscape scales • Reduce impacts from Sugar Gliders at Swift Parrot breeding sites. • Monitor and manage other sources of mortality • Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions • Improve understanding of foraging and breeding habitat use at a landscape scale in order to better target protection and restoration measures. The proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species. In addition, the OEMP includes measures to control potential direct and indirect impacts and threats to the species. Based on this, the proposed action is unlikely to significantly interfere with the recovery of the species.

3.0 Endangered species and communities

3.1 Subtropical floodplain eucalypt TEC

3.1.1 Description and status under the EPBC Act

The Subtropical eucalypt floodplain forest and woodland Threatened Ecological Community (TEC) is listed as endangered under the EPBC Act, effective from 5 October 2022 (Department of Climate Change, Energy, the Environment and Water, 2022).

It is listed as a TEC because of its historic losses due to clearing and selective logging; fragmentation resulting from land clearing legacies; and ongoing threats to its integrity and function.

3.1.2 Occurrence within the Impact area

Refer to Section 4.6, Appendix B Figure 8 and Appendix B Figure 14 of the Supplementary MNES Report for TEC field survey results and figures.

No TEC patches of class A1, A2, B1 or B2 were observed within or adjacent to the Impact area. Seven TEC patches (I-VII) were ground truthed in good to moderate condition (classes B3, C1 and C2) within and adjacent to the Impact area. Table 4 shows before and after impacts to the TEC patches as a result of the proposed action.

Table 4 TEC ground truthed within and adjacent to Impact area, before and after proposed action

Patch Number	Condition	Class	Before proposed action area (ha)	After proposed action area (ha)
I	Good	Class B3	4.11	3.63
II	Good	Class C1	0.78	0.78
III	Good	Class B3	2.77	2.77
IV	Good	Class C1	1	0.83
V	Good	Class B3	13.59	12.95
VI	Moderate	Class C2	2.95	2.95
VII	Good	Class C1	1.02	1.01
Total			**26.22**	**24.92**

Limited native vegetation buffer surrounds the TEC; and where it occurs, adjoining native vegetation did not meet the TEC's key diagnostic characteristics or conditions classes, however can also be considered important to the survival of the ecological community as per the TEC's Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022).

The proposed action is unlikely to directly or indirectly impact patches II and VI (Table 5), since they are considered sufficiently distant (approximately 130 m-350 m) from the Impact area. The proposed action is unlikely to increase or amplify threats to TEC patches II and VI (such as edge effects, alteration of hydrology, weed incursion or other relevant threats as per TEC's Conservation advice (Department of Climate Change, Energy, the Environment and Water, 2022).

As such, the following assessments including Significant Impact Assessment (Section 3.1.8) will assess patches I, III, IV, V and VII for the following two assessment areas (Table 5):

1. TEC direct impact area (that is, proposed clearing within the Impact area)
2. TEC buffer zone (that is, 50 metres (m) into TEC patches from the boundary of clearing).

Table 5 shows that direct impacts are proposed to occur to a maximum of **1.30 ha total** over four TEC patches I, IV, V and VII, and a **4.80 ha total** TEC buffer zone has been applied for five TEC patches I, III, IV, V and VII to assess the potential for indirect impacts (for example, impacts arising from any new edge effects, alteration of hydrology, weed incursion).

Table 5 Summary of extent and condition of TEC within direct impact area and buffer zone

Patch Number	Class	Direct impact area (ha)	Buffer zone (ha)	Total direct impact and buffer zone area (ha)
I	Class B3	0.48	0.98	1.46
III	Class B3	0.00	0.40	0.40
IV	Class C1	0.17	0.68	0.84
V	Class B3	0.64	2.37	3.01
VII	Class C1	0.01	0.38	0.39
Total		**1.30**	**4.80**[3]	**6.10**

Historic and current threats and degradation are evident in all TEC patches (Plate 2, Plate 3, Plate 4 and Plate 5), with fragmentation leading to isolated patches in a modified urban landscape. In particular, historical clearing and thinning likely for grazing purposes from 1976 has occurred to TEC patches III, IV, V and VII. All TEC patches are currently exposed to indirect impacts including hydrological changes from adjacent urban/industrial development with edge effects, weed incursion, altered fire regimes, invasive fauna, disturbance from urbanisation and recreational activity and potentially urban heat island effects (Plate 6, Plate 7, Plate 8, Plate 9, Plate 10, Plate 11 and Plate 12). Conversely, historical images (Plate 1, Plate 2, Plate 3, Plate 4 and Plate 5) outlines remaining remnants of TEC patches have been islands within an urban matrix for decades (that is, since 1976 and for at least 48 years) and have persisted with relatively good condition and integrity (that is, TEC patches remain as class B3 that is habitat critical to the survival of the community, as well as class C1 and C2), with the exception of the edge's adjacent to linear infrastructure and development.

Plate 1 Historical aerial imagery from 1976 displaying the urbanisation of the area and historical clearing within patch V of Class C3 and patch VII Class C1 subtropical floodplain eucalypt TEC (source: historical aerial imagery from QGlobe (2024) and groundtruthed TEC patches (AECOM, 2024)).

[3] Rounding to 2 decimal places estimates a 0.01 discrepancy is expected.

Plate 2 **Historical clearing from 1987 within patch V class B3 of subtropical floodplain eucalypt TEC. Note: aerial imagery extent is limited to what was accessible (source: historical aerial imagery from QGlobe (2024) and groundtruthed TEC patches (AECOM, 2024)).**

Plate 3 **Historical clearing from 2002 within patch V class B3, patch IV Class C1 and patch VII class C1 of subtropical floodplain eucalypt TEC (source: historical aerial imagery from QGlobe (2024) and groundtruthed TEC patches (AECOM, 2024)).**

Plate 4 **Historical clearing from 2004 within patch V class B3, patch IV Class C1 and patch VII class C1 of subtropical floodplain eucalypt TEC (source: historical aerial imagery from QGlobe (2024) and groundtruthed TEC patches (AECOM, 2024)).**

Plate 5 **Historical clearing from 2017 within patch V class B3, patch IV Class C1 and patch VII class C1 of subtropical floodplain eucalypt TEC (source: historical aerial imagery from QGlobe (2024) and groundtruthed TEC patches (AECOM, 2024)).**

Plate 6 **Patch I class B3, within and adjacent to the Impact area.**

Plate 7 **Patch V class B3, within and adjacent to the Impact area showing the proliferation of weed species in the ground layer.**

Plate 8 Patch IV class C1, within and adjacent to the Impact area.

Plate 9 Patch III class B3 adjacent to the Impact area.

Plate 10 Patch V class B3, within and adjacent to the Impact area showing the scarcity of large trees.

Plate 11 Patch V class B3, within and adjacent to the Impact area showing proliferation of weed in the ground and shrub layers.

Plate 12 Patch VII class C1, within and adjacent to the Impact area showing the scarcity of large trees.

3.1.3 Habitat critical to the survival of the ecological community

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat at this time.

Habitat critical to the survival of subtropical floodplain eucalypt TEC within and adjacent to the Impact area assessed as per the Approved Conservation Advice (Department of Climate Change, Energy, the Environment and Water, 2022a) indicated:

- Potential for class B3 within and adjacent to the Impact area to be considered habitat critical to the survival of the TEC
- Unlikely class C1 within and adjacent to the Impact area is considered habitat critical to the survival of the TEC.

The assessment is provided in Table 6 provides a summary of habitat critical to the survival of subtropical floodplain eucalypt TEC as per the Approved Conservation Advice, and assessment against this for TEC observed within and adjacent to the Impact area (Department of Climate Change, Energy, the Environment and Water, 2022a). As per Table 6, class B3 within and adjacent to the Impact area may be considered habitat critical to the survival of the TEC, and class C1 within and adjacent to the Impact area is unlikely to be considered habitat critical to the survival of the TEC.

Table 6 Habitat critical to the survival of subtropical floodplain eucalypt TEC

Criteria	Class C1 (patch IV and VII) assessment	Class B3 (patch I, III and V) assessment
The habitat or areas most critical to the survival of the ecological community are those patches that are in the best condition (i.e. classes A and B). These represent those parts of the ecological community that retain the highest diversity and most intact structure and ecological function and have the highest chance of persisting in the long-term. However, areas that otherwise meet the minimum condition thresholds (i.e., Class C) are also important for the functioning and survival of the ecological community.		

Criteria	Class C1 (patch IV and VII) assessment	Class B3 (patch I, III and V) assessment
Where the following criteria are met, these areas are critical to the survival of the ecological community:		
If they occur in locations or landscape positions that are particularly important for biodiversity or function; and/or	**Unlikely** According to the conservation advice, larger patches with less disturbance and those with greater connectivity are likely to provide greater biodiversity and ecological value. More isolated patches may offer value where they may be able to be reconnected to surrounding vegetation corridors. While the TEC patches adjoin other vegetation communities, there is currently no or very limited existing native vegetation to act as buffer zones between the TEC patches, and the existing railway line and residential/industrial development. As such, the patches are currently subject to a high level of threats associated with preexisting urbanisation including (but not limited to) edge effects, illegal dumping of waste, altered fire regime, weed invasion and invasive fauna species and have been since the area was first urbanised. Within and adjacent to the Impact area, TEC patches are relatively small (patch I Class B3 = 4.11 ha, patch III Class B3 = 2.77 ha, patch IV Class C1 = 1.00 ha, patch V B3 = 13.59ha, and patch VII Class C1 = 1.02 ha as per Table 5) and occur in a historically highly disturbed and urbanised area, with all patches showing a degree of degradation (based on the fact that no class A1, A2, B1 or B2 was observed). While associated with an alluvial corridor, the corridor is fragmented by major linear infrastructure, such as the Logan Motorway, Pacific Motorway, existing rail line, Kingston Road, and Loganlea Road, as well as several smaller roads. The area is also surrounded by industrial, and housing developments, including recent development south of Nealdon Park. It is unlikely connectivity of TEC patches across the broader landscape can be meaningfully improved. Due to the above, the TEC is not considered to be in a landscape position that is important for maintaining biodiversity or function.	
Contain suites of species, or habitat features, which are important in a regional or local context, or	**Unlikely** There are criteria in the TEC's Conservation Advice to assess if TEC patches offer high value habitat in a regional or local context, including those in the best condition, with low incidence of weeds, higher numbers of hollow-bearing trees, diverse understorey, and higher connectivity to native vegetation. As can be seen in the chronological sequence of aerial photos, the patches of TEC have thickened considerably from at least the 1970's. In the April 1976 image (Plate 1), Patches III, IV, V and VII were thinned likely for grazing purposes with remnant trees widely spaced. It is likely these areas along the Scrubby Creek waterway were not developed due to being located on a floodplain, therefore purchased as bushland expanding the local reserve estate. The thickening that has occurred since then has resulted with an ecologically dominant layer of early mature trees that have yet to develop hollows. The TEC within and adjacent to the Impact area are not of the best condition and generally lack large, hollow-bearing trees and typically have a cleared or weedy understorey, with adjacent native vegetation also of lower condition and habitat value. As such, the TEC is not anticipated to support a suite of species or habitat features important in a regional or local context.	
They also have the potential to recover, or be restored, to a higher condition	**Unlikely** Class C1 of this TEC occurs adjacent to urbanised areas containing cleared easements or the railway line, and contain a high level of edge effects, weeds, hydrological changes, and disturbance from urbanisation and recreational activity. This is likely due to the process of secondary succession whereby these TEC	**Potential** TEC Class B3 patches I, III and V have experienced historic thinning. They are also located adjacent to urban and industrial areas, roads and the railway line. While threats such as edge effects, weeds, hydrological changes, and disturbance from urbanisation and recreational activity occurs, there is potential these TEC

Criteria	Class C1 (patch IV and VII) assessment	Class B3 (patch I, III and V) assessment
	patches have recolonized after disturbance from being historically thinned from at least the 1970's. Due to these threats and lower condition class of this TEC patch, Class C1 is unlikely to be able to be meaningfully restored to a better condition.	patches could be considered with the potential to recover to a higher condition through active management.
Conclusion	**Unlikely** TEC patches IV and VII of Class C1 within and adjacent to the impact area are unlikely to support habitat critical to the survival of the TEC.	**Potential** TEC patches I, III and V of Class B3 within and adjacent to the impact area has the potential to support habitat critical to the survival of the TEC.

3.1.4 Distribution

The community occurs in the New South Wales North Coast (NNC) and South Eastern Queensland (SEQ) IBRA bioregions and on Curtis Island in the Brigalow Belt North (BBN) IBRA Bioregion. This encompasses an area from just north of Newcastle, New South Wales (around Raymond Terrace) in the south, to just north of Gladstone in Queensland (Department of Climate Change, Energy, the Environment and Water, 2022a).

The ecological community is found on alluvial landforms, including floodplains, the riparian zones of parent rivers and other order tributaries, alluvial flats, floodplain/alluvial terraces and periodically flooded depressions. It generally occurs below 50 m above sea level, although it can occur up to 250 m above sea level (Department of Climate Change, Energy, the Environment and Water, 2022a).

3.1.5 Threats

Major threats facing this TEC include clearing, hydrological changes, fragmentation legacies, weeds, climate change, fire regimes that cause declines in biodiversity, invasive fauna, disturbance from urbanisation and recreational activity, diseases and pathogens, livestock grazing, vegetation and firewood removal and urban heat effects (Department of Climate Change, Energy, the Environment and Water, 2022). The relevance of these threats according to the proposed action are outlined below, including measures to avoid, minimise, mitigate, and rehabilitate potential impacts:

- Clearing - Eastern Australian floodplains have been cleared and highly modified, primarily for agricultural development, following non-Indigenous settlement. Large areas of forested floodplains are now occupied by exotic pastures grazed by cattle, or occupied by market gardens, turf and other cropping enterprises. Historical clearing and thinning evident in TEC patches I, III, IV, V and VII within and adjacent to the Impact area.
- Hydrological changes – The TEC is detrimentally impacted by changes to hydrology, including from construction of dams, weirs, levees, roads and bridges; flood mitigation and drainage works; water extraction; river regulation; water diverted for crop irrigation. Hydrological changes, created through levee and weir construction, artificial drainage and irrigation, can trigger oxidisation in acid sulfate soils which has the potential for severe negative impacts on the flora and fauna of the TEC, as well as water quality. These impacts include changes in species composition, declines in population and shifts in food resources (e.g., after natural flooding patterns are impacted by the diversion of water). Declining food resources include a lower abundance of vegetation and fewer invertebrates on floodplains that inundate less frequently after their natural flow regimes are disrupted. Urbanisation of landscapes adjoining the ecological community may also have significant hydrological effects. The 'hardening' of surfaces through activities such as road building and urban development surrounding the TEC, results in increased runoff (and less infiltration and water retention). This changes stream flow patterns causing erosion, and the runoff often penetrates adjacent bushland. It can carry high nutrient and sediment loads, which encourage weed invasion. Historical clearing and industrial/residential development within the landscape since 1976 (that is, for at least 48 years) (Plate 1) has likely already caused notable hydrological changes. Potential acid sulfate soils (PASS) may be present in the Impact area, including adjacent

to Scrubby Creek at Gould Adams Park/Nealdon Park, Logan River, and Edens Landing near Ridgewood Reserve North and Edens Parkland. PASS was confirmed to be present in Beenleigh near Holmview Station and adjacent to Beenleigh Station. The field screening results show that PASS may be present at depths ranging from 6 to 16.5 metres below ground (mbgl) and may be encountered during the installation of pre-cast bridge piers at these depths. PASS encountered during construction will be managed in accordance with relevant Federal and State guidelines, including *Queensland Acid Sulfate Soil Technical Manual* (Department of Resources and Department of Environment, Science and Innovation 2024*), National Acid Sulfate Soils Guidance* (Department of Agriculture and Water Resources, 2018), and *Best Practice Erosion and Sediment Control Guidelines* (International Erosion Control Association (IECA), 2019) so that there is no impact on the TEC. The bridge piers at Scrubby Creek will be installed so that in-situ PASS will not be exposed to the atmosphere, and material removed during installation will be neutralised and disposed of at an appropriately licensed facility. While some groundwater waste will be generated during the bridge pier installation, sustained dewatering of the aquifer is not required, so there will be no impact on regional groundwater levels or surface water that the TEC depends on. Based on the considerations described above, the risk of PASS impacting the TEC is considered low.

- Fragmentation legacies - Native eucalypt forests and woodlands on eastern Australian floodplains are often degraded and have a fragmented distribution due to historic clearing for pastoralism. They persist as long, narrow patches along rivers and waterways and are more prone to invasion by weeds, feral animals and introduced species. Historical clearing and industrial/residential development within the landscape since 1976 (that is, 48 years) has already likely caused notable fragmentation legacies. Given the proposed action will clear TEC edges rather than dissect patches, fragmentation is unlikely to be significant to TEC patches I, IV, V and VII as a result of the proposed action.
- Weeds - Invasion by non-native plants, including transformer weed species, is a major threat to this TEC. Transformer weeds are highly invasive plants with the potential to seriously alter the structure and function of the TEC they invade, thereby 'transforming' them into a different system. In this TEC they include camphor laurel (*Cinnamomum camphora)*, groundsel bush (*Baccharis halimifolia*), exotic vines and scramblers (such as lantana (*Lantana camara*), cats-claw creeper (*Dolichandra unguis-cati*) and Madeira vine (*Anredera cordifolia*)), and exotic perennial grasses (such as cocksfoot (*Dactylis glomerata*), paspalum (*Paspalum dilatatum*) and fountain grass (*Cenchrus setaceus*). TEC patches I, IV, V and VII within and adjacent to the Impact area already contain a high level of weeds, specifically between 40-80% exotic perennial understorey vegetation cover comprising camphor laurel, groundsel bush, lantana, cats-claw creeper, *Paspalum* sp., and numerous other exotic shrubs, vines, grasses and forbs. Significant weed impacts to the TEC as a result of the proposed action is unlikely to occur given that the proposed action will clear TEC edges rather than dissect patches, and environmental management plans developed prior to works commencing will prescriptively outline the controls needed to manage weed, pests and disease.
- Climate change - Major impacts of climate change is likely through interactions with other threatening processes, including habitat loss and degradation, invasion of exotic species, and changes to hydrological and fire regimes
- Fire regimes that cause declines in biodiversity - Altered fire regimes may threaten the ecological community through a variety of direct and indirect processes. Fire regimes have changed throughout the extent of the ecological community in association with the growth of agriculture and urban development. Fire may be used to promote regrowth (green pick) for livestock and for hazard reduction management, both of which can increase fire frequency. The amount of fallen timber and other plant litter can be diminished during such burns. Arson can also be an issue, particularly on urban fringes. Alternately, fire management, altered land practices, fragmentation and other vegetation changes can decrease fire frequency. In some areas, high intensity or too frequent fires due to climate change may slow or prevent regeneration of some species in the ecological community and lead to lower species richness. Since the TEC is located with an industrial/residential area with known rough sleeper camps, the potential for arson is a current threat.
- Invasive fauna – Invasive species such as feral pigs, cats, dogs, European red foxes, other feral (or domestic) predators, rabbits, feral goats (*Capra hircus),* deer, other feral herbivores, cane toads (*Rhinella marinus),* feral honeybees, over abundant noisy miners (*Manorina melanocephala*), other

aggressive birds and insects (e.g., exotic ants such as fire ant), and bell miner associated dieback (BMAD) can negatively impact the TEC. Impacts can include predation and habitat destruction, disease transmission and spread of invasive plant species, grazing and trampling pressures which can leave the ecological community open to erosion and weed invasion, adverse competitive, or lethal impacts to fauna. Invasive species observed during targeted field surveys within the Impact area include cane toad, common myna, Indian myna, and European red fox. Given the disturbed and fragmented nature of the Impact area, feral and domestic cats and dogs, rabbits, feral honeybees, and feral pigs are also likely to occur. Weed and pest management requirements will be incorporated into environmental management plans developed prior to works commencing. Requirements will prescriptively outline the controls needed to manage weed, pests and disease as a result of the proposed action. As such, significant invasive fauna impacts to the TEC as a result of the proposed action is unlikely to occur.

- Disturbance from urbanisation, including illegal dumping of green and hard waste and recreational activity - Recreational activities result in a range of detrimental impacts when people access areas of the ecological community. For example, visitors' feet, trail bikes, mountain bikes and four-wheel drive vehicles cause soil disturbance, compaction and erosion, and can spread weeds and diseases. Fishing and boat ramp access points, and new planned and unplanned tracks, also increase disturbance and other impacts. Increased visitation to adjacent watercourses results in greater demand for and use of visitor facilities, such as walking tracks, viewing platforms, toilet blocks, parking lots and picnic areas in the ecological community. The illegal dumping of green and hard waste throughout the TEC facilitates soil and water contamination, spread of weeds and pests and increase risk of fire. A high level of urbanisation and recreational activities already occur within TEC patches I, IV, V and VII. In particular, rough sleeper camps occur within and adjacent to TEC patches I, IV and V.
- Diseases and pathogens - Diseases and pathogens can affect the TEC and resident flora/fauna, including dieback resulting from Armillaria root rot caused by *Armillaria* spp. (honey fungus), myrtle rust (*Austropuccinia psidii*), Phytophthora (*Phytophthora cinnamomi*), Chytridiomycosis caused by chytrid fungus (*Batrachochytrium dendrobatidis*) and Psittacine beak and feather disease (Psittacine circoviral disease). Environmental management plans developed prior to works commencing will prescriptively outline the controls needed to manage weed, pests and disease. As such, significant disease impacts to the TEC as a result of the proposed action is unlikely to occur.
- Livestock grazing - The TEC experiences overgrazing, trampling, weed invasion and other soil disturbance by domestic livestock, which are known to have a strong negative influence on riparian and floodplain vegetation.
- Vegetation and firewood removal - In rural-residential areas, patches of the ecological community are often mown, slashed or under-scrubbed (removing scrubby undergrowth) for bushfire fuel reduction, grazing and perceived aesthetics. These activities can deplete the soil seed bank and contribute to the spread of weeds. Due to the high level of urbanisation and recreational activities which already occur within TEC patches I, IV, V, and VII, vegetation and firewood removal is highly likely to already occur.
- Urban heat island effects - Urbanisation can also result in an 'urban heat island effect' whereby heat is absorbed then radiated by urban structures, such as houses and paved, concreted and asphalted areas, leading to elevated temperatures. Given the disturbed and fragmented nature of the Impact area, urban heat island effects are likely to currently occur within the TEC.

TEC within and adjacent to the Impact area occurs in a historically highly urbanised and fragmented landscape, characterised by existing development associated with operational roads and railways as well as adjacent residential and industrial areas. TEC patches remain as class B3, C1 and C2, despite a high level of historical and current relevant threats as per the TEC's Conservation Advice:

- Clearing,
- Hydrological changes,
- Fragmentation legacies (including edge effects),
- Weeds,

- Potentially altered fire regimes that cause declines in biodiversity,
- Invasive fauna,
- Disturbance from urbanisation and recreational activities,
- Potential vegetation and firewood removal, and
- Urban heat island effects.

Given the proposed action's strong commitment to TEC mitigation measures (Section 6.0 and Section 6.4 of the Supplementary MNES Report and Section 9.1.1 of the OEMP) the proposed action is unlikely to significantly increase or amplify the abovementioned relevant TEC threats to the extent that a reduction in the quality and condition class of the TEC and/or long-term viability of TEC patches would occur. Table 7 of the Significant Impact Assessment outlines this in further detail.

3.1.6 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures for subtropical floodplain eucalypt TEC.

