

## Appendix D: MNES Report

## **QTMP – Torbanlea Train Manufacturing Facility**

Matters of National Environmental Significance Report

**Department of Transport and Main Roads**

Reference: 511003

Revision: 3

---

2023-03-02



# Document control record

Document prepared by:

**Aurecon Australasia Pty Ltd**

ABN 54 005 139 873

Ground Floor, 25 King Street  
Bowen Hills QLD 4006

Locked Bag 331  
Brisbane QLD 4001  
Australia

**T** +61 7 3173 8000

**F** +61 7 3173 8001


**E** brisbane@aurecongroup.com

**W** aurecongroup.com

A person using Aurecon documents or data accepts the risk of:

- a) Using the documents or data in electronic form without requesting and checking them for accuracy against the original hard copy version.
- b) Using the documents or data for any purpose not agreed to in writing by Aurecon.

Document control						aurecon	
Report title		Matters of National Environmental Significance Report					
Document code		511003-0002-REP-NN-0010	Project number		511003		
File path		https://aurecongroup.sharepoint.com/sites/P511003/5 Deliver Design/508 Environmental/Referral/511003-0002-REP-NN-0010-MNES Reportdocx					
Client		Department of Transport and Main Roads					
Client contact		Tamara Hanssen	Client reference		TBA		
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver	
0	2022-06-10	Bronze review	A. Dalton	C.Schell	D. Bell	G. Osborn	
1	2022-07-01	Silver/Gold review	A. Dalton	C.Schell	S Cole	D. Bell	
2	2022-08-05	Response to RFI	A. Dalton	S Cole		D. Bell	
3	2023-03-02	Response to RFI	A. Dalton	L Bignill		G. Osborn	
Current revision		3					

Approval			
Author signature		Approver signature	
			
Name		Name	
Andy Dalton		Gabrielle Osborn	
Title		Title	
Senior Consultant		Principle Civil Engineer	

# Contents



<b>Executive Summary .....</b>	<b>1</b>
<b>1 Introduction .....</b>	<b>3</b>
1.1 Scope and structure of report .....	3
1.2 Project background .....	4
1.2.1 Project urgency .....	4
1.2.2 Project future use .....	4
1.2.3 Options assessment and site selection .....	5
1.2.4 Stakeholder engagement .....	5
1.3 Detailed description of Proposed Action .....	6
1.4 Extent (size) and location of Proposed Action .....	8
1.5 Description of the natural values of the area encompassed by the Proposed action .....	8
<b>2 Legislative framework .....</b>	<b>9</b>
2.1 Relationship to other referred Actions or proposals .....	18
<b>3 Matters of National Environmental Significance associated with the Proposed Action .....</b>	<b>19</b>
3.1 Overview of Matters of National Environmental Significance identified within and adjacent to the Proposed Action .....	19
3.2 Matters of National Environmental Significance likely to be significantly impacted by the Proposed Action .....	20
3.2.1 Coastal Swamp Sclerophyll Forest of NSW and SEQ Threatened Ecological Community .....	20
3.2.2 Grey-headed flying-fox .....	23
3.2.3 Greater Glider .....	25
3.3 Matters of National Environmental Significance not-likely to be significantly impacted by the proposed Action .....	27
3.3.1 Koala .....	27
3.4 Matters of National Environmental Significance that will not be impacted by the Proposed Action .....	29
3.4.1 White-throated needletail .....	29
3.4.2 Migratory species .....	30
<b>4 Measures to avoid, minimise, mitigate and offset potential environmental impacts .....</b>	<b>33</b>
4.1 General measures to avoid, minimise and mitigate potential impacts on MNES and other environmental values .....	33
4.1.1 Compliance with State-based approval processes .....	33
4.1.2 TMR guidelines/specifications .....	33
4.1.3 General mitigation measures .....	35
4.2 Environmental offset for direct disturbance of Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC .....	37
4.3 Environmental offset for direct disturbance to Grey-headed flying fox ( <i>Pteropus poliocephalus</i> ) .....	39
4.4 Environmental offset for direct disturbance to Greater glider ( <i>Petauroides volans</i> ) .....	40
<b>5 Summary and conclusion .....</b>	<b>42</b>
<b>6 References .....</b>	<b>43</b>
<b>Appendix A .....</b>	<b>45</b>
<b>Appendix B .....</b>	<b>47</b>
<b>Appendix C .....</b>	<b>59</b>

Appendix D .....	60
Appendix E .....	71

## Figures

Figure 1	Locality map .....	7
Figure 2	Location of vegetation within the context of the site property .....	22

## Tables

Table 1-1	Vegetation within the model disturbance footprint to be removed .....	8
Table 2-1	Legislation and policies relevant to the Proposed Action .....	10
Table 2-2	Projects which have been referred by TMR to the Commonwealth Minister for the Environment and Water for assessment .....	18
Table 3-1	Assessment of Habitat critical to the survival of the species criteria for Greater glider .....	25
Table 3-2	Assessment of Habitat critical to the survival of the species criteria for Koala .....	28
Table 4-1	Impact site calculations used to determine offset obligations for the TEC .....	38
Table 4-2	Assumptions used to determine offset obligations for the TEC using the Commonwealth Offset Assessment Guide .....	38
Table 4-3	Impact site calculations used to determine offset obligations for the Grey-headed flying fox .....	39
Table 4-4	Assumptions used to determine offset obligations for the Grey-headed flying fox using the Commonwealth Offset Assessment Guide .....	39
Table 4-5	Impact site calculations used to determine offset obligations for the Greater glider .....	40
Table 4-6	Assumptions used to determine offset obligations for the Greater glider using the Commonwealth Offset Assessment Guide .....	41
Table A-1	Likelihood of occurrence for matters within the Project site .....	45
Table B-1	Significant impact assessment of <i>Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland Threatened Ecological Community</i> .....	47
Table B-2	Significant impact assessment of Koala .....	49
Table B-3	Significant impact assessment of Greater glider .....	52
Table B-4	Significant impact assessment of Grey-headed flying-fox .....	54
Table B-5	Significant impact assessment of White-throated needletail .....	56
Table B-6	Significant impact assessment of listed migratory species .....	57



# Executive summary

This Matters of National Environmental Significance Report has been prepared to support the referral of the proposed Queensland Train Manufacturing Program (QTMP) at Torbanlea (Lot 35 SP326250 (Project site)) as required under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).


The Proposed Action consists of the construction of a train manufacturing facility, including associated infrastructure, for the initial purpose of manufacturing 65 six-car passenger trains which are required to meet Queensland's current and future public transport demands. The State-owned manufacturing facility will revert to the State following the completion of the QTMP deliverables for manufacturing of future SEQ passenger fleets.

Infrastructure associated with the Proposed Action includes widening and reconstruction of an existing unsealed local government road, "Ritchie Road". This road connects the Torbanlea township with the facility and is being designed to local government and Main Roads standards. The road provides an alternative access to the site, primarily for light vehicles, however it also serves as a secondary evacuation route as required by Bushfire Management guidelines.

The key findings of this report are:

- The Proposed Action (excluding the Ritchie Road component) is **likely** to cause a significant impact on a EPBC Act listed Endangered Threatened Ecological Community (TEC) (i.e., Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland) as a result of vegetation clearing, reducing the current extent and fragmenting the existing area of occurrence.
- The area associated with the Proposed Action contains suitable habitat for the Koala (listed as Endangered under the EPBC Act), Greater glider (listed as Endangered under the EPBC Act), and Grey-headed flying-fox (listed as Vulnerable under the EPBC Act), however these species have not been identified as present within, or adjacent to the area of the Proposed Action. It is noted that additional, targeted field surveys for the Greater glider have been scheduled to occur within the Project area during February 2023
- The area associated with the Proposed Action is considered to provide *habitat critical to the survival* of the Greater glider, as per the Conservation Advice for the Greater glider and Commonwealth *EPBC Act Significant Impact Guidelines* 1.1, and *habitat critical to the survival* of the Grey-headed flying-fox, as per the Commonwealth *EPBC Act Significant Impact Guidelines* 1.1 and National Recovery Plan for the Grey-headed flying-fox. The Proposed Action is **likely** to cause a significant impact to habitat for these species by vegetation clearing and reducing the current extent of habitat.
- The area associated with the Proposed Action is **not** considered to provide *habitat critical to the survival* of the Koala, as per the Commonwealth *EPBC Act Significant Impact Guidelines* 1.1 and National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory). As such, with the implementation of appropriate mitigation measures, it is expected that the Proposed Action will not introduce or exacerbate key threats to areas of critical Koala habitat.
- Rehabilitation will occur within the areas contained by the Proposed Action. 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 site will seek to restore the pre-disturbance vegetation communities.
- A summary of the proposed mitigation measures associated with the Proposed Action, include:
  - Species Management Programs and a Flora and Fauna Management Plan (part of the Project Environmental Management Plan (EMP)) will be developed and implemented for threatened species (approved by Queensland Government – Department of Environment and Science (Queensland Government) (DES): Management measures to reduce impacts to flora and fauna species and their breeding and/or foraging habitat
  - A Pest and Weed Management Plan (PWMP) will be developed and implemented as part of the Project EMP: Existing government approved management measures to reduce indirect impacts upon species habitat



