# QTMP – Torbanlea Train Manufacturing Facility

Response to Request for Information (RFI) EPBC Ref 2022/09301

**Department of Transport and Main Roads**

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# Document control record

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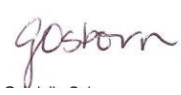
| Author signature |  | Approver signature |  |
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# Contents

# Appendices



# Tables

# 1 Introduction

## 1.1 Background

On 22nd August 2022, a referral for the Queensland Train Manufacturing Program (QTMP) – Torbanlea Train Manufacturing Facility Project (the Project) was submitted to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

On 16th September 2022, a delegate for the Commonwealth Minister for the Environment and Water determined that the Project was a 'Controlled Action' due to its potential to have a significant impact on listed threatened species and communities (sections 18 & 18A of the EPBC Act). Subsequently, an additional information request (required for assessment by preliminary documentation) was issued by DCCEEW on 30th September 2022.

The Project is a program of works that has been initiated by Queensland Department of Transport and Main Roads (TMR) to modernise and allow the expansion of the South-East Queensland (SEQ) passenger train fleet to support the region's population and economic growth, while reducing road congestion and associated emissions.

The Project is proposing to establish a train manufacturing facility in Torbanlea, Queensland, on Lot 35 SP326250, and associated infrastructure on the Ritchie Road and Bruce Highway road reserves, and the North Coast Rail Line. The Project is located approximately 23 kilometres (km) north of Maryborough.

In the 2017 State election, the Queensland Government made a commitment that all future trains and associated infrastructure, for which Queensland has the manufacturing capacity to deliver, will be manufactured and maintained by Queenslanders to support jobs in Maryborough and other regional centres.

The QTMP will deliver an initial fleet of 65 six-car multiple units (MUs) under the first design, build and maintain contract. The purpose of the new QTMP fleet will be to service Queensland's growing need for efficient public transport, which is particularly driven by transformative infrastructure projects, such as Cross River Rail (CRR) and the 2032 Olympic and Paralympic Games.

The Project will likely include the following (subject to final design):

- Site preparation works, including clearing and earthworks
- Construction of a train manufacturing facility, consisting of a main assembly area, bogie frame manufacturing, assembly stores, main assembly stores and offices, and associated infrastructure
- Rail network connection to the North Coast Rail Line
- Internal road access connections from the Bruce Highway and Ritchie Road
- Widening and reconstruction of Ritchie Road.

## 1.2 Existing environment

The Project is bordered by the Bruce Highway on the western boundary, the North Coast Rail Line at the eastern boundary, Torbanlea township to the north and forest plantations to the south. The Project area has direct access to the Bruce Highway and Ritchie Road. The Project area has a total area of 1,289,040 square metres (m²) (128.90 hectares (ha)). The Project area and surrounding areas are zoned as 'Rural' under the Fraser Coast Planning Scheme.

The area encompassed by the Project has historically been subject to anthropogenic disturbance. Historic land management practices associated with agriculture has resulted in large areas surrounding the Project being cleared of vegetation. Much of the regenerated vegetation located in the centre of the Project area contains a mosaic of pine plantation and Acacia regrowth.

The area associated with the Project historically supported low intensity cattle grazing, and a single dwelling (now demolished), which was located within areas of non-remnant vegetation.

Areas containing mature vegetation communities within the Project area consists of open forest to woodland dominated by *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia,* and woodland dominated by *Eucalyptus latisinensis* +/- *Corymbia intermedia*, *Corymbia trachyphloia*, *Angophora leiocarpa* and *Eucalyptus exserta*.

The major industries in the surrounding the Project area are forestry, rural residential and farming. There are no natural features and/or any other important or unique values relevant to the Project area. The Project area is reasonably flat and undulates gently between approximately 27.5 metres (m) and 38.0 m Australian Height Datum (AHD). The highest elevation occurs towards the centre and southern portion of the Project area and slopes towards the north and west, to the Bruce Highway.

## 1.3 Purpose of document

The purpose of this document is to provide responses to address the request for additional information (required for assessment by preliminary documentation), issued by DCCEEW on 30th September 2022. This document has been partitioned into sections that reflect the format of the formal DCCEEW-issued Request for Information (RFI).

The proponent notes that the provided preliminary documentation, which includes this document, should be sufficient to allow the Minister (or delegate) to make an informed decision on whether to approve the Project, under Part 9 of the EPBC Act.

**Appendix A** includes a cross referencing table, that will provide the location of the responses to each question posed by DCCEEW for easy of reference.

## 1.4 Preliminary documentation contribution

**Table 1: Names, roles and qualifications of all persons involved in preparing the preliminary documentation**

| Name | Role | Qualification |
|---|---|---|
| Andy Dalton | Senior Ecologist – Document author and survey team | Bachelor of Science (majoring in Ecology and Conservation Biology)<br>12 years' experience in industry |
| Kurtis Kemp | Ecologist – Document author and survey team | Bachelor of Science majoring in biological sciences<br>5 years' experience in the industry |
| Dr Chris Schell | Associate Ecologist – Document verifier and survey team | Bachelor of Science (Honours Class 1) and PhD in Zoology<br>20 years' experience in the industry |
| Jiordyn Trinca | Ecologist – Document author and survey team | Bachelor of Wildlife Science and Masters Conservation Science<br>1 year experience in the industry |
| Dr James Bone | Aquatic Ecologist and survey team | Bachelor of Science (Honours Class 1) and PhD in environmental science<br>9 years' experience in the industry |
| Bianca Voges-Haug | Senior Consultant – Document author | Bachelor of Laws (LLB) and BSc (Environmental Science)<br>9 years' experience in the industry |
| Stephen Cole | Strategic advisor and peer reviewer | Bachelor of Science and Master in Urban and Regional Planning<br>36 years' experience in industry |

# 2 Responses

## 2.1 Description of action

RFI 1.1: Include updated information if any changes have been made to the project since the referral documentation was submitted. Include updated disturbance footprints (in hectares) and layout plans for the proposed action, where relevant. (DCCEEW, 2022)

The referral describes the Project area as including Lot 35 CK3261. However, following submission of the referral, a portion of the Ritchie Road road reserve was acquired by TMR and amalgamated with Lot 35 CK3261 to create one freehold lot, which is now referred to as Lot 35 SP326250. This was a change to the lot details only – noting the Project area and model disturbance footprint have not changed. Ritchie Road reserve was included in the model disturbance footprint as part of Lot 35 CK3261. The change to the lot numbering occurred on the 2nd September 2022.

There are otherwise no changes to the Project area since the initial referral submission.

## 2.2 Habitat assessment

DCCEEW has identified that the following listed species and ecological communities may be significantly impacted by the Project:

- Coastal Swamp Sclerophyll Forest of NSW and SEQ (Coastal Swamp Sclerophyll Forest Threatened Ecological Community (TEC))
- Grey-headed flying fox (*Pteropus poliocephalus*).
- Greater glider (*Petauroides volans*).

A review of these species distributions within the Species Profile and Threats (SPRAT) Database has been undertaken, and is provided in **Appendix B**. Additionally, a recent Protected Matters Search Tool (PMST) report has been generated (refer **Appendix C**).

### 2.2.1 Species/communities general information

#### Survey adequacy

RFI 2.1.1: Include an assessment of the adequacy of any surveys undertaken (including survey effort and timing). In particular, the extent to which these surveys were appropriate for the listed species or community and undertaken in accordance with relevant departmental survey guidelines and/or best practice. (DCCEEW, 2022)

A number of surveys were undertaken by Aurecon in order to inform the significant impact assessments as part of the EPBC Act referral (2022/09301) for the Costal Swamp Sclerophyll Forest TEC, Greater glider (*Petauroides volans)* and Grey-headed flying fox (*Pteropus poliocephalus*).

Below is a summary of the ecological surveys that were undertaken:

- May 2021 – Preliminary ecological field survey, including a Protected Plants Survey as per the Queensland Flora Survey Guidelines
- April 2022 – Ecological field investigation conducted within the Project area, including visual habitat assessment and an animal breeding place survey
- May 2022 – Field-based investigations to target matters of national environmental significance (MNES).

A detailed background on each survey has been provided below.

An additional survey was undertaken by the University of Queensland to assess the presence of the Koalas (*Phascolarctos cinereus)* in September 2022 (refer to Appendix F). In addition, field surveys were completed by Aurecon in February 2023 to assess the presence of Greater gliders (Petauroides volans)(refer to Appendix M)

## Preliminary Ecological Survey May 2021

Protected Flora Surveys were conducted on the 18th and 19th May 2021, to identify *Nature Conservation Act 1992* (Qld) (NC Act) Threatened and Near-threatened flora species which may be present within the Project clearing impact area.

Surveys in accordance with the Queensland Flora Survey Guidelines – Protected Plants were undertaken within the Project area in May 2021 (Aurecon 2021d). The ecological field assessment was conducted by suitably qualified and experienced senior ecologists Dr Chris Schell and Dr James Bone (refer **Appendix B** Figure 4 of **Appendix E** for the location of survey locations).

The timed meander survey methodology defined in Section 6.2.2 of the Flora Survey Guidelines (Department of Environment and Science (DES) 2020) was employed to identify and locate potentially occurring threatened or near threatened flora species within the Project clearing impact area.

Further information on the survey methodology is provided in the MID Ecological Assessment Report (Aurecon 2022) and Protect Plants Survey Report (Aurecon 2021a).

Field investigations confirmed habitat was present for the Grey-headed flying fox, however no species were observed to occur during surveys. In order to determine impacts to the Grey-headed flying fox, the presence of foraging habitat was used. In accordance with DCCEEW's Conservation Advice, Habitat Critical to the survival of the species was determined through the presence of winter flowering species and proximity to camps of National Significance. The use of habitat as a proxy for species presence transcends issues associated with annual population fluctuations and seasonal oscillations. This technique exceeds regulatory fauna survey guidelines and is an example application of the precautionary principle as prescribed under the EPBC Act.

Vegetation surveys noted the presence of *Melaleuca quinquenervia* with *Eucalyptus tereticornis* and *Corymbia intermedia* open forest to woodland on alluvial plains. This Regional Ecosystem (RE12.3.6) was identified as analogous to the threatened ecological community Coastal Swamp Sclerophyll Forest of NSW and SEQ by the Commonwealth Conservation Advice (DCCEEW 2022a) when the community was listed on the 8th December 2021. No condition threshold was conducted at the time of the survey, instead the survey data and ground-truthed habitat mapping was used to determine the extent of the threatened ecological community at the time of its listing.

## Protected Plant Survey April 2022

An ecological field assessment was undertaken on the 7th April 2022, by one suitably qualified ecologist (Dr Chris Schell).

The fauna field survey consisted of visual habitat assessment as well as an animal breeding place survey. Observations of fauna species were made opportunistically throughout the ecological assessment. The vegetation was assessed for its applicability to support conservation significant species habitat. In addition, where required, specific habitat features were investigated to assess their importance to conservation significant species and whether they constituted an animal breeding place.

The ecological field survey of the Project area completed by Aurecon was conducted in accordance with Aurecon's Scientific Purposes Permit (WISP14453114) and Aurecon's Animal Ethics Committee approval (CA 2015/03/846).

Field investigations confirmed habitat was present for the Grey-headed flying fox, however no species were observed to occur during surveys.

### Targeted Field Based Surveys May 2022

An ecological field assessment was undertaken in May 2022, by one suitably qualified ecologist (Kurtis Kemp). The fauna field survey consisted of visual habitat assessment, assessed for its applicability to support conservation significant species habitat.

The ecological field survey of the Project area completed by Aurecon was conducted in accordance with Aurecon's Scientific Purposes Permit (WISP14453114) and Aurecon's Animal Ethics Committee approval (CA 2015/03/846).

Field investigations confirmed habitat was present for the Grey-headed flying fox and Greater glider (Appendix M), however no species were observed to occur during surveys. In alignment with the precautionary principle the presence of habitat was used as a proxy for the species presence.

### Ecological Surveys

RFI 2.1.2: Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation. (DCCEEW, 2022)

The following assessment reports were prepared in association with ecological investigations for the Project area:

- Aurecon (2022c). Queensland Train Manufacturing Program Torbanlea MID Ecological Assessment Report. Prepared for Department of Transport and Main Roads (refer **Appendix B**)
- Aurecon (2022b). Queensland Train Manufacturing Program Torbanlea Matters of National Environmental Significance Report. Prepared for the Department of Transport and Main Roads (refer **Appendix D**)
- Aurecon (2021a). Rollingstock Expansion Project Torbanlea Protected Plants Report. Prepared for Department of Transport and Main Roads (refer **Appendix E**)
- University of Queensland (2022) – Koala survey by detection dogs to detect presence of the species (refer **Appendix F**).
- Aurecon (2023). Queensland Train Manufacturing Program Greater Glider Memorandum. Prepared for the Department of Transport and Main Roads (refer **Appendix M**)

## 2.2.2 Community specific information

### Coastal Swamp TEC Key Diagnostic Characteristics

RFI 2.2.1: Provide an assessment (in a cross-reference table) of vegetation composition against the key diagnostic characteristics provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice, including any remnant and regrowth vegetation. (Section 2.2.1, DCCEEW, 2022)

Table 2-1 details the key diagnostic characteristic for the Coastal Swamp Sclerophyll Forest TEC Conservation Advice (DCCEEW 2022a).

**Table 2: Coastal Swamp Sclerophyll Forest TEC Assessment**

| Key diagnostic characteristic | Assessment |
|---|---|
| Occurs on the mainland and islands near to the coast (within 20 km) from South East Queensland to south-eastern NSW specifically within these IBRA Bioregions: South Eastern Queensland (SEQ); NSW North Coast (NNC); Sydney Basin (SYB) and the Bateman sub-region of the South East Corner (SEC). | The Project area is located on the mainland, 16 km from the coast in the South East Queensland Bioregion. |

| Key diagnostic characteristic | Assessment |
|---|---|
| Occurs in coastal catchments typically below 20 m above sea level (ASL), but occasionally up to 220 m ASL. | The Project area is located within a coastal catchment at approximately 30 m ASL. |
| Occurs on hydric soils with inundation patterns ranging from intermittent to episodic. | The Coastal Swamp Sclerophyll Forest observed within the Project area is situated on a drainage line which experiences episodic inundation. The soil for this vegetation was observed to be alluvial in nature and saturated by water at times. |
| The vegetation structure varies from tall closed to open forest to woodland, to dense (closed) shrubland or scrub forest. Minimum crown cover is at least 10%, but it is more typically in the range 50% to 70%. | The Coastal Swamp Sclerophyll Forest within the Project area had an observed range of 10% to 70% crown cover. |
| From South East Queensland to the Sydney Basin Bioregion, the canopy is typically dominated or co-dominated by *Melaleuca quinquenervia* and/or *Eucalyptus robusta*. In some areas, the canopy may be locally dominated by other melaleuca species, including *M. dealbata* (SEQ bioregion) (rarely); *M. biconvexa* (mid-NSW coast to south of Sydney); *M. decora* (north of Shoalhaven), frequently with *Parsonsia straminea* climbing on the trunks of canopy species. In the SEQ bioregion, *M. ericifolia* may occur as a dominant canopy or sub-canopy species. | The Coastal Swamp Sclerophyll Forest within the Project area was observed to be dominated by *Melaleuca quinquenervia* in the canopy layer. |
| Other tree species may occur in the canopy (or sub-canopy) in some areas, but they are not dominant across a patch, including *Casuarina glauca*, *Banksia* spp., *Callistemon salignus*, *Corymbia intermedia* (Pink Bloodwood), *E. tereticornis*, (Forest Red Gum/Queensland Blue Gum), E. longifolia (Woollybutt), *E. botryoides* (Southern Mahogany/Bangalay), *E. ovata* (Swamp Gum), *Livistona australis* and/or *Lophostemon* spp. | *Eucalyptus tereticornis* and *Corymbia intermedia* were observed to occur (but not dominant) in the canopy of the Coastal Swamp Sclerophyll vegetation within the Project area. |
| The understorey typically includes a variable ground layer, depending on the canopy cover and inundation rate/period. Tall sedges (typically *Gahnia* spp.) and/or ferns often dominate the ground layer, mixed with graminoids and other herbs, especially *Imperata cylindrica* (Blady Grass). | The Coastal Swamp Sclerophyll Forest understorey within the Project area was dominated by *Imperata cylindrica,* and *Gahnia aspera.* |
| While they can occur regularly in the ground layer, the ecological community is not present if halophytic species, more typically associated with estuarine/saltmarsh areas, dominate the ground layer of a patch, for example, *Appium prostratum*, *Atriplex cineria*, *Chenopodium glaucum*, *Rhagodia candolleaus* and *Samolus repens*. | No halophytic species were observed to dominate the Coastal Swamp Sclerophyll Forest understorey within the Project area. |

## Total Coastal Swamp TEC Area

RFI 2.2.2: Provide the total area (in hectares) of identified Coastal Swamp Sclerophyll Forest TEC (i.e., all vegetation that meets the key diagnostic characteristics). (Section 2.2.2, DCCEEW, 2022)

Approximately **4.76 ha** of Coastal Swamp Sclerophyll Forest has been identified as being contained within the area of direct disturbance of the Project, and in total approximately 31.98 ha of the TEC has been identified in the Project Area (refer page 20 of **Appendix D**).

## Coastal Swamp TEC Condition Thresholds

RFI 2.2.3: Provide an assessment of all Coastal Swamp Sclerophyll Forest TEC against the condition thresholds provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice. (Section 2.2.3, DCCEEW, 2022)

Table 4 within the MNES Report (refer **Appendix D**) identified the site condition (structure and condition of site, diversity of relevant endemic and non-endemic species) of the Coastal Swamp Sclerophyll Forest TEC areas (>5 ha) and determined that it meets criteria for condition threshold A of the listing advice (refer extract below).

The patch is larger than 5 ha, and was observed to comprise of less than 20% of non-native total ground layer vegetation cover. Table 2 from the Coastal Swamp Sclerophyll Forest TEC Conservation Advice has been provided in Table 2-2.

**Table 3: Condition classes, categories, and thresholds for Coastal Swamp Sclerophyll Forest TEC (Table 2 of DCCEEW 2022)**

| **Patch size thresholds**<br><br>**Biotic thresholds** | **Large patch**<br>The patch is at least 5 ha. It may or may not be contiguous with other native vegetation. | **Medium patch**<br>The patch is at least 2 ha and less than 5 ha. It may or may not be contiguous with other native vegetation. | **Small contiguous patch**<br>The patch is at least 0.25 ha and less than 2 ha and is part of a larger area of native vegetation of at least 5 ha. | **Small patch**<br>The patch is at least 0.5 ha and less than 2 ha which is isolated or part of a small native vegetation remnant less than 5 ha in total. |
|---|---|---|---|---|
| HIGH CONDITION<br>Non-native species comprise < 20% of total ground layer vegetation cover* | CLASS A<br>A large patch that meets key diagnostics AND has a predominantly native ground layer. | CLASS B1<br>A medium patch that meets key diagnostics AND has a predominantly native ground layer. | CLASS B2<br>A small patch that meets key diagnostics AND has a predominantly native ground layer AND is contiguous** with another large area of native vegetation. | CLASS C1<br>A small patch which meets key diagnostics AND has a predominantly native ground layer. |
| GOOD CONDITION<br>Non-native species comprise 20% to 50% of total ground layer vegetation cover* | CLASS B1<br>A large patch that meets key diagnostics AND the ground layer is mostly native. | CLASS C1<br>A medium patch that meets key diagnostics AND the ground layer is mostly native. | CLASS C2<br>A small patch that meets key diagnostics AND has a mostly native ground layer AND is contiguous** with another large area of native vegetation. | CLASS C2<br>A small patch that meets key diagnostics AND has a mostly native ground layer. |
| MODERATE CONDITION<br>Non-native species comprise 50% - 80% of total ground layer vegetation cover* | CLASS C1<br>A large patch which meets key diagnostics AND the ground layer has at least 20% native vegetation cover. | CLASS C2<br>A medium patch that meets key diagnostics AND the ground layer has at least 20% native vegetation cover. | Not protected. | Not protected. |

| | | | | |
|---|---|---|---|---|
| LOW CONDITION<br><br>Non-native species comprise more than 80% of total ground layer vegetation cover* | CLASS C2<br><br>A large patch which meets key diagnostics, but the ground layer has low native vegetation cover. | Not protected. | Not protected. | Not protected. |

*Refers to total perennial ground layer vegetation cover for the patch of the ecological community. Includes vascular plant species with a lifecycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs, and juvenile plants of canopy species, but does not include annual plants, cryptogams, leaf litter or exposed soil.

**Contiguous means the patch is connected or within 30 m of another area of native vegetation.

See **Appendix B** for further information on non-native/invasive alien plants associated with the Coastal Swamp Sclerophyll Forest.

## 2.3 Impact assessment

DCCEEW has determined that the Project is a 'Controlled Action' as a result of potential impacts to listed threatened species and communities, and the following impacts were found likely:

- Vegetation clearing and loss of habitat
- Fragmentation of habitat
- Altered hydrological regimes
- Habitat degrading processes such as weed invasion (and other edge effects)
- Increased risk of vehicle strike (DCCEEW 2022).

### 2.3.1 Likely impacts for the Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox habitat

RFI 3.3.1: *[Provide]* An assessment of the likely impacts associated with the proposed action, including construction and operational phases (DCCEEW, 2022)

An Ecological Assessment Report (Aurecon 2022b) was developed for the Project and finalised in August 2022. The purpose of this report was to assess the State and Commonwealth ecological impacts associated with the Project for the State based approvals. This report assessed the significant impacts on the Greater glider, Grey-headed flying fox and the Swamp Sclerophyll TEC, this was assessed in accordance with the Commonwealth Significant Impact Guidelines 1.1. This report is included in **Appendix B** and contains an analysis of potential Project impacts. In order to inform this process a precautionary principle was applied to determine the presence of the habitat for the Grey-headed flying fox using the presence of winter flowering species as per the national recovery plan for the species.

The Project footprint includes the construction of a manufacturing facility and associated infrastructure and are likely to impact the ecological values contained within the Project area through the clearing of vegetation and its associated impact on species habitat. The proposed development also has the potential to adversely impact the waterway within the Project footprint.

Project impacts which have the potential to cause harm to ecological values are summarised against construction and operational activities below.

#### Construction

- Removal of vegetation and wildlife habitat for Project activities (i.e. manufacturing facility and access tracks).

- Habitat removal also potentially leading to a reduction in connectivity and habitat fragmentation.
- Increased edge effects such as weed invasion.
- Project construction activities potentially causing alterations to hydrology.
- Project construction activities which have the potential to impact ecological values directly and indirectly, including direct mortality of plants and animals, and indirect effects from noise, dust vibration and light.

### Operation

- Operational transportation along the rail which has the potential to impact fauna due to direct mortality/injury via collision or disturbance associated with noise, light, and vibration.
- Increased erosion and sediment movement and dispersion.
- Increased activity increasing risk of bushfire in the area.
- Increased edge effects such as weed invasion.

Further detail against each impact (below) is detailed in Section 4.1 of **Appendix B**.

## 2.3.2 Direct and indirect loss for the Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox habitat

RFI 3.1.2: Include the direct and indirect loss and/or disturbance of habitat as a result of the proposed action. This must include the quality and area (in hectares) of habitat to be impacted (Section 3.1.2, DCCEEW, 2022)

### Indirect impacts

Indirect impacts for the Coastal Swamp Sclerophyll TEC and Grey-headed flying fox habitat include flora and fauna edge effects, spreading of weed and pest species as well as erosion and sediment release offsite. In addition, changes to hydrology, from construction of access roads can potentially impact ecosystem structure. This can result in the potential reduction of the extent of habitat for the Coastal Swamp Sclerophyll TEC and Grey-headed flying fox if no mitigation measures are implemented. Mitigation measures will be implemented such that there will be no indirect loss of habitat to adjoining habitat areas as a result of the Project. The most relevant mitigation measures which will enable the Project to avoid indirect impacts include:

- Pest and Weed Management Plan (PWMP) will be developed and implemented as part of the Project Environmental Management Plan (EMP) as per existing government approved management measures to reduce indirect impacts upon species habitat
- A Water Quality Management Plan will be developed and implemented as part of the Project EMP and include measures to reduce indirect water quality impacts on downstream environmental values
- An Erosion and Sediment Control Plan (ESCP) will be developed and implemented to minimise erosion and sediment movement offsite
- Guidelines provided in TMR's Road Drainage Manual have been incorporated into the Project's design to reduce impacts to the identified MNES, particularly in relation to any potential indirect impacts to aquatic species.

Further detail on additional mitigation measures is provided in **Section 2.4** of this report.

### Direct impacts

The Project will encompass approximately 68 ha and have a perimeter of approximately 10 km. Within this footprint, 17.42 ha of regulated vegetation will be removed. Table 2-3 provides the maximum area of regulated vegetation to be removed (i.e. direct impact).

**Table 4: Direct impacts**

| Vegetation Community | Description | Maximum area to be removed within the model disturbance footprint (ha) | Relevant MNES values |
|---|---|---|---|
| RE12.3.6 | *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest to woodland on alluvial plains | 4.76 | ■ Identified as habitat critical to the survival of the species for the Grey-headed flying fox by the national recovery plan<br>■ Identified as analogous to the Coastal Swamp Sclerophyll TEC by the DCCEEW Conservation Advice |
| RE12.5.4 | *Eucalyptus latisinensis* +/- *Corymbia intermedia, Corymbia trachyphloia, Angophora leiocarpa* and *Eucalyptus exserta* woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments | 12.66 | ■ Identified as habitat critical to the survival of the species for the Greater glider and Grey-headed flying fox by the national recovery plan |
| **Total area of vegetation to be removed** | | **17.42** | |

## 2.3.3 Habitat fragmentation Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox

RFI 3.1.3: *[Provide]* An assessment of the impacts of habitat fragmentation in the proposed action area and surrounding areas, including consideration of species' movement patterns (Section 3.1.3, DCCEEW, 2022)

Section 4.1.3 of the MID Ecological Assessment Report (refer **Appendix B**) examines the impacts of habitat fragmentation on the proposed area and surrounding areas. For ease of reference, below is an excerpt from this report.

### Reduction in connectivity of biodiversity corridors and habitat fragmentation

Habitat fragmentation has been identified as a threating process by the Commonwealth Conservation Advice for the Swamp Sclerophyll TEC. The Project will result in the creation of additional fragmentation by severing a relatively large patch of RE 12.3.6 in two separate locations. Fragmentation can lead to reduced buffering for remaining patches and alter the integrity of swamp systems to more dryland communities, which particularly impact species reliant on sheltered and inundated habitat. Decreased connectivity can lead to reduced seed dispersal and limit migration for species that require a large home range (DCCEEW 2022b).

Due to the vagile nature of the Grey-headed flying fox, fragmentation of habitat is unlikely to impact the species.

### 2.3.4 Duration of impacts for Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox

RFI 3.1.4: *[Provide]* An assessment of the likely duration of impacts as a result of the proposed action (Section 3.1.4, DCCEEW, 2022)

The Project's proposed duration includes:

- 20-30 months for construction of the Project
- 8 years for operation of the Project, and potential for future operations to be confirmed
- 20 years for the rehabilitation of the Project.

The above estimated duration of impacts is subject to change based on the final site design and further Project approvals.

The impacts described in Section 2.3.1 for both construction and operation timeframes provide a description of the types of impacts.

### 2.3.5 Repeated impacts for Coastal Swamp Sclerophyll TEC, Greater glider and Grey-headed flying fox

RFI 3.1.5: *[Provide]* A discussion of whether the impacts are likely to be repeated, for example as part of maintenance (Section 3.1.5, DCCEEW, 2022)

The primary Project impact to MNES, being the clearing of vegetation, will not be a repeated impact during the operational period of the Project.

The following impacts may be repeated and will therefore have a continual regime of monitoring and management:

- Erosion and sediment movement transport will be monitoring and managed continually throughout the construction, operation and rehabilitation periods of the Project via an ESCP under the Project EMP.
- Any surface water and hydrology impacts across the life of the Project will be managed through the development and implementation of a Stormwater Management Plan, to manage release of stormwater offsite.
- Monitoring and management of weeds and pest species will be continually managed across the life of the Project, due to possible encroachment at all stages of the Project. A PWMP will be implemented at all Project stages to manage weed and pest encroachment, and movement of pest species to and from site.

### 2.3.6 Unknown, unpredictable or irreversible impacts for Coastal Swamp Sclerophyll TEC and Grey-headed flying fox

RFI 3.1.6: *[Provide]* A discussion of whether any impacts are likely to be unknown, unpredictable or irreversible. (Section 3.1.6, DCCEEW, 2022)

Multiple ecological surveys have been undertaken so that the proponent has a comprehensive knowledge of the environmental setting within the Project area. All impacts which may be caused by the Project are well-known and established impacts that are consistent across similar projects (i.e., vegetation clearing,

construction activities). The Project is not proposing any new or novel technology or activities in an unknown environmental setting which may result in unknown or unpredictable impacts to the environment.

Any disturbance caused by Project activities will be rehabilitated to an outcome which reflects the pre-existing natural environment, wherever possible, as per a Rehabilitation Control Plan (RCP) and TMR's Specifications **MRTS16 Landscape and Revegetation Works.**

While impacts to the environment may not be completely reversible, impacts can be mitigated so that ongoing harm is minimised, and environmental conditions reflect the surrounding environment once the Project has ceased operations and completed rehabilitation activities.

A combination of measures, including offsets and rehabilitation activities, are being proposed so that a net environmental benefit will occur to mitigate any potential residual impacts or irreversible impacts.

RFI 3.1.7: *[Provide]* Justification, with supporting evidence, as to how the proposed action will not be inconsistent with:

- Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and
- Any relevant recovery plan or threat abatement plan. (Section 3.1.7, DCCEEW, 2022)

### 2.3.7 Consistency with obligations and plans

The Project has not proposed any inconsistencies with Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Threat abatement plans and species recovery plans have been used to inform the significant impact assessments undertaken in the MNES Report (Aurecon 2022a), under the Commonwealth's Significant Impact Assessment Guidelines 1.1 (DCCEEW 2022).

**Threat abatement plans** relevant to MNES associated with the Project include:

- Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*
- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (*Rhinella marina*)
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)
- Threats identified in the threat abatement plan for competition and land degradation by rabbits
- Threat abatement plan for predation by feral cats
- Threat abatement plan for predation by the European red fox.

**Species recovery plans** for the following MNES relevant to this Project have been adopted by DCCEEW and have been considered as part of this assessment of likelihood of occurrence and tests of significance, in particular the:

- National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022
- National Recovery Plan for the Grey-headed flying fox *Pteropus poliocephalus*.

For further evidence in relation to the application of the above plans, refer to the MNES Report (**Appendix D**).

## 2.4 Avoidance, mitigation and management measures

### 2.4.1 Summary of avoidance, mitigation and management measures

RFI 4.1: *[Provide]* A detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of the proposed action on relevant MNES (Section 4.1, DCCEEW, 2022).

Section 4.1 of the MNES Report (Aurecon 2022a) (refer **Appendix D**) provides information on general measures to avoid, minimise and mitigate potential impacts on MNES and other environmental values. **Appendix G** provides a summary regarding management plans and proposed specifications that are relevant to MNES. For ease of reference, this information has been summarised below.

- Construction Environmental Management Plan (EMP(C))
- Project EMP
- Stormwater Management Plan (SWMP)
- Bushfire Management Plan (BMP)
- Species Management Program (SMP)
- Protected Plants Clearing Permit
- TMR Fauna Sensitive Road Design Manual
- TMR Road Drainage Manual
- TMR Landscape and Revegetation Works Specification
- Environmental Specifications for Rail
- General mitigation measures.

Further explanation of each of the above avoidance, mitigation and management measures have been included below.

#### Construction Environmental Management Plan (EMP(C))

The total amounts of vegetation to be removed and removal process will be addressed prior to removal in the Project EMP(C).

To minimise the risk of weed and pest animal establishment within and adjacent to the Project area, the measures outlined in the EMP(C) will be implemented by the appointed contractor(s) and be overseen and audited by the relevant Site Environmental Officer. Pest fauna will be monitored throughout the Project and management measures within the project EMP(C) will reduce impacts.

The EMP(C) will manage all incoming vehicles, fill material and vegetation for rehabilitation purposes to ensure that no weed species that are particularly harmful to swamp, wetland and riparian habitat suitable for Wallum froglet are introduced into the Project footprint. The EMP(C) includes an internal 'permit to disturb' process to ensure construction does not occur outside of the authorised and designated footprint.

#### Project Environmental Management Plan (Project EMP)

The Project EMP will be established for the operational life of the Project and will include an array of sub-management plans and monitoring programs to monitor, measure and minimise impacts on the environment.

A PWMP will be developed and implemented as part of the Project EMP. The PWMP will outline specific measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area. Only chemicals suitable for use near waterways will be approved for use in reasonable proximity of

watercourses/drain lines within the Project area. Weed control measures will be designed to minimise impacts on native fauna (e.g. use of aquatic and frog friendly chemicals).

A Water Quality Management Plan will be developed and implemented as part of the Project EMP and will include management measures to minimise indirect water quality impacts on downstream environmental values.

An Air Quality Management Plan will be developed and implemented as part of the Project EMP and will include management measures to reduce air quality impacts.

## Stormwater Management Plan (SWMP)

A SWMP water quality component has been developed to provide stormwater quality analysis and identify any impacts associated with the proposed changes to land use on the site.

A range of treatment measures have been assessed and a treatment strategy has been proposed to target specific stormwater pollutants. Water quality modelling (MUSIC model) and indicative sizing of treatment measures has been undertaken to support this assessment and confirm the appropriateness of the proposed treatment measures for the site.

The following stormwater quality treatment measures are proposed for the Project:

- Rainwater tanks are proposed as the primary treatment device to treat runoff from roof areas. The stored water provides opportunities for reuse.
- Bio retention swales.

Results of the MUSIC modelling demonstrate that the development site and the above adopted mitigation strategies and water quality treatment train will sufficiently reduce and prevent any adverse impact to the health and quality of nearby waterways.

## Bushfire Management Plan (BMP)

A BMP was completed alongside the MID Environment Assessment Report (Aurecon 2022c). The purpose of the BMP is to identify hazards within and adjoining the Project area, and provide actions on how to manage the hazards.

The BMP identifies the main bushfire hazards within the Project area and its immediate surroundings as the vegetation that is pervasive of the area. The vegetation is characterised by high and medium potential bushfire intensity flora, containing open forest, pine plantation and grazed grassland. Historically, regular hazard reduction measures have been adopted to reduce the intensity of potential bushfires, specifically within the Wongi State Forest. Grazing on the Project area has also assisted in reducing the intensity of bushfires.

Additionally, the machinery that will be used in the operation of the facility may provide an ignition source if not managed appropriately.

To mitigate bushfire risk to people and property the following measures are recommended and will be incorporated into the design of the facility:

- The implementation of asset protection zones of up to 25 m around the facility
- Buildings being designed in accordance with relevant bushfire guidelines
- Implementation of fire breaks
- Planned and controlled burning to reduce fine fuels and grasses
- Building maintenance during fire season, including the clearing of gutters, fire extinguisher servicing, and fire hose and alarm system testing.

## Species Management Program (NC Act)

A High Risk Species Management Program (SMP) under the NC Act will be prepared due to the presence of potential animal breeding places for threatened and Special Least Concern species (i.e. the NC Act Vulnerable species Wallum froglet [*Crinia tinnula*] and colonial breeding species, including gliders and Microchiropteran bats) (Aurecon 2022b).

Works undertaken in accordance with the proposed High Risk SMP for State listed acid frog (*Crinia tinnula*), will provide environmental benefits for the surrounding communities, including the TEC.

**Appendix E** of the MNES Report (**Appendix D**) (Aurecon 2022a) provides the High Risk SMP. **Appendix C** in the High Risk SMP includes a table 'Impact mitigation measures' which includes control activities to avoid, minimise and management impacts.

## Protected Plants Clearing Permit

No vegetation clearing is to take place without an appropriate vegetation clearing permit in place. A permit is required under the NC Act to undertake clearing that may impact Critically endangered, Endangered, Vulnerable, or Near Threatened (CEEVNT) species.

A protected plants survey was undertaken within the Project area on 18th and 19th May 2021. The survey identified no CEEVNT flora species protected under the provisions of the NC Act present within the Project area. The NC Act provides exemptions for work that will not impact CEEVNT flora species.

It is proposed that clearing works involved with the development of train manufacturing facility will qualify for such an exemption, as the flora species that were recorded were identified as either Least Concern or not deemed to be 'in the wild' under the NC Act.

An exemption for a Protected Plant Clearing Permit has been granted for the Project (Department of Environment and Science Reference: APP0083083) and will be applicable for three years from the date of survey (May 2021) (Aurecon 2022c).

## TMR Fauna Sensitive Road Design Manual

The conservation and protection of native fauna, including threatened and endangered species, is important to TMR. Road corridors are maintained where possible to support unique flora and fauna species. As part of the planning stage for this Project, TMR completes environmental assessments to understand the potential risks on fauna corridors, fauna habitat and the potential for road kills, to inform the Project design where possible.

As part of the design process, TMR's Fauna Sensitive Road Design Manual is used to design, construct and maintain roads that better accommodate the needs of fauna, by reducing habitat or population fragmentation and the impact of road traffic. The Fauna Sensitive Road Design Manual has been divided into two parts, including:

- Part 1 (https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Faunasensitive-road-design-volume-1) provides information to assist practitioners to design, construct and maintain roads that better accommodate the needs of fauna, including:
  - Chapter 2: Current legislation regarding fauna conservation
  - Chapter 3: Population ecology and animal behaviour
  - Chapter 4: Wildlife corridors
  - Chapter 5: Effects of roads
  - Chapter 6: Existing practices
  - Chapter 7: Review of field data
- Part 2 (https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Fauna-Sensitive-Road-Design-Volume-2) provides information to assist practitioners to design, construct and maintain roads that better accommodate the needs of fauna, including:

- Chapter 3: Preferred planning for mitigation measures
- Chapter 4: Site assessment of monitoring
- Chapter 5: Maintenance requirement
- Chapter 6: Measures to achieve fauna sensitive roads
- Chapter 7: Target species design considerations
- Chapter 8: Non-native species design consideration
- Chapter 9: Case studies.

When considering the suitability of fauna friendly infrastructure as a possible mitigation measure, TMR consider a number of issues, including:

- The design needs of the target species
- Existing landscape connectivity
- Current and future land uses adjacent to the Project
- Physical design constraints such as topography, geometry, accessibility and drainage
- Road safety and funding availability for both construction and an ongoing maintenance commitment
- The suitability of alternative mitigation measures such as signage, habitat restoration and reduced speed limits.

Measures as outlined in TMR's Fauna Sensitive Road Design Manual have been incorporated into the Project's road design to reduce impacts to the identified MNES.

## TMR Road Drainage Manual

TMR's Road Drainage Manual provides information related to the planning, design, construction, maintenance and operation of road drainage infrastructure. It provides the technical reference required for all aspects of hydraulic, road drainage, erosion, environmental and sediment control throughout Queensland.

TMR has generally agreed to adopt the guidance published in Austroads' Guides to **Road Design series** (https://austroads.com.au/safety-and-design/road-design/guide-to-road-design) as part of national harmonisation. While the Road Drainage Manual remains the primary document, it references and adopts criteria and methodology as published in the Austroad's Guide to Road Design.

Guidelines provided in TMR's Road Drainage Manual have been incorporated into the Project's design to reduce impacts to the identified MNES, particularly in relation to any potential indirect impacts to aquatic species.

## Landscape and Revegetation Works (Specification MRTS16)

This Technical Specification (Specifications MRTS16) applies to the construction of landscape and revegetation treatments in road works. This Technical Specification provides a standardised approach to ensure that landscape and revegetation treatments are of sufficient standard and quality to meet TMR's expectations and minimise impacts to the surrounding landscape.

Site rehabilitation will be undertaken in accordance with TMR's Specifications MRTS16.

## Environmental Specifications for Rail

The functional environmental specifications for the construction of rail and facility are to conform with the two Queensland Rail standards (MD-10-64 *Policy Statement – Environment* and MD-13-320 *Framework Environmental Planning and Management*) as well as one International Standard (ISO-14001 – Environmental management systems).

## General mitigation measures

General mitigation measures to be applied to the Project, include:

- A Suitably Qualified and Experienced Person (SQEP) will be nominated to oversee the environmentally relevant tasks and activities. This may include (but not limited to) overseeing vegetation clearing, liaising with any spotter/catcher contractors, reporting any environmentally relevant information to the appropriate regulatory authorities and ensuring conformance occurs for all environmental requirements documented in the Project EMP.
- Washdown and weed and seed certificates are to be gained in accordance with local and State government biosecurity requirements.
- Clearly delineate significant vegetation boundaries to prevent unnecessary vegetation clearing of MNES.
- All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified spotter catchers.
- Discourage the feeding of wildlife by Project personnel throughout the Project area.
- Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15-degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site.
- Avoidance of direct impact to waterways (i.e. remain outside of the existing drainage system).
- Appropriate sediment and erosion control at all works sites.
- Works undertaken in accordance with the proposed High-risk SMP for State listed acid frog (*Crinia tinnula*), providing environmental benefits for the surrounding communities, including the TEC.
- Temporary fencing to be installed along clearing boundaries to identify no-go areas and reduce access to stream bank vegetation.
- A certified fauna spotter/catcher (i.e. holding a Damage Mitigation Permit (Removal and Relocation of Wildlife) and/or Rehabilitation Permit issued by DES) will be engaged to inspect the Project area within 48 hours prior to vegetation clearing. The fauna spotter/catcher will:
  - Undertake pre-clearance ecological assessments prior to any–vegetation clearing − Where practical, active breeding nests will be relocated prior to clearing
  - Identify infrastructure which are used by fauna (e.g. culverts that may be used by some species for roosting).
- Ensure that where a habitat tree requires removal, the habitat is removed by suitably qualified personnel with a certified spotter/catcher present prior to the commencement of any clearing in order to safely remove any fauna species which might be located inside. Actions to be implemented include:
  - Measures will be taken to avoid injuring animals.
  - Displaced fauna will then be relocated to a suitable, previously identified recipient site, provided the animal did not sustain any injuries. Any injured animals (native or introduced) are to be taken to receive veterinary attention immediately. Once recovered, animals will be relocated to an area of similar habitat adjoining the Project area.
  - In the case of the presence of other fauna species, the spotter/catcher will encourage the fauna to leave by reasonable means or capture and relocate it in the local environment prior to felling and trimming. If the spotter/catcher determines that a fauna species is present in a tree he/she will remove the animal prior to the felling of that tree or any tree of which the crown overlaps that tree. All members of staff have an obligation to report any fauna species seen in areas to be cleared to the fauna spotter/catcher prior to clearing.
- During construction works, a certified fauna spotter/catcher is to inspect trenches, culverts and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate.

- Where practical, any fauna to be relocated will be moved to an area of similar habitat within close proximity to the Project site. It is preferable that this site is of similar vegetation characteristics in order to replicate habitat for displaced fauna. Suitable relocation areas will be identified prior to the commencement of clearing by the spotter/catcher.
- Environmental incidents will be reported, including those which involve harm to native wildlife, to DES within 24 hours of the incident occurring. The report will include details on the location and cause of the incident, extent of impact and corrective action taken.
- In the event of injury to fauna, works in the area will cease immediately and not recommence until rescue actions have been undertaken and a review of appropriate management actions to ensure the risk of reoccurrence is minimised.
- Contact details for qualified animal carers and vets within the area to be outlined provided to relevant staff.
- The placement and use of Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna.
- Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction.
- Where practical use existing roads and access tracks. Design any new access tracks (permanent and temporary) with the aim of minimising the loss and/or impact on existing vegetation communities. Access tracks must not be constructed through vegetation not approved for clearing.
- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zones of trees (to avoid compaction)
- All contractors are to be made aware of the risks associated with fauna and vehicle movement. This is to be provided in a toolbox.
- All contractors must ensure that only appropriately sized machinery is used during Project works to minimise potential impact to adjacent flora (i.e., direct collision with flora).
- Avoid chemical contact (e.g., fuel spills, unnecessary use of insecticides/fertilisers, etc.) with the environment where possible.
- Fuel and chemical storage facilities should be bunded and designed in order to provide sufficient buffer zones and limited pathways to adjoining terrestrial and aquatic environments.
- Any waste storage facilities associated with the Project area are to be designed and located to restrict fauna access. Ensure all contractors are aware that all waste must be discarded in suitable waste receptacles that cannot be accessed by wildlife.
- Stockpile sites and storage of machinery, materials or equipment will be within designated areas that have already been disturbed and outside of the drip zone of any trees. Areas outside of the Project area must not be disturbed in order to create stockpile sites or storage areas.
- A PWMP is to be developed as part of the Project EMP and will outline specific measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area. Weed control measures will be designed to minimise impacts on native fauna (e.g. us of aquatic (fish-friendly) and frog friendly chemicals).
- To minimise the risk of weed and pest animal establishment within and adjacent to the proposed clearing area, the measures outlined in the PWMP will be implemented by the appointed contractor(s) and be overseen and audited by the relevant Site Environmental Officer.
- Fill and imported soil materials are to be declared weed free or to be sourced from weed free areas.
- No domesticated animals (e.g. dogs) to be allowed on site.
- No stormwater is to be discharged from the site without passing through appropriate treatment devices.
- Sediment fences shall be located along the construction boundary when down slope. Sediment fencing posts/pickets should have maximum spacing of 2 m and be installed in accordance with the certified ESCP and manufacturers specifications.

- Sediment fences will be inspected weekly for UV degradation, effectiveness and capacity (maintained at greater than 60%). Sediment fences shall not be removed until disturbed areas have been stabilised. Replacement may be required.
- Vehicle exit point(s) will incorporate designated shakedown area and access roads/driveways will have clean aggregate rock/stone/recycled concrete overlaid as soon as practicable to reduce the amount of sediment transfer onto the road.
- Equipment which is used intermittently should be shut down when not in use.
- Development of a site-specific Construction Air Quality Management Plan to reduce potential air quality impacts, including:
  - Specify locations of shake-down areas on drawings in locations where trucks will be moving from unsealed to sealed areas
  - Maintain sealed access roads to the Project area where reasonably practicable
  - Vehicles and plant to be operated at speeds appropriate to weather conditions
  - Cover loads on haul trucks
  - Ensure vehicles and plant use designated entry and exist points
  - Stabilisation and regular watering of main haul routes and traffic areas to minimise the generation of dust
  - Ensure vehicles and plant comply with the relevant Australian Standards for emissions, and
  - Ensure regular servicing of vehicles to maintain compliance with standards.

### 2.4.2 Best available practices, standards and evidence

RFI 4.2: The proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence (Section 4.2, DCCEEW, 2022).

A number of the mitigation measures referenced in the previous section relate to specifications and manuals developed by TMR which have been implemented across a wide range of sites. These include specifications and manuals include:

- Specification MRTS16: Landscape and Revegetation Works
- TMR Road Drainage Manual
- TMR Fauna Sensitive Road Design Manual.

TMR has referred 13 projects to the Commonwealth Minister for the Environment and Water for consideration in the last three years, with at least 10 projects being completed or in post-approval. These specifications have previously been reviewed and assessed as part of a wide range of projects.

Additionally, the environmental specifications for the construction of the rail and facility must conform to the following Queensland Rail standards, which have been used across a number of sites:

- MD-10-64 Policy Statement – Environment
- MD-13-320 Framework Environmental Planning and Management.

The Environmental Management Plan/Programs (Construction and Project versions) will be compliant with the International Standard ISO-14001 – Environmental management systems.

### 2.4.3 SMART Principles

RFI 4.3: All proposed measures for MNES must be drafted to meet the 'S.M.A.R.T' principle:
- S –Specific (what and how)
- M –Measurable (baseline information, number/value, auditable)
- A –Achievable (timeframe, money, personnel)
- R –Relevant (conservation advices, recovery plans, threat abatement plans)
- T –Time-bound (specific timeframe to complete)

(Section 4.3, DCCEEW, 2022)

As part of the development of management and monitoring plans and programs, measures which are compliant with the SMART principles will be developed and implemented. Management plans that will be compliant to SMART principles are outlined in **Appendix G**.

### 2.4.4 Commitments

RFI 4.4: Details of specific and measurable environmental outcomes to be achieved for relevant MNES. All commitments must be drafted using committal language (e.g. 'will' and 'must') when describing the proposed measures (Section 4.4, DCCEEW, 2022)

A number of commitments relating to mitigation and management measures for the Project, to reduce environmental degradation and impacts to MNES, are included in Table 2-4.