3.1.7 Buffer zone

As per the Approved Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022) and DCCEEW advice, a 50 m buffer zone from the boundary of clearing (that is direct impact areas) has been applied to assess potential impacts to the TEC, arising from any new edge effects, alteration of hydrology, weed incursion and to understand how proposed impacts may impact the integrity of the remaining TEC patches (for example, change in condition and quality of the patch).

Table 5 outlines direct impact areas and buffer zones for TEC patches I, III, IV, V and VII, which is assessed in more detail in Table 7 of the Significant Impact Assessment.

3.1.8 Significant impact assessment

An assessment against the Significant Impact Guidelines for this TEC is provided below in Table 7. The outcome of the SIA is the proposed action is **unlikely to result in a significant impact** to subtropical floodplain eucalypt TEC. A letter by suitably qualified expert Andrew Franks (Technical Director – Botany) endorsing the technical accuracy and justification of the SIA outcome is provided in Attachment A – Suitably qualified expert TEC SIA endorsement.

Table 7 Significant impact assessment – Subtropical floodplain Eucalypt TEC

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
Reduce the extent of an ecological community	**Unlikely.** The extent of subtropical floodplain eucalypt TEC is not currently provided within the Conservation Advice for the TEC. The proposed action will **directly impact** up to **1.30 ha** total of the following four patches of subtropical floodplain eucalypt TEC: • Patch I Class B3: 0.48 ha • Patch IV Class C1: 0.17 ha • Patch V Class B3: 0.64 ha • Patch VII Class C1: 0.01 ha To note, vegetation clearing for the proposed action will occur along the existing railway corridor and TEC edges, rather than dissecting patches. Table 4 within Section 3.1.2 of this SIA shows that after construction is completed for the proposed action, no TEC patches will be reduced to less than 0.5 ha, and as such will meet the TEC's 0.5 ha patch size thresholds (as per condition categories, classes and thresholds within the TEC's Conservation Advice). While up to **1.30** ha total of subtropical floodplain eucalypt TEC is proposed to be impacted**,** the following mitigation measures will ensure **direct impacts** (such as a reduction in quality, condition class and/or long-term viability of patches) are avoided, minimised and mitigated: Detailed design phase: • Exhaust every opportunity to avoid and minimise the clearing footprint within the TEC.	**Unlikely.** The extent of subtropical floodplain eucalypt TEC is not currently provided within the Conservation Advice for the TEC. A 50 m buffer zone around direct TEC impact areas include up to **4.80 ha** total of the following five patches of subtropical floodplain eucalypt TEC: • Patch I Class B3: 0.98 ha • Patch III Class B3: 0.40 ha • Patch IV Class C1: 0.68 ha • Patch V Class B3: 2.37 ha • Patch VII Class C1: 0.38 ha Indirect impacts may potentially occur to these TEC buffer zones; however, impacts will be temporary and are proposed to occur for approximately 2 years during construction phase. After construction is completed, disturbance and threats of the proposed action will return to current levels commensurate with surrounding urban and industrial land use. While up to **4.80** ha total of subtropical floodplain eucalypt TEC may be indirectly impacted within the buffer zone, the following mitigation measures will ensure **indirect impacts** (such as a reduction in quality, condition class and/or long-term viability of patches) are avoided, minimised and mitigated: Detailed design phase: • Exhaust every opportunity to avoid and minimise the clearing footprint within the TEC. • Construction footprints will be strictly limited to the smallest required in order to facilitate bridge construction at the Scrubby Creek location. As such, all other temporary

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	• Construction footprints will be strictly limited to the smallest required in order to facilitate bridge construction at the Scrubby Creek location. As such, all other temporary disturbances such as siting of laydown areas, site offices and access tracks are prohibited from within the TEC area. NOTE: based on the design refinements the TEC located at Hugh Muntz Park is unlikely to be directly impacted (refer Appendix B Figure 14 of the Supplementary MNES Report). Construction phase: • Site-inductions and toolbox talks to convey specific information to construction personnel and raise awareness/identification of the TEC, as well as protocols relating to the protection of the TEC. • Pre-clearance searches within TEC to be undertaken by a suitably qualified fauna spotter catcher, with habitat features identified and searched for fauna presence. • Habitat features such as mature trees or stags with hollows adjacent to the Impact area will be retained. • Clearly delineate a 50 m buffer zone (beyond the canopy of the outermost trees in the patch) as per the Approved Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022) with high visibility flagging to minimise indirect impacts and ensure vegetation removal is not undertaken outside Impact area. • Indirect impacts will be managed through dust, water quality, erosion and sediment controls, with their performance validated through monitoring and observations.	disturbances such as siting of laydown areas, site offices and access tracks are prohibited from within the TEC area. NOTE: based on the design refinements the TEC located at Hugh Muntz Park is unlikely to be indirectly impacted (refer Appendix B Figure 14 of the Supplementary MNES Report). Construction phase: • Site-inductions and toolbox talks to convey specific information to construction personnel and raise awareness/identification of the TEC, as well as protocols relating to the protection of the TEC. • Pre-clearance searches within TEC to be undertaken by a suitably qualified fauna spotter catcher, with habitat features identified and searched for fauna presence. • Habitat features such as mature trees or stags with hollows adjacent to the Impact area will be retained. • Clearly delineate a 50 m buffer zone (beyond the canopy of the outermost trees in the patch) as per the Approved Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022) with high visibility flagging to minimise indirect impacts and ensure vegetation removal is not undertaken outside Impact area. • Indirect impacts will be managed through dust, water quality, erosion and sediment controls, with their performance validated through monitoring and observations. • Monitoring will include: - **Pre-construction**: A BioCondition survey will be undertaken by a suitably qualified ecologist prior to construction commencing, and include baseline (pre-construction) dust, erosion and sediment monitoring.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	• Monitoring will occur within the buffer zone at Gould Adams Park/Nealdon Park, to assess quality and species composition, and monitor if erosion and sediment control and dust suppression is compliant with standards and/or commensurate with pre-construction ambient conditions. Monitoring will include: - **Pre-construction**: A BioCondition survey will be undertaken by a suitably qualified ecologist prior to construction commencing, and include baseline (pre-construction) dust, erosion and sediment monitoring. - **During-construction**: Ongoing dust deposition monitoring will occur as well as rainfall event-triggered water quality monitoring and review of performance of erosion and sediment controls. - **Post-construction:** Where dust, water quality, erosion and sediment controls are compliant with standards and/or commensurate with pre-construction ambient conditions, and no signs of TEC degradation are evident, ongoing monitoring (if required) will be determined by a suitably qualified ecologist. • Dust will be controlled throughout the construction phase within direct TEC areas and buffer zones through dust suppression (e.g. soil binders, watercarts), speed restrictions, appropriate erosion and sediment measures, and progressive stabilisation / revegetation of temporary disturbance areas. • Maintain core patches and/or habitat patches (i.e. clear edges rather than dissect patches) to avoid fragmentation and weed, pest and pathogen incursion. • Implement effective sediment and erosion control methods prior to / during vegetation clearing and civil	- **During-construction**: Ongoing dust deposition monitoring will occur as well as rainfall event-triggered water quality monitoring and review of performance of erosion and sediment controls. - **Post-construction:** Where dust, water quality, erosion and sediment controls are compliant with standards and/or commensurate with pre-construction ambient conditions, and no signs of TEC degradation are evident, ongoing monitoring (if required) will be determined by a suitably qualified ecologist. • Dust will be controlled throughout the construction phase within direct TEC areas and buffer zones through dust suppression (e.g. soil binders, watercarts), speed restrictions, appropriate erosion and sediment measures, and progressive stabilisation / revegetation of temporary disturbance areas. • Maintain core patches and/or habitat patches (i.e. clear edges rather than dissect patches) to avoid fragmentation and weed, pest and pathogen incursion. • Implement effective sediment and erosion control methods prior to / during vegetation clearing and civil works to control runoff and prevent movement of weeds and pathogens entering waterways and into adjoining TEC and other native vegetation outside of the Impact area. • Implement effective sediment and erosion control methods prior to / during vegetation clearing and civil works to control runoff and prevent movement of weeds and pathogens entering waterways and into adjoining TEC and other native vegetation outside of the Impact area. • Potential acid sulfate soils (PASS) may be present in the Impact area. As such, acid sulfate soil testing, monitoring and management will occur across the entire Impact area,

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	works to control runoff and prevent movement of weeds and pathogens entering waterways and into adjoining TEC and other native vegetation outside of the Impact area. • Potential acid sulfate soils (PASS) may be present in the Impact area. As such, acid sulfate soil testing, monitoring and management will occur across the entire Impact area, including soil management plans, soil treatment (where necessary), erosion and sediment control and monitoring, inspections and audits. • PASS encountered during construction will be managed in accordance with relevant Federal and State guidelines, including *Queensland Acid Sulfate Soil Technical Manual (Department of Environment, Science and Innovation, 2024), National Acid Sulfate Soils Guidance* (Department of Agriculture and Water Resources, 2018) and *Best Practice Erosion and Sediment Control Guidelines* (International Erosion Control Association, 2019) so that there is no impact on the TEC, Based on this, the risk of PASS impacting the TEC is considered low. • Weed and seed certificates and regular weed hygiene inspections for all machinery entering from outside to prevent introduction of new weed infestations within TEC. Based on pre-construction weed survey results, temporary washdowns may be required throughout high-risk activities (e.g. site establishment and clearing works). • Strict control of ignition sources to minimise the risk of accidental fires (Department of Climate Change Energy the Environment and Water, 2022)	including soil management plans, soil treatment (where necessary), erosion and sediment control and monitoring, inspections and audits. • PASS encountered during construction will be managed in accordance with relevant Federal and State guidelines, including *Queensland Acid Sulfate Soil Technical Manual* (Department of Environment, Science and Innovation, 2024), *National Acid Sulfate Soils Guidance* (Department of Agriculture and Water Resources, 2018) and *Best Practice Erosion and Sediment Control Guidelines* (International Erosion Control Association, 2019) so that there is no impact on the TEC, Based on this, the risk of PASS impacting the TEC is considered low. • Weed and seed certificates and regular weed hygiene inspections for all machinery entering from outside to prevent introduction of new weed infestations within TEC. Based on pre-construction weed survey results, temporary washdowns may be required throughout high-risk activities (e.g. site establishment and clearing works). • Strict control of ignition sources to minimise the risk of accidental fires (Department of Climate Change Energy the Environment and Water, 2022) • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. • Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. • Rehabilitation of temporarily disturbed habitat using species that meet the Regional Ecosystem indicator relevant to the TEC.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	• Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. • Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. • Rehabilitation of temporarily disturbed habitat using species that meet the Regional Ecosystem indicator relevant to the TEC. Based on proposed direct impacts to a small area (up to 1.30 ha total) of TEC as well as abovementioned measures to manage potential direct and indirect impacts, the proposed action is unlikely to reduce the extent of the subtropical floodplain eucalypt TEC.	The extent of subtropical floodplain eucalypt TEC will not be reduced within the 4.80 ha TEC buffer zone. In addition, the above-mentioned monitoring and mitigation measures will be implemented within the buffer zone.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	**Unlikely.** All sections of the TEC already occur within a highly fragmented, urbanised landscape and the proposed action is unlikely to significantly increase fragmentation. In addition, the railway corridor is existing, will be widened for the proposed action (i.e. TEC edges will be cleared rather than dissected) and will not change the functionality of the core TEC area, such as a reduction in the quality, condition class and/or long-term viability of TEC patches. A review of historical aerial imagery indicates clearing, and fragmentation has occurred within and adjacent to the TEC since 1976 with higher levels of vegetation clearing from 2002 to 2015 and increasing industrial and urban development from 2017 (see MNES Supplementary Report, Plates 1-7). In particular, patch V class B3 and patch VII class C1 have been	**Unlikely.** All sections of the TEC occur within a highly fragmented, urbanised landscape and the proposed action is unlikely to significantly increase fragmentation. In addition, the railway corridor is existing, will be widened for the proposed action (i.e. TEC edges will be cleared rather than dissected) and will not change the functionality of the core TEC area, such as a reduction in the quality, condition class and/or long-term viability of TEC patches. A review of historical aerial imagery indicates clearing, and fragmentation has occurred within and adjacent to the subtropical floodplain eucalypt TEC since the 1970s, with higher levels of vegetation clearing from 2002 to 2015, and increasing industrial and urban development from 2017 (see MNES Supplementary Report, Plates 1-7). In particular, patch V class

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	cleared and fragmented since 1976 (that is, for at least 48 years). The proposed action is unlikely to significantly fragment direct impact areas of the TEC, as it will reduce the overall patch size from edges, however, is unlikely to cause large strips of fragmented clearing or clear strips within patches. In addition, clearing of some direct impact areas of the TEC may have partial and not full clearing[4]. Fragmentation will not occur to indirect impact areas of the TEC, and a 50 m buffer zone will be implemented including monitoring and mitigation measures will be implemented to protect the integrity of the remaining TEC. Following construction, rehabilitation of disturbed habitat is to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. Based on the abovementioned revegetation/rehabilitation measures, the proposed action is unlikely to significantly fragment or increase fragmentation for the TEC.	B3 and patch VII class C1 have been cleared and fragmented since 1976 (that is, for at least 48 years). Since the proposed action will not clear the TEC buffer zone, it will not be fragmented. Nonetheless, monitoring and mitigation measures will be implemented within the TEC buffer zones to protect the integrity of the remaining TEC. Based on this, the proposed action is unlikely to significantly fragment or increase fragmentation of TEC buffer zones.
Adversely affect habitat critical to the survival of an ecological community	**Unlikely.** No TEC patches of high condition class or class A1, A2, B1 or B2 were observed within or adjacent to the Impact area. A total of 1.12 ha total of class B3 proposed to be directly impacted may potentially be considered habitat critical to the survival (HCS) for the TEC (that is, 0.48 ha of patch I and 0.64 ha of patch V). However, class B3 is within the lowest condition class for HCS of the TEC, and patch I and patch V have a high level	**Unlikely.** No TEC patches of high condition class or class A1, A2, B1 or B2 were observed within or adjacent to the Impact area. A total of 3.75 ha total of class B3 within TEC buffer zone may potentially be considered HCS (that is, 0.98 ha of patch I, 0.40 ha of patch III and 2.37 ha of patch V). However, class B3 of this TEC is within the lowest condition class for habitat critical to the survival of the ecological community, and has been subject

[4] Partial clearing is where >10% of canopy cover remains, while full clearing is where <10% of crown cover remains.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	of historical and current threats, including clearing, hydrological changes, fragmentation legacies (including edge effects), weeds, potentially altered fire regimes that cause declines in biodiversity, invasive fauna, disturbance from urbanisation and recreational activities, potential vegetation and firewood removal and urban heat effects. For example, several invasive flora were observed within the TEC, including habit transformer weed species Cat's claw (*Dolichandra unguis-cati*) creeper and lantana (*Lantana camara*). A review of historic aerial imagery indicates patch I and patch V class B3 of the TEC have experienced high levels of threats from clearing, fragmentation and urbanisation since 1976, with higher levels of vegetation clearing from 2002 to 2015 and increasing industrial and urban development from 2017 (see MNES Supplementary Report, Plates 1-7, and Plate 6, Plate 7, Plate 8, Plate 9, Plate 10, Plate 11 and Plate 12 of this SIA). Industrial development within patch I Class B3 has been occurring for the past 7 years and is likely to be commensurate with activities for the proposed action. This industrial development is unlikely to have adversely affected the quality and function of the habitat critical to the survival of the TEC (since it still currently occurs and as class B3), which indicates the proposed action is also unlikely to adversely affect habitat critical to the survival of the community. As such, the proposed action's direct impacts are unlikely to significantly increase the level of disturbance and threats which is already present within the landscape. Based on the small size of class B3 considered HCS and proposed to be directly impacted (1.12 ha total), the proposed action is unlikely to adversely affect direct impact areas that are HCS of the TEC.	to a high level of threats, including clearing, habitat fragmentation, hydrological changes including likely increased nutrient and pollutant loads from stormwater runoff, weeds, altered fire regimes, invasive fauna, disturbance from urbanisation and recreational activities, previous livestock grazing and urban heat effects. For example, several invasive flora were observed within the TEC, including habit transformer weed species Cat's claw (*Dolichandra unguis-cati*) creeper and lantana (*Lantana camara*). A review of historic aerial imagery indicates patch I and patch V class B3 of the TEC have experienced high levels of threats from clearing, fragmentation and urbanisation since 1987, with higher levels of vegetation clearing from 2002 to 2015 and increasing industrial and urban development from 2017 (see MNES Supplementary Report, Plates 1-7, and Plate 6, Plate 7, Plate 8, Plate 9, Plate 10, Plate 11 and Plate 12 of this SIA). Industrial development within patch I Class B3 has been occurring for the past 7 years and is likely to be commensurate with activities for the proposed action. This industrial development is unlikely to have adversely affected the quality and function of the habitat critical to the survival of the TEC (since it still currently occurs and as class B3), which indicates the proposed action is also unlikely to adversely affect habitat critical to the survival of the community In addition, potential indirect impacts to HCS within the TEC buffer zone will be temporary and proposed for approximately 2 years during construction phase. Monitoring and mitigation measures will be implemented within the TEC buffer zone as per the OEMP. As such, the proposed action is unlikely to significantly increase the level of disturbance and threats to the TEC buffer zone than

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
		that which is already present within the landscape. Once construction is completed, disturbance and threats to the TEC buffer zone are likely to be commensurate with the current status, as well as surrounding industrial/urban disturbances and threats. In addition, potential indirect impacts as a result of construction activities proposed within TEC buffer zones will be actively managed and monitored during all phases of the proposed action as per the OEMP. Based on the small size of class B3 within the TEC buffer zone (up to 3.75 ha total), and measures to manage and monitor potential indirect impacts to the TEC, the proposed action is unlikely to adversely affect HCS of the TEC and is unlikely to reduce the quality, condition class and/or long-term viability of TEC within the buffer zone.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Unlikely.** The proposed action proposes to directly and permanently impact abiotic factors up to 1.30 ha total of subtropical floodplain eucalypt TEC. **Direct Impacts** Direct impacts are likely to include alteration of soil profiles, erosion, sedimentation and changes to hydrology. A review of historic aerial imagery indicates the TEC has likely experienced high levels of threats to abiotic factors such as changed hydrological regimes, erosion, sedimentation and runoff, due to disturbances of clearing, fragmentation, and urban/industrial development since 1976, with increasing levels of disturbance since 2002. Surrounding urban/industrial development is unlikely to have adversely modified or destroyed	**Unlikely.** The proposed action may temporarily impact up to 4.80 ha total of abiotic factors within the buffer zone for this TEC. **Indirect Impacts** Indirect impacts within the buffer zone are likely to include erosion, sedimentation, dust and alteration to hydrology. Following the temporary (approximately 2 years) of activities required for construction phase of the proposed action, once construction is completed, disturbance and threats to the TEC's buffer zones are likely to be commensurate to that which is already present within the landscape. In addition, rehabilitation of disturbed habitat is to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	abiotic factors necessary for the TEC's survival (since it still occurs), which indicates the proposed action is also unlikely to adversely modify or destroy the TEC's abiotic factors. As such and given the proposed action's mitigation measures as per the OEMP, the proposed action is unlikely to significantly increase the level of disturbance and threats to abiotic factors than that which is already present within the landscape.	Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. Direct and potential indirect impacts to abiotic factors, in particular erosion, sedimentation, runoff, dust and alteration of hydrology as a result of construction activities proposed adjacent to the TEC will be actively managed and monitored during all phases of the proposed action as per the OEMP. Based on the above assessment, the proposed action is unlikely to significantly modify or destroy abiotic factors necessary for the TEC's survival within the buffer zone.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**Unlikely.** A change to up to **1.30 ha** total of the species composition for subtropical floodplain eucalypt TEC is proposed to be **directly impacted.** However, this is unlikely to be significant to the TEC on a local or regional scale. Within each TEC patch for direct impacts, average vegetation threshold values as per the TEC's Conservation Advice are provided according to a) ground cover richness, b) number of large native trees (>45 cm diameter at breast height), c) number of very large native trees (>60 cm diameter at breast height), and d) % cover native perennial understorey vegetation cover): • Patch I Class B3: a) 9 b) 7 c) 2 d) 40% • Patch IV Class C1: a) 9 b) 5 c) 4.5 d) 30% • Patch V Class B3: a) 3 b) 3 c) 2.3 d) 68.30% • Patch VII Class C1: a) 11 b) 7 c) 1 d) 75% These abovementioned values are not necessarily representative of highly variable TEC patch condition (particularly large trees, very large trees and perennial understorey vegetation cover). It indicates a highly conservative	**Unlikely.** A potential change to up to **4.80 ha** total of the species composition may occur within the TEC buffer zone. The proposed action is also unlikely to reduce the quality, condition class or long-term viability of patches within the TEC buffer zone, based on the small area and the proposed action's strong commitment to mitigation, monitoring and management. Within each TEC patch for the buffer zone, average vegetation threshold values as per the TEC's Conservation Advice are listed according to a) ground cover richness, b) number of large native trees (>45 cm diameter at breast height), c) number of very large native trees (>60 cm diameter at breast height), and d) % cover native perennial understorey vegetation cover): • Patch I Class B3: a) 9 b) 7 c) 2 d) 40% • Patch III Class C1: a) 11 b) 3 c) 0 d) 35% • Patch IV Class C1: a) 9 b) 5 c) 4.5 d) 30% • Patch V Class B3: a) 3 b) 3 c) 2.3 d) 68.30% • Patch VII Class C1: a) 11 b) 7 c) 1 d) 75% These abovementioned values are not necessarily