- 
- Works to be undertaken in accordance with State-based legislative mechanisms geared towards environmental protection (e.g., Queensland *Nature Conservation Act 1992*), which required specific approvals to be in place prior to disturbance
  - A Suitably Qualified and Experienced Person will be nominated to oversee the environmentally relevant tasks and activities
  - A Water Quality Management Plan will be developed and implemented as part of the Project EMP: Management measures to reduce indirect water quality impacts on downstream environmental values
  - Project works will adhere to a certified Project Erosion and Sediment Control Plan (ESCP) in accordance with MTRS52 Erosion and sediment control processes
  - An Air Quality Management Plan will be developed and implemented as part of the Project EMP: Management measures to reduce air quality impacts.
- Areas of offsets for the direct disturbance of the TEC and habitats critical to the survival for the Greater glider and Grey-headed flying fox will occur within the Project site (land parcel of the Proposed Action). These offset areas will include a total of 15.12 ha for the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland TEC, 55 ha for Greater glider habitat, and 45.4 ha for Grey-headed flying fox habitat. Composite offsets will be utilised for the Greater glider and Grey-headed flying fox habitats.
  - The Proposed Action is considered to constitute a controlled action based on:
    - The significance of impacts to the Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland TEC (without the consideration of proposed offsets). These impacts result from the construction and operation of the facility itself, and not from the associated (road) infrastructure.
    - The significance of impacts to the Greater glider and Grey-headed flying fox (without the consideration of proposed offsets). These impacts result from the construction and operation of the facility itself, and not from the associated (road) infrastructure.
  - The Proposed Action is not considered to constitute a controlled action on other MNES based on:
    - Impacts are localised and represent only a small percentage of the habitat available for other identified MNES
    - State government approved management plans that have been approved, or are yet to be approved, together with implementation of mitigation measures identified in Queensland Rail's (QR) standards/guidelines, will reduce impacts to MNES.



# 1 Introduction

## 1.1 Scope and structure of report

This report provides information to support the referral of the proposed Torbanlea Train Manufacturing Facility (the Proposed Action or Project) to the Commonwealth Minister for the Environment to determine if the Proposed Action constitutes a controlled action as a result of impacts to Matters of National Environmental Significance (MNES).

This report draws information from field-based ecological assessments (Aurecon 2022; Aurecon 2021a; Aurecon 2021b) which have informed significant impact assessments for MNES in accordance with the relevant MNES Significant Impact Guidelines (DotE 2013).

This report has been structured in such a way to provide a coherent and easily understood analysis of the MNES that are relevant to the Proposed Action. Clear statements related to the Proposed Action's potential to result in a significant impact to each of the identified MNES, and clear mitigation measures/strategies are identified which align with both Commonwealth and State (Queensland) government expectations.

This report contains the following sections:

- Section 1 provides information related to the Proposed Action, including a project background (Section 1.2), detailed description on the extent of potential impacts (Sections 1.3 and 1.4), description of the locations of natural values (Section 1.5)
- Section 2 provides legislative framework associated with the Proposed Action and other related actions that have been referred to the Commonwealth Minister for the Environment and Water for assessment is provided in Section 2.1
- Section 3 provides information related to MNES associated with the Proposed Action (Section 3.1), MNES likely to be subject to significant impacts (Section 3.2), MNES not likely to be subject to significant impacts (Section 3.2.2) and MNES that will not be subject to significant impacts (Section 3.4)
- Section 4 provides information related to mitigation measures to reduce the magnitude and severity of impacts to the identified MNES. This includes general mitigation measures (Section 4.1) and MNES specific mitigation measures (Section 4.2)
- Section 50 provides a summary of this report, with clear statements related to the Proposed Action's potential impacts.





## 1.2 Project background

The Queensland Train Manufacturing Program (QTMP) (previously known as Rollingstock Expansion Project (REP)) is a program of works that has been initiated by Department of Transport and Main Roads (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.

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.

### 1.2.1 Project urgency

Due to the time criticality of CRR opening and long procurement lead times, TMR immediately commenced the recommended approach for accelerated procurement following the Cabinet Budget Review Committee (CBRC) submission approval.

Following the CBRC approval in October 2021, the recommended rollingstock procurement transaction process was required to be expedited without delay or disruption. In order to meet the planned contract close date, the Request for Proposal phase was initiated with the shortlisted proponents in November 2021.

This process concluded in June 2022, with tender assessment concluding late 2022 leading into negotiation. The current date for contract award is early 2023. Contractual obligations on the Successful Contractor will include adherence to any development conditions, including those imposed under EPBC Act legislation. The State prefers to have the final approval conditions prior to contract close.

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 for meeting the needs of efficient operation of the Cross River Rail tunnel and the 2032 Olympic and Paralympic Games.

### 1.2.2 Project future use

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 associated 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.



### 1.2.3 Options assessment and site selection

To identify the preferred site for the manufacturing facility, TMR undertook a detailed site selection process in April 2021, which included Geographic Information Systems (GIS) Site Suitability Assessment, allowing the study area to be mapped and potential sites overlaid with selected constraints. From this process, three sites were determined to be potentially suitable for the train manufacturing facility.

A comparative analysis was then undertaken on the three sites using a Multi-Criteria Analysis (MCA). Key considerations of the MCA included proximity to road and rail infrastructure, environmental values, flooding, community impacts and constructability.

The Project site scored best due to its suitability for construction, driven by the smaller amount of earthworks required to make the site viable for construction, in addition to the Project site contained fewer ecological values and lower potential for impacts on MNES and Matters of State Environmental Significance (MSES). Both alternative sites were significantly closer to known Koala and Grey-headed flying-fox populations. Undertaking the Proposed Action on the Torbanlea Project site was considered the least constrained in terms of MNES of all three sites. Changes to the EPBC legislation on the 8<sup>th</sup> December 2021 (Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC being listed as Endangered) and particularly February 2022 (listing for Koala in Queensland changed from vulnerable to endangered) would have further compounded impacts on the other sites.

### 1.2.4 Stakeholder engagement

#### 1.2.4.1 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 Requirements 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 Ministerial Infrastructure Designation (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 28th April 2022 and 30th May 2022. As part of this process, the local community and key stakeholder 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 was received from the Minister on 17<sup>th</sup> January 2023.

#### 1.2.4.2 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 26th April and 7th 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.

#### **1.2.4.3 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 have been continuing regarding the development of a Cultural Heritage Management Plan for the project.

### **1.3 Detailed description of Proposed Action**

As part of the Queensland Train Manufacturing Program (QTMP), the State - through the Department of Transport and Main Roads (TMR) – is proposing to establish a train manufacturing facility in Torbanlea, Queensland (the Proposed Action), on Lot 35 SP326250, and associated infrastructure on the Ritchie Road and Bruce Highway Road reserves, and the North Coast Rail Line (Project site).

The Proposed Action is located approximately 23 km north of Maryborough. The area of the Proposed Action is bordered by the Bruce Highway to the west, the North Coast Rail Line at the eastern boundary, Torbanlea township to the north and forest plantations to the south. The model disturbance footprint shown in Figure 1 depicts a proposed disturbance footprint that is indicative of the design. The site has a total area of 1,289,040 m<sup>2</sup> (128.90 ha).

In relation to the Proposed Action, the following is likely to occur:

- 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.





**aurecon**



**Legend**  
Model disturbance footprint  
Property boundary  
Cadastre boundaries



Date: 4/08/2022 4:08 PM Version:0

Department of Transport and Main Roads QTMP - Torbanlea Train Manufacturing Facility

**Figure 1:  
Locality Map**

Figure 1 Locality map

**aurecon**





## 1.4 Extent (size) and location of Proposed Action

The Proposed Action is bordered by the Bruce Highway (along the western boundary) and the existing North Coast Rail Line (along the eastern boundary). The site is approximately 1.5 km south of the Torbanlea township, Fraser Coast, Queensland, and lies north of commercial forestry areas. Site location is shown in Figure 1.

The Project will encompass approximately 68 ha and have a perimeter of approximately 10 km. Within the project site, the north-western approach from the Bruce Highway to the facility is approximately 200 m in length, the north-eastern approach from Ritchie Road is approximately 1,400 m in length and the rail link is approximately 400 m in length. External to the site, works on the Bruce Highway and works on local & State roads within Torbanlea, including Ritchie Road, will be required.

## 1.5 Description of the natural values of the area encompassed by the Proposed Action

The area encompassed by the Proposed Action has historically been subject to anthropogenic disturbance. Early use of the land included the establishment and operation of coal mines. More recently, land management practices associated with agriculture and commercial forestry has resulted in large areas surrounding the Proposed Action being cleared of remnant vegetation. Much of the regenerated vegetation located in the centre of the Project site contains a mosaic of pine plantation and Acacia regrowth. The area associated with the Proposed Action currently supports low intensity cattle grazing and a single dwelling, which is located within areas of non-remnant vegetation (refer Figure 1).