**Table 5: Project commitments**

| # | Commitment |
|---|---|
| 1 | A Suitably Qualified and Experienced Person will be nominated to oversee the environmentally relevant tasks and activities. |
| 2 | The Project will be designed and constructed in accordance with TMR and Queensland Rail's specifications, manuals, standards and guidelines to reduce impacts to MNES. |
| 3 | The final Project design will adopt the hierarchy of mitigation (i.e. avoided, minimised, and mitigated where possible) to reduce the duration and severity of impacts. |
| 4 | Works will be undertaken in accordance with State-based legislative mechanisms geared towards environmental protection, which require specific approvals to be in place prior to disturbance, including:<br>▪ Rehabilitation Permit (spotter catcher endorsement) (Part 14 of the Nature Conservation (Animals) Regulation 2020)<br>▪ Damage Mitigation Permit (removal and relocation) (Part 10 of the Nature Conservation (Animals) Regulation 2020)<br>▪ Species Management Plan (Section 335 of the Nature Conservation (Animals) Regulation 2020). |
| 5 | An EMP(C) will be developed in compliance with IS0 14001, and will be implemented at the Project to mitigate and manage environmental impacts during construction activities, and will include:<br>▪ Measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area<br>▪ Requirements for pre-clearance surveys to protect species (i.e. koala)<br>▪ Management measures around the amounts of vegetation to be removed and the removal process<br>▪ Construction Air Quality Management Plan to reduce potential air quality impacts. |

| # | Commitment |
|---|---|
| 6 | A Project EMP will be developed and implemented for the duration of the Project's operations, and will be compliant with ISO 14001, and include the following management plans:<br>■ Water Quality Management Plan to reduce indirect water quality impacts on downstream environmental values<br>■ PWMP to implement existing government approved management measures to reduce indirect impacts upon species habitat<br>■ AQMP to implement management measures to reduce air quality impacts. |
| 7 | Project works will adhere to a certified Project ESCP in accordance with MTRS52 Erosion and sediment control processes. |
| 8 | Rehabilitation will occur for the areas disturbed by the Project, as per a RCP and as per TMR's Specification MRTS16: Landscape and Revegetation Works. |
| 9 | Rehabilitation areas within the Project area will seek to restore the pre-disturbance vegetation communities. |
| 10 | Offsets will be provided under the EPBC Act and EPBC Act Offset Assessment Guide to mitigate the loss of the Coastal Swamp Sclerophyll Forest of NSW and SEQ QLD. Offsets will also be provided to mitigate the loss of habitat for the Greater glider (*Petauroides volans*) and the Grey-headed flying fox (*Pteropus poliocephalus*). The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES. |

RFI 4.5: Details of the proposed measures to be undertaken to avoid, mitigate and manage the relevant impacts of the proposed action, including those required through other Commonwealth, State and local government approvals (Section 4.5, DCCEEW, 2022)

### 2.4.5 Other approvals

The following permits and management plans will be required for the Project, which will include additional measures to avoid, mitigate and management impacts caused by the Project:

- Rehabilitation Permit (spotter catcher endorsement) (Part 14 of the Nature Conservation (Animals) Regulation 2020)
- Damage Mitigation Permit (removal and relocation) (Part 10 of the Nature Conservation (Animals) Regulation 2020)
- SMP must be submitted to DES for approval for tampering with some animal breeding places (Section 335 of the Nature Conservation (Animals) Regulation 2020).

### 2.4.6 Timing, frequency and duration

RFI 4.6: Information on the timing, frequency and duration of the proposed avoidance, mitigation, management and monitoring measures, and any corrective actions to be implemented, where relevant (Section 4.6, DCCEEW, 2022)

A large number of avoidance, mitigation and management measures have been proposed in Section 2.4.1 and will be required over different stages of the Project. Management plans to be developed are listed in **Appendix G**. This is summarised below.

Further detail on the exact timing and frequency of monitoring, management and mitigation measures will be subject to the development of management plans and programs prior to construction (following obtaining all Project approvals).

### Construction (20 to 30 months)

- TMR Fauna Sensitive Road Design Manual
- TMR Road Drainage Manual
- Environmental Specifications for Rail (Queensland Rail)
- Project EMP(C), including:
  - Weed and pest management
  - Erosion and sediment control
  - Vegetation clearing monitoring and pre-clearance surveys
  - Construction air quality monitoring.

### Operational (8 Years – future operational use to be confirmed)

- Project EMP, including:
  - PWMP
  - Water Quality Management Plan
  - AQMP
- SWMP
- BMP
- SMP
- Protected Plants Clearing Permit.

### Rehabilitation (as areas become available during and post construction)

- TMR Landscape and Revegetation Works Specification.

## 2.4.7 Effectiveness

RFI 4.7: An assessment of the expected or predicted effectiveness of the proposed measures. (Section 4.7, DCCEEW, 2022)

All proposed avoidance, mitigation and management measures are based on controls that have been used as a standard across a multitude of sites and follow the international standard ISO 14001 Environmental Management Systems.

The effectiveness of the proposed measures is predicted to be of a high standard, in consideration of the number of sites constructed, managed and remediated by TMR across Queensland.

### 2.4.8 Statutory or policy basis

RFI 4.8: Any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are not inconsistent with relevant plans. (Section 4.8, DCCEEW, 2022)

The below mentioned plans will be used to inform a number of mitigation measures, but are primarily relevant to the development of the PWMP.

**Threat abatement plans** relevant to MNES associated with the Project include:

- Threat abatement plan for disease in natural ecocystems by *Phytophthora cinnamomi*
- Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (*Rhinella marina*)
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)
- Threats identified in the threat abatement plan for competition and land degradation by rabbits
- Threat abatement plan for predation by feral cats
- Threat abatement plan for predation by the European red fox.

**Species recovery plans** for the following MNES relevant to this Project have been adopted by DCCEEW and have been considered as part of this assessment of likelihood of occurrence and tests of significance, in particular the:

- National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022
- National Recovery Plan for the Grey-headed flying fox *Pteropus poliocephalus*.

### 2.4.9 Adaptive management approach

RFI 4.9: Details of ongoing management, including monitoring programs to support an adaptive management approach, that validate the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved (Section 4.9, DCCEEW, 2022)

Ongoing monitoring of environmental conditions is proposed and will support an adaptive management approach to implementing mitigation measures. These monitoring regimes are summarised below and are described further in **Section 2.4.1** under each of the relevant measures.

- Stormwater and water quality monitoring
- Pest and weed monitoring
- Erosion and sediment monitoring
- Species (breeding places) monitoring.

### 2.4.10 Corrective actions

RFI 4.10: Details of tangible, on-ground corrective actions that will be implemented in the event the monitoring programs indicate that the environmental outcomes have not or will not be achieved. (Section 4.10, DCCEEW, 2022)

Trigger Action Response Plans (TARPs) are a standard component of monitoring and management programs and will provide opportunity for the identification of triggers that may result in environmental degradation (i.e. early identification) and the implementation of actions to mitigate impacts prior to significant harm being caused.

TARPs are required as part of emergency preparedness and response procedures within ISO 14001 and to be included in the EMP(C) and Project EMP at a minimum. TARPS will be incorporated within the management plans to be developed in **Appendix G.**

## 2.5 Rehabilitation requirements

### 2.5.1 Rehabilitation acceptance criteria

RFI 5.1: Rehabilitation acceptance criteria, including for the restoration of habitat for relevant listed threatened species and communities. (Section 5.1, DCCEEW, 2022)

Rehabilitation will occur within the areas temporarily disturbed by the Project. These areas will include, but not be limited to, construction laydown areas and disturbance areas without permanent infrastructure. All rehabilitation areas will be commensurate to the areas of temporary disturbance. Rehabilitation areas within the Project area will seek to restore the pre-disturbance vegetation communities (refer page 1, MNES Report in **Appendix D**).

The Project will follow procedures which will include an RCP.

A Rehabilitation Permit (spotter catcher endorsement) will be required for the Project under the NC Act.

This Technical Specification (Specifications MRTS16) applies to the construction of landscape and revegetation treatments in road works. This Technical Specification provides a standardised approach to ensure that landscape and revegetation treatments are of sufficient standard and quality to meet TMR's expectations and minimise impacts to the surrounding landscape.

Site rehabilitation will be undertaken in accordance with TMR's Specifications MRTS16, which includes completion criteria for the following:

- Weed management (Clause 9.1.1.3 MRTS16)
- Seeding treatment (Clause 9.1.2.1 MRTS16)
- Turfing treatments (Clause 9.1.2.2 MRTS16)
- Planting treatments (Clause 9.1.2.3 MRTS16).

RFI 5.2: A summary of the procedures, including contingency measures, that will be undertaken to achieve the rehabilitation acceptance criteria (Section 5.2, DCCEEW, 2022)

### 2.5.2 Procedures and contingency measures

A Rehabilitation Management Plan will be prepared to provide guidance and procedures that will allow TMR, to achieve enhanced environmental outcomes as part of the development of the Project. This includes:

- A regeneration strategy
- Weed control techniques
- Revegetation
- Maintenance Inspection and reporting.

TMR will ensure that controls are properly implemented, regularly monitored and audited to assess their effectiveness. Changes to the vegetation management controls will be investigated if they are not achieving their objectives.

### 2.5.3 Rehabilitation monitoring program

RFI 5.3: A summary of a monitoring program to determine the success of rehabilitation activities implemented by the proponent. (Section 5.3, DCCEEW, 2022)

Monitoring for restoration is typically undertaken using quantitative methods (i.e. transect or quadrat-based monitoring) and qualitative methods (i.e. observations on daily record sheets and photo-point monitoring).

Prior to the commencement of restoration activities, a minimum of five photo-monitoring points are to be established in each regeneration zone. Baseline data is to be collected at each of these locations using transect and quadrat-based sampling techniques, to which progress can be measured. Data should be collected within stratified random quadrats of a minimum size of 20 m x 20 m.

Monitoring is to be conducted at three-monthly intervals for the first two years and then at six-monthly intervals thereafter until the performance targets have been achieved.

Performance indicators will be set along with an adaptive management strategy to be adopted to ensure compliance (i.e. in instances of drought, fire, disease, or planting failure). In instances where weeds persist on site, or excessive mortality within revegetation zones, management strategies are to be revaluated and updated to ensure that performance indicators are met.

Any alterations to any component of this management plan will be approved the relevant regulatory authority and to be accompanied by an Adaptive Management Statement (AMS) which clearly outlines the plan component to be altered and the reasoning for the alteration.

RFI 5.4: The details of any rehabilitation activities proposed to be undertaken as required by Commonwealth, State or Territory, and local government legislation. Attach relevant Commonwealth, State or Territory, and local government approvals and permits as supporting documents to the preliminary documentation. (Section 5.4, DCCEEW, 2022)

### 2.5.4 Other rehabilitation approvals

Under Queensland legislation, including the NC Act, the following permits and management plans relating to rehabilitation activities, are being developed for the Project:

- Rehabilitation Permit (spotter catcher endorsement) under Part 14 of the Nature Conservation (Animals) Regulation 2020
- Rehabilitation Management Plan.

The permit and management plan have not yet been fully developed and approved and could not be attached to this report.

## 2.6 Offsets

### 2.6.1 Residual significant impacts

RFI 6.1: An assessment and conclusion on whether residual significant impacts will occur on relevant protected matters, after application of avoidance, mitigation and management measures. (Section 6.1, DCCEEW, 2022)

The Project will implement avoidance and mitigation measures (including the provision of offsets) to minimise the significant residual impacts on the MNES.

Offsets provided for under the policy include direct offsets. The provision of direct offsets is proposed based on the outcomes of the assessment of significance and the extent of the significant residual impacts on MNES (refer page 11, MNES Report in **Appendix D**).

The Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Greater glider (*Petauroides volans)* and Grey-headed flying fox (*Pteropus poliocephalus)* have been identified as likely to be subject to significant impacts when assessed against the Significant Impact Guidelines 1.1 (DoE 2013) as the Project will reduce the extent of the ecological community (i.e. removal of 4.76 ha) and habitats for the Greater glider and Grey-headed flying fox (i.e. removal of 17.46 ha). The removal of this area is unavoidable and therefore, in order to mitigate the loss of this area, direct offsets are proposed in accordance with the Commonwealth's EPBC Act Environmental Offsets Policy and calculated as per the EPBC Act Offset Assessment Guide (refer page 34, MNES Report in **Appendix D**).

The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES. Areas of offsets for the direct disturbance of the TEC and habitat will occur within the Project area (land parcel of the Project).The total offset area is dedicated to 55 ha. The offset area will include 15.12 ha for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, 45.4 ha for the Grey-headed flying fox habitat, and 55 ha of habitat suitable for the Greater glider. Greater glider and Grey-headed flying fox habitat will be provided as a composite offset (refer page 2, MNES Report in **Appendix D**).

### 2.6.2 Summary of proposed environmental offset

RFI 6.2: A summary of the proposed environmental offset and key commitments to achieve a conservation gain for each relevant protected matter (Section 6.2, DCCEEW, 2022)

In order to ensure that a positive conservation outcome is achieved, it is proposed that an environmental offset of 55 ha for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Greater glider habitat, and Grey-headed flying fox habitat will be provided. This offset quantum has been calculated utilising the EPBC Act Offset Assessment Guide. 15.12 ha of offset is required for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, 55 ha for the Greater glider, and 45.4 ha for the Grey-headed flying fox. These areas have been assessed and will be provided as a composite offset for the Greater glider and Grey-headed flying fox. The provision of this environment offset also has the potential to benefit other MNES within the location area that are unlikely to be subject to significant impacts from the Project (e.g. migratory species) (refer page 38, MNES Report in **Appendix D**).

Whilst assessment of the Project upon the Koala, White-throated needletail and migratory species indicated that these species are not likely to be subject to significant impacts from the Project, the provision of a direct offset for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Greater glider habitat, and Grey-headed flying fox habitat would ensure that these species are subject to a positive conservation outcome as a result of the Project (refer page 35, MNES Report in **Appendix D**).

### 2.6.3 Offset Area Management Plan

RFI 6.3: Where offset area/s have been nominated, include a draft OAMP as an appendix to the PD. The draft OAMP must meet the minimum information requirements set out in **Appendix B**.1, and must be prepared by a suitably qualified ecologist and in accordance with the department's Environmental Management Plan Guidelines (2014), available at: www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines. (Section 6.3, DCCEEW, 2022)

An Offset Area Management Plan (OAMP) has been developed for the Project and is provided in **Appendix H.**

## 2.7 Ecologically Sustainable Development (ESD)

RFI 7.1: *[Provide]* A description of how the proposed action meets the principles of ESD, as defined in section 3A of the EPBC Act.

a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;
b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and
e) improved valuation, pricing and incentive mechanisms should be promoted. (Section 3.1.7, DCCEEW, 2022)

TMR understands, and are committed to, meeting the intent of the EPBC Act and DCCEEW's requirements. Using the precautionary principle, TMR identified that this Project would be a Project which could significantly impact upon MNES, and subsequently the Project was referred to the Commonwealth Minister for the Environment and Water for a controlled action determination under the EPBC Act.

Table 2-5 has been developed to provide responses against each Ecologically Sustainable Development (ESD) principle, as per Section 3A of the EPBC Act.

**Table 6: ESD principles**

| Principle | Response |
|---|---|
| Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations. | The Project will implement avoidance and mitigation measures (including the provision of offsets) to minimise the significant residual impacts on the MNES.<br>Offsets provided for under the policy include direct offsets, and other compensatory methods (or indirect offsets). The provision of direct offsets is proposed based on the outcomes of the assessment of significance and the extent of the significant residual impacts on MNES.<br>The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES. |
| If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used | A number of field surveys by qualified ecologists, in compliance with relevant standards, have been undertaken in order to understand the existing environment and develop |

| Principle | Response |
|---|---|
| as a reason for postponing measures to prevent environmental degradation. | a strong understanding of any environmental degradation that would be caused by the Project and its activities.<br><br>Reference has been made to the relevant MNES Guidelines, Species Recovery Plans and Threat Abatement Plans for the relevant MNES to develop this understanding of the Project and reduce any uncertainty.<br><br>All possible measures to prevent environmental degradation have been considered, including avoidance, management and monitoring measures, rehabilitation, and offsets under the EPBC Act framework. |
| The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. | Inter-generational equity has been considered and promoted as part of the Project's design and proposed activities.<br><br>A number of mitigation measures are being proposed to ensure that the health, diversity and productivity of the environment is maintained or enhanced for future generations. These include rehabilitation activities to ensure disturbed areas are transitioned back to pre-disturbance environmental values, as well as offsets under the EPBC Act.<br><br>An offset area of 55 ha will provide approximately 100.09% of the direct offset requirement, resulting in a positive conservation outcome for MNES identified in the Project area. |
| The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making. | Wherever possible, the Project has been designed to conserve biological diversity and ecological integrity, which included consideration of options to vary Project designs or methodologies to minimise impact on the threatened species breeding places.<br><br>Additionally, mitigation measures have been designed to reduce the magnitude and severity of potential impacts upon the environment, including animals, plants and animal breeding places. Refer to Section 2.4 which provides further detail on mitigation strategies proposed for the Project. |
| Improved valuation, pricing and incentive mechanisms should be promoted. | The Project has used the latest version of the EPBC Act Offsets Policy and calculated as per the Offset Assessment Guide. |

## 2.8 Economic and social matters

### 2.8.1 Economic and social impacts

RFI 8.1: An analysis of the economic and social impacts of the action, both positive and negative. (Section 8.1, DCCEEW, 2022)

QTMP is a program of works that has been initiated by TMR to modernise and allow the expansion of the SEQ passenger train fleet to support the region's population and economic growth, while reducing road congestion and associated emissions.

Following delivery of the QTMP, the State-owned manufacturing facility will revert to the State after the contractor's term is fulfilled.

The key strategic objectives of the QTMP are to:

- Ensure the provision of affordable, safe, accessible, and high-quality passenger rail services for the people of SEQ
- Grow passenger rail customer satisfaction and facilitate the predicted increase of passenger rail patronage in SEQ
- Deliver trains and associate infrastructure which integrates with, and enhances SEQ's existing and future rail operating environment, including CRR
- Improve train availability and reliability to meet operational requirements
- Create genuine, quality, secure, and ongoing jobs for Queenslanders, and to increase manufacturing capability and encourage supply chain resilience through the engagement of local suppliers and local workforces.

A full summary of the Torbanlea rail facility site key benefits is provided in **Appendix I**.

### 2.8.2 Public consultation

RFI 8.2: Details of any public consultation activities undertaken and their outcomes (Section 8.2, DCCEEW, 2022)

Section 1.2.4 (Stakeholder engagement) of the MNES Report (refer **Appendix D**) describes the stakeholder engagement and public consultation that has occurred. This information has been included below for ease of reference. It is important to note that some engagement activities are still underway, and therefore outcomes are not yet available for discussion in this report.

#### Ministerial Infrastructure Designation (MID) submission engagement

An Initial Advice Request (IAR) was lodged to the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) in seeking initial advice regarding the MID proposal.

TMR undertook preliminary stakeholder engagement with the Torbanlea community in August 2021 in accordance with the Minister's Guidelines and Rules for the MID process and the Operational Guidance for Making or Amending a Ministerial Infrastructure Designation. This correspondence included a brief program overview letter and frequently asked questions (FAQ) sheet, which was mailed in early November 2021 to residents within the vicinity of the site. The letters served as preliminary advice of the MID process and the related upcoming public consultation period. Contact details for the QTMP Project team were provided within the contents of the letter, however limited response was received.

The MID public consultation period was open between 28 April 2022 and 30 May 2022. As part of this process, the local community and key stakeholders had the opportunity to provide feedback about the future train manufacturing facility. Letters were sent advising stakeholders and 100 surrounding residents of the MID process, QTMP MID submission and guidance for to provide feedback to DSDILGP. Approval of the MID application could not be received until the public notification period closed and submissions from stakeholders and residents are considered by DSDILGP. In total, there were four submissions received in relation to the Project which all related to objections to the acquisition of the land.

#### Local industry and community engagement

A briefing event was held at Maryborough in early December 2021 to engage local suppliers and manufacturers and introduce QTMP's supply chain opportunities. Strong attendance and encouraging survey outcomes suggest positive public perception was established and maintained from the November 2021 media coverage following the Premier's announcement of the Program. Over 500 members of the

Maryborough region community were engaged at five drop-in information sessions held around the region between 26 April and 7 May 2022. To conduct the engagement program, the QTMP Communications Team collaborated with representatives of DSDILGP, Department of Employment Small Business and Training, Department of Regional Development Manufacturing and Water and Translink Wide Bay.

The purpose of the engagement program was to inform the community about the current status of the QTMP, and to understand from local communities, the current and future potential operational, access and environmental impacts of the manufacturing site. The information sessions served as the initial face-to-face engagement with the local community to create awareness and education about the Program.

From community information sessions, general project information, supply chain, employment and training enquiries accounted for the majority of all interactions. No significant environmental concerns were raised by community members. Overall, the sentiment QTMP within the community was overwhelmingly positive and supportive of the future Torbanlea manufacturing facility.

Future engagement programs will target local industry, job seekers, local community and small business owners.

### Stakeholders, local government, and council

The QTMP team has engaged the local government and Fraser Coast Regional Council through regular briefings and Project updates.

The Butchulla people of the Maryborough region have been engaged during various stages of the Project. Representatives from the Butchulla Native Title Aboriginal Corporation were present during geotechnical and site investigation works. Discussions are have been continuing regarding the development of a Cultural Heritage Management Plan for the Project.

Additional details on consultation process, undertaken specifically for the MID Environmental Assessment Report, are provided in **Appendix B** (Aurecon 2022c).

The Draft Preliminary Documentation (this report in draft) was made available for public comment from Monday 13 March to Monday 27 March 2023. A total of two (2) submissions were received during the public notification period via the Project web page. A summary of these submissions (which have been de-identified for privacy), and responses to the topics raised, are outlined in Appendix L.

## 2.8.3 Indigenous stakeholder engagement

RFI 8.3: Details of any consultation with Indigenous stakeholders.
Indigenous engagement
Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the proposed action and the potential for managing those impacts. (Section 8.3, DCCEEW, 2022)

### Native title

The Project area is located within the external boundary of the Butchulla People Land & Sea Claim #2 native title determination area. The nature and extent to which native title is determined to exist within the determination area (including over the Project area) has been considered as part of this process.

### Cultural heritage

Everick Heritage Pty Ltd (Everick Heritage) was commissioned by TMR to undertake two Cultural Heritage Field Assessments (CHFAs) of the proposed location of the Rollingstock Expansion Project manufacturing site, haul road and truck turn around bay.

Aboriginal cultural heritage has been identified in the Project area which includes a number of features such as artefact scatters and scarred trees. Following provision of the CHFAs, and consideration of the

recommendations, TMR has undertaken further consultation with the Aboriginal party. It is proposed that the parties will develop a Cultural Heritage Management Plan to protect and manage Aboriginal cultural heritage within the Project area.

### 2.8.4 Projected economic costs and benefits

RFI 8.4: Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies. (Section 8.4, DCCEEW, 2022)

The proposed train manufacturing facility represents the largest investment in rail in Queensland's history by the Queensland Government, in improving the efficiency of the SEQ public transport network, regional growth, and local manufacturing. In the 2017 State election, the Queensland Government made a commitment that all future trains and associated infrastructure, for which Queensland has the manufacturing capacity to deliver, will be manufactured and maintained by Queenslanders to support jobs in Maryborough and other regional centres.

The QTMP will deliver an initial fleet of 65 six-car units under the first design, build and maintain contract. The purpose of the new QTMP fleet will be to service Queensland's growing need for efficient public transport which is particularly driven by transformative infrastructure projects, such as CRR and the 2032 Olympic and Paralympic Games. After the initial fleet of 65 trains is delivered through the QTMP, the State-owned manufacturing facility will revert back to State after the design, build and maintain provider's contract term is fulfilled.

A full summary of the Torbanlea rail facility site key benefits is provided in **Appendix I.**

### 2.8.5 Employment opportunities

RFI 8.5: Employment opportunities expected to be generated by the project (including construction and operational phases). (Section 8.5, DCCEEW, 2022)

As the State's single largest rail investment, QTMP will help support the economy and bolster Queensland as a leader in rail manufacturing with long-term jobs and skills development. In the Maryborough region, the construction and operation of the manufacturing facility will produce a major jobs boost, creating hundreds of construction, rail and manufacturing jobs.

## 2.9 Environmental record of the person proposing to take the action

RFI 9.1: Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: the person proposing to take the action; (Section 9.1, DCCEEW, 2022)

TMR has a satisfactory record of responsible environment management. TMR, as the proponent, are highly experienced in the planning, delivery and operation of major transport infrastructure projects. TMR's core role is the planning, building and maintaining of Queensland's road, rail, freight, and maritime infrastructure (Aurecon 2022). Further details of TMR's approach to environmental management can be found at https://www.tmr.qld.gov.au/Community-and-environment/Environmental-management, and copies of TMR EPBC Act annual compliance reports can be found at https://www.tmr.qld.gov.au/Community-and-environment/Environmental-management/Federal-EPBC-Compliance-Reports-and-Offset-Management-Plans.

TMR North Coast has an excellent and long track record in coordinating environmental assessments and delivery of environmentally sensitive transport solutions, evidenced through recent major infrastructure on the Bruce Highway upgrades.

RFI 9.2: For an action for which a person has applied for a permit, the person making the application (Section 9.2, DCCEEW, 2022)

Refer to the response to RFI 9.1.

RFI 9.3: If the person is a body corporate—the history of its executive officers in relation to environmental matter (Section 9.3, DCCEEW, 2022)

Not applicable – TMR is not a body corporate.

# 3 Conclusion

This report has provided comprehensive responses to each of the questions posed by DCCEEW as part of the RFI issued on 30th September 2022 for the QTMP Project (reference 2021/09301) (DCCEEW 2022). The recommendations and instructions on how to respond to questions in the RFI document has been followed wherever possible. For instance, to enable a streamlined assessment, a cross reference table has been provided in **Appendix A**.

Construction activities at the manufacturing facility site are required to commence from early 2023 to meet planned project milestones and delivery timeframes. The manufacturing facility is on the critical path for train delivery, and delays in commencement date will result in undesirable program and delivery delays. These delays would impact the local and regional economy, train availability and operations, and potentially impact the public transport needs for the 2032 Olympic and Paralympic Games.

To assist this Project to meet these scheduled timeframes, it is respectfully requested that any further requests for information are provided as soon as possible to the proponent for immediate response.

# 4 References


Aurecon (2021a). Rollingstock Expansion Project Torbanlea Protected Plants Report. Prepared for Department of Transport and Main Roads.

Aurecon (2021b). Rollingstock Expansion Project Manufacturing Facility – Options Analysis Report. Prepared for Department of Transport and Main Roads.

Aurecon (2022a). Queensland Train Manufacturing Program Torbanlea EPBC Referral Application Number 01197. Accessed via EPBC Business Portal on 09/05/2022.

Aurecon (2022b). Queensland Train Manufacturing Program Torbanlea Matters of National Environmental Significance Report. Prepared for the Department of Transport and Main Roads.

Aurecon (2022c). Queensland Train Manufacturing Program Torbanlea MID Environment Assessment Report. Prepared for Department of Transport and Main Roads.

Aurecon (2022c). Queensland Train Manufacturing Program Torbanlea MID Ecological Assessment Report. Prepared for Department of Transport and Main Roads.

Department of Climate Change, Energy, Environment and Water (DCCEEW) (2022a), *Additional information for assessment by preliminary documentation QTMP – Torbanlea Train Manufacturing Facility, Queensland* (2022/09301) DCCEEW, Canberra.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022b). Species Profile and Threats Database (SPRAT): *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*. Available from: **http://www.environment.gov.au/cgibin/sprat/public/publicshowcommunity.pl?id=171&status=Endangered**

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Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022d), National Recovery Plan for the Grey-headed Flying-fox 'Pteropus poliocephalus', Department of Climate Change, Energy, the Environment and Water, Canberra, March. CC BY 4.0.

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Everick Heritage (2022). *Rollingstock Expansion Project Manufacturing Site: Cultural Heritage Field Assessment* Everick Heritage Pty Ltd. Unpublished report prepared for the Department of Transport and Main Roads.

The University of Queensland Australia (2022). Koala Survey by Detection Dogs – Torbanlea. Prepared for the Queensland Department of Transport and Main Roads.

# 5 Definitions

| Terminology | Definition |
|---|---|
| AHD | Australian Height Datum |
| AQMP | Air Quality Management Plan |
| BMP | Bushfire Management Plan |
| DCCEEW | Department of Climate Change, Energy, the Environment and Water |
| DES | Department of Environment and Science (Queensland Government) |
| EP Act | *Environmental Protection Act 1994* (Queensland) |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) |
| EMP | Environmental Management Plan |
| EMP(C) | Construction Environmental Management Plan |
| ESCP | Erosion and Sediment Control Plan |
| MNES | Matters of National Environmental Significance |
| NC Act | *Nature Conservation Act 1992* (Queensland) |
| OAMP | Offset Area Management Plant |
| PWMP | Pest and Weed Management Plan |
| PMST | Protected Matters Search Tool |
| QTMP | Queensland Train Manufacturing Program |
| SEQ | South-East Queensland |
| SIA | Significant Impact Assessment |
| SPRAT | Species Profile and Threats Database |
| SMP | Species Management Program |
| SWMP | Stormwater Management Plan |
| TEC | Threatened Ecology Community |
| TMR / DTMR | Transport and Main Roads (Qld) / Department of Transport and Main Roads (Qld) |
| RFI | Request for Information |
| WQMP | Water Quality Management Plan |

# Appendices

# Appendix A Cross Reference Table

The table below provides information to allow the cross-referencing of information requested in the formal Request for Information, as per Condition A1.7 (**Appendix A**) of the formal RFI itself.

| Item # | RFI (DCCEEW) | Location of response (QTMP) |
|---|---|---|
| **1. DESCRIPTION OF ACTION** | | |
| 1.1 | Include updated information if any changes have been made to the project since the referral documentation was submitted. Include updated disturbance footprints (in hectares) and layout plans for the Project, where relevant. | Refer to Section 2.1 in this document. |
| **2. HABITAT ASSESSMENT** | | |
| 2.1.1 | Include an assessment of the adequacy of any surveys undertaken (including survey effort and timing). In particular, the extent to which these surveys were appropriate for the listed species or community and undertaken in accordance with relevant departmental survey guidelines and/or best practice. | Refer to Section 2.2.1 in this document. |
| 2.1.2 | Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation. | Refer to Section 2.2.1 in this document. |
| 2.2.1 | Provide an assessment (in a cross-reference table) of vegetation composition against the key diagnostic characteristics provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice, including any remnant and regrowth vegetation. | Refer to Section 2.2.1 in this document. |
| 2.2.2 | Provide the total area (in hectares) of identified Coastal Swamp Sclerophyll Forest TEC (i.e. all vegetation that meet the key diagnostic characteristics). | Refer to Section 2.2.2 in this document. |
| 2.2.3 | Provide an assessment of Coastal Swamp Sclerophyll Forest TEC against the condition thresholds provided in the Coastal Swamp Sclerophyll Forest TEC Conservation Advice. | Refer to Section 2.2.2 in this document. |
| **3. IMPACT ASSESSMENT** | | |
| 3.1.1 | An assessment of the likely impacts associated with the Project, including construction and operational phases. | Refer to Section 2.3.1 in this document. |
| 3.1.2 | Include the direct and indirect loss and/or disturbance of habitat as a result of the Project. This must include the quality and area (in hectares) of habitat to be impacted. | Refer to Section 2.3.2 in this document. |
| 3.1.3 | An assessment of the impacts of habitat fragmentation in the Project area and surrounding areas, including consideration of species' movement patterns. | Refer to Section 2.3.3 in this document. |

| Item # | RFI (DCCEEW) | Location of response (QTMP) |
|---|---|---|
| 3.1.4 | An assessment of the likely duration of impacts as a result of the Project. | Refer to Section 2.3.4 in this document. |
| 3.1.5 | A discussion of whether the impacts are likely to be repeated, for example as part of maintenance. | Refer to Section 2.3.5 in this document. |
| 3.1.6 | A discussion of whether any impacts are likely to be unknown, unpredictable or irreversible. | Refer to Section 2.3.6 in this document. |
| 3.1.7 | Justification, with supporting evidence, as to how the Project will not be inconsistent with:<br>■ Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and<br>■ Any relevant recovery plan or threat abatement plan. | Refer to Section 2.3.7 in this document. |
| **4. AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES** | | |
| 4.1 | A detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts of the Project on relevant MNES. | Refer to Section 2.4.1 in this document. |
| 4.2 | The proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence. | Refer to Section 2.4.2 in this document. |
| 4.3 | All proposed measures for MNES must be drafted to meet the 'S.M.A.R.T' principle:<br>■ S –Specific (what and how)<br>■ M –Measurable (baseline information, number/value, auditable)<br>■ A –Achievable (timeframe, money, personnel)<br>■ R –Relevant (Conservation Advices, recovery plans, threat abatement plans)<br>■ T –Time-bound (specific timeframe to complete) | Refer to Section 2.4.3 in this document. |
| 4.4 | Details of specific and measurable environmental outcomes to be achieved for relevant MNES. All commitments must be drafted using committal language (e.g., 'will' and 'must') when describing the proposed measures. | Refer to Section 2.4.4 in this document. |
| 4.5 | Details of the proposed measures to be undertaken to avoid, mitigate and manage the relevant impacts of the Project, including those required through other Commonwealth, State and local government approvals. | Refer to Section 2.4.5 in this document. |
| 4.6 | Information on the timing, frequency and duration of the proposed avoidance, mitigation, management and monitoring measures, and any corrective actions to be implemented, where relevant. | Refer to Section 2.4.6 in this document. |
| 4.7 | An assessment of the expected or predicted effectiveness of the proposed measures. | Refer to Section 2.4.7 in this document. |

| Item # | RFI (DCCEEW) | Location of response (QTMP) |
|---|---|---|
| 4.8 | Any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved Conservation Advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are not inconsistent with relevant plans. | Refer to Section 2.4.8 in this document. |
| 4.9 | Details of ongoing management, including monitoring programs to support an adaptive management approach, that validate the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved. | Refer to Section 2.4.9 in this document. |
| 4.10 | Details of tangible, on-ground corrective actions that will be implemented in the event the monitoring programs indicate that the environmental outcomes have not or will not be achieved. | Refer to Section 2.4.10 in this document. |
| **5. REHABILITATION REQUIREMENTS** | | |
| 5.1 | Rehabilitation acceptance criteria, including for the restoration of habitat for relevant listed threatened species and communities. | Refer to Section 2.5.1 in this document. |
| 5.2 | A summary of the procedures, including contingency measures, that will be undertaken to achieve the rehabilitation acceptance criteria. | Refer to Section 2.5.2 in this document. |
| 5.3 | A summary of a monitoring program to determine the success of rehabilitation activities implemented by the proponent. | Refer to Section 2.5.3 in this document. |
| 5.4 | The details of any rehabilitation activities proposed to be undertaken as required by Commonwealth, State or Territory, and local government legislation. Attach relevant Commonwealth, State or Territory, and local government approvals and permits as supporting documents to the preliminary documentation. | Refer to Section 2.5.4 in this document. |
| **6. OFFSETS** | | |
| 6.1 | An assessment and conclusion on whether residual significant impacts will occur on relevant protected matters, after application of avoidance, mitigation and management measures. | Refer to Section 2.6.1 in this document. |
| 6.2 | A summary of the proposed environmental offset and key commitments to achieve a conservation gain foreach relevant protected matter. | Refer to Section 2.6.2 in this document. |
| 6.3 | Where offset area/s have been nominated, include a draft OAMP as an appendix to the PD. The draft OAMP must meet the minimum information requirements set out in **Appendix B.1,** and must be prepared by a suitably qualified ecologist and in accordance with the department's Environmental Management Plan Guidelines (2014), available at: www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines. | Refer to Section 2.6.3 in this document. |
| **7. ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)** | | |

| Item # | RFI (DCCEEW) | Location of response (QTMP) |
|---|---|---|
| 7.1 | A description of how the Project meets the principles of ESD, as defined in section 3A of the EPBC Act.<br>■ decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;<br>■ if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;<br>■ the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;<br>■ the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and<br>■ improved valuation, pricing and incentive mechanisms should be promoted. | Refer to Section 2.7 in this document. |
| **8. ECONOMIC AND SOCIAL MATTERS** | | |
| 8.1 | An analysis of the economic and social impacts of the action, both positive and negative. | Refer to Section 2.8.1 in this document. |
| 8.2 | Details of any public consultation activities undertaken and their outcomes. | Refer to Section 2.8.2 in this document. |
| 8.3 | Details of any consultation with Indigenous stakeholders.<br><u>Indigenous engagement</u><br>Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the Project and the potential for managing those impacts.<br>Describe any Indigenous consultation that has been undertaken, or will be undertaken, in relation to the Project and their outcomes. The department considers that best practice consultation, in accordance with the Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act (2016) includes:<br>■ identifying and acknowledging all relevant affected Indigenous peoples and communities;<br>■ committing to early engagement;<br>■ building trust through early and ongoing communication for the duration of the project, including approvals, implementation and future management;<br>■ setting appropriate timeframes for consultation; and<br>■ demonstrating cultural awareness.<br>Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the Project with regards to Indigenous peoples and communities. | Refer to Section 2.8.3 in this document. |

| Item # | RFI (DCCEEW) | Location of response (QTMP) |
|---|---|---|
| 8.4 | Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies. | Refer to Section 2.8.4 in this document. |
| 8.5 | Employment opportunities expected to be generated by the project (including construction and operational phases). | Refer to Section 2.8.5 in this document. |
| **9. ENVIRONMENTAL RECORD OF THE PERSON PROPOSING TO TAKE THE ACTION** | | |
| 9.1 | Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:<br>a) the person proposing to take the action; | Refer to Section 2.9 in this document. |
| 9.2 | b) for an action for which a person has applied for a permit, the person making the application | Refer to Section 2.9 in this document. |
| 9.3 | c) if the person is a body corporate—the history of its executive officers in relation to environmental matters; and | Refer to Section 2.9 in this document. |
| 9.4 | a) if the person is a body corporate that is a subsidiary of another body or company (the parent body)—the history in relation to environmental matters of the parent body and its executive officers. | Refer to Section 2.9 in this document. |

# Appendix B: MID Ecological Assessment Report

# Queensland Train Manufacturing Program

Ecological Assessment Report

**Department of Transport and Main Roads**

Reference: 511003

Revision: 4

2023-03-02

# Document control record

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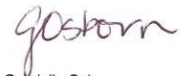
| Author signature |  | Approver signature |  |
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# Contents

# Appendices



# Figures

# Tables

# Executive summary

This Ecological Assessment Report has been prepared to identify the ecological constraints at the proposed Queensland Train Manufacturing Program (QTMP) site (Lot 35 SP326250) at Torbanlea. The findings of this assessment will be used to advise the future development of the manufacturing facility.

The key findings of this assessment are:

- The assessment identified ecological values present within the Project area including regulated vegetation, waterway for barrier works and wildlife habitat mapped areas. No conservation significant species were identified during the field investigations.
- The waterway identified within the Project area was ground truthed as drainage features and poor aquatic habitat. No significant aquatic habitat constraint was identified from the Project area.
- The Project area contains mapped Essential habitat for the Koala (listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Nature Conservation Act 1992* (NC Act)) and the Wallum froglet (listed as Vulnerable under the *Nature Conservation Act 1992*). Essential habitat for the Greater glider (listed as Endangered under the EPBC Act and NC Act) and the Grey-headed flying fox (listed as Vulnerable under the EPBC Act) was also identified within the Project area.
- The total amount of vegetation proposed to be removed for the Project will not exceed 17.42 ha of Category B vegetation. This consists of 4.76 ha of RE 12.3.6 and 12.66 ha of RE 12.5.4.
- It is recommended that a High Risk Species Management Program (SMP) under the *Nature Conservation Act 1992* be prepared due to the presence of potential animal breeding places for threatened and Special Least Concern species (i.e. the NC Act Vulnerable species Wallum froglet [*Crinia tinnula*] and colonial breeding species including gliders and Microchiropteran bats).
- A significant residual impact is anticipated for several Matters of State Environmental Significance (MSES) including;
  - Regulated vegetation that is remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map; and essential habitat as identified on the essential habitat map.
- Protected wildlife habitat for four threatened species will be removed. A total of 17.42 ha of suitable habitat for the Koala (*Phascolarctos cinereus*), Greater glider (*Petauroides volans)* and Grey-headed flying fox (*Pteropus poliocephalus),* and a total of 4.76 ha of suitable habitat for the Wallum froglet (*Crinia tinnula*).

# 1 Introduction

## 1.1 Document purpose

The Department of Transport and Main Roads (DTMR) has started the Queensland Train Manufacturing Program (QTMP) to identify the requirements for new rollingstock and associated infrastructure including a train manufacturing facility.

The train manufacturing facility is to proceed through a Ministerial Infrastructure Designation (MID) in accordance with Chapter 2, Part 5 of the *Planning Act 2016.* The MID will enable the use of each facility as 'railway infrastructure' as defined under Schedule 5 of the *Planning Regulation 2017*.

Aurecon have been requested to undertake an ecological investigation and assessment of Lot 35 SP326250 (Project area) to support the proposal of a Ministerial Infrastructure Designation (MID) application. Specifically, the purpose of the ecological investigation and assessment is to:

- Undertake an ecological field assessment to ground-truth vegetation community mapping and species habitat
- Prepare an ecological assessment report which:
  - Is prepared and approved by suitably qualified and experienced ecologists
  - Identifies ecological values and the likely ecological legislative constraints associated with site development
  - Identifies the potential ecological approval obligations for the proposed development

The outcomes of the ecological assessment described in this report include;

- Definition of the Project area in relation to the ecological assessment
- Methodology undertaken to complete the desktop and field ecological assessment
- Results from desktop and field ecological assessment
- Assessment of direct and indirect impacts on ecological values associated with the Project area and surrounds.
- Significant impact assessment on matters of National and State environmental significance
- Additional approval requirements for the Project

## 1.2 Project location

The Project area (Lot 35 SP326250) is located approximately 25 km North of Maryborough. The site is bordered by the Bruce Highway on the western boundary and the North Coast rail line at the eastern boundary (refer Figure 1). The site has a total area of 1,289,040 m² (128.90 ha).

The manufacturing facility and associated infrastructure will be constructed within the Project footprint illustrated in Figure 1.

## 1.3 Current land use

The Project area contains predominately undeveloped and densely vegetated land. A portion of the site located in the south east, is cleared and used for grazing purposes. This area of the site also includes a residential dwelling and multiple enclosed structures. A high voltage overhead powerline traverses the eastern portion of the proposed manufacturing facility.


**Figure 1** **Project location**

## 1.4 Document author

This report has been prepared by a suitably qualified ecologists Kurtis Kemp and Andy Dalton. Andy Dalton and Kurtis Kemp are ecologists with 12 and 5 years' experience respectively conducting ecological field assessments and reporting. Andy holds a Bachelor of Science (majoring in Ecology and Conservation Biology) and Kurtis holds a Bachelor of Science majoring in biological sciences from the Queensland University of Technology (QUT). Andy and Kurtis' CV can be provided upon request.

The ecological field assessment was conducted by suitably qualified and experienced senior ecologist's Dr Chris Schell and Dr James Bone. Chris is a senior ecologist with over 20 years of industry experience. Chris holds a Bachelor of Science (Honours Class 1) and a PhD in Zoology. James is a senior ecologist with over 9 years' experience conducting ecological assessments. James holds a Bachelor of Science (Honours Class 1) and a PhD in environmental science. CVs for Chris and James can be provided upon request.

# 2 Methodology

## 2.1 Desktop assessment

Prior to the commencement of the ecological field survey of the Project area, a desktop review of government ecological databases and vegetation mapping was conducted to identify potential ecological constraints, including conservation significant flora and fauna species, which may occur within the Project area.

The following databases, maps and documents were reviewed:

- Protected Matters Search Tool (DoEE 2022), search area defined by a 2 km buffer of the Project area.
- Wildlife Online Database (DES 2022a), search area defined by a 2 km buffer of the Project area.
- Protected Plants Flora Survey Trigger Map (DES 2022).
- Regulated Vegetation Management Mapping (DNRME 2022).
- Essential Habitat Mapping (DNRME 2022).
- Matters of State Environmental Significance (DES 2022b).
- South East Queensland Koala habitat areas and Koala priority areas mapping (DES 2022c).

The outputs of the database and mapping reviews have been provided in Appendix A.

## 2.2 Field assessment

A preliminary ecological field assessment was conducted within the Project area to ground-truth the mapped ecological values of the sites (i.e. vegetation community mapping, habitat values for threatened flora and fauna species). As part of the preliminary ecological field assessment the following tasks were undertaken:

- A Protected Plant Survey undertaken at the Project area was required under the provisions of the *Nature Conservation Act 1992* (NC Act) (Qld) (triggered by the Department of Environment and Science (DES) Flora Survey Trigger Map) to identify Critically Endangered, Endangered, Vulnerable, or Near Threatened (CEEVNT) flora species which may be present at the site. The protected plant survey was conducted for the sites 'clearing impact area', defined as the Project area and a surrounding 100m buffer. The outcomes of the survey have been captured in a separate Protected Plant Flora Survey Report, as per the requirements of the DES Flora Survey Guidelines (DES 2020).
- Analysis of habitat values and likelihood of occurrence assessment of:
  - Conservation significant terrestrial and aquatic flora and fauna species (i.e. CEEVNT species listed under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or NC Act.
  - Animal breeding places to determine if a high risk of impact species management program is required.
- Analysis of the dominant species that define the vegetation communities within the Project area, including identifying and mapping any CEEVNT flora species present, and identifying any areas of suitable habitat for CEEVNT species which may be present within the Project area. Targeted vegetation communities were traversed to gather information such as vegetation structure (including remnant status) and composition (species richness), dominant species present and plant identification to genus and/or species level.

- Collection of an incidental list of fauna, including bird, reptile, mammal, and amphibian species which were encountered during the field assessment. Opportunistic diurnal searches for reptile species were conducted during the ecological field assessment.
- Preliminary AUSRIVAS physical habitat assessments were conducted at unmapped drainage features and watercourses present within the Project area.

The ecological field assessment sites at which quaternary assessments of vegetative and habitat values were conducted are detailed in Table 2-1. The field assessment sites and associated ecological survey track log are illustrated in Figure 2.

**Table 2-1 Ecological field assessment site locations**

| Site Name | Latitude | Longitude | Date assessed | Aquatic site name | Latitude | Longitude | Date assessed |
|---|---|---|---|---|---|---|---|
| 1 | -25.37341003 | 152.60413 | 18.5.2021 | **W01** | -25.36206203 | 152.608458 | 19.5.2021 |
| 2 | -25.37070603 | 152.602649 | 18.5.2021 | **W02** | -25.366544 | 152.602709 | 19.5.2021 |
| 3 | -25.36882396 | 152.599995 | 18.5.2021 | **W03** | -25.36974002 | 152.599269 | 19.5.2021 |
| 4 | -25.366991 | 152.59993 | 18.5.2021 | **W04** | -25.47442001 | 152.655976 | 20.5.2021 |
| 5 | -25.36680803 | 152.602635 | 18.5.2021 | | | | |
| 6 | -25.363683 | 152.601739 | 18.5.2021 | | | | |
| 7 | -25.36314396 | 152.605723 | 18.5.2021 | | | | |
| 8 | -25.361108 | 152.605576 | 18.5.2021 | | | | |
| 9 | -25.37063202 | 152.606737 | 19.5.2021 | | | | |
| 10 | -25.36919578 | 152.604492 | 19.5.2021 | | | | |
| 11 | -25.36667702 | 152.607604 | 19.5.2021 | | | | |
| 12 | -25.36451298 | 152.612465 | 19.5.2021 | | | | |
| 13 | -25.36398903 | 152.610818 | 19.5.2021 | | | | |
| 14 | -25.36340397 | 152.60864 | 19.5.2021 | | | | |
| 15 | -25.36226202 | 152.609152 | 19.5.2021 | | | | |
| 16 | -25.36078898 | 152.608432 | 19.5.2021 | | | | |
| 17 | -25.48233597 | 152.653751 | 20.5.2021 | | | | |
| 18 | -25.481091 | 152.65711 | 20.5.2021 | | | | |

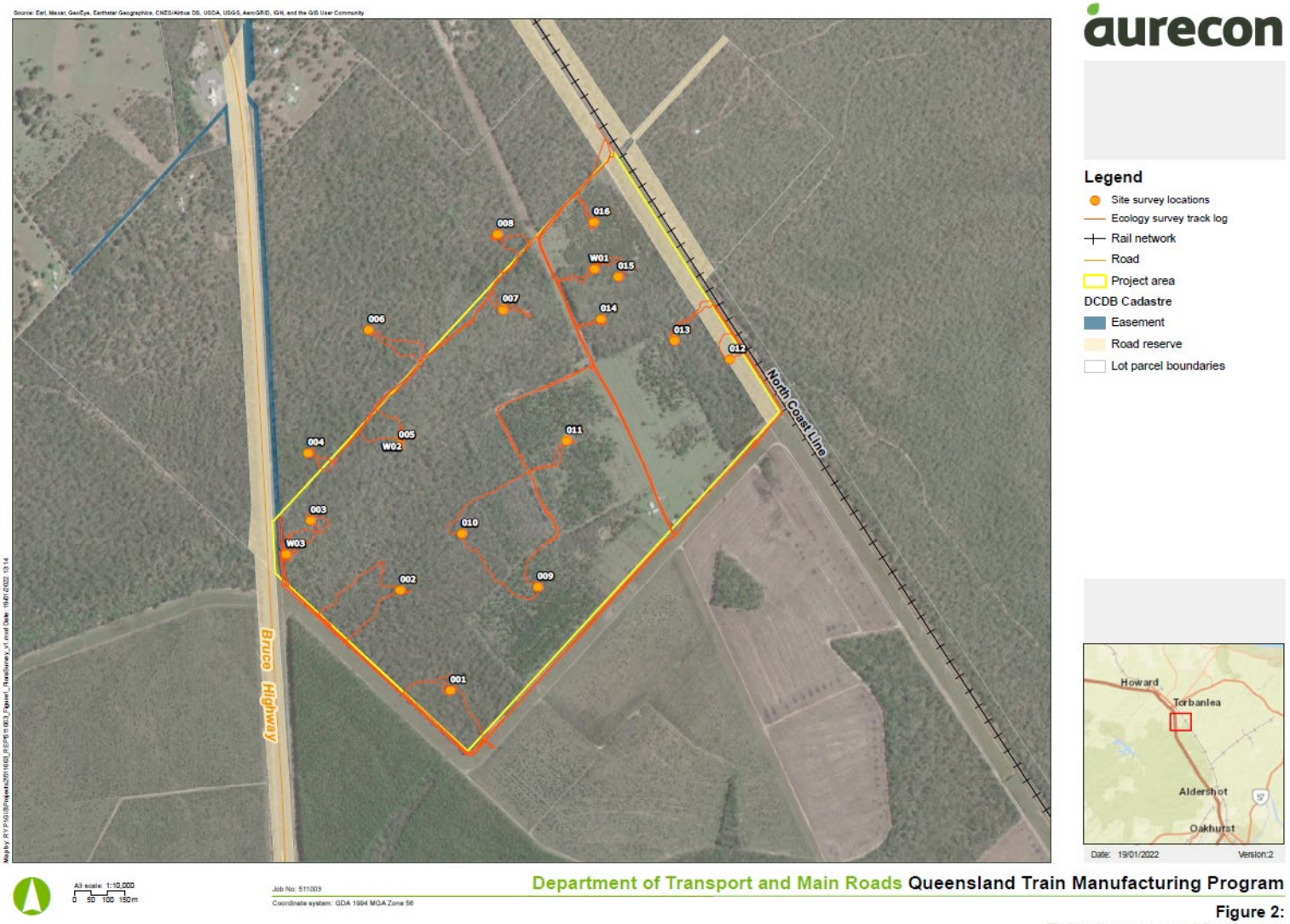


**Figure 2 Ecological field survey sites and track logs for the field survey within the Project area**

## 2.3 Likelihood of occurrence assessment

The likelihood of threatened ecological communities (TEC), threatened flora species or threatened fauna species, as listed under the provisions of the NC Act and/or the EPBC Act, to occur within the Project area and immediate surrounds was determined based on:

- The results of the desktop study.
- Species and habitat observations collected during the ecological field assessment.
- Consideration of a species current (known) distribution range.
- Presence and condition of suitable habitat in the Project areas and immediate surrounds.