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	approach was undertaken assigning TEC condition class, where even if a TEC patch did not meet all criteria for a condition class, the highest possible condition class was assigned. Direct impacts as a result of the proposed action are unlikely to reduce the abovementioned vegetation threshold values, quality, condition class or long-term viability for each TEC patch and is further justified below. While a small area (maximum of 1.30 ha total) of functionally important species from the juvenile and adult *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Syncarpia* genera will be lost within TEC direct impact areas, large trees of these genera primarily occur within TEC patches outside the Impact area and will not impact. Also, high levels of disturbance from clearing, fragmentation and urban/industrial development have been occurring to these functionally important species since 1976, with higher levels of disturbance since 2002. An assessment of aerial imagery indicates appropriate fire regimes are unlikely to have occurred for this TEC since 1976, since it is located within an urban parkland area where fire management is unlikely to have occurred. Flora and fauna harvesting may already occur, since there is a high level of urbanisation and recreational activity including rough sleeper camps within and adjacent to the TEC. The proposed action will not significantly alter current fire regimes and has the potential to deter flora and fauna harvesting due to construction activities, temporary exclusion fencing and human deterrence through noise, vibration, light and dust. Rehabilitation of disturbed habitat is to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. Rehabilitation will be considered against the	representative of highly variable TEC patch condition (particularly large trees, very large trees and perennial understorey vegetation cover). It indicates a highly conservative approach was undertaken assigning TEC condition class, where even if a TEC patch did not meet all criteria for a condition class, the highest possible condition class was assigned. Functionally important species from the *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Syncarpia* genera within TEC buffer of the TEC have the potential be indirectly and temporarily impacted for approximately two years during the construction phase of the project. However, high levels of disturbance from clearing, fragmentation and urban/industrial development have been occurring to these functionally important species since 1987, with higher levels of disturbance since 2002. The proposed action's potential impacts to functionally important species within the TEC buffer zone are likely to be commensurate with the surrounding industrial/urban disturbance and threats, and after construction will return to current levels of disturbance and threats. An assessment of aerial imagery indicates appropriate fire regimes are unlikely to have occurred for this TEC since 1976, since it is located within an urban parkland area where fire management is unlikely to have occurred. Flora and fauna harvesting may already occur, since there is a high level of urbanisation and recreational activity including rough sleeper camps within and adjacent to the TEC. The proposed action will not significantly alter current fire regimes and has the potential to deter flora and fauna harvesting due to construction activities, temporary exclusion fencing and human deterrence through noise, vibration, light and dust.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	landscape and maintenance requirements of the future asset owner. No flora or fauna will be harvested from the site and ignition sources will be strictly controlled to minimise the risk of accidental fires. Direct impacts to abiotic factors as a result of construction activities proposed adjacent to the TEC will be actively managed and monitored during all phases of the proposed action as per the OEMP.	Rehabilitation of disturbed habitat is to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. No flora or fauna will be harvested from the site and ignition sources will be strictly controlled to minimise the risk of accidental fires. Potential indirect impacts to abiotic factors as a result of construction activities proposed adjacent to the TEC will be actively managed and monitored during all phases of the proposed action as per the OEMP.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established, or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	**Unlikely.** A reduction in the quality or integrity of up to **1.30 ha** total of subtropical floodplain eucalypt TEC is proposed to be **directly impacted**. While the quality of up to **1.30 ha** of the TEC will be directly impacted, this area is small and unlikely to be a substantial reduction, or significant on a local or regional scale. A high level of threats already occurs within TEC patches, in particular weeds, invasive fauna, hydrological changes, disturbance from urbanisation and recreational activities, altered fire regime and potential vegetation and firewood removal will be actively managed and monitored during all phases of the proposed action as per the OEMP. The quality and integrity of some direct impact areas of the TEC may be rehabilitated in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed	**Unlikely.** A reduction in the quality or integrity of up to **4.80 ha** total may occur within the TEC buffer zone. The quality and integrity of TEC within the buffer zone is unlikely to be significantly impacted by the proposed action, since a high level of threats from weeds, invasive fauna, hydrological changes, and potentially chemicals as a result of surrounding urban/industrial development has already been occurring within the landscape since 1976, with higher levels of disturbance since 2002. These disturbances have not adversely affected the TEC's quality and function (since it still occurs), which indicates the proposed action with commensurate construction activities to occur temporarily for two years is also unlikely to cause a substantial reduction in the quality or integrity of the TEC. In addition, potential indirect impacts to the TEC buffer zone, in particular weeds and invasive fauna, erosion, sediment and

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	action's MRTS16 Landscape and Revegetation. Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner.	runoff will be actively managed and monitored during all phases of the proposed action as per the OEMP.
Interfere with the recovery of an ecological community	**Unlikely.** A national recovery plan is not currently available for the subtropical floodplain eucalypt TEC. However, it is considered that recovery should focus on the following threats identified in the TEC's Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022): • Weeds • Climate change • Fire regimes that cause declines in biodiversity • Invasive fauna • Disturbance from urbanisation and recreational activity • Diseases and pathogens • Livestock grazing • Vegetation and firewood removal • Urban heat effects The Impact area occurs in a highly urbanised and fragmented landscape, characterised by existing development associated with operational roads and railways as well as adjacent residential and industrial areas. TEC patches remain as class B3 and class C1, despite a high level of historical and current threats from clearing, hydrological changes, fragmentation legacies (including edge effects), weeds, potentially altered fire regimes that cause declines in biodiversity, invasive fauna, disturbance from urbanisation and recreational activities, potential vegetation and firewood removal, and urban heat effects.	**Unlikely.** A national recovery plan is not currently available for the subtropical floodplain eucalypt TEC. However, it is considered that recovery should focus on the following threats identified in the TEC's Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022): • Weeds • Climate change • Fire regimes that cause declines in biodiversity • Invasive fauna • Disturbance from urbanisation and recreational activity • Diseases and pathogens • Livestock grazing • Vegetation and firewood removal • Urban heat effects The Impact area occurs in a highly urbanised and fragmented landscape, characterised by existing development associated with operational roads and railways as well as adjacent residential and industrial areas. TEC patches remain as class B3 and class C1, despite a high level of historical and current threats occurring from clearing, hydrological changes, fragmentation legacies, weeds, invasive fauna and disturbance from urbanisation and recreational activities. Mitigation measures outlined in the OEMP are proposed to avoid, minimise, mitigate and manage these abovementioned threats. In addition, the proposed action is unlikely to significantly increase the level threats than that which is already

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance for TEC direct impact area	Assessment of Significance for TEC buffer zone
	Mitigation measures outlined in the OEMP are proposed to avoid, minimise, mitigate and manage these abovementioned threats. In addition, the proposed action is unlikely to significantly increase the level of threats than that which is already present within the landscape, or reduce the quality, condition class or long-term viability of the TEC. Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. No flora or fauna will be harvested from the site. Provided that mitigation measures for the proposed action are effectively implemented; the proposed action is unlikely to significantly interfere with the recovery or affect long-term viability of the TEC.	present within the landscape. Once construction is completed, disturbance and threats to the TEC's indirect impact areas are likely to be commensurate with the current status, as well as surrounding industrial/urban disturbances and threats. Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. No flora or fauna will be harvested from the site. Provided that mitigation measures for the proposed action are effectively implemented; the proposed action is unlikely to significantly interfere with the recovery or affect long-term viability of the TEC.

3.2 Greater glider (southern and central) *(Petauroides volans)*

3.2.1 Description and status under the EPBC Act

The greater glider (southern and central) is listed as endangered under the EPBC Act (Department of Climate Change Energy the Environment and Water, 2022c).

The greater glider (southern and central) is the largest gliding possum in Australia, with a head and body length of 35−46 cm and a long furry tail measuring 45−60 cm. Its tail is not prehensile. This species has thick fur that increases its apparent size. The fur is white or cream in colour below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has large furry ears and a short snout (Department of Climate Change Energy the Environment and Water, 2022c).

3.2.2 Distribution

The greater glider (southern and central) occurs in eastern Australia, where it has a broad distribution from around Proserpine in Qld, south through NSW and the ACT, to Wombat State Forest in central Vic. It occurs across an elevational range of 0−1200 m above sea level (Department of Climate Change Energy the Environment and Water, 2022c).

3.2.3 Habitat requirements

The greater glider (southern and central) is an arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. During the day, this species spends most of its time denning in hollowed trees, with each animal inhabiting up to twenty different dens within its home range. It is primarily folivorous, with a diet mostly comprising the leaves and flowers of *Myrtaceae* (e.g. eucalypt) trees. Home ranges of this species are typically relatively small (1 - 4 ha) but are larger in lower productivity forests and more open woodlands (up to 16 ha). They are larger for males than for females, with male home ranges being largely non-overlapping. A study on the greater glider (southern and central) population in the Seven Mile Beach National Park area found that while the species can cover distances up to 100 m, they usually glide less than 30 m and have a steeper trajectory than other species of glider (Department of Climate Change Energy the Environment and Water, 2022c).

Hollows develop extraordinarily slowly in Australian eucalypts, with figures most often quoted as minimum lag times of 150 - 360 years from germination to the beginning of hollow development. A fall in the number of hollows below a minimum critical threshold for greater glider (southern and central) could cause a decline in any local population and compromise population viability in the longer term if there is not a new cohort of hollow trees available to replace trees lost (Department of Climate Change Energy the Environment and Water, 2022c).

3.2.4 Threats

Key threats to the greater glider (southern and central) are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting. There are synergies between these threats, and their combined impact needs to be considered in the recovery of the species. Loss and fragmentation of habitat has already occurred in many areas of the species' range, and the unprecedented 2019-20 bushfires have increased pressure on its remaining habitat. It has been identified that the species requires a national recovery plan, however one has not yet been developed (Department of Climate Change Energy the Environment and Water, 2022c).

As per the species Conservation Advice, threats include:

- Inappropriate fire regimes
- Habitat clearing and fragmentation
- Timber harvesting
- Barbed wire fencing entanglement
- Climate change
- Increased temperatures and changes to rainfall patterns
- Over-abundant native species

- Hyper-predation by owls
- Competition from *Cacatua galerita* (Sulphur-crested Cockatoos)
- Introduced species
- Predation by feral cats (*Felis catus*)
- Predation by European red foxes (*Vulpes vulpes*).

3.2.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.8, Appendix B Figure 9 and Appendix B Figure 15 of the Supplementary MNES Report for habitat and historic records.

3.2.6 Important population

As per the species Conservation Advice, all populations of the greater glider (southern and central) are important for the conservation of the species across its range. Due to the species' low fecundity and limited dispersal capabilities, areas where the species has become locally extinct are not readily recolonised (Department of Climate Change Energy the Environment and Water, 2022c).

3.2.7 Habitat critical to the survival of the species

As per the species' Conservation Advice, habitat critical to survival for the greater glider (southern and central) may be broadly defined as (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis) (Department of Climate Change Energy the Environment and Water, 2022c):

- Large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; and
- Smaller or fragmented habitat patches connected to larger patches of habitat, which can facilitate dispersal of the species and/or that enable recolonization; and
- Cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes); and
- Areas identified as refuges under future climate changes scenarios; and
- Short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.

Habitat meeting any one of the criteria above is considered habitat critical to the survival of greater glider (southern and central), irrespective of the current abundance or density of greater glider (southern and central) or the perceived quality of the site. Forest areas currently unoccupied by the greater glider (southern and central) may still represent habitat critical to survival if the recruitment of hollow-bearing trees as the forest ages could allow the species to colonise these areas and ensure persistence of a subpopulation.

The Impact area is located within a highly urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas; also, the Impact area is highly susceptible to threats from Red fox (*Vulpes vulpes*) and domestic cats (*Felis catus*). Suitable habitat often occurs sporadically across the Impact area.

All breeding habitat (21.40 ha) and foraging habitat (7.52 ha) within the Impact area is considered to meet the definition of habitat critical to the survival of the species. Dispersal habitat (5.97 ha) for the species has been mapped as "any remaining eucalypt woodland or forest that occurs" (refer to Appendix D of the Supplementary MNES Report for further detail). It is noted that a portion of this dispersal habitat may not meet the definition of habitat critical to the survival of the species, for example due to excessive fragmentation. However, to be conservative, all mapped species habitat totalling 34.89 ha of direct impacts and 7.26 ha of breeding habitat within a 50 m buffer zone has been assessed as habitat critical to the survival of the species.

3.2.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. In addition, refer to Appendix G Figure 3 of the Supplementary MNES Report for the glider landscape connectivity model outputs. Generally, obstructions and barriers include barbed wire, habitat fragmentation, abundant presence of predators and introduced species. However, in areas with an abundance of hollows (essential for denning), eucalyptus and woodlands, migration and movement pathways are well supported.

3.2.9 Buffer zone

A 50 m buffer zone around mapped breeding habitat for greater glider (southern and central) has been applied within large patches of contiguous vegetation within key fauna biodiversity areas (i.e. Acacia Forest Park and Gould Adams Park/Nealdon Park), based on a review of scientific literature and statutory documentation (Department of Agriculture Water and the Environment, 2022; Department of Climate Change Energy the Environment and Water, 2022; Environment Protection Authority, 2018 and ;Eyre, 2006).

The consideration into the suitability of a 50 m buffer zone is based on the fact that:

- Greater glider habitat is already located adjacent to a currently operational line, vegetation is already subject to indirect impacts such as edge effects, weeds, pests and pathogens, dust and noise light and vibration and will be actively managed during all of the proposed action's phases as per the OEMP.
- A high level of conservatism has been applied for this species' habitat mapping, whereby habitat mapping was based off habitat features (i.e. breeding habitat mapped as all vegetation (i.e. remnant, non-remnant, high value regrowth (HVR), regrowth) with a mature eucalypt canopy that contains trees over 30 cm DBH) instead of individual feature approach. This approach includes large areas of fragmented landscape (despite the fact the species is highly sensitive to fragmentation (Eyre, 2006), including scattered Eucalypt species and pre-existing barriers (i.e. rail infrastructure, noise barriers, highways and public access roads).

Therefore, as per the *New South Wales Environment Protection Authority - New protections for endangered southern gliders* (Environment Protection Authority, 2018) requirements include a 50 m exclusion zone around known recorded locations of greater glider dens. Given this, up to 7.26 ha comprising a 50 m vegetated buffer has been applied for greater glider breeding habitat within large patches of contiguous vegetation located within key fauna biodiversity areas (i.e. Acacia Forest Park and Gould Adams Park/Nealdon Park). Monitoring and adaptive management for potential indirect impacts will be undertaken within the buffer zone.

3.2.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

3.2.11 Significant impact assessment

Initially, it was assessed the proposed action has potential to result in a significant impact greater glider (southern and central), as per AECOM's EPBC Act referral (8 December 2022).

Since the referral for the proposed action, significant reductions to the Impact area have occurred, as well as targeted surveys and species-specific habitat mapping. As such, direct impacts to greater glider (southern and central) habitat have substantially reduced from 49.42 ha to 34.89 ha. As such, an updated SIA for this species as per Table 8 was undertaken to reflect these changes. The outcome of the updated SIA is the proposed action is **unlikely to result in a significant impact to the greater glider (southern and central) and is unlikely to be important, notable or of consequence,** since:

- Highly conservative habitat mapping has been undertaken across the Impact area
- The proposed action will be restricted along the existing railway corridor and edges of habitat, rather than dissecting or fragmenting core patches. Within the broader context, habitat critical to the survival of the species will persist, particularly in Key Biodiversity Areas Wally Tate Park,

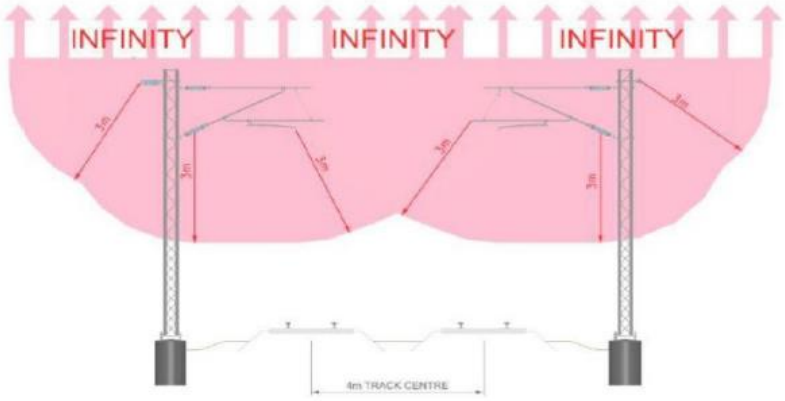
Karawatha Forest Park, Nealdon Park/Gould Adams Park and Hugh Muntz Gardens. The species is likely preferentially to use these larger contiguous habitat patches.

- While habitat critical to the survival of the species is mapped, the proposed action is unlikely to significantly impact this habitat or cause impacts that are important, notable or of consequence, since:
  - Habitat primarily occurs within small, fragmented patches,
  - Habitat is unlikely to be a significant stepping stone for connectivity into the broader landscape
  - Where contiguous habitat for the species occurs at Wally Tate Park, Karawatha Forest Park, and Nealdon Park/Gould Adams Park, core high quality habitat will be retained and habitat edges are proposed to be impacted, which are generally already impacted by high levels of disturbance, urbanisation and edge effects.
- There is a low likelihood the species occupies the Impact area, either now or in the future. This is because the species is considered to be sensitive to fragmentation due to low dispersal ability and relatively small home ranges (Eyre, 2006b), and the majority of the Impact area comprises sparse overlapping canopy cover and low density of hollow-bearing trees for breeding/denning.
- There are 17 greater glider (southern and central) records within 5 km of the Impact area. Many records contain high spatial uncertainty (approximately 3 km), however could be considered to primarily occur within Karawatha Forest Park. While some connectivity occurs between habitat within the Impact area and areas where gliders are known to occur within Karawatha Forest Park, habitat within the Impact area is a physical and genetic ‘dead end’ for the species, and is also surrounded by residential/industrial areas, powerlines, barbed wire fencing, and operational roads and railways. Due to this, greater glider (southern and central) is more likely to remain in core contiguous patches outside the Impact area, rather than disturbed and fragmented patches within the Impact area.
- A high level of threats already occurs within and surrounding the Impact area from habitat clearing and fragmentation, barbed wire fencing, competition with other arboreal mammal species and hollow dependent species such as the common brushtail possum and sulphur-crested cockatoo, predation by feral cats and European red foxes, as well as other indirect impacts from noise, light, vibration, urbanisation, and edge effects (Department of Climate Change Energy the Environment and Water, 2022).
- Live, hollow-bearing trees are thought to be a key habitat feature and limiting factor for the species (Department of Climate Change Energy the Environment and Water, 2022).Large, continuous tracts of mature woodland and forest with a minimum of 2-4 suitable hollows per 2 ha is considered essential for sustaining a population (Department of Climate Change Energy the Environment and Water, 2022).
- The quality of and extent of habitat and availability of live, hollow bearing trees is generally low, with a low density of suitable trees primarily occurring within small, fragmented patches adjacent the existing railway corridor generally associated with Acacia Forest Park and Nealdon/Goud Adams Park.
- No direct or indirect Greater glider (southern and central) evidence was observed during targeted and seasonal field surveys, despite significant survey effort that met species survey requirements comprising 494 person hours of habitat assessments, spotlighting, and call playback, 3 nights of infrared thermal drone surveys, 14 days of Audiomoth acoustic recorders and 42 trap nights of motion sensing cameras (refer to Supplementary MNES Report, Section 2.5.2.3, Table 9).

Table 8 Significant impact assessment – Greater glider (southern and central)

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Lead to a long-term decrease in the size of a population	**Unlikely.** Despite targeted and seasonal survey effort being undertaken for the greater glider (southern and central), no individuals or indirect evidence for this species was observed within the Impact area. This suggests the species may be present at low abundance within the Impact area and/or that habitat within the Impact area is used on an occasional or intermittent basis only. However, potential breeding, foraging and dispersal habitat was assessed to occur within the Impact area, including patches of connected eucalypt dominated forests. A maximum of 21.40 ha of breeding (including functionally lost areas), 7.52 ha of foraging (including functionally lost areas), and 5.97 ha of dispersal habitat will be directly impacted by the proposed action. This habitat may be considered 'habitat critical to the survival of the species' as per the species' Conservation Advice. In addition, there is currently no robust estimate of the population size of the greater glider (southern and central). Indirect impacts that can potentially impact species long term survival include increased noise, light and vibration, the introduction, spread of weeds and pests and increased dust which reduces the quality of vegetation. However, these will be actively managed within a 7.26 ha buffer zone during all of the proposed action's phases as per the OEMP. The following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to greater glider (southern and central): <u>Detailed design phase:</u> - Exhaust all opportunities for design refinement to avoid areas where species-specific hollows occur - Design to embody pre-construction management measures (i.e. fauna movement infrastructure opportunities) outlined in Section 6.2 of the Supplementary MNES Report. <u>Construction phase:</u> - Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as protocols relating to the protection of species and their habitat. For example, habitat tree inspection and management requirements; contact lists of nearby veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction - Fauna spotter-catchers will provide targeted advice in relation to additional controls throughout known fauna breeding periods where clearing works cannot be scheduled to avoid these times. - Qualified and experienced fauna spotter catchers to undertake pre-clearance surveys in suitable habitat prior to planned vegetation clearance. - The pre-clearance survey will be undertaken in advance of clearing activities (e.g. 1-2 weeks) to identify MNES occupation and breeding places to allow for any associated permits and programming to ensure that hollow-bearing trees / habitat features containing MNES fauna and/or breeding places are managed suitably. Where necessary, additional pre-clearing inspections will occur immediately in advance of clearing activities to re-check for presence.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	- Pre-clearance surveys will: - Survey and assess areas of potential habitat for conservation significant fauna. - Identify mark and map potential and known foraging and breeding places for to direct fauna spotter-catchers to appropriate manage during clearing. - Identify opportunities for salvage of relevant microhabitat (such as tree hollows) features prior to clearing. - Where hollows / habitat features have been identified, best attempts will be made to salvage and preserve these (acknowledging age / decay / structural damage may constrain this). Salvaged features will be reinstalled or placed within / alongside the impact area where safety and access allow. Adjoining areas – including Acacia Forest Park based on acceptance by landholder – may be used to re-site habitat features. - All hollow-bearing trees will be inspected by a suitably qualified fauna spotter catcher prior to clearing to identify any denning individuals. - Encourage fauna to leave hollows of their own accord through tree tapping, use of spotlights and other measures. - MNES species will be removed from active denning/nesting trees within the clearance footprint immediately prior to clearing and translocated to suitable habitat adjacent to the Impact area. Gliders are to be released 2 hours after sunset into trees that contain suitable hollows. - Where species need to be physically removed from hollows, trees will be dismantled (in sections if necessary) under the direction of trained and experienced fauna spotter catchers. - Trees will be felled immediately after removing wildlife to prevent animals from returning to hollows. - Fauna spotter catcher to undertake a ground inspection once the hollow bearing tree has been felled to identify presence of young or injured fauna. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation, Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. • Barbed wire occurrences in Key Biodiversity Areas based on the Asset Owner's Security Risk requirements, will apply the following hierarchy: - Remove hazard through avoidance of using barbed-wire wherever possible - Replacement of the top strand barbed-wire with plane wire (as per greater glider Conservation Advice); - Enhance visibility through plastic strand-wrapping or addition of electrical fence tape of similar; - Affixing reflective / bat tags at suitable spacings. - As a minimum requirement, fencing in all Key Biodiversity Areas will be fauna exclusion fencing and incorporate reflective discs / bat tags (generally in accordance with Bat Conservation & Rescue QLD Inc guidance document Mitigating Barbed Wire Risk For Wildlife, 2021). Controls in this document will have suitability for gliders as well as bats in regard to barb-wire fencing.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	• Installation of electrostatic wildlife guards on Overhead Line Equipment (OHLE) to minimise electrocution • Plate 13 displays the overhead line equipment exclusion zones (Queensland Rail, 2016).  **Plate 13 Overhead line equipment exclusion zone (Queensland Rail, 2016).** • Dust will be controlled throughout the construction phase within direct and indirect impact areas through dust suppression (e.g. soil binders, watercarts), speed restrictions, appropriate erosion and sediment measures, and progressive stabilisation / revegetation of temporary disturbance areas. • Appropriate weed, pathogen and disease hygiene practices and management to be implemented for the species as per the OEMP. • Domestic dogs are to be prohibited on the construction site at all times. Whilst no individuals were observed during targeted surveys, it is expected the species occurs within the Impact area in low densities only. Large intact patches of potential habitat will remain following construction of the proposed action and individuals are expected to be common in the wider local area in some locations surrounding the Impact area. As such, it is considered unlikely that the proposed action may lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of the species	**Unlikely.** The area of occupancy for this species has previously been estimated at 15,244 km^2 and the extent of occurrence at 752,962 km^2. Maximum direct impacts will occur to 34.89 ha of potential habitat (including functionally lost areas) as a result of the proposed action, or <0.01% of the total area of occupancy. The majority of vegetation clearing required for the proposed action will occur in linear areas running north to south, and which has already been disturbed. While there are still anticipated to be habitat fragmentation impacts to the species, it is considered unlikely these will reduce the area of occupancy of the species.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Fragment an existing population into two or more populations.	**Unlikely.** As per the greater glider (southern and central) Conservation Advice and given its endangered status, all populations of the greater glider (southern and central) are important for the conservation of the species across its range. The species is considered to be sensitive to fragmentation, due to low dispersal ability and relatively low home ranges. The proposed action has been predominantly co-located with an existing railway corridor, therefore potential habitat for the species is already highly fragmented and likely already limits the species' dispersal capabilities. These areas are unlikely to be a significant stepping stone for connectivity into the broader landscape. Where existing cleared areas occur within the Impact area, the greater glider (southern and central) is considered absent as the species has little dispersal ability to move through cleared areas between fragments. While some connectivity occurs between habitat within the Impact area and areas where gliders are known to occur within Karawatha Forest Park, habitat within the Impact area is a physical and genetic 'dead end' for the species, and is also surrounded by residential/industrial areas, powerlines, barbed-wire fences, and operational roads and railways. Due to this, greater glider (southern and central) is more likely to remain in core contiguous patches outside the Impact area, rather than disturbed and fragmented patches within the Impact area. Despite targeted and seasonal survey effort being undertaken for the greater glider (southern and central), no direct or indirect evidence for this species was observed within the Impact area. This suggests the species may be present at low abundance within the Impact area and/or that habitat within the Impact area is used on an occasional or intermittent basis only. Based on this, it is unlikely the proposed action has potential to fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species.	**Unlikely.** All breeding habitat (21.40 ha) and foraging habitat (7.52 ha) mapped within the Impact area is considered to meet the definition of habitat critical to the survival of the species. Dispersal habitat (5.97 ha) may not meet the definition of habitat critical to the survival of the species, for example due to excessive fragmentation and disturbance. However, to be conservative all areas of mapped habitat (34.89 ha direct impact area including functionally lost areas and 7.26 ha buffer zone) have been assessed as habitat critical to the survival of the species. While the Impact area contains habitat features that may be considered habitat critical to the survival of the species, live, hollow-bearing trees are thought to be a key habitat feature and limiting factor for the species. Large, continuous tracts of mature woodland and forest with a minimum of 2-4 suitable hollows per 2 ha are considered essential for sustaining a population (Eyre, 2002). The quality of and extent of habitat and availability of live, hollow bearing trees within the Impact area is generally low, with a low density of suitable trees primarily occurring within small, fragmented patches adjacent the existing railway corridor generally associated with Acacia Forest Park and Nealdon/Goud Adams Park. Common brushtail possum and sulphur-crested cockatoos which compete with greater glider (southern and