Areas of remnant vegetation communities within the Project site 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* is present as an emergent layer. Occurs on quaternary floodplains and fringing drainage lines in coastal areas.

Areas of remnant vegetation communities within the Project site 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.

Table 1-1 provides the maximum area of regulated vegetation to be removed. As mentioned in Section 1.2.1, a Successful Contractor will not be finalised until early 2023. Upon contract award the design will be confirmed which may vary the spatial extent and location of the model disturbance footprint, and consequently the extent and location of the avoidance area. However, this maximum quantum of area for each vegetation community impacted, as listed in the Table 1-1 in the MNES report, will not be exceeded.

**Table 1-1 Vegetation within the model disturbance footprint to be removed**

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



The Project site is located within the Burrum River catchment and is located approximately 20 km upstream of Great Sandy Marine Park. An unnamed tributary, which intersects the area of the Proposed Action, is defined as a first-order waterway (Strahler 1964).

Climatically, the Project site is located in a sub-tropical area. With warm, humid summers and cool, dry winters. Maximum average temperatures range from 22.6°C (July) to 34.2°C (January). Average annual rainfall is approximating 898 mm (BOM 2022).

## 2 Legislative framework

This section provides an overview of the legislation that is applicable to MNES associated with the Proposed Action. Included is an outline of the intent of each legislative instrument and its applicability to the Proposed Action. State-based legislation that has been considered in the formulation of Project mitigation measures has also been included within this section. The Commonwealth and State-based legislative instruments relevant to the Proposed Action is presented in Table 2-1.



Table 2-1 Legislation and policies relevant to the Proposed Action

Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
Commonwealth legislation			
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act)	Australia and its Territories. Specifically, projects that involve or have the potential to impact upon nationally and internationally important flora, fauna, ecological communities and heritage places – defined under the Act as MNES.	The EPBC Act is the Australian Government's central piece of environmental legislation and provides the legal basis for the management and protection of nationally and internationally important flora, fauna, ecological communities and heritage places.	MNES have been identified within and directly adjacent to the Proposed Action. As such, the Project must comply with the EPBC Act.





Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
<i>EPBC Act Environmental Offsets Policy (2012)</i> (EPBC Act Offsets Policy)	Areas subject to the EPBC Act	<p>Developed to support the management and protection of MNES under the EPBC Act and outlines the Australian Government's approach to the use of environmental offsets for impacts to MNES.</p> <p>Eight principles for the use of environmental offset under the EPBC Act have been developed by the Department of Climate Change, Energy, the Environment and Water (DCCEEW). These principles are used to assess any proposed environmental offset for MNES to ensure consistency, transparency and equity under the Act. The Australian Government's position is that environmental offsets must:</p> <ul style="list-style-type: none"><li>a) <i>Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the Proposed Action</i></li><li>b) <i>Be built around direct offsets but may include other compensatory measures</i></li><li>c) <i>Be in proportion to the level of statutory protection that applies to the protected matter</i></li><li>d) <i>Be of a size and scale proportionate to the residual impacts on the protected matter</i></li><li>e) <i>Effectively account for and manage the risks of the offset not succeeding</i></li><li>f) <i>Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of State or territory offsets that may be suitable as offsets under the Act for the same action)</i></li><li>g) <i>Be efficient, effective, timely, transparent, scientifically robust and reasonable</i></li><li>h) <i>Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced (DSEWPaC 2012a).</i></li></ul> <p>The Australian Government defines offsets as measures that compensate for the significant residual impacts of an action on the environment (DSEWPaC 2012a).</p>	<p>The Project will implement avoidance and mitigation measures (including the provision of offsets) to minimise the significant residual impacts on the MNES.</p> <p>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.</p> <p>The Project will comply with the EPBC Act Offsets Policy for any significant residual impacts to MNES.</p>



Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
<p><i>Significant impact guidelines 1.1 – Matters of National Environmental Significance:</i></p> <p><i>Environment Protection and Biodiversity Conservation Act 1999 (MNES Guidelines)</i></p>	MNES	<p>The purpose of the MNES Guidelines is to assist any person who proposes to take an action to decide whether or not they should submit a referral to the DCCEEW for a decision by the Commonwealth Minister for the Environment and Water on whether assessment and approval is required under the EPBC Act.</p> <p>The MNES Guidelines outlines a 'self-assessment' process, including detailed criteria, to assist persons in deciding whether or not referral may be required. Important terms and phrases are explained.</p>	<p>Assessment of MNES against the MNES Guidelines facilitate the determination of a significant residual impact to MNES. The outcomes of this assessment have been presented in Section 3 and Appendix B.</p>
Species recovery plans	MNES	<p>Recovery plans for listed threatened species and ecological communities have been made or adopted under the EPBC Act. These plans remain in force until and unless the species is removed from the threatened list.</p> <p>A recovery plan is a document stating the research and management actions necessary to stop the decline, support the recovery and enhance the chance of long-term survival in the wild, of a protected community, animal or plant species.</p>	<p>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:</p> <ul style="list-style-type: none"> <li>■ National Recovery Plan for the Koala <i>Phascolarctos cinereus</i> (combined populations of Queensland, New South Wales and the Australian Capital Territory) published March 2022</li> <li>■ National Recovery Plan for the Grey-headed Flying-fox <i>Pteropus poliocephalus</i>.</li> </ul> <p>Species recovery plans adopted by DCCEEW are accessible at the at the following internet location:  <a href="http://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl">http://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl</a></p>



Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
Threat abatement plans	MNES	Threat abatement plans provide for the research, management, and any other actions necessary to reduce the impact of a listed key threatening process on native species and ecological communities. Implementing the plan should assist the long-term survival in the wild of affected native species or ecological communities.	<p>Threat abatement plans relevant to MNES associated with the Project include:</p> <ul style="list-style-type: none"> <li>a) Threat abatement plan for disease in natural ecosystems caused by <i>Phytophthora cinnamomi</i></li> <li>b) Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (<i>Rhinella marina</i>)</li> <li>c) Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (<i>Sus scrofa</i>)</li> <li>d) Threats identified in the threat abatement plan for competition and land degradation by rabbits</li> <li>e) Threat abatement plan for predation by feral cats</li> <li>f) Threat abatement plan for predation by the European red fox.</li> </ul> <p>Threat abatement plans approved by DCCEEW are accessible at the at the following internet location:  <a href="https://www.environment.gov.au/biodiversity/threatened/threat-abatement-plans/approved">https://www.environment.gov.au/biodiversity/threatened/threat-abatement-plans/approved</a></p>
<b>Queensland legislation</b>			
<i>Nature Conservation Act 1992</i> (Qld) (NC Act)	Queensland	<p>The NC Act provides for the conservation of nature through protection of all native plants, birds, reptiles, mammals and amphibians in Queensland (along with a limited range of invertebrates and freshwater fish). The NC Act is based on principles aimed at conserving biological diversity, ecologically sustainable use of wildlife, ecologically sustainable development and international criteria developed by the International Union for the Conservation of Nature for establishing and managing protected areas.</p> <p>The NC Act has 14 subordinate regulatory instruments in the form of regulations, conservation plans and notices. Of particular relevance to the Project are three instruments that regulate disturbance to flora, fauna and habitat, including:</p> <ul style="list-style-type: none"> <li>■ <i>Nature Conservation (Animals) Regulation 2020</i> (Qld), which prohibits the taking or destruction, without authorisation, of protected animals and lists all fauna species that are considered to be extinct in the wild, endangered, vulnerable, near threatened, least concern and special least concern</li> </ul>	<p>The following permits and management plans will be required for the Project:</p> <ul style="list-style-type: none"> <li>■ Clearing Permit (Protected Plants) (Section 89 of the NC Act) – for the clearing of vegetation contained within High-risk areas identified on the Department of Environment and Science (DES) flora survey trigger map, or where protected plants have been identified in a Project survey within a proposed clearing area</li> <li>■ Rehabilitation Permit (spotter catcher endorsement) (Part 14 of the <i>Nature Conservation (Animals) Regulation 2020</i>)</li> <li>■ Damage Mitigation Permit (removal and relocation) ((Part 10 of the <i>Nature Conservation (Animals) Regulation 2020</i>)</li> <li>■ Species management plan must be submitted to DES for approval for tampering with some animal breeding places (Section 335 of the <i>Nature Conservation (Animals) Regulation 2020</i>).</li> </ul>



Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
		<p>wildlife. Also listed is international wildlife and prohibited wildlife.</p> <ul style="list-style-type: none"> <li>■ <i>Nature Conservation (Plants) Regulation 2020</i> (Qld), which prohibits the taking or destruction, without authorisation, of protected plants and lists all flora species that are considered to be extinct in the wild, endangered, vulnerable, near threatened, least concern and special least concern wildlife (refer Glossary and Abbreviations for definitions of these terms). Also listed is international wildlife and prohibited wildlife.</li> </ul> <p>The NC Act also includes provisions for protected areas such as national parks, nature refuges, and world heritage management areas.</p>	
<i>Biosecurity Act 2014</i> (Qld)	Queensland	<p>The <i>Biosecurity Act 2014</i> seeks to provide a framework for an effective biosecurity system for Queensland that helps to manage and minimise State biosecurity risks, as well as facilitate the response to biosecurity issues and events in a timely and effective way, so as to align with national and international obligations.</p> <p>The Act introduces the general biosecurity obligation upon all persons to take all reasonable and practical measures to prevent or minimise biosecurity risks. Additionally, the Act holds power to repeal the provisions of various former Acts with respect to the management and impacts of animals and plant diseases and pests, including the <i>Plant Protection Act 1989</i>, <i>Land Protection (Pest and Stock Route Management) Act 2002</i> and <i>Fisheries Act 1994</i> to provide a single cohesive legislative framework for biosecurity for Queensland.</p>	<p>The Proposed Action will potentially involve interaction with restricted matters and prohibited matters (potentially including pests and weeds) and will therefore require compliance with the <i>Biosecurity Act 2014</i>.</p> <p>The pest and weed management strategies will consider construction activities and operational impacts associated with the Proposed Action.</p>



<i>Fisheries Act 1994</i> (Qld) (Fisheries Act)	Queensland	<p>The Fisheries Act provides for the management, use, development and protection of fish habitats and resources, together with the management of aquaculture activities. Administered by the Department of Agriculture and Fisheries (DAF), the Fisheries Act applies to:</p> <ul style="list-style-type: none"><li>■ The removal, destruction or damage of marine plants</li><li>■ Works in a declared Fish Habitat Area (FHA)</li><li>■ Waterway barrier works resulting in the construction of instream structures inhibiting the free movement of fish along waterways.</li></ul> <p>Waterway Barrier Works:</p> <p>A waterway includes a river, creek, stream, watercourse or inlet of the sea as defined in the Schedule under the Fisheries Act and mapped according to the spatial data layer, Queensland waterways for waterway barrier works.</p> <p>Waterways providing for fish passage are a MSES.</p> <p>A waterway barrier is defined under the Fisheries Act as a dam, weir, or other barrier across a waterway if the barrier limits fish stock access and movement along a waterway.</p> <p>Under the provisions of the Fisheries Act and <i>Planning Act 2016</i>, a Development Permit for Operational Works involving Waterway Barrier Works is required for works which pose a barrier to fish passage (including permanent, partial and temporary barriers) within a waterway which is mapped by DAF on the spatial data layer 'Queensland waterways for waterway barrier works' unless:</p> <ul style="list-style-type: none"><li>■ The works have a low impact to fisheries productivity and comply with DAF's requirements for 'works which are not waterway barrier works' which include (subject to specific design and construction requirements): –<ul style="list-style-type: none"><li>– New single or multi-span bridges</li></ul></li></ul>	<p>The Proposed Action transverses mapped waterways for waterway barrier works.</p> <p>Obstruction of the waterway is not proposed at this time, and therefore approvals under the Fisheries Act are not applicable to the Proposed Action.</p> <p>However, if obstruction of the watercourse is proposed, it is likely that this will trigger the requirement to obtain a Development Permit for Operational Works that is constructing or raising waterway barrier works, unless an exemption applies, or where works can be shown to comply with the accepted development requirements.</p> <p>The Project does not require:</p> <ul style="list-style-type: none"><li>■ The removal, destruction or damage of marine plants</li><li>■ Works involving aquaculture</li><li>■ Work that is completely or partly within a declared FHA.</li></ul>
----------------------------------------------------	------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
		<ul style="list-style-type: none"><li>– Maintenance of existing bridge structures not subject to an existing permit</li><li>– Bank revetment</li><li>– Road resurfacing at waterway crossings</li><li>– Stormwater outlet construction</li><li>– Works that occur within these waterways will be defined as waterway barrier works, unless the works comply with the accepted development requirements for operational work that is constructing or raising waterway barrier works (1 October 2018).</li></ul>	



Legislation/ policy/plans	Legislative jurisdiction	Intent	Applicability to Proposed Action
<i>Planning Act 2016 (Qld)</i> (Planning Act), the <i>Planning Regulation 2017</i> (Qld), the Minister's Guidelines and Rules (Queensland Treasury 2020) – Ministerial Infrastructure Designation	Queensland	<p>The Planning Act, the <i>Planning Regulation 2017</i>, the Minister's Guidelines and Rules (Queensland Treasury 2020), and the Operational Guidance for Making and Amending a Ministerial Infrastructure Designation (MID) (Department of State Development, Infrastructure, Local Government and Planning [DSDILGP] 2021) provides the process for the making a MID. The purpose of a MID is to expedite the delivery of infrastructure that is needed in an efficient and timely manner. The effect of a designation made is that the development is considered accepted development under the relevant local planning scheme and does not require further development approval under the Planning Act.</p> <p>The process for creating a MID is as follows:</p> <ol style="list-style-type: none"> <li>1. Lodgement of an initial advice request, which provides general information related to the project, including the statutory context for the development and identified stakeholders, and seeks information from DSDILGP regarding any concerns that the Department may have, any requirements of the development, or any requirements of the consultation.</li> <li>2. Preliminary stakeholder engagement, where the MID applicant engages with any identified stakeholders to understand concerns they may have about the project.</li> <li>3. The applicant must request ministerial endorsement from the Minister of State Development, Infrastructure, Local Government and Planning to seek a MID.</li> <li>4. Once the applicant has received ministerial endorsement, the MID proposal can be lodged with DSDILGP. The proposal contains an Environmental Assessment Report, and any other technical reports or assessments that may be required.</li> <li>5. Following lodgement, the applicant must undertake wider stakeholder and community consultation, and respond to any submissions properly made by the community or stakeholders.</li> </ol>	<p>The MID process was selected as the appropriate approval pathway for the Torbanlea Train Manufacturing Facility for the following reasons:</p> <ol style="list-style-type: none"> <li>1. The <i>Planning Regulation 2017</i>, Schedule 6, Part 5, Section 26 states that local planning schemes are unable to state that government supported transport infrastructure is assessable development, and therefore an alternative approval pathway was sought.</li> <li>2. There is a need for the manufacturing facility to be delivered in an efficient and timely manner, as trains that will be constructed at the facility will be used in the currently under construction Cross River Rail project, and the 2032 Olympic and Paralympic Games.</li> </ol> <p>The consultation period for the Project has concluded, and the proposal was approved on 17<sup>th</sup> January 2023 with gazettal occurring on the 20<sup>th</sup> January 2023.</p>





## 2.1 Relationship to other referred Actions or proposals

TMR has referred 13 projects to the Commonwealth Minister for the Environment and Water for consideration in the last three years. A list of these projects is provided in Table 2-2. TMR understand, and are committed to, meeting the intent of the EPBC Act and DCCEEW's requirements. Using the precautionary principle, where TMR identify that there is potential for a Proposed Action to significantly impact upon MNES, the relevant Proposed Action is referred to the Commonwealth Minister for the Environment and Water for determination.

**Table 2-2 Projects which have been referred by TMR to the Commonwealth Minister for the Environment and Water for assessment**

Reference No. ↑	Title of referral	Valid Date	Stage	Status
<a href="#">2022/9181</a>	Department of Transport and Main Roads/Transport - Land/966-1558 Yeppoon Road, Ironpot/Queensland /Rockhampton - Yeppoon Road Upgrade	29/03/2022	Referral Publication	Referral Published
<a href="#">2021/9120</a>	Department of Transport and Main Roads/Transport - Land/Pomona Kin Kin Road, Kin Kin/Queensland/Six Mile Creek Bridge Replacement	20/01/2022	Completed	Referral Decision Made
<a href="#">2021/9116</a>	Department of Transport and Main Roads/Transport - Land/Williams Road reserve, Kin Kin/Queensland/Kin Kin Road - Transport - Road widening	4/01/2022	Completed	Referral Decision Made
<a href="#">2021/9003</a>	Department of Transport and Main Roads/Transport - Land/Port of Townsville and Abbott Street, Cluden/Queensland/Townsville Eastern Access Rail Corridor	11/08/2021	Assessment Approach	Assessment Method Determined
<a href="#">2020/8803</a>	Department of Transport and Main Roads/Transport - Land/between Beerburrum and Nambour, Sunshine Coast LGA/Queensland/Beerburrum to Nambour Rail Upgrade Project the B2N Project	12/10/2020	Post-Approval	Approval Decision Made
<a href="#">2020/8783</a>	Department of Transport and Main Roads/Transport - Land/from Bald Hill Road, Glenella, to Harbour Road, North Mackay/Queensland/Mackay Port Access Road	1/10/2020	Completed	Referral Decision Made
<a href="#">2020/8692</a>	Queensland Department of Transport and Main Roads/Transport - Water/Road Reserve and Unallocated State Land/Queensland/Yorkeys Knob Boating Infrastructure Project	14/07/2020	Post-Approval	Approval Decision Made
<a href="#">2020/8646</a>	Queensland Department of Transport and Main Roads/Transport - Land/Oaky Creek Road Coomera, to Nerang-Broadbeach Road Nerang/Queensland/Stage 1 Coomera Connector	1/06/2020	Guidelines Issued	Guidelines Issued
<a href="#">2020/8628</a>	Department of Transport and Main Roads/Transport - Land/between Fairy Bower and Kawana, 6km west of Rockhampton/Queensland/Rockhampton Ring Road	18/05/2020	Final PD	Preliminary Documentation Published
<a href="#">2020/8625</a>	Department of Transport and Main Roads, Northern District, Townsville/Transport - Land/Townsville/Queensland /Townsville Ring Road 5	6/05/2020	Completed	Referral Decision Made
<a href="#">2019/8573</a>	Department of Transport and Main Roads/Transport - Land/Bruce Highway between Smiths Gap and Friday Pocket Road/Queensland/Bruce Highway - Smiths Gap Overtaking Lane and Fauna Crossing	27/03/2020	Completed	Referral Decision Made
<a href="#">2019/8523</a>	Department of Transport and Main Roads/Transport - Water/Lot 10 on SP312679/Queensland/Molongle Creek Navigation Channel Improvement	7/02/2020	Completed	Referral Decision Made
<a href="#">2019/8511</a>	Department of Transport and Main Roads/Transport - Land/Port Alma Road reserve and Lot 51 SP102240/Queensland/Bajool - Port Alma Road Safety Upgrade Project	25/10/2019	Completed	Referral Decision Made