Species considered **unlikely to occur** include species that fit one or more of the following criteria:

- The Project area is beyond the species current distributional limits.
- The species is associated with specific habitat types or resources that are known not to be present in the Project area (e.g. intertidal saltmarshes and estuarine wetlands for the Eastern curlew (*Numenius madagascariensis*)).
- The species is considered locally extinct (e.g. Red goshawk [*Erythrotriorchis radiatus*]).

Species considered to have a **low** likelihood of occurrence include species that fit one or more of the following criteria:

- No records of the species within 20km of the Project area, but the species uses habitat types or resources that are present in the Project area.
- The species has been recorded within 20km of the Project area, but habitat present is generally in a poor or modified condition or is limited in extent (e.g. wetland bird species).
- The species is unlikely to maintain sedentary populations, however, may seasonally utilise resources within the Project area opportunistically during variable seasons or migration (e.g. Grey-headed flying-fox [*Pteropus poliocephalus*]).

Species considered to have a **moderate** likelihood of occurrence include species that fit one or more of the following criteria:

- The species has been recorded within 20km of the Project area (but not directly within the site), within the last 20 years and suitable habitat is present within the Project area as supported by ecological observations recorded during the ecological field survey.
- The species uses habitat types or resources that are present in the Project area, which are in good condition (with condition based on field review).
- The species is likely to maintain sedentary populations within the Project area.

Species is considered **known to occur** as it fits the following criteria:

- The species has been recorded within the Project area.

## 2.4 Impact assessment

The impact assessment process included the identification of potential Project impacts on ecological values within and adjacent to the Project footprint (refer to Section 4.1). The direct and indirect impacts to ecological values within the Project footprint were also assessed. Mitigation measures were then defined and applied to the potential Project impacts (refer to Section 4.2).

## 2.5 Significant residual impact assessment

A significant impact assessment was then conducted for ecological values that qualified as a Matter of National Environmental Significance (MNES) or a Matter of State Environmental Significance (MSES) defined under the provisions of the *Environmental Offsets Act 2014* (EO Act). The significant impact assessments were based on the potential Project residual impacts, that is those potential impacts which remain following the application of the Project mitigation measures. The significant impact assessments were based on the direct impacts within the Project footprint as well as the indirect impacts adjacent to the Project footprint and in the local and regional context.

The significant impact assessments were conducted in accordance with the appropriate guideline document.

The significant impact assessment guidelines which were referenced during the assessment included:

- MNES Significant impact guidelines 1.1 (DotE 2013a).
- Significant Residual Impact Guideline for MSES and prescribed activities assessable under the Sustainable Planning Act 2009 (DSDIP, 2014).

MNES and MSES potentially subject to significant residual Project impacts were assessed against the relevant guidelines and discussed in Sections 5 and 5.4.

## 2.6 Permits to conduct works

The ecological field assessment was conducted in accordance with Aurecon's Scientific Purposes Permit, WISP14453114 (valid between 20 April 2019 and 19 April 2024).

## 2.7 Survey limitations

The information presented in this report is subject to survey limitations. The ecological field assessment was conducted to provide an overview of the ecological values within the Project area.

The Protected Plant Survey completed during this ecological field investigation included a comprehensive flora species list (i.e. all plants encountered). The flora species list from this survey has been included as Appendix C. The survey encompassed all habitat across the Project area. It is important to note that some flora species may not have been identified due to a lack of fertile material or plants lying dormant (e.g. terrestrial orchids) at the time of the survey. However, most of the targeted CEEVNT flora species may be considered distinctive, even when reproductive material is absent, to overcome the limitations of surveying in autumn.

The survey works did not include targeted threatened fauna surveys and were limited to incidental observations and analysis of habitat suitability. It should be noted that not all fauna species inhabiting the area were identified during the ecological field survey due to season variations and survey limitations associated with time and scope.

Handheld Garmin GPS units (GPS map 76) were used during the field investigations. It should be noted that while efforts were made to ensure the GPS co-ordinates provided in this report are accurate, a margin of error of approximately +/- 5m is expected due to the limitations of the devices used and the recording environment.

# 3 Results

## 3.1 Desktop assessment

The desktop ecological assessment has identified multiple environmental considerations, including Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES), as potentially occurring within and immediately surrounding the Project area. The findings of the desktop assessment for the Project area are provided in Table 3-1.

**Table 3-1 Summary of desktop assessment results regarding ecological considerations within and surrounding the Project area**

| Ecological | Details |
|---|---|
| **Matters of National Environmental Significance** | |
| Threatened ecological communities (TECs) | The following two TECs have been identified by the EPBC Act protected matters search tool (PMST) as potentially occurring within 2 km of the Project area:<br>■ Coastal Swamp Sclerophyll Forest of NSW and SE QLD<br>■ Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland<br>■ Lowland Rainforest of Subtropical Australia |
| Protected flora and fauna | The EPBC Act PMST has identified 27 threatened species and 15 migratory species as potentially occurring within a 2 km radius of the Project area |
| RAMSAR wetlands | There are no RAMSAR wetlands identified on the PMST search for the Project area. |
| **Matters of State Environmental Significance** | |
| Regulated vegetation | **The Project area, as illustrated in Figure 3 is mapped as containing:**<br>■ Regulated vegetation – Category R GBR Riverine<br>■ Regulated vegetation – Essential habitat (Koala and Wallum froglet)<br>■ Regulated vegetation – 100 m from wetland |
| Regulated vegetation (*Vegetation Management Act 1999)* | The Project area, as illustrated in Figure 4, is mapped as containing the following vegetation:<br>■ Category B (Least Concern) remnant vegetation<br>■ Category C high value regrowth vegetation<br>■ Category R reef regrowth vegetation<br>■ Wetland vegetation<br>■ Essential habitat (Koala and Wallum froglet)<br>This includes Regional Ecosystems:<br>■ 12.5.4 (Least Concern Category B and C): *Eucalyptus latisinensis* with or without *Corymbia intermedia*, *C. trachyphloia subsp. trachyphloia*, *Angophora leiocarpa*, *Eucalyptus exserta* woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments<br>■ 12.3.6 (Least Concern Category B, containing wetland vegetation and essential habitat): *Melaleuca quinquenervia* with or without *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains. |

| Ecological | Details |
|---|---|
| State protected areas | There are no State protected areas located within the site. |
| Wetland values | A defined watercourse, as illustrated in Figure 3, traverses the northern portion of the Project area. This watercourse is mapped as a Palustrine waterbody. |
| Wildlife habitat | The Project area, as illustrated below in Figure 3, is mapped as containing wildlife habitat for the NC Act Vulnerable listed species Wallum froglet (*Crinia tinnula*) and Koala (*Phascolarctos cinereus*). |
| Protected plants (*Nature Conservation Act 1992)* | The Project area, as illustrated in Figure 5, is mapped within a flora survey trigger area. |
| Threatened species | *Prasophyllum exilis*, a Near Threatened Orchid under the NC Act, has been recorded within 2km of the Project area (one record identified on the Queensland Government WildNet database search) |
| Watercourses (*Water Act 2000)* | There are no *Water Act 2000* mapped watercourses or drainage features located within the Project area. There are however unmapped watercourses (i.e. determination yet to be made by Department of Regional Development, Manufacturing and Water (DRDMW) as to whether these features are watercourses or drainage features) in the northern and western portion. Refer to Figure 6. |
| Waterway barrier works (*Fisheries Act 1994)* | One moderate (amber) waterway for waterway barrier works, as illustrated in Figure 6, traverses the northern portion of the Project area. |


**Figure 3 MSES Regulated vegetation identified from Desktop analysis within the Project area**

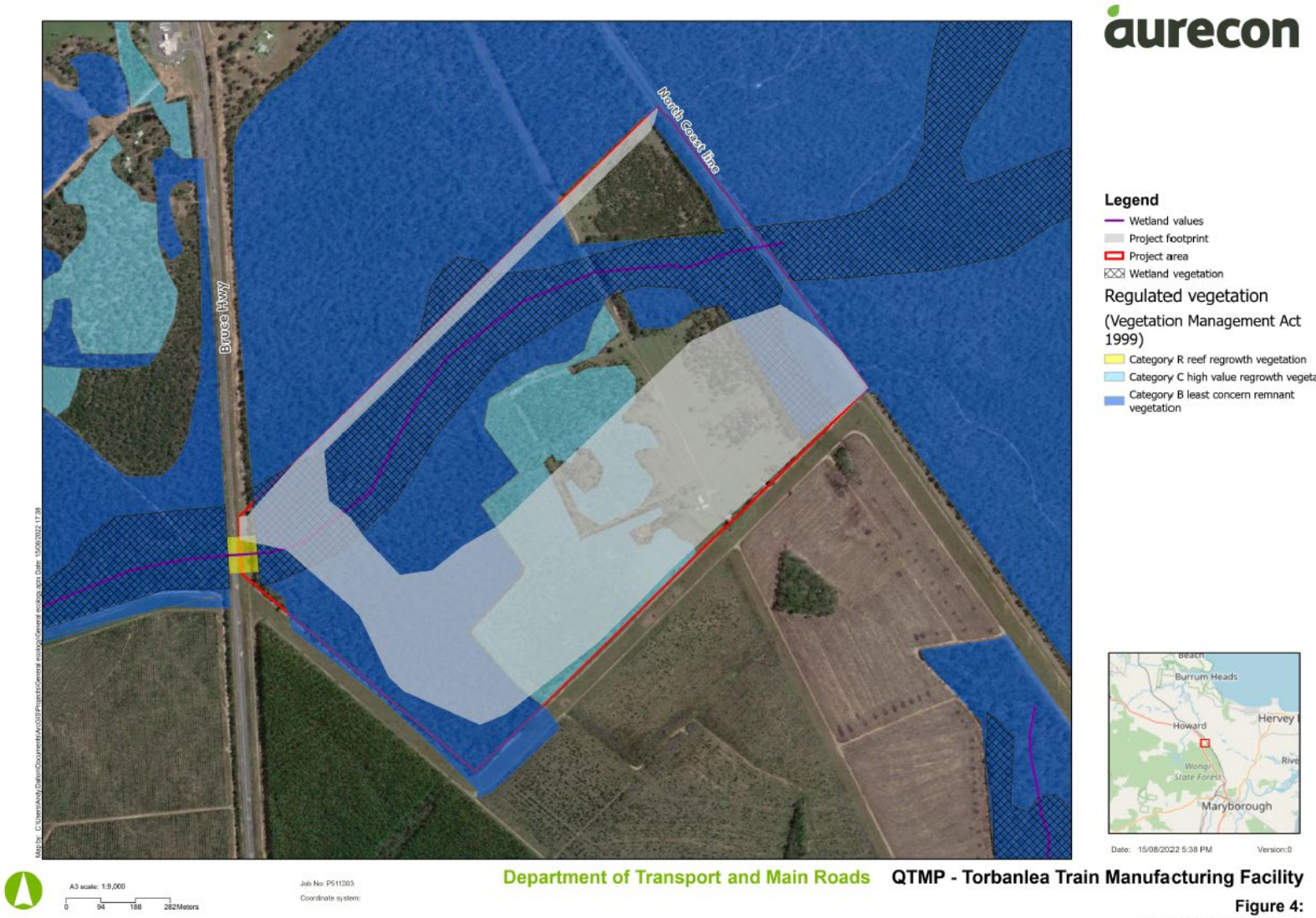


**Figure 4 VMA Regulated Vegetation identified from Desktop analysis within the Project area**


**Figure 5 Protected Plant mapping identified from Desktop analysis within the Project area**

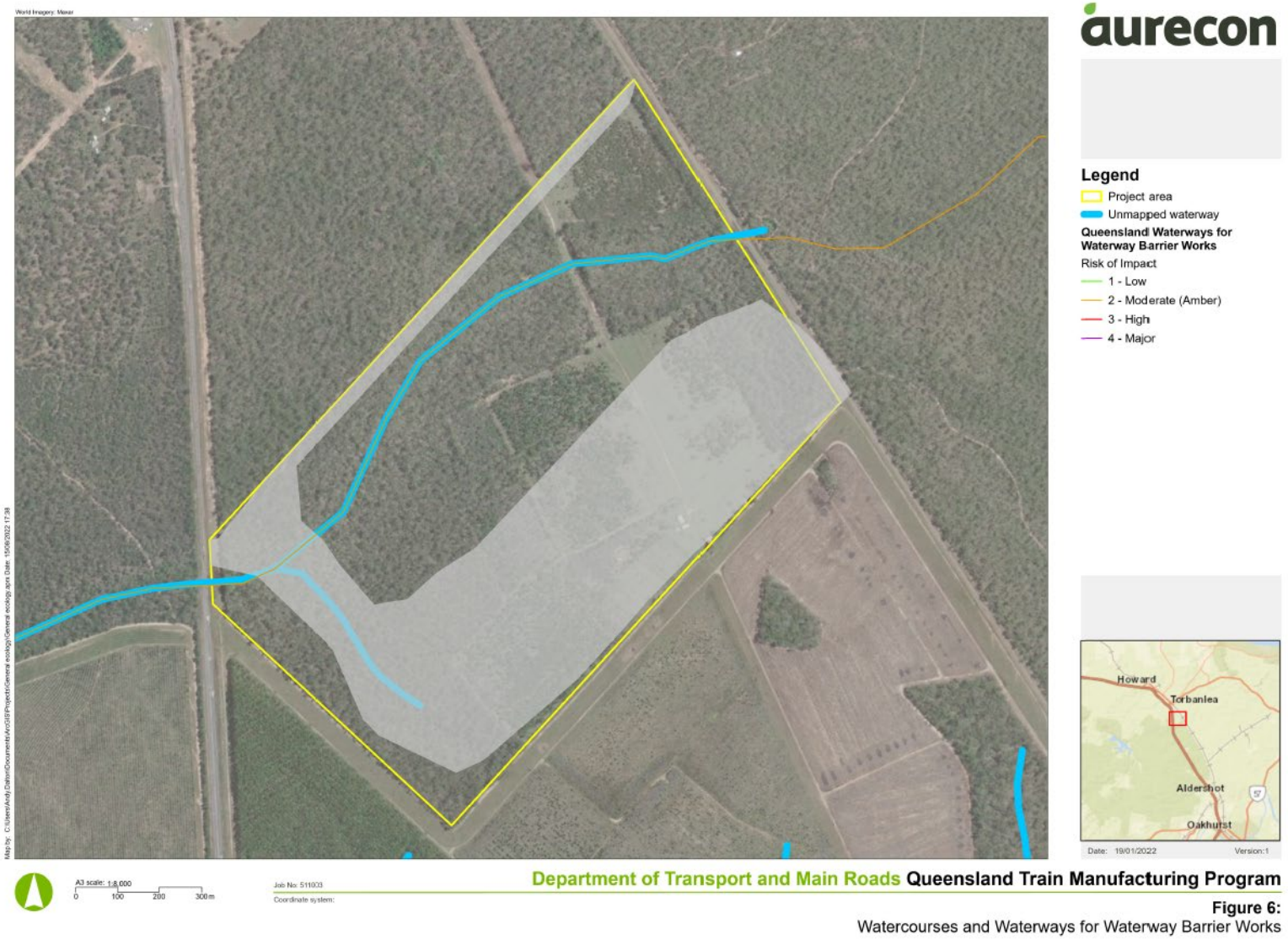


**Figure 6 Waterways and Waterways for Barrier Works Permits identified from desktop analysis within the Project area**

## 3.2 Likelihood of occurrence assessment

Following the likelihood of occurrence assessment for the Project area, the following was identified:

- 30 matters considered to have a low likelihood of occurrence
- 7 matters considered to have a moderate likelihood of occurrence
- One matter known to occur

The likelihood of occurrence assessment is provided in Appendix B, with the results summarised in Table 3-2 for those matters considered to have a 'moderate' or 'known' likelihood of occurrence within the Project area.

**Table 3-2 Summary of matters with a moderate or known likelihood of occurrence within the Project area**

| Ecological matter | Conservation status | | Likelihood of occurrence |
|---|---|---|---|
| | EPBC Act | NC Act | |
| **Threatened flora species** | | | |
| *Acacia attenuata* | V | V | Low |
| *Bosistoa transversa* | V | LC | Low |
| *Cossinia australiana* | E | E | Low |
| *Cryptostylis hunteriana* (Leafless tongue-orchid) | V | SLC | Low |
| *Cupaniopsis shirleyana* | V | V | Low |
| *Fontainea venosa* | V | V | Low |
| *Macadamia integrifolia* | V | V | Low |
| *Macrozamia lomandroides* | V | E | Low |
| *Macrozamia pauli-guilielmi* (Pineapple zamia) | E | E | Low |
| *Phaius australis* (Lesser swamp-orchid) | E | E | Low |
| *Prasophyllum exilis* (Thin leek orchid) | - | NT | Low |
| *Rhodomyrtus psidioides* (Native guava) | CE | CE | Low |
| *Samadera bidwillii* (Quassia) | V | V | Low |
| **Threatened fauna species** | | | |
| Curlew Sandpiper (*Calidris ferruginea*) | CE | E | Low |
| Greater Sand Plover (*Charadrius leschenaultii*) | V | V | Low |
| Coxen's Fig-Parrot (Cyclopsitta diophthalma coxeni) | E | E | Low |
| Red goshawk (*Erythrotriorchis radiatus*) | V | E | Low |
| Grey Falcon (*Falco hypoleucos*) | V | V | Low |
| Squatter Pigeon (*Geophaps scripta scripta*) | V | V | Low |
| Eastern Curlew (*Numenius madagascariensis*) | CE | E | Low |
| Australian Painted Snipe (*Rostratula australis*) | E | E | Low |
| Black-breasted Button-quail (*Turnix melanogaster*) | V | V | Low |
| White-throated needletail (*Hirundapus caudacutus*) | V, M | V | Moderate |
| Large-eared pied bat *(Chalinolobus dwyeri*) | V | V | Low |
| Northern Quoll (*Dasyurus hallucatus*) | E | LC | Low |
| Ghost Bat (*Macroderma gigas*) | V | E | Low |
| Greater glider (*Petauroides Volans sensu lato*) | E | V | Moderate |
| Yellow-bellied Glider (*Petaurus australis australis*) | V | V | Low |
| Koala (*Phascolarctos cinereus*) | E | E | Moderate |
| Grey-headed flying-fox (*Pteropus poliocephalus*) | V | V | Moderate |
| **Migratory species** | | | |
| Fork-tailed swift (*Apus pacificus*) | M | SLC | Moderate |
| Oriental cuckoo (*Cuculus optatus*) | M | SLC | Moderate |
| Spectacled Monarch (*Symposiachrus trivirgatus*) | M | SLC | Moderate |
| Black-faced Monarch (Monarcha melanopsis) | M | SLC | Low |
| Satin flycatcher (*Myiagra cyanoleuca*) | M | SLC | Known |

| Ecological matter | Conservation status | | Likelihood of occurrence |
|---|---|---|---|
| | EPBC Act | NC Act | |
| Osprey (*Pandion haliaetus*) | M | SLC | Low |
| Rufous fantail (*Rhipidura rufifrons*) | M | SLC | Moderate |
| **Threatened Ecological Communities** | | | |
| Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community | E | - | Low |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | E | - | Known |
| Lowland Rainforest of Subtropical Australia | CE | - | Low |

**Table Notes**

Moderate: Records for the species are from a reliable data source but not specifically recorded within the Project area. Suitable habitat for this species exists within the Project area

CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near Threatened, M = Migratory, SLC = Special Least Concern

## 3.3 Field assessment

The following sections will present the results of the ecological field investigation. Results are based on ground truthing of the Project area with relevance to environmental values identified in Section 3.1 and 3.2.

### 3.3.1 Threatened ecological communities

Field investigations identified the presence of one EPBC Act listed threatened ecological community, Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community, within the Project area. Approximately 4.76 ha of the TEC analogous with RE 12.3.6 was mapped within the Project area.

### 3.3.2 Threatened flora and fauna species

Field investigations did not identify the presence of any CEEVNT flora or fauna species listed under the provisions of the NC Act and/or the EPBC Act within the Project area.

Whilst no CEEVNT flora or fauna species were identified, suitable habitat for the following threatened species was identified within the Project area:

- Greater glider (*Petauroides volans),* Endangered under the provisions of the EPBC Act and the NC Act.
- Koala (*Phascolarctos cinereus*), Endangered under the provisions of the EPBC Act and the NC Act.
- Grey-headed flying fox (*Pteropus poliocephalus),* Vulnerable under the provisions of the EPBC Act.
- Wallum froglet (*Crinia tinnula*), Vulnerable under the provisions of the NC Act.

### 3.3.3 Migratory species

Field investigations conducted in May 2021, identified the presence of a Satin Flycatcher (*Myiagra cyanoleuca*), a EPBC Act listed migratory species within the Project area.

### 3.3.4 Special Least Concern species

Eight Special Least Concern flora species were identified within the Project area during field investigation. These flora species were:

- Lobelia purpurascens (White root).
- *Drosera burmanni* (Annual sundew).
- *Drosera peltata* (Pale sundew).

- *Geodorum densiflorum* (Pink nodding orchid).
- *Pterostylis nutans* (Greenhood orchid).
- *Stylidium graminifolium* (Grassy-leaved trigger-flower).
- *Xanthorrhoea fulva* (Swamp grasstree).
- Xanthorrhoea johnsonii (Grasstree).

No Special Least Concern fauna species were identified during field-based investigations.

### 3.3.5 Flora species

In total, 104 flora species were identified within the Project area during the ecological field investigation conducted in May 2021. Of these species, 86 (82.7%) were native and 18 (17.3%) were non-native. Of the non-native species 2 (11.1%) were listed as Restricted matters under the *Biosecurity Act 2014* (refer to Section 3.3.11).

A list of flora species identified within the Project area during the ecological field investigation is provided in Appendix C.

### 3.3.6 Vegetation communities

A large portion of the Project area (approximately 55%) is mapped as containing Category B regulated vegetation (i.e. remnant vegetation). The site is also mapped as containing Category C regulated vegetation (i.e. regrowth). Category C and Category X (non-remnant) vegetation comprise of approximately 44% of the Project area. Category R (Reef regrowth) vegetation comprises of approximately 1% of the Project area.

Remnant vegetation within the Project area is comprised of two distinct Regional Ecosystems (REs) (i.e. RE 12.3.6 and RE 12.5.4). These vegetation communities are discussed below. Non-remnant and regrowth areas within the Project area are typically dominated by pasture grasses (e.g. African lovegrass – *Eragrostis curvula*), or infestation by Slash Pine (*Pinus elliottii*) or Black Wattle (*Acacia leiocalyx*). The ecological field investigations confirmed the government RE mapping for the area.

The Project area currently supports low intensity cattle grazing, and a single dwelling is located within areas of non-remnant vegetation. The following sections further describe the vegetation within the site and the potential to support CEEVNT flora and fauna species.

#### 3.3.6.1 Remnant vegetation (RE 12.3.6)

Areas of remnant RE 12.3.6 within the Project area consists of open forest to woodland, dominated by *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* with a grassy ground layer dominated by species such as *Imperata cylindrica*. *Eucalyptus tereticornis* may be present as an emergent layer. Occurs on quaternary floodplains and fringing drainage lines in coastal areas. This community is analogous with the TEC, Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community.

Photos of RE 12.3.6 within the Project area are provided in Photo Plate 3-1.

**Photo Plate 3-1 Typical vegetation associated with RE 12.3.6 within the Project area**

### 3.3.6.2 Remnant vegetation (RE 12.5.4)

Areas of remnant RE 12.5.4 within the Project area consist of woodland, dominated by *Eucalyptus latisinensis* +/- *Corymbia intermedia, Corymbia trachyphloia, Angophora leiocarpa* and *Eucalyptus exserta*. Other characteristic species include *Eucalyptus siderophloia, Lophostemon suaveolens, Melaleuca quinquenervia* and *Grevillea banksii*. Patches of *Banksia oblongifolia* are present locally and *Xanthorrhoea johnsonii* is common in ground layer. Occurs on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments.

Photos of RE 12.5.4 within the Project area are provided in Photo Plate 3-2.

**Photo Plate 3-2 Typical vegetation associated with RE 12.5.4 within the Project area**

### 3.3.6.3 Non-remnant and regrowth areas

Non-remnant and regrowth areas within the Project area have been regenerated to be dominated by non-native trees (e.g. Slash pine [*Pinus elliottii*]), or native pioneering species (e.g. Black wattle [*Acacia leiocalyx*]). In all instances, the ground stratum was dominated by non-native species, most prominently African love grass (*Eragrostis curvula*) and Praxelis (*Praxelis clematidea*).

The non-remnant areas provided relatively low habitat value for CEEVNT flora species due to the prevalence of highly competitive non-native, and native pioneering species.

Photographs of non-remnant areas within the Project area are provided in Photo Plate 3-3.

**Photo Plate 3-3 Typical vegetation associated with non-remnant areas within the Project area**

### 3.3.7 Habitat value

The Project area is mapped as containing essential habitat for the NC Act and EPBC Act Endangered listed species Koala (*Phascolarctos cinereus*) and Greater glider (*Petauroides volans),* EPBC Act Vulnerable listed species Grey-headed flying fox (*Pteropus poliocephalus),* and the NC Act Vulnerable listed species Wallum froglet (*Crinia tinnula*). Ecological field investigations conducted in May 2021 confirmed the presence of habitat for these species within the Project area. The vegetation communities within the site are dominated by Non-Juvenile Koala Habitat Trees (NJKHTs) and provide potential habitat for the Koala, Greater glider and Grey-headed flying fox. The low-lying riparian areas within the site are conducive to suitable habitat for the Wallum froglet. It is noted that there were no scats or scratch marks considered conducive to the Koala observed within the Project area during the field investigation.

### 3.3.8 Animal breeding places

The Project area supports suitable animal breeding places for CEEVNT and Least Concern species (including Special Least Concern and colonial breeders) species. Special Least Concern fauna species are listed under Schedule 1 of the *Nature Conservation (Animals) Regulation 2020* (Animals Regulation). Colonial breeder species are defined under the provisions of the NC Act as Least Concern animals that co-exist in close association for breeding purposes and are of the same species.

The low-lying areas of the Project area which have the capacity to hold water for periods of the year provide suitable potential breeding places for the NC Act vulnerable listed species Wallum froglet (*Crinia tinnula*).

The Project area also supports several hollow bearing trees which provide suitable potential breeding places for Special Least Concern gliders and microchiropteran bat species.

### 3.3.9 Incidental fauna observations

Twenty-nine incidental fauna observations were recorded within the Project area during the ecological field assessment. This included 26 (86.2%) native species and 4 introduced species (13.8%). One of the introduced species is listed as a Restricted matter under the *Biosecurity Act 2014* (refer to Section 3.3.11). A list of fauna species identified within the Project area during the ecological field investigation is provided in Appendix D.

### 3.3.10 Aquatic values

Limited aquatic habitat values were present within the Project area. Desktop analysis identified aquatic habitat within the Project area consisting of isolated artificial waterbodies linked by first order unmapped water features (under *Water Act 2000*). On-ground truthing identified that aquatic habitat presented as drainage features throughout the whole site, with poor habitat present throughout the entire length of the drainage feature (refer Photo Plate 3-4). Limited evidence of a channel was present within the head section (W01) and lower section (W03), while bank structure was present within the mid-section (W02), however was likely scoured from overflow from the upstream artificial waterbody rather than from any regularity of flow. Noting this, surrounding vegetation communities at the mid-and lower sections of the drainage feature was indicative of soaks and comprised of *Melaleuca* spp., with fringing communities of emergent wetland indicator species of, *Lomandra* spp. and *Cyperus* spp. and *Baumea* spp. The head section (W01) did not present with any wetland indicator species. A soak was located downstream of W03, with a depression associated with the intersect of an easement at the western side of the Project area. In summary, no significant aquatic habitat constraint was identified from the Project area.

**Photo Plate 3-4 Unmapped drainage feature within the Project area**

### 3.3.11 Restricted matters

Restricted invasive matters are established in Queensland and seriously threaten Queensland's primary industries, natural environment livestock, human health, and people's livelihoods. The following 'Restricted Invasive Plants' under the *Biosecurity Act 2014* (Qld) were recorded within the Project area during the ecological field investigation conducted in May 2021:

- Lantana (*Lantana camara*) – Category 3[1]
- Giant Parramatta grass (*Sporobolus fertilis*) – Category 3[1]

The following 'Noxious Fish' under the Biosecurity Act 2014 (Qld) were recorded within the Project area during the ecological field investigation conducted in May 2021:

- Mosquito fish (*Gambusia holbrooki*) – Category 3, 5, 6 and 7[1]

[1]Category 3 restricted matters must not be released into the environment, given away or sold.
Category 5 restricted matters must not be kept.
Category 6 restricted matters must not be fed.
Category 7 restricted matters must be killed and buried (includes only Noxious fish)

# 4 Potential impacts and mitigation measures

## 4.1 Project Impacts

The project footprint includes the construction of a manufacturing facility and associated infrastructure. The proposed works are likely to impact the ecological values contained within the project footprint through the clearing of vegetation and its associated impact on species habitat. The proposed development also has the potential to adversely impact the waterway within the project footprint.

Project impacts which have the potential to negatively impact the surrounding ecological values include;

- Removal of vegetation and wildlife habitat for Project activities (i.e. manufacturing facility and access tracks) (refer to Sections 4.1.1 and 4.1.2).
- Habitat removal also potentially leading to a reduction in connectivity and habitat fragmentation (refer to Section 4.1.3).
- Increased edge effects such as weed invasion (refer to Section 4.1.4).
- Project construction activities potentially causing alterations to hydrology (refer to Section 4.1.5).
- Project construction activities which have the potential to impact ecological values directly and indirectly including direct mortality of plants and animals (refer to Section 4.1.6), and indirect effects from noise, dust vibration and light (refer to Section 4.1.7).
- Operational transportation along the rail which has the potential to impact fauna due to direct mortality/injury via collision or disturbance associated with noise, light, and vibration.
- Increased activity increasing risk of bushfire in the area (refer to Section 4.1.8).

### 4.1.1 Removal of vegetation

Vegetation clearing will be required during the construction of the Project. The clearing of vegetation is managed under the *Vegetation Management Act 1999* (VM Act).

The total amount of vegetation to be removed for the Project is 17.42 ha. This vegetation consists of Category B remnant vegetation. A detailed breakdown of where vegetation is to be removed as part of the Project is shown in Table 4-1.

**Table 4-1 Vegetation within the Project footprint to be removed**

| Vegetation community | Description | Maximum area to be removed within the model disturbance footprint (ha) |
|---|---|---|
| RE12.3.6 | *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest to woodland on alluvial plains | 4.76 |
| RE12.5.4 | *Eucalyptus latisinensis* +/- *Corymbia intermedia, Corymbia trachyphloia, Angophora leiocarpa* and *Eucalyptus exserta* woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments | 12.66 |
| **Total area of vegetation to be removed** | | **17.42** |

Vegetation associated with the Regional Ecosystem (RE) 12.3.6 will be prioritised to be retained where possible due to its higher ecological significance as riparian corridor and wildlife habitat (refer to Section 4.1.2). The total amounts of vegetation to be removed and removal process will be addressed prior to removal in the Project EMP(C).

Regulated vegetation is considered a MSES which are a component of the biodiversity state interest that is defined under the State Planning Policy (SPP) and defined under the Environmental Offsets Regulation 2014 (Offset Regulation). Removal of regulated vegetation may result in a significant residual impact which is discussed in Section 5.

### 4.1.2 Removal of wildlife habitat

Existing habitat values within the proposed project footprint were associated with remnant vegetation towards the north west of the Project area. Habitat values in the southern portion of the project footprint were minimised due to previous degradation caused by cattle grazing activity and weed invasion.

Essential habitat under the VM Act is mapped in the northern portion of the project footprint for two conservation significant species, the Koala (*Phascolarctos cinereus*) and the Wallum froglet (*Crinia tinnula*) (refer to Section 3.1). The mapped essential habitat within the project footprint is associated with RE 12.3.6 and was field verified as suitable habitat for the two species. This essential habitat mapping is similarly suitable habitat for the Greater glider and Grey-headed flying fox. Potential habitat for the Koala, Greater glider and Grey -headed flying fox also exists within areas associated with remnant patches of RE 12.5.4.

It is noted that no threatened fauna or flora species were observed as present within the Project area during the May 2021 surveys.

The maximum amount of field verified suitable habitat within the project footprint to be removed for the Project includes;

- Greater glider (*Petauroides volans)* (Endangered under the EPBC Act and NC Act): 17.42 ha of suitable habitat (considered as habitat critical to the survival of the Greater glider as defined by the Conservation Advice) (refer to Sections 5.2 and 6.1)
- Koala (*Phascolarctos cinereus)* (Endangered, NC Act and EPBC Act): 17.42 ha of suitable habitat (which is not considered habitat critical to the survival of the Koala, refer to Sections 5.3 and 6.1)
- Grey-headed flying fox (*Pteropus poliocephalus)* (Vulnerable under the EPBC Act): 17.42 ha of suitable habitat (considered as habitat critical to the survival of the Grey-headed flying fox as defined by the Conservation Advice) (refer to Sections 5.4 and 6.1)
- Wallum froglet (Vulnerable, NC Act): 4.76 ha of suitable habitat (which is considered habitat critical to the survival of the Wallum froglet as defined by the National recovery plan for the species, refer to Section 6.1).

### 4.1.3 Reduction in the connectivity of biodiversity corridors and habitat fragmentation

Vegetation clearing for the Project can reduce habitat connectivity and create habitat fragmentation. It can also introduce “edge effects” due to changes in environmental conditions (i.e. altered light levels, wind speed, temperature). This can lead to changes in the local environment, by promoting the growth of different vegetation types (including weed species), promoting invasion by pest animals specialising in edge habitats, or changing the behaviour of resident native animals (Moenting and Morris 2006).

Woodlands within the project footprint are connected to larger patches of remnant vegetation to the north of the Project. Vegetation to the east and west of the project footprint is limited but not restricted by the existing Bruce Highway and North Coast Line. Due to the width of these major traffic corridors it is unlikely that fauna cross the barriers regularly and it is likely that there is high mortality along the highway. However, there is still accessibility for fauna to cross the transport corridors due to lack of fencing and minimal drainage line passage. Vegetation to the south includes a pine plantation that is intermittently cleared and lacking in suitable habitat. It can be used by larger fauna and avian species as transient vegetation. Pine plantations are not a habitable connection for foraging and breeding populations and are a restriction in connectivity for smaller fauna species.

The vegetation to the east includes patches such as Vernon Conservation Park, Vernon State Forest, and a patch of approximately 15,000 ha of remnant vegetation (i.e. Category B regulated vegetation). The vegetation to the west is connected to the western ranges associated with Lake Lenthall. The major traffic

corridors are all that separate these large patches of vegetation of which the Project is located between. Remnant riparian corridors throughout the pine plantation are mapped as State corridors under the Biodiversity Planning Assessment (BPA) mapping (DES 2021d). The clearing of vegetation within the project footprint would reduce connectivity between east and west vegetation but would not block or further disconnect the patches.

To assess the extent of potential Project connectivity impacts, the DES 'landscape fragmentation and connectivity' tool is used. The tool has been applied to the project footprint and determined that any impact on connectivity areas is not significant. It has defined that reduction in core remnant vegetation at the local scale is non-significant (0.95%) and that a change from core to non-core remnant vegetation at the site scale is also non-significant.

### 4.1.4 Displacement of flora and fauna species from invasion of weed and pest species

Weed and pest species have the potential to impact on terrestrial and aquatic biodiversity. Exotic species can displace native species through predation and competition. The most likely causes of pest dispersal and pest introduction associated with the Project include vegetation and soil movement, and attachment of seed (and other propagules) to vehicles and machinery.

Numerous non-native flora species have been recorded in the project footprint and surrounds. Non-remnant patches within the project footprint are dominated by introduced grasses, particularly African love grass (*Eragrostis curvula*). Non-remnant patches are also experiencing heavy recruiting of exotic pine (*Pinus elliottii*) from nearby pine plantations to the south of the Project area. Two Category 3 restricted plants, Lantana (*Lantana camara*) and Giant rat's tail grass (*Sporobolus pyramidalis*) listed under the provisions of the *Biosecurity Act 2014* were recorded by Aurecon within the Project area during the May 2021 field survey. Given the presence of these weeds in the Project area, it is unlikely the Project will increase weed populations any more than existing cattle grazing activities. Weed controls will be put in place under the project EMP(C) and will be applied to the Project in accordance with other operational procedures.

Three exotic fauna species were recorded in the Project area and surrounds by Aurecon during the May 2021 field survey. This included one Restricted matter, the mosquito fish (*Gambusia holbrooki*) classed as a Noxious fish and a Category 3, 4, 5 and 6 under the provisions of the *Biosecurity Act 2014*. The species was observed within the waterway within the project footprint. Presently, feral animals were not commonly observed within the Project area nor was there evidence of these fauna (scats, tracks, and signs etc). The Project is unlikely to introduce new pest animals to the area due to the previous disturbance. Pest fauna will be monitored throughout the Project and management measures within the Project EMP(C) will reduce impacts.

### 4.1.5 Aquatic impacts

Impacts to aquatic values within the project footprint are limited due to low aquatic values present (refer to Section 3.3.10). Aquatic ecology such as habitat value for aquatic species or wetland ecosystems is minimal throughout the unmapped waterway within the project footprint which has no regular flow. The aquatic habitat does however provide essential habitat for amphibian species such as the Wallum froglet.

The impacts to surface water are deemed minimal due to influx likely from artificial waterbodies. The Project will minimise its impacts to the waterway where possible and will be managed to avoid loss of waterway integrity. Indirect impacts to the waterway will be managed under the *Technical specification MRTS52 Erosion and Sediment Control* (MRTS52) and associated Erosion Sediment Control Plan (ESCP).

### 4.1.6 Fauna species injury or mortality

Direct impacts to fauna have the potential to occur during all phases of the Project, with the highest potential to occur during vegetation clearing. This potential impact will be proportionate to the extent of vegetation and habitat potential for species that is removed.

No conservation significant species are known to occur within the project footprint. There are twelve (12) conservation significant fauna species with a moderate likelihood of occurrence within the Project area. In addition to conservation significant species, all native fauna (including those listed as Least Concern species) are protected under the *Nature Conservation Act 1992*.

Some diurnal and mobile species, such as birds, may move away from areas being disturbed (i.e. vegetation removal) and may not be adversely impacted unless fauna are nesting. However, other species that are less mobile, or those that are nocturnal and nest or roost in tree hollows during the day, such as arboreal mammals, may be adversely affected.

The operational use of access tracks and roads across the project footprint will result in increased vehicle movements that may cause injury or death to fauna by vehicle strike.

### 4.1.7 Dust, noise, and light impacts

In general, construction activities can generate noise, dust, and light, which may impact on adjacent vegetation and fauna. The likelihood of potential impacts is anticipated to be greatest where Project activities take place near vegetated areas and known habitat. These areas include the remnant vegetation adjacent to the project footprint to the north, east and west.

In general, dust deposition from construction activities has the potential to impact upon vegetation if excessive quantities are sustained over extended periods of time. Excessive dust deposition on foliage reduces photosynthetic processes, which in turn stunts floral growth rates, and reduces the overall health of the remaining remnant communities within, and adjacent to, the project footprint.

Impacts from noise and light can create an edge effect around the construction site driving fauna away from the area reducing biodiversity during construction. These impacts can also be present during the operational life of the Project. These impacts are not considered to significantly impact the species within and adjacent to the project footprint.

### 4.1.8 Bushfire

The operation of ignition sources such as machinery and hot works during the Project may cause an increased risk of fire. There is also potential for bushfire to impact the project from surrounding vegetation. The Project is largely surrounded by eucalypt woodland and pine plantation which have the potential to be impacted by fire. Currently a large fire break (70 m) exists between the Project area and the neighbouring pine plantation to the south, reducing fire risk dependant on maintained firebreaks. Remnant vegetation within the Project area may require firebreaks during construction and operational stages of the Project to minimise the risk of fire. This will be addressed within the Project specific Bushfire Management Plan.

## 4.2 Management of Impacts and mitigation measures

### 4.2.1 Mitigation measures

Mitigation measures which are recommended to be implemented by the Project to minimise adverse impact on ecological values contained within the project footprint (including indirect impacts to adjacent areas) are listed below;

- The final design will adopt the hierarchy of mitigation (i.e. avoided, minimised, and mitigated where possible) to reduce the duration and severity of impacts.
- The Project will follow procedures associated with the MRTS51 (Environmental Management), MRTS52 (Erosion and Sediment Control) and MRTS16 (Landscape and Revegetation Works) and provisional ESCP, EMP(C) and Rehabilitation Control Plan (RCP) with associated plans and programs (refer to Section).
- No vegetation clearing is to take place without the appropriate vegetation clearing permits in place. An exemption for a Protected Plant Clearing Permit has been granted for the Project (DES Reference: APP0083083) and will be applicable for three years from the date of survey (May 2021).

- The clearing of all areas will be restricted to the minimal area required to enable safe construction, operation, and maintenance of the Project infrastructure.
- Vegetation will be avoided where possible within 20m of the waterway mapped in the north of the project footprint. Where infrastructure is proposed within this area, fauna movement along the riparian corridor is to be maintained, with particular attention to Wallum froglet and Koala.
- Clearing to be undertaken in a sequential manner to allow fauna to move safely into areas of existing bushland to the north.
- Ensure that vegetation clearing boundaries are established with appropriate signage at regular intervals and visible and physical markings. High visibility tape, barricade webbing or similar should be utilised. Ensure that all contractors are aware of these boundaries.
- Where possible, minimise loss of canopy vegetation and works that will lead to the proliferation of weed species.
- Obtain all the appropriate approvals under local, State and Commonwealth legislation. This includes relevant approvals required to undertake site preparation and pre-clearing surveys and works.
- Ensure that all the approval conditions have been addressed or adequate measures are included in the relevant management plans to address these conditions.
- All site personnel are to be made aware of local fauna that could occur on site and that all native fauna, including snakes, are protected. Fauna are only to be handled by suitably qualified personnel.
- Discourage the feeding of wildlife by project personnel throughout the project area.
- Consider mechanisms to facilitate fauna movement (i.e. culvert design and bridging).
- Where temporary fencing is required consideration will be given to fauna movement, current land uses and construction staff safety requirements. Special consideration will be given to frogs and Koalas.
- Implement fauna escape devices where practical (such as planks within trenches or trench ramps designed with a 15-degree slope placed every 30 m along the trench) to enable fauna to exit hazardous areas within the construction site.
- A suitably qualified and licenced Ecologist/Fauna Spotter Catcher with the appropriate permits will be engaged to conduct a preclearance survey and be present for all habitat clearing. During the preclearance survey the Ecologist/Fauna Spotter Catcher will inspect the Project area at least 3 days prior to vegetation clearing. The Contractor will give notice to the Principal prior to commencing any clearing within the project footprint.
- Ensure that all hollow bearing tree clearing is supervised and managed by the Ecologist/ Fauna Spotter Catcher.
- During construction works, a certified Ecologist/ Fauna Spotter Catcher is to inspect trenches, culverts, and other structures to determine whether there are any trapped or injured fauna species present and action as appropriate.
- Where practical, minimise night work to reduce impacts to nocturnal and diurnal species.
- Project infrastructure lighting will be designed, with due consideration to safety, to have a minimal impact on surrounding habitats and fauna.
- Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of fauna throughout construction.
- Where practical, maintenance works are to be carried out within designated areas or offices and away from sensitive environments such as REs, riparian vegetation, and waterways.
- No vegetation is to be burnt either as a form of removal or disposal.
- Dust suppression techniques are to be adopted during construction to minimise smothering of native vegetation
- The EMP(C) will outline specific measures to minimise the risk of weed and pest animal establishment within and adjacent to the Project area. Only chemicals suitable for use near waterways will be approved for use in reasonable proximity of watercourses/drain lines within the project area. Weed control measures will be designed to minimise impacts on native fauna (e.g. use of aquatic and frog friendly chemicals)

- To minimise the risk of weed and pest animal establishment within and adjacent to the Project area, the measures outlined in the EMP(C) shall be implemented by the appointed contractor(s) and be overseen and audited by the relevant Site Environmental Officer
- Fill and imported soil materials are to be declared weed free or to be sourced from weed free areas.
- Fill and imported soil materials are to be sourced from outside fire ant biosecurity zones or otherwise permitted.
- Any identified Class 1 or 2 infestations are to be reported to the Queensland Department of Primary Industries and Fisheries (QPIF).
- Any vehicles or machinery coming onto site from an area known to contain Category 1, 2 or 3 weeds are to be washed down prior to entry to site.
- Vegetation removed from the site will be managed to reduce the spread or introduction of myrtle rust and other plant pathogens.
- Chytrid fungus will be managed under the technical manual '*Interim Hygiene Protocol for Handling Amphibians'* which will be implemented by the onsite environmental representatives, ecologists and fauna spotter catchers. Dewatering practices will also be managed to ensure water is distributed on and off site without spreading the pathogen.

# 5 Significant residual impact assessment for Matters of National Environmental Significance

Following field-based investigations specifically designed to target potentially occurring MNES (Aurecon 2022), two MNES (i.e. Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland TEC and Satin flycatcher), were identified as present within, and immediately adjacent to the Project site.

In addition, habitat for the following MNES has been identified within and/or immediately adjacent to the Project site:

- Greater glider (*Petauroides volans)* – Endangered
- Koala (Phascolarctos cinereus) – Endangered
- Grey-headed flying-fox (*Pteropus poliocephalus*) – Vulnerable
- White-throated needletail (*Hirundapus caudata*) – Vulnerable
- Four Migratory species:
  - Satin flycatcher (*Myiagra cyanoleuca)*
  - Fork-tailed swift (*Apus pacificus*)
  - Oriental cuckoo (*Cuculus optatus*)
  - Spectacled Monarch (*Symposiachrus trivirgatus*)

Under the EPBC Act these matters require assessment using the *MNES Significant Impact Guidelines 1.1*.

## 5.1 Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community

The Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC was listed as Endangered under the EPBC Act on the 8th December 2021.

The ecological community includes the plants, animals and other organisms typically associated with forested palustrine wetlands, or swamp forests, found in the temperate to subtropical coastal valleys of Australia's east coast. The Coastal Sclerophyll Swamp Forest often has a layered canopy, dominated by melaleucas and/or *Eucalyptus robusta* and occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales (DCCEEW 2022b).

The ecological community typically occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dune. The ecological community most commonly occurs at elevations below 20 m above sea-level (ASL) but may occur occasionally up to 220 m ASL on hill slopes, for example in association with perched swamps and lakes, or a naturally high-water table (DCCEEW 2022b).

The structure of the Coastal Swamp Sclerophyll Forest ecological community varies from open woodland to closed forest with a crown covers of at least 10% and typically no more than 70%. In an intact forest, the canopy can be layered, with a sub-canopy of melaleuca grading into a taller mixed

melaleuca and/or eucalypt canopy. Canopy density, light availability, water regime, salinity level and soil fertility influence the development and composition of the understorey flora (DCCEEW 2022b).

Within Queensland, there are five Regional Ecosystems (REs) (as regulated under the Queensland *Vegetation Management Act 1999*) that are considered to be analogous to the Coastal Swamp Sclerophyll Forest ecological community where they meet the necessary condition class and patch size as defined within the Commonwealth conservation advice for the Coastal Swamp Sclerophyll Forest ecological community. These vegetation communities consist of the following:

- RE 12.2.7 – *Melaleuca quinquenervia* or rarely *Melaleuca dealbata* open forest on sand plains
- RE 12.3.4 and 12.3.4a – Melaleuca quinquenervia, Eucalyptus robusta woodland on coastal alluvium/Eucalyptus bancroftii open woodland often with Melaleuca quinquenervia.
- RE 12.3.5 – *Melaleuca quinquenervia* open forest on coastal alluvium.
- RE 12.3.6 – Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains
- RE 12.3.20 (in part) - Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, Eucalyptus siderophloia open forest on low coastal alluvial plains.