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	central) for hollow-bearing trees (DCCEEW, 2022) were also observed during targeted field surveys. As such, while the Impact area contains habitat that may be considered habitat critical to the survival of the species, it is highly fragmented is highly disturbed and fragmented, contain a high level of threats, generally lacks overlapping canopy cover and may be considered unlikely to support a functional population as per to Eyre's (2002) definition. Based on the above, the proposed action is unlikely to adversely affect habitat critical to the survival of the greater glider (southern and central).
Disrupt the breeding cycle of a population.	**Unlikely.** The potential for a breeding population to occur within the Impact area would require the Impact area to support a functional population of greater glider (southern and central). Live, hollow-bearing trees are thought to be a key habitat feature and limiting factor for the species. Large, continuous tracts of mature woodland and forest with a minimum of 2-4 suitable hollows per 2 ha is considered essential for sustaining a population (Eyre, 2002). The quality of and extent of habitat and availability of live, hollow bearing trees is generally low, with a low density of suitable trees primarily occurring within small, fragmented patches adjacent the existing railway corridor, generally associated with Acacia Forest Park and Nealdon/Goud Adams Park. Potential breeding in the form of remnant, non-remnant, high value regrowth (HVR) and regrowth vegetation with a mature eucalypt canopy that contains trees over 30 cm DBH are scattered throughout the Impact area. However, the lack of overlapping canopy cover and high level of fragmentation within the Impact area is considered to reduce the capacity of the Impact area to sustain a functional population of greater glider, and therefore to support breeding population. Additionally, targeted surveys did not observe direct or indirect evidence of greater glider within the Impact area. Mitigation measures outlined within the OEMP are considered appropriate to manage potential impacts to the species, such pre-clearance surveys and fauna spotter catchers including during the species' breeding period. The fauna spotter catcher will provide targeted advice in relation to additional controls throughout breeding periods where clearing works cannot be scheduled to avoid these times. Given this, it is unlikely the proposed action will disrupt the breeding cycle of the species which may occur within the Impact area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** The proposed action proposes to directly impact a maximum of 34.89 ha of potential habitat (including functionally lost areas). Since the proposed action has been predominantly co-located with an existing railway corridor, habitat proposed to be impacted is likely to be already disturbed and fragmented. Due to this, greater glider (southern and central) is more likely to remain in core contiguous patches outside the Impact area (such as within Karawatha Forest Park), rather than disturbed and fragmented patches within the Impact area.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	While some connectivity occurs between habitat within the Impact area and areas where greater glider (southern and central) are known to occur within Karawatha Forest Park, habitat within the Impact area is a physical and genetic 'dead end' for the species, and is also surrounded by residential/industrial areas, and a high level of threats such as powerlines, barbed wire fencing, and operational roads and railways. As such it is considered unlikely the proposed action will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Unlikely.** Predation by feral cats and European red foxes have the potential to impact the greater glider (southern and central) becoming established in its habitat. The European red fox was observed during targeted field surveys, and feral cats are highly likely to occur given the disturbed and fragmented nature of the Impact area. High levels of weed incursion already occur within the Impact area, and there is potential for the introduction or spread of these to occur as a result of the proposed action. Environmental management plans developed prior to works commencing will prescriptively outline the controls needed to manage weed, pests and disease to manage and mitigate potential direct and indirect impacts to the greater glider (southern and central). Weed and seed certificates and regular weed hygiene inspections to be undertaken for all machinery entering from outside to prevent introduction of new weed infestations. Based on pre-construction weed survey results, temporary washdowns may be required throughout high-risk activities (e.g. site establishment and clearing works). Based on these abovementioned mitigation measures, it is unlikely the proposed action will exacerbate invasive species beyond current levels.
Introduce disease that may cause the species to decline.	**Unlikely.** While disease is not identified as a threat to greater glider (southern and central), *phytophthora* and myrtle rust are pathogens which may indirectly impact the species by affecting its vegetation and complexity of habitats. Environmental management plans developed prior to works commencing will prescriptively outline the controls needed to manage weed, pests and disease which may impact greater glider (southern and central). Regular hygiene inspections are to be undertaken for all machinery entering from outside to prevent introduction of new weed infestations. Based on pre-construction survey results, temporary washdowns may be required throughout high-risk activities (e.g. site establishment and clearing works). As such, it is unlikely the proposed action will introduce disease that may cause the species to decline.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Interfere with the recovery of the species.	**Unlikely.** While a national recovery plan is not currently available for the species, the species' Conservation Advice identifies the following recovery actions: • Habitat loss, disturbance and modification (including fire) • Climate change • Invasive species (including threats from predation, grazing, trampling) • Reintroduction/translocations • Stakeholder engagement/community engagement • Surveying and monitoring The proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species. In addition, the OEMP includes measures to control potential direct and indirect impacts and threats to the species. Based on this, the proposed action is unlikely to significantly interfere with the recovery of the species.

3.3 Koala (Phascolarctos cinereus)

3.3.1 Description and status under the EPBC Act

The koala is listed as endangered under the EPBC Act. The koala is a medium-sized marsupial with a stocky body, large, rounded ears, sharp claws and variable but predominantly grey-coloured fur. They are a tree-dwelling, obligate folivore with a highly specialised diet of *Eucalyptus, Corymbia* and *Angophora* species (Department of Agriculture Water and the Environment, 2022b).

3.3.2 Distribution

The koala is a wide-ranging marsupial endemic to Australia, with typical occurrence in eastern Australian forests and woodlands of predominantly *Eucalyptus* species. Koalas are widespread across Queensland, occurring in patchy and often low-density populations across the state. In the state, they inhabit moist coastal forests, southern and central western subhumid woodlands and a number of eucalypt woodlands adjacent to waterbodies in the semi-arid western parts of the state (Department of Agriculture Water and the Environment, 2022b).

3.3.3 Habitat requirements

The koala inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by species from the Eucalypt species (that is, those from the *Eucalyptus, Corymbia, Lophostemon* and *Angophora* genus*)*. The distribution of koalas is also affected by altitude (limited to <800 m ASL), temperature and, at the western and northern ends of the range, leaf moisture (Department of Agriculture Water and the Environment, 2022b).

The koala is a leaf-eating specialist that feeds primarily during dawn, dusk or night. Its diet is restricted mainly to foliage of *Eucalyptus* spp; however, it may also consume foliage of related genera, including *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp, and may, at times, supplement its diet with other species, including *Leptospermum* spp. and *Melaleuca* spp (Department of Agriculture Water and the Environment, 2022b).

Based on the geographical location of the proposed action and the annual rainfall in the region, koala habitat is defined as (Department of Agriculture Water and the Environment, 2022b):

- Large, connected areas of native vegetation, including forests and woodlands where logging has altered tree species composition; these areas may be remnant, regrowth or plantation vegetation.
- Small, isolated patches of native vegetation in rural, urban or peri-urban areas.
- Windbreaks and narrow areas of native vegetation along riparian areas or linear infrastructure.
- Isolated food and/or shelter trees (i.e. on farmlands, in suburban streetscapes, parks and yards)
- Forests or woodlands, road-side and rail vegetation and paddock trees, safe intervening ground matrix for travelling between trees and patches to forage and shelter and reproduce and access to vegetated corridors or paddock trees to facilitate movement between patches.

Based on the above definition, all koala food trees (those within the *Eucalyptus, Corymbia, Angophora, Lophostemon, Leptospermum* and *Melaleuca* genera) are considered to provide koala habitat.

Within the Southeast Queensland bioregion, locally important koala food trees include *Eucalyptus tereticornis, Eucalyptus crebra* and *Eucalyptus propinqua*, all of which were identified within the Impact area.

3.3.4 Threats

Based on the *National Recovery Plan for the Koala Phascolarctos cinereus* (national recovery plan), The main identified threats to the species are (Department of Agriculture Water and the Environment, 2022b):

- Climate change driven processes and drivers:
    - Loss of climatically suitable habitat
    - Increased intensity/frequency of drought, heatwave, bushfire

  - Declining nutritional value of foliage.
- Human related activities:
  - Clearing and degradation of koala habitat
  - Mortality from vehicle strike
  - Mortality from dog attack.
- Disease and health:
  - Koala retrovirus (KoRV)
  - Chlamydia (*Chlamydia percorum*).

Indirect impacts which may affect vegetation and complexity of habitats supporting Koalas may include:

- Phytophthora (*Phytophthora cinnamomi*), which is a soil borne water mould contributing to tree death.
- Myrtle Rust (*Austropuccinia psidii*), which is a fungus that affects plants within the Myrtaceae family including those within the *Eucalyptus, Corymbia, Angophora, Lophostemon, Leptospermum* and *Melaleuca* genera. Myrtle Rust causes deformed leaves, heavy defoliation of branches, dieback, stunted growth and often plant death.

3.3.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.8, Appendix B Figure 9 and Appendix B Figure 15 of the Supplementary MNES Report for habitat and historic records.

3.3.6 Important Population

As per the species' Conservation Advice (Department of Agriculture Water and the Environment, 2022b), populations that are considered important are those that are valued for cultural, social and economic reasons as well as for the species conservation. Important populations that need to be maintained include ones that:

- Have the potential to act as source populations to adjacent areas of suitable, or potentially suitable, habitat.
- Exist in areas of climatically suitable refugia during periods of environmental stress including droughts, heatwaves, and long-term climate change.
- Are genetically diverse.
- Are disease free and/or exhibit low rates of infection with important pathogens.
- Contain genes which may confer adaptation to current and future environmental stressors.
- Are geographical or environmental outliers within the species range.

As this species is listed as endangered under the EPBC Act, all populations may be considered important populations.

3.3.7 Habitat critical to the survival of the species

Potential significant impacts to koala habitat may occur if habitat that is considered to be critical to the survival of the koala is disturbed. The current Conservation Advice for Koala lists the following factors that should be considered when identifying habitat that is critical to the survival of a species (Department of Agriculture Water and the Environment, 2022b):

- Whether the habitat is used during periods of stress (examples: flood, drought or fire)
- Whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes)
- The extent to which the habitat is used by important populations

- Whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development
- Whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements
- Whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation, and
- Any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.

Based on the above factors, all mapped koala habitat within the proposed Impact area (107.74 ha) is considered habitat critical to the survival of the species.

However, the Impact area is located in a highly urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas acting as barriers and restrict Koalas in accessing habitat critical for the survival of the species. Suitable habitat for the species often occurs sporadically across the Impact area. A high level of threats occurs such as domestic dogs and vehicle strikes.

3.3.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. In addition, refer to Appendix G Figure 2 of the Supplementary MNES Report for the koala landscape connectivity model. Generally, a lack of suitable habitat, presence of dogs, and roads which fragment habitats are potential barriers and obstructions for the migration and movement of Koalas.

3.3.9 Buffer zone

Consideration for the provision of buffer zones were assessed to compensate for indirect impacts on the species. Buffers were not considered ecologically relevant for the species given the following:

- A high level of conservatism has been applied throughout the habitat mapping approach whereby a ‘habitat’ approach (instead of individual feature approach) was undertaken. This approach includes large areas of fragmented landscape where pre-existing barriers (i.e. rail infrastructure, highways and public access roads) and high levels of disturbance (i.e. noise, light and weed infestations) are present.
- Koalas are highly mobile, have a wide-ranging distribution and are known to disperse across distances of 1 to 3 km but sometimes over 10 km (Youngentob, Marsh and Skewes, 2021), therefore are able to disperse into the broader landscape avoiding indirect impacts.
- Koalas are adapted to living in urban environments which includes exposure to indirect impacts such as increased noise, light and vibration and the introduction or weeds, pests and pathogens. The Impact area is located within an urban environment and has largely been co-located or adjacent to the existing railway corridor, habitats have already been subjected to disturbance, fragmentation, weed incursion and edge effects, increased activity, light, noise, weeds, pests, pathogens and dust. The proposed action will not exacerbate pre-existing indirect impacts beyond current levels. Indirect impacts will be temporary and localised as the proposed action will be constructed in phases, allowing individuals to avoid impacted areas. Indirect impacts will be actively managed during phases as per the OEMP.

3.3.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

3.3.11 Significant Impact Assessment

An assessment against the Significant Impact Guidelines for the koala this is provided below in Table 9. The outcome of the SIA is the proposed action is **likely to result in a significant impact** to the koala.

Table 9 Significant Impact Assessment – Koala

EPBC Act criteria – is there a real possibility that the Proposed action will:	Assessment of significance
Lead to a long-term decrease in the size of a population?	**Unlikely.** Two (2) adult male koalas were detected during targeted thermal drone surveys undertaken by Endeavour Veterinary Ecology. One individual was located in bushland within Gould Adam Park approximately 4 m west of the Impact area. The second koala was located in Karawatha Forest Park approximately 317 m west of the Impact area, where a known small population of koala occurs. Therefore, any population known to persist within this region could be considered important for the species ongoing survival. A maximum of 27.48 ha of potential breeding and foraging habitat and 80.27 ha of dispersal habitat is proposed to be impacted for the project. This habitat is likely to be considered critical to the survival of the koala. While the proposed action proposes to impact 107.74[5] ha of koala habitat, this habitat is located in a landscape that has already experienced fragmentation from residential and industrial development, linear infrastructure and agricultural grazing and is unlikely to act as a source population for adjacent areas of suitable habitat. Large intact patches of potential habitat will remain in surrounding vegetation following the construction of the proposed action. The koala is highly mobile and known to utilise cleared areas (as long as scattered suitable food or shelter trees occur) and proposed fauna movement infrastructure in culverts and underpasses are proposed to movement pathways. Direct and indirect impacts that can potentially impact the species long term survival include vegetation clearing, habitat fragmentation, increased risk of injury or mortality from vehicle/machinery strike, increased noise, light and vibration and the introduction or weeds, pests and pathogens. However, these impacts will be actively managed during all phases of the proposed action's phases. In addition, the following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to koala: <u>Detailed design phase:</u> • Design to embody pre-construction management measures (i.e. fauna movement infrastructure opportunities) outlined in Section 6.2 of the Supplementary MNES Report. <u>Construction phase:</u> • Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as and protocols relating to the protection of species and their habitat. For example, Pre-clearing inspection and management requirements; contact lists nearby of veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction. • During the construction phase, impacts due to increased human presence and domestic dog attacks will be mitigated by installing temporary koala exclusion fencing around the perimeter of Key Biodiversity Areas. Where applicable, permanent fencing will be installed as a priority including the provision of fauna crossing structures to limit human and dog interactions. • Install refuge poles along easements to facilitate rapid escape into treed habitat areas. • Domestic dogs are to be prohibited on the construction site at all times.

[5] *Due to rounding to two decimal places, rounding errors of < 0.01 ha may occur*.

EPBC Act criteria – is there a real possibility that the Proposed action will:	Assessment of significance
	• Works near high-risk koala habitat areas should be avoided during early morning, dusk and night (i.e. prior to 6 am and after 6 pm), which are high koala activity periods. Where works cannot be avoided (i.e. based on corridor access / safety constraints) during early morning, dusk and night temporary koala exclusion fencing will be erected to avoid koalas entering the Impact area. Additionally, pre-start meetings will convey information to construction personnel noting works are being undertaken in a high-risk koala habitat area which requires increased vigilance. Pre-start meeting will relay procedures in the event a koala is identified within the Impact area. • Where early morning, dusk or night works are required, lights will be directed away from fauna sensitive habitat to minimise light spill into adjacent habitats. • To reduce noise and vibration all construction vehicles to comply with maintenance schedules and operational restrictions designed to limit noise impact during construction. Vehicles and machinery to be switched off when not in use. • During the clearing phase prior to vegetation clearing, trees (or areas) with koalas present are clearly flagged (e.g. individual tree marked with a specific colour; signage / flagging tape for larger areas containing many trees), and an exclusion zone set in place, and all personnel notified of location. • In the event a koala is identified within proposed construction areas, works are to stop within 50 m of the koala or where the canopy of any other tree overlaps (whichever is greater). • Works should not resume until the koala(s) leave the area on its own accord. • To avoid potentially blocking the movement of koalas, temporary laydown areas for equipment/infrastructure (i.e. culverts, rail track and machinery) must be located within cleared areas as to not impede koala movement into suitable habitat outside of the Impact area. • Install signs on the tracks and go-slow points where koalas are known to occur and enforce speed limits. • Temporary koala exclusion fencing shall be installed around the perimeter of known key fauna biodiversity areas to minimise the emigration of koalas from the site into the clearing works. Key fauna biodiversity areas are summarised in Section 9.0 and Appendix B Figure 2 of the OEMP. • Where temporary fencing is required, it will replicate the TMR Standard Drawing SD1603 (Transport and Main Roads, 2024), unless TMR Standard Drawing SD1615 fencing design (Transport and Main Roads, 2021) or other suitable alterative as informed by an appropriately qualified and experienced ecologist can be applied. • Temporary koala exclusion fencing will be inspected weekly to ensure fencing is in good condition and maintained so there are no points of egress for koalas into the construction site. If fencing is in poor condition, it should be rectified as soon as possible to reduce the potential of koala emigration into developed areas. • Notwithstanding that trenches/excavations/pits will be located within temporary koala exclusion fencing areas, prior to works commencing trenches/excavations/pits will be visually checked for koala entrapment/injury. Where trenches/excavations/pits are required to remain open for extended periods unsupervised (e.g. over weekends, holiday-shutdowns, extended poor weather) suitable exclusion zones

EPBC Act criteria – is there a real possibility that the Proposed action will:	Assessment of significance
	(e.g. barriers, fencing, covers, or similar will be applied to avoid fauna entrapment / injury. • In the instance a koala (or other fauna) is observed within trenches/excavations/pits a suitably qualified fauna spotter catcher will be engaged to respond to the situation. • In the event a sick or injured koala is found within or adjacent to the Impact area, an appropriately qualified koala spotter catcher[6] is to be contacted for observation and potential medical intervention. • The release of koalas to the wild must be conducted in accordance with the relevant provisions outlined in Queensland Nature Conservation (Koala) Conservation Plan 2017 (Koala Plan). • Clearing of koala habitat trees is to comply with the sequential clearing requirements prescribed in Part 3, Section 10 of the Koala Plan. These include: - Clearing of koala habitat trees carried out in a way that ensures koalas within the clearing site have enough time to move out without human intervention, including in particularly clearing sites with an area of more than 3 ha, specifically in the following locations: ▪ Karawatha/Acacia Forest Park (20.10 ha) ▪ Kuraby (Spring Creek) (11.90 ha). - Clearing of koala habitat trees in the aforementioned areas must be cleared in accordance with the Koala Plan (Queensland Government, 2023) including: ▪ Carrying out the clearing in stages; and ▪ Ensuring not more than the following is cleared in any one stage either a) For a clearing site with an area of 6 ha or less-50% of the site's area or b) For a clearing site with an area of more than 6 ha-3 ha or 3% of the site's area, whichever is greater; and ▪ Ensuring that between each stage and the next there is at least one period of 12 hours starting at 6pm on a day and ending at 6 am on the following day and during this time no trees are cleared on the site. ▪ Clearing of the koala habitat trees are carried out in a way that ensures, while the clearing is being carried out, that appropriate habitat links are maintained within the clearing site and between the site and its adjacent area, to allow koalas living on the site to move out of the site. ▪ No koala habitat tree in which a koala is present and no koala habitat tree with a crown overlapping a tree in which a koala is present is cleared until such time the koala has dispersed to a safe area at its own accord, as deemed by a suitably qualified koala fauna spotter catcher. ▪ Clearing of koala habitat trees within mapped koala habitat areas to be undertaken in the presence of a koala spotter. The koala spotter's primary role is to locate koalas in the trees to be removed. The koala spotter must have qualifications and experience or demonstrated skills and knowledge in: - Locating koalas in koala habitats

[6] As per the *Nature Conservation (koala) Conservation Plan 2017* a suitably qualified koala spotter catcher means a person who has qualifications and experience or demonstrated skills and knowledge in locating koalas or koala habitats or conducting arboreal fauna surveys.