## 3 Matters of National Environmental Significance associated with the Proposed Action

### 3.1 Overview of Matters of National Environmental Significance identified within and adjacent to the Proposed Action

The Protected Matter Search Tool (PMST) indicates that forty-eight (48) MNES potentially occur within a 2 km radius of the Proposed Action (i.e., 19 fauna, 11 flora, 15 migratory and 3 threatened ecological communities) (refer Appendix D). A summary of the likelihood of occurrence for the matters identified in the PMST, is provided in Appendix A.

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:

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

However, it is noted that the Koala, Greater glider, Grey-headed flying-fox, or the White-throated needletail have not been identified as occurring within the Project site, or adjacent to this area from either specimen backed, desktop records or field-based investigations. Additional targeted field surveys for the Greater glider have been scheduled to occur within the Project site during February 2022.

Surveys in accordance with the Queensland Flora Survey Guidelines – Protected Plants were undertaken on the Project site in May 2021 (Aurecon 2021b). No threatened flora were observed to occur within 100 m of the Project site.

Significant impact assessments for each of the species presented above is provided within Appendix B.

A summary of the key findings of Appendix B for the Proposed Action is provided below:

- The Proposed Action is likely to have a significant impact on the listed TEC: **Coastal Swamp Sclerophyll Forest of NSW and SEQ.**
- The Proposed Action is likely to have a significant impact on the listed **Grey-headed flying-fox** (*Pteropus poliocephalus*)
- The Proposed Action is likely to have a significant impact on the listed **Greater glider** (*Petauroides volans*)
- The Ritchie Road roadworks component of the Proposed Action is not likely to have a significant impact

on the listed TEC: Coastal Swamp Sclerophyll Forest of NSW and SEQ.

- The Proposed Action is not likely to have a significant impact on the listed Koala (*Phascolarctos cinereus*)
- The Proposed Action is not likely to have a significant impact on the listed White-throated needletail (*Hirundapus caudacutus*)
- The proposed Action will not have a significant impact on the listed **Migratory species**.

## 3.2 Matters of National Environmental Significance likely to be significantly impacted by the Proposed Action

Three MNES; Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Grey-headed flying fox (EPBC Act: Vulnerable) and the Greater glider (EPBC Act: Endangered) have been identified as likely to be subject to significant impacts as a result of the Proposed Action.

Significant impact assessments for these MNES have been provided within Appendix B.

### 3.2.1 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 8<sup>th</sup> 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, and in total approximately 31.98 ha of the TEC has been identified in the Project Area.



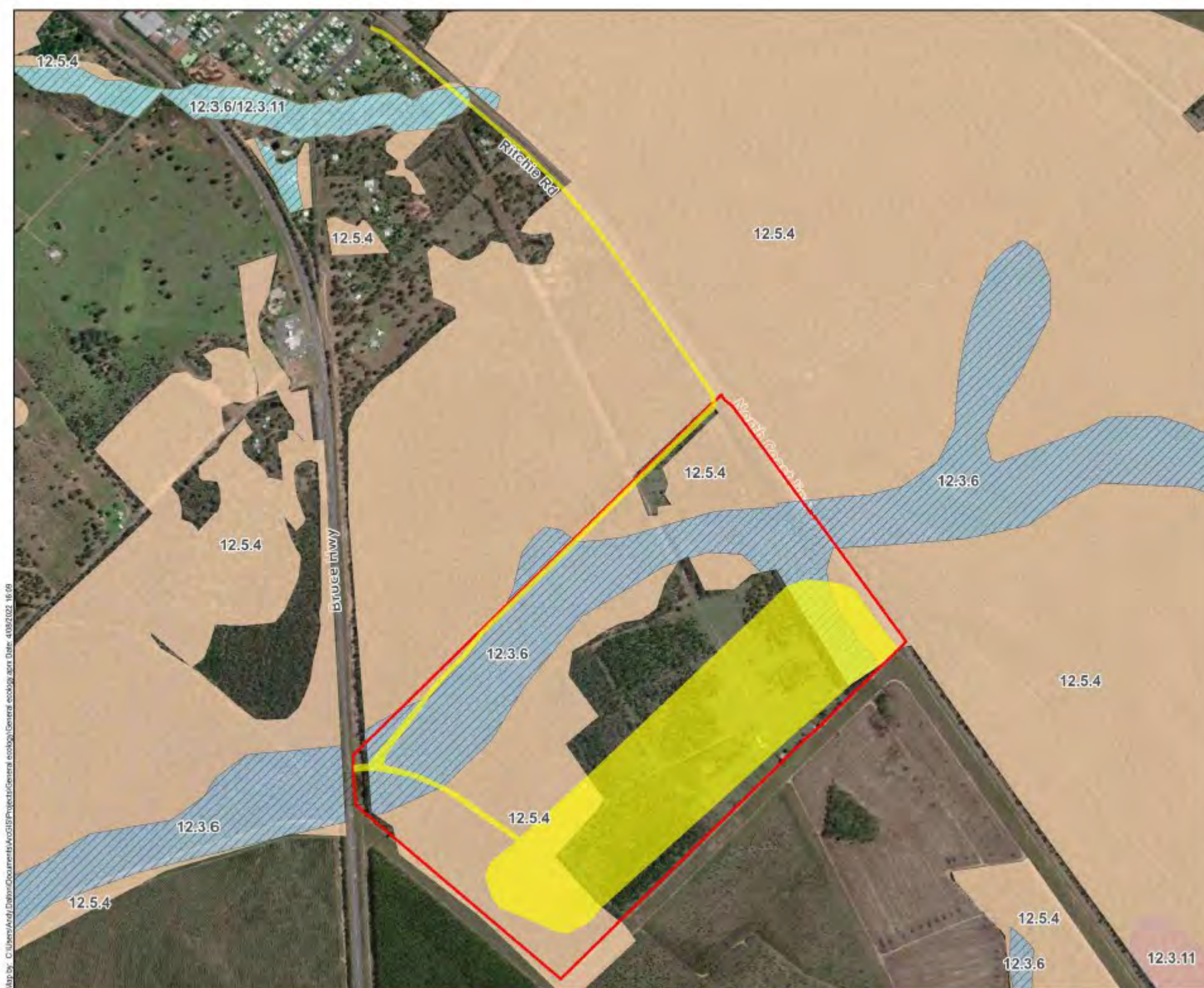


**Legend**

- ▬ Property boundary
- ▨ Swamp Sclerophyll Threatened Ecological Community
- RE**
  - RE 12.3.11 - Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains
  - RE 12.3.6 - Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains
  - 12.3.6/12.3.11
  - RE 12.5.4 - Eucalyptus latissinensis +/- Corymbia intermedia, C. trachyphloia subsp. trachyphloia, Angophora leiocarpa, Eucalyptus exserta woodland on complex remnant Tertiary surfaces and Cainozoic and Mesozoic sediments
  - ▬ Model disturbance footprint



Date: 4/08/2022 4:09 PM Version:0



AS scale: 1:12,000  
0 125 250 375Meters

Job No: P511203  
Coordinate system:

**Department of Transport and Main Roads QTMP - Torbanlea Train Manufacturing Facility**

**Figure 2:  
Vegetation Map**

Figure 2 Location of vegetation within the context of the site property





### 3.2.2 Grey-headed flying-fox

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 has 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).

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.