Of the REs identified above, the Proposed Action is likely to impact upon RE 12.3.6 which is located within the northern and eastern portion of the Project site, and the northern section of Ritchie Road. Approximately **4.76 ha** of Coastal Swamp Sclerophyll Forest has been identified as being contained within the area of direct disturbance of the Proposed Action.

## 5.2 Greater glider (*Petauroides volans)*

### 5.2.1 Ecology and distribution

The Greater glider is Australia's largest gliding marsupial with a head and body length of 35-46 cm and a tail measuring up to 60 cm. This species has thick fur that is pale below and the upper side varies from dark grey, brown to light mottled grey and cream. The tail lacks the ability to curl around objects and the ears are large and rounded.

Greater gliders are arboreal and nocturnal, largely restricted to eucalypt forests and woodlands. The diet is mostly florivorous, feeding on eucalypt leaves and occasionally flowers. The largest populations are in taller, montane forests with old trees and abundant hollows. Even in suitable habitat, the species may have a patchy distribution. Due to the seasonal variation of eucalypts, this species prefers forests of high species diversity.

During the day it shelters in tree hollows, with a preference for large hollows in large, old trees. In Southern Queensland, greater gliders require at least 2-4 live den trees for every 2 ha of suitable forest habitat.

Home ranges are small, becoming larger in lower productivity forests. This species is particularly sensitive to forest clearance and to intensive logging and wildfire. Following disturbance, it is slow to recover. Due to the sensitivity of the species and the low dispersal ability, it is sensitive to habitat fragmentation.

### 5.2.2 Distribution in context to the Project

There were no signs of Greater glider presence (i.e. individuals, scats, and scratch marks) within the Project site during the field survey conducted by Aurecon. Greater glider food trees and hollows were recorded throughout the vegetation within the Project site.

There are scattered database records (i.e. WildNet) beyond the Project site. The nearest species occurrence record is 5km northeast of the Project site near Vernon Conservation Park.

### 5.2.3 Recovery plans/threat abatement plans

There have been no adopted or made Recovery Pan for this species. No Threat Abatement Plan has been identified as being relevant for this species.

### 5.2.4 Habitat critical to the survival of the Greater glider

The conservation advice for the Greater glider listed by DCCEEW in July 2022 lists the considerations for habitat critical to the survival of the species, as addressed in Table 5-1 below.

**Table 5-1 Assessment of Habitat critical to the survival of the species criteria for Greater glider**

| Considerations for habitat critical to the survival of the species | Response for the Project site |
|---|---|
| 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 | Within the Project site approximately 17.42 ha of Greater glider habitat is proposed to be cleared. This habitat is remnant (ie mature). The Project site is contiguous with vegetation to the north, but is fragmented by land clearing, rail and road infrastructure to the east, south and west. |
| Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization | The Project site is contiguous with vegetation to the north, but is fragmented by land clearing, rail and road infrastructure to the east, south and west. Movement of individuals from the north has potential to occur. |
| Cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes) | The vegetation within the Project site contains coastal low-land areas which have the potential to provide a cool micro-climate. |
| Areas identified as refuges under future climate changes scenarios | The Project site is unlikely to provide refuge under climate change scenarios due the isolation of the vegetation and surrounding fragmentation on all but one side. |
| 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. | The Project site has the potential to provide refuge for short term of long term post-fire recolonisation due to its proximity to existing infrastructure and the existing fragmentation that may acts as firebreaks. |
| **Conclusion of assessment:** | **The Project site does contain habitat critical to the survival of the species.** |

The following factors have been considered in relation to the potential impact to Greater glider as part of the Project:

- The clearing of **17.42 ha** of potential Greater glider habitat.
- The nature of potential impacts and disturbance.
- Presence of habitat critical to the survival of the species.
- Lack of records within 5 km of the Project Site.
- Connectivity in habitat within the Project site to external habitat (contiguous habitat is only present to the north of the Project site).

In consideration of these factors, an assessment of significance related to potential impacts upon the Greater glider (and its habitat), as a result of the Project, has been undertaken in accordance with the Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999 (DoE 2013) (refer Table 5-2).

**Table 5-2 Significant impact assessment of Greater Glider**

| Significant impact criteria | Assessment of the Project against the Significant impact criteria |
|---|---|
| Will the action lead to a long-term decrease in the size of a population | **No**. No. The species was not observed to occur within the project site. |
| Will the action reduce the area of occupancy of a population | **No**. Field-based surveys indicate that the species is not present onsite, with the closet record of the species identified as occurring 5km to the north of the Project site. Approximately 17.42 ha of potential Greater glider habitat is proposed to be removed, which is located on the edge of a larger patch. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. The proposed removal is not considered to significantly reduce the area of occupancy of the species. |
| Will the action fragment an existing population into two or more populations | **No**. Field-based surveys indicate that the species is not present onsite, with the closet record of the species identified as occurring 5km to the north of the Project site. Approximately 17.42 ha of potential Greater glider habitat is proposed to be removed alongside a local road and North Coast Rail Line, which is located on the edge of a larger patch. As such, the Proposed Action is considered unlikely to fragment an existing population of this species into two or more populations. |
| Will the action adversely affect habitat critical to the survival of a species | **Yes.** Approximately 17.42 ha of potential Greater glider habitat is proposed to be removed. This habitat is considered to fulfil the requirements of habitat critical to the survival of the species. |
| Will the action disrupt the breeding cycle of a population | **No**. The proposed Action is unlikely of disrupt the breeding cycle if a population of the Greater glider. |
| Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | **No**. Habitat modification from the Project is considered unlikely to lead to the species declining, as the Project site area does not contain important connectivity. |
| Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | **No**. It is unlikely that the Proposed action will result in an increase in the presence and establishment of invasive species which may impact on the Greater glider. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management will be implemented during the life of the Project site to manage potential impacts from invasive species. As such, the Project site area considered unlikely to result in invasive species becoming established in habitat that are harmful to an endangered species. |
| Will the action introduce disease that may cause the species to decline | **No**. The proposed action is unlikely to introduce disease which may lead to decline of these species. While it is unknown whether individuals that may use the Project site for transient foraging or resting opportunities are disease free, no additional risk to the health of these species is considered likely as a result of construction of the Project site. Pathogens, such as Myrtle rust (*Austropuccinia psidiior*) and Phytophthora (*Phytophthora cinnamomi*), have the potential to be introduced to the Project site area during Project construction, by means of increased vehicular and pedestrian movements and imported soils. These pathogens may result in reduced quality and integrity of habitats for Greater glider. The potential risks associated with the introduction and spread of these pathogens are considered relatively low risk where appropriate construction hygiene protocols are implemented for the Project site. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management are recommending during the life of the Project site to manage potential impacts from invasive species. As such, the Project is |

| Significant impact criteria | Assessment of the Project against the Significant impact criteria |
|---|---|
| | considered unlikely to introduce disease that may cause these species to decline. |
| Will the action interfere with the recovery of the species. | **Possible**. The clearing of habitat critical to the survival of the species is country to the recovery of the species. As such, the Project site is considered likely to interfere substantially with the recovery of the species. |
| Determination of assessment: **Significant impact <u>likely</u>** | |

As per the significant residual impact assessment detailed in Table 5-2 there is likely to be a significant residual impact on the Greater glider or Greater glider habitat as a result of the Project activities.

## 5.3 Koala (*Phascolarctos cinereus*)

### 5.3.1 Ecology and distribution

The Koala is a leaf-eating specialist feeding primarily during dawn, dusk or during the 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. Koala habitat can be broadly defined as any environment containing Koala food tree species or shelter trees. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands dominated by Eucalyptus species. Koalas are also known to occur in highly modified (i.e. urbanised) or regenerating native vegetation communities. Female Koalas generally produce one offspring each year, with births occurring between October and May (DAWE 2020). The species home range size is dependent on the quality of habitat. In central Queensland home ranges may be as large as 135ha (Ellis et al. 2002), and as little as 37ha in northern New South Wales (Goldingay and Dobner 2014). Koalas are generally sedentary, with longer movements largely restricted to dispersing males which may extend several kilometres through lands cleared of vegetation (DAWE 2020).

The Koala is distributed along the east coast of Australia extending from Queensland south to Victoria and the eastern portion of South Australia. In Queensland, the Koala's distribution extends across several bioregions, encompassing a great diversity of habitats, with the greatest concentration thought to occur in south-east Queensland (DES 2017).

### 5.3.2 Distribution in context to the Project

There were no signs of Koala presence (i.e. individuals, scats, and characteristic scratch marks) within the Project area during the May 2021 field survey.

Koala food trees were recorded throughout the vegetation within the project footprint. The southern portion of the project footprint is largely cleared for cattle grazing and contains disturbed areas dominated by pine and regrowth vegetation where limited koala food trees were present. The remnant vegetation areas on the western side of the project footprint and adjacent to the north comprised of favourite koala food trees such as Queensland blue gum (*Eucalyptus tereticornis*) and Mahogany (*Eucalyptus latisinensis*) (Mitchell, 2015). The riparian vegetation surrounding the waterway within the project footprint (RE 12.3.6) contained a higher density of Queensland blue gum than the rest of the project footprint. Within the broader landscape, extensive patches of suitable habitat occur to the north of the project footprint. Large patches of contiguous Koala habitat also exist either side of the Bruce Highway and the North Coast Rail line. However, it is likely that linear infrastructure and large tracts of pine plantation surrounding the Project site create barriers to long distance dispersal (Norman et al. 2019).

There are scattered database records (i.e. WildNet) well beyond the Project site, but no records that indicate that Koala historically occurred within the region. The nearest species occurrence record is from Maryborough (2010 record from approximately 18 km south of the Project site) and one record from south of Childers (1987 record from approximately 32 km north of the Project site). Records occur more frequently 20 km towards the south. An assessment of significance related to potential impacts upon the Koala (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999 (DoE 2013) (refer Aurecon 2022).

### 5.3.3 Recovery plans/threat abatement plans

The current Commonwealth adopted recovery plan applicable to Koala is the National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022. The National Koala Conservation and Management Strategy 2009-2014 (NRMMC 2009) expired in 2014. The DAWE Approved Conservation Advice (DSEWPaC 2012) notes the following potentially threatening processes for Koala:

- Habitat loss, modification, or fragmentation because of urbanisation
- Secondary threats such as predation by domestic dogs, vehicle strikes and stress
- Extreme heat events, drought and climate change
- Chlamydia and other diseases (such as Koala retrovirus) which reduces the life expectancy of the species (DCCEEW 2022).
- Natural systems modification including altered fire regimes and native forestry

### 5.3.4 Habitat critical to the survival of the Koala

The conservation advice for the Koala listed by DCCEEW in February 2022 lists the considerations for habitat critical to the survival of the species, Table 5-3 below.

**Table 5-3 Assessment of Habitat critical to the survival of the species criteria**

| Considerations for habitat critical to the survival of the species | Response for the Project site |
|---|---|
| Is the habitat is used during periods of stress (examples: flood, drought or fire) | There is no historic evidence of Koala presence within the Project site. There are large barriers to connectivity (e.g. Bruce Highway & North Coast line) It is not foreseeable that during periods of stress Koalas could move back into the Project site. |
| Is the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes) | Habitat for Koala within the Project site is unlikely to sustain Koala for long periods given its poor connectivity with contiguous habitats. |
| What is the extent to which the habitat is used by important populations | There are no current records of Koala populations within 2 km of the project area, Koala surveys conducted in 2022 by Koala scat detection dogs did not detect the species. There were no evidence of scats, scratches or direct Koala presence observed in 2021 surveys. |
| Is the habitat necessary to maintain genetic diversity and long-term evolutionary development | Given the location of the site between the Bruce Highway and the North Coast Line, it is unlikely to support a flow in genetic diversity. |
| Is the habitat necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements | Habitat for Koala within the Project site is unlikely to sustain Koala for long periods given its relatively poor connectivity with contiguous habitats. |
| Is the habitat necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation | Due to limited connectivity to habitat to the of the Project site is it not foreseeable that Koalas could recolonise into the area. Any re-introduction of the species into the area could lead to a sink population due to high mortality rates associated with vehicle strikes. |
| **Conclusion of assessment:** | **The Project site does not contain habitat critical to the survival of the species** |

The following factors have been considered in relation to the potential impact to Koala as part of the Proposed Action:

- The area of disturbance (i.e. **17.42 ha**).
- The localised nature of potential impacts.
- The nature of disturbance.
- The absence of an important population.
- Absence of habitat critical to the survival of the species.
- No utilisation of the area by Koalas
- The proposed mitigation measures
- Inability for the Koala to recolonise due to lack of connectivity in habitat within the Project site to external habitat.

In accordance with the Significant Impact Guidelines, an action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:

lead to a long-term decrease in the size of a population

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

An assessment of the Proposed Action described in Section 1 against the Commonwealth's Significant Impact Guideline for the Koala is provided in Table 5-4.

**Table 5-4 Assessment against the MNES Significant Impact Guidelines 1.1 criteria: Koala (**Endangered **species)**

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| **Matter:** Koala | |
| Will the action reduce the area of occupancy of the species | **No**. On ground surveys and a review of existing data indicates Koala did not occur within a 2 km radius to the proposed works. Approximately 17.42 ha of potential Koala habitat is proposed to be removed, which is located on the edge of a larger patch. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%. The proposed removal is not considered to significantly reduce the area of occupancy of the species. |
| Will the action fragment an existing population into two or more populations | **No**. On ground surveys and a review of existing data indicates Koala did not occur within a 2 km radius to the Proposed Action. Approximately 17.42 ha of potential Koala habitat is proposed to be removed alongside a local road and North Coast Rail Line, which is located on the edge of a larger patch. As such, the Proposed Action is considered unlikely to fragment an existing population of this species into two or more populations. |
| Will the action adversely affect habitat critical to the survival of a species | **No**. On ground surveys and a review of existing data indicates Koala did not occur within a 2 km radius to the proposed works. Approximately 17.42 ha of potential Koala habitat is proposed to be removed, which is located on the edge of a larger patch. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%.<br><br>Habitat for Koala within the proposed works area is unlikely to sustain Koala for long periods given its relatively small extent and poor connectivity with larger more contiguous habitats to the north, east and west. |

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| | However, vegetation is likely to provide transient foraging and resting opportunities for the species across its local range. The habitat contained within the Project site is not habitat critical to the survival of the species.<br><br>As such, the proposed works are considered unlikely to adversely affect habitat critical to the survival of Koala. |
| Will the action disrupt the breeding cycle of a population | **No**. Habitat for Koala within the proposed works is unlikely to sustain Koala for long periods given its relatively small extent and poor connectivity with larger more contiguous habitats to the north, east and west. However, vegetation is likely to provide transient foraging and resting opportunities for the species across its local range. Since the proposed works area is unlikely to be used for breeding by the species, impacts from the proposed works are unlikely to disrupt the Koala breeding cycle. |
| Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | **No**. Habitat modification from the Project is considered unlikely to lead to the species declining, as the proposed works area does not contain important connectivity. |
| Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | **No**. Invasive species identified within the proposed works area are not considered a primary threat for Koala (DCCEEW 2022).<br><br>It is unlikely that the proposed works will result in an increase in the presence and establishment of invasive species which may impact on the Koala. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management will be implemented during the life of the proposed works to manage potential impacts from invasive species.<br><br>As such, the proposed works area considered unlikely to result in invasive species becoming established in habitat that are harmful to a vulnerable species. |
| Will the action introduce disease that may cause the species to decline | **No.** The proposed works is unlikely to introduce disease which may lead to decline of these species. While it is unknown whether individuals that may use the Project site for transient foraging or resting opportunities are disease free, no additional risk to the health of these species is considered likely as a result of construction of the proposed works. Pathogens, such as Myrtle rust (*Austropuccinia psidiior*) and Phytophthora (*Phytophthora cinnamomi*), have the potential to be introduced to the proposed works area during Project construction, by means of increased vehicular and pedestrian movements and imported soils. These pathogens may result in |

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| | reduced quality and integrity of habitats for Koala. The potential risks associated with the introduction and spread of these pathogens are considered relatively low risk where appropriate construction hygiene protocols are implemented for the proposed works. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management are recommending during the life of the proposed works to manage potential impacts from invasive species.<br><br>As such, the Proposed Action is considered unlikely to introduce disease that may cause these species to decline. |
| Will the action interfere with the recovery of the species. | **No**. The Proposed Action is unlikely to interfere substantially with the recovery of this species, as the Project site area is only considered to contain marginal transient or foraging habitat for this species.<br><br>As such, the proposed works is considered unlikely to interfere substantially with the recovery of the species. |
| Determination of assessment: **Significant impact unlikely** | |

Within the Koala guidelines, Figure 2 provides guidance on the requirement for referral of an action likely to adversely impact Koala habitat (DotE 2014). Where habitat to be impacted is not considered habitat critical to the survival of the Koala (as per the habitat assessment results in Table 5-3). There is no habitat critical to the survival of the Koala considered to occur within the project footprint. As per the significant residual impact assessment detailed in Table 5-4, there is unlikely to be a significant residual impact on Koala or Koala habitat as a result of the Project activities.

## 5.4 Grey-headed Flying fox (*Pteropus poliocephalus)*

### 5.4.1 Ecology and distribution

The Grey-headed flying-fox (*Pteropus poliocephalus*) weighs approximately 600 g to 1 kg, and typically measures 23 cm to 28 cm from head to body. The Grey-headed flying-fox exhibits a collar of orange/brown around its neck, whilst its head is covered in light grey. The fur on the body is grey, often with flecks of white and ginger. The fur on the back exhibits two morphs, which are possibly related to age, moult, or sub-population. Winter fur is typically darker than summer fur, and pronounced moulting is known to occur in June (DCCEEW 2022b).

The Grey-headed flying-fox occurs in the coastal belt of Eastern Australia, typically ranging from Rockhampton in central Queensland to Melbourne in Victoria. It is noted that only a small portion of this range is used at any one time, as the species selectively forages where resources are available (DCCEEW 2022b).

The availability of food resources have a direct influence on the occurrence and relative abundance within the Grey-headed flying-foxes distribution in various seasons and years (DCCEEW 2022b).

Nectar and pollen from *Eucalyptus*, *Corymbia, Angophora, Melaleuca*, and *Banksia* species are considered the primary food source for Grey-headed flying-foxes. This species is known to supplement its diet with a wide range of rainforest fruits and introduced species (DCCEEW 2022b).

The Grey-headed flying-fox is a canopy-feeding species that eats fruit and nectar. This species utilises a range of vegetated habitats, including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. In an urban setting, this species is known to feed on commercial fruit crops, and on introduced tree species (DCCEEW 2022b).

Roost sites are generally located near water bodies. This species is known to roost in vegetation ranging from rainforest, *Melaleuca* stands, mangroves and riparian vegetation. The species has a high level of roost site fidelity, although new sites have been known to be colonised (DCCEEW 2022b).

Mating is known to occur in the early autumn months, after which time the larger camps begin to separate, reforming in late spring/early summer when food resources become more abundant. Males and females typically separate in October, when the young are born. Each year, following six months of gestation, females bear single young. For one month after giving birth, the mother carries her offspring on her ventral surface to feeding sites. When completely furred, the young are left in maternal camps, and are nursed until they are independent, at approximately 12 weeks of age. Sexual maturity typically occurs at about three years of age (DCCEEW 2022b).

### 5.4.2 Distribution in context to the Project

Three camps have been identified by the DCCEEW National Flying-fox monitoring viewer containing Grey-headed flying-foxes within the last 10 years. A camp at Maryborough (21 km south of the Project) has contained large numbers (16,000-50,000) of the species on several occasions until 2021. A camp at Childers (33 km west of the Project) recorded more than 2,500 individuals in 2013. The camp at Woocoo (25 km south-west of the Project) had more than 50,000 individuals estimated in 2021.

Important populations are not identified in the *National recovery plan for the Grey-headed flying-fox (Pteropus poliocephalus*) (DCCEEW 2021) as the population is considered to be national. Although they are spatially structured into colonies, there are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' entire geographic range. Therefore, for the purpose of this assessment, all individuals are considered to be part of an important population.

### 5.4.3 Recovery plans/threat abatement plans

A National Recovery Plan for the Grey-headed flying fox (*Pteropus poliocephalus)* has been developed for the species (DAWE 2021). No Threat Abatement Plan has been identified as being relevant to the species. However, the following have been identified as potentially threatening processes to the Grey-headed flying-fox:

- Clearing of native vegetation for agriculture and forestry operations has accelerated the destruction and disturbance of roosting and foraging habitats of the species in eastern Australia (DCCEEW 2022b)
- Lack of foraging resources can also force Grey-headed flying-foxes into commercial fruit crops, increasing conflict with growers and subsequent culling of individuals (DCCEEW 2022b)
- Urban-dwelling Grey-headed flying-foxes can accumulate lethal levels of lead from the environment and are prone to electrocution on powerlines (DCCEEW 2022b)
- Displacement leading to competition and hybridisation with the Black flying-fox (*P. alecto*) is also a known threat (DCCEEW 2022b).

The Referral guideline for management actions in grey-headed and spectacled flying-fox camps (DotE 2015a) identifies 'nationally important' camps for Grey-headed flying-fox as:

- Camps 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.

### 5.4.4 Habitat critical to the survival of the Grey-headed flying fox

The National recovery plan for the Grey-headed flying-fox (*Pteropus poliocephalus*) (DCCEEW 2021) defines habitat critical to the survival of the species as:

- Important winter or spring flowering vegetation communities that contain one or more of the following species:
  - *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or Syncarpia glomulifera*.

As well as vegetation communities not containing the above trees species but which:

- Contain native species that are known to be productive as foraging habitat during the final weeks of gestation and during the weeks of birth, lactation and conception (August to May)
- Contain native species used for foraging and occur within 20 km of a nationally important camp
- Contain native and or exotic species used for roosting at the site of a nationally important Grey-headed flying-fox camp.

Vegetation communities associated with the Melaleuca woodland comprise at least one of these important foraging species listed above and is therefore considered foraging habitat for the species. Given the proximity to known roost sites (including three which qualify as nationally important flying-fox camps), surveys have identified areas containing suitable foraging habitat as Habitat critical to the survival of the species. The mapping process determined that **17.42 ha** of Habitat critical to the survival of the species may be impacted by the Project.

The following factors have been considered in relation to the potential impact to Grey-headed flying-fox as part of the Proposed Action:

- Area of disturbance (i.e. **17.42 ha**).
- The localised nature of potential impacts.
- The nature of disturbance.
- The proposed mitigation measures.

In consideration of these factors, and in consideration of Significant impact guidelines 1.1, the Proposed Action is likely to result in a significant impact to the Grey-headed flying-fox (refer Table 5-5).

**Table 5-5 Significant impact assessment of Grey-headed flying-fox**

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| **Matter:** Grey-headed flying-fox | |
| Will the action lead to a long-term decrease in the size of an important population of a species | **No**. Grey-headed flying-fox are considered to form one single interbreeding population across most states of Australia. As |

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| | such, local populations of the species may be considered to be an important population.<br><br>Grey-headed flying-foxes are capable of nightly flights of up to 50 km from their roost to different feeding areas as food resources change (DCCEEW 2022). It is likely that individuals from the camps in the region may utilise foraging resources within the Project site.<br><br>Three camps have been identified by the DCCEEW National Flying-fox monitoring viewer containing Grey-headed flying-foxes within the last 10 years. A camp at Maryborough (21 km south of the project) has contained large numbers (16,000-50,000) of the species on several occasions until 2021. A camp at Childers (33 km west of the Project) recorded more than 2,500 individuals in 2013. The camp at Woocoo (25 km south-west of the Project) had more than 50,000 individuals estimated in 2021.<br><br>Approximately 17.42 ha of Grey-headed flying-fox habitat is proposed to be removed. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%.<br><br>As such, the proposed works are considered unlikely to lead to a long-term decrease in the size of an important population of this species. |
| Will the action reduce the area of occupancy of an important population | **No**. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest.<br><br>The proposed works area is not considered to significantly reduce the area of occupancy of an important population of this species. |
| Will the action fragment an existing population into two or more populations | **No**. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest. However, given the highly mobile nature of the species, availability of other suitable foraging habitats within the region and data indicating lack of nationally-important Flying-fox roost within the Project site, the Project is not considered likely to fragment an existing important population into two or more populations. |
| Will the action adversely affect habitat critical to the survival of a species | **Yes**. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest. |

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| | The action associated with the proposed works are considered likely to adversely affect habitat critical to the survival of a species. |
| Will the action disrupt the breeding cycle of a population | **No**. The proposed works are expected to impact approximately 17.42 ha of suitable Grey-headed flying-fox foraging habitat, comprising Eucalypt open forest and swamp sclerophyll forest. Within the local context (i.e. with a 1 km radius of the Proposed Action), the proposed clearing equates to approximately 0.03%.<br><br>Given the availability of other suitable foraging habitats within the region and the highly mobile nature of the species and data indicating lack of recent Flying-fox presence indicates the action associated with the proposed works are considered unlikely to adversely disrupt the breeding cycle of a population. |
| Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | **Possible**. As there is habitat critical to the survival of the species within the proposed works, there is the potential for the action to modify and remove the availability of foraging habitat for the species that may lead to their decline, despite their highly mobile nature and the availability of other suitable foraging habitats within the region. However, this species is not considered likely to be wholly reliant on vegetation within the proposed works area.<br><br>As such, the proposed works are considered to possibly modify, destroy, remove or isolate or decrease the availability or quality of foraging habitat to the extent that this species is likely to decline. |
| Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | **No**. Invasive species identified within the proposed works area are not considered a primary threat for Grey-headed flying-fox (DCCEEW 2021b).<br><br>It is unlikely that the proposed works will result in an increase in the presence and establishment of invasive species which may negatively impact on the Grey-headed flying-fox. The area of potential habitat is already affected by weed invasion and mitigation strategies, including weed management are recommending during the life of the Project to manage potential impacts from invasive species.<br><br>As such, the proposed works are considered unlikely to result in invasive species that are harmful becoming established in habitat for this species. |
| Will the action introduce disease that may cause the species to decline | **No**. The proposed works are unlikely to introduce disease which may lead to declines of these species. While it is unknown whether individuals that may use the proposed works area for transient foraging or resting opportunities are |

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| | disease free, no additional risk to the health of these species is considered likely as a result of construction of the proposed works.<br>Pathogens, such as Myrtle rust (*Austropuccinia psidiior*) and Phytophthora (*Phytophthora cinnamomi*), have the potential to be introduced to the proposed works area during proposed works construction, by means of increased vehicular and pedestrian movements and imported soils. These pathogens may result in reduced quality and integrity of habitats for Grey-headed flying-fox. The potential risks associated with the introduction and spread of these pathogens are considered relatively low risk where appropriate construction hygiene protocols are implemented. |
| Will the action interfere with the recovery of the species | **Possible.** The proposed works could interfere substantially with the recovery of this species, as the proposed works area is considered to contain habitat critical to the survival of the species in the form of foraging habitat. Mitigation measures will be recommended to ensure that adjoining fauna habitat is suitably protected and that the proposed works does not result in indirect impacts that will affect adjoining habitat areas.<br>The proposed works are considered likely to interfere with the recovery of the species. |
| Determination of assessment: **Significant impact <u>likely</u>** | |

## 5.5 White-throated needletail (*Hirundapus caudacutus)*

The White-throated needletail (*Hirundapus caudacutus*) is a summer migratory bird to Australia and is widespread throughout east and south-east Australia. They enter Australia from the Torres Strait, between September and October (Draffan et al. 1983). They leave between March and April (Higgins 1999).

The species is seldom seen on the ground, living most of its life between 1 m and 1,000 m from the ground floor. The bird roosts in trees that have dense foliage in the canopy, or in hollows (Tarburton 1993). In Australia, they are mostly found in woody areas, including open forest and rainforest, and over heathland. They nest in tall coniferous trees or on vertical rockfaces, with breeding only occurring in Southeast Asia and not within Australia.

There were no White-throated needletail observed during field surveys however its associated habitat was confirmed to be present.

An assessment of significance related to potential impacts upon the White-throated needletail (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) (refer Table 5-6).

In consideration of the localised nature of potential impacts, the nature of disturbance, the aerial nature of the species, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1, the Proposed Action is not likely to result in a significant impact to the White-throated needletail.

**Table 5-6 Significant impact assessment of White-throated needletail**

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| **Matter:** White-throated needletail | |
| Will the action lead to a long-term decrease in the size of an important population of a species | **No**. The White-throated needletail is a high elevation aerial forager that flies over huge areas in its daily movements. The habitats important to the species will not be affected by the proposed works and are located above the Project site (i.e. airspace).<br>As such, the Proposed Action is considered unlikely to lead to a long-term decrease in the size of an important population of this species. |
| Will the action reduce the area of occupancy of an important population | **No**. The White-throated needletail is a high elevation aerial forager that flies over huge areas in its daily movements. The habitats important to the species will not be affected by the proposed works. As such the Project site area is not considered to significantly reduce the area of occupancy of an important population of this species. |
| Will the action fragment an existing population into two or more populations | **No**.<br>The White-throated needletail occurs as a single, migratory non-breeding population when present in Australia. The proposed works is not considered likely to fragment an existing important population into two or more populations. |
| Will the action adversely affect habitat critical to the survival of a species | **No**. The White-throated needletail is a high elevation aerial forager that flies over huge areas in its daily movements. The habitats important to the species will not be affected by the proposed works. As such, the action associated with the Proposed Action is considered unlikely to adversely affect habitat critical to the survival of a species. |
| Will the action disrupt the breeding cycle of a population | **No**. White-throated needletails do not breed in Australia, and the proposed works would not result in impacts (e.g. via impacts to migration or mortality of adults) that could affect breeding success elsewhere. The Proposed Action is therefore likely to have no capacity to disrupt the breeding cycle of White-throated needletails. |
| Will the action modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | **No**. Given their highly mobile nature the fact that is a high elevation aerial forager that flies over huge areas in its daily movements, it is highly likely the habitats important to the species will not be affected by the proposed works As such, |

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| | the Proposed Action is considered unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that this species is likely to decline. |
| Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | **No**. The Proposed Action would not result in the establishment or introduction of an invasive species or disease that could cause the species to decline. As such, the Proposed Action is considered unlikely to result in invasive species becoming established in habitat for this species. |
| Will the action introduce disease that may cause the species to decline | **No**. The Proposed Action would not result in the establishment or introduction of an introduced disease that could cause the species to decline. As such, the Proposed Action is considered unlikely to result in introduced disease becoming established in habitat for this species. |
| Will the action interfere with the recovery of the species | The Proposed Action is unlikely to interfere substantially with the recovery of this species, as the proposed works area is only considered to contain marginal transient or foraging habitat for this species. In addition, mitigation measures will be recommended to ensure that adjoining fauna habitat is suitably protected and that the proposed works does not result in indirect impacts that will affect adjoining habitat areas.<br>As such, the Proposed Action is considered unlikely to interfere substantially with the recovery of the species |
| Determination of assessment: **Significant impact unlikely** | |

## 5.6 Migratory species

### 5.6.1 Satin flycatcher (*Myiagra cyanoleuca*)

The Satin flycatcher (*Myiagra cyanoleuca*) ranges in size from 15 cm to 17 cm. This species is blue-black and white bird with a small crest. The sexes are dimorphic. Males are glossy blue-black dorsally, with a blue-black chest and white below. Females are duskier blue-black dorsally, with an orange-red chin, throat and breast, and white underparts and pale-edged wing and tail feathers. Immature birds are dark brown-grey above, with pale streaks and buff edges to the wing feathers, and a mottled brown-orange throat and chest (Pizzey and Knight 2007).

The Satin flycatcher occurs along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. In Queensland, it is widespread but scattered in the east. The Satin flycatcher is a migratory species, moving northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring (Pizzey and Knight 2007).

Satin flycatchers are mainly insectivorous although very occasionally they will also eat seeds.

The Satin flycatcher builds a neat cup of bark strips, moss and spiders webs on a horizontal dead branch located 5 cm to 25 m above the ground under living foliage. This species has been reported to nest in loose groups with each individual pair spaced between 20 m to 50 m apart. Both sexes build the nest, incubate the eggs and feed the young. Clutch size ranges from two to three eggs and breeding occurs between October and February (Pizzey and Knight 2007).

The Satin flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. This species is known to inhabit heavily vegetated gullies in Eucalypt dominated forests and taller woodlands usually above the shrub layer. On migration, this species occurs in coastal forests, woodlands, mangroves and drier woodlands and open forests as well as trees in open country and gardens (Pizzey and Knight 2007).

There was one Satin flycatcher and its associated habitat was confirmed to be present during surveys in May 2021. Approximately **17.42 ha** of Satin flycatcher habitat has been identified as being contained within the area of direct disturbance of the Proposed Action.

An assessment of significance related to potential impacts upon the Satin Flycatcher (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) (refer Table 5-7).

In consideration of the area of disturbance (i.e. **17.42 ha**), the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1 (DotE 2013) and the draft referral guidelines for migratory species (DotE 2015), the Proposed Action is not likely to result in a significant impact to the Satin flycatcher.

### *5.6.2* Fork-tailed swift (*Apus pacificus)*

The Fork-tailed swift (*Apus pacificus*) is a non-breeding visitor to all States and Territories of Australia. In Queensland, there are scattered records of the Fork-tailed swift in the Gulf Country, and a few records on Cape York Peninsula. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. They are also widespread in much of the south south-eastern region, more so west of the Great Divide, and are commonly found west of the line joining Chinchilla and Hughenden.

The Fork-tailed swift is an almost exclusively aerial species, flying from less than 1 m to at least 300 m above ground, and probably much higher. In Australia, Fork-tailed swifts predominately occur over inland plains, but sometimes occur above foothills, or in coastal areas. They often occur over cliffs, beaches, islands, and sometimes far out to sea. This species is also known to occur in the skies above settled areas, including urban areas and cities. Sometimes, Fork-tailed swifts may feed among tree-tops in open forests. Breeding for the species only occurs in Southeast Asia and not within Australia.

An assessment of significance related to potential impacts upon the Fork-tailed swift (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DotE 2013) and the draft referral guidelines for migratory species (DotE 2015) (refer Table 5-7).

In consideration of the localised nature of potential impacts, the nature of disturbance, the aerial nature of the species, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1, the Proposed Action is not likely to result in a significant impact to the Fork-tailed swift.

### 5.6.3 Oriental cuckoo (*Cuculus optatus*)

The Oriental cuckoo (*Cuculus optatus*) is a non-breeding migrants from Asia, wintering across northern Australia from the Kimberley region in Western Australia, to Brisbane in Queensland, and occasionally south to Narooma, NSW.

Oriental cuckoos inhabit monsoon forests, wet sclerophyll forests, paperbark swamps, dense open forests, scrubby gullies, and mangroves and is also known to use rainforest edges, leafy trees in paddocks, river flats and roadsides. This species prefers dense vegetation with a closed canopy.

There were no Oriental cuckoos confirmed to be present during surveys in May 2021. However, approximately **4.76 ha** of Oriental cuckoo habitat has been identified as being contained within the area of direct disturbance of the Proposed Action.

An assessment of significance related to potential impacts upon the Oriental cuckoos (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013, refer to Table 5-7)

In consideration of the relatively small area of disturbance (i.e. **4.76 ha**), the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1 (DotE 2013) and the draft referral guidelines for migratory species (DotE 2015), the Proposed Action is not likely to result in a significant impact to the Oriental cuckoo.

### 5.6.4 Spectacled monarch (*Symposiachrus trivirgatus*)

The Spectacled monarch (*Symposiachrus trivirgatus*) is found in coastal north eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, NSW. It is much less common in the south. It is also found in Papua New Guinea, the Moluccas and Timor.

The Spectacled monarch inhabits both dense low vegetation and habitats with fairly open understoreys. The species prefers the understorey of mountain and lowland rainforests, thickly wooded gullies and waterside vegetation.

There were no Spectacled monarchs confirmed to be present during surveys in May 2021. However, approximately **17.42 ha** of Spectacled monarch habitat has been identified as being contained within the area of direct disturbance of the Proposed Action.

An assessment of significance related to potential impacts upon the Spectacled monarch (and its habitat), as a result of the Proposed Action, has been undertaken in accordance with the Significant impact guidelines 1.1 (DoE 2013) (refer Table 5-7).

In consideration of the area of disturbance (i.e. **17.42 ha**), the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of Significant impact guidelines 1.1 (DotE 2013) and the draft referral guidelines for migratory species (DotE 2015), the Proposed Action is not likely to result in a significant impact to the Spectacled monarch.

### 5.6.5 Assessment of significance

In accordance with the Significant Impact Guidelines, an action is likely to have a significant impact on Migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or

- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An assessment of the Proposed Action against the Commonwealth's Significant Impact Guideline for the migratory species is provided in Table 5-7.

**Table 5-7 Significant impact assessment of listed migratory species**

| Significant impact criteria | Assessment of the proposed action against the Significant impact criteria |
|---|---|
| **Matter:** Migratory species:<br>Fork-tailed swift (*Apus pacificus*)<br>Oriental cuckoo (*Cuculus optatus*)<br>Spectacled Monarch (*Symposiachrus trivirgatus*)<br>Satin flycatcher (*Myiagra cyanoleuca*) | |
| Will the action substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species | **No**. Approximately 17.42 ha of habitat for the migratory species will be impacted by the proposed work. In the local context (1 km radius) this represents approximately 0.03%. The proposed works are unlikely to substantially modify destroy or isolate an area of important habitat for a migratory species. |
| Will the action result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or | **No**. Pest management strategies and procedures will apply to the Project to minimise the potential to create favourable environments and/or sustain existing populations of invasive pests which are known to present a threat to Fork-tailed swift, Oriental cuckoo, Spectacled monarch, and Satin flycatcher. |
| Will the action seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species | **No**. Approximately 17.42 ha of habitat for the migratory species will be impacted by the proposed work. It would be unlikely for this small area of habitat to support an ecologically significant proportion of the population. Therefore, it is concluded that it is highly unlikely that the Project would seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the Fork-tailed swift, Oriental cuckoo, Spectacled monarch, and Satin flycatcher. |
| Determination of assessment: **Significant impact unlikely** | |

# 6 Significant residual impact assessment for Matters of State Environmental Significance

An environmental offset condition may be imposed under various State assessment frameworks (including the EP Act) for a prescribed environmental activity under the Offsets Act (i.e. a MSES), if the activity will, or is likely to have a significant residual impact on the matter.

In the case of the *Planning Act 2016*, a Project may require assessment against the criteria set out in the *Significant Residual Impact guideline for matters of state environmental significance and prescribed activities assessable under the Sustainable Planning Act 2009* (*sic*) hereon referred to as the 'State guidelines'.

The State Guidelines refer to the *Sustainable Planning Act 2009* and provisions including the State Development Assessment Provisions (SDAP) and its associated modules. The *Sustainable Planning Act 2009* has been replaced by the *Planning Act 2016* and the provisional SDAP has been updated. Therefore, the significant residual impact assessment has been undertaken in accordance with SDAP v2.6 and associated State codes.

It is understood that the Project will obtain an 'Use' approval through the Ministerial Infrastructure Designation (MID) process, under Section 44(6)(b) of the *Planning Act 2016* (Qld) (refer to Section 6). Once designated the following approval requirements will be Accepted Development:

- Vegetation clearing under the *Vegetation Management Act 1999*
- Waterway barrier works under the *Fisheries Act 1994*

This will not include environmental matters listed under the *Nature Conservation Act 1992*.

Although some environmental matters will become Accepted Development, assessment against the State guidelines has been completed for all relevant matters to measure the direct and indirect impacts for the Project. Determining a significant impact will help to focus future management plans in mitigating impacts during construction and operational stages of the Project.

A desktop and field assessment of the presence of MSES within the Project area and immediate surrounds identified the following as present within the project footprint (refer to Section 3):

- Mapped regulated vegetation.
- Protected wildlife habitat.
- Waterway providing for fish passage.
- Connectivity areas.

Table 6-1 presents the significant residual impact assessment of the MSES identified as present within the project footprint, in accordance with the SRI Guideline criteria, SDAP v2.6 and associated State codes. Assessment against the State code 16 is provided in Appendix E.

**Table 6-1 MSES significant impact assessment for the Project**

| MSES present within the project footprint | SRI Guideline criteria (DSDIP 2014) | Significant impact assessment |
|---|---|---|
| *Regulated vegetation*<br>■ remnant vegetation within the defined distance of a watercourse identified on the vegetation management watercourses map; | ■ An action is **LIKELY** to have a SRI on remnant vegetation within the defined distance of a watercourse if the action will result in:<br>permanent removal of vegetation within the defined distance of a stream order 2 or higher where no rehabilitation is proposed. | **Significant impact anticipated**<br>■ It is unlikely that the Project will have a significant residual impact on remnant vegetation within the defined distance of a watercourse as the action will not remove vegetation within the defined distance of a stream order 2, build an online detention basin or permanently clear endangered or of concern RE. |

| MSES present within the project footprint | SRI Guideline criteria (DSDIP 2014) | Significant impact assessment |
|---|---|---|
| ▪ remnant vegetation that intersects with an area shown as a wetland on the vegetation management wetlands map;<br>▪ essential habitat (EH) as identified on the essential habitat map. | building of an online detention basin greater than 1ha in size or other similar works that result in the clearing of vegetation which fragments up and downstream remnant areas on any stream order; **OR**<br>permanent clearing of more than 0.5ha of an endangered or of concern RE, within the defined distance of a watercourse.<br>▪ An action is **LIKELY** to have a SRI on remnant vegetation intersecting with a wetland if the action will result in:<br>clearing within the defining banks of a defined wetland area exceeding the thresholds specified in Table 2, SDAP Module 8 (Table 16.3.2, SDAP State code 16);<br>clearing involving the permanent removal of more than 25% of the vegetation located within 50m of the defining bank of a defined wetland;<br>clearing involving the permanent removal of more than 50% of the vegetation located between 50m and 100m of the defining bank of a defined wetland.<br>▪ An action is **LIKELY** to have a SRI on Essential habitat if the action will result in:<br>clearing of Essential habitat exceeding the thresholds specified in Table 1, SDAP Module 8 (Table 16.3.1, SDAP State code 16), and resulting in a greater than 10% permanent reduction in the extent of EH mapped on site. | However, the Project is likely to clear 'least concern' RE of more than 1 ha on a stream order 1. There will be removal of vegetation from a heavily vegetated stream order 1 where revegetation will only occur where permanent infrastructure is not constructed. |
| *Connectivity areas*<br>Areas of remnant vegetation outside urban areas containing prescribed regional ecosystems that are required for ecosystem functioning (a connectivity area) | ▪ In deciding if a SRI is likely to occur on a connectivity area, an administering agency (that is the State) must consider the significance of the vegetation in the context of the local and the regional landscape. The measure of impact significance is based on how the prescribed activity will change the size and | **No significant impact anticipated**<br>To assess the extent of potential Project connectivity impacts, the DES 'landscape fragmentation and connectivity' tool is used.<br>The tool determined that any impact on connectivity areas is not significant. It has defined that reduction in core remnant vegetation at the local scale is non-significant (0.95%) and that a change from core to non-core remnant vegetation at the site scale is also non-significant. |

| MSES present within the project footprint | SRI Guideline criteria (DSDIP 2014) | Significant impact assessment |
|---|---|---|
| | configuration of remnant vegetation areas and the level of fragmentation that will result at the local scale (5km radius) given regard to the regional scale (20km radius). Impact significance is measured by the reduction in the extent of remnant vegetation and increase in patchiness at the local scale. | |
| *Protected wildlife habitat*<br>Wildlife habitat for endangered or vulnerable fauna | Assessed under relevant significant residual impact assessment criteria for prescribed activities assessable under SPA (refer to Section 6.1) | **Significant impact anticipated**<br>The Project area contains mapped Essential habitat for the Wallum froglet and Koala. This area was field verified during the surveys in May 2021. Significant impact assessment against the relevant criteria is provided in Section 6.1. |
| *Waterway providing for fish passage*<br>One moderate (amber) waterway for waterway barrier works traverses the northern portion of the Project area. | An action is **LIKELY** to have a SRI on a waterway providing for fish passage if the action will result in:<br>■ a permanent modification to the volume, depth, timing, duration, or flow frequency of the waterway;<br>■ permanent modification or fragmentation of fish habitat including but not limited to in stream vegetation, snags and woody debris, substrate, bank, or riffle formation necessary for breeding and/or survival of native fish species;<br>■ the mortality or injury of fish species; **OR**<br>■ works that permanently reduce the level of fish passage provided in a tidal waterway or a waterway identified as a major high risk waterway for waterway barrier works, to a level that would increase stress on fish populations. | **No significant impact anticipated**<br>The Project is not anticipated to have a significant residual impact on a waterway providing for fish passage as the Project will not permanently modify the volume, depth, timing, duration, or flow frequency of the waterway.<br>The water feature onsite was ground-truthed as drainage features with poor aquatic habitat and limited evidence of channel. Any bank integrity likely scoured from overland flow from artificial waterbodies.<br>Any infrastructure within the drainage features would be mitigated with culverts to retain fauna movement.<br>Fish and aquatic species will be managed onsite during all construction works by an onsite suitably qualified person able to manage and relocate any animals within the project footprint. Any dewatering works undertaken during the Project will be managed under the appropriate permits. |

## 6.1 Protected wildlife habitat

Section 4.1.2 identifies four threatened species with mapped and field verified habitat within the project footprint. These species include the Wallum froglet (*Crinia tinnula*), Greater glider (*Petauroides volans),* Koala (*Phascolarctos cinereus*) and Grey-headed flying fox (*Pteropus poliocephalus)*. The Koala, Greater glider and Grey-headed flying fox has been assessed under the MNES significant impact guidelines (refer to Sections 5.2, 5.3 and 5.4). The Project was assessed as to have a likely

significant impact on the Greater glider and Grey-headed flying fox. The Project is unlikely to have a significant impact upon the Koala. Therefore, the species will also be assessed under the MSES significant residual impact criteria for Protected wildlife habitat as the species is also a State-based matter and the area is outside of the South-east Queensland planning area. Evidence of these species was not recorded within the project footprint or the surrounding area. However, suitable habitat for these species was confirmed within the project footprint during the field surveys in May 2021. Assessment of these species under the SRI Guideline criteria (DEHP 2014) has been completed in Table 6-2 and Table 6-3 below.