EPBC Act criteria – is there a real possibility that the Proposed action will:	Assessment of significance
	- Conducting arboreal fauna surveys. • Retrofit existing culverts and underpass at appropriate locations to include fauna ledges to aid koala movement. • Install speed reduction signs, road signage and road pavement stencils to reduce speed limits, alert drivers to speed and allow detection of koalas during construction. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed actions MRTS16 Landscape and Revegetation. • Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. Given this, it is unlikely this amount of clearing will lead to a long-term decrease in any koala populations present in the region. The species will continue to persist within its current distribution, regardless of the presence of habitat within the Impact area. Therefore, the proposed action is unlikely to lead to a long-term decrease in the size of a population of the koala.
Reduce the area of occupancy of the species?	**Potential.** The species occupies large areas of habitat within its range, with the area of occupancy estimated at 19,428 km^2. However, it is considered that even small areas of habitat loss (as little as 1 ha) can have a significant impact to the species. The proposed action proposes to impact a maximum of 107.74 ha of habitat, which is likely to be considered critical to the survival of the species. However, it is noted the proposed action extends throughout landscape that has already experienced fragmentation and has the ability to increase koala movement opportunities through the installation of fauna movement infrastructure. While measures to mitigate potential direct and indirect impacts to the species are proposed, the proposed action has the potential to reduce the area of occupancy of the koala.
Fragment an existing population into two or more populations?	**Unlikely.** The proposed action proposes to impact a maximum of 107.74 ha of koala habitat. This habitat is located in a landscape that has already experienced fragmentation from residential and industrial development, linear infrastructure and agricultural grazing and is unlikely to act as a source population for adjacent areas of suitable habitat. Large intact patches of potential habitat will remain in surrounding vegetation following the construction of the proposed action. The koala is also highly mobile and known to utilise cleared areas and proposed fauna movement infrastructure in culverts and underpasses are proposed for the species' movement pathways. Based on these abovementioned mitigation measures and given the mobile nature of the koala, the proposed action is unlikely to fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species?	**Likely.** The proposed action proposes to impact a maximum of 107.74 ha of koala habitat, which is likely to be habitat critical to the survival of the koala. In addition, it is considered that even small areas of habitat loss (as little as 1 ha) can have a significant impact to the species. As such, the proposed

EPBC Act criteria – is there a real possibility that the Proposed action will:	Assessment of significance
	action is likely to have an adverse impact on habitat critical to the survival of the species.
Disrupt the breeding cycle of a population?	**Likely.** The koala breeding season is generally between September and March, with females giving birth to a single young between October and May. During the breeding season, males actively seek females and koala movements are more extensive. Therefore, there is a chance that dispersing males may move into the Impact area during this time. While the proposed action will likely be staged, it is unlikely it can avoid all construction, operation and maintenance activities during this breeding period. Mitigation measures within the OEMP are proposed to manage potential impacts to the species, such as the use of fauna spotter catchers, particularly during the breeding period, will ensure that displaced individuals possibly bearing young are captured and relocated to suitable habitat. Despite this, it is likely the proposed action will disrupt the breeding cycle of the species which may occur within the Impact area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely.** The proposed action proposes to impact a maximum of 107.74 ha of potential habitat for the koala, which is likely to be habitat critical to the survival of the species. This habitat is located in a landscape that has already experienced fragmentation from residential and industrial development, linear infrastructure and agricultural grazing and is unlikely to act as a source population for adjacent areas of suitable habitat. Large intact patches of potential habitat will remain in surrounding vegetation following the construction of the proposed action. The koala is also highly mobile and known to utilise cleared areas and proposed fauna movement infrastructure in culverts and underpasses are proposed for the species' movement pathways. While the proposed action is proposed to remove koala habitat, other areas of contiguous breeding, foraging and dispersal habitat occur outside the Impact area. Mitigation measures within the OEMP are also proposed to manage potential impacts to the species. As such, the proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat?	**Unlikely.** The primary invasive fauna species which poses a threat to koala is the domestic dog. Due to the urban nature of the Impact area, domestic dogs are likely to occur within and surrounding the Impact area. High levels of weed incursion already occur within the Impact area, however there is potential for the introduction spread of invasive weeds to occur as a result of the proposed action. The proposed action will manage potential direct and indirect impacts to koala as a result of weeds and pests within an OEMP. Based on the abovementioned mitigation measures, it is unlikely the proposed action will result in invasive species that are harmful to koala becoming established in its habitat.
Introduce disease that may cause the species to decline?	**Unlikely.** Provided the control and management of weeds, pest and pathogens are effectively implemented within an OEMP, the proposed action is not expected to introduce or exacerbate the spread of disease or pathogens (i.e.

EPBC Act criteria – is there a real possibility that the Proposed action will:	Assessment of significance
	Chlamydia spp., koala retrovirus, Myrtle Rust or Phytophthora) that may reduce the reproductive output of koalas or reduce the carrying capacity of the habitat.
Interfere with the recovery of the species?	**Unlikely.** The following objectives are outlined in the national recovery plan for the koala: • The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased. • The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased. • Metapopulation processes are maintained or improved. • Partners, communities and individuals have a greater role and capability in listed Koala monitoring, conservation and management. The proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species. In addition, the OEMP will include measures to control potential direct and indirect impacts and threats to the species. Based on this, the proposed action is unlikely to significantly interfere with the recovery of the species.

3.4 Angle-stemmed myrtle (*Gossia gonoclada*)

3.4.1 Description and status under the EPBC Act

The angle-stemmed myrtle is listed as Endangered under the EPBC Act.

The angle-stemmed myrtle is a tree growing to 18 m tall. The bark of the trunk is smooth to flaky, pale brown, reddish, orangish, or grey. Branchlets are distinctly four-angled to laterally compressed and leaves are slightly discoloured, matte or slightly glossy above and matte below. The winged branchlets, slightly retuse leaf apex and five merous flowers distinguish *G. gonoclada* from other species of the genus in south-east Queensland (Threatened Species Scientific Committee, 2016a).

3.4.2 Distribution

The angle-stemmed myrtle is endemic to south-east Queensland along the lower reaches of the Brisbane and Logan rivers. The species formerly occurred around Moggill and New Farm in Brisbane but there have been no recent discoveries in these areas. There are currently eight known populations with 72 individual wild plants within these (Austromyrtus gonoclada Recovery Team, 2001).The populations are located at sites within Tanah Merah, Daish Hill, Loganholme, Corinda, Fig Tree Pocket and Long Pocket (*Austromyrtus gonoclada* Recovery Team, 2001).

3.4.3 Habitat requirements

The angle-stemmed myrtle is naturally found on sloping metamorphic or flat alluvial terraces of (largely) permanent waterways, which experience some degree of tidal influence at an elevation of 5 to 70 m. The species appears to have a preference for well-drained clay soils derived from metamorphosed sediments and Cainozoic or alluvial deposits. The species flowers in October through to December, fruiting in January through to early April. The unspecialized flowers, similar to those of many species in the Myrtaceae, suggest that insects, most likely bees, beetles, thrips and flies are pollinators (Threatened Species Scientific Committee, 2016c).

3.4.4 Threats

The main identified threats to the species are (Threatened Species Scientific Committee, 2016a):

- Myrtle rust (*Puccinia psidii*) disease,
- Habitat loss and degradation, and
- Habitat degradation and competition from invasive species such as hiptage (*Hiptage benghalensis*), cats-claw creeper (*Macfadyena unguis-cati*), balloon vine (*Cardiospermum grandiflorum*) and climbing asparagus (*Asparagus africanus*).

3.4.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.7, Appendix B Figure 8 and Appendix B Figure 16 of the Supplementary MNES Report for habitat and historic records.

3.4.6 Important Populations

As this species is listed as Endangered under the EPBC Act, all populations are considered in the Significant Impact Assessment, and ‘important populations’ therefore do not apply.

3.4.7 Habitat critical to the survival of the species

The angle-stemmed myrtle national recovery plan states that as so few individuals remain, all areas where the species occur (including those sites where the species has recently been established) are considered critical. On this basis, all areas of habitat for the species are considered habitat critical to the survival of the species (Austromyrtus gonoclada Recovery Team, 2001).

No habitat for the species occurs within the Impact area. Habitat for the species that is adjacent to the Impact area is located in a highly urbanised and fragmented landscape, which has experienced previous clearing, weed, pest and pathogen invasion, habitat fragmentation, disturbance from urbanisation and recreational activities, and altered fire regimes.

3.4.8 Buffer zone

One individual was located approximately 14 m west and outside the Impact area. An exclusion zone to include the full extent of the tree protection zone, but no less than 10 m from the individual is being considered to address indirect impacts.

3.4.9 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

3.4.10 Significant impact assessment

An assessment against the Significant Impact Guidelines for Angle-stemmed myrtle this is provided below in Table 10. The outcome of the SIA is the proposed action **is unlikely to result in a significant impact on the species.**

Table 10 Significant impact assessment – Angle Stemmed myrtle

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Lead to a long-term decrease in the size of a population	**Unlikely.** No angle-stemmed myrtle individuals were recorded within the Impact area and no potential habitat is mapped within the Impact area. However, one (1) angle-stemmed myrtle individual was recorded during field surveys located approximately 14 m away from the Impact area. Indirect impacts that can potentially impact species long term survival include dust, waste disposal and increased human traffic around the trees, resulting in soil compaction. However, these will be temporary and distant from the recorded species location. Indirect impacts will be actively managed during all of the proposed action's phases. In addition, the following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to angle-stemmed myrtle: <u>Construction phase:</u> • Clearing required in areas of angle-stemmed myrtle habitat will be restricted to the Impact area. • Establish exclusion zone fencing to exclude pedestrian and machinery access as far as possible from the angle-stemmed myrtle – exclusion zone to include the full extent of the tree protection zone, but no less than 10 m from the individual. • The Design and Construction Contractor must engage a suitably qualified and experienced ecologist to undertake a pre-construction survey within circa 100 m of individual plant location to inspect for Myrtle Rust (high risk of disease-induced death to species) • Should Myrtle rust be positively identified, and it is assessed as having a high-risk of spread to the region immediately surrounding individual specimen a hygiene program is to be established. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation. • Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. As such, it is considered unlikely the proposed action will lead to a long-term decrease in the size of a population for the species.
Reduce the area of occupancy of the species	**Unlikely.** Vegetation clearing required for the proposed action will occur along portions of an existing linear rail corridor that is already disturbed and exists within an

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	urbanised context. No vegetation clearing will occur within the species' potential habitat and no angle-stemmed myrtle individuals will be cleared by the proposed action. On this basis, it is considered unlikely that the proposed action will reduce the area of occupancy of the species.
Fragment an existing population into two or more populations.	**Unlikely.** No vegetation clearing will occur within the species' potential habitat and no angle-stemmed myrtle individuals will be cleared by the proposed action. Therefore, vegetation clearing required for the proposed action will not impact or fragment the species' population.
Adversely affect habitat critical to the survival of a species.	**Unlikely.** No vegetation clearing will occur within the species' potential habitat and indirect impacts to the species will be managed through the OEMP. The main threats to the species include exotic weed invasion, livestock grazing, inbreeding depression, illegal or inappropriate collection of cuttings and seeds and myrtle rust caused by *Puccinia psiddi.* Above mentioned causes are not related to proposed action activities. Therefore, the proposed action is unlikely to adversely impact habitat critical to the survival of the species.
Disrupt the breeding cycle of a population.	**Unlikely.** Main causes that impact the species' breeding and reproduction are inbreeding depression, illegal or inappropriate collection of cuttings and seeds, low production of fruits and low viability of seeds. In breeding depression occurs due to the occurrences of limited number of individuals. However, vegetation clearing will not occur within species potential habitat. Therefore, the proposed action will not reduce species population size and breeding opportunity. Other factors that impact species breeding are plant based and not related to proposed action activities.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** Neither a population nor suitable habitat was recorded for angle-stemmed myrtle within the Impact area during the field survey. Therefore, vegetation clearing will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline availability and quality of the species habitat. Also, the Impact area has been predominantly co-located with an existing cleared linear area. Therefore, the area to be impacted by the proposed action is unlikely to be the best quality in the local area due to the existing edge effects. Indirect impacts to potential habitat adjacent to the impact area will be managed as per OEMP to mitigate potential indirect impacts i.e. increased nutrient loads, trampling, rubbish dumping and slashing.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Unlikely.** Invasive weed species such as cats-claw creeper, balloon vine, climbing asparagus and lantana have been identified as a key threat to the establishment of the species. It is unlikely that the proposed action will exacerbate invasive species beyond current levels. The OEMP for the proposed action includes mitigation and management measures to control the potential spread of pest flora and fauna species which may threatened the species.
Introduce disease that may cause the species to decline.	**Unlikely.** Fungus *Puccinia psidii* is known to impact the reproductive and vegetative parts of the plant and will impact species establishment. This threat is considered 'major' and has had a negative impact on the reproductive success of a large percentage of the population at Logan area. However, it is

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	unlikely that the proposed action will introduce a disease to the extent that this species would decline. The OEMP for the proposed action details the biosecurity measures to prevent the introduction and spread of disease.
Interfere with the recovery of the species.	**Unlikely.** Specific recovery objectives within the species' national recovery plan are: • Locate new populations. • Provide secure habitat by negotiating a conservation agreement with the appropriate management authority or landholder. • Undertake ecological investigations. • Undertake controlled cultivation and propagation to ensure representative sampling of the genetic diversity of the species and supplement existing populations with genetically diverse stock. • Establish new populations within appropriate habitat in southeast Queensland. • Facilitate local community awareness and involvement in the conservation of the species. • Manage and reduce threats for each population. Since the proposed action will not clear angle stemmed myrtle individuals or habitat, and given mitigation measures such as exclusion fencing, minimising clearing where possible and surveying for potential disease are proposed, the proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species.

4.0 Vulnerable species

4.1 South-eastern glossy black-cockatoo (*Calyptorhynchus lathami lathami)*

4.1.1 Description and status under the EPBC Act

The south-eastern glossy black cockatoo is listed as vulnerable under the EPBC Act.

The south-eastern glossy black cockatoo has a body length of around 48cm and weight of 420g. Plumage is mostly dull black, with a blackish-brown head, an inconspicuous crest and a broad bulbous bill. Adult males have bright red panels in the tail while adult females have yellowish-red panels (Department of Climate Change, 2022b).

4.1.2 Distribution

The south-eastern glossy black cockatoo is uncommon but widespread, with a range from Mitchell (Queensland) through eastern New South Wales to East Gippsland (Victoria). The species has a continuous distribution through the forested areas of the Great Dividing Range but becomes more scattered inland (Department of Climate Change, 2022b).

4.1.3 Habitat requirements

The species feeds almost exclusively on the seeds of sheoaks (*Allocasuarina* spp. and *Casuarina* spp.), which may explain the patchy distribution of the subspecies in parts of its range. The south-eastern glossy black cockatoo is a hollow nester, utilising large hollows in both living and dead eucalypt trees. Little is known about the social structure of the subspecies, other than that the species usually occurs in pairs or in groups of three (made up of a breeding pair and their offspring) and is observed in woodlands (Department of Climate Change, 2022b).

4.1.4 Threats

The main identified threats to the south-eastern glossy black-cockatoo are (Department of Climate Change, 2022b):

- Increased likelihood of extreme events (i.e. heatwaves, drought, bushfire)
- Clearing of native vegetation/timber harvesting
- Habitat fragmentation
- Grazing by rabbits and other feral herbivores reducing foraging habitat and the regeneration ability of native vegetation, including feed tree species for the subspecies, after fires
- Invasive weeds
- Competition for nest hollows, and
- Psittacine Beak and Feather Disease (PBFD).

4.1.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.8, Appendix B Figure 9 and Appendix B Figure 17 of the Supplementary MNES Report for habitat and historic records.

4.1.6 Important Population

The main factors that make the subspecies eligible for listing in the Vulnerable category are the declining population, extent of occurrence (EOO), area of occupancy (AOO), and the small population size. The subspecies has undergone a substantial reduction (30–50%) in the last three generations (Cameron et al. 2021). This reduction in population was mostly caused by the 2019/2020 bushfires, and a result of historical and ongoing habitat loss. Both EOO and AOO are contracting, they are estimated as 470,000 km2 and 40,000 km2, respectively. Furthermore, the estimated total number of mature individuals is 7,500, and is declining rapidly. A structured expert elicitation process was used to estimate the proportional population change for this subspecies from pre-fire levels to immediately after

the fire and then out to three generations after the fire, when exposed to fires of varying severity. These results, combined with the spatial analyses of fire overlap, suggest that one year after the fire, the subspecies has experienced an overall decline of 15% from pre-fire levels, but that the decline could be as large as 32% (upper bound of 80% confidence limit). After three generations, the estimate for the overall population decline relative to the pre-fire population is predicted to be 22%, but potentially as much as 46% (upper bound of 80% confidence limit). For comparison, experts also estimated the population change over time in the absence of fire; by three generations after the 2019/2020 bushfires, the overall population of the south-eastern glossy black cockatoo was estimated to be 16% lower than it would have been, had the fires not occurred (Department of Climate Change, 2022b).

4.1.7 Habitat critical for the survival of a species

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary (Department of Climate Change, 2022b):

- For activities such as foraging, breeding, roosting, or dispersal.
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.

The south-eastern glossy black-cockatoo has a highly specialised diet and feed exclusively on the cones of nine (9) species of *Allocasaurina* sp and *Casaurina* sp, four (4) of which are present within the Impact area; black sheoak (*Allocasaurina littoralis*), forest sheoak (*Allocasaurina torulosa*), river sheoak (*Casaurina cunninghamiana*) and swamp sheoak (*Casaurina glauca*), including eucalypt woodland with a stratum of *Allocasuarina* sp.

The Impact area is located in a highly urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas. Suitable habitat often occurs sporadically across the Impact area. Despite this fragmentation, potentially suitable habitat within parklands and scattered eucalypt trees occurs within the vicinity of foraging resources and contiguous eucalypt forest or woodland (i.e. remnant, non-remnant or high value regrowth (HVR)). These sporadic areas are likely to facilitate localised movement and dispersal into the broader landscape. Additionally, suitable breeding trees (i.e. mature hollow-bearing trees (>30 cm diameter at breast height)) occur within the Impact area. The species is highly mobile and can travel up to 12 km to forage and may easily occur in modified urban environment as it disperses across the landscape. However, no records occur within the last 10 years occur within 5 km of the Impact area.

An elevated exposure to threats occurs within the Impact area such as increased competition for the low number of available nest hollows. Sulphur-crested cockatoos and common brushtail possums frequent the Impact area and can be considered competitors for nesting habitat. Additionally, there is potentially an increased likelihood of nest predation through the common brushtail possum within the Impact area.

As per the species' modelled distribution map outlined in the Conservation Advice (Department of Climate Change Energy the Environment and Water, 2022), the proposed action is located where the species is 'known' or 'likely' to occur. Given this, the species is considered as 'potential to occur' based on the location of the proposed action and the presence of foraging, breeding and dispersal resource. Based on the above factors, mapped habitat within the Impact area (41.74 ha) is considered potential habitat critical to the survival of the species.

4.1.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. Generally, migration and movement pathways, barriers and obstructions for the south-eastern Glossy Black Cockatoo include the presence of bushfires, land clearing and poor habitat quality due to weeds.

4.1.9 Buffer zone

Consideration for the provision of buffer zones were assessed to compensate for indirect impacts on the species. Buffers were not considered ecologically relevant for the species given the following:

- A high level of conservatism has been applied for species habitat mapping whereby a 'habitat' approach (instead of individual feature approach). This approach includes large areas of fragmented landscape where pre-existing barriers (i.e. rail infrastructure, highways and public access roads) and high levels of disturbance (i.e. noise, light and weed infestations) are present. The high levels of disturbance and fragmentation will likely reduce the species preference for utilising habitat within this area as large suitable areas (i.e. Karawatha Forest Park and Gould Adams Park/Nealdon Park) occur outside of the Impact area.
- Glossy Black-Cockatoo are highly mobile moving up to 30 km to forage (Glossy Black Conservancy, 2022). It is considered that individuals, if they were to occur within the locality would be able to disperse into the broader landscape avoiding indirect impacts.
- The Impact area is located within an urban environment and has largely been co-located or adjacent to the existing railway corridor, habitats have already been subjected to disturbance, fragmentation, weed incursion and edge effects, increased activity, light, noise, weeds, pests, pathogens and dust. The proposed action will not exacerbate pre-existing indirect impacts beyond current levels. Indirect impacts will be temporary and localised as the proposed action will be constructed in phases, allowing individuals to avoid impacted areas. Indirect impacts will be actively managed during phases as per the OEMP.

4.1.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

4.1.11 Significant Impact Assessment

An assessment against the Significant Impact Guidelines for this is provided below in Table 11. The outcome of the SIA is the proposed action has the **potential to result in a significant impact** to the south-eastern glossy black-cockatoo.

Table 11 Significant impact assessment – South-eastern glossy black-cockatoo

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population of a species	**Unlikely.** Despite targeted and seasonal survey effort being undertaken for the south-eastern glossy black cockatoo, no individuals or indirect evidence for this species was observed within the Impact area. This suggests the species may be present at low abundance within the Impact area and/or that habitat within the Impact area is used on an occasional or intermittent basis only. However, potential breeding, foraging and dispersal habitat was assessed to occur within the Impact area, including Casuarina/Allocasuarina foraging patches. A maximum of 18.91 ha of breeding, 7.13 ha of breeding and foraging, 2.19 ha of foraging and 13.51 ha of dispersal habitat is proposed to be impacted for the proposed action. Indirect impacts include increased activity, light, noise, weeds, pests, pathogens and dust. However, these will be temporary and localised as the proposed action will be constructed in phases. Indirect impacts will be actively managed during phases as per the OEMP. Considering the species can travel up to 12 km to forage, the removal of a small portion of foraging habitat is unlikely to lead to a long-term decrease in the local population. While breeding habitat was observed within the Impact

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
	area, high competition for nest sites from sulphur crested cockatoo and arboreal mammals is likely given the urban nature of the Impact area. In addition, the following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to south-eastern glossy black-cockatoo: <u>Construction phase:</u> – Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as protocols relating to the protection of species and their habitat. For example, habitat tree inspection and management requirements; contact lists of nearby veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction – Fauna spotter-catches will provide targeted advice in relation to additional controls throughout known fauna breeding periods where clearing works cannot be scheduled to avoid these times. – Qualified and experienced fauna spotter catchers to undertake Pre-clearance surveys in suitable habitat prior to planned vegetation clearance. – The Pre-clearance Survey will be undertaken in advance of clearing activities (e.g. 1-2 weeks) to identify MNES occupation and breeding places to allow for any associated permits and programming to ensure that hollow-bearing trees / habitat features containing MNES fauna and/or breeding places are managed suitably. Where necessary, additional pre-clearing inspections will occur immediately in advance of clearing activities to re-check for presence. – Pre-clearance surveys will: – Survey and assess areas of potential habitat for conservation significant fauna – Identify mark and map potential and known foraging and breeding places for to direct fauna spotter-catchers to appropriate manage during clearing – Identify opportunities for salvage of relevant microhabitat (such as tree hollows) features prior to clearing – All hollow-bearing trees will be inspected by a suitably qualified fauna spotter catcher prior to clearing to identify any nesting individuals. – Encourage fauna to leave hollows of their own accord through tree tapping, use of spotlights and other measures – MNES species will be removed from active denning/nesting trees within the clearance footprint immediately prior to clearing and translocated to suitable habitat adjacent to the Impact area. – Where species need to be physically removed from hollows, trees will be dismantled (in sections if necessary) under the direction of trained and experienced fauna spotter catchers. – Trees will be felled immediately after removing wildlife to prevent animals from returning to hollows. – Fauna spotter catcher to undertake a ground inspection once the hollow bearing tree has been felled to identify presence of young or injured fauna. – Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
	Revegetation, Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. – Appropriate weed, pathogen and disease hygiene practices and management to be implemented for the species as per the OEMP. – Domestic dogs are to be prohibited on the construction site at all times. Given abovementioned mitigation measures and due to the highly mobile nature of the species, the proposed action is unlikely to significantly lead to a long-term decrease in the size of an important population of the south-eastern glossy black cockatoo.
Reduce the area of occupancy of an important population	**Unlikely.** The area of occupancy for this species has previously been estimated at 40,000 km^2 and the extent of occurrence at 470,000 km^2. The proposed action is proposed to impact 41.74 ha of potential breeding, foraging and dispersal habitat. Given no species were observed during targeted field surveys, the species is highly mobile, and no records occur within the last 10 years occur within 5 km of the Impact area, it is unlikely the proposed action will significantly reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	**Unlikely.** While the proposed action proposes to impact up to 41.74 ha of potential breeding, foraging and dispersal habitat, it is unlikely to fragment populations since the species is highly mobile and can fly up to 12 km to forage. Habitat is also located in a landscape that has already experienced fragmentation from residential and industrial development, linear infrastructure and agricultural grazing. Large intact patches of potential habitat will remain in surrounding vegetation following the proposed action. In addition, no species were observed during targeted field surveys, the species is highly mobile, and no records occur within the last 10 years occur within 5 km of the Impact area. As such, the proposed action is unlikely to significantly fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species.	**Potential.** No individuals or indirect evidence for this species was observed within the Impact area, which suggests the species may be present at low abundance within the Impact area and/or that habitat within the Impact area is used on an occasional or intermittent basis only. However, given the habitat values within the Impact area proposed action has the potential to adversely impact a maximum of 41.74 ha of habitat that may be considered habitat critical to the survival of the species.
Disrupt the breeding cycle of a population.	**Potential.** The breeding season for this species is between March and August and females give birth to a single clutch. While the proposed action will likely be staged, and mitigation measures will be applied to check hollows prior to clearing for breeding individuals or young, it is unlikely it can avoid all construction, operation and maintenance activities during this breeding period. Mitigation measures within the OEMP are proposed to manage potential impacts to the species, such as the use of fauna spotter catchers particularly during the breeding period, will ensure that displaced individuals possibly bearing young are captured and relocated to suitable habitat. Despite this, there is potential the proposed action will disrupt the breeding cycle of the species which may occur within the Impact area.