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.

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*, *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**)
- Presence of habitat critical to the species survival (foraging habitat)
- 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 Appendix B).

Mitigation measures to reduce the severity of impact to this species include the provision of offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to minimise impact to the species during construction. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1 and Section 4.3.





### 3.2.3 Greater Glider

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 folivorous, 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.

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 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.


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 3-1 below.

**Table 3-1 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 (i.e., 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 and long term post-fire recolonisation due to its proximity to existing infrastructure and the existing fragmentation that may acts as firebreaks.
<b>Conclusion of assessment:</b>	<b>The Project site <u>does</u> contain habitat critical to the survival of the species.</b>

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
  - Presence of records within 10 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, and in consideration of Significant impact guidelines 1.1, the Proposed Action is likely to result in a significant impact to the Greater glider.

Mitigation measure to reduce the severity of impact to this species include the provision of offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to minimise impact to the species during construction. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action are provided within Section 4.1 and Section 4.4.

### 3.3 Matters of National Environmental Significance not likely to be significantly impacted by the Proposed Action

One MNES, Koala (*Phascolarctos cinereus*) (EPBC Act: Endangered) has been identified as having habitat removed as part of the Proposed Action. However, this species is not likely to be subject to significant residual impacts as a result of the Proposed Action, given the relatively small area of clearing and proposed mitigation measures.

Further details related to the Koala, and potential impacts associated with the Proposed Action are provided in the sections below.

#### 3.3.1 Koala

The Koala is a medium-sized, arboreal marsupial that is predominantly grey in colour. The Koala is endemic to Australia and ranges from north-eastern Queensland to the south-east corner of South Australia.

Within Queensland, the highest density of the Koala population occurs in South-east Queensland. Lower densities occur through central and eastern areas (DCCEEW 2022a; Youngentob et al. 2021).

Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species and their habitat can be broadly defined as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils.

In coastal lowlands in Queensland, Koalas are also found in vegetation communities dominated by Melaleuca or Casuarina species (DCCEEW 2022a; Youngentob et al. 2021).

Koalas are folivores, feeding primarily during the dawn, dusk or night periods. Its diet is restricted mainly to *Eucalyptus* spp; however, they may also consume foliage of related genera (Family: Myrtaceae), including *Corymbia* spp., *Angophora* spp. and *Lophostemon* spp. (Youngentob et al. 2021).

Whilst Koala maintain a defined home-range, they are not considered to be territorial, and there may be significant overlap in the distribution of home-ranges (DCCEEW 2022a). Home range size is also variable with those occurring within poorer quality habitat, being relatively larger in size, when compared to those that are located within higher quality habitat.

Koalas have naturally low fecundity, with females potentially producing a single offspring a year, with births occurring within the warmer months of the year (e.g., October through to May). The estimated lifespan of wild Koalas is generally greater than 15 years in females and 12 years in males (DCCEEW 2022a).

The main threats to the Koala include habitat loss and fragmentation, mortality associated with dog attacks and vehicle strikes, disease (i.e., Chlamydiosis), Climate change and drought, and other threats such as Bell Miner Associated Dieback (BMAD) and Myrtle rust, both of which impact the health and quantity of available forage (DCCEEW 2022a; DCCEEW 2022e).

There were no signs of Koala presence (i.e., individuals, scats, and characteristic scratch marks) within the Project site during the May 2021 field survey. Koala scat detection dog surveys conducted from the 15th to the 30th of August 2022 did not detect the presence of Koalas within a 2km radius of the Project site.

Koala food trees were recorded throughout the vegetation within the model disturbance footprint. The southern portion of the model disturbance 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 model disturbance footprint and adjacent to the north comprised of favourite koala food trees such as Queensland blue gum (*Eucalyptus tereticornis*) and Mahogany

(*Eucalyptus latisinensis*) (Youngentob et al. 2021). The riparian vegetation surrounding the waterway within the model disturbance footprint (RE 12.3.6) contained a higher density of Queensland blue gum than the rest of the model disturbance footprint. Within the broader landscape, extensive patches of suitable habitat occur to the north of the model disturbance 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). An assessment for Habitat critical to the survival of the Koala is in Table 3-2 below.

**Table 3-2 Assessment of Habitat critical to the survival of the species criteria for Koala**

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 site. 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 Project site between the Bruce Highway and the North Coast Line, the Project site 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 of habitat to the Project site, it is 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.
<b>Conclusion of assessment:</b>	<b>The Project site does not <u>contain habitat critical to the survival of the species</u></b>

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

- Relatively small 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 consideration of these factors, and in consideration of Significant impact guidelines 1.1, the Proposed Action is not likely to result in a significant impact to the Koala.

Mitigation measure to reduce the severity of impact to this species include the provision of offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to minimise impact to the species during construction. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1.

### 3.4 Matters of National Environmental Significance that will not be impacted by the Proposed Action

Two MNES have been identified as potentially occurring in close proximity to the Project site but will not be impacted by the Proposed Action. These MNES consist of the following:

- White-throated needletail (*Hirundapus caudata*) – Vulnerable
- Four Migratory species:
  - Fork-tailed swift (*Apus pacificus*)
  - Oriental cuckoo (*Cuculus optatus*)
  - Spectacled monarch (*Symposiachrus trivirgatus*)
  - Satin flycatcher (*Myiagra cyanoleuca*).

Further details related to each of these MNES and potential impacts associated with the Proposed Action are provided within the sections below.


#### 3.4.1 White-throated needletail

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 Appendix B).



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.

Mitigation measures to reduce the severity of these impacts include the provision of direct, land-based offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to reduce edge-related impact from degrading areas that have been retained. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1.

### 3.4.2 Migratory species

#### 3.4.2.1 Satin flycatcher

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 Appendix B).

In consideration of the relatively small 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 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015), the Proposed Action is not likely to result in a significant impact to the Satin flycatcher.

Mitigation measures to reduce the severity of these impacts include the provision of direct, land-based offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to reduce edge-related impact from degrading areas that have been retained. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1.





### 3.4.2.2 Fork-tailed swift

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 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015) (refer Appendix B).

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.

Mitigation measures to reduce the severity of these impacts include the provision of direct, land-based offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to reduce edge-related impact from degrading areas that have been retained. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1.

### 3.4.2.3 Oriental cuckoo

The Oriental cuckoo (*Cuculus optatus*) is a non-breeding migrant 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 Appendix B).

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 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015), the Proposed Action is not likely to result in a significant impact to the Oriental cuckoo.

Mitigation measures to reduce the severity of these impacts include the provision of direct, land-based offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to reduce edge-related impact from degrading areas that have been retained. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1.





#### 3.4.2.4 Spectacled monarch

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 Appendix B).

In consideration of the relatively small 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 (DoE 2013) and the draft referral guidelines for migratory species (DoE 2015), the Proposed Action is not likely to result in a significant impact to the Spectacled monarch.

Mitigation measures to reduce the severity of these impacts include the provision of direct, land-based offsets, clearing the minimum extent necessary for the Proposed Action, and management measures to reduce edge-related impact from degrading areas that have been retained. Further detail related to mitigation measures to reduce the potential impacts associated with the Proposed Action, are provided within Section 4.1.



## 4 Measures to avoid, minimise, mitigate and offset potential environmental impacts

This section provides information related to measures designed to avoid, minimise and mitigate potential impacts on MNES and other environmental values. This section has been split into four sections, with measures to avoid, minimise and mitigate potential impacts on MNES and other environmental values (refer Section 4.1); specific measures to reduce (offset) significant residual impacts to the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC (refer Section 4.2); Grey-headed flying fox (Section 4.3); and Greater glider (Section 4.4).

The Project ecological and environmental mitigation measures will be included in a Project Environmental Management Plan (EMP) to be implemented during the construction and operational stages of the Project.

### 4.1 General measures to avoid, minimise and mitigate potential impacts on MNES and other environmental values

Mitigation measures presented within this section are designed to reduce the magnitude and severity of potential impacts upon the environment, including animals, plants and animal breeding places. The mitigation measures presented within this section will avoid, minimise and mitigate impacts to the identified MNES and other environmental values. Measures presented in the sections below include State-based (i.e., Queensland) legislative approval requirements, compliance with State-based policies/guidelines as well as general best-practice techniques.

#### 4.1.1 Compliance with State-based approval processes


Compliance with Queensland legislative requirements (refer Section 2 and Table 2-1) must occur for the Project to proceed. This includes the preparation of specific documentation, supported by field-based site investigations where triggered by State-based environmental mapping (e.g., “High risk areas” as mapped under *Nature Conservation Act 1992* Protected Plant trigger mapping or a Species Management Program where breeding places are to be disturbed (Aurecon 2022a). For such areas, approval to undertake works within or adjacent to these areas is required. State-based legislative instruments applicable to the Proposed Action that are relevant to MNES are outlined in Table 2-1. Compliance with these legislative instruments will ensure that the environmental impacts are minimised to acceptable levels.