**Table 6-2 MSES (Protected wildlife habitat) significant impact assessment for the project footprint as per EP Act: Wallum froglet (*Crinia tinnula*)**

| Criteria (DEHP 2014) | Assessment against significance criteria |
|---|---|
| **An action is likely to have a significant impact on endangered and vulnerable wildlife if the impact on the habitat is likely to:** | |
| Lead to a long-term decrease in the size of a local population | The Wallum froglet has not been recorded within the project footprint. The nearest recording is approximately 9 km to the East of the project footprint (WildNet). The species is known from Coastal Eastern Australia from Bundaberg to just south of Sydney. Preferred habitat includes wallum heathland, drainage lines and melaleuca forests with acidic waters. It prefers dense vegetation around waterways usually with an abundance of ferns (e.g. *Blechnum indicum*). The project footprint is within the northern portion of this species' distribution.<br>The total Essential habitat for the Wallum froglet to be cleared is 4.76 ha. During clearing the frog species will be managed by onsite suitably qualified and experienced persons to minimise any impacts to individuals. With conditions addressed in the EMPI in place, it is unlikely that the Project will result in a decrease in the size of the local population. |
| Reduce the extent of occurrence | Wallum froglet is distributed from Bundaberg to just south of Sydney. The project footprint is within the northern portion of the species' distribution but not at the edge of the distribution. The project footprint is surrounded by areas of suitable habitat which will not be impacted. It is unlikely that the Wallum froglet will experience a reduction in the extent of occurrence for the species. |
| Fragment an existing population | The project footprint is surrounded by areas of suitable habitat for Wallum froglet which will not be impacted. The suitable habitat within the broader landscape scale is riparian melaleuca woodland associated with waterways and ephemeral swamps. The irregular flow of the unmapped waterway within the project footprint and its ability to act as Wallum froglet dispersal network will not be impacted throughout the Project. Currently the connectivity of the suitable habitat associated with the unmapped waterway is partially disrupted by the North Coast Rail Line and the Bruce Highway. Underpass for water and prostrate aquatic vegetation is present under both transport infrastructures allowing the species to periodically disperse between nearby populations. Therefore, the Project will not further fragment the population from existing populations. |
| Result in genetically distinct populations forming as a result of habitat isolation | Connectivity between populations within the broader area is through riparian vegetation associated with waterways. The irregular flow of the unmapped waterway within the project footprint and its ability to act as Wallum froglet dispersal network will not be impacted throughout the Project. Vegetated areas 20 m around the waterway will be retained where possible. Where infrastructure is proposed in these areas, fauna connectivity and movement will be retained. Currently the connectivity of the suitable habitat associated with the unmapped waterway is partially disrupted by the North Coast Rail Line and the Bruce Highway. Underpass for water and prostrate aquatic vegetation is present under both transport infrastructures allowing the species to periodically disperse between nearby populations. Therefore, the Project will not cause habitat isolation to occur which would result in genetically disjunct populations forming. |
| Result in invasive species that are harmful to an endangered or vulnerable species becoming established | Two exotic flora species have been identified within the project footprint that are classed as Category 3 Restricted matters under the *Biosecurity Act 2014* which include Giant rat's tail grass (*Sporobolus fertilis*) and Lantana (*Lantana camara*). Lantana is known to inhabit areas of RE 12.3.6 but is not likely to reduce habitat value for Wallum froglet. The I(C) will manage all incoming vehicles, fill material and vegetation for rehabilitation purposes to ensure that no weed species that are |

| Criteria (DEHP 2014) | Assessment against significance criteria |
|---|---|
| in the endangered or vulnerable species' habitat | particularly harmful to swamp, wetland and riparian habitat suitable for Wallum froglet are introduced into the project footprint.<br>The Cane toad (*Rhinella marina*) was identified within the project footprint in May 2021. The Cane toad is known to feed on smaller frog species and out compete local frog species. The species has already become established however, during construction stages invasive fauna will be managed by onsite suitably qualified personal in accordance with the relevant permits and tIEMP(C). |
| Introduce disease that may cause the population to decline | The EMP(C) will manage all incoming vehicles, fill material and vegetation for rehabilitation purposes to ensure that no foreign material, wetland vegetation or amphibian individuals that may carry chytrid fungus are introduced into the project footprint. All suitably qualified personnel holding the relevant permits to handle native wildlife will adhere to the *Hygiene protocols for the control of disease within Australian frogs* during all survey and fauna spotter catcher work throughout the life of the Project. |
| Interfere with the recovery of the species | The Wallum froglet is covered under the *National recovery plan for the Wallum sedge frog and other wallum-dependant frog species* (Meyer, 2006). This plan identifies the recovery objectives for the species which include;<br>■ To identify areas of habitat critical to the survival of wallum frog species more accurately<br>■ To protect habitat critical to wallum frog survival and important wallum frog populations from threatening processes<br>■ To rehabilitate degraded wallum frog habitat<br>■ To determine population trends in areas of disturbed, undisturbed, and rehabilitated habitat<br>The project footprint contains melaleuca ephemeral swamp which is recognised as habitat critical to the survival of the species (Meyer, 2006). The removal of habitat critical survival of the species will interfere with the recovery of the species. |
| Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration, or resting sites) | The suitable habitat within the project footprint is likely to be used for foraging, breeding, and resting for the Wallum froglet. No Wallum froglet individuals where recorded within the field survey in May 2021. However ecological surveys following the *Terrestrial vertebrate fauna survey guidelines for Queensland* which are required to be undertaken to determine the presence of the Wallum froglet were not completed. Therefore, the precautionary principle is applied, and the presence of the species is assumed. The removal of 4.76 ha of Wallum froglet habitat for the Project will cause disruption to ecologically significant locations such as breeding, foraging, and resting habitat for the species. |
| **Assessment of potential for significant residual impacts** | It is determined that a significant residual Project impact **is considered likely** to occur to the Wallum froglet. The Project will result in the clearing of up to 4.76 ha of habitat critical to the survival of the species and it will cause disruption to ecologically significant locations such as breeding, foraging, and resting habitat for the species. |

**Table 6-3 MSES (Protected wildlife habitat) significant impact assessment for project footprint as per EP Act: Koala (*Phascolarctos cinereus*)**

| Criteria (DEHP 2014) | Assessment against significance criteria |
|---|---|
| **An action is likely to have a significant impact on endangered and vulnerable wildlife if the impact on the habitat is likely to:** | |
| Lead to a long-term decrease in the size of a local population of the species | The species was not identified as present (scats / scratches) within the project footprint. No nearby occurrences (not within 18km) have been recorded within the surrounding area. The species occurs but appears to occur in low densities in the wider area.<br>Pre-clearance surveys will be carried out where suitable habitat for this species is identified within the project footprint. Provisions to protect Koalas will be included within the Project EMP(C). Individuals will remain undisturbed and allowed to leave |

| Criteria (DEHP 2014) | Assessment against significance criteria |
|---|---|
| | the project footprint of their own volition. All Koala management will be in accordance with the *Nature Conservation (Koala) Conservation Plan 2020*.<br>There are no recognised important populations of the Koala. The Project will require clearing up to a total of 17.42 ha of suitable habitat for the species. The habitat removed is previously isolated by pine plantation and two major traffic corridors. It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of Koala. |
| Reduce the extent of occurrence of the species | The Project will require clearing up to 17.42 ha of suitable habitat for the species. It is uncertain to what extent the species occurs in the habitat within the project footprint (if at all). The suitable habitat within the project footprint is the southern edge of a larger area. There is abundant habitat on the opposite sides of the Bruce highway and North Coast Rail Line. The Project is considered unlikely to reduce the extent of occurrence of the species. |
| Fragment an existing population | The species appears to occur in low densities in the wider area. There are large patches of suitable habitat for the Koala adjacent to the north of the project footprint and on either side of the Bruce Highway and the North Coast Rail Line. The area to be cleared will not further separate or fragment existing patches of Koala habitat. Much of the project footprint is previously cleared paddocks with encroaching pine recruits. The Project is considered unlikely to fragment an existing population. |
| Result in genetically distinct populations forming as a result of habitat isolation | There are large patches of suitable habitat for the Koala adjacent to the north of the project footprint and on either side of the Bruce Highway and the North Coast Rail Line. The area to be cleared will not further separate or fragment existing patches of koala habitat. Much of the area to be cleared is previously cleared paddocks with encroaching pine recruits. The suitable habitat within the project footprint is the southern edge of a larger area. The Project is considered unlikely to result in genetically distinct populations forming as a result of habitat isolation. |
| Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat | There are no weed species identified as relevant to Koala. Feral predators are identified as a threat to the species (DSEWPaC 2012). No evidence of dingoes or wild dogs were recorded within the project footprint in the May 2021 field survey.<br>The project footprint is already heavily impacted due to clearing of remnant vegetation. Invasive species will be managed under the EMP(C) created for the Project. The Project is considered unlikely to result in invasive species becoming established in this species' habitat. |
| Introduce disease that may cause the population to decline | The project footprint is already impacted due to clearing of woody vegetation. It is unlikely that the Project will contribute to the spread of diseases directly affecting Koala (i.e. Chlamydia). Vegetation movement will be managed under the Weed and Pest Management Plan to minimise the risk of spreading myrtle rust or *Phytophthora cinnamomi* and other diseases that may affect Koala habitat trees. The Project is considered unlikely to introduce disease that may cause the species to decline. |

| Criteria (DEHP 2014) | Assessment against significance criteria |
|---|---|
| Interfere with the recovery of the species | There is no State or Commonwealth recovery plan for Koala. The *EPBC Act referral guidelines for the vulnerable Koala* (DotE 2014a) notes the following actions that may substantially interfere with the recovery of the Koala in areas associated with critical habitat:<br>■ Increasing koala fatalities due to dog attacks to a level that is likely to result in multiple, ongoing mortalities<br>■ Increasing koala fatalities due to vehicle-strikes to a level that is likely to result in multiple, ongoing mortalities.<br>■ Facilitating the introduction or spread of disease or pathogens for example Chlamydia or *Phytophthora cinnamomi*, to habitat critical to the survival of the koala<br>■ Creating a barrier to movement that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala<br>■ Changing hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term<br>With mitigation of potential Project impacts through measures incorporated within the Project Fauna Management Plan, any potential impact on Koala will be very minor and is considered unlikely to interfere substantially with the recovery of the species. |
| Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration, or resting sites) of a species | The removal of koala habitat within the project footprint will result in the removal of koala habitat trees defined under the *Koala Conservation (Koala) Conservation Plan 2020*. The removal of these koala habitat trees will result in the removal of feeding and resting sites for the Koala. Therefore, the Project will result in the disruption to ecologically significant locations such as feeding and resting sites for the species. |
| **Assessment of potential for significant residual impacts** | The Project will result in the removal of 17.42 ha of suitable habitat for the Koala. This habitat includes koala habitat trees which are ecologically significant feeding and resting locations for the species. Therefore, the Project **is considered likely** to have a significant residual impact on the species. |

# 7 Conclusion

The project footprint provides ecological values associated with remnant vegetation, wetland vegetation and suitable habitat for threatened species and other wildlife.

During the field investigations in May 2021, the vegetative and habitat features were assessed and showed patches of remnant vegetation with complex habitat structure including mature and frequent hollows. The remnant vegetation includes eucalypt woodland and eucalypt wetland vegetation. Large patches to the south of non-remnant vegetation consist of a dominated pine canopy with associated eucalypts and wattles. Fields of maintained lawn grasses and herbs were also present due to the history of cattle use. The project footprint did not support defined drainage features and were likely resulting from overland flow from artificial waterbodies.

The Project will remove areas of regulated vegetation and essential habitat for the Greater glider (listed as Endangered under the EPBC Act and NC Act), the Koala (listed as Endangered under the EPBC Act and NC Act), the Grey-headed flying fox (listed as Vulnerable under the EPBC Act) and the Wallum froglet (Listed as Vulnerable under the NC Act). Assessment under the MNES Guidelines determined that a significant impact is likely for the Greater glider and Grey-headed flying fox. Assessment under the State Guidelines determined that a significant residual impact is anticipated for the Koala and the Wallum froglet. Significant Residual Impacts may vary dependant on the total vegetation removed within the project footprint.

Approximately up to 4.76 ha of the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC and 17.42 ha of Greater glider and Grey-headed flying fox habitat (inclusive of the 4.76 ha of TEC) is proposed to be removed as part of the Proposed Action. Upon contract award a design will be selected which may vary the spatial extent and location of the model disturbance footprint, however this maximum quantum of area to be removed will not be exceeded. In consideration of EPBC Act Significant impact guidelines 1.1, the Proposed Action will result in reduction to the extent of an ecological community and fragmentation, ultimately resulting in a likely significant impact to the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC and habitat for the Greater glider and Grey-headed flying fox.

Koala habitat within the project footprint is not considered to constitute habitat critical to the survival of the Koala, as per the definitions listed in the conservation advice for the species (DAWE 2022). As the site does not support critical Koala habitat, and providing that the works will not interfere substantially with the recovery of the Koala through the introduction or exacerbation of key threats in adjacent areas of potential critical Koala habitat, a EPBC Act referral for potential impacts to the Koala within the project footprint is considered unlikely to be required.

To ensure that the Project will not interfere substantially with the recovery of the Koala through the introduction or exacerbation of key threats into adjacent areas of potential critical Koala habitat, Project measures must be put in place to ensure the works will not:

- Increase koala fatalities due to dog attacks to a level that is likely to result in multiple, ongoing mortalities.
- Increase koala fatalities due to vehicle-strikes to a level that is likely to result in multiple, ongoing mortalities.
- Facilitate the introduction or spread of disease or pathogens that are likely to significantly reduce the reproductive output of koalas or reduce the carrying capacity of the habitat.
- Create a barrier to movement to, between or within habitat critical to the survival of the koala that is likely to result in a long-term reduction in genetic fitness or access to habitat critical to the survival of the koala.

- Change hydrology which degrades habitat critical to the survival of the koala to the extent that the carrying capacity of the habitat is reduced in the long-term.

It is recommended that a High Risk SMP would be required due to the presence of potential animal breeding places for threatened and Special Least Concern species (i.e. the threatened Wallum froglet).

# 8 References


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# Appendix A

## Database search results

Australian Government

Department of Climate Change, Energy, the Environment and Water

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 17-Feb-2023

# Summary

## Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

| | |
|---|---|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance (Ramsar | 1 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 4 |
| Listed Threatened Species: | 33 |
| Listed Migratory Species: | 16 |

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

| | |
|---|---|
| Commonwealth Lands: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 20 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Australian Marine Parks: | None |
| Habitat Critical to the Survival of Marine Turtles: | None |

## Extra Information

This part of the report provides information that may also be relevant to the area you have

| | |
|---|---|
| State and Territory Reserves: | 1 |
| Regional Forest Agreements: | None |
| Nationally Important Wetlands: | None |
| EPBC Act Referrals: | 2 |
| Key Ecological Features (Marine): | None |
| Biologically Important Areas: | None |
| Bioregional Assessments: | None |
| Geological and Bioregional Assessments: | None |

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar Wetlands) [ Resource Information ]

| Ramsar Site Name | Proximity | Buffer Status |
|---|---|---|
| Great sandy strait (including great sandy strait, tin can bay and tin can inlet) | 10 - 20km upstream from Ramsar site | In buffer area only |

### Listed Threatened Ecological Communities [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

| Community Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | Endangered | Community may occur within area | In feature area |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | Endangered | Community may occur within area | In feature area |
| Lowland Rainforest of Subtropical Australia | Critically Endangered | Community may occur within area | In feature area |
| Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions | Endangered | Community likely to occur within area | In feature area |

### Listed Threatened Species [ Resource Information ]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| BIRD | | | |
| Botaurus poiciloptilus<br>Australasian Bittern [1001] | Endangered | Species or species habitat may occur within area | In buffer area only |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area | In buffer area only |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Cyclopsitta diophthalma coxeni<br>Coxen's Fig-Parrot [59714] | Endangered | Species or species habitat may occur within area | In feature area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Falco hypoleucos<br>Grey Falcon [929] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Geophaps scripta scripta<br>Squatter Pigeon (southern) [64440] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Rostratula australis<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Turnix melanogaster<br>Black-breasted Button-quail [923] | Vulnerable | Species or species habitat may occur within area | In feature area |
| MAMMAL | | | |
| Dasyurus hallucatus<br>Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat likely to occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Macroderma gigas](#) | | | |
| Ghost Bat [174] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Petauroides volans](#) | | | |
| Greater Glider (southern and central) [254] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Petaurus australis australis](#) | | | |
| Yellow-bellied Glider (south-eastern) [87600] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) | | | |
| Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Pteropus poliocephalus](#) | | | |
| Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour known to occur within area | In feature area |
| PLANT | | | |
| [Acacia attenuata](#) | | | |
| [10690] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Bosistoa transversa](#) | | | |
| Three-leaved Bosistoa, Yellow Satinheart [16091] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Cossinia australiana](#) | | | |
| Cossinia [3066] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Cryptostylis hunteriana](#) | | | |
| Leafless Tongue-orchid [19533] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Cupaniopsis shirleyana](#) | | | |
| Wedge-leaf Tuckeroo [3205] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Fontainea venosa](#) | | | |
| [24040] | Vulnerable | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Macadamia integrifolia<br>Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Macrozamia lomandroides<br>cycad [55406] | Endangered | Species or species habitat may occur within area | In feature area |
| Macrozamia pauli-guilielmi<br>Pineapple Zamia [5712] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Rhodomyrtus psidioides<br>Native Guava [19162] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Samadera bidwillii<br>Quassia [29708] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| REPTILE | | | |
| Delma torquata<br>Adorned Delma, Collared Delma [1656] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Elseya albagula<br>Southern Snapping Turtle, White-throated Snapping Turtle [81648] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Furina dunmalli<br>Dunmall's Snake [59254] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Hemiaspis damelii<br>Grey Snake [1179] | Endangered | Species or species habitat likely to occur within area | In feature area |

| Listed Migratory Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Migratory Marine Birds | | | |
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area | In feature area |
| Migratory Marine Species | | | |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Crocodylus porosus](#)<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Terrestrial Species** | | | |
| [Cuculus optatus](#)<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat known to occur within area | In feature area |
| [Hirundapus caudacutus](#)<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Monarcha melanopsis](#)<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area | In feature area |
| [Myiagra cyanoleuca](#)<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area | In feature area |
| [Rhipidura rufifrons](#)<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area | In feature area |
| [Symposiachrus trivirgatus as Monarcha trivirgatus](#)<br>Spectacled Monarch [83946] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Wetlands Species** | | | |
| [Actitis hypoleucos](#)<br>Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | | Species or species habitat may occur within area | In feature area |
| [Calidris canutus](#)<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area | In buffer area only |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Calidris melanotos](#) | | | |
| Pectoral Sandpiper [858] | | Species or species habitat may occur within area | In feature area |
| [Charadrius leschenaultii](#) | | | |
| Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Gallinago hardwickii](#) | | | |
| Latham's Snipe, Japanese Snipe [863] | | Species or species habitat likely to occur within area | In feature area |
| [Numenius madagascariensis](#) | | | |
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |

## Other Matters Protected by the EPBC Act

| Listed Marine Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Bird | | | |
| [Actitis hypoleucos](#) | | | |
| Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| [Anseranas semipalmata](#) | | | |
| Magpie Goose [978] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Apus pacificus](#) | | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| [Bubulcus ibis as Ardea ibis](#) | | | |
| Cattle Egret [66521] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Calidris acuminata](#) | | | |
| Sharp-tailed Sandpiper [874] | | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area overfly marine area | In buffer area only |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area overfly marine area | In feature area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat likely to occur within area | In feature area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area overfly marine area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Numenius madagascariensis | | | |
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Rhipidura rufifrons | | | |
| Rufous Fantail [592] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Rostratula australis as Rostratula benghalensis (sensu lato) | | | |
| Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Symposiachrus trivirgatus as Monarcha trivirgatus | | | |
| Spectacled Monarch [83946] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| **Reptile** | | | |
| Crocodylus porosus | | | |
| Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area | In feature area |

## Extra Information

| State and Territory Reserves | | | [ Resource Information ] |
|---|---|---|---|
| Protected Area Name | Reserve Type | State | Buffer Status |
| Burrum | Fish Habitat Area (B) | QLD | In buffer area only |

| EPBC Act Referrals | | | | [ Resource Information ] |
|---|---|---|---|---|
| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
| Controlled action | | | | |
| Raising of Lenthalls Dam, Doongal Creek | 2004/1716 | Controlled Action | Post-Approval | In buffer area only |
| Not controlled action | | | | |
| Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia | 2015/7522 | Not Controlled Action | Completed | In feature area |

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.


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Queensland Government

**Department of Environment and Science**

Environmental Reports

# Matters of State Environmental Significance

For the selected area of interest
Lot: 35 Plan: SP326250

# Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

# Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.

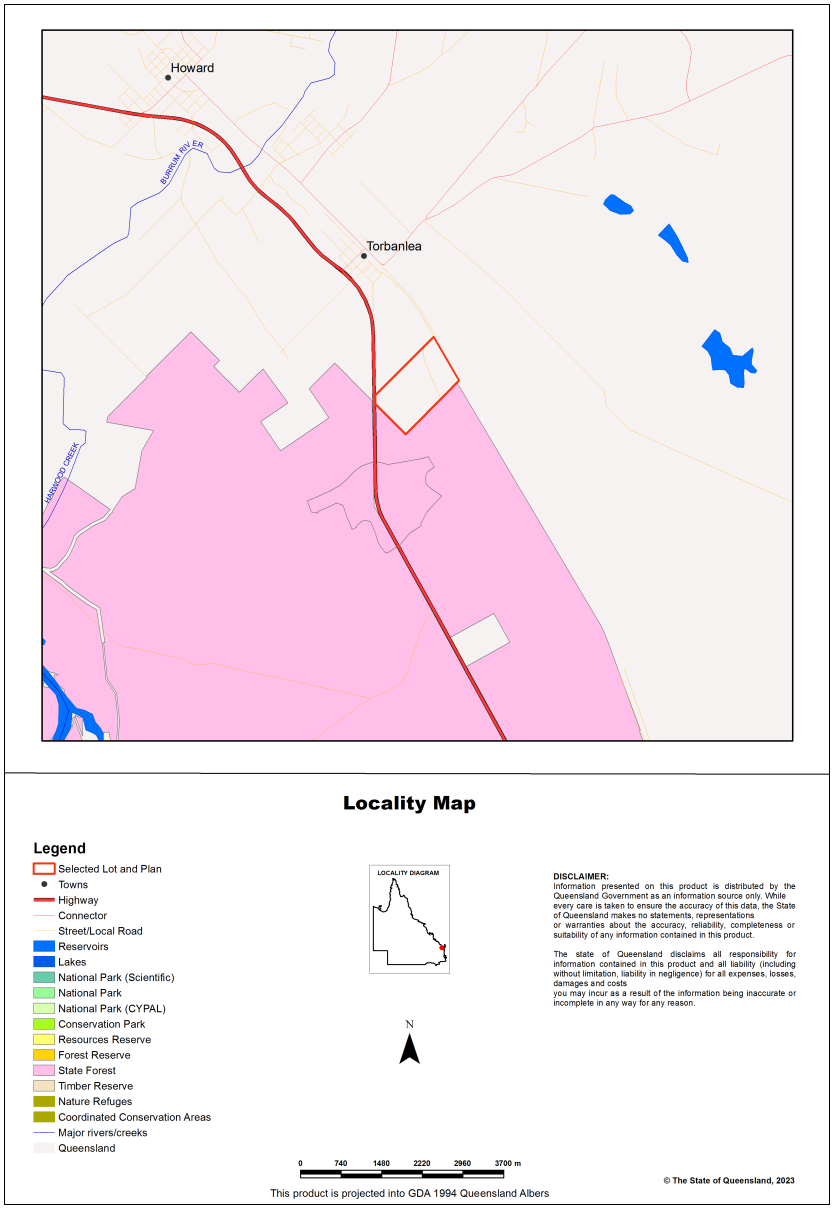
# Table of Contents

# Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

**Table 1: Summary table, details for AOI Lot: 35 Plan: SP326250**

| | |
|---|---|
| Size (ha) | 132.74 |
| Local Government(s) | Fraser Coast Regional |
| Bioregion(s) | Southeast Queensland |
| Subregion(s) | Burnett - Curtis Coastal Lowlands |
| Catchment(s) | Burrum |



# Matters of State Environmental Significance (MSES)

## MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

    • Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;

    • Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;

    • Category R areas on the regulated vegetation management map;

    • Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;

    • Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;

- Legally secured offset areas.

## MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

**Table 2: Summary of MSES present within the AOI**

| | | |
|---|---|---|
| 1a Protected Areas- estates | 0.0 ha | 0.0 % |
| 1b Protected Areas- nature refuges | 0.0 ha | 0.0 % |
| 1c Protected Areas- special wildlife reserves | 0.0 ha | 0.0 % |
| 2 State Marine Parks- highly protected zones | 0.0 ha | 0.0 % |
| 3 Fish habitat areas (A and B areas) | 0.0 ha | 0.0 % |
| 4 Strategic Environmental Areas (SEA) | 0.0 ha | 0.0 % |
| 5 High Ecological Significance wetlands on the map of Referable Wetlands | 0.0 ha | 0.0 % |
| 6a High Ecological Value (HEV) wetlands | 0.0 ha | 0.0 % |
| 6b High Ecological Value (HEV) waterways | 0.0 km | Not applicable |
| 7a Threatened (endangered or vulnerable) wildlife | 32.53 ha | 24.5% |
| 7b Special least concern animals | 0.0 ha | 0.0 % |
| 7c i Koala habitat area - core (SEQ) | 0.0 ha | 0.0 % |
| 7c ii Koala habitat area - locally refined (SEQ) | 0.0 ha | 0.0 % |
| 7d Sea turtle nesting areas | 0.0 km | Not applicable |
| 8a Regulated Vegetation - Endangered/Of concern in Category B (remnant) | 0.0 ha | 0.0 % |
| 8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth) | 0.0 ha | 0.0 % |
| 8c Regulated Vegetation - Category R (GBR riverine regrowth) | 0.41 ha | 0.3% |
| 8d Regulated Vegetation - Essential habitat | 32.53 ha | 24.5% |
| 8e Regulated Vegetation - intersecting a watercourse | 1.6 km | Not applicable |
| 8f Regulated Vegetation - within 100m of a Vegetation Management Wetland | 51.85 ha | 39.1% |
| 9a Legally secured offset areas- offset register areas | 0.0 ha | 0.0 % |
| 9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation | 0.0 ha | 0.0 % |

## Additional Information with Respect to MSES Values Present

### MSES - State Conservation Areas

**1a. Protected Areas - estates**

(no results)

**1b. Protected Areas - nature refuges**

(no results)

**1c. Protected Areas - special wildlife reserves**

(no results)

**2. State Marine Parks - highly protected zones**

(no results)

**3. Fish habitat areas (A and B areas)**

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

### MSES - Wetlands and Waterways

**4. Strategic Environmental Areas (SEA)**

(no results)

**5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values**

(no results)

**6a. Wetlands in High Ecological Value (HEV) waters**

(no results)

**6b. Waterways in High Ecological Value (HEV) waters**

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

### MSES - Species

**7a. Threatened (endangered or vulnerable) wildlife**

Values are present

**7b. Special least concern animals**

Not applicable

**7c i. Koala habitat area - core (SEQ)**

Not applicable

**7c ii. Koala habitat area - locally refined (SEQ)**

Not applicable

**7d. Wildlife habitat (sea turtle nesting areas)**

Not applicable

**Threatened (endangered or vulnerable) wildlife habitat suitability models**

| Species | Common name | NCA status | Presence |
|---|---|---|---|
| *Boronia keysii* | | V | None |
| *Calyptorhynchus lathami* | Glossy black cockatoo | V | None |
| *Casuarius casuarius johnsonii* | Sthn population cassowary | E | None |
| *Crinia tinnula* | Wallum froglet | V | Core |
| *Denisonia maculata* | Ornamental snake | V | None |
| *Litoria freycineti* | Wallum rocketfrog | V | None |
| *Litoria olongburensis* | Wallum sedgefrog | V | None |
| *Macadamia integrifolia* | | V | None |
| *Macadamia ternifolia* | | V | None |
| *Macadamia tetraphylla* | | V | None |
| *Melaleuca irbyana* | | E | None |
| *Petaurus gracilis* | Mahogany Glider | E | None |
| *Petrogale persephone* | Proserpine rock-wallaby | E | None |
| *Pezoporus wallicus wallicus* | Eastern ground parrot | V | None |
| *Phascolarctos cinereus* | Koala - outside SEQ* | E | Core |
| *Taudactylus pleione* | Kroombit tinkerfrog | E | None |
| *Xeromys myoides* | Water Mouse | V | None |

**For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.*

**Threatened (endangered or vulnerable) wildlife species records**

(no results)

**Special least concern animal species records**

(no results)

**Shorebird habitat (critically endangered/endangered/vulnerable)**

Not applicable

**Shorebird habitat (special least concern)**

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

*Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)*

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals, Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

## MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

**8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)**

Not applicable

**8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)**

Not applicable

**8c. Regulated Vegetation - Category R (GBR riverine regrowth)**

| Regulated vegetation map category | Map number |
|---|---|
| R | 9447 |

**8d. Regulated Vegetation - Essential habitat**

Values are present

**8e. Regulated Vegetation - intersecting a watercourse****

A vegetation management watercourse is mapped as present

**8f. Regulated Vegetation - within 100m of a Vegetation Management wetland**

| Regulated vegetation map category | Map number |
|---|---|
| B | 9447 |
| C | 9447 |
| R | 9447 |

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

**MSES - Offsets**

**9a. Legally secured offset areas - offset register areas**

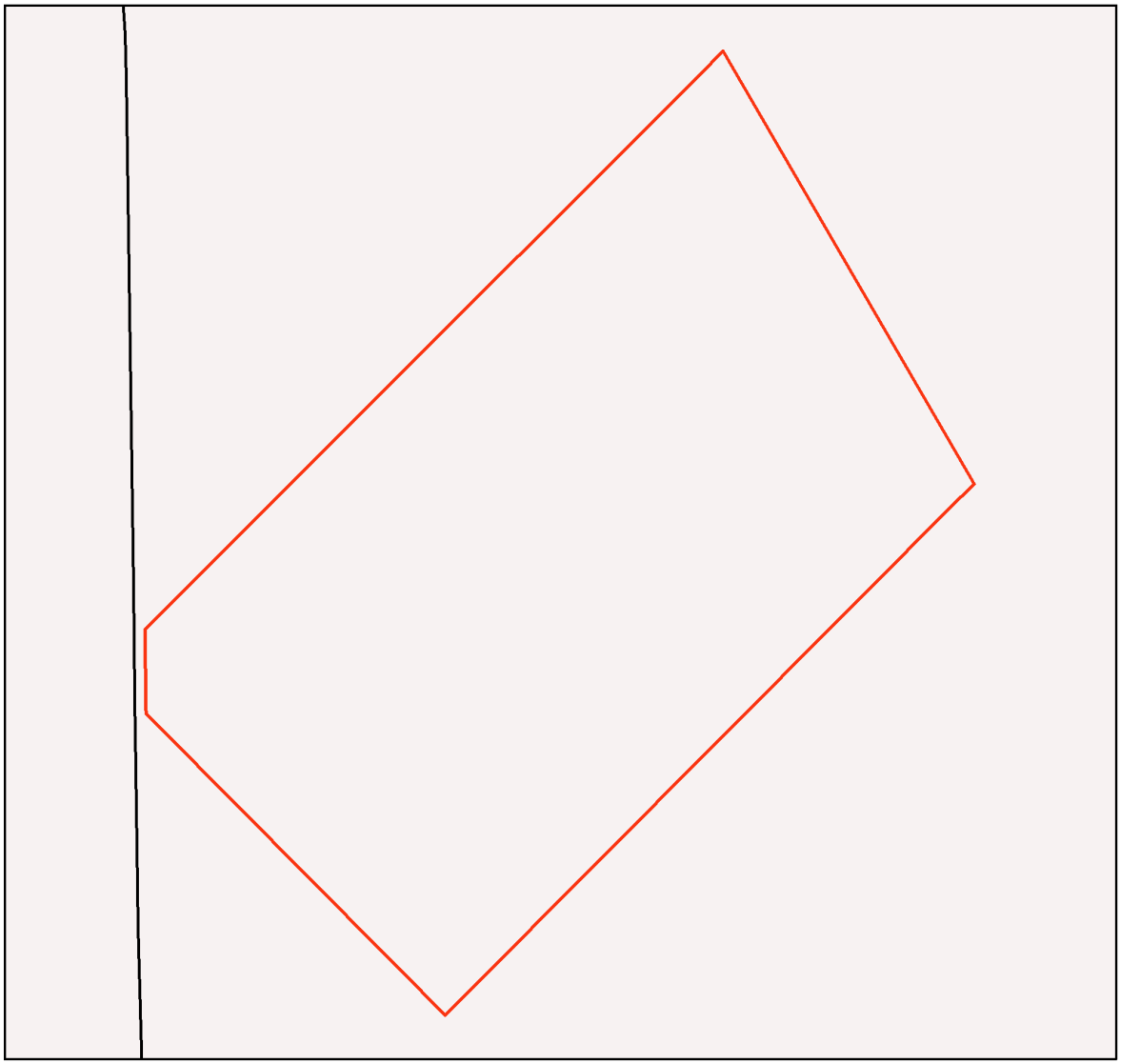
(no results)

**9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation**

(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

# Map 1 - MSES - State Conservation Areas

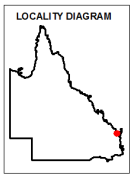


## MSES - State Conservation Areas

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)

LOCALITY DIAGRAM





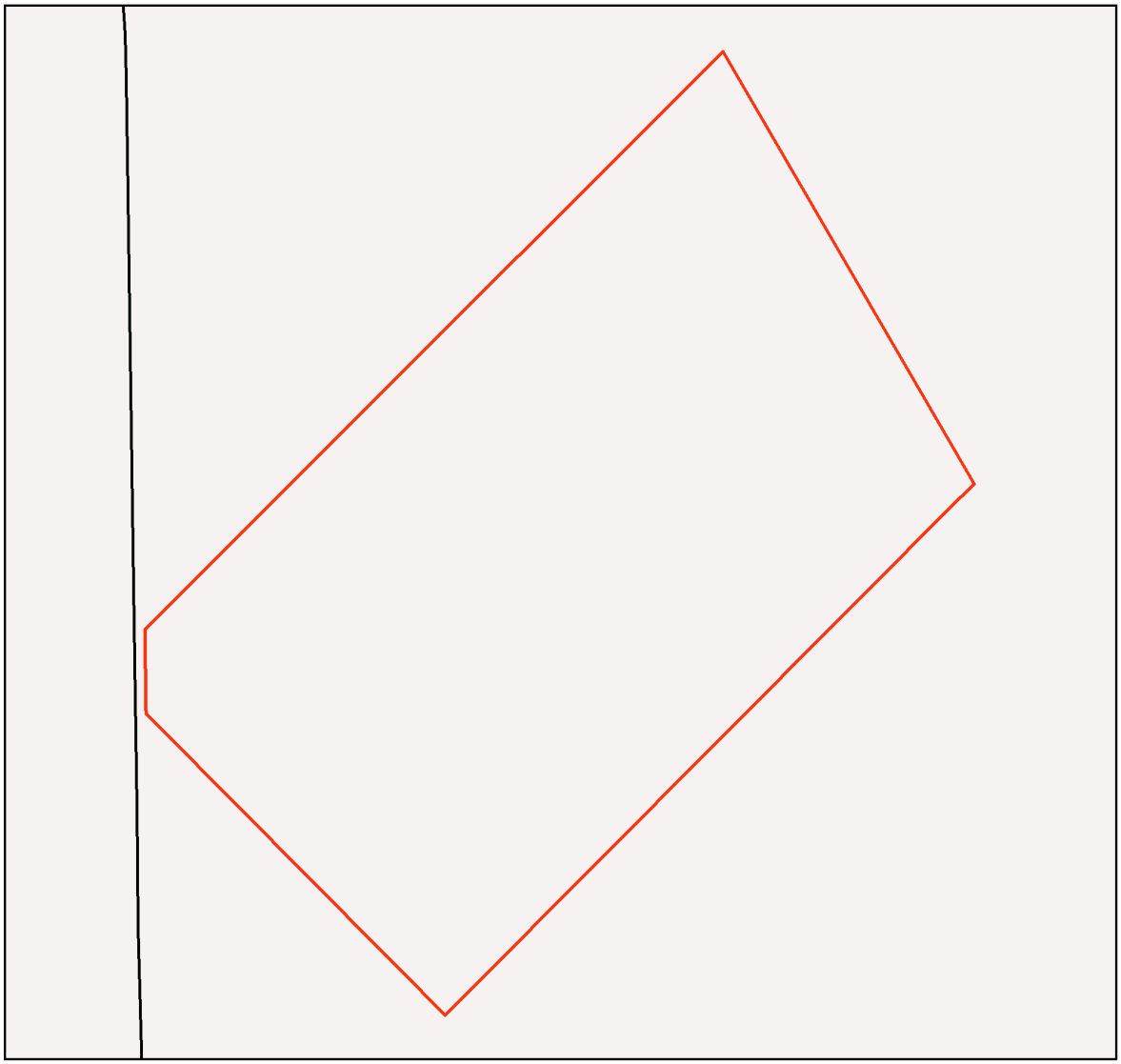
N

0 110 220 330 440 550 m



This product is projected into GDA 1994 Queensland Albers

# Map 2 - MSES - Wetlands and Waterways

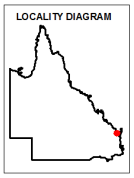


## MSES - Wetlands and Waterways

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands

LOCALITY DIAGRAM





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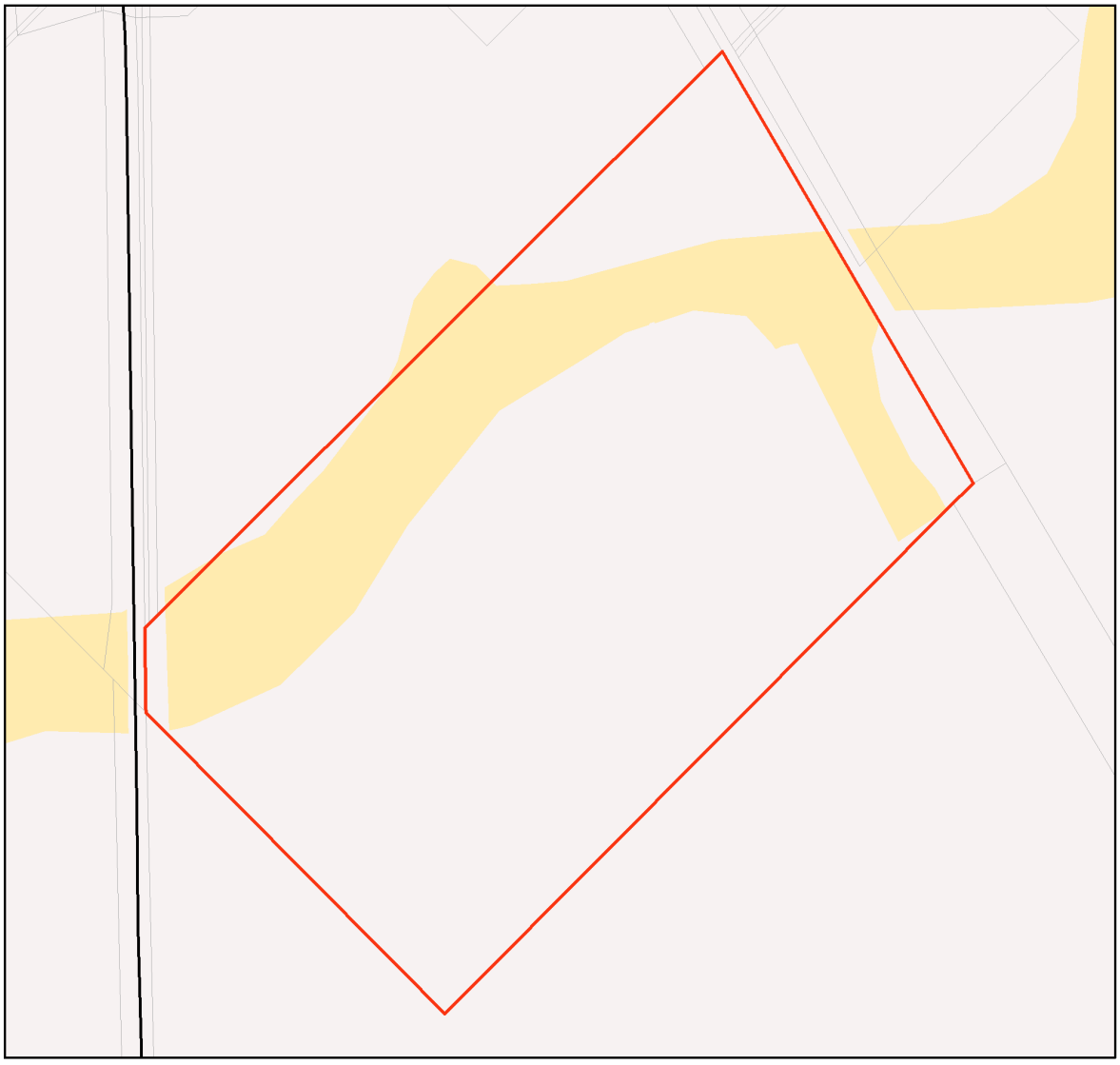
0 110 220 330 440 550 m



This product is projected into GDA 1994 Queensland Albers

# Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals

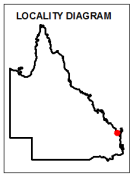


## MSES - Species
## Threatened (endangered or vulnerable) wildlife and special least concern animals

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)

LOCALITY DIAGRAM



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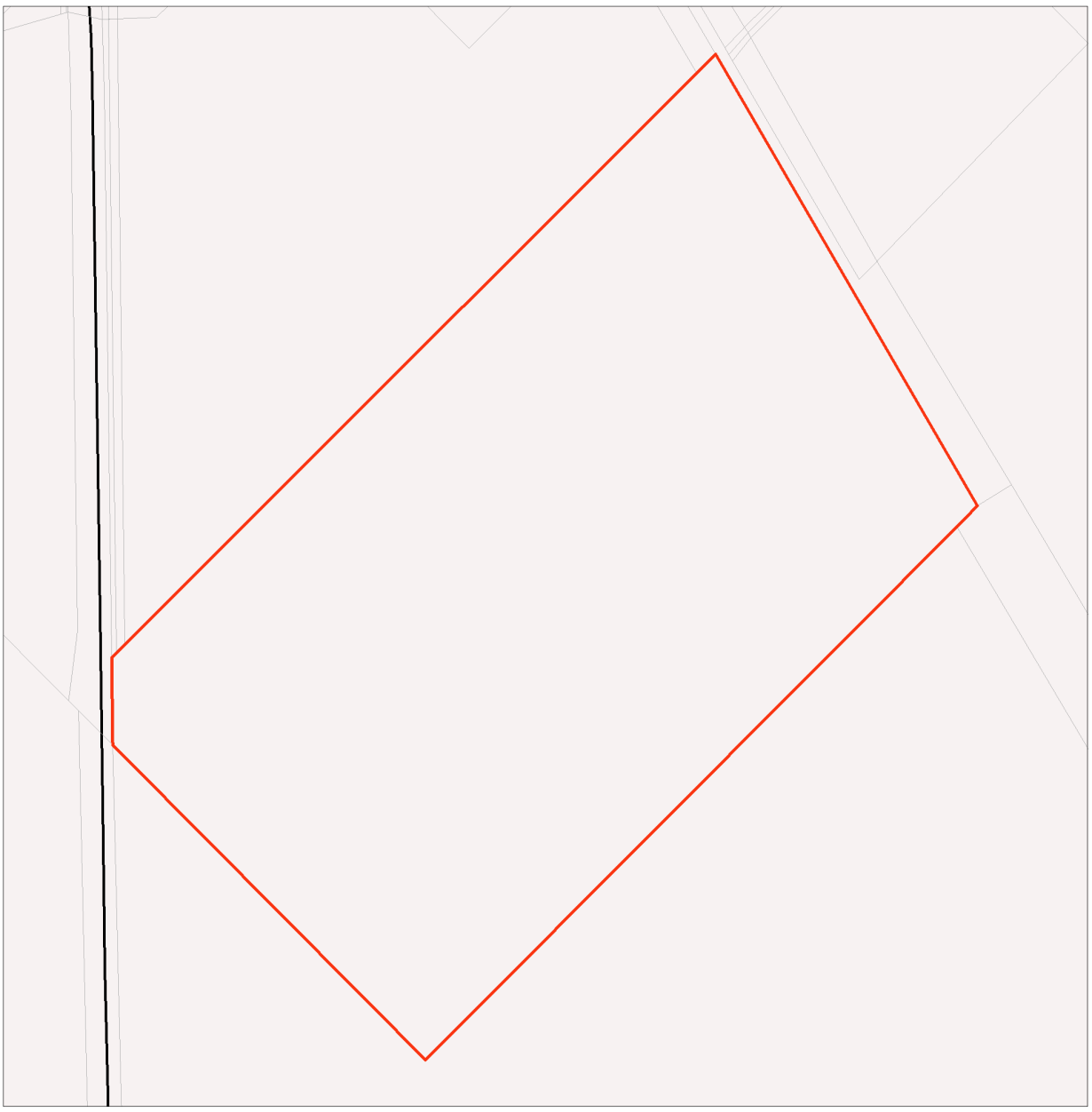
N

0 110 220 330 440 550 m



This product is projected into GDA 1994 Queensland Albers

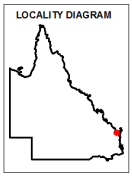
# Map 3b - MSES - Species - Koala habitat area (SEQ)



## MSES - Species
## Koala habitat area (SEQ)

**Area of Interest**
- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)

LOCALITY DIAGRAM



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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

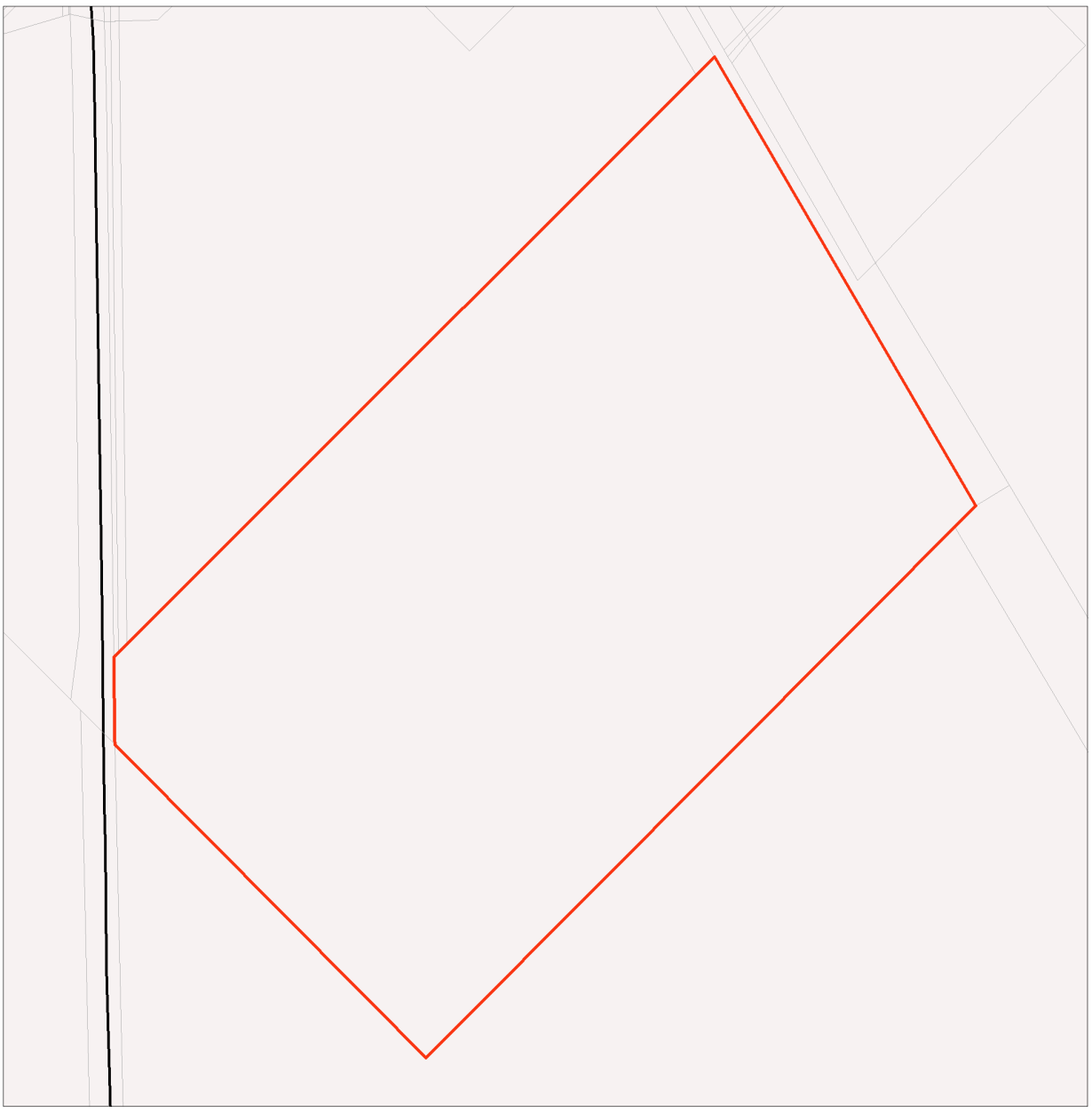
The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



0 100 200 300 400 500 m

This product is projected into GDA 1994 Queensland Albers

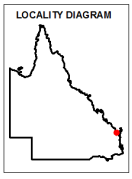
# Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)



## MSES - Wildlife habitat (sea turtle nesting areas)

**Area of Interest**
- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)

LOCALITY DIAGRAM



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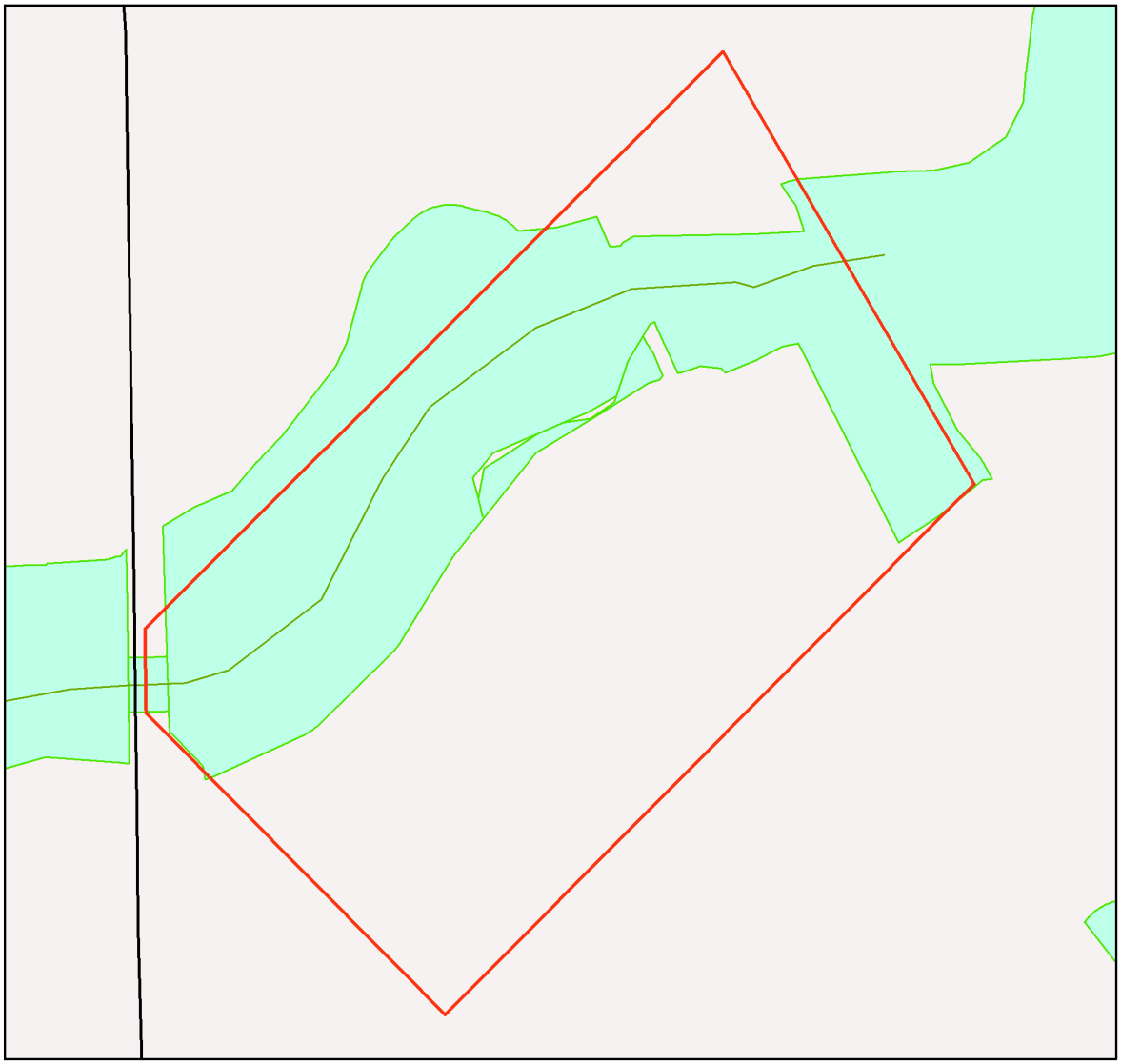
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 100 200 300 400 500 m