EPBC Act Criteria – is there a real possibility that the Proposed Action will:	Assessment of Significance
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** Although impacts as a result of the proposed action have the potential to reduce the area of available habitat, it is unlikely to significantly modify, destroy, remove, isolate the potential local population to the extent the species will decline, since: • The species is highly mobile and can move with available resources, and • Other areas of contiguous breeding, foraging and dispersal habitat occur outside the Impact area.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely.** Predation by European red fox and cats and potentially domestic dogs can be threats to the south-eastern glossy black cockatoo. Due to the urban nature of the Impact area, these species are likely to occur within and surrounding the Impact area. High levels of weed incursion already occur within the Impact area, however there is potential for the introduction spread of invasive weeds to occur as a result of the proposed action. The proposed action will manage potential direct and indirect impacts to the species as a result of weeds and pests within an OEMP. Based on these abovementioned mitigation measures, it is unlikely the proposed action will result in invasive species that are harmful to south-eastern glossy black cockatoo becoming established in its habitat.
Introduce disease that may cause the species to decline.	**Unlikely.** Psittacine Beak and Feather Disease (PBFD) is a disease that may directly impact the south-eastern glossy black cockatoo. In addition, phytophthora and myrtle rust are pathogens which may indirectly impact the species by affecting its vegetation and complexity of habitats. Provided disease and pathogen management measures are implemented for these abovementioned diseases within the OEMP, the proposed action is unlikely to significantly introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species.	**Unlikely.** No current national recovery plan exists for the south-eastern glossy black-cockatoo however the three main recovery strategies are outlined for the species: • Clearing of native vegetation/timber harvesting and habitat fragmentation • Inappropriate fire regimes • Competition for nest hollows. The proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species, based on the highly mobile nature of the species, availability of habitats outside the Impact area, likely high competition for nest sites from sulphur crested cockatoo and arboreal mammals is likely given the urban nature of the Impact area. In addition, the OEMP will include measures to control potential direct and indirect impacts and threats to the species. Based on this, the proposed action is unlikely to significantly interfere with the recovery of the species.

4.2 Grey-headed flying fox (*Pteropus poliocephalus*)

4.2.1 Description and status under the EPBC Act

The grey-headed flying-fox is listed as vulnerable under the EPBC Act.

The grey-headed flying-fox is one of the largest bats in the world with a weight of 600–1000 g and a head-body length of 230–289 mm (Tidemann, 1998; Eby, 2002). It is the only Australian flying-fox that has a collar of orange/brown fully encircling its neck. Thick leg fur extends to the ankle, in contrast to other *Pteropus* spp. in which it only reaches the knee. As its name implies, the head is covered by light grey fur. The belly fur is grey, often with flecks of white and ginger (Tidemann, 1998; Eby, 2002).

4.2.2 Distribution

The grey-headed flying-fox is Australia's only endemic flying-fox and occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria (Tidemann, 1998). However, only a small proportion of this range is used at any one time, as the species selectively forages where food is available. As a result, patterns of occurrence and relative abundance within its distribution vary widely between seasons and between years. At a local scale, the species is generally present intermittently and irregularly (Eby, 2002). At a regional scale, broad trends in the distribution of plants with similar flowering and fruiting times support regular annual cycles of migration.

4.2.3 Habitat requirements

The grey-headed flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, *Melaleuca* spp. swamps and *Banksia* spp. woodlands. It also feeds on commercial fruit crops and on introduced tree species in urban areas (Tidemann, 1997; Eby, 1998). Major food plants include the fruit and blossom of rainforest species, especially *Ficus* spp., and blossoms of myrtaceous species such as *Eucalyptus*, *Corymbia* and *Angophora*, melaleucas, banksias and the fruit and flowers of *Syzygium* spp. None of the vegetation communities used by the grey-headed flying-fox produce continuous foraging resources throughout the year. As a result, the species has adopted complex migration traits in response to ephemeral and patchy food resources (Eby, 1998).

The foraging behaviour of the grey-headed flying-fox alters when native food sources are scarce (Commonwealth of Australia, 2021). They have no biological adaptations to withstand food shortages (e.g. torpor) and migrate in response to changes in the quantity and location of food. The majority of eucalypts have regular seasonal flowering events, but do not flower every year and there are few areas within the species range where nectar is available continuously (Commonwealth of Australia, 2021).

Grey-headed flying-foxes forage over extensive areas and have been known to fly as far as 40 km to feed, before returning to their roost the same night. Based on telemetry data, reported the mean distance of a grey-headed flying-fox foraging site from the camp in which the animal had roosted and to which it returned was 10.9 km (quartile range from 6.2 - 27.9 km), with the maximum distance recorded during these observations being 148.3 km (Commonwealth of Australia, 2021).

Grey-headed flying-foxes roost in large aggregations, known as camps, in the exposed branches of trees. Camps provide resting habitat, sites of social interactions and refuge for animals during significant phases of their annual cycle, such as birth, lactation and conception (Commonwealth of Australia, 2021).

4.2.4 Threats

As per the *National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus* (national recovery plan) (Commonwealth of Australia, 2021), key threats to the species include:

- Habitat loss
- Camp disturbance
- Mortality in commercial fruit crops
- Heat stress
- Entanglement in netting and barbed wire fencing

- Climate change
- Bushfires
- Electrocution on power lines.

4.2.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.7, Appendix B Figure 9 and Appendix B Figure 18 of the Supplementary MNES Report for habitat and historic records.

4.2.6 Important Population

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

4.2.7 Habitat critical for the survival of a species

Habitat critical to the survival of the grey-headed flying-fox are considered to be winter and spring foraging resources, as reliable resources during late gestation, birth and early lactation are required to avoid rapid weight loss in adults and poor reproductive success (Commonwealth of Australia, 2021).

As per the national recovery plan, important winter and spring vegetation communities are those that contain the following flora species:

Present within the Impact area
- Blue gum (*Eucalyptus tereticornis)*
- Lemon scented gum *(Corymbia citriodora)*
- Narrow-leaved ironbark (*Eucalyptus crebra)*
- Grey ironbark (*Eucalyptus siderophloia)*
- Narrow-leaved red gum (*Eucalyptus seeana)*
- Broad-leaved paperbark *(Melaleuca quinquenervia)*
- Blackbutt *(Eucalyptus pilularis)*
- Broad-leaved ironbark *(Eucalyptus fibrosa)*
- Silky oak *(Grevillea robusta)*

Not present within the Impact area
- White box *(Eucalyptus albens)*
- Yellow box *(Eucalyptus melliodora)*
- Grey ironbark *(Eucalyptus paniculata)*
- Swamp mahogany *(Eucalyptus robusta)*
- Red ironbark (*Eucalyptus sideroxylon)*
- Coast banksia *(Banksia integrifolia)*
- Black bean *(Castanospermum australe)*
- Yellow bloodwood *(Coymbia eximia)*
- Spotted gum *(Corymbia maculata)*
- Turpentine *(Syncarpia glomulifera)*

Based on the aforementioned species, numerous important winter and spring foraging species were observed within the Impact area, with blue gum (*Eucalyptus tereticornis*) being the dominant species present, flowering in winter from June to November. These trees often occur sporadically across the Impact area, and occur within a highly urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas. A high presence of threats also occurs, such as powerlines, traffic and netted/fenced fruit trees. Despite this, given the availability of winter foraging resources and roosting sites (likely temporary and which do not meet the criteria of a 'nationally important camp' as per the species' national recovery plan) observed within and adjacent to

the Impact area, all areas of breeding, foraging and dispersal habitat (43.14 ha direct impacts and 2.20 indirect impacts) mapped within the Impact area have conservatively been assessed as habitat critical to the survival of the species. However, it is noted that some foraging flora species observed within the Impact area are exotic (e.g. cocos palm *Syagrus romanzoffiana)* and unlikely to be habitat critical to the survival of the species.

4.2.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. Generally, migration and movement pathways of the grey-headed flying fox depend on the availability of suitable habitat, competition in the area with other native species for food and habitat, levels of pollution in the area and presence of fences and powerlines.

4.2.9 Buffer zone

The grey-headed flying-fox has been considered ecologically relevant for the provision of buffer zones given two grey-headed flying-fox camps (including juveniles) were observed within the Impact area located at Voyager Drive, Kuraby and Jacaranda Avenue, Logan Central. One grey-headed flying-fox camp was observed approximately 158 m outside of the Impact area at Ridgewood Reserve, Edens Landing. Given this, construction activities may disturb/impact the breeding cycle of the species (Ecosure, 2021).

A 300 m buffer zone to assess potential indirect impacts to breeding/roosting habitat is based on a review of scientific literature and statutory documentation including *Chapter 10, Section 8 of the TMR Fauna Sensitive Transport Infrastructure Delivery manual* (Department of Transport and Main Roads, 2024)and *Draft National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus* (Eby, 2009).

For grey-headed flying-fox camps within the Impact area (Voyager Drive, Kuraby and Jacaranda Avenue, Logan Central), a 300 m buffer zone around mapped breeding/roosting habitat was applied to assess potential indirect impacts to breeding/roosting habitat. Within this 300 m buffer zone, 1.78 ha of breeding/roosting habitat occurs at Voyager Drive, Kuraby and 0.42 ha occurs at Jacaranda Avenue, Logan Central (Appendix B Figure 19, page 3 and page 8 of the Supplementary MNES Report). Indirect impacts have the potential to occur to camps at Voyager Drive, Kuraby and Jacaranda Avenue, Logan Central (Table 12).

The camp at Ridgewood Reserve, Edens Landing is not located within the Impact area (i.e. no direct impacts are proposed), however a 300 m buffer zone around the central camp location was applied to conservatively map breeding/roosting habitat, and to assess if the buffer zone intersects the Impact area. Approximately 7.57 ha of breeding/roosting habitat at Ridgewood Reserve, Edens Landing occurs within the buffer zone outside the Impact area, and the buffer zone comprising sporadic foraging/dispersal habitat intersects the Impact area (Appendix B Figure 19 page 13 of the Supplementary MNES Report). Proposed works at the Ridgewood Reserve, Edens Landing are unlikely to cause indirect impacts, since works are approximately 200 m from the camp, works will be temporary, will avoid high impact activities, and will generally be undertaken at night when grey-headed flying-fox are likely to be absent (when foraging).

Indirect impacts have the potential to occur to camps at Voyager Drive, Kuraby and Jacaranda Avenue, Logan Central (Table 12), but are unlikely to occur to the camp at Ridgewood Reserve, Edens Landing. Despite this, monitoring and management measures outlined in Section 10 and Appendix C of the OEMP will be undertaken within breeding/roosting habitat at all three camps at Voyager Drive, Kuraby, Jacaranda Avenue, Logan Central and Ridgewood Reserve, Edens Landing for noise, light, vibration, weeds, pests, pathogens and dust. Indirect impacts to breeding/roosting habitat have been acquitted via offsets at Voyager Drive, Kuraby, Jacaranda Avenue, Logan Central.

Table 12 Summary of indirect impacts to grey-headed flying-fox camps

Relevant MNES value	Indirect impact area (ha)
Grey-headed flying-fox	1.78 ha at Voyager Drive, Kuraby
	0.42 ha at Jacaranda Avenue, Logan Central
Total	**2.20 ha total**

4.2.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

4.2.11 Significant Impact Assessment

An assessment against the Significant Impact Guidelines for this is provided below in Table 13. The outcome of the SIA is the proposed action has the **potential to result in a significant impact** to the grey-headed flying fox.

Table 13 Significant impact assessment – Grey-headed flying-fox

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Lead to a long-term decrease in the size of an important population of a species?	**Unlikely.** Grey-headed flying-fox were observed during targeted field surveys within three (3) different locations at Ridgewood Reserve, Voyager Drive and Jacaranda Avenue. All three camps are likely to be temporary due to the low numbers (that is, generally < 100) and intermittent occurrence during the targeted field surveys. These camps are not listed on the National Flying-fox Monitoring Viewer and are unlikely to meet the criteria of a 'nationally important camp'[7] as defined in the national recovery plan. A maximum of 0.54 ha of breeding and 42.60 ha of foraging and dispersal habitat is proposed to be directly impacted for the proposed action. In addition, up to 2.20 ha of breeding/roosting habitat may be indirectly impacted at Voyager Drive, Kuraby and Jacaranda Avenue, Kingston, This habitat is not considered highly unique and surrounding habitat with similar characteristics, quality and condition occurs widely within the surrounding area. Grey-headed flying-foxes are not restricted in their dispersal ability and regularly move between foraging areas. The species will continue to persist within its current distribution, regardless of the potential impacts as a result of proposed action. Indirect impacts include increased activity, light, noise, weeds, pests, pathogens and dust. However, these stressors already exist within the Impact area and are not expected to be significantly exacerbated as result of the proposed activity. Additionally, indirect impacts from construction activities will be temporary and localised as the proposed action will be constructed in phases and will be actively managed during phases as per the OEMP. In addition, the following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to grey-headed flying-fox. **Detailed Design phase:** • Exhaust all opportunities for design refinement to avoid, or otherwise minimise impacts where camps occur • Eliminate the use of barbed wire fencing in areas of known breeding/roosting habitat (Appendix B, Figure 19 of the Supplementary MNES Report) in accordance with the Fauna Sensitive Transport Infrastructure Delivery manual (Department of Transport and Main Roads, 2024). • Design to apply the considerations within the National Recovery Plan for Grey-headed Flying-fox (DAWE, 2021) (specifically Recovery Objective 9) to account for Flying-fox friendly design principles including removal of barbed/razor wire. • For the Grey-headed flying-fox as per conservation advice, barbed wire occurrences in Key Biodiversity Areas based on the Asset Owner's Security Risk requirements, will apply the following hierarchy: - Remove hazard through avoidance of using barbed-wire wherever possible; - Replacement of the top strand barbed-wire with plane wire; - Enhance visibility through plastic strand-wrapping or addition of electrical fence tape of similar; - Affixing reflective / bat tags at suitable spacings.

[7] Those that have contained ≥ 10,000 Grey-headed Flying-foxes in more than one year in the last 10 years or have been occupied by more than 2,500 Grey-headed Flying-foxes permanently or seasonally every year for the last 10 years criteria of a 'nationally important camp' as defined in the national recovery plan (Commonwealth of Australia, 2021).

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
	• As a minimum requirement, fencing in all Key Biodiversity Areas will be fauna exclusion fencing and incorporate reflective discs / bat tags (generally in accordance Bat Conservation & Rescue QLD Inc guidance document Mitigating Barbed Wire Risk For Wildlife). • Roost Activity Observations (i.e. monitoring) to be undertaken in advance of activity commencing to visually verify grey-headed flying-fox presence and estimated roost abundance at the previously identified roost locations, being: • Voyager Drive, Kuraby • Jacaranda Avenue, Kingston; and, • Ridgewood Reserve, Edens Landing. **<u>Construction phase:</u>** • Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as and protocols relating to the protection of species and their habitat. For example, habitat tree inspection and management requirements; contact lists of nearby veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction. • EMP (C) to outline roost information and relevant management procedures as stated in the OEMP (this document). • Areas where grey-headed flying-fox roosts occur within the Impact area or within a 300 m buffer zone, light management controls and compliance monitoring will be undertaken, for the period between dusk and dawn, in accordance with the “Bat light mitigation toolbox” section outlined in the *DCCEEW National Light Pollution Guidelines for Wildlife, Appendix I – Bats* (Department of Climate Change Energy the Environment and Water, 2023) - Noise and vibration indirect impacts are considered low given the existing urban environment – specifically alongside a functioning rail corridor - and it is likely camps have developed a tolerance to the existing noise, light and human activity disturbances. Nonetheless, noise and vibration controls will be implemented across the entire Impact area in accordance with the following guidelines: - Queensland *Environmental Protection (Noise) Policy 2019*, Schedule 1 - Acoustic quality objectives; - TMR’s *Volume 2 - Transport Noise Management Code of Practice,* and, - TMR’s *MRTS51 Environmental Management Technical Specification* section 8.5 - TMR’s *Interim Guideline Operational Railway Noise and Vibration, Section 2, Section 3 and Section 4.* - Dust controls will be implemented within entire Impact area and during construction phase through various control measures including dust suppression (e.g. soil binders, watercarts), speed restrictions, appropriate erosion and sediment measures, and progressive stabilisation / revegetation of temporary disturbance areas. • Prior to vegetation clearing within the Impact area, disturbance boundary to be clearly delineated and demarcated with high-visibility flagging tape • Vegetation clearing across entire Impact area to be supervised by a suitably qualified fauna spotter catcher with knowledge and experience

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
	relevant to management of flying-foxes and their habitat, who can identify dependent young and is aware of climatic extremes (i.e. heat stress or cyclone event) and food stress events. • For any clearing activities, a fauna spotter catcher will undertake a pre-clearing fauna inspection which will check for presence of new camps as well as verify the presence / abundance at known/previously identified camps • Prior to works commencing within 300 m buffer zone from camps, the fauna spotter catcher will assess the presence of any grey-headed flying-foxes, including checking for breeding activity (pregnant females, creche young and/or dependent young). Based on this assessment, the fauna spotter catcher will advise whether vegetation clearing can commence. • If a new flying-fox camp is found within 300 m of the proposed Impact area (other than at Voyager Drive, Kuraby, Jacaranda Avenue, Kingston and Ridgewood Reserve, Edens Landing), the suitably qualified fauna spotter catcher will review the proposed construction activities, including timing and appropriate management measures in accordance with the *Referral guideline for management actions in grey-headed and spectacled flying fox camps* (Department of the Environment, 2015) • Other than under exceptional circumstances[8], vegetation clearing activities within 300m buffer zone surrounding known grey-headed flying-fox camps (i.e. Voyager Drive, Kuraby, Jacaranda Avenue, Kingston and Ridgewood Reserve, Edens Landing): - To occur in low-risk times (i.e. outside of August – November breeding / creche periods). Works required under exceptional circumstances will be guided by a fauna spotter catcher. - Should be prioritised at night, as this is when individuals are less likely to be present - Will not occur during or immediately after climatic extremes (heat stress[9] or cyclone events[10]), or during or immediately after a period of significant food stress[11]. - Will be sequentially staged to commence at maximum distance away from the camp and then proceed towards camp to enable the individuals to become accustomed to the activities and to allow them to self-disperse / retract into adjoining vegetation. - The flying fox heat stress forecaster (Animal Ecology Lab, 2024) and Bureau of Meteorology weather forecast will be reviewed within 24 hours when vegetation clearing proposed within 300m of a camp. Where forecasts indicate daily ambient temperatures $\geq$ 38° C and clearing proposed within 300 m buffer zone from camp, fauna spotter catcher to complete hourly temperature check and assess if camps contain notable signs of stress (such as excessive fanning or flyouts). Vegetation clearing works to immediately cease if temperatures exceed 38° C within 300 m of camp, or notable signs of stress are observed within camps.

[8] Exceptional circumstances may include, but are not limited to, preparation for severe/inclement weather; maintaining public safety; and responding to emergencies or incidents.

[9] A 'heat stress event' is defined as a day on which the maximum temperature does (or is predicted to) meet or exceed 38°C (Department of the Environment, 2015).

[10] A cyclone event is defined as a cyclone that is identified by the Australian Bureau of Meteorology (www.bom.gov.au/cyclone/index.shtml) (Department of the Environment, 2015).

[11] Food stress events may be apparent if large numbers of low body weight animals are being reported by wildlife carers in the region (Department of the Environment, 2015).

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
	• Other than under exceptional circumstances, high impact activities[12] within 100 m of camps: - To occur in low-risk times (i.e. outside of August – November breeding / creche periods), Works required under exceptional circumstances will be guided by a fauna spotter catcher. - Should be to be prioritised at night, as this is when individuals are less likely to be present - Will not occur during or immediately after climatic extremes (heat stress or cyclone events), or during or immediately after a period of significant food stress. - Will be staged to commence at maximum distance away from the camp, and then proceed towards camp to enable the individuals to become accustomed to the activities and to allow them to self-disperse / retract into adjoining vegetation. - The flying fox heat stress forecaster and Bureau of Meteorology weather forecast will be reviewed within 24 hours when high impact activities proposed within 100m of a camp. Where forecasts indicate daily ambient temperatures $\geq$ 38^{o} C AND high impact activities proposed within 100 m buffer zone from camp, fauna spotter catcher to complete hourly temperature check and assess if camps contain notable signs of stress (such as excessive fanning or flyouts). High impact works to immediately cease if temperatures exceed 38^{o} C within 100 m of camp, or notable signs of stress are observed within camps • Vegetation outside the Impact area and adjacent to camps will be retained to maintain vegetation integrity, allowing individuals to naturally move/retract to cooler areas reducing heat-related stress/mortality and support the persistence of the camp • Only a qualified and suitable fauna spotter catcher or wildlife carer with up-to-date Lyssavirus vaccines are to handle bats. Personnel must not attempt to touch or handle a flying fox. If interaction with a flying-fox is required, a FSC must be contacted. This information will also be conveyed to all construction personnel during site inductions. Fauna handling will be in accordance with: - 'Code of Practice: Care of Sick, Injured or Orphaned Protected - Animals in Queensland, Nature Conservation Act 1992', - relevant approvals, licences, permits • Any injured fauna are to be taken to: 139 Wacol Station Road, WACOL QLD 4076, 1300 ANIMAL (1300-264-625) • Installation of electrostatic wildlife guards on Overhead Line Equipment (OHLE) to minimise electrocution • Domestic dogs are to be prohibited on the construction site at all times. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation, Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner Based on this information, the proposed action is unlikely to lead to a long-term decrease in the size of an important population of grey-headed flying fox.