The environmental offset proposed in Section 4.2, Section 4.3, and Section 4.4 will be compliant with the EPBC Act Environmental Offsets Policy (SEWPaC 2012).

#### 4.1.2 TMR guidelines/specifications

##### 4.1.2.1 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:

- 
- Part 1 (<https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Fauna-sensitive-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 Proposed Action's road design to reduce impacts to the identified MNES.

#### 4.1.2.2 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 Proposed Action's design to reduce impacts to the identified MNES, particularly in relation to any potential indirect impacts to aquatic species.

#### 4.1.2.3 Specifications MRTS16: Landscape and Revegetation Works

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.


#### 4.1.2.4 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*).


#### 4.1.3 General mitigation measures

General mitigation measures to be applied to the Proposed Action, include:

- A Suitably Qualified and Experienced Person 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 EMP.
- Clearing to be limited, refer Table 1-1
- Washdown and weed and seed certificates are to be gained in accordance with local and State government biosecurity requirements
- Clearly delineate significant vegetation boundaries (e.g., Koala habitat and TEC boundary) 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 site
- 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 site 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 site.
    - 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 site 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 site must not be disturbed in order to create stockpile sites or storage areas.
  - A Pest and Weed Management Plan (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 site. Weed control measures will be designed to minimise impacts on native fauna (e.g., use 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 site 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
    - Ensure regular servicing of vehicles to maintain compliance with standards.

Application of these mitigation measures will result in a minimisation of indirect impacts to the MNES and other environmental values adjoining the Proposed Action.

## 4.2 Environmental offset for direct disturbance of Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC

As indicated in Section 3.2.1, the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC has been identified as likely to be subject to significant impacts when assessed against the Significant impact guidelines 1.1 (DoE 2013) as the Proposed Action will reduce the extent of an ecological community (i.e. removal of **4.76 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.

Whilst assessment of the Proposed Action upon the Koala, White-throated needle tail and migratory species indicated that these species are not likely to be subject to significant impacts (refer Section 3.3.1, Section 3.4.1, and Section 3.4.2)), the provision of a direct offset for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, would ensure that these species are subject to a positive conservation outcome as a result of the Proposed Action. Offset inputs for the EPBC Offsets Assessment Guide are listed in Table 4-1.

**Table 4-1 Impact site calculations used to determine offset obligations for the TEC**

MNES feature requiring offset	Comment
Threatened Ecological Community	Coastal Swamp Sclerophyll Forest of NSW and SEQ (Endangered)
Site condition (structure and condition of site, diversity of relevant endemic and non-endemic species)	<p>The assessed patch:</p> <ul style="list-style-type: none"> <li>Large (&gt;5ha) contiguous patch</li> <li>Good condition (non-native species 20-50% of total groundcover)</li> <li>Meets criteria for condition threshold B of the listing advice</li> </ul>
Site context (connectivity, importance in relation to overall occurrence, threats)	The impact site is currently connected to a band of mapped Melaleuca open forest on alluvium (RE 12.3.6). Connectivity is occasionally broken by existing roads, rail line, pine plantation and Torbanlea township.
Overall site quality	6 out of 10
Overall area impacted	4.76 ha
Total quantum of impact (in consideration of habitat quality)	2.86 ha

The following assumptions have been used to estimate an indicative offset requirement:

- Maximum area of disturbance = **4.76 ha** (refer Section 1.5).
- The total quantum of impact (refer Table 4-1) = **2.86 ha**.
- The offset site will have a starting quality of 6 (out of 10).
- The proposed offset works will raise the offset site quality to 8 after 20 years.

Based on these assumptions, an offset area of **15.12 ha** will provide approximately **100.09%** of the direct offset requirement (refer Table 4-2). A copy of the EPBC Act Offset Assessment Guide for the proposed offset is provided in Appendix C.

**Table 4-2 Assumptions used to determine offset obligations for the TEC using the Commonwealth Offset Assessment Guide**

Offset Assessment Guide item	Value used (refer Appendix C)
Total quantum of impact (refer Table 4-1)	2.86 ha
Risk-related time horizon	20 years
Time until ecological benefit	20 years
Offset site starting quality	6
Offset site quality without offsets	5
Risk of loss without offset	0%
Offset site quality with offset	8
Risk of loss with offset	0%
Confidence in result	80%
Proposed offset area	15.12 ha
Proportion of impact area offset	100.09%

# Assumed or derived from the Commonwealth Offset Assessment Guide

## 4.3 Environmental offset for direct disturbance to Grey-headed flying fox (*Pteropus poliocephalus*)

As indicated in Section 3.2.2, the Grey-headed flying fox (*Pteropus poliocephalus*) has been identified as likely to be subject to significant impacts when assessed against the Significant impact guidelines 1.1 (DoE 2013) as the Proposed Action will reduce the extent of the species habitat (i.e. removal of **17.42 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.

Whilst assessment of the Proposed Action upon the Koala, White-throated needle tail and migratory species indicated that these species are not likely to be subject to significant impacts (refer Section 3.3.1, Section 3.4.1, and Section 3.4.2)), the provision of a direct offset for the Grey-headed flying fox, would ensure that these species are subject to a positive conservation outcome as a result of the Proposed Action. Offset inputs for the EPBC Offsets Assessment Guide are listed in Table 4-3.

**Table 4-3 Impact site calculations used to determine offset obligations for the Grey-headed flying fox**

MNES feature requiring offset	Comment
Fauna species	Grey-headed flying fox ( <i>Pteropus poliocephalus</i> )
Site condition (structure and condition of site, diversity of relevant endemic and non-endemic species)	<p>The assessed patch:</p> <ul style="list-style-type: none"> <li>Large (&gt;5ha) contiguous patch</li> <li>Good condition (non-native species 20-50% of total groundcover)</li> <li>Meets criteria for Habitat critical for the survival of the species</li> </ul>
Site context (connectivity, importance in relation to overall occurrence, threats)	The impact site is currently connected to a band of mapped Melaleuca open forest on alluvium (RE 12.3.6) and Eucalypt woodland (RE 12.5.4). Connectivity is occasionally broken by existing roads, rail line, pine plantation and Torbanlea township.
Overall site quality	5 out of 10
Overall area impacted	17.42 ha
Total quantum of impact (in consideration of habitat quality)	8.71 ha


The following assumptions have been used to estimate an indicative offset requirement:

- Maximum area of disturbance = **17.74 ha** (refer Section 1.5).
- The total quantum of impact (refer Table 4-3) = **10.45 ha**.
- The offset site will have a starting quality of 5 (out of 10).
- The proposed offset works will raise the offset site quality to 7 after 20 years.

Based on these assumptions, an offset area of **45.4 ha** will provide approximately **99.94%** of the direct offset requirement (refer Table 4-4). A copy of the EPBC Act Offset Assessment Guide for the proposed offset is provided in Appendix C.

**Table 4-4 Assumptions used to determine offset obligations for the Grey-headed flying fox using the Commonwealth Offset Assessment Guide**

Offset Assessment Guide item	Value used (refer Appendix C)
Total quantum of impact (refer Table 4-3)	10.45 ha
Risk-related time horizon	20 years
Time until ecological benefit	20 years



Offset Assessment Guide item	Value used (refer Appendix C)
Offset site starting quality	5
Offset site quality without offsets	4
Risk of loss without offset	0%
Offset site quality with offset	7
Risk of loss with offset	0%
Confidence in result	80%
Proposed offset area	45.4 ha
Proportion of impact area offset	100.16%

# Assumed or derived from the Commonwealth Offset Assessment Guide

## 4.4 Environmental offset for direct disturbance to Greater glider (*Petauroides volans*)

As indicated in Section 3.2.3, the Greater glider (*Petauroides volans*) has been identified as likely to be subject to significant impacts when assessed against the Significant impact guidelines 1.1 (DoE 2013) as the Proposed Action will reduce the extent of the species habitat (i.e., removal of **17.42 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.

Whilst assessment of the Proposed Action upon the Koala, White-throated needle tail and migratory species indicated that these species are not likely to be subject to significant impacts (refer Section 3.3.1, Section 3.4.1, and Section 3.4.2)), the provision of a direct offset for the Greater glider, would ensure that these species are subject to a positive conservation outcome as a result of the Proposed Action. Offset inputs for the EPBC Offsets Assessment Guide are listed in Table 4-5.

**Table 4-5 Impact site calculations used to determine offset obligations for the Greater glider**

MNES feature requiring offset	Comment
Fauna species	Greater glider ( <i>Petauroides volans</i> )
Site condition (structure and condition of site, diversity of relevant endemic and non-endemic species)	<p>The assessed patch:</p> <ul style="list-style-type: none"> <li>Large (&gt;5ha) contiguous patch</li> <li>Good condition (non-native species 20-50% of total groundcover)</li> <li>Meets criteria for Habitat critical for the survival of the species</li> </ul>
Site context (connectivity, importance in relation to overall occurrence, threats)	The impact site is currently connected to a band of mapped Melaleuca open forest on alluvium (RE 12.3.6) and Eucalypt woodland (RE 12.5.4). Connectivity is occasionally broken by existing roads, rail line, pine plantation and Torbanlea township.
Overall site quality	5 out of 10
Overall area impacted	17.42 ha
Total quantum of impact (in consideration of habitat quality)	10.44 ha

The following assumptions have been used to estimate an indicative offset requirement:

- Maximum area of disturbance = **17.74 ha** (refer Section 1.5).
- The total quantum of impact (refer Table 4-5 Table 4-3) = **10.44 ha**.
- The offset site will have a starting quality of 5 (out of 10).
- The proposed offset works will raise the offset site quality to 7 after 20 years.