This product is projected into GDA 1994 Queensland Albers

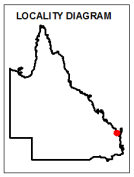
# Map 4 - MSES - Regulated Vegetation



## MSES - Regulated Vegetation

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)





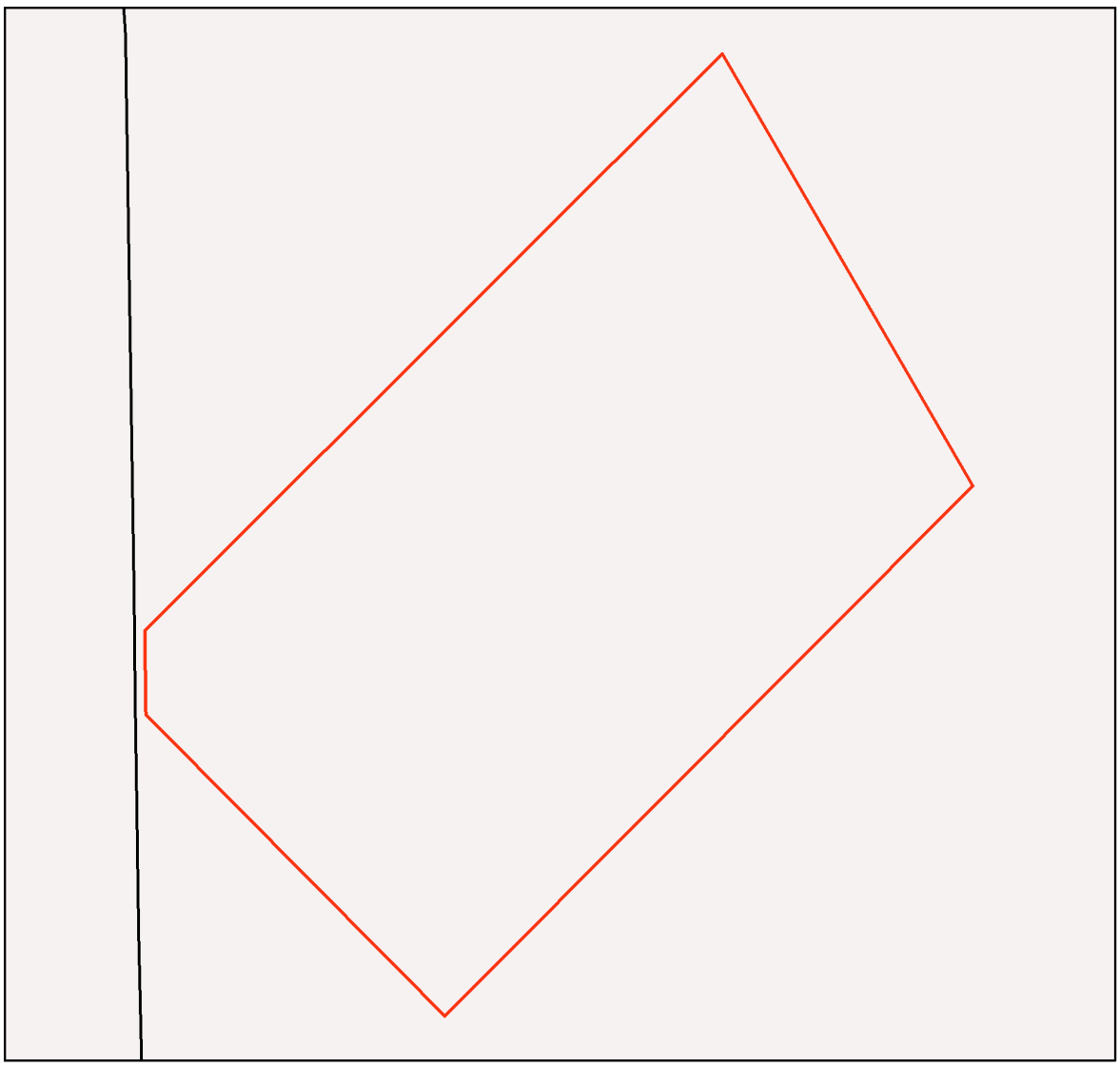

N

0 110 220 330 440 550 m



This product is projected into GDA 1994 Queensland Albers

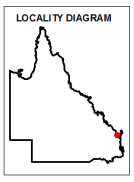
# Map 5 - MSES - Offset Areas



## MSES - Offsets

**Area of Interest**

- Selected Lot and Plan
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)

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# Appendices

## Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

## Appendix 2 - Source Data

**The datasets listed below are available on request from:**

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

| **MSES layers** | **current QSpatial data (http://qspatial.information.qld.gov.au)** |
|---|---|
| Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves | - Protected areas of Queensland<br>- Nature Refuges - Queensland<br>- Special Wildlife Reserves- Queensland |
| Marine Park-Highly Protected Zones | Moreton Bay marine park zoning 2008 |
| Fish Habitat Areas | Queensland fish habitat areas |
| Strategic Environmental Areas-designated | Regional Planning Interests Act - Strategic Environmental Areas |
| HES wetlands | Map of Queensland Wetland Environmental Values |
| Wetlands in HEV waters | HEV waters:<br>- EPP Water intent for waters<br>Source Wetlands:<br>- Queensland Wetland Mapping (Current version 5)<br>Source Watercourses:<br>- Vegetation management watercourse and drainage feature map (1:100000 and 1:250000) |
| Wildlife habitat (threatened and special least concern) | - WildNet database species records<br>- habitat suitability models (various)<br>- SEQ koala habitat areas under the Koala Conservation Plan 2019<br>- Sea Turtle Nesting Areas records |
| VMA regulated regional ecosystems | Vegetation management regional ecosystem and remnant map |
| VMA Essential Habitat | Vegetation management - essential habitat map |
| VMA Wetlands | Vegetation management wetlands map |
| Legally secured offsets | Vegetation Management Act property maps of assessable vegetation.<br>For offset register data-contact DES |
| Regulated Vegetation Map | Vegetation management - regulated vegetation management map |

## Appendix 3 - Acronyms and Abbreviations

| | |
|---|---|
| AOI | - Area of Interest |
| DES | - Department of Environment and Science |
| EP Act | - *Environmental Protection Act 1994* |
| EPP | - Environmental Protection Policy |
| GDA94 | - Geocentric Datum of Australia 1994 |
| GEM | - General Environmental Matters |
| GIS | - Geographic Information System |
| MSES | - Matters of State Environmental Significance |
| NCA | - *Nature Conservation Act 1992* |
| RE | - Regional Ecosystem |
| SPP | - State Planning Policy |
| VMA | - *Vegetation Management Act 1999* |

Queensland Government

**Department of Environment and Science**

Environmental Reports

# Regional Ecosystems

## *Biodiversity Status*

For the selected area of interest
Custom Geometry

# Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

# Important Note to User

Information presented in this report is based upon the Queensland Herbarium's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Resources website https://www.resources.qld.gov.au/

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

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# Table of Contents

# Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

**Table 1: Area of interest details: Custom Geometry**

| | |
|---|---|
| Size (ha) | 1,295.46 |
| Local Government(s) | Fraser Coast Regional |
| Bioregion(s) | Southeast Queensland |
| Subregion(s) | Burnett - Curtis Coastal Lowlands |
| Catchment(s) | Burrum |

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

**Table 2: Summary table, biodiversity status of regional ecosystems within the AOI**

| Biodiversity Status | Area (Ha) | % of AOI |
|---|---|---|
| Endangered | 0.0 | 0.0 |
| Of concern | 25.35 | 1.96 |
| No concern at present | 646.99 | 49.94 |
| Total remnant vegetation | 672.34 | 51.9 |

Refer to **Map 2** for further information.

# Regional Ecosystems

## 1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2020) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Resources website.

https://www.resources.qld.gov.au/

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss*, or
- 10-30 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare** regional ecosystem subject to a threatening process.***

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.****

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 per cent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

**Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

***Rare regional ecosystem: pre-clearing extent (1000 ha); or patch size (100 ha and of limited total extent across its range).*

****Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

*****Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.*

## 2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

**Table 3: Remnant regional ecosystems, description and status within the AOI**

| Regional Ecosystem | Short Description | BD Status | Area (Ha) | % of AOI |
|---|---|---|---|---|
| 12.3.11 | Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast | Of concern | 25.35 | 1.96 |
| 12.3.6 | Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains | No concern at present | 137.87 | 10.64 |
| 12.5.4 | Eucalyptus latisinensis +/- Corymbia intermedia, C. trachyphloia subsp. trachyphloia, Angophora leiocarpa, Eucalyptus exserta woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments | No concern at present | 507.52 | 39.18 |
| 12.5.7 | Corymbia citriodora subsp. variegata +/- Eucalyptus portuensis or E. acmenoides, E. fibrosa subsp. fibrosa open forest on remnant Tertiary surfaces. Usually deep red soils | No concern at present | 1.6 | 0.12 |
| non-remnant | None | None | 332.25 | 25.65 |
| plantation | None | None | 290.87 | 22.45 |

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

**Table 4** provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

**Table 4: Remnant regional ecosystems within the AOI, additional information**

| Regional Ecosystem | Remnant Extent | BVG (1 Million) | Wetland | Representation in protected estate |
|---|---|---|---|---|
| 12.3.11 | Pre-clearing 164000 ha; Remnant 2019 41000 ha | 16c | Contains Palustrine | Low |
| 12.3.6 | Pre-clearing 31000 ha; Remnant 2019 12000 ha | 22a | Palustrine | Medium |
| 12.5.4 | Pre-clearing 207000 ha; Remnant 2019 100000 ha | 9g | Contains Palustrine | Medium |

| Regional Ecosystem | Remnant Extent | BVG (1 Million) | Wetland | Representation in protected estate |
|---|---|---|---|---|
| 12.5.7 | Pre-clearing 63000 ha; Remnant 2019 30000 ha | 10b | Not a Wetland | Low |
| non-remnant | None | None | None | None |
| plantation | None | None | None | None |

*Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.*

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

**Table 5: Remnant regional ecosystems within the AOI, special values**

| Regional Ecosystem | Special Values |
|---|---|
| 12.3.11 | Potential habitat for NCA listed species: Acronychia littoralis, Alectryon ramiflorus, Arthraxon hispidus, Cupaniopsis shirleyana, Eulophia bicallosa, Gossia gonoclada, Macrozamia lomandroides, Macrozamia pauli-guilielmi, Marsdenia coronata, Maundia triglochinoides. This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). 12.3.11a: Habitat for threatened fauna species including the Black-breasted Button-quail Turnix melanogaster (Aridis, Melzer and Hamley, 1998). This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). 12.3.11b: This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). |
| 12.3.6 | Habitat for threatened fauna species including the wallum froglet Crinia tinnula. This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). |
| 12.5.4 | Habitat for threatened plant species including Macrozamia lomandroides and near threatened species including Melaleuca cheelii. This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). 12.5.4a: Habitat for threatened plant species including Macrozamia lomandroides, Germainia capitata and near threatened species including Melaleuca cheelii. This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). |
| 12.5.7 | Potential habitat for NCA listed species: Eulophia bicallosa, Macrozamia pauli-guilielmi. This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). 12.5.7b: This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). 12.5.7c: This ecosystem is known to provide suitable habitat for koalas (Phascolarctos cinereus). |
| non-remnant | None |
| plantation | None |

## 3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional) scales.

A comprehensive description of BVGs is available at:

https://publications.qld.gov.au/dataset/redd/resource/

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

**Table 6: Broad vegetation groups (1 million) within the AOI**

| BVG (1 Million) | Description | Area (Ha) | % of AOI |
|---|---|---|---|
| None | None | 623.12 | 48.1 |
| 10b | Moist open forests to woodlands dominated by Corymbia citriodora (spotted gum). (land zones 12, 11, 9, 5, 8) (SEQ, CQC, EIU, WET) | 1.6 | 0.12 |
| 16c | Woodlands and open woodlands dominated by Eucalyptus coolabah (coolabah) or E. microtheca (coolabah) or E. largiflorens (black box) or E. tereticornis (blue gum) or E. chlorophylla on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL). | 25.35 | 1.96 |
| 22a | Open forests and woodlands dominated by Melaleuca quinquenervia (swamp paperbark) in seasonally inundated lowland coastal areas and swamps. (land zones 3, 2, 1, [11]) (SEQ, WET, CQC, CYP, [BRB]) | 137.87 | 10.64 |
| 9g | Moist woodlands dominated by Eucalyptus tindaliae (Queensland white stringybark) or E. racemosa or E. tereticornis (blue gum) and Corymbia intermedia (pink bloodwood) on remnant Tertiary surfaces. (land zone 5) (SEQ) | 507.52 | 39.18 |

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

## 4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See:

http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/

The descriptions are compiled using site survey data from the Queensland Herbarium's CORVEG database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2020 (PDF)* section 3.3 of:

https://publications.qld.gov.au/dataset/redd/resource/

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community.

http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/

Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the

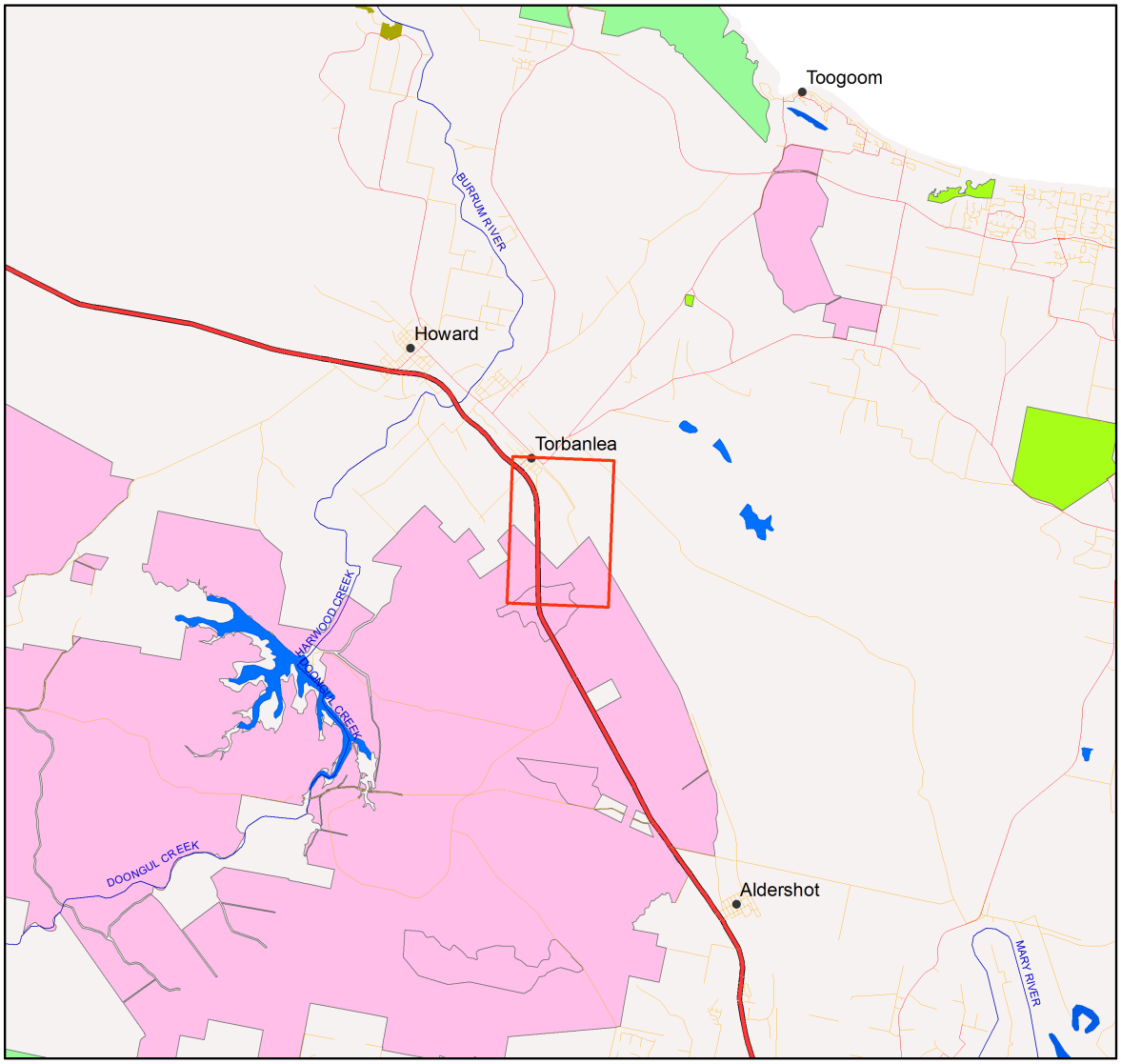
geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

**Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available**

| Regional ecosystems mapped as within the AOI | Technical Descriptions | Biocondition Benchmarks |
|---|---|---|
| 12.3.11 | Available | Available |
| 12.3.6 | Available | Available |
| 12.5.4 | Available | Available |
| 12.5.7 | Available | Available |
| non-remnant | Not currently available | Not currently available |
| plantation | Not currently available | Not currently available |

# Maps

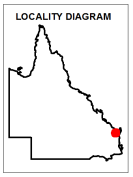
## Map 1 - Location




### Locality Map

**Legend**

- polygon
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland

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0 1750 3500 5250 7000 8750 m

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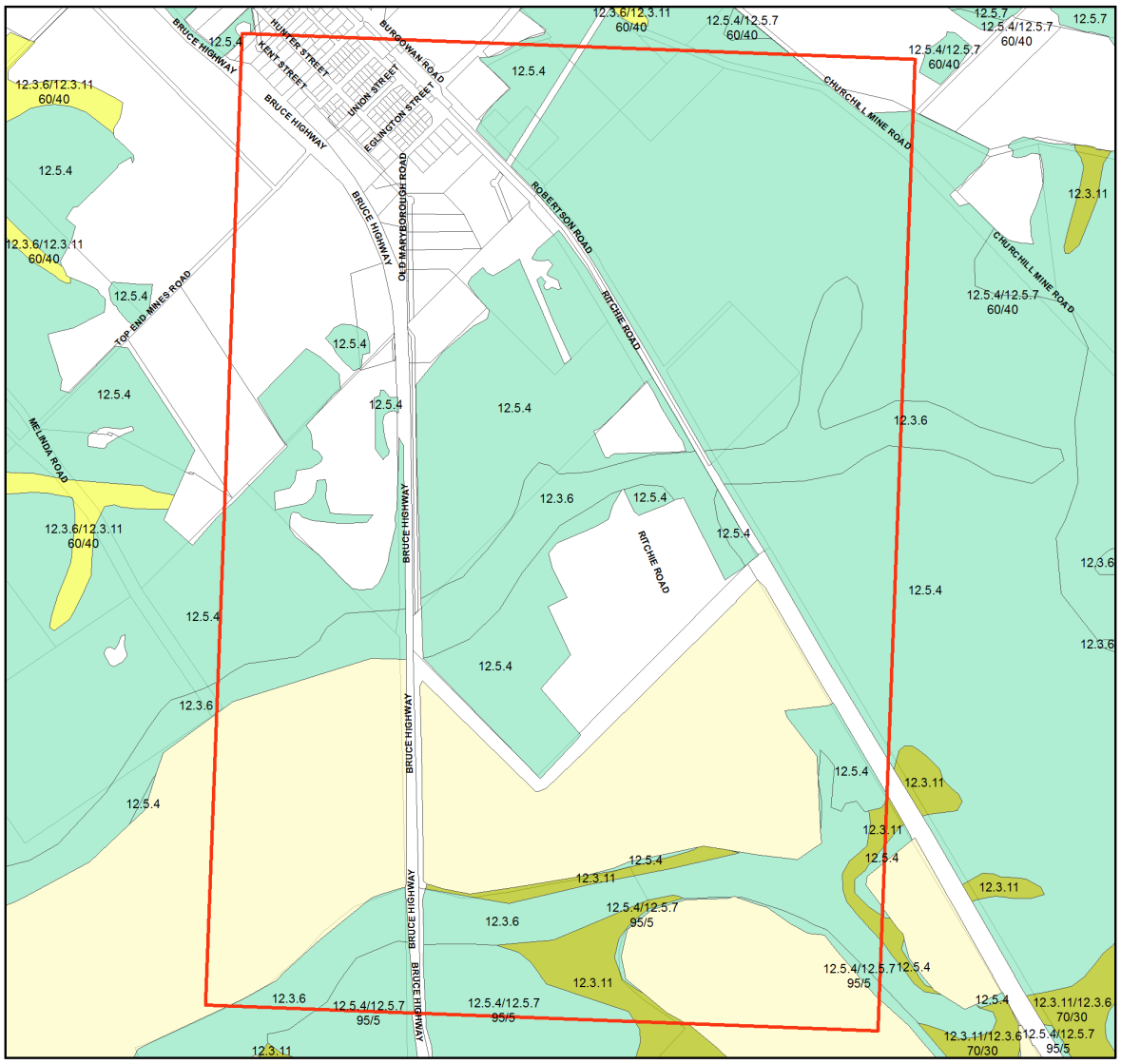
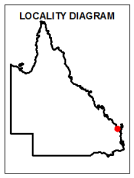
# Map 2 - Remnant 2019 regional ecosystems




## Remnant 2019 Regional Ecosystems

### Biodiversity Status

- polygon
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water
- Cadastral Boundaries



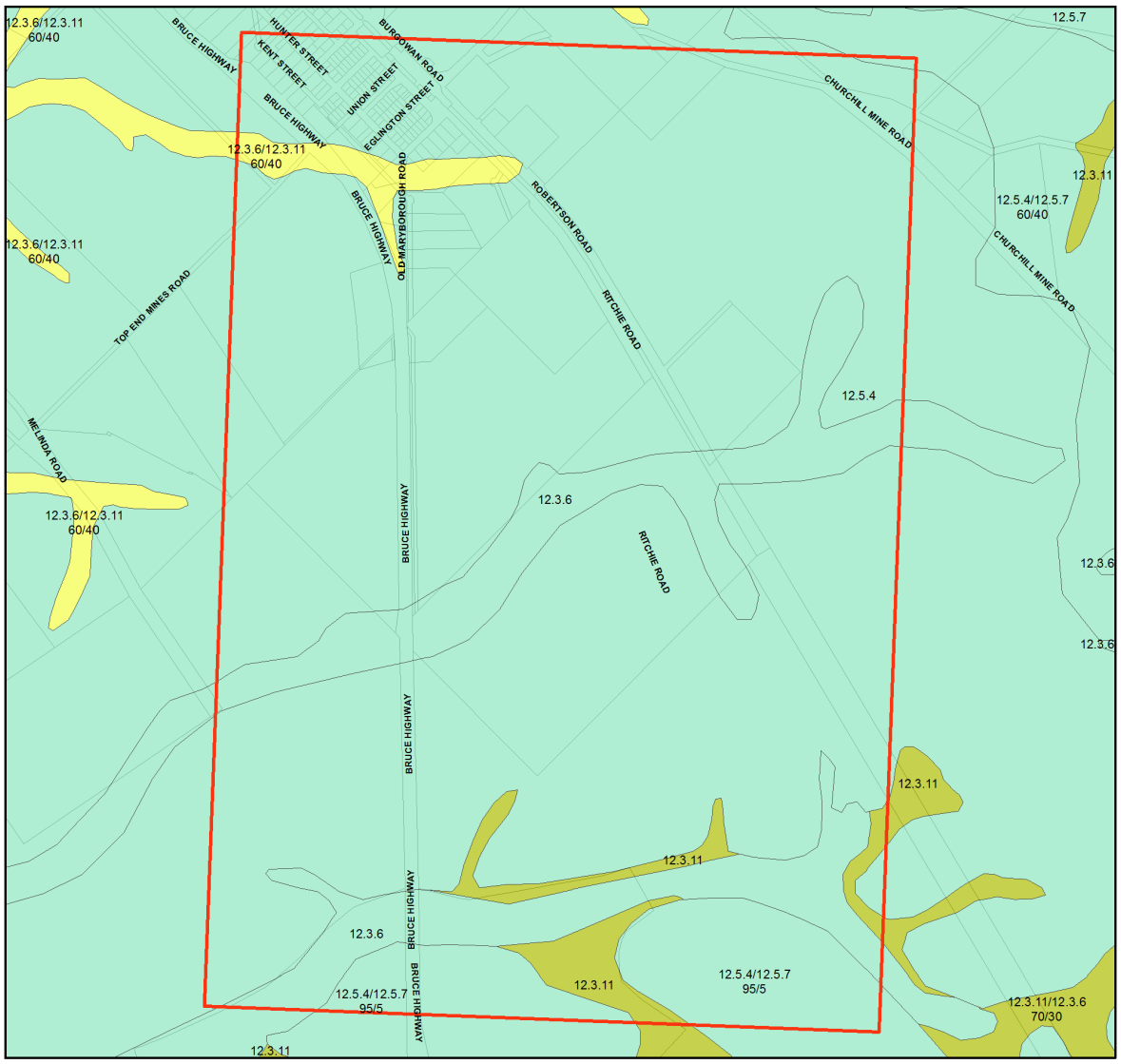

N

0 0.3 0.6 0.9 1.2 km

This product is projected into GDA 1994 Queensland Albers

**Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.**
**Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.**
**The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".**
**Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.**
**Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.**
**Non-remnant vegetation includes regrowth and disturbed native vegetation.**

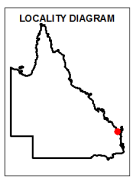
# Map 3 - Pre-clearing regional ecosystems




## Pre-clearing Regional Ecosystems

### Biodiversity Status

- polygon
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Water
- Cadastral Boundaries



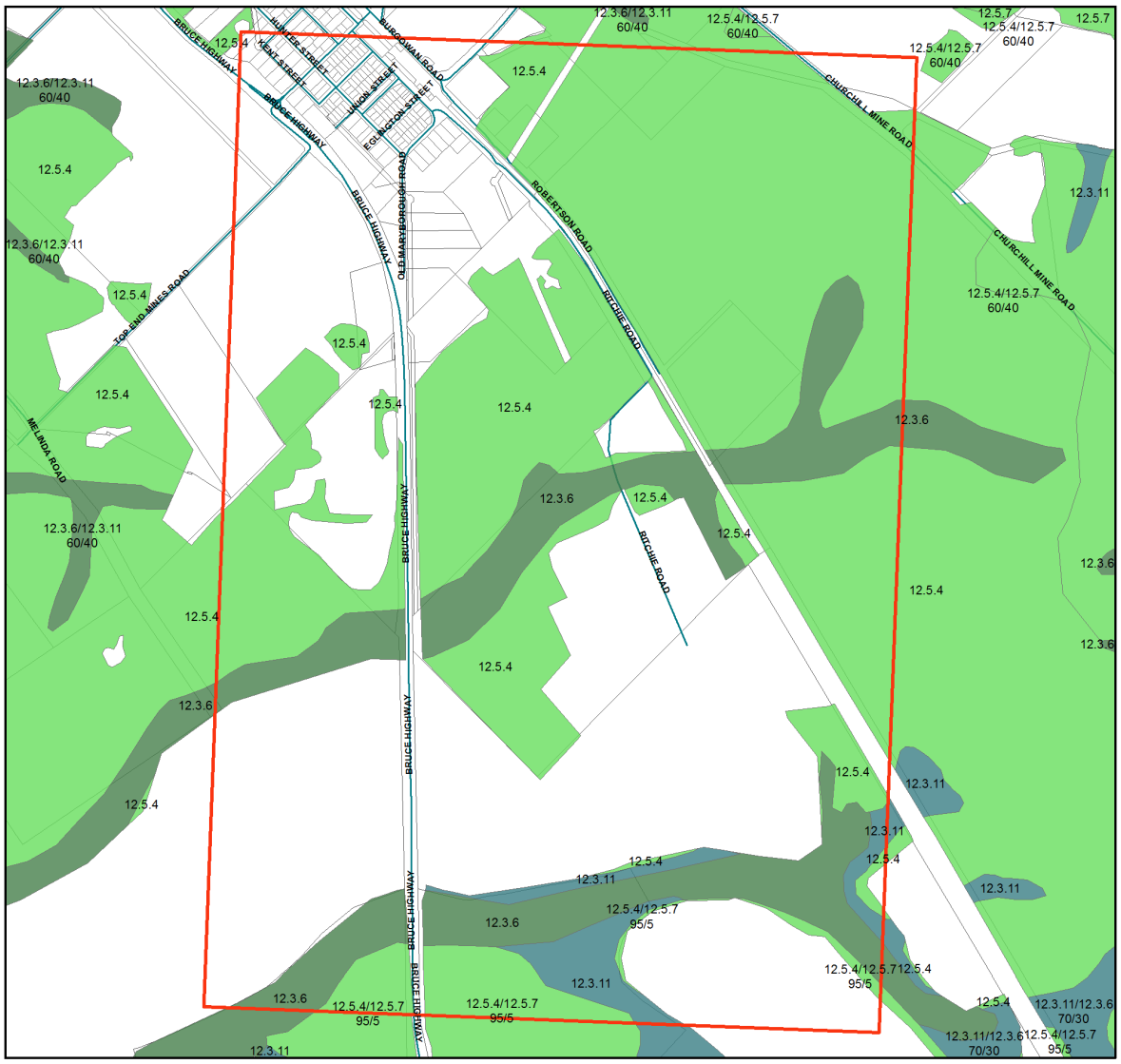

N

0 0.3 0.6 0.9 1.2 km

This product is projected into GDA 1994 Queensland Albers

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.
The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

# Map 4 - Remnant 2019 regional ecosystems by BVG (5M)




## Remnant 2019 Regional Ecosystems coloured by Broad Vegetation Groups

### Broad Vegetation Groups
#### BVG5M Description (BVG1M codes)

- polygon
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries

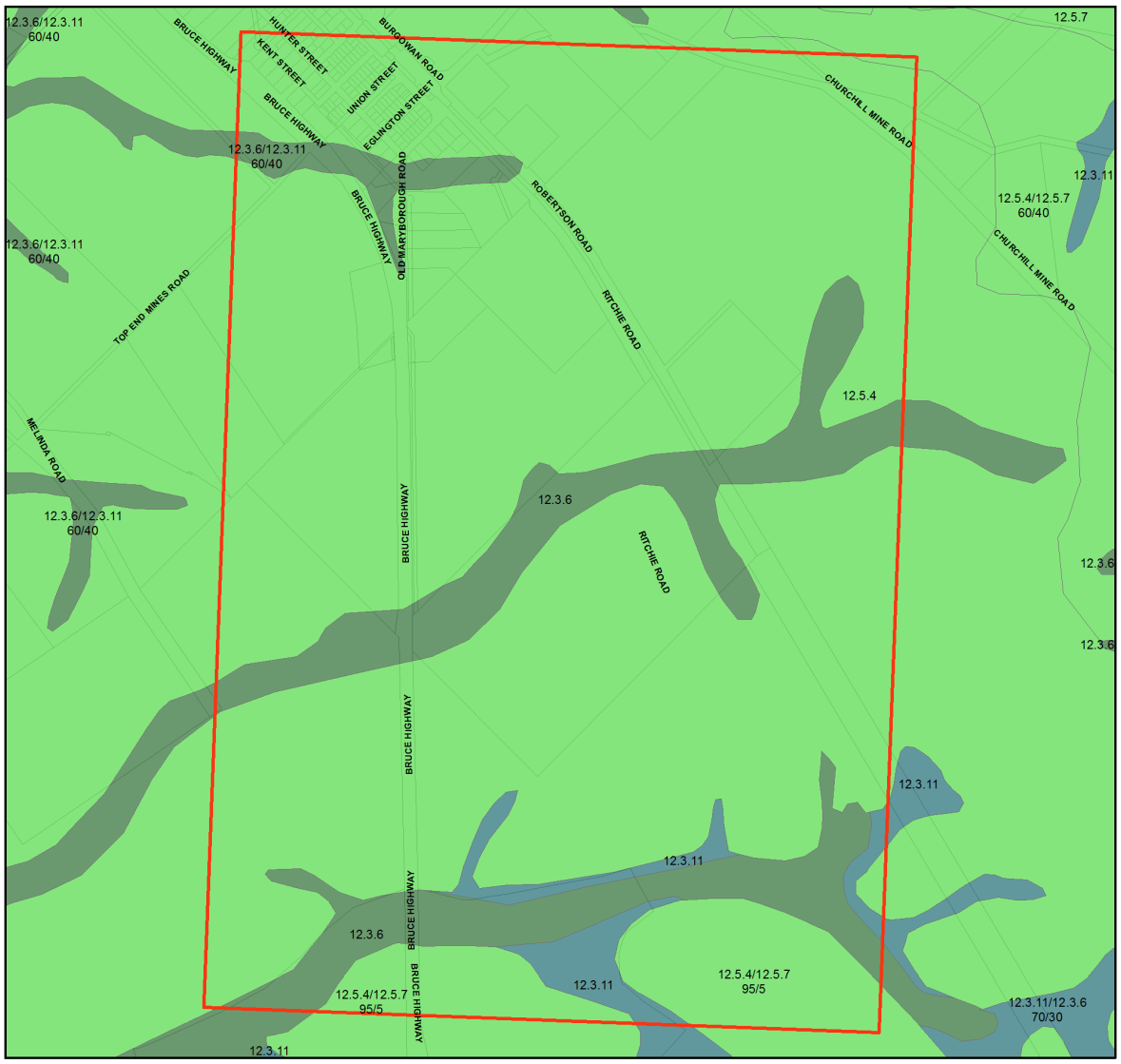

N

0 0.3 0.6 0.9 1.2 km

This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.
The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.
Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.
Non-remnant vegetation includes regrowth and disturbed native vegetation.

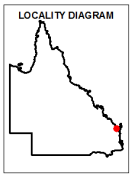
# Map 5 - Pre-clearing regional ecosystems by BVG (5M)

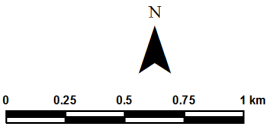



## Pre-clearing Regional Ecosystems coloured by Broad Vegetation Groups

### Broad Vegetation Groups
**BVG5M Description (BVG1M codes)**

- polygon
- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Water
- Cadastral Boundaries

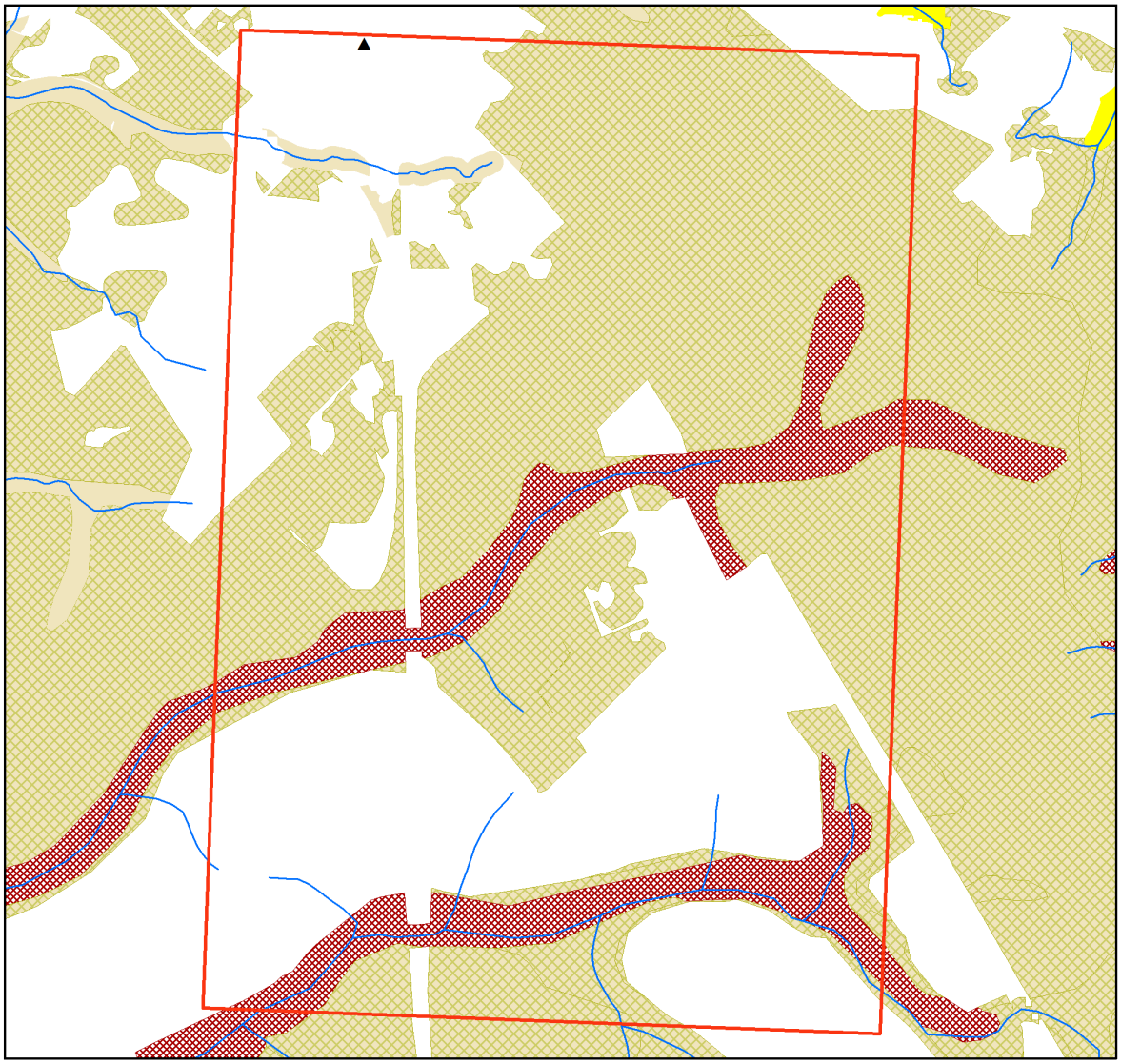



This product is projected into GDA 1994 Queensland Albers

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.
The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

# Map 6 - Wetlands and waterways



## Queensland Wetland Data

**Legend**

- polygon
- Towns

**Queensland Wetland Data**

- Riverine Drainage Lines
- Springs

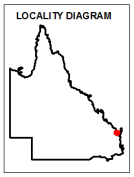
**Wetland System - Water Bodies**

- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies

**Wetland System - Regional Ecosystems**

- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51-80% wetland (mosaic units)
- RE 1-50% wetland (mosaic units)

LOCALITY DIAGRAM



N

0 260 520 780 1040 1300 m

Accuracy information: The positional accuracy of wetland data mapped at a scale of 1:100,000 is +/-100m with a minimum polygon size of 5ha or 75m wide for linear features, except for areas along the east coa st which are mapped at the 1:50,000 scale with a positional accuracy of +/-50m, with a minimum polygon size of 1ha or 35m wide for linear features. Wetlands smaller than 1ha are not delineated on the wetland data. Consideration of the effects of mapped scale is necessary when interpret ing data at a larger scale, e.g. 1:25,000. For property assessment, digital linework should be used as a guide only. The extent of wetlands depicted on this map is based on rectified 2013 Landsat ETM+ imagery supplied by Statewide Landcover and Trees Study (SLATS), Department of Environment and Science. The extent of water bodies is based on the maximum extent of inundation derived from available Landsat imagery up to and including the 2013 imagery.



This product is projected into GDA 1994 Queensland Albers

## Links and Other Information Sources

The Department of Environment and Science's Website -

http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from:

https://publications.qld.gov.au/dataset/redd/resource/

The methodology for mapping regional ecosystems can be downloaded from:

https://publications.qld.gov.au/dataset/redd/resource/

Technical descriptions for regional ecosystems can be obtained from:

http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/

Benchmarks can be obtained from:

http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

http://dds.information.qld.gov.au/dds/

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link:

https://qldglobe.information.qld.gov.au/

## References

Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2019). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 4.0. Queensland Herbarium, Department of Environment and Science.

(https://publications.qld.gov.au/dataset/redd/resource/78209e74-c7f2-4589-90c1-c33188359086)

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Addicott, E.P. and Appelman, C.N. (2020). Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

(https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4)

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

# Appendices

## Appendix 1 - Source Data

**The dataset listed below is available for download from:**

http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/

- Regional Ecosystem Description Database

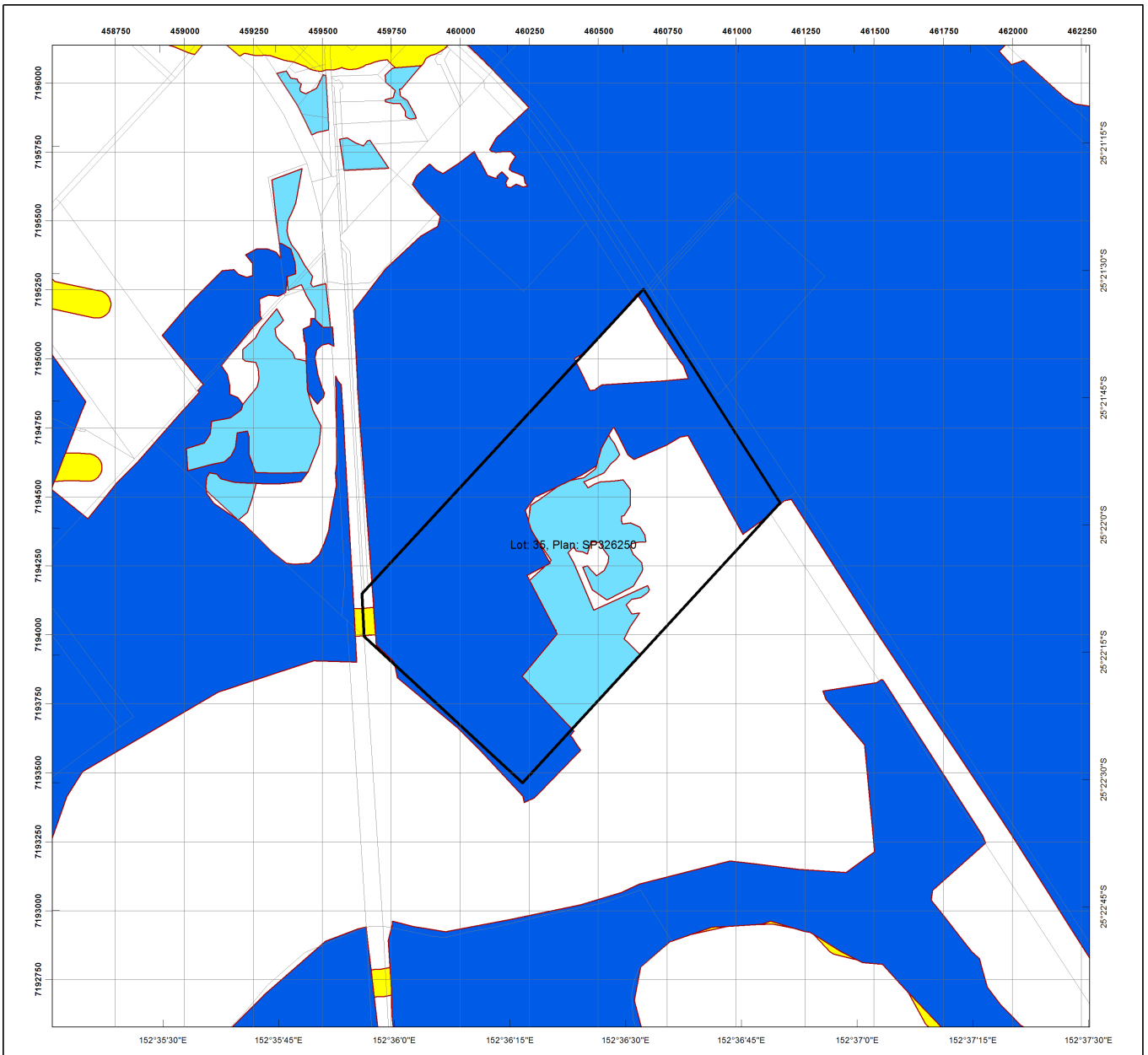
**The datasets listed below are available for download from:**

http://dds.information.qld.gov.au/dds/

- Biodiversity status of pre-clearing and 2019 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

## Appendix 2 - Acronyms and Abbreviations

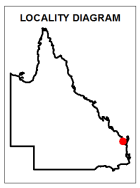
| | |
|---|---|
| AOI | - Area of Interest |
| GDA94 | - Geocentric Datum of Australia 1994 |
| GIS | - Geographic Information System |
| RE | - Regional Ecosystem |
| REDD | - Regional Ecosystem Description Database |
| VMA | - *Vegetation Management Act 1999* |



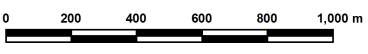

# Regulated Vegetation Management Map

## Legend

- Selected Lot and Plan
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Other land parcel boundaries








This product is projected into:
GDA 1994 MGA Zone 56

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

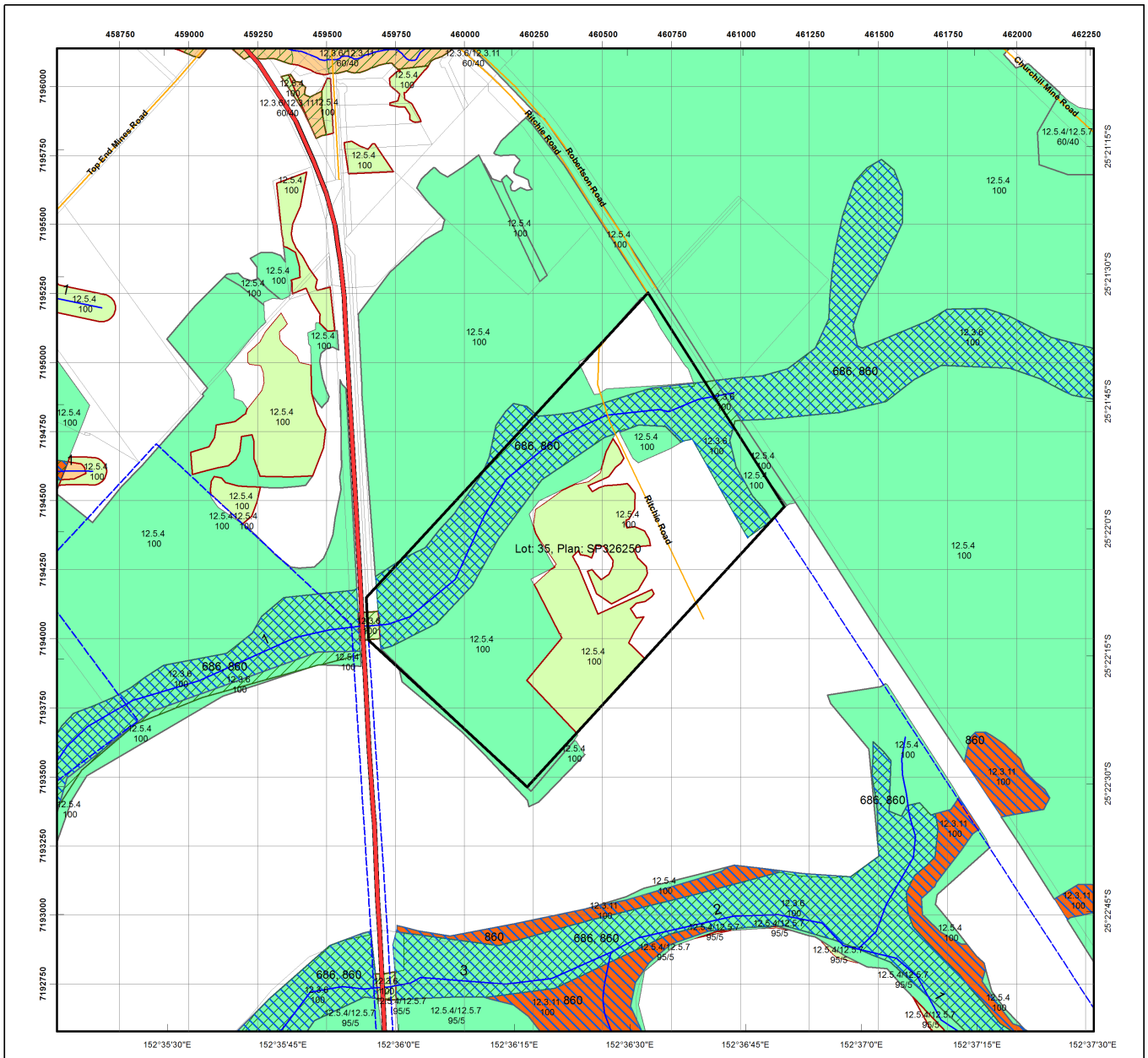
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.