[12] Impact pile driving, impact guard rail installation or removal, saw cutting, rock / concrete breaking (hammering), rock removal or placement

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Reduce the area of occupancy of an important population?	**Unlikely.** The grey-headed flying fox occurs in a broad distribution from the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. The proposed action proposes to directly impact a maximum of 43.14 ha, and indirectly impact a maximum of 2.20 ha of habitat. The species is also widespread throughout its range from Victoria to Queensland. Habitat proposed to be impacted is not considered highly unique and surrounding habitat with similar characteristics, quality and condition occurs widely within the surrounding area. Therefore, the proposed action is unlikely to reduce the area of occupancy of an important population of the grey-headed flying-fox.
Fragment an existing important population into two or more populations?	**Unlikely.** Grey-headed flying-fox were observed during targeted field surveys within three different locations at Ridgewood Reserve, Voyager Drive and Jacaranda Avenue. These camps are unlikely to be a nationally important camp and are likely to be temporary due to the relatively low numbers and fluctuation of occurrence observed during targeted field surveys. Furthermore, both camps were also co-dominated by black flying foxes (*Pteropus alecto)*. Habitat proposed to be impacted is not considered highly unique and surrounding habitat with similar characteristics, quality and condition occurs widely within the surrounding area. In addition, the species is highly mobile and able to utilise a broad range of habitats within the region. As such, it is unlikely the proposed action will fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species?	**Potential.** Habitat critical to the survival of the grey-headed flying-fox is considered to be winter spring foraging resources. Important winter and spring species including blue gum (*Eucalyptus tereticornis*) were observed within undisturbed vegetation within the Impact area. To be conservative, all habitat mapped within the Impact area has been considered to be habitat critical to the survival of the species. The proposed action has the potential to adversely impact a maximum of 43.14 ha of habitat that may be considered habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population?	**Unlikely.** The mating season for the species occurs in early autumn and is followed by larger camps being broken up and reforming in late spring/early summer, when food sources become more abundant. While camps were observed adjacent to the Impact area, they are unlikely to be a ‘nationally important camp’ as defined in the national recovery plan. Direct impacts are proposed to occur directly to a maximum of 43.14 ha of habitat, and indirectly to a maximum of 2.20 ha. Mitigation measures within the OEMP are proposed to manage potential direct and indirect impacts to the species, such as the use of fauna spotter catchers, to ensure that breeding individuals or individuals bearing young are captured and relocated to suitable habitat. Since no nationally important camps occur within or adjacent to the Impact area and based on the information above, the proposed action is unlikely to disrupt the breeding cycle of an important population.

EPBC Act criteria – is there a real possibility that the proposed action will:	Assessment of significance
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely.** The proposed action will result in direct impacts to a maximum of 43.14 ha and indirect impacts to a maximum of 2.20 ha of habitat. Despite impacted habitat containing winter flowering feed species that may be considered habitat critical to the survival of the species, similar suitable foraging habitat is widespread and relatively abundant within surrounding areas that also do not possess potential threats in form of powerlines, traffic and netted/fenced fruit trees. The species is also highly mobile and able to utilise habitats based on seasonal resources. Mitigation measures within the OEMP are proposed to manage potential impacts to the species. As such, the proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**Unlikely.** The species is generally not considered to be at risk from invasive species and may utilise some weeds e.g. camphor laurel (*Cinnamomum camphora)*, *Celtis spp., Ligustrum spp., Cocos palm and Psidium spp.* as foraging resources. High levels of weed incursion already occur within the Impact area, and there is potential for the introduction spread of invasive weeds to occur which may increase foraging resources. The proposed action will manage weeds and pests within an OEMP. As such, the proposed action is unlikely to result in invasive species that are harmful to grey-headed flying fox becoming established in its habitat.
Introduce disease that may cause the species to decline?	**Unlikely.** While disease is not identified as a threat to grey-headed flying fox, Phytophthora and Myrtle Rust are pathogens which may indirectly impact the species by affecting its vegetation and complexity of habitats. Disease has not been identified as a threat to the grey-headed flying-fox. The proposed action will manage potential direct and indirect impacts to grey-headed flying fox as a result of disease and pathogens within an OEMP. As such, it is unlikely the proposed action will significantly introduce disease that may cause the species to decline.
Interfere with the recovery of the species?	**Unlikely.** The overall recovery objectives outlined in the grey-headed flying fox's national recovery plan are: • To improve the Grey-headed flying-foxes national population trend by reducing the impact of the threats outlined in this plan on Grey-headed Flying-foxes through habitat identification, protection, restoration and monitoring, and • To assist communities and Grey-headed Flying-foxes to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers. The proposed action will result in localised loss of foraging habitat from a region in which similar foraging habitat is widespread and abundant. The proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species. In addition, the OEMP will include measures to control potential direct and indirect impacts and threats to the species. As such, the proposed action is unlikely to interfere with the recovery of the species.

4.3 Yellow-bellied glider (south-eastern) (*Petaurus australis australis*)

4.3.1 Description and status under the EPBC Act

The yellow-bellied glider (south-eastern) is listed as vulnerable under the EPBC Act.

The yellow-bellied glider is a medium-sized arboreal marsupial, the largest Australian petaurid and the second largest Australian glider with a head and body length of 240–310 mm, with a 380–470 mm long tail (Department of Agriculture Water and the Environment, 2022a). The body is a greyish-brown colour with a black stripe running down the back and extending to the tail. The tail is mostly black with grey edging at the base. Males weigh 470–725 g and females weigh 435–660 g, though the head and body length of males is only marginally longer than that of females, and females have longer tails. The belly is white to yellow, typically paler in young individuals and becoming more yellow with age. There are black markings along the edge of the gliding membrane and on the feet, with a black stripe running down each thigh (Department of Agriculture Water and the Environment, 2022a).

4.3.2 Distribution

The distribution of the yellow-bellied glider (south-eastern) overlaps with the Gondwana Rainforests of Australia World Heritage Area (Department of Agriculture Water and the Environment, 2022a). The yellow-bellied glider (south-eastern) is found at altitudes ranging from sea level to 1400 m above sea level and has a widespread but patchy distribution from south-eastern Queensland (Qld) to far south-eastern SA, near the SA-Vic border. As in NSW, most of the Qld distribution is coastal, extending southward along the eastern seaboard from north of Mackay and continuing through the NSW-Qld border. However, isolated subpopulations are found inland in the Blackdown and Carnarvon Ranges of central Qld (Department of Agriculture Water and the Environment, 2022a).

4.3.3 Habitat requirements

The yellow-bellied glider (south-eastern) occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests (Department of Agriculture Water and the Environment, 2022a). Abundance is highly dependent on habitat suitability, which is in turn determined by forest age and floristics. The species shows a preference for large patches of mature old growth forest that provide suitable trees for foraging and shelter, also a clear preference for forests with a high proportion of winter-flowering and smooth-barked eucalypts, which are important due to the range of foraging substrates (and therefore food resources) they provide, as loose bark hanging in strips from these trees provides shelter for insect prey. Yellow-bellied gliders (south-eastern) also require some level of floristic diversity to provide a year-round food supply, and they are unlikely to persist in forests dominated by only one or two tree species. Many tree species are found in the subspecies' habitat, with some used for sap feeding (Department of Agriculture Water and the Environment, 2022a).

4.3.4 Threats

As per the *Conservation Advice for Petaurus australis australis (yellow bellied glider (south-eastern))* (conservation advice) (Department of Agriculture Water and the Environment, 2022a), the main identified threats the species are:

- Habitat clearing and fragmentation
- Extensive clearing and bushfires
- Prescribed burns
- Timber harvesting
- Increased temperatures and changes to precipitation patterns
- Predation by European red foxes (Vulpes vulpes) or feral cats (Felis catus)
- Habitat degradation from feral deer
- Barbed wire fencing (entanglement)

4.3.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.8, Appendix B Figure 9 and Appendix B Figure 19 of the Supplementary MNES Report for habitat and historic records.

4.3.6 Important population

Populations important to the survival of the yellow-bellied glider (south-eastern) include stronghold populations, ecologically or genetically distinct populations (e.g., those at the limits of the subspecies' range, outlying populations), research populations, and other populations where recovery actions are being implemented (Department of Agriculture Water and the Environment, 2022a).

Known important populations include (Department of Agriculture Water and the Environment, 2022a):

- Carnarvon Range (Inland population; Qld);
- Blackdown Tableland (Inland population; Qld);
- Bago Plateau (Endangered under NSW legislation; NSW);
- Richmond Range National Park (research population; NSW);
- Blacktown range (population near urban area; NSW);
- Shoalhaven populations (severely fire-affected, surveyed; NSW);
- Populations between Coffs Harbour, Dorrigo, Glen Innes and Grafton (affected by fire and timber harvesting, research populations; NSW);
- Populations between Nimmitabel and Cathcart (affected by fire and timber harvesting, research populations; NSW);
- Populations near Waratah Creek (affected by fire and timber harvesting, research populations; NSW);
- South Australian population (only SA population, potentially an ESU, six individuals, may be extinct; SA); and
- Western Vic populations (outlying populations, potentially an ESU; Vic).

The Impact area is not recorded to contain an important population for the species.

4.3.7 Habitat critical for the survival of a species

Habitat critical to the survival of the yellow-bellied glider (south-eastern) may be broadly defined as areas containing the following attributes (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis) (Department of Agriculture Water and the Environment, 2022a):

- Large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees.
- Areas identified as refuges under future climate change scenarios.
- Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.
- Habitat corridors required to facilitate dispersal of the subspecies between fragmented habitat patches and/or that enable recolonization or movement away from threats. yellow-bellied gliders (south-eastern) have a glide ratio (horizontal distance/height dropped) of around 2.0, and corridors spanning gaps larger than the distance gliders are likely to be able to travel should be considered critical to the survival. There is not enough evidence to define the canopy and width characteristics of appropriate corridors. In the absence of such information, a precautionary approach should be taken to maximise dispersal by considering all habitat corridors in the species' range to be habitat critical to the survival; and
- Areas in which some trees have evidence of use for sap extraction by yellow-bellied glider (south-eastern).

Habitat meeting any one of the criteria above is considered habitat critical to the survival of the yellow-bellied glider (south-eastern), irrespective of the abundance or density of the species or the perceived quality of the site. Forest areas currently unoccupied by the species may still represent habitat critical to the survival, if the recruitment of hollow-bearing trees in the future could allow the species to colonise these areas and ensure persistence of a population.

As per the species modelled habitat distribution map outlined in the Conservation Advice (Department of Agriculture Water and the Environment, 2022a), the proposed action is located where the species is 'known' or 'likely' to occur. However, no records within the last 10 years occur within 5 km of the Impact area. Moreso, no characteristic 'V' shaped feed marks indicative of tree sap extraction by yellow-bellied glider (south-eastern) or individuals were observed during targeted field surveys. However, field surveys confirmed the presence of smooth barked eucalypts. Known feed trees including blue gum (*Eucalyptus tereticornis*), lemon-scented gum (*Corymbia citriodora*) and *Angophora* spp are present within the Impact area. In addition, large eucalypt trees with DBH >30cm may provide suitable breeding habitat.

However, the Impact area is located in a heavily urbanised and fragmented landscape, characterised by operational roads and railways as well as residential and industrial areas. The majority of the habitat within the Impact area is sporadic and highly disjunct from surrounding vegetation, which potentially limits the species' ability for dispersal and colonisation, with the exception of large contiguous patches of remnant vegetation associated with Kuraby State School, Karawatha Forest Park, Acacia Forest, Nealdon Park and Gould Adams Park. These areas facilitate dispersal of the subspecies between fragmented habitat patches and movement away from threats. In addition, the riparian habitat associated with Nealdon/Gould Adams Park may provide refuge in times of severe weather events (i.e. fire and/or drought). A high level of threats occurs within potential habitat, such as barbed wire fencing, increased competition for nest hollows as well as increased predation through introduced species like domestic cats and the red fox.

All breeding habitat (21.40 ha) and foraging habitat (7.52 ha) mapped within the Impact area is considered to meet the definition of habitat critical to the survival of the species. Dispersal habitat (5.97 ha) for the species has been mapped as "all remaining undisturbed (remnant) vegetation comprising eucalypt woodland or forest that occurs" (refer to Appendix D for further detail). It is noted that a portion of this dispersal habitat may not meet the definition of habitat critical to the survival of the species for example due to the absence of suitable winter flowering eucalypts within localised patches. However, to be conservative all areas of mapped habitat (totalling 38.49 ha) within the Impact area including 7.26 ha of breeding habitat within a 50m buffer zone has been assessed as habitat critical to the survival of the species within the SIA.

4.3.8 Migration and movement pathways, barriers and obstructions

Refer to Section 3.9 and Section 5.4 of the Supplementary MNES Report for a summary of mapped biodiversity corridors and ground truthed fauna movement corridors, and results of the landscape connectivity modelling. In addition, refer to Appendix G, Figure 3 for the glider landscape connectivity model output. Generally, migration and movement pathways, barriers and obstructions for the yellow-bellied glider include bushfires, barbed wire fencing, predation, land clearing and fragmentation of habitat.

4.3.9 Buffer zone

Based on a review of scientific literature and statutory documentation assessed, a 50 m buffer zone to assess potential for indirect impacts was determined. While the yellow-bellied glider is not considered to be sensitive to disturbance and fragmentation (in comparison to the greater glider), to be conservative 7.26 ha comprising a 50 m vegetated buffer has been applied for breeding habitat within large patches of contiguous vegetation located within key fauna biodiversity areas (i.e. Acacia Forest Park and Gould Adams Park/Nealdon Park). Monitoring and adaptive management for potential indirect impacts will be undertaken within the buffer zone, outlined within the OEMP.

4.3.10 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

4.3.11 Significant Impact Assessment

Initially, it was assessed the proposed action has potential to result in a significant impact yellow-bellied glider (south-eastern), as per AECOM's EPBC Act referral (8 December 2022).

Since the referral for the proposed action, significant reductions to the Impact area have occurred, as well as targeted surveys and species-specific habitat mapping. As such, direct impacts to yellow-bellied glider (south-eastern), habitat have substantially reduced from 49.42 ha to 34.89 ha. As such, an updated SIA for this species as per Table 14 was undertaken to reflect these changes. The outcome of the updated SIA is the proposed action is **unlikely to result in a significant impact to the yellow-bellied glider (south-eastern), and is unlikely to be important, notable or of consequence,** since:

- Highly conservative habitat mapping has been undertaken across the Impact area
- The proposed action will be restricted along the existing railway corridor and edges of habitat, rather than dissecting or fragmenting core patches. Within the broader context, habitat critical to the survival of the species will persist, particularly in Key Biodiversity Areas of Wally Tate Park, Karawatha Forest Park, Nealdon Park/Gould Adams Park and Hugh Muntz Gardens. The species is likely preferentially using these larger contiguous habitat patches.
- There is a low likelihood the species occupies the Impact area, either now or in the future. This is because the species shows a preference for large patches of mature old growth forest, and hollow-bearing trees are a critical breeding habitat feature. The Impact area predominantly comprises disturbed and fragmented vegetation and a low density of hollow-bearing trees for breeding/denning.
- While habitat critical to the survival of the species is mapped, the proposed action is unlikely to significantly impact this habitat or cause impacts that are important, notable or of consequence, since:
    - Habitat primarily occurs within small, fragmented patches,
    - Habitat is unlikely to be a significant stepping stone for connectivity into the broader landscape
    - Where contiguous habitat for the species occurs at Wally Tate Park, Karawatha Forest Park, and Nealdon Park/Gould Adams Park, core high quality habitat will be retained and habitat edges are proposed to be impacted, which are generally already impacted by high levels of disturbance, urbanisation and edge effects.
- There is a low likelihood the species occupies the Impact area, either now or in the future. This is because no records within the last 10 years occur within 5 km of the Impact area, and the Impact area is generally dominated by a lack of functional habitat including lack of overlapping canopy cover or habitat corridors required to facilitate dispersal of the subspecies between fragmented habitat patches and/or that enable recolonization or movement away from threats. and sparse distribution of hollow-bearing trees offering breeding/denning.
- While some connectivity occurs between potential habitat within and outside the Impact area, habitat within the Impact area is a physical and genetic 'dead end' for the species, and is also surrounded by residential/industrial areas, powerlines, barbed wire fencing, and operational roads and railways. Due to this, the yellow-bellied glider (south-eastern) is more likely to remain in core contiguous patches outside the Impact area, rather than disturbed and fragmented patches within the Impact area.
- A high level of threats already occurs within and surrounding the Impact area from habitat clearing and fragmentation, predation by European red foxes and/or feral cats and barbed wire fencing (Department of Agriculture Water and the Environment, 2022)
- Key habitat features are considered to include sap trees, hollow-bearing trees for the species (Department of Agriculture Water and the Environment, 2022). While sap tree species for yellow-bellied glider (south-eastern) occurs within the Impact area, none were observed to be actively used for sap feeding during targeted and seasonal field surveys. The quality of and extent of habitat and availability of live, hollow bearing trees is also generally low, with a low density of suitable trees primarily occurring within small, fragmented patches adjacent the existing railway corridor generally associated with Acacia Forest Park and Nealdon/Gould Adams Park.

- No direct or indirect yellow-bellied glider (south-eastern) evidence was observed during targeted and seasonal field surveys, despite significant survey effort that met species survey requirements comprising 494 person hours of habitat assessments, spotlighting, and call playback, 3 nights of infrared thermal drone surveys, 14 days of Audiomoth acoustic recorders and 42 trap nights of motion sensing cameras (refer to Supplementary MNES Report, Section 2.5.2.3, Table 9).

Table 14 Significant impact assessment – Yellow-bellied glider

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population	**Unlikely.** The Impact area is not identified as an important population as per the species' conservation advice. Potential breeding, foraging and dispersal habitat was assessed to occur within the Impact area. A maximum of 21.40 ha of breeding (including functionally lost areas), 7.52 ha of foraging (including functionally lost areas), and 5.97 ha of dispersal habitat are proposed to be impacted by the proposed action, which may be considered 'habitat critical to the survival of the species'. Indirect impacts to the species may include increased noise, light and vibration, introduction, spread of weeds and pests and increased dust which reduces the quality of vegetation. The following species-specific mitigation measures are proposed to avoid, minimise and mitigate potential direct and indirect impacts to yellow-bellied glider (south-eastern): <u>Construction phase:</u> • Site inductions and pre-start meetings to convey specific information to construction personnel and raise awareness/identification of species on site, as well as protocols relating to the protection of species and their habitat. For example, habitat tree inspection and management requirements; contact lists of nearby veterinary centres/wildlife hospitals and procedures for sick or injured fauna requiring rescue to be provided at induction • Fauna spotter-catches will provide targeted advice in relation to additional controls throughout known fauna breeding periods where clearing works cannot be scheduled to avoid these times. • Qualified and experienced fauna spotter catchers to undertake Pre-clearance surveys in suitable habitat prior to planned vegetation clearance. • The pre-clearance survey will be undertaken in advance of clearing activities (e.g. 1-2 weeks) to identify MNES occupation and breeding places to allow for any associated permits and programming to ensure that hollow-bearing trees / habitat features containing MNES fauna and/or breeding places are managed suitably. Where necessary, additional pre-clearing inspections will occur immediately in advance of clearing activities to re-check for presence. • Pre-clearance surveys will: – Survey and assess areas of potential habitat for conservation significant fauna – Identify mark and map potential and known foraging and breeding places for to direct fauna spotter-catchers to appropriate manage during clearing – Identify opportunities for salvage of relevant microhabitat (such as tree hollows) features prior to clearing

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	– All hollow-bearing trees will be inspected by a suitably qualified fauna spotter catcher prior to clearing to identify any denning individuals. – Encourage fauna to leave hollows of their own accord through tree tapping, use of spotlights and other measures – MNES species will be removed from active denning/nesting trees within the clearance footprint immediately prior to clearing and translocated to suitable habitat adjacent to the Impact area. Gliders are to be released 2 hours after sunset into trees that contain suitable hollows. – Where species need to be physically removed from hollows, trees will be dismantled (in sections if necessary) under the direction of trained and experienced fauna spotter catchers. – Trees will be felled immediately after removing wildlife to prevent animals from returning to hollows. – Fauna spotter catcher to undertake a ground inspection once the hollow bearing tree has been felled to identify presence of young or injured fauna. • Rehabilitation of disturbed habitat to be undertaken in suitable locations (i.e. outside railway corridor) using native species in accordance with the proposed action's MRTS16 Landscape and Revegetation, Rehabilitation will be considered against the landscape and maintenance requirements of the future asset owner. • Barbed wire occurrences in Key Biodiversity Areas based on the Asset Owner's Security Risk requirements, will apply the following hierarchy: - Remove hazard through avoidance of using barbed-wire wherever possible - Replacement of the top strand barbed-wire with plane wire (as per greater glider Conservation Advice); - Enhance visibility through plastic strand-wrapping or addition of electrical fence tape of similar; - Affixing reflective / bat tags at suitable spacings. - As a minimum requirement, fencing in all Key Biodiversity Areas will be fauna exclusion fencing and incorporate reflective discs / bat tags (generally in accordance Bat Conservation & Rescue QLD Inc guidance document Mitigating Barbed Wire Risk For Wildlife) [controls in this document will have suitability for gliders as well as bats in regards to barb-wire fencing] • Installation of electrostatic wildlife guards on Overhead Line Equipment (OHLE) to minimise electrocution • Dust will be controlled throughout the construction phase within direct and indirect impact areas through dust suppression (e.g. soil binders, watercarts), speed restrictions, appropriate erosion and sediment measures, and progressive stabilisation / revegetation of temporary disturbance areas. • Appropriate weed, pathogen and disease hygiene practices and management to be implemented for the species as per the OEMP. • Domestic dogs are to be prohibited on the construction site at all times. It is not anticipated that additional fragmentation or new barriers to species movement will occur as a result of the proposed action. Based on the abovementioned mitigation measures and since the Impact area is not considered an important population for yellow-bellied glider

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	(south-eastern), it is unlikely the proposed action will lead to a long-term decrease in the size of an important population for the species.
Reduce the area of occupancy of the species	**Unlikely.** The area of occupancy for the species is estimated at 12,724 km^2. A maximum of 34.89 ha of potential habitat (including functionally lost areas) is proposed to be directly impacted as a result of the proposed action, or <0.01% of the total area of occupancy. On this basis, it is considered unlikely that the proposed action will significantly reduce the area of occupancy of the species.
Fragment an existing important population into two or more populations.	**Unlikely.** The Impact area is not identified as an important population for yellow-bellied glider (south-eastern). Approximately up to 34.89 ha of potential breeding, foraging and dispersal habitat is proposed to be impacted as a result of the proposed action. The species is considered to be sensitive to fragmentation due to low dispersal ability and exclusive home ranges occurring at low densities. Vegetation clearing required for the proposed action will occur along portions of an existing linear rail reserve that is already disturbed and exists within an urbanised context. The vegetation clearance will not introduce new barriers to movement. As such, the proposed action is unlikely to fragment an existing important population into two or more populations of the species.
Adversely affect habitat critical to the survival of a species.	**Unlikely.** All breeding habitat (21.40 ha) and foraging habitat (7.52 ha) mapped within the Impact area is considered to meet the definition of habitat critical to the survival of the species. Dispersal habitat (5.97 ha) for the species may not meet the definition of habitat critical to the survival of the species. However, to be conservative all mapped habitat ((totalling 34.89 ha, including functionally lost areas and 7.26 ha buffer zone) has been assessed as habitat critical to the survival of the species. While the Impact area contains habitat features that may be potentially used by yellow-bellied glider (south-eastern), habitat is primarily fragmented, generally lacks overlapping canopy cover or habitat corridors required to facilitate dispersal of the subspecies between fragmented habitat patches and/or that enable recolonization or movement away from threats, and comprises a low density of hollow-bearing trees. Habitat is also surrounded by residential/industrial areas, powerlines, barbed wire fencing, and operational roads and railways. Overall, the high level of disturbance and fragmentation within the Impact area is unlikely to wholly meet the definition of habitat critical to the survival of the species i.e., large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees (Department of Agriculture Water and the Environment, 2022a). The high level of disturbance across the Impact area invites the potential for greater levels of competition with other arboreal mammal species and hollow dependent species such as the common brushtail possum and sulphur-crested cockatoo, compared with remnant vegetation areas. Both of these species were recorded during surveys including utilisation of hollows by a pair of sulphur-crested cockatoos. Direct impacts are anticipated to occur to a maximum of 34.89 ha of potential habitat (including functionally lost areas). Based on the above the