Based on these assumptions, an offset area of **55 ha** will provide approximately **99.60%** of the direct offset requirement (refer Table 4-6). A copy of the EPBC Act Offset Assessment Guide for the proposed offset is provided in Appendix C.

**Table 4-6 Assumptions used to determine offset obligations for the Greater glider using the Commonwealth Offset Assessment Guide**

Offset Assessment Guide item	Value used (refer Appendix C)
Total quantum of impact (refer Table 4-5)	10.44 ha
Risk-related time horizon	20 years
Time until ecological benefit	20 years
Offset site starting quality	5
Offset site quality without offsets	4
Risk of loss without offset	0%
Offset site quality with offset	7
Risk of loss with offset	0%
Confidence in result	80%
Proposed offset area	55 ha
Proportion of impact area offset	99.60%

# Assumed or derived from the Commonwealth Offset Assessment Guide





## 5 Summary and conclusion

The area encompassed by the Proposed Action (Project site) contains the following MNES values:

- Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC
- Grey-headed flying-fox habitat
- Greater glider habitat
- Koala habitat
- White-throated needletail habitat
- Habitat for EPBC Act listed migratory species.

Whilst the presence of Koala was not observed during site assessments, habitat for this species will be removed by the Proposed Action. However, the magnitude of these impacts, in consideration of the relatively small area of disturbance, the localised nature of potential impacts, the nature of disturbance, the proposed mitigation measures, and in consideration of the EPBC Act Significant impact guidelines 1.1, these impacts are not likely to result in a significant impact to this species.

Approximately **4.76 ha** of the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC is proposed to be removed as part of the Proposed Action. Additionally, an approximate area of **17.42 ha** of Grey-headed flying fox and Greater glider will 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 this ecological community. In order to ensure that a positive conservation outcome is achieved, it is proposed that the following environmental offsets will be provided:

- **15.12 ha** for the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC.
- **45.4 ha** for the Grey-headed flying fox.
- **55 ha** for the Greater Glider.

These offset quantum's have been calculated utilising the EPBC Act Offset Assessment Guide. The provision of these environment offsets are also likely to benefit MNES within the location area that are unlikely to be subject to significant impacts (e.g., Migratory species).

A range of mitigation measures, both MNES specific and for other environmental values, are proposed to reduce the magnitude of impacts associated with the Proposed Action. This includes mitigation measures to reduce the magnitude of direct impacts (e.g., provision of an environmental offset) and indirect impacts (i.e., flora and fauna measure, weed and pest control, rehabilitation, erosion and sedimentation control, High-Risk SMP). Combined, these measures will effectively reduce the severity of impacts to acceptable levels and in the long-term, result in positive environmental outcomes.

It is therefore concluded, in consideration of the nature of impacts, proposed mitigation and the type of disturbance, that the Proposed Action is a **controlled action** as a result of its impact to the Coastal Swamp Sclerophyll Forest of NSW and SEQ TEC, Grey-headed flying fox and Greater glider.



## 6 References

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

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.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022a). Species Profile and Threats Database (SPRAT): *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT) — Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory). Available from: [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=85104](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=85104)

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/cgi-bin/sprat/public/publicshowcommunity.pl?id=171&status=Endangered>

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022c). Species Profile and Threats Database (SPRAT): *Pteropus poliocephalus* — Grey-headed Flying-fox. Available from: [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=186](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=186)

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

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022e). National Recovery plan for the Koala: *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory). Department of Climate Change, Energy, the Environment and Water, Canberra. March 2022. CC BY 4.0.

Department of Environmental and Science (DES) (2020). Flora Survey Guidelines - Protected Plants. *Nature Conservation Act 1992*.

Department of the Environment (DotE) (2013). *Matters of National Environmental Significance: Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999*. Available from: [https://www.awe.gov.au/sites/default/files/documents/nas-guidelines\\_1.pdf](https://www.awe.gov.au/sites/default/files/documents/nas-guidelines_1.pdf)


Department of the Environment (DotE) (2015). Referral guideline for 14 birds listed as migratory species under the EPBC Act. <https://www.awe.gov.au/sites/default/files/documents/migratory-birds-draft-referral-guideline.pdf>

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2012). Offsets Assessment Guide. Available from: <https://www.awe.gov.au/sites/default/files/documents/offset-assessment-guide.xlsm>

Draffan, R.D.W., S.T. Garnett & G.J. Malone. (1983). Birds of the Torres Strait: an annotated list and biogeographic analysis. *Emu*. 83:207-234.

Eby, P. and Law, B., (2008). Ranking the feeding habitats of Grey-headed flying-foxes for conservation management. A report for The Department of Environment and Climate Change (NSW) & The Department of Environment, Water, Heritage and the Arts. October 2008

Eyre, T.J., Kelly, A.L., Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. (2015). *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2*. Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane. Available from: [https://www.qld.gov.au/data/assets/pdf\\_file/0029/68726/biocondition-assessment-manual.pdf](https://www.qld.gov.au/data/assets/pdf_file/0029/68726/biocondition-assessment-manual.pdf)



Higgins, P.J. (ed.). (1999). Handbook of Australian, New Zealand and Antarctic Birds. Volume Four - Parrots to Dollarbird. Melbourne: Oxford University Press.

Norman, J.A., Phillips, S.S., Blackmore, C.J. et al. Integrating measures of long-distance dispersal into vertebrate conservation planning: scaling relationships and parentage-based dispersal analysis in the koala. *Conserv Genet* 20, 1163–1174 (2019). <https://doi.org/10.1007/s10592-019-01203-2>

Pizzey, G. and Knight, F. (2007). *The Field Guide to the Birds of Australia*. Harper Collins publishing, Sydney.

Phillips S and Callaghan J (2011). *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus*. *Australian Zoologist*, 35(3):774-780.

State of Queensland (2014). *Queensland Environmental Offsets Policy Significant Residual Impact Guideline (Nature Conservation Act 1992 Environmental Protection Act 1994 Marine Parks Act 2004)*. Communities. Available from: [https://environment.des.qld.gov.au/data/assets/pdf\\_file/0017/90404/significant-residual-impact-guide.pdf](https://environment.des.qld.gov.au/data/assets/pdf_file/0017/90404/significant-residual-impact-guide.pdf)

Strahler, A.N. (1964). *Quantitative geomorphology of drainage basins and channel networks*. Chow, V.T., Editor. *Handbook of Applied Hydrology*. New York: McGraw-Hill; 1964; pp. 4-39, 4-76.

Tarburton, M.K. (1993). Radiotracking a White throated Needletail to roost. *Emu*. 93:121--124.

Yungentob, K.N, Marsh, K.F., Skewes, J., (2021). A review of koala habitat assessment criteria and methods, report prepared for the Department of Climate Change, Energy, the Environment and Water, Canberra, November. CC BY 4.0.



# Appendix A

## Likelihood of occurrence assessment

Table A-1 Likelihood of occurrence for matters within the Project site

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



Ecological matter	Conservation status EPBC Act	Likelihood of occurrence
Coastal Swamp Oak ( <i>Casuarina glauca</i> ) 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 site. Suitable habitat for this species exists within the Project site.

CE: Critically Endangered

E: Endangered

V: Vulnerable

M: Migratory





## Appendix B

# Significant Impact Assessment

### Coastal Swamp Sclerophyll Forest Threatened Ecological Community

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

- Reduce the extent of an ecological community
- Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- Adversely affect habitat critical to the survival of an ecological community
- Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  - Assisting invasive species, that are harmful to the listed ecological community, to become established, or
  - Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
  - Interfere with the recovery of an ecological community.

An assessment of the Proposed Action against the Commonwealth's Significant Impact Guideline for endangered ecological communities is provided in Table B-1 Table B-1.

**Table B-1 Significant impact assessment of Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland Threatened Ecological Community**

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
<b>Matter:</b> Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland Threatened Ecological Community (Endangered)	
Will the action reduce the extent of an ecological community	<b>Yes.</b> Commonwealth conservation listing advice for this TEC does not provide minimum or maximum thresholds related to allowable direct removal of this community. In addition, the direct removal of vegetation is identified as one of the key threatening processes for this TEC. Therefore, is it considered that the direct removal of approximately 4.76 ha of RE 12.3.6 will result in the reduction of the extent of this TEC.
Will the action fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	<b>Yes.</b> The proposed action will result in the creation of additional fragmentation by severing a relatively