Queensland Government



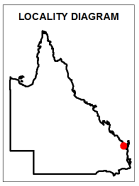

# Vegetation Management Supporting Map

## Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries

Queensland Government

LOCALITY DIAGRAM



N

0 140 280 420 560 700 m

This product is projected into: GDA 1994 MGA Zone 56

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

# Vegetation Management Act 1999 - Extract from the essential habitat database

Essential habitat is required for assessment under the:

- State Development Assessment Provisions - State Code 16: Native vegetation clearing which sets out the matters of interest to the state for development assessment under the *Planning Act 2016*; and
- Accepted development vegetation clearing codes made under the *Vegetation Management Act 1999*

Essential habitat for one or more of the following species is found on and within 1.1 km of the identified subject lot/s on the accompanying essential habitat map.

This report identifies essential habitat in Category A, B and Category C areas.

The numeric labels on the essential habitat map can be cross referenced with the database below to determine which essential habitat factors might exist for a particular species.

Essential habitat is compiled from a combination of species habitat models and buffered species records.

The Department of Resources website (http://www.resources.qld.gov.au) has more information on how the layer is applied under the State Development Assessment Provisions - State Code 16: Native vegetation clearing and the *Vegetation Management Act 1999*.

Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated.

Essential habitat, for protected wildlife, means a category A area, a category B area or category C area shown on the regulated vegetation management map-

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

Protected wildlife includes critically endangered, endangered, vulnerable or near-threatened native wildlife prescribed under the *Nature Conservation Act 1992*.

**Essential habitat in Category A and/or Category B and/or Category C**

| Label | Scientific Name | Common Name | NCA Status | Vegetation Community | Altitude | Soils | Position in Landscape |
|---|---|---|---|---|---|---|---|
| 686 | Crinia tinnula | wallum froglet | V | Vegetation community is a mandatory essential habitat factor for this species. Permanent to ephemeral acidic (pH 4.3 - 5.2), soft freshwater in Melaleuca (e.g. M. quinquenervia) swamps, sedgeland, wet and dry heathland (e.g. Banksia robur, Xanthorrhoea) and wallum (Banksia aemula shrubland/woodland) areas coastal lowlands on sand or sandstone, occasionally in adjacent open forest/woodland (e.g. Eucalyptus racemosa, Corymbia citriodora) with heathy understorey; known to persist in small remnants (<10ha); may be found well away from water. | Sea level to 150m. | Sandy and sandy-alluvial substrates. | None |
| 860 | Phascolarctos cinereus | koala | E | Open forests and woodlands containing Eucalyptus, Corymbia, Lophostemon or Melaleuca trees having a trunk of a diameter of more than 10cm at 1.3m above the ground. Tree species used for food and habitat varies across the state and can include: Corymbia citriodora, Corymbia henryi, Corymbia intermedia, Eucalyptus acmenoides, Eucalyptus bancroftii, Eucalyptus biturbinata, Eucalyptus blakelyi, Eucalyptus brownii, Eucalyptus camaldulensis, Eucalyptus carnea, Eucalyptus chloroclada, Eucalyptus coolabah, Eucalyptus crebra, Eucalyptus dealbata, Eucalyptus drepanophylla, Eucalyptus dunnii, Eucalyptus eugenioides, Eucalyptus exserta, Eucalyptus fibrosa, Eucalyptus grandis, Eucalyptus helidonica, Eucalyptus latisinensis, Eucalyptus longirostrata, Eucalyptus major, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus microcarpa, Eucalyptus microcorys, Eucalyptus microtheca, Eucalyptus moluccana, Eucalyptus montivaga, Eucalyptus orgadophila, Eucalyptus papuana, Eucalyptus pilularis, Eucalyptus platyphylla, Eucalyptus populnea, Eucalyptus portuensis, Eucalyptus propinqua, Eucalyptus racemosa, Eucalyptus resinifera, Eucalyptus robusta, Eucalyptus saligna, Eucalyptus seeana, Eucalyptus siderophloia, Eucalyptus sideroxylon, Eucalyptus tereticornis, Eucalyptus thozetiana, Eucalyptus tindaliae, Eucalyptus umbra, Lophostemon confertus, Melaleuca leucadendra, Melaleuca quinquenervia. | Sea level to 1000m. | None | Riparian areas, plains and hill/escarpment slopes. |

| Label | Regional Ecosystem (mandatory unless otherwise specified) |
|---|---|
| 686 | 12.2.5, 12.2.7, 12.2.9, 12.2.10, 12.2.12, 12.2.15, 12.3.4, 12.3.5, 12.3.6, 12.3.12, 12.3.14, 12.3.20, 12.5.2, 12.5.10. These regional ecosystems are not a mandatory essential habitat factor for this species. |
| 860 | 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.15, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.4, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10. |

# Appendix B

## Likelihood of occurrence assessment

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| **Threatened Ecological Communities** | | | | | |
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | | E | - | Occurs in sub-tropical, sub-humid and temperate climatic zones from Curtis Island, north of Gladstone, in Queensland to Bermagui in southern New South Wales. Occurs in coastal catchments, mostly at elevations of less than 20 m above sea-level (ASL) that are typically found within 30 km of the coast. Typically associated with low-lying coastal alluvial floodplains and alluvial flats.<br>The TEC is associated with two Regional Ecosystems in Queensland, RE 12.1.1 and 12.3.20. | **Not present / Unlikely**<br><br>A review of the RE mapping and on site values did not identify the presence of REs conducive to the TEC (i.e. REs 12.1.1 and 12.3.20 were not present within the Project area).<br><br>The site inspection confirmed that the TEC is not present within the Project area. |
| Lowland Rainforest of Subtropical Australia | | CE | - | Occurs in South Eastern Queensland Bioregion and NSW North Coast Bioregion. Occurs on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on enriched rhyolitic soils and basaltically enriched meta-sediments. Lowland Rainforest mostly occurs in areas <300 m above sea level with annual rainfall >1,300 mm.<br>The ecological community is generally a moderately tall (≥20 m) to tall (≥30 m) closed forest (canopy cover ≥70%). Tree species with compound leaves are common and leaves are relatively large (notophyll to mesophyll). Typically, there is a relatively low abundance of species from the genera Eucalyptus, Melaleuca and Casuarina. Buttresses are common, as is an abundance and diversity of vines.<br><br>Typically, non-rainforest species such as eucalypts and brush box comprise <30% of canopy emergent.<br><br>The TEC is associated with the following Regional Ecosystems in Queensland, RE 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16 | **Not present / Unlikely**<br><br>A review of the RE mapping and on site values did not identify the presence of REs conducive to the TEC (i.e. REs 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16 were not present within the Project area).<br><br>The site inspection confirmed that the TEC is not present within the Project area. |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | | E | - | The ecological community includes the plants, animals and other organisms typically associated with forested palustrine wetlands, or swamp forests, found in the temperate to subtropical coastal valleys of Australia's east coast. The Coastal Sclerophyll Swamp Forest often has a layered canopy, dominated by melaleucas and/or Eucalyptus robusta and occurs between the Great Dividing Range and the coastline from near Gladstone in Queensland, through to the south coast of New South Wales<br><br>Within Queensland, there are five Regional Ecosystems (REs) (as regulated under the Queensland Vegetation Management Act 1999) that are | **Known**<br><br>**This TEC was observed on site during field investigations.** |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| | | | | considered to be analogous to the Coastal Swamp Sclerophyll Forest ecological community where they meet the necessary condition class and patch size as defined within the Commonwealth conservation advice for the Coastal Swamp Sclerophyll Forest ecological community. These vegetation communities consist of the following:<br>■ RE 12.2.7 – Melaleuca quinquenervia or rarely Melaleuca dealbata open forest on sand plains<br>■ RE 12.3.4 and 12.3.4a – Melaleuca quinquenervia, Eucalyptus robusta woodland on coastal alluvium/Eucalyptus bancroftii open woodland often with Melaleuca quinquenervia.<br>■ RE 12.3.5 – Melaleuca quinquenervia open forest on coastal alluvium.<br>■ RE 12.3.6 – Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains<br>■ RE 12.3.20 (in part) - Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, Eucalyptus siderophloia open forest on low coastal alluvial plains. | |
| **Flora** | | | | | |
| *Acacia attenuata* | NCN | V | V | *Acacia attenuata* is a slender shrub growing to about 5 m tall. The species occurs in high rainfall areas of south-east Queensland and is confined to coastal lowland sand plains.<br><br>Across this range *A. attenuata* typically occurs in seasonally waterlogged areas of wet heathland or heathland margins, open forest, and woodland communities, and specifically on sandy poorly drained soils or peat swamps which are infertile.<br>*Acacia attenuata* has been recorded growing in shrublands with *Leptospermum whitei* and *Baeckea frutescens*; in wallum with *Banksia aemula* and *Eucalyptus robusta*; in woodlands with *Corymbia trachyphloia, E. umbra* and *Banksia oblongifolia*; and in open forests of *E. umbra, E. racemosa* and *Melaleuca quinquenervia*. | **Low**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Bosistoa transversa* | Three-leaved bosistoa | V | LC | In Queensland, suitable habitat for Three-leaved bosistoa includes:<br>■ Reddish loam over basalt rock on a very steep slope in complex notophyll vine forest with emergent Brush box (*Lophostemon confertus*) | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation). |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| | | | | ▪ On brown loamy soils on a hillside within a complex notophyll vine forest with Brush poison tree (*Excoecaria dallachyana*) and Hauer (*Dissiliaria baloghioides*)<br>▪ Remnant vine forest pockets with varying slope, from relatively flat to a steep slope. The species appears to occur only in areas that have experienced minimal disturbance. | The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Cossinia australiana* | Cossinia | E | E | *Cossinia australiana* is a shrub to small slender tree, growing to 7 m in height with a sparse crown.<br><br>Cossinia is known from fragmented relict patches of Araucarian vineforest or vine thickets on fertile soils. | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation).<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Cryptostylis hunteriana* | Leafless tongue-orchid | V | SLC | The Leafless Tongue Orchid has no leaf. It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between November and February.<br><br>The species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland | **Low**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Cupaniopsis shirleyana* | Wedge-leaf tuckeroo | V | V | A small tree to 10m usually found within a variety of rainforest types including vine thicket and dry rainforest communities on hillsides, mountain tops, lower slopes of valleys, stream beds and along riverbanks Distribution of the species has been recorded between Brisbane and Mount Larcom. | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation).<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Fontainea venosa* | NCN | V | V | Occurs south west of Beenleigh near Brisbane, and along the Koolkooroon Creek in the Boyne Valley in Queensland. Occurs in Araucarian microphyll vine forest with a mean annual rainfall of 1,000 mm on alluvial soil along creeks | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation).<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| *Macadamia integrifolia* | Queensland nut tree | V | V | Queensland nut tree occurs from Mt Bauple, near Gympie, to Currumbin Valley in the Gold Coast hinterland, southeast Queensland.<br><br>Queensland nut tree 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 southeast Queensland Natural Resource Management regions.<br><br>Queensland nut tree is known to prefer to grow in mild frost-free areas with a reasonably high rainfall. There have been records of planted specimens bearing fruit as far south as Sydney. | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation).<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Macadamia tetraphylla* | Rough-shelled macadamia nut | V | V | Rough-leaved Queensland nut occurs from northeast NSW (chiefly in the Richmond and Tweed River areas) to southeast Queensland (Mt Glorious, near Brisbane). It inhabits areas in subtropical rainforest and notophyll vine forest in near coastal areas. The species has been noted to occur on steep slopes especially at ecotones. | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation).<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Macrozamia pauli-guilielmi* | Pineapple zamia | E | E | *Macrozamia pauli-guilielmi* is a small cycad with an underground ovoid trunk and spiral leaves. The species is distinguished by its very narrow and pale-green leaflets.<br><br>The species occurs in occurs in lowland (5–230 m altitude) open forest or woodland (wallum) dominated by banksias or eucalypts, or in shrub land or heath land, generally on stabilised sand dunes | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Phaius australis* | Lesser swamp-orchid | E | E | The Lesser-swamp orchid is endemic to Australia and occurs in eastern Queensland and northern NSW. Records indicate the species extending as far as Lake Cathie near Port Macquarie and as far south at South West Rocks (Brown 2010; DEE 2018; Harden 1993). This species is associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved paperbark (*Melaleuca leucadendra*) or Swamp mahogany (*Eucalyptus robusta*) are found. Less commonly, the species has been found in drier forest near the coast. The species are known to be restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest. | **Low**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Prasophyllum exilis* | Thin leek orchid | - | NT | *Prasophyllum exilis* is a slender orchid with a single, round, tubular onion-like leaf which encloses the flowering stem. The species flowers are brown to greenish with a white labellum, with the flowering period occurring between July-August, usually following winter rain.<br>*Prasophyllum exile* grows in damp, grassy places in coastal and near-coastal forest and woodland. | **Low**<br>The species has been previously recorded within 2 km of the Project area and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| *Rhodomyrtus psidioides* | Native guava | CE | CE | Distributed from Sydney to Maryborough in Queensland. Habitat consists of lowland coastal and subcoastal areas of eucalypt and dry rainforest. Pioneer species for littoral subtropical rainforest and riparian wet sclerophyll. | **Low**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| *Samadera bidwillii* | Quassia | V | V | *Samadera bidwillii* commonly occurs in lowland rainforest often with *Araucaria cunninghamii* or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland, it is commonly found in areas adjacent to both temporary and permanent watercourses up to 510m altitude. | **Low**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species.<br><br>The species was not identified within the Project area during ecological field investigations conducted in May 2021 |
| **Birds** | | | | | |
| *Calidris ferruginea* | Curlew sandpiper | M - CE | CE | Curlew sandpipers occur around coastal regions of Australia and are also quite widespread inland. In Queensland, widespread records occur along the coast south of Cairns and are widespread east of the Great Divide. The species mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They have also been recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters and wet mats of algae or waterweed, or on banks of beach cast seagrass or seaweed. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| *Erythrotriorchis radiatus* | Red goshawk | V | E | The Red goshawk is distributed along the east coast of QLD, Cape York Peninsula and across into northern regions of Australia. It is estimated the species population is limited to the bioregions of the Wet Tropics, Cape York Peninsula and Mount Isa in QLD. The Red goshawk typically occurs in both coastal and sub-coastal areas, in wooded and forested lands of tropical and warm-temperate Australia. This species is closely associated with riverine forests. The Red goshawk nests in large trees, frequently the tallest and largest in a stand, which are within one kilometre of a permanent water source. This species typically avoids very dense, and very open habitats (Debus 1991; 1993; OEH 2017; Marchant and Higgins 1993). The species occupies large home ranges estimated to be up to 120 $km^2$ (females) and 200 $km^2$ (males). Preferred habitat requirements are extensive tracts or remnant woodlands/forests along watercourses or wetlands with fertile soils with a mosaic of vegetation types, access to permanent water, and large populations of birds. The species is considered locally extinct from South-east Queensland due to a lack of records in the last 10 years despite targeted ecological investigations. | **Low**<br>The species is considered locally extinct due to no reputable records in 10 years. |
| *Falco hypoleucos* | Grey falcon | V | V | The known distribution of the Grey falcon is over Australia's arid and semi-arid zones. The species is very rare. It is absent from the Cape York Peninsula and south of the Great Diving Range in Queensland. The habitat of the Grey falcon is restricted to shrubland, grassland and wooded watercourses of arid or semi-arid regions, however, wetlands where surface water attracts potential prey is also capitalised on by the falcon. Grey falcon has a high affinity with arid and semi-arid habitats with annual rainfall less than 500 mm. During periods of drought, this species moves towards the coast regions, where is frequents wooded watercourses. | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation) |
| *Geophaps scripta scripta* | Squatter pigeon (southern) | V | V | The Squatter pigeon is now limited to an area from north Queensland to the northwest slopes of NSW, including southeast Queensland, the western slopes of the Great Diving Range, the Gwydir River region, and the Liverpool Plains. They inhabit grassy understorey of open eucalypt woodlands and plains featuring sandy areas within proximity to water. Areas of semi-arid or arid landscape with sandy, open, and short grass cover dissected by gravel ridges is the preferred habitat for the species. The ground cover in foraging and breeding habitat is typically patchy, consisting | **Low**<br>The Project area is not considered to provide preferred habitat for the species. Furthermore, there are no species occurrence records within an approximately 65 km radius of the Project area |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| | | | | of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs. This vegetated ground layer rarely exceeds 33% of the ground area. The remaining ground surface typically consists of bare patches of gravelly or dusty soil, and areas lightly covered in leaf litter and coarse, woody debris (e.g. fallen trees, logs, and smaller debris). The species is also often found alongside tracks and roadsides. | |
| *Hirundapus caudacutus* | White-throated needletail | V, M | V | In Australia, the White-throated needletail is almost exclusively aerial, flying at heights of less than 1 m up to more than 1,000 m above the ground. White-throated needletails often forage along the edges of low pressure systems, which both lift their food sources, and assist with their flight. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.<br><br>This species is known to occur over most types of habitat; however, they are most often recorded above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy. In coastal areas, they are often seen flying over sandy beaches or mudflats, and often around coastal cliffs and areas with prominent up draughts, such as ridges and sand-dunes. | **Moderate**<br>The species is an aerial foraging species and can occur in the skies above most habitat types. The species does not breed in Australia. |
| *Numenius madagascariensis* | Eastern curlew | M - CE | E | Within Australia, the Eastern curlew has a primarily coastal distribution and is found in all state and territories. The Eastern curlew can be found foraging and roosting in sheltered coasts, especially estuaries, bays, harbours, inlets, and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae). The species is known to inhabit ocean beaches, coral reefs, rock platforms, rocky islets, coastal saltworks and sewage farms. They are often recorded in saltmarshes and near mangrove forests. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Rostratula australis* | Australian painted snipe | E | E | The Australian painted snipe has been recorded at wetlands in all states and territories of Australia but is most common in eastern Australia, where it has been recorded at scattered locations throughout much of QLD. The species generally inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. The species has also been observed to use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Turnix melanogaster* | Black-breasted buttonquail | V | V | The Black-breasted button-quail (*Turnix melanogaster*) is a relatively large, plump, and pale-eyed quail. The males are about 18 cm long, with a wingspan of 32 to 35 cm, and weighing 65 g. The females tend to be larger weighing 100 g. Females are slightly larger than males and are the dominant sex.<br>Suitable habitat includes rainforests and forests, mostly in areas with 770 to 1,200 mm rainfall per annum in areas characterised by highly fertile soils. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest. They may also be found in low, dense Acacia thickets and, in vegetation behind coastal sand dunes. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| **Mammals** | | | | | |
| *Chalinolobus dwyeri* | Large-eared pied bat | V | V | The former and current distribution of the Large-eared pied bat is poorly known. Records for current distribution exist from Shoalwater Bay and inland to Carnarvon in Queensland, through to Ulladulla, in NSW. This species requires a combination of sandstone cliffs/escarpments to provide roosting habitat that is adjacent to higher fertility sites (particularly box gum woodlands or river/rainforest corridors which are used for foraging). They have been observed in disused mine shafts, caves, overhangs, and disused Fairy martin (*Hirundo ariel*) nests for shelter and to raise young. This species possibly also roosts in tree hollows, within dry and wet sclerophyll forest, Cyprus-pine dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland, Brigalow, and sandstone outcrop country. In southeast Queensland, the species has primarily been recorded from higher altitude, among moist tall open forest adjacent to rainforest. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |
| *Dasyurus hallucatus* | Northern quoll | E | LC | Known Queensland populations occur as far south as Gracemere and Mt Morgan, to Weipa in the north and west into central Queensland near Carnarvon Range National Park (DAWE 2020; DES 2018). The Northern quoll can be found in various habitats across its range including rocky areas, eucalypt forest and woodlands, sandy lowlands and beaches, rainforests, shrubland, grasslands and desert. They tend to require a habitat with some form of rocky area for denning purposes and surrounding vegetation used for foraging and dispersal. They are also known to inhabit areas around human dwellings and campgrounds. No database records occur within the Project area for this species. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Petauroides Volans sensu lato* | Greater glider | E | E | This species of greater glider is distributed in northern Queensland and shares genetic and morphological differences to its southern sister species. Its habitat is similar in that it prefers old woodland forest with large hollows focused around riparian areas. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |
| *Phascolarctos cinereus* | Koala | E | E | The Koala is distributed along the east coast of Australia. In Queensland, the distribution extends across several bioregions, encompassing a great diversity of habitats with the greatest concentration on southeast Queensland. Koala habitat can be broadly defined as any environment containing Koala food tree species (*Eucalyptus* spp., *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp.) or shelter trees. Preferred food and shelter trees are naturally abundant on fertile clayey soils. | **Low**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |
| *Pteropus poliocephalus* | Grey-headed flying-fox | V | SLC | The Grey-headed flying-fox occurs in the coastal belt of Eastern Australia, typically ranging from Rockhampton in central Queensland to Melbourne in Victoria. This is a canopy-feeding species that eats fruit and nectar. This species utilises a range of vegetated habitats, including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. In an urban setting, this species is known to feed on commercial fruit crops, and on introduced tree species.<br>Roost sites are generally located near water bodies. This species is known to roost in vegetation ranging from rainforest, Melaleuca stands, mangroves and riparian vegetation. The species has a high level of roost site fidelity, although new sites have been known to be colonised. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species. No roost sites were identified within the Project area during field investigations conducted in May 2021 |
| **Reptiles** | | | | | |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| *Coeranoscincus reticulatus* | Three-toed snake-tooth skink | V | LC | The Three-toed snake-tooth skink occurs from Crescent Head in northeast NSW to Fraser Island in southeast Queensland. Most records are from the Border Ranges in the vicinity of the NSW/Queensland border.<br>In Queensland, the Three-toed Snake-tooth Skink has been recorded in rainforest, closed forest, wet sclerophyll forest, tall open Blackbutt (*Eucalyptus pilularis*) forest, tall layered open eucalypt forest and closed Brush Box (*Lophostemon confertus*) forest. It has also been recorded from extensive regrowth in heavily logged areas. | Not predicted to be in the locality of the Project area through desktop analyses. Not observed during field survey. |
| *Delma torquata* | Collared delma | V | V | The Collared delma is endemic to southeast Queensland. The known distribution of the species occurs at Lockyer Forest Reserves, Western Creek near Millmerran, the Toowoomba Range eastward to Moggill on the western outskirts of Brisbane.<br><br>The species typically inhabits Eucalypt-dominated woodlands and open-forests in Queensland RE Land Zones 3, 9 and 10 (Brigalow Belt Reptiles Workshop 2010). Recent studies indicate that the species is most frequently associated with open *Eucalyptus crebra* woodland (canopy cover between 10 to 30%) located on northwest facing slopes.<br><br>The Collared delma has been recorded from rocky areas associated with dry open forests, open Eucalypt, acacia woodland with an understorey of native grasses and loose rocks and eucalypt woodland adjacent to semi-evergreen vine thicket. Rocks, fallen timber, leaf litter and in soil cracks provide refuge. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Furina dunmalli* | Dunmall's snake | V | V | Dunmall's snake is endemic to Australia and inhabits areas near the Queensland border within the Brigalow Belt South bioregion to the Nandewar bioregion in NSW. In Queensland, the snake is often found in areas 200 to 500 m above sea level with recorded sightings in Oakey and Inglewood. Recent records exist only from a restricted area of inland south-eastern Queensland between Chinchilla and Morven. All suitable habitats (remnant or non-remnant vegetation) that are coincident with the known locations of the species are considered important habitats. Dunmall's snake has been found in a broad range of habitats, including:<br>■ Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (*Acacia harpophylla*), other Wattles (*A. burrowii, A. deanei, A. leiocalyx*), native<br>■ Cypress (Callitris spp.) or Bull-oak (Allocasuarina luehmannii)<br>■ Various Spotted gum (*Corymbia citriodora*), Ironbark (*Eucalyptus crebra* and *E. melanophloia*), White cypress pine (*Callitris glaucophylla*) and Bull-oak open forest and woodland associations on sandstone derived soils | **Low**<br>The Project area is not considered to provide preferred habitat for the species |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| | | | | ▪ The edge of dry vine scrub near Tarong Power Station, Queensland, and hard ironstone country (Queensland RE Land Zone 7) at Lake Broadwater near Dalby, Queensland. | |
| **Migratory species**[1] | | | | | |
| *Actitis hypoleucos* | Common sandpiper | M | SLC | In Australia, the Common sandpiper is most commonly found in the north, east and west from August to May. The species is found in shallow, pebbly, muddy, or sandy edges of rivers and streams. They occur in coastal to inland areas, recorded in dams, lakes, sewage ponds, margins of tidal rivers, mangrove forests, saltmarshes, mudflats, beaches, and drains | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Apus pacificus* | Fork-tailed swift | M | SLC | The Fork-tailed swift is a non-breeding visitor to all states and territories of Australia (Higgins 1999). The species is almost exclusively aerial species, flying from less than 1 m to at least 300 m above ground, and probably much higher. In Australia, Fork-tailed swifts predominately occur over inland plains, but sometimes occur above foothills, or in coastal areas. They often occur over cliffs, beaches, islands, and sometimes far out to sea. This species is also known to occur in the skies above settled areas, including urban areas and cities Sometimes, Fork-tailed swifts may feed among tree-tops in open forests. | **Moderate**<br>The species is an aerial foraging species and can occur in the skies above most habitat types. The species does not breed in Australia. |
| *Calidris acuminata* | Sharp-tailed sandpiper | M | SLC | The Sharp-tailed sandpiper visits Australia from August to May and commonly found in the south-east but widespread across Australia in both inland and coastal locations. The species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation including lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets and estuaries or seashores. A database record for this species exists at the south of the Project area at Jellinbah from 2003. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Calidris melanotos* | Pectoral sandpiper | M | SLC | The Pectoral sandpiper is widespread occurring in Australia during the non-breeding season but most common in eastern Queensland and south eastern Australia. They utilise shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains, and artificial wetlands. It is occasionally found further inland within wetlands and inundated vegetation. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Cuculus optatus* | Oriental cuckoo | M | SLC | The Oriental cuckoo over-winters across northern Australia from the Kimberley region in Western Australia, to Brisbane in Queensland. They inhabit monsoon forests, wet sclerophyll forests, paperbark swamps, dense open forests, scrubby gullies, and mangroves and is also known to use rainforest edges, leafy trees in paddocks, river flats and roadsides. This species prefers dense vegetation with a closed canopy. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |

| Species name | Common name | EPBC Act | NC Act | Description and habitat associations (information sourced from DoE SPRAT 2021) | Likelihood of occurrence within the Project area |
|---|---|---|---|---|---|
| *Gallinago hardwickii* | Latham's snipe | M | SLC | Latham's snipe is a non-breeding visitor to south eastern Australia, a passage migrant through northern Australia i.e. it travels through northern Australia to reach non-breeding areas located further south. The species has been recorded along the east coast of Australia from Cape York Peninsula, through to south eastern South Australia. | **Low**<br>The Project area is not considered to provide preferred habitat for the species |
| *Monarcha melanopsis* | Black-faced monarch | M | SLC | The Black-faced Monarch is widespread in eastern Australia. In Queensland, it is widespread from the islands of the Torres Strait and on Cape York Peninsula, south along the coasts and the eastern slopes of the Great Divide, to the NSW border. The species mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical rainforest, subtropical rainforest, mesophyll thicket/shrubland, warm temperate rainforest, dry rainforest, and cool temperate rainforest. | **Low**<br>The Project area is not considered to provide preferred habitat for the species (i.e. rainforest and vine thicket vegetation) |
| *Monarcha trivirgatus* | Spectacled Monarch | M | SLC | The species occurs in the understorey of mountain/lowland rainforests; thickly wooded gullies; waterside vegetation; mostly well below canopy. Summer breeding migrant to SEQ/northeast NSW from September to May. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |
| *Myiagra cyanoleuca* | Satin flycatcher | M | SLC | In Queensland the Satin flycatcher is widespread but scattered in the east. The species migrates northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring. They occur in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. This species is known to inhabit heavily vegetated gullies in Eucalypt dominated forests and taller woodlands usually above the shrub layer. On migration, this species occurs in coastal forests, woodlands, mangroves and drier woodlands and open forests as well as trees in open country and gardens. | **Known**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |
| *Pandion haliaetus* | Osprey | M | SLC | The Osprey occurs almost entire along the coast of Australia and occasionally inland. The distribution of the species around the northern coast appears continuous except for a possible gap at Eighty Mile Beach. Typically, they are found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They frequent a variety of wetland habitats including inshore waters, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging sites. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential transitional habitat for the species |
| *Rhipidura rufifrons* | Rufous fantail | M | SLC | The Rufous fantail occurs in coastal and near coastal districts of northern and eastern Australia. The species typically inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts. Typical habitat usually has a dense shrubby understorey often including ferns. The species also occasionally occurs in secondary regrowth, following logging or disturbance in forests or rainforests. This species has also been recorded from parks and gardens during movement events. | **Moderate**<br>The species has been previously recorded within the wider region and the Project area provides potential suitable habitat for the species |

**Table Notes**

Unlikely: Identified from database searches only and no suitable habitat exists within the Project area

Low: Records for the species are from a reliable data source but not specifically recorded within the Project area. Suitable habitat for this species does not exist within the Project area

Moderate: Records for the species are from a reliable data source but not specifically recorded within the Project area. Suitable habitat for this species exists within the Project area

| | |
|---|---|
| Known: | The species has been recorded within the Project area |
| [1] | The migratory species below do not include those migratory species identified in database searches which are also listed as conservation significant under the EPBC Act or NC Act. These species have been discussed above |

# Appendix C

## Flora species list

**Summary:**

| | |
|---|---|
| Total flora species identified: | 104 (100%) |
| Number of threatened species (flora): | 0 |
| Total native flora species: | 86 (82.7%) |
| Number of SLC flora species: | 8 |
| Total non-native flora species: | 18 (17.3%) |
| Number of Restricted matters (flora): | 2 |

| Family | Scientific name | Common name | NC Act | EPBC Act | Comments | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 | Site 11 | Site 12 | Site 13 | Site 14 | Site 15 | Site 16 | Incidental |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acanthaceae | *Pseuderanthemum variabile* | Pastel flower | LC | - | | | | | | X | | | X | | X | | | | | | | X |
| Acanthaceae | *Rostellularia adscendens* | Rostellularia | LC | - | | | | | | | | | X | | X | | | X | X | | | X |
| Adiantaceae | *Cheilanthes sieberi* | Cloak fern | LC | - | | X | X | | | | | | X | X | | | | X | | | X | X |
| Amaranthaceae | *Gomphrena celosioides* | Gomphrena weed | - | - | non-native | | | | | | | | | X | | X | | | | | | X |
| Apiaceae | *Centella asiatica* | Penny wort | LC | - | | | | | | | | | X | | | | | X | | | X | X |
| Apiaceae | *Platysace linearifolia* | Platysace | LC | - | | | | | | | | | | | | | X | X | | | X | X |
| Apocynaceae | *Gomphocarpus physocarpus* | Balloon cottonbush | - | - | non-native | | | | | | | | | | | X | | | | | X | X |
| Apocynaceae | *Parsonsia straminea* | Monkey rope | LC | - | | | X | X | | X | | X | | | X | | | | X | X | | X |
| Asteraceae | *Ageratum houstonianum* | Blue billygoat weed | - | - | non-native | | | | | | | | | | | | | | | | | |
| Asteraceae | *Emilia sonchifolia* | Emilia | - | - | non-native | | | | | | | | | X | | X | | | | | X | X |
| Asteraceae | *Praxelis clematidea* | Praxelis | - | - | non-native | | X | | | | | | X | X | | X | | X | X | | X | X |
| Campanulaceae | *Lobelia purpurascens* | White root | SLC | - | Special least concern species | X | X | X | | X | | X | | X | | X | X | X | X | X | X | X |
| Casuarinaceae | *Allocasuarina littoralis* | Black she oak | LC | - | | | | X | X | X | X | | X | | X | | | | | X | | X |
| Cyperaceae | *Baumea articulata* | Jointed twigrush | LC | - | | | | X | | | | | | | | | | | | | | X |
| Cyperaceae | *Baumea teretifolia* | Twigrush | LC | - | | | | X | | X | | X | | | | | | | | X | | X |
| Cyperaceae | *Cyperus difformis* | Rice sedge | LC | - | | | | X | | | | | | X | | X | | | | | | X |
| Cyperaceae | *Cyperus exaltatus* | Tall flatsedge | LC | - | | | | X | | | | | | | | | | | | | | X |
| Cyperaceae | *Cyperus gracilis* | Small sedge | LC | - | | | | X | | | | | | | | | | | | | | X |
| Cyperaceae | *Cyperus polystachyos* | Bunchy sedge | LC | - | | | | X | | | | | | | | | | | | | | X |
| Cyperaceae | *Cyperus prolifer* | Dwarf papyrus | - | - | non-native | | | | | | | | | | | | | | | | | |
| Cyperaceae | *Fimbristylis ferruginea* | Sedge | LC | - | | X | | | | | | | | | | | X | | | | | X |
| Cyperaceae | *Gahnia sieberiana* | Sword grass | LC | - | | X | X | X | X | X | X | | X | | X | X | X | X | X | X | | X |
| Cyperaceae | *Isolepis inundata* | Swamp club rush | LC | - | | | | X | | | | | | | | | | | | | | X |
| Cyperaceae | *Lepidosperma laterale* | Variable sword sedge | LC | - | | | | | | | | | | | | | | | | | | |
| Cyperaceae | *Lepironia articulata* | Tall reed | LC | - | | | | | | | | | | | | | | | | | | |

| Family | Scientific name | Common name | NC Act | EPBC Act | Comments | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 | Site 11 | Site 12 | Site 13 | Site 14 | Site 15 | Site 16 | Incidental |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dilleniaceae | *Hibbertia vestita* | Hibbertia | LC | - | | X | X | | | X | | | X | | X | | X | | | X | | X |
| Droseraceae | *Drosera burmanni* | Annual sundew | SLC | - | Special least concern species | | | | | | | | | | | | | | | | | X |
| Droseraceae | *Drosera peltata* | Pale sundew | SLC | - | Special least concern species | | | | | X | | | | | | | X | | | | | X |
| Ericaceae | *Acrotriche aggregata* | Red cluster heath | LC | - | | | X | | X | | | | | | X | | | | X | | | X |
| Fabaceae | *Desmodium rhytidophyllum* | Native desmodium | LC | - | | | | | | | | | | | | | | | X | | | X |
| Fabaceae | *Glycine clandestina* | Glycine pea | LC | - | | X | X | | | | | | | | X | | | | | | | X |
| Fabaceae | *Glycine tabacina* | Glycine pea | LC | - | | X | X | | | | | | X | | | | | | | X | | X |
| Fabaceae | *Gompholobium pinnatum* | Poor man's gold | LC | - | | X | X | | X | | X | | | | | | | | | | | X |
| Fabaceae | *Macroptilium atropurpureum* | Siratro | - | - | non-native | | | | | | | | | X | | | | | | | X | X |
| Fabaceae | *Pultenaea myrtoides* | Eggs and bacon | LC | - | | X | X | | X | | | | | | | | | | | | | X |
| Fabaceae | *Stylosanthes scabra* | Stylo pea | - | - | non-native | | | | | | | | | | | | | X | | | X | X |
| Goodeniaceae | *Goodenia rotundifolia* | Goodenia | LC | - | | X | X | X | | | | | | | | | | | X | | | X |
| Goodeniaceae | *Velleia spathulata* | Wild pansies | LC | - | | X | | X | | | X | | | | | | X | | | | | X |
| Haemodoraceae | *Haemodorum tenuifolium* | Blood root | LC | - | | X | | X | | | | | | | | | | | | | | X |
| Iridaceae | *Patersonia sericea* | Purple flag | LC | - | | X | | | | | | | | | | | | | | | | X |
| Juncaginaceae | *Triglochin procerum* | Water ribbons | LC | - | | | | | | | | | | | | | | | | | | X |
| Lamiaceae | *Westringia tenuicaulis* | Tufted westringia | LC | - | | | | X | | | | | | | | | | | | | | X |
| Lauraceae | *Cassytha filiformis* | Dodder laurel | LC | - | | X | | | | | | | | | X | | | | X | | | X |
| Laxmanniaceae | *Eustrephus latifolius* | Wombat berry | LC | - | | | | | | | | | | | | | | | X | | | X |
| Laxmanniaceae | *Laxmannia gracilis* | Slender wire lily | LC | - | | X | | | | | | | | | | | | | | | | X |
| Laxmanniaceae | *Lomandra confertifolia* | Small mat rush | LC | - | | X | X | | X | | | X | X | | | | X | | | | | X |
| Laxmanniaceae | *Lomandra longifolia* | Long leaved mat rush | LC | - | | | X | X | | X | | X | | | | | | | | X | | X |
| Laxmanniaceae | *Lomandra multiflora* | Many headed mat rush | LC | - | | X | | | X | | | | X | | X | | X | | | X | | X |
| Malvaceae | *Sida cordifolia* | Flannel weed | - | - | non-native | | X | | | | | | X | X | | | | | X | | X | X |
| Malvaceae | *Sida rhombifolia* | Paddy's lucerne | - | - | non-native | | | | | | | | | X | | | | X | | | X | X |
| Mimosaceae | *Acacia leiocalyx* | Black wattle | LC | - | | X | X | | X | X | X | X | X | X | X | | X | X | X | X | X | X |
| Myrtaceae | *Angophora leiocarpa* | Rusty gum | LC | - | | | | | | | X | X | | | | | | | X | | | X |
| Myrtaceae | *Corymbia intermedia* | Pink bloodwood | LC | - | | X | X | X | X | | | | | | | | | X | | | | X |
| Myrtaceae | *Corymbia trachyphloia* | Brown bloodwood | LC | - | | X | X | | | | X | | X | | X | | X | | | X | | X |
| Myrtaceae | *Eucalyptus exserta* | Queensland peppermint | LC | - | | | | X | | X | | | X | | X | | X | | X | X | | X |
| Myrtaceae | *Eucalyptus latisinensis* | Mahogany | LC | - | | | | X | X | | X | X | X | | X | | X | X | X | X | | X |
| Myrtaceae | *Eucalyptus siderophloia* | Grey ironbark | LC | - | | | | | | | | | | | | | | | X | | | X |
| Myrtaceae | *Eucalyptus tereticornis* | Queensland blue gum | LC | - | | | | | | X | X | | X | | | | | | | | | X |
| Myrtaceae | *Leptospermum polygalifolium* | Tantoon | LC | - | | | | | | X | | | | | | | | | | X | | X |
| Myrtaceae | *Lophostemon suaveolens* | Swamp box | LC | - | | X | | X | | | X | X | X | | | | X | | | X | | X |
| Myrtaceae | *Melaleuca quinquenervia* | Swamp paperbark | LC | - | | X | X | X | | X | | X | X | | X | | | X | | X | X | X |
| Orchidaceae | *Geodorum densiflorum* | Pink nodding orchid | SLC | - | Special least concern species | | | | | | | | | | | | | | | | | X |

| Family | Scientific name | Common name | NC Act | EPBC Act | Comments | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 | Site 11 | Site 12 | Site 13 | Site 14 | Site 15 | Site 16 | Incidental |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Orchidaceae | *Pterostylis nutans* | Greenhood orchid | SLC | - | Special least concern species | X | X | | | X | | | | | | | | | | | | X |
| Oxalidaceae | *Oxalis chnoodes* | Wood sorrel | LC | - | | | | | | | | | | X | | | | | | X | X | X |
| Passifloraceae | *Passiflora subpeltata* | White passionflower | - | - | non-native | X | X | | X | X | | | X | | | | | X | X | X | | X |
| Phyllanthaceae | *Breynia oblongifolia* | Coffee bush | LC | - | | | X | | | | | | X | | | X | | | X | | | X |
| Phyllanthaceae | *Glochidion ferdinandi* | Cheese tree | LC | - | | | | X | | X | | | | | | X | | | | | | X |
| Phyllanthaceae | *Phyllanthus virgatus* | Green phyllanthus | LC | - | | | X | X | X | | | | X | X | X | | | | X | | | X |
| Picrodendraceae | *Petalostigma pubescens* | Quinine tree | LC | - | | X | | | | | | | | | | | | | | | | X |
| Pinaceae | *Pinus elliottii* | Slash pine | - | - | non-native | X | X | | | X | | X | | X | | X | | | | | | X |
| Pittosporaceae | *Pittosporum viscidum* | Black-fruited thornbush | LC | - | | | | | X | | | | | | | | | | | | | X |
| Plantaginaceae | *Limnophila aromatica* | Aromatic limnophila | LC | - | | | | | | | | | | | | | | | | | | X |
| Poaceae | *Alloteropsis semialata* | Cockatoo grass | LC | - | | | X | | X | X | | | | | | | | | X | | | X |
| Poaceae | *Aristida vagans* | Awned grass | LC | - | | X | | | | | X | | | | | | X | X | | | | X |
| Poaceae | *Cymbopogon refractus* | Barbed-wire grass | LC | - | | | | | | X | | | | | | | | | X | | | X |
| Poaceae | *Digitaria brownii* | Finger grass | LC | - | | | | | | | | X | | | | | | | | | | X |
| Poaceae | *Entolasia stricta* | Wiry panic | LC | - | | X | X | | X | X | | | X | | X | | X | | | X | | X |
| Poaceae | *Eragrostis brownii* | Brown's lovegrass | LC | - | | | X | X | X | X | | | X | X | | | X | | | | X | X |
| Poaceae | *Eragrostis curvula* | African lovegrass | - | - | non-native | | | X | | X | | | X | X | | X | | X | | | X | X |
| Poaceae | *Heteropogon contortus* | Black speargrass | LC | - | | X | | | | | | | | | | | X | | | X | | X |
| Poaceae | *Imperata cylindrica* | Blady grass | LC | - | | X | | | | | | X | | X | | | X | X | X | X | | X |
| Poaceae | *Ischaemum australe* | Ischaemum | LC | - | | | | | | | X | X | X | | | | X | | | X | X | X |
| Poaceae | *Melinis repens* | Red natal grass | - | - | non-native | | | | | | | | | X | | | | | | | | X |
| Poaceae | *Oplismenus aemulus* | Creeping shade grass | LC | - | | | | | | | X | | | | | | | | | X | | X |
| Poaceae | *Ottochloa gracillima* | Pademelon grass | LC | - | | | | | | | X | | | | | | | | | X | | X |
| Poaceae | *Sporobolus fertilis* | Giant Parramatta grass | - | - | non-native, RESTRICTED MATTER | | | | | | | | | X | | | | | | | X | X |
| Poaceae | *Urochloa decumbens* | Signal grass | - | - | non-native | | | | | X | | | | X | | | | | | | | X |
| Proteaceae | *Banksia integrifolia* | Coastal banksia | LC | - | | X | X | | X | | | | | | | | | | | | | X |
| Proteaceae | *Banksia robur* | Broad-leaved banksia | LC | - | | | | X | | X | | X | X | | | | | | | | | X |
| Proteaceae | *Grevillea banksii* | Pink grevillea | LC | - | | X | | X | X | | X | | X | | X | | | X | X | X | X | X |
| Proteaceae | *Grevillea leiophylla* | Wallum grevillea | LC | - | | | | | | | | | | | | | X | | | | | X |
| Proteaceae | *Hakea actites* | Wallum hakea | LC | - | | | | | | | | | | | | | X | | | | | X |
| Proteaceae | *Persoonia virgata* | Small-leaved geebung | LC | - | | X | | | | | | | | | | | | | | | | X |
| Proteaceae | *Xylomelum salicinum* | Woody pear | LC | - | | | | | | | | | | | | | | | | | | X |
| Rhamnaceae | *Alphitonia excelsa* | Soap tree | LC | - | | X | X | X | X | X | | X | X | | X | X | | X | X | X | X | X |
| Rubiaceae | *Psydrax odorata* | Hat stand | LC | - | | | | | | | | | | | | | | | X | | | X |
| Solanaceae | *Solanum stelligerum* | Devil's needles | LC | - | | X | | | | | | | | X | | X | | | | | | X |
| Stylidiaceae | *Stylidium graminifolium* | Grassy-leaved trigger-flower | SLC | - | Special least concern species | | | | | | | | | | | | | | | | | X |
| Thymelaeaceae | *Pimelea linifolia* | Rice flower | LC | - | | X | | | | | X | | X | | X | | X | | | | | X |

| Family | Scientific name | Common name | NC Act | EPBC Act | Comments | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 6 | Site 7 | Site 8 | Site 9 | Site 10 | Site 11 | Site 12 | Site 13 | Site 14 | Site 15 | Site 16 | Incidental |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Verbenaceae | *Lantana camara* | Lantana | - | - | non-native, RESTRICTED MATTER | | X | | | | | | | X | | X | | X | | | X | X |
| Verbenaceae | *Verbena litoralis* | Tall verbena | - | - | non-native | | | | | | | | | | | X | | | | | | X |
| Violaceae | *Hybanthus stellarioides* | Spade flower | LC | - | | | | | | | | | | | | | X | X | | | | X |
| Xanthorrhoeaceae | *Xanthorrhoea fulva* | Swamp grasstree | SLC | - | Special least concern species | X | X | X | X | X | X | X | X | | X | | X | | | | | X |
| Xanthorrhoeaceae | *Xanthorrhoea johnsonii* | Grasstree | SLC | - | Special least concern species | | X | | X | | | | | | X | | | | | | | X |

**Table Notes**

- Not listed
LC Least Concern
SLC Special least concern
X Observed

# Appendix D

## Fauna species list

| Class | Family | Scientific name | Common name | NC Act | EPBC Act | Comments |
|---|---|---|---|---|---|---|
| amphibians | Bufonidae | *Rhinella marina* | cane toad | - | - | non-native |
| amphibians | Limnodynastidae | *Platyplectrum ornatum* | ornate burrowing frog | LC | - | |
| birds | Acanthizidae | *Gerygone olivacea* | white-throated gerygone | LC | - | |
| birds | Acanthizidae | *Smicrornis brevirostris* | weebill | LC | - | |
| birds | Artamidae | *Cracticus tibicen* | Australian magpie | LC | - | |
| birds | Artamidae | *Cracticus torquatus* | grey butcherbird | LC | - | |
| birds | Campephagidae | *Coracina novaehollandiae* | black-faced cuckoo-shrike | LC | - | |
| birds | Climacteridae | *Climacteris picumnus* | brown treecreeper | LC | - | |
| birds | Columbidae | *Geopelia humeralis* | bar-shouldered dove | LC | - | |
| birds | Columbidae | *Geopelia striata* | peaceful dove | LC | - | |
| birds | Corcoracidae | *Corcorax melanorhamphos* | white-winged chough | LC | - | |
| birds | Maluridae | *Malurus lamberti* | variegated fairy-wren | LC | - | |
| birds | Meliphagidae | *Lichmera indistincta* | brown honeyeater | LC | - | |
| birds | Meliphagidae | *Manorina melanocephala* | noisy miner | LC | - | |
| birds | Meliphagidae | *Myzomela sanguinolenta* | scarlet honeyeater | LC | - | |
| birds | Meliphagidae | *Philemon corniculatus* | noisy friarbird | LC | - | |
| birds | Meropidae | *Merops ornatus* | rainbow bee-eater | LC | - | |
| birds | Nectariniidae | *Dicaeum hirundinaceum* | mistletoebird | LC | - | |
| birds | Pachycephalidae | *Colluricincla harmonica* | grey shrike-thrush | LC | - | |
| birds | Pachycephalidae | *Pachycephala rufiventris* | rufous whistler | LC | - | |
| birds | Pardalotidae | *Pardalotus striatus* | striated pardalote | LC | - | |
| birds | Petroicidae | *Eopsaltria australis* | eastern yellow robin | LC | - | |
| birds | Rhipiduridae | *Rhipidura albiscapa* | grey fantail | LC | - | |
| birds | Rhipiduridae | *Rhipidura leucophrys* | willie wagtail | LC | - | |
| birds | Timaliidae | *Zosterops lateralis cornwalli* | silvereye (eastern) | LC | - | |
| birds | Dicruridae | *Myiagra cyanoleuca* | Satin flycatcher | SLC | M | - |

| Class | Family | Scientific name | Common name | NC Act | EPBC Act | Comments |
|---|---|---|---|---|---|---|
| mammals | Macropodidae | *Macropus giganteus* | eastern grey kangaroo | LC | - | |
| mammals | Bovidae | *Bos indicus* | zebu | - | - | non-native |
| mammals | Bovidae | *Bos taurus* | European cattle | - | - | non-native |
| ray-finned fishes | Poeciliidae | *Gambusia holbrooki* | mosquitofish | - | - | non-native<br>RESTRICTED MATTER |