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	proposed action is unlikely to adversely affect habitat critical to the survival of the yellow-bellied glider (south-eastern).
Disrupt the breeding cycle of a population.	**Unlikely.** The potential for a breeding population to occur within the Impact area would require the Impact area to support a functional population of yellow-bellied glider (south-eastern). The presence of live, hollow-bearing trees, primarily smooth-barked eucalypts to be a key habitat feature and limiting factor for the species. Additionally, large areas of forest are required to maintain population viability (Department of Agriculture Water and the Environment, 2022a). The quality of and extent of habitat and availability of live, hollow bearing trees is generally low, with a low density of suitable trees primarily occurring within small, fragmented patches adjacent the existing railway corridor, generally associated with Acacia Forest Park and Nealdon/Goud Adams Park. Potential breeding in the form of remnant, non-remnant, high value regrowth (HVR) and regrowth vegetation with a mature eucalypt canopy that contains trees over 30 cm DBH are scattered throughout the Impact area. However, the lack of overlapping canopy cover and high level of fragmentation within the Impact area is considered to reduce the capacity of the Impact area to sustain a functional population of yellow-bellied glider (south-eastern), and therefore to support breeding population. Additionally, targeted surveys did not detect evidence of yellow-bellied glider (south-eastern) within the Impact area. Mitigation measures outlined within the OEMP are considered appropriate to manage potential impacts to the species, such as pre-clearance surveys and fauna spotter catchers including during the species' breeding period. The fauna spotter catcher will provide targeted advice in relation to additional controls throughout breeding periods where clearing works cannot be scheduled to avoid these times. Given this, it is unlikely the proposed action will disrupt the breeding cycle of the species which may occur within the Impact area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** The proposed action proposes to directly impact a maximum of 34.89 ha of potential habitat (including functionally lost areas). Since the proposed action has been predominantly co-located with an existing railway corridor, habitat proposed be impacted is likely to be already disturbed and fragmented. Due to this, yellow-bellied glider (south-eastern) is more likely to remain in core contiguous patches outside the Impact area (such as within Karawatha Forest Park), rather than disturbed and fragmented patches within the Impact area. While some connectivity occurs between potential habitat within and outside the Impact area, habitat within the Impact area is a physical and genetic 'dead end' for the species, and is also surrounded by residential/industrial areas, and a high level of threats such as powerlines, barbed wire fencing, and operational roads and railways. As such it is considered unlikely the proposed action will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established	**Unlikely.** Predation by feral cats and European red foxes have the potential to impact the yellow-bellied glider (south-eastern) becoming established in its habitat.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
in the vulnerable species' habitat	The European red fox was observed during targeted field surveys, and feral cats have the potential to occur given the disturbed and fragmented nature of the Impact area. Environmental management plans developed prior to works commencing will prescriptively outline the controls needed to manage weed, pests and disease which may impact greater glider (southern and central). Weed and seed certificates and regular weed hygiene inspections to be undertaken for all machinery entering from outside to prevent introduction of new weed infestations. Based on pre-construction weed survey results, temporary washdowns may be required throughout high-risk activities (e.g. site establishment and clearing works). Based on these abovementioned mitigation measures, it is unlikely the proposed action will exacerbate invasive species beyond current levels.
Introduce disease that may cause the species to decline.	**Unlikely.** While disease is not identified as a threat to yellow-bellied glider (south-eastern), phytophthora and myrtle rust are pathogens which may indirectly impact the species by affecting its vegetation and complexity of habitats. An environmental management plan will be implemented throughout the delivery of the proposed action to manage and mitigate potential direct and indirect impacts from disease and pathogens to the greater glider (southern and central) as a result of the proposed action. Regular hygiene inspections are to be undertaken for all machinery entering from outside to prevent introduction of new weed infestations. Based on pre-construction survey results, temporary washdowns may be required throughout high-risk activities (e.g. site establishment and clearing works). As such, it is unlikely the proposed action will introduce disease that may cause the species to decline.
Interfere with the recovery of the species.	**Unlikely.** While a national recovery plan is not currently available for the species, the species' conservation advice identifies the following recovery actions: • Habitat loss, disturbance and modification (including fire) • Climate change • Invasive species (including threats from predation, grazing, trampling) The proposed action is unlikely to significantly interfere with the abovementioned recovery actions for the species. In addition, the OEMP includes measures to control potential direct and indirect impacts and threats to the species. Based on this, the proposed action is unlikely to significantly interfere with the recovery of the species.

4.4 Macadamia nut (*Macadamia integrifolia*)

4.4.1 Description and status under the EPBC Act

The macadamia nut is listed as Vulnerable under the EPBC Act.

The macadamia nut is a medium sized tree that grows to 20 m in height with a 20 m wide crown. This species produces cream or creamy-white flowers that have been recorded in January, March and June to November. Flowers occur on the end of 30 cm long racemes. Fruit is a hard brown spherical nut encased in a green leathery outer shell with a diameter of 2–3 cm (Department of the Environment, Water, Heritage and the Arts, 2008c).

4.4.2 Distribution

Macadamia Nut occurs from Mt Bauple, near Gympie, to Currumbin Valley in the Gold Coast hinterland, south-east Queensland. The species was known to occur in north-east New South Wales; was described from 1850-60 specimens collected from Camden Haven, and there are specimens also from Lismore. It occurs as a scattered rare to occasional tree, and population sizes are difficult to estimate. Populations in the south-east Queensland Regional Forest Agreement region (area of 10,000 km²) are estimated at 2 500 mature individuals in 20 populations. These populations were formerly declining but are presently stable (Department of the Environment, Water, Heritage and the Arts, 2008c).

4.4.3 Habitat requirements

Macadamia Nut is conserved in at least four reserves in south-east Queensland (Nicholls Scrub National Park, Triunia National Park, Mt Cooroy Conservation Park and Mt Bauple National Park) but these are all small. This species grows in remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges. This species occurs within the Northern Rivers (NSW) and South East Queensland Natural Resource Management Regions (Department of the Environment, Water, Heritage and the Arts, 2008c).

4.4.4 Threats

The main identified threats to the species are (Department of the Environment, Water, Heritage and the Arts, 2008c):

- Habitat fragmentation from urban and agricultural clearing,
- Weed invasion from species such as Lantana (*Lantana camara*) and Camphor Laurel (*Cinnamomum camphora*), and
- Inappropriate fire regimes.

4.4.5 Occurrence and potential habitat within the Impact area

Refer to Section 4.7, Appendix B Figure 8 and Appendix B Figure 20 of the Supplementary MNES Report for habitat and historic records.

4.4.6 Important population

An ‘important population’ is a population that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

The *National Recovery Plan for Macadamia Species* (national recovery plan) includes a list of all priority populations (Department of Climate Change Energy the Environment and Water, 2023), and this does not include any areas within the Impact area.

4.4.7 Habitat critical to the survival of the species

The national recovery plan defines habitat for critical for the survival of the species, which can include complex and simple notophyll vine forests, simple microphyll-notophyll vine forest with emergent *Araucaria* and *Argyrodendron*, and sclerophyll forests where rainforest is subdominant, and its

presence is mediated by fire (Department of Climate Change Energy the Environment and Water, 2023).

Given that all of the observed individuals were planted within residential gardens and there is no known population within the Impact area it is considered that the Impact area does not support habitat critical to the survival of the species.

Habitat for the species that is adjacent to the Impact area is located in a highly urbanised and fragmented landscape, which has experienced previous clearing, weed, pest and pathogen invasion, habitat fragmentation, disturbance from urbanisation and recreational activities, and altered fire regimes.

4.4.8 Buffer zone

Buffer zones do not apply to individual as all individuals are considered 'not in the wild' since they are actively being managed as amenity vegetation (occurring in parklands) or occur within residential backyards.

4.4.9 Proposed action impacts and mitigation measures

Refer to Section 6.0 of the Supplementary MNES Report for impacts and mitigation measures, specifically Section 6.4 in relation to species-specific mitigation measures.

4.4.10 Significant Impact assessment

An assessment of the significance of impacts to this species is provided in Table 15. The outcome of this assessment is that the proposed action will **unlikely result in a significant impact** on the species.

Table 15 Significant impact assessment – Macadamia Nut

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Lead to a long-term decrease in the size of an important population	**Unlikely.** Six (6) macadamia nut individuals were recorded by GHD (2021) within parkland and two (2) macadamia nut individuals were observed within residential backyards by AECOM (2024) within the Impact area, however these individuals are considered 'not in the wild' since they are actively being managed as amenity vegetation or occur within residential backyards. A total 0.016 ha of macadamia nut habitat occurs within the Impact area. Indirect impacts that can potentially impact species long term survival include dust, waste disposal and increased human traffic around the trees, resulting in soil compaction. However, these will be temporary and actively managed during all of the proposed action's phases as per the OEMP. Given the above, it is considered unlikely the proposed action will lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of the species	**Unlikely.** Eight (8) individuals of macadamia nut were recorded within the Impact area, however individuals were planted and maintained as amenity vegetation and deemed 'not in the wild'. A total of 0.016 ha of potential macadamia nut habitat occurs within the Impact area. Indirect impacts to potential habitat will be managed through the measures identified in the OEMP. Therefore, a reduction in the area of occupancy of the species is unlikely.
Fragment an existing important population into two or more populations.	**Unlikely.** The individuals observed within the Impact area are located within residential properties and already fragmented. There are no other known populations within the Impact area, and therefore the proposed action is unlikely to fragment an existing population into two.

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
Adversely affect habitat critical to the survival of a species.	**Unlikely.** The species' national recovery plan defines habitat for critical for the survival of the species, which can include complex and simple notophyll vine forests, simple microphyll-notophyll vine forest with emergent Araucaria and Argyrodendron, and sclerophyll forests where rainforest is subdominant, and its presence is mediated by fire. Noting all of the observed individuals were planted within residential gardens and there is no known population within the Impact area it is unlikely the proposed action will adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population.	**Unlikely.** The species' national recovery plan defines priority populations which are based on their population size, proximity to other populations (based on pollen transfer distance) and occurrence within remnant vegetation. Since the macadamia nut individuals are deemed to be 'not in the wild' and do not occur in the known priority populations list, no impacts are anticipated to occur to these individuals which are actively being managed as amenity vegetation or within residential backyards.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**Unlikely.** Given the individuals recorded within the Impact area are actively being managed and 'not in the wild' and habitat is limited to 0.016 ha, vegetation clearing is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline availability and quality of the species habitat.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely** Given the observed individuals were located within parklands or residential backyards with high amounts of weed incursion, it is unlikely the proposed action will exacerbate existing weed. Furthermore, strict weed management measures during construction will be implemented by the proposed action's OEMP. As a result, the proposed action is unlikely to result in the introduction of invasive species that are harmful the species becoming established in its habitat.
Introduce disease that may cause the species to decline.	**Unlikely.** Dieback caused by the root-rot fungus *(Phytophthora cinnamomi)* is a Listed Key Threatening Process under the *Environment Protection and Biodiversity Conservation Act 1999 and* is also considered a threat to wild macadamia nut populations. The observed macadamia nut is 'not in the wild', however mitigation measures for potential introduction of disease within the Impact area that the contractor will be required to confirm that all soil or planted material (e.g. hydromulch with seed mix) is clean and declared free from plant pathogens. Therefore, it is considered unlikely that the proposed action would introduce disease that may cause the species to decline.
Interfere with the recovery of the species.	**Unlikely.** Recovery objectives according to the species' national recovery plan are: • Continue to identify and evaluate the extent and quality of Macadamia species populations and their habitat • Reduce and manage the major threatening processes affecting Macadamia species and their habitat • Increase knowledge of Macadamia species and their ecology to affect their conservation and management • Improve awareness and understanding of Macadamia species, especially their conservation management requirements and major threats • Manage, monitor and evaluate the national recovery plan for Macadamia Species

EPBC Act Criteria – is there a real possibility that the Proposed action will:	Assessment of Significance
	Due to the fact that macadamia nut was located within parklands or residential backyards, are deemed ‘not in the wild’ and a limited extent of habitat (0.016 ha) occurs, it is unlikely the proposed action will significantly interfere with the recovery of the species.

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Attachment A – Suitably qualified expert TEC SIA endorsement

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Your ref: EPBC 2022/09439
Our ref: 12567857

21 January 2025

Nature Positive Regulation Division, Queensland Assessments Branch, Queensland South Assessments Section
Department of Climate Change, Energy, the Environment and Water
C/O Rachel Driml (Rachel.Driml@dcceew.gov.au**); Sheron Chand (**Sheron.Chand@dcceew.gov.au**)**

EPBC 2022/09439 Logan Gold Coast (LGC) Faster Rail - Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (subtropical floodplain eucalypt) Threatened Ecological Community (TEC) – Significant Impact Assessment (SIA)

Dear Rachel and Sheron

For assessment of LGC Faster Rail (the proposed action) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, Queensland Department of Transport and Main Roads (TMR) prepared Draft Preliminary Documentation (PD) in response to Department of Climate Change, Energy, the Environment and Water's (DCCEEW) decision notice and request for information (RFI) received 4 May 2023.

AECOM Australia Pty Ltd (AECOM) assessed the proposed action's likelihood for significant impacts to Subtropical floodplain eucalypt TEC, in accordance with criteria for critically endangered and endangered ecological communities in the Significant Impact Guidelines 1.1 (DotE, 2013)[1]. AECOM assessed significant impacts are unlikely to occur, including it is unlikely the proposed action will reduce the quality and/or condition class of the TEC and unlikely to impact long-term viability of the TEC patches.

I, Andrew Franks B.Sc. (Hons I), GCert. Arb., Principal Botanist and Technical Director of Botany with GHD, have been requested by TMR to complete a review of the technical accuracy and justification of outcomes within AECOM's TEC SIA. I am a 'suitably qualified expert' to assess TEC and vegetation condition, with over 26 years' professional botanical experience, including more than 14 years with the Queensland Herbarium, technical author of the BioCondition assessment manual and training program, and AQF Level 8 consulting arborist. My extensive relevant experience in the enclosed curricula vitae further supports my fit as a suitably qualified expert.

I endorse the technical accuracy and justification of outcomes within AECOM's TEC SIA, specifically that significant impacts are unlikely to occur as a result of the proposed action.

The TEC SIA has been prepared and appropriately assessed in accordance with the TEC's latest Approved Conservation Advice for the subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (DCCEEW 2022)[2].

The TEC in this area has been subject to historical clearing, urbanisation and fragmentation as well as associated threats since 1976 (that is, at least 48 years) and quality and function has been maintained (that is, Class B3 that is habitat critical to the survival of the community as well as Class C1 and Class C2 of the TEC still occurs). This supports conclusions that impacts to the long-term viability of the patches is unlikely, and appropriate and relevant TEC-specific measures will be implemented to manage and/or mitigate

[1] Matters of National Environmental Significance – Significant Impact Guidelines 1.1 EPBC Act, Department of the Environment, Commonwealth of Australia 2013.
[2] Available from: **http://www.environment.gov.au/biodiversity/threatened/communities/pubs/179-conservation-advice.pdf**. In effect under the EPBC Act from 05-Oct-2022.

potential direct or indirect impacts and threats to the TEC which may impact quality, condition class, or long-term viability of TEC patches, including hydrological impacts, edge effects and all relevant threats listed in the Conservation Advice.

Activities for the proposed action are likely to be commensurate with surrounding residential/industrial disturbance and threats, and unlikely to significantly:

– Reduce the extent of the TEC
– Fragment or increase fragmentation of the TEC
– Adversely affect habitat critical to the survival of the TEC
– Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the TEC's survival,
– Cause a substantial change in the species composition of an occurrence of the TEC
– Cause a substantial reduction in the quality or integrity of an occurrence of the TEC
– Interfere with the recovery of the TEC.

I support AECOM's TEC SIA assessments and outcomes to be true and accurate in keeping with the TEC's Approved Conservation Advice (DCCEEW, 2022) and Significant Impact Guidelines 1.1 (DotE, 2013).

Please feel free to contact me if you require further information.

Regards

Andrew Franks
Technical Director - Botany

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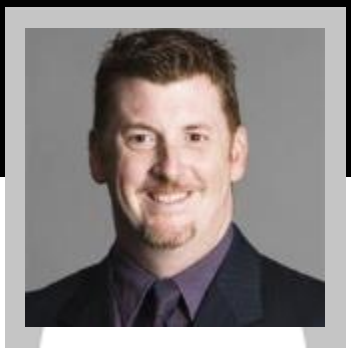
Attachment: Curricula vitae - Andrew Franks

Andrew Franks B.Sc., B.Sc. (Hons), Grad.Cert. Arb.

Technical Director - Botany



Location

Brisbane, Queensland, Australia

Experience

20 years

Qualifications/Accreditations

- Graduate Certificate Arboriculture, 2017
- Bachelor of Science (Hons 1), 1998
- Bachelor of Science, 1997

Key technical skills

- Vegetation assessment and mapping
- Baseline flora assessments
- Threatened flora surveys
- Arboricultural assessments

Memberships

- Queensland Arboricultural Association

Relevant experience summary

Andrew is one of Queensland's most respected botanists with over 20 years' experience working within professional environmental consulting firms, non-government organisations, and the Queensland Government. His specialist skills include flora surveys, Regional Ecosystem verification and mapping, ecological assessments, vegetation and weed mapping, protected flora assessments and surveys, and project management. Andrew is also an author of the current version of the BioCondition assessment method (Eyre et al. 2015) widely used as a vegetation condition method in Queensland. During his time with the Queensland Herbarium, Andrew assisted with flora surveys and threatened species searches of ultramafic areas of Queensland including sites near the Shoalwater Bay Training area. This included documenting populations of rare and endangered plant species in the Canoona, Glen Geddes and Marlborough area. Additionally, Andrew has undertaken floristic assessment and mapped the vegetation and regional ecosystems within some of the training area expansion area properties including Charon's Ferry, Wellington, Redbank, and Strathmuir as part of his involvement with the Central Queensland Coal project. Andrew will provide botanical and TEC inputs into the project.

Project experience

Botanical Surveys

Botanist
Queensland Herbarium | 1991

The Queensland Herbarium undertook detailed floristic and threatened flora surveys in the central Queensland ultramafic areas. This included assessing populations of ultramafic endemic and threatened species. Andrew assisted with these surveys and processing specimens and data.

Botanist
Department of Natural Resources | 1999

As part of the Department of Natural Resources, Andrew undertook detailed floristic and threatened flora surveys in Beeron Holdings (now Beeron National Park). This included assessing populations of narrow endemic and threatened species. Andrew assisted with these surveys and processing specimens and data.

Principal Botanist
Mineralogy via Yeats Consulting Engineers | 2011

Mineralogy required botanical and vegetation assessments of EPC1029 as part of their Central Queensland Coal project. This area was subject to seasonal surveys with field results informing the Environmental Impact Assessment produced for the project. Andrew was the lead for the botanical assessment and is very familiar with the flora and vegetation in this region.

Principal Botanist
Department of Defence via O2 Ecology | 2015

The Department of Defence required detailed survey of populations of *Macrozamia pauli-guilielmi* within the Wide Bay Training Area. These surveys were required as development of part of the training area. Andrew

was the lead botanist for surveying populations of this threatened plant near to the development footprint.

Principal Botanist
Vale via O2 Ecology | 2014-2015

Vale required detailed assessment of areas of endangered Regional Ecosystems across all of their tenements in central Queensland. This required substantial field work and subsequent mapping to be produced to verify areas of endangered Regional Ecosystems and Threatened Ecological Communities.

Copernicus Nickel Mine Rehabilitation
Principal Botanist
Panoramic Resources | 2013 - 2023
Panoramic Resources required biennial assessment of analogue and rehabilitation sites as part of the closure of the Copernicus Nickel Mine in the eastern Kimberley region. Analogue sites are located both on the Savannah and Copernicus Nickel Mine areas with rehabilitation sites located on Copernicus. Sites are assessed with the Ecosystem Function Analysis which has at its core Landscape Function Analysis. Andrew has been undertaking these assessments since 2013 and has developed a robust knowledge of the flora of the region.

Principal Botanist and Consulting Arborist
City of Gold Coast | 2017 - 2023

Andrew undertakes annual vegetation condition monitoring within receiving areas of released treated effluent from the South Stradbroke Island's sewage treatment plants. This involved converting the existing permanent monitoring plots into BioCondition monitoring plots, arboricultural assessment of trees and incorporating past results into a useable and comparable format.

Consulting Arborist
Visionstream via Golders Associates | Sept 2020

Visionstream (now Ventia) required an arboricultural assessment on trees in proximity to a Telstra mobile network tower facility within the MacArthur Hill section of the Wanniassa Hills Nature Reserve, Fadden, ACT. The assessment was required to determine the potential pruning of nearby trees that would be required for the installation of telecommunication monopole antennae at differing inclinations at the mobile network site 27710 (MacArthur Reservoir). Pruning requirements on impacted trees were assessed for modelled Radio Frequency Zones associated with the inclination of antennae installed as 4, 5, 6, and 7 degrees on the monopole.

Principal Botanist and Consulting Arborist
DITCRD via GHD | November 2020

The Department of Infrastructure, Transport, Cities and Regional Development (DITCRD) required a preliminary tree assessment in relation to trees that could be impacted by a proposed upgrade of facilities at Norfolk Island Health and Residential Aged Care Service (NIHRACS). This included determining the direct and indirect impacts associated with the proposed replacement of the Multi-Purpose Service Facility on retained trees.

Principal Botanist and Consulting Arborist
DITRDCA | October 2023

The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) required a preliminary tree assessment and ecological assessment report in relation to trees and vegetation that could be impacted by a proposed upgrade of roads in the Kingston and Arthur's Vale Heritage Area (KAVHA), Norfolk Island. This included determining the direct and indirect impacts associated with the proposed upgrade and replacement of roads on retained trees.

Career history

2023 - present	GHD, Technical Director - Botany
2020 - 2023	Queensland Herbarium, Department of Environment and Science, Principal Botanist
2018 - 2020	Queensland Herbarium, Department of Environment and Science, Senior Botanist
2015 - 2020	Sole trader, t/a Oberonia Botanical Services, Director, Principal Botanist and Consulting Arborist
2012 - 2015	O2 Ecology, Principal Botanist
2010 - 2012	Queensland Herbarium, Department of Environment and Resource Management, Senior Botanist
2007 - 2010	GHD Pty Ltd, Senior Ecologist and Terrestrial Ecology Team Leader
2005 - 2007	Greening Australia WA, Senior Ecologist
2002 - 2005	PhD studies, Murdoch University
2000 - 2002	Queensland Herbarium, Environmental Protection Agency, Senior Botanist
1998 – 2000	Forest Ecosystem Research and Assessment, Department of Natural Resources, Ecologist
1997	Honors studies, University of Queensland
1989-1996	Queensland Herbarium, Department of Environment and Heritage, Botanist