**Table Notes**
- Not listed
LC Least Concern

# Appendix E

**State code assessment**

## State Code 16: Native vegetation clearing

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **General** | | |
| **Clearing avoids or minimises impacts** | | |
| **PO1** Clearing and adverse impacts of clearing do not occur unless the application has demonstrated that the clearing and the adverse impacts of clearing have been:<br>reasonably avoided; or<br>reasonably minimised where it cannot be reasonably avoided. | No acceptable outcome is prescribed. | **Complies with performance outcome**<br>Vegetation clearing has been reasonably avoided in high risk areas by positioning the manufacturing facility towards the southern end of the lot where category X vegetation occurs. Clearing has been minimised as much as possible by only clearing areas necessary for construction of infrastructure within the project footprint.<br><br>A preliminary ecological investigation report which was undertaken to determine the ecological values present at the subject site concluded that the clearing of native vegetation at the subject site would not have adverse impacts on local fauna species with mitigation measures implemented. |
| **Clearing on land in particular circumstances** | | |
| **PO2** Clearing is consistent with any notice requiring compliance on the land subject to the development application, unless a better environmental outcome can be achieved.<br><br>Note: The discharge of the vegetation management requirements under the notice requiring compliance can only occur in conjunction with the better environmental outcome being legally secured.<br><br>Further guidance on meeting the requirements of a better environmental outcome can be found in State Development Assessment Provisions Guidance Material: State code 16: Native vegetation clearing, Department of Natural Resources and Mines and Energy, 2019. | No acceptable outcome is prescribed. | **Not applicable**<br>There is no notice affecting the clearing of vegetation on the subject site. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO3** Clearing is consistent with vegetation management requirements for particular regulated areas unless a better environmental outcome can be achieved.<br><br>Note: The discharge of the vegetation management requirements under the notice requiring compliance can only occur in conjunction with the better environmental outcome being legally secured.<br><br>Further guidance on meeting the requirements of a better environmental outcome can be found in State Development Assessment Provisions Guidance Material: State code 16: Native vegetation clearing, Department of Natural Resources and Mines and Energy 2019. | No acceptable outcome is prescribed. | **Not applicable**<br>The subject site is not affected by a particular regulated area. |
| **PO4** Clearing of a legally secured offset area:<br>is consistent with the offset delivery plan; or agreement for the offset area on the land subject to the development application; or<br>only occurs if an additional offset is provided that is consistent with the *Environmental Offsets Act 2014* and the relevant policy in the Queensland Environmental Offsets Policy, Department of Environment and Heritage Protection, 2014.<br><br>Note: Reference to 'agreement' above includes the 'agreed delivery arrangement' for the offset area as well as instruments associated with the legally secured offset area. Clearing should be consistent with any agreement however described. | No acceptable outcome is prescribed. | **Not applicable**<br>The subject site has not been identified as a legally secured offset area under the *Environmental Offsets Act 2014*. |
| **Clearing of vegetation as a result of the material change of use or reconfiguration of a lot** | | |
| **PO5** Clearing as a result of a material change of use, or clearing as a result of reconfiguring a lot does not occur. | No acceptable outcome is prescribed. | **Not applicable**<br>The project is being assessed under a Ministerial Infrastructure Designation therefore the clearing work required for the proposed rollingstock manufacturing facility is considered exempt under Schedule 21 of the Planning Regulation. |
| **Clearing that could already be done under an exemption** | | |
| **PO6** Clearing does not occur unless it is clearing that could be done as exempt clearing work for the purpose of the development (as prescribed under schedule 21 of the Planning Regulation 2017) prior to the material change of use or reconfiguring a lot application being approved. | No acceptable outcome is prescribed. | **Complies with performance outcome**<br>The clearing work required for the proposed rollingstock manufacturing facility is considered exempt under Schedule 21 of the Planning Regulation. A protected plants clearing exemption form has been lodged with the appropriate State Government Department. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **Specific** | | |
| **Clearing associated with wetlands (public safety, relevant infrastructure activities consequential development of IPA approval, a coordinated project, extractive industry)** | | |
| **PO7** Clearing maintains the current extent of vegetation associated with any natural wetland to protect:<br><br>bank stability by protecting against bank erosion; and<br>water quality by filtering sediments, nutrients and other pollutants; and<br>aquatic habitat; and<br>terrestrial habitat. | **AO7.1** Clearing does not occur in a natural wetland or within 100 metres of the defining bank of any natural wetland.<br><br>OR | **Complies with Acceptable Outcome AO7.3**<br>Vegetation clearing will occur within 10m of a natural wetland with vegetation of mid-dense structure category. This will occur for access tracks, the test loop track and associated infrastructure.<br><br>Vegetation will be avoided where possible within 20m of the waterway mapped in the north of the project footprint. Where infrastructure is proposed within this area, fauna movement along the riparian corridor is to be maintained, with particular attention to Wallum froglet and Koala.<br><br>Clearing will be undertaken in such a way that protects bank stability, water quality, aquatic habitat, and terrestrial habitat outside of the project footprint. |
| | **AO7.2** Clearing within 100 metres of the defining bank of any natural wetland:<br>does not occur within 10 metres of the defining bank of any natural wetland; and<br>does not exceed widths in table 16.3.1 in this code.<br><br>OR | |
| | **AO7.3** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with a natural wetland (matter of state environmental significance). | |
| **Clearing associated with wetlands (necessary to control non-native plants or declared pests, encroachment, managing thickened vegetation, fodder harvesting)** | | |
| **PO8** Clearing maintains vegetation associated with a natural wetland to protect:<br>bank stability by protecting against bank erosion; and<br>water quality by filtering sediments, nutrients and other pollutants; and<br>aquatic habitat; and<br>terrestrial habitat. | *Clearing necessary to control non-native plants or declared pests:*<br><br>**AO8.1** Mechanical clearing does not occur in any of the following areas, unless it is required to provide necessary access to control non-native plants or declared pests:<br>inside the defining bank of any natural wetland; and<br>within 20 metres of the defining bank of any natural wetland.<br>AND | **Not applicable**<br>The proposed clearing is not associated with controlling non-native plants, declared pests, encroachment, thickened vegetation, or fodder harvesting. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO8.2** Clearing to provide necessary access to control non-native plants or declared pests only occurs where:<br>clearing does not exceed five metres in width; and<br>clearing retains all mature trees and habitat trees; and<br>the access track:<br>a. runs parallel to a natural wetland and clearing is not within 10 metres of the defining bank of a natural wetland; or<br>b. is required to provide access across the wetland.<br><br>AND | |
| | **AO8.3** Chemical clearing retains:<br>all mature trees; and<br>all habitat trees; and<br>at least 50 per cent of immature trees in each 50 metre by 50 metre area.<br><br>AND | |
| | **AO8.4** Root absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a natural wetland:<br>100 metres; or<br>the distance specified on the approved product label; or<br>the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.<br><br>AND | |
| | **AO8.5** Aerial application of a foliar herbicide does not occur within whichever is the greater distance from the defining bank of a natural wetland;<br>50 metres; or<br>the distance specified for wetlands on the approved product label; or<br>the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.<br><br>AND | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | *Clearing for managing thickened vegetation*:<br><br>**AO8.6** Mechanical clearing does not occur in any of the following areas:<br>inside the defining bank of a natural wetland; and<br>within 20 metres of the defining bank of a natural wetland.<br><br>AND | |
| | *Clearing for encroachment*:<br><br>**AO8.7** Mechanical clearing does not occur in any of the following areas:<br>1. inside the defining bank of any natural wetland; and<br>2. within 20 metres of the defining bank of any natural wetland.<br><br>AND | |
| | **AO8.8** Root absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a natural wetland<br>100 metres; or<br>the distance specified on the approved product label; or<br>the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.<br><br>AND | |
| | *Clearing for fodder harvesting*:<br><br>**AO8.9** Mechanical clearing does not occur in any of the following areas:<br>inside the defining bank of any natural wetland; and<br>within 20 metres of the defining bank of any natural wetland.<br><br>AND | **Not applicable**<br>The proposed clearing is not associated with controlling non-native plants, declared pests, encroachment, thickened vegetation, or fodder harvesting. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO8.10** Mechanical clearing that is strip harvesting or block harvesting does not occur in any of the following areas:<br>inside the defining bank of any natural wetland; and<br>within 100 metres of the defining bank of any natural wetland. | **Not applicable**<br>The proposed clearing is not associated with controlling non-native plants, declared pests, encroachment, thickened vegetation, or fodder harvesting. |
| **Clearing associated with wetlands (necessary environmental clearing – land restoration and natural disaster preparation)** | | |
| **PO9** Clearing maintains vegetation associated with any natural wetland or rehabilitates the cleared area to protect:<br>bank stability by protecting against bank erosion; and<br>water quality by filtering sediments, nutrients and other pollutants; and<br>aquatic habitat; and<br>terrestrial habitat. | **AO9.1** Clearing does not occur in any of the following areas:<br>inside the defining bank of any natural wetland; and<br>within 100 metres of the defining bank of any natural wetland.<br><br>OR | **Not applicable**<br>The proposed clearing is not associated with necessary environmental clearing, land restoration or natural disaster preparation. |
| | **AO9.2** Clearing within 100 metres of the defining bank of any natural wetland only occurs where:<br>1. clearing does not exceed 0.5 hectares; and<br>2. clearing retains all mature trees and habitat trees; and<br>3. clearing that is for flood preparation complies with all of the following:<br>clearing is undertaken by felling only; and:<br>clearing does not exceed 100 square metres; and<br>clearing does not occur outside the defining banks of a natural wetland; and<br>clearing does not occur within 50 metres of other clearing for flood preparation.<br><br>OR | |
| | **AO9.3** Clearing to provide necessary access to undertake necessary environmental clearing only occurs where clearing:<br>1. does not exceed 10 metres in width; and<br>2. retains all mature trees and habitat trees; and<br>3. the access track:<br>a. runs parallel to a natural wetland and clearing is not within 10 metres of the defining bank of a natural wetland; or<br>b. is required to provide access across the wetland.<br>OR | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO9.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated. | |
| **Clearing associated with wetlands (necessary environmental clearing - natural channel diversion and contaminants removal)** | | |
| **PO10** Clearing maintains the current extent of vegetation associated with any natural wetland or rehabilitates the cleared area to protect:<br>bank stability by protecting against bank erosion; and<br>water quality by filtering sediments, nutrients and other pollutants; and<br>aquatic habitat; and<br>terrestrial habitat. | **AO10.1** Clearing does not occur in any of the following areas:<br>inside the defining bank of any natural wetland; and<br>within 100 metres of the defining bank of any natural wetland.<br><br>OR | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility is not for the purpose of necessary environmental clearing, natural channel diversion, or the removal of contaminants. |
| | **AO10.2** Clearing within 100 metres of the defining bank of any natural wetland only occurs where:<br>clearing does not exceed 0.5 hectares; and<br>clearing retains all mature trees and habitat trees.<br><br>OR | |
| | **AO10.3** Clearing to provide necessary access to undertake necessary environmental clearing only occurs where clearing:<br>does not exceed 10 metres in width; and<br>retains all mature trees and habitat trees; and<br>the access track:<br>runs parallel to a natural wetland and clearing is not within 10 metres of the defining bank of a natural wetland; or<br>is required to provide access across the wetland.<br><br>OR | |
| | **AO10.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.<br><br>OR | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO10.5** Where clearing is for natural channel diversion or contaminants removal, and clearing cannot be reasonably avoided, and:<br>clearing has been reasonably minimised; and<br>the cleared area cannot be reasonably rehabilitated,<br>an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with a natural wetland (a matter of state environmental significance). | |
| **Clearing associated with watercourses and drainage features (public safety, relevant infrastructure activities, consequential development of IPA approval, coordinated project, extractive industry)** | | |
| **PO11** Clearing maintains the current extent of vegetation associated with any watercourse or drainage feature to protect:<br>1. bank stability by protecting against bank erosion; and<br>2. water quality by filtering sediments, nutrients and other pollutants; and<br>3. aquatic habitat; and<br>4. terrestrial habitat. | **AO11.1** Clearing does not occur in any of the following areas:<br>inside the defining bank of a watercourse or drainage feature; and<br>within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code.<br><br>OR | **Complies with Acceptable Outcome AO11.3**<br>Vegetation clearing will occur within 10m of a stream order 1 drainage feature. This will occur for access tracks, the test loop track and associated infrastructure.<br><br>Vegetation will be avoided where possible within 20m of the waterway mapped in the north of the project footprint. Where infrastructure is proposed within this area, fauna movement along the riparian corridor is to be maintained, with particular attention to Wallum froglet and Koala.<br><br>Clearing will be undertaken in such a way that protects bank stability, water quality, aquatic habitat, and terrestrial habitat outside of the project footprint. |
| | **AO11.2** Clearing within any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code:<br>does not exceed the widths in table 16.3.1 of this code; and<br>does not occur within 10 metres of the defining bank, unless clearing is required into or across the watercourse or drainage feature.<br><br>OR | |
| | **AO11.3** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with any watercourse or drainage feature (a matter of state environmental significance). | |
| **Clearing associated with watercourses and drainage features (necessary environmental clearing- land restoration and natural disaster preparation)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO12** Clearing maintains vegetation associated with any watercourse or drainage feature or rehabilitates the cleared area to protect:<br>1. bank stability by protecting against bank erosion; and<br>2. water quality by filtering sediments, nutrients and other pollutants; and<br>3. aquatic habitat; and<br>4. terrestrial habitat. | **AO12.1** Clearing does not occur in any of the following areas:<br>inside the defining bank of a watercourse or drainage feature; and<br>within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code.<br><br>OR | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility does not involve clearing associated with watercourses and drainage features for necessary environmental clearing, land restoration and natural disaster preparation. |
| | **AO12.2** Clearing in any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code only occurs where:<br>clearing does not exceed 0.5 hectares; and<br>clearing retains all mature trees and habitat trees; and<br>clearing that is for flood preparation complies with all of the following:<br>clearing is undertaken by felling only; and<br>clearing does not exceed 100 square metres; and<br>clearing does not occur outside of the defining bank of any watercourse or drainage feature; and<br>clearing does not occur within 50 metres of other clearing for flood preparation.<br><br>OR | |
| | **AO12.3** Clearing to provide necessary access to undertake necessary environmental clearing only occurs where clearing:<br>does not exceed 10 metres in width; and<br>retains all mature trees and habitat trees; and<br>the access track:<br>runs parallel to a watercourse or drainage feature and clearing is not within 10 metres of the defining bank of a watercourse or drainage feature; or<br>is required to provide access across the watercourse or drainage feature. | |
| | **AO12.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated. | |
| **Clearing associated with watercourses and drainage features (necessary environmental clearing – natural channel diversion, and contaminants removal)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO13** Clearing maintains the current extent of vegetation associated with any watercourse or drainage feature or rehabilitates the cleared area to protect:<br>1. bank stability by protecting against bank erosion; and<br>2. water quality by filtering sediments, nutrients and other pollutants; and<br>3. aquatic habitat; and<br>4. terrestrial habitat. | **AO13.1** Clearing does not occur within any of the following areas:<br>inside the defining bank of a watercourse or drainage feature; and<br>within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code.<br><br>OR | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility will not be associated with watercourses and drainage features for necessary environmental clearing, natural channel diversion, or the removal of contaminants. |
| | **AO13.2** Clearing in any watercourse or drainage feature, or within the relevant distance of the defining bank of any watercourse or drainage feature in table 16.3.2 of this code only occurs where:<br>clearing does not exceed 0.5 hectares; and<br>clearing retains all mature trees and habitat trees.<br><br>OR | |
| | **AO13.3** Clearing to provide necessary access to undertake necessary environmental clearing only occurs where:<br>clearing does not exceed 10 metres in width; and<br>clearing retains all mature trees and habitat trees; and<br>the access track:<br>runs parallel to a watercourse or drainage feature and clearing is not within 10 metres of the defining bank of a watercourse or drainage feature; or<br>is required to provide access across the watercourse or drainage feature.<br><br>OR | |
| | **AO13.4** Where clearing cannot be reasonably avoided, and:<br>clearing has been reasonably minimised; and<br>the cleared area cannot be reasonably rehabilitated, an offset is provided for any acceptable significant residual impact from clearing of vegetation associated with a watercourse or drainage feature (a matter of state environmental significance). | |
| **Clearing associated with watercourses or drainage features (necessary to control non-native plants or declared pests, managing thickened vegetation, fodder harvesting)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO14** Clearing maintains vegetation associated with any watercourse or drainage feature to protect:<br>bank stability by protecting against bank erosion; and<br>water quality by filtering sediments, nutrients and other pollutants; and<br>aquatic habitat; and<br>terrestrial habitat. | *Clearing necessary to control non-native plants or declared pests:*<br><br>**AO14.1** Mechanical clearing does not occur in any of the following areas, unless it is required to provide necessary access to control non-native plants or declared pests:<br>inside the defining bank of any watercourse or drainage feature; and<br>within 10 metres of the defining bank of a watercourse or drainage feature that is a stream order 1 or 2 watercourse or drainage feature; and<br>within 15 metres of the defining bank of a watercourse or drainage feature that is a stream order 3 or 4 watercourse or drainage feature; and<br>within 20 metres of the defining bank of a watercourse or drainage feature that is a stream order 5 or more watercourse or drainage feature.<br><br>AND | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility is not associated with clearing for watercourses and drainage features, the control of non-native plants or declared pests, the management of thickened vegetation or fodder harvesting. |
| | **AO14.2** Clearing to provide necessary access to control non-native plants or declared pests only occurs where:<br>clearing does not exceed five metres in width; and<br>clearing retains all habitat trees and mature trees; and<br>the access track:<br>runs parallel to the watercourse or drainage feature and is not within 10 metres of the defining bank of the watercourse or drainage feature; or<br>is required to provide access across the watercourse or drainage feature.<br><br>AND | |
| | **AO14.3** Chemical clearing retains all of the following:<br>1. mature trees; and<br>2. habitat trees; and<br>3. at least 50 per cent of immature trees in any 50 metre by 50 metre area. | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO14.4** Root absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a watercourse or drainage feature:<br>1. 100 metres; or<br>2. any distance specified on the approved product label; or<br>3. the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.<br><br>AND | |
| | **AO14.5** Aerial application of a foliar herbicide does not occur within whichever is the greater distance from the defining bank of a watercourse or drainage feature:<br>1. 50 metres; or<br>2. any distance specified on the approved product label; or<br>3. the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority.<br><br>AND | |
| | *Clearing for managing thickened vegetation*:<br><br>**AO14.6** Mechanical clearing does not occur in any of the following areas:<br>inside the defining bank of any watercourse or drainage feature;<br>within 10 metres of the defining bank of a watercourse or drainage feature that is a stream order 1 or 2 watercourse or drainage feature;<br>within 15 metres of the defining bank of a watercourse or drainage feature that is a stream order 3 or 4 watercourse or drainage feature;<br>within 20 metres of the defining bank of a watercourse or drainage feature that is a stream order 5 or more watercourse or drainage feature.<br><br>AND | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | *Clearing for fodder harvesting*:<br><br>**AO14.7** Mechanical clearing does not occur in any of the following areas:<br>inside the defining bank of any watercourse or drainage feature; and<br>within 20 metres of the defining bank of any watercourse or drainage feature.<br><br>AND | |
| | **AO14.8** Mechanical clearing that is strip harvesting or block harvesting does not occur in any of the following areas:<br>inside the defining bank of any watercourse or drainage feature; and<br>within 100 metres of the defining bank of any watercourse or drainage feature. | |
| **Clearing associated with watercourses or drainage features (encroachment)** | | |
| **PO15** Clearing of encroachment maintains:<br>1. bank stability by protecting against bank erosion; and<br>2. water quality by filtering sediments, nutrients and other pollutants; and<br>3. aquatic habitat; and<br>4. terrestrial habitat. | **AO15.1** Mechanical clearing does not occur in any of the following areas:<br>inside the defining bank of any watercourse or drainage feature; and<br>within 10 metres of the defining bank of a watercourse or drainage feature that is a stream order 1 or 2 watercourse or drainage feature; and<br>within 15 metres of the defining bank of a watercourse or drainage feature that is a stream order 3 or 4 watercourse or drainage feature; and<br>within 20 metres of the defining bank of a watercourse or drainage feature that is a stream order 5 or more watercourse or drainage feature.<br><br>AND | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility is not associated with encroachment on watercourses or drainage features. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO15.2** Root-absorbed broad spectrum herbicides are not applied within whichever is the greater distance from the defining bank of a watercourse or drainage feature:<br>100 metres; or<br>any distance specified on the approved product label; or the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. | |
| **Maintaining connectivity (public safety, relevant infrastructure activities, consequential development of IPA approval, extractive industry)** | | |
| **PO16** In consideration of vegetation on the land subject to the development application and on adjacent land, sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes. | **AO16.1** Clearing occurs in accordance with table 16.3.3 in this code. | **Complies with performance outcome** |
| **Connectivity areas (coordinated project)** | | |
| **PO17** In consideration of vegetation on the land subject to the development application and on adjacent land:<br>1. sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes; or<br>2. where this not reasonably possible, the applicant provides an offset. | **AO17.1** Clearing occurs in accordance with table 16.3.3 of this code.<br><br>OR<br><br>**AO17.2** Where clearing cannot be reasonably avoided; and clearing has been reasonably minimised; an offset is provided for any acceptable significant residual impact from clearing of vegetation that forms a connectivity area (a matter of state environmental significance). | **Complies with Acceptable Outcome AO17.2**<br>Clearing has been reasonably avoided and minimised where possible. The DES 'landscape fragmentation and connectivity' tool has been applied to the project footprint and determined that any impact on connectivity areas is not significant (0.95%).<br><br>Clearing will be carried out only where construction of infrastructure is required. Additionally, multiple areas within and adjacent to the project footprint will be rehabilitated back to remnant status. |
| **Maintaining connectivity (necessary environmental clearing - land restoration and natural disaster preparation)** | | |
| **PO18** In consideration of vegetation on the land subject to the development application and on adjacent land, sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes, or where this is not reasonably possible, the cleared area is rehabilitated. | **AO18.1** Clearing occurs in accordance with table 16.3.3 of this code.<br><br>OR<br><br>**AO18.2** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated. | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility is not associated with necessary environmental clearing. |
| **Connectivity areas (necessary environmental clearing – natural channel diversion and contaminants removal)** | | |
| **PO19** In consideration of vegetation on the land subject to the development application and on adjacent land: | **AO19.1** Clearing occurs in accordance with table 16.3.3 of this code.<br><br>OR | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility is not associated with necessary environmental clearing. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| 1. sufficient vegetation is retained to maintain ecological processes and remains in the landscape despite threatening processes; or<br>2. where this is not reasonably possible, the applicant rehabilitates the cleared area; or<br>3. where this not reasonably possible, the applicant provides an offset. | **AO19.2** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.<br><br>OR<br><br>**AO19.3** Where clearing cannot be reasonably avoided, and:<br>clearing has been reasonably minimised; and<br>the cleared area cannot be reasonably rehabilitated<br>an offset is provided for any acceptable significant residual impact from clearing of vegetation that forms a connectivity area (a matter of state environmental significance). | |
| **Soil erosion (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act approval, coordinated project, necessary environmental clearing)** | | |
| **PO20** Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application. | **AO20.1** Clearing only occurs if an erosion and sediment control plan is developed and implemented to:<br>prevent accelerated soil erosion; or<br>where prevention is not possible, minimise accelerated soil erosion.<br><br>OR<br><br>**AO20.2** The local government is the assessment manager for the development application. | **Complies with performance outcome**<br>Clearing will be conducted under a construction environmental management plan, which will contain management measures to reduce the possibility of erosion at the subject site. |
| **Soil erosion (necessary to control non-native plants or declared pests, managing thickened vegetation, encroachment, fodder harvesting)** | | |
| **PO21** Clearing does not result in accelerated soil erosion within or outside the land subject of the development application. | **AO21.1** Clearing only occurs where recognised best practice methods are employed to:<br>prevent increased soil erosion resulting from the clearing; and<br>stabilise soil erosion which would result from clearing; and<br>prevent increased sediment run-off entering a wetland, watercourse or drainage feature as a result of the clearing.<br><br>AND | **Not applicable**<br>The clearing proposed for the rollingstock manufacturing facility is not associated with necessary environmental clearing. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | *Clearing necessary to control non-native plants or declared pests*:<br><br>**AO21.2** Mechanical clearing:<br>1. does not occur on a slope greater than 15 percent; and<br>2. in each 50 by 50 metre area (0.25 hectares), retains 50 per cent of the ground cover and does not disturb more than 50 per cent of the ground cover.<br><br>AND | |
| | **AO21.3** New access tracks required to provide necessary access to control a non-native plant or declared pests do not exceed five metres in width or de-stabilise the banks of any watercourse or drainage feature as a result of crossing, construction or use<br><br>AND | |
| | *Clearing for managing thickened vegetation*:<br><br>**AO21.4** Mechanical clearing does not:<br>1. occur in a regional ecosystem in table 16.3.4 of this code that states 'mechanical clearing not permitted';<br>2. disturb more than 50 per cent of the ground surface or result in any hectare having less than 50 per cent ground cover;<br>3. occur on a slope greater than five per cent; and<br>4. occur within 50 metres of an area of existing accelerated soil erosion.<br><br>AND | |
| | *Clearing for encroachment*:<br><br>**AO21.5** Mechanical clearing does not occur in any of the following areas:<br>within 50 metres of an area of soil erosion; and<br>slopes greater than 5 per cent.<br><br>AND | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | *Clearing for fodder harvesting:*<br><br>**AO21.6** Mechanical clearing does not occur on a slope greater than five percent.<br><br>OR | |
| | **AO21.7** Mechanical clearing does not occur within 50 metres of an areas of soil erosion and instability. | |
| **Salinity (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry, necessary environmental clearing, encroachment, fodder harvesting)** | | |
| **PO22** Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater, surface water or soil. | **AO22.1** Clearing does not occur within 100 metres of a salinity expression area. | **Complies with performance outcome**<br>Clearing will be carried out under a construction environmental management plan, which will aim to avoid land degradation as a result of the clearing. |
| **Conserving endangered and of concern regional ecosystems (public safety and relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry)** | | |
| **PO23** Clearing maintains the current extent of endangered regional ecosystems and of concern regional ecosystems. | **AO23.1** Clearing does not occur in an endangered regional ecosystem or an of concern regional ecosystem.<br><br>OR | **Complies with Accepted Outcome 23.1**<br>The regional ecosystems mapped over the site are least concern under the *Vegetation Management Act 1999*. |
| | **AO23.2** Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed the widths prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO23.3** Total clearing of endangered regional ecosystems and of concern regional ecosystems combined does not exceed areas prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO23.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of endangered regional ecosystems and of concern regional ecosystems (a matter of state environmental significance). | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **Essential habitat (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry, fodder harvesting)** | | |
| **PO24** Clearing maintains the current extent of essential habitat. | **AO24.1** Clearing does not occur in essential habitat.<br><br>OR | **Complies with Accepted Outcome 24.4**<br>To facilitate construction of the Project approximately 4.76 ha of essential habitat will be cleared and will therefore exceed the widths prescribed in Table 16.3.1 of this code.<br>Clearing will be carried out only where construction of infrastructure is required. Additionally, multiple areas within and adjacent to the project footprint will be rehabilitated back to remnant status. |
| | **AO24.2** Clearing in essential habitat does not exceed the widths prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO24.3** Clearing in essential habitat does not exceed the areas prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO24.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, an offset is provided for any acceptable significant residual impact from clearing of essential habitat (a matter of state environmental significance). | |
| **Essential habitat (necessary environmental clearing – land restoration and natural disaster preparation)** | | |
| **PO25** Clearing does not occur in essential habitat, or where this is not reasonably possible, the applicant rehabilitates the cleared area. | **AO25.1** Clearing does not occur in essential habitat.<br><br>OR | **Not applicable**<br>The proposed clearing is not for the purposes of necessary environmental clearing, land restoration, or natural disaster preparation. |
| | **AO25.2** Clearing in essential habitat does not exceed the widths prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO25.3** Clearing in essential habitat does not exceed the areas prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO25.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated. | |
| **Essential habitat (necessary environmental clearing – natural channel diversion and contaminants removal)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO26** Clearing does not occur in essential habitat, or where this is not reasonably possible, the applicant rehabilitates the cleared area, or maintains the current extent of essential habitat. | **AO26.1** Clearing does not occur in essential habitat.<br><br>OR | **Not applicable**<br>The proposed clearing is not for the purposes of necessary environmental clearing, natural channel diversions or the removal of contaminants. |
| | **AO26.2** Clearing in essential habitat does not exceed the widths prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO26.3** Clearing in essential habitat does not exceed the areas prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO26.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated.<br><br>OR | |
| | **AO26.5** Where clearing cannot be reasonably avoided, and:<br>1. clearing has been reasonably minimised; and<br>2. the cleared area cannot be reasonably rehabilitated<br>an offset is provided for any acceptable significant residual impact from clearing of essential habitat (a matter of state environmental significance). | |
| **Acid sulfate soils (public safety, relevant infrastructure activities, consequential development of Integrated Planning Act 1997 approval, coordinated project, extractive industry, necessary environmental clearing, necessary to control non-native plants or declared pests, managing thickened vegetation, encroachment)** | | |
| **PO27** Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either of the following:<br>aeration of horizons containing iron sulphides; or | **AO27.1** Clearing does not occur in land zone 1, land zone 2 or land zone 3.<br><br>OR | **Complies with performance outcome**<br>The subject site is mapped as having an extremely low probability of acid sulfate occurrence. The proposed clearing work is considered unlikely to result in or accelerate |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| mobilisation of acid or metals. | **AO27.2** Clearing in land zone 1, land zone 2 or land zone 3 in areas below the five metre Australian Height Datum only occurs where:<br>mechanical clearing does not disturb the soil to a depth greater than 30 centimetres; and<br>acid sulfate soils are managed consistent with the State Planning Policy, Department of Infrastructure, Local Government and Planning, July 2017, and with the soil management guidelines in the Queensland Acid Sulfate Soil Technical Manual, Department of Science Information Technology Innovation and the Arts, 2014.<br><br>OR | the disturbance of acid sulfate soils or hydrology of the subject site. |
| | **AO27.3** The local government is the assessment manager for the development application. | |
| **Clearing is staged (extractive industry)** | | |
| **PO28** Clearing:<br>is staged in line with operational needs that restrict clearing to the current operational area; and<br>only occurs in the area from which material will be extracted, and any reasonably associated built infrastructure, within the term of the development approval; and<br>does not occur without required permits. | No acceptable outcome is prescribed. | **Not applicable**<br>The proposed clearing is not for the purpose of an extractive industry. |
| **Coordinated project – involving clearing for agriculture** | | |
| **PO29** Clearing only occurs where the land is suitable for agriculture having regard to topography, climate and soil attributes. | No acceptable outcome is prescribed. | **Not applicable**<br>The proposed clearing work is not for agricultural purposes. |
| **PO30** For applications for irrigated crops, the owner of the land has, or may have, access to enough water for establishing, cultivating and harvesting the crops to which the clearing relates. | No acceptable outcome is prescribed. | **Not applicable**<br>The proposed clearing work is not for agricultural purposes. |
| **Clearing for necessary environmental clearing – land restoration and natural disaster preparation** | | |
| **PO31** Clearing does not occur, or where this is not reasonably possible, the applicant rehabilitates the cleared area. | **AO31.1** Clearing retains all of the following:<br>habitat trees;<br>mature trees; and<br>the natural floristic composition and range of sizes across the application area.<br><br>OR | **Not applicable**<br>The proposed clearing is not for the purposes of necessary environmental clearing, land restoration, or natural disaster preparation. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO31.2** Clearing is for the purpose of natural disaster preparation and does not exceed the widths prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO31.3** Clearing is for the purpose of natural disaster preparation and does not exceed the areas prescribed in table 16.3.1 of this code.<br><br>OR | |
| | **AO31.4** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the cleared area is rehabilitated. | |
| **Clearing for necessary environmental clearing - natural channel diversion and contaminants removal** | | |
| **PO32** Clearing does not occur, or where this is not reasonably possible, the applicant rehabilitates the cleared area or maintains the current extent of vegetation. | **AO32.1** Clearing retains all of the following:<br>1. habitat trees;<br>2. mature trees; and<br>3. the natural floristic composition and range of sizes across the application area.<br><br>OR | **Not applicable**<br>The proposed clearing is not for necessary environmental clearing, natural channel diversion of the removal of contaminants. |
| | **AO32.2** Where clearing cannot be reasonably avoided, and clearing has been reasonably minimised, the regional ecosystem is rehabilitated.<br><br>OR | |
| | **AO32.3** Where clearing an endangered regional ecosystem or of concern regional ecosystem cannot be reasonably avoided, minimised or rehabilitated, an offset is provided for any acceptable significant residual impact from clearing of an endangered regional ecosystem or of concern regional ecosystem (a matter of state environmental significance). | |
| **Conserving remnant vegetation that are regional ecosystems (necessary to control non-native plants or declared pests)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO33** Clearing activities:<br>maintain the natural floristic composition and range of sizes of each species of the regional ecosystem evenly spaced across the application area; and<br>retain all habitat and mature trees. | **AO33.1** Mechanical clearing:<br>1. only occurs within 1.5 metres from the edge of the canopy of individual non-native plants, unless the clearing is required to provide necessary access to control a non-native plant or declared pest; and<br>2. does not occur using two machines linked by chain or cable; and<br>3. retains all habitat trees and mature trees.<br><br>AND | **Not applicable**<br>The proposed clearing is not for the purposes of necessary environmental clearing or control of non-native plants or declared pests. |
| | **AO33.2** Clearing to provide necessary access to control non-native plants or declared pests does not exceed five metres in width.<br><br>AND | |
| | **AO33.3** Any regional ecosystem burn is undertaken in accordance with the fire guideline for the regional ecosystem, as outlined in the Regional Ecosystem Description Database (REDD).<br><br>AND | |
| | **AO33.4** Chemical clearing retains all of the following:<br>mature trees; and<br>habitat trees; and<br>at least 50 per cent of immature trees in each 50 metre by 50 metre area.<br><br>AND | |
| | **AO33.5** Aerial application of a root-absorbed broad spectrum herbicides does not occur.<br><br>AND | |
| | **AO33.6** Root-absorbed broad spectrum herbicides are not applied within whichever distance is the greater from a mature tree or a habitat tree;<br>30 metres; or<br>the distance specified on the approved product label; or<br>the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. | |
| **Restoring the regional ecosystem (managing thickened vegetation)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO34** Clearing activities:<br>restore the natural floristic composition and range of sizes of each species of the regional ecosystem evenly spaced across the application area; and<br>retain mature trees, habitat trees and tall immature trees and thickets. | **AO34.1** Clearing does not occur in thickets.<br><br>AND | **Not applicable**<br>The proposed clearing is not for the purposes of restoring a regional ecosystem or managing thickened vegetation |
| | **AO34.2** Clearing retains:<br>all mature trees and habitat trees;<br>a full range of sizes and species typical of the regional ecosystem in the area; and<br>where the number of mature trees plus habitat trees is less than 20 per hectare, tall immature trees to total 20 mature trees, habitat trees and tall immature trees per hectare.<br><br>AND | |
| | **AO34.3** Clearing does not result in debris stacked or pushed against a mature tree, habitat tree or tall immature tree.<br><br>AND | |
| | **AO34.4** If clearing immature trees, retain immature trees in each 50 metre by 50 metre area to at least the density specified in table 16.3.4 of this code. | |
| | **AO34.5** If clearing low shrubs:<br>in regional ecosystems where clearing is restricted to low shrubs as specified in table 16.3.4 of this code – clearing retains all immature trees;<br>in regional ecosystems where clearing is not restricted to low shrubs as specified in table 16.3.4 of this code – clearing retains at least the number of immature trees specified in table 16.3.4 of this code; and<br>clearing retains at least 10 per cent of the predominate species that have thickened.<br><br>AND | |
| | **AO34.6** Mechanical clearing does not occur within 5 metres of the trunk of a mature tree, habitat tree or tall immature tree.<br><br>AND | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO34.7** Clearing is not undertaken by:<br>aerial application of any herbicide;<br>application of a root-absorbed broad spectrum herbicide.<br><br>AND | |
| | **AO34.8** Chemical clearing does not occur within five metres of the trunk of a mature tree, habitat tree or tall immature tree.<br><br>AND | |
| | **AO34.9** Any regional ecosystem burn is undertaken in accordance with the fire guideline for the regional ecosystem, as outlined in the Regional Ecosystem Description Database (REDD). | |
| **Clearing limited to specific regional ecosystems and specific clearing methods (managing thickened vegetation)** | | |
| **PO35** Clearing must be for the purpose of restoring the remnant regional ecosystem and only occur if all of the following apply:<br>1. clearing is in regional ecosystems prescribed in table 16.3.4 of this code; and<br>2. clearing is in accordance with the clearing restrictions for the regional ecosystem prescribed in table 16.3.4 of this code, retain mature trees, habitat trees and tall immature trees and thickets. | No acceptable outcome is prescribed. | **Not applicable**<br>The proposed clearing is not limited to specific regional ecosystems or managing thickened vegetation |
| **Clearing limited to specific regional ecosystems (encroachment)** | | |
| **PO36** Clearing of encroachment does not occur, other than in the regional ecosystems listed in table 16.3.5 of this code. | No acceptable outcome is prescribed. | **Not applicable**<br>The proposed clearing is not limited to specific regional ecosystems |
| **Conserving vegetation (encroachment)** | | |
| **PO37** Clearing activities:<br>result in the restoration of the regional ecosystem; and<br>retain all habitat trees; and<br>retain all groves; and<br>retain species which make up the natural floristic composition of the regional ecosystem, distributed in a natural pattern. | **AO37.1** Clearing retains all of the following:<br>all mature trees; and<br>all habitat trees; and<br>all woody vegetation within a grove, unless it is undertaken by a regional ecosystem burn.<br><br>AND | **Not applicable**<br>The proposed clearing is not for the purpose of conserving vegetation or encroachment. |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO37.2** Any regional ecosystem burn is undertaken in accordance with the fire guideline for the regional ecosystem, as outlined in the Regional Ecosystem Description Database (REDD).<br><br>AND | |
| | **AO37.3** Clearing does not result in debris being stacked or pushed against a mature tree or a habitat tree.<br><br>AND | |
| | **AO37.4** Mechanical clearing does not occur within 10 metres of a mature tree or a habitat tree.<br><br>AND | |
| | **AO37.5** Aerial application of a herbicide does not occur.<br><br>AND | |
| | **AO37.6** Chemical clearing does not occur within five metres of a mature tree or a habitat tree.<br><br>AND | |
| | **AO37.7** Root-absorbed broad spectrum herbicides are not applied in any of the following areas:<br>regional ecosystems 11.4.11 and 11.8.11; and<br>within whichever is the greater distance from a mature tree or a habitat tree:<br>10 metres; or<br>the distance specified by the approved product label; or<br>the safety and use conditions specified by the Australian Pesticides and Veterinary Medicines Authority; and<br>within whichever is the greater distance from a grove:<br>30 metres; or<br>the distance specified by the approved product label; or<br>the distance specified in the safety and use conditions issued by the Australian Pesticides and Veterinary Medicines Authority. | |
| **Limits to clearing for fodder harvesting (fodder harvesting)** | | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **PO38** Clearing is limited to:<br>the extent necessary to provide fodder for stock; and<br>areas where the stock is located, and the stock have sufficient water. | No acceptable outcome is prescribed. | **Not applicable**<br>No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility. |
| **PO39** Clearing must only occur:<br>in regional ecosystems listed in table 16.3.6 or table 16.3.7 of this code; and<br>in accordance with the harvesting method limitations for the regional ecosystem listed in table 16.3.6 or table 16.3.7 of this code. | No acceptable outcome is prescribed. | **Not applicable**<br>No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility. |
| **PO40** Clearing consists predominantly of fodder species. | No acceptable outcome is prescribed. | **Not applicable**<br>No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility. |
| **Conserving vegetation (fodder harvesting)** | | |
| **PO41** Clearing is carried out in a way that conserves:<br>remnant vegetation in perpetuity; and<br>the regional ecosystem in which the vegetation is situated. | **AO41.1** Clearing does not result in the removal of non-fodder species with a height of four metres or more.<br><br>AND | **Not applicable**<br>No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility. |
| | **A042.2** Selective harvesting:<br>retains all non-fodder species except where the damage is an unavoidable consequence of clearing the selected fodder tree; and<br>when using a chainsaw in regional ecosystems listed in table 16.3.6 of this code, retains at least one fodder tree for every fodder tree cleared; and<br>in least concern regional ecosystems listed in table 16.3.7 of this code, retains at least one fodder tree for each fodder tree cleared; and<br>in of concern regional ecosystems listed in table 16.3.7 of this code, retains at least two fodder trees for each fodder tree cleared.<br><br>AND | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| | **AO41.3** Strip harvesting and block harvesting:<br>where fodder harvesting has previously occurred in an area of a lot, only occurs if all of the following apply:<br>the vegetation has not been cleared in the last 10 years; and<br>the average height of the fodder trees is at least 70 per cent of the height of the tallest stands of fodder species in the regional ecosystem; and<br>the fodder trees that were previously harvested have now attained an average height of at least 4 metres; and<br>aligns clearing along the contour where practical; and<br>does not occur in patches of regional ecosystems that are less than 10 hectares in area or less than 500 metres wide.<br><br>AND | |
| | **AO41.4** Strip harvesting:<br>does not result in any strip harvesting area exceeding 50 metres in width; and<br>results in all strip retention areas:<br>being preserved along the length of strip harvest areas to a width of at least 1.5 times that of the adjacent strip harvest area; and<br>containing fodder species with an average height of at least four metres; and<br>does not result in clearing for machinery access between strip harvest areas exceeding 15 metres in width.<br><br>AND | |
| | **AO41.5** Block harvesting:<br>does not result in any block harvest area exceeding one hectare; and<br>results in block retention areas:<br>being preserved between block harvest areas in accordance with the widths specified in table 16.3.8 of this code; and<br>containing fodder species with an average height of at least four metres; and<br>does not result in clearing for machinery access between block harvest areas exceeding 10 metres in width. | |

| Performance outcomes | Acceptable outcomes | Response |
|---|---|---|
| **Cleared vegetation (fodder harvesting)** | | |
| **PO42** Fodder harvesting is carried out in a way that results in the woody biomass of the cleared vegetation remaining where it is cleared. | No acceptable outcome is prescribed. | **Not applicable**<br>No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility. |
| **Conserving the fodder resource (fodder harvesting)** | | |
| **PO43** Fodder harvesting is carried out in a way that will conserve the fodder resource. | **AO43.1** Clearing does not occur:<br>in an area that has been cleared in the previous 10-year period; and<br>more than once in the same area of a lot; and<br>in more than 50 per cent of the area of the regional ecosystem listed in table 16.3.6 and table 16.3.7 of this code on the lot; and<br>in areas required to be retained under this code, a development approval or any accepted development vegetation clearing code. | **Not applicable**<br>No fodder harvesting is required as part of the clearing proposed for the train manufacturing facility. |
| **Duration of clearing, preventing land degradation, and maintaining biodiversity, ecological processes and regional ecosystems (Vegetation retention purposes)** | | |
| **PO44** The duration of clearing for a vegetation retention purpose occurs only for a period that:<br>will not contribute to land degradation; and<br>ensures the ongoing maintenance of ecological processes and biodiversity; and<br>maintains the regional ecosystem. | No acceptable outcome is prescribed. | **Not applicable**<br>The proposed clearing is not for the purposes of vegetation retention. |

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# Appendix C: PMST results

Australian Government

Department of Climate Change, Energy, the Environment and Water

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 17-Feb-2023

# Summary

## Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

| | |
|---|---|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance (Ramsar | 1 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 4 |
| Listed Threatened Species: | 33 |
| Listed Migratory Species: | 16 |

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

| | |
|---|---|
| Commonwealth Lands: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 20 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Australian Marine Parks: | None |
| Habitat Critical to the Survival of Marine Turtles: | None |

## Extra Information

This part of the report provides information that may also be relevant to the area you have

| | |
|---|---|
| State and Territory Reserves: | 1 |
| Regional Forest Agreements: | None |
| Nationally Important Wetlands: | None |
| EPBC Act Referrals: | 2 |
| Key Ecological Features (Marine): | None |
| Biologically Important Areas: | None |
| Bioregional Assessments: | None |
| Geological and Bioregional Assessments: | None |

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar Wetlands) [ Resource Information ]

| Ramsar Site Name | Proximity | Buffer Status |
|---|---|---|
| Great sandy strait (including great sandy strait, tin can bay and tin can inlet) | 10 - 20km upstream from Ramsar site | In buffer area only |

### Listed Threatened Ecological Communities [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

| Community Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | Endangered | Community may occur within area | In feature area |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | Endangered | Community may occur within area | In feature area |
| Lowland Rainforest of Subtropical Australia | Critically Endangered | Community may occur within area | In feature area |
| Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions | Endangered | Community likely to occur within area | In feature area |

### Listed Threatened Species [ Resource Information ]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| BIRD | | | |
| Botaurus poiciloptilus<br>Australasian Bittern [1001] | Endangered | Species or species habitat may occur within area | In buffer area only |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area | In buffer area only |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Cyclopsitta diophthalma coxeni<br>Coxen's Fig-Parrot [59714] | Endangered | Species or species habitat may occur within area | In feature area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Falco hypoleucos<br>Grey Falcon [929] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Geophaps scripta scripta<br>Squatter Pigeon (southern) [64440] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Rostratula australis<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Turnix melanogaster<br>Black-breasted Button-quail [923] | Vulnerable | Species or species habitat may occur within area | In feature area |
| MAMMAL | | | |
| Dasyurus hallucatus<br>Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331] | Endangered | Species or species habitat likely to occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Macroderma gigas](#) | | | |
| Ghost Bat [174] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Petauroides volans](#) | | | |
| Greater Glider (southern and central) [254] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Petaurus australis australis](#) | | | |
| Yellow-bellied Glider (south-eastern) [87600] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#) | | | |
| Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Pteropus poliocephalus](#) | | | |
| Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour known to occur within area | In feature area |
| PLANT | | | |
| [Acacia attenuata](#) | | | |
| [10690] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Bosistoa transversa](#) | | | |
| Three-leaved Bosistoa, Yellow Satinheart [16091] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Cossinia australiana](#) | | | |
| Cossinia [3066] | Endangered | Species or species habitat likely to occur within area | In feature area |
| [Cryptostylis hunteriana](#) | | | |
| Leafless Tongue-orchid [19533] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Cupaniopsis shirleyana](#) | | | |
| Wedge-leaf Tuckeroo [3205] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Fontainea venosa](#) | | | |
| [24040] | Vulnerable | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Macadamia integrifolia<br>Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Macrozamia lomandroides<br>cycad [55406] | Endangered | Species or species habitat may occur within area | In feature area |
| Macrozamia pauli-guilielmi<br>Pineapple Zamia [5712] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Rhodomyrtus psidioides<br>Native Guava [19162] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Samadera bidwillii<br>Quassia [29708] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| REPTILE | | | |
| Delma torquata<br>Adorned Delma, Collared Delma [1656] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Elseya albagula<br>Southern Snapping Turtle, White-throated Snapping Turtle [81648] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Furina dunmalli<br>Dunmall's Snake [59254] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Hemiaspis damelii<br>Grey Snake [1179] | Endangered | Species or species habitat likely to occur within area | In feature area |

| Listed Migratory Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Migratory Marine Birds | | | |
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area | In feature area |
| Migratory Marine Species | | | |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Crocodylus porosus](#)<br>Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Terrestrial Species** | | | |
| [Cuculus optatus](#)<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat known to occur within area | In feature area |
| [Hirundapus caudacutus](#)<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| [Monarcha melanopsis](#)<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area | In feature area |
| [Myiagra cyanoleuca](#)<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area | In feature area |
| [Rhipidura rufifrons](#)<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area | In feature area |
| [Symposiachrus trivirgatus as Monarcha trivirgatus](#)<br>Spectacled Monarch [83946] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Wetlands Species** | | | |
| [Actitis hypoleucos](#)<br>Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | | Species or species habitat may occur within area | In feature area |
| [Calidris canutus](#)<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area | In buffer area only |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Calidris melanotos](#) | | | |
| Pectoral Sandpiper [858] | | Species or species habitat may occur within area | In feature area |
| [Charadrius leschenaultii](#) | | | |
| Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Gallinago hardwickii](#) | | | |
| Latham's Snipe, Japanese Snipe [863] | | Species or species habitat likely to occur within area | In feature area |
| [Numenius madagascariensis](#) | | | |
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |

## Other Matters Protected by the EPBC Act

| Listed Marine Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Bird | | | |
| [Actitis hypoleucos](#) | | | |
| Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| [Anseranas semipalmata](#) | | | |
| Magpie Goose [978] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Apus pacificus](#) | | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| [Bubulcus ibis as Ardea ibis](#) | | | |
| Cattle Egret [66521] | | Species or species habitat may occur within area overfly marine area | In feature area |
| [Calidris acuminata](#) | | | |
| Sharp-tailed Sandpiper [874] | | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area overfly marine area | In buffer area only |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area overfly marine area | In feature area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat likely to occur within area | In feature area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area overfly marine area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Numenius madagascariensis | | | |
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Rhipidura rufifrons | | | |
| Rufous Fantail [592] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Rostratula australis as Rostratula benghalensis (sensu lato) | | | |
| Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Symposiachrus trivirgatus as Monarcha trivirgatus | | | |
| Spectacled Monarch [83946] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| **Reptile** | | | |
| Crocodylus porosus | | | |
| Salt-water Crocodile, Estuarine Crocodile [1774] | | Species or species habitat likely to occur within area | In feature area |

## Extra Information

| State and Territory Reserves | | | [ Resource Information ] |
|---|---|---|---|
| Protected Area Name | Reserve Type | State | Buffer Status |
| Burrum | Fish Habitat Area (B) | QLD | In buffer area only |

| EPBC Act Referrals | | | | [ Resource Information ] |
|---|---|---|---|---|
| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
| Controlled action | | | | |
| Raising of Lenthalls Dam, Doongal Creek | 2004/1716 | Controlled Action | Post-Approval | In buffer area only |
| Not controlled action | | | | |
| Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia | 2015/7522 | Not Controlled Action | Completed | In feature area |

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.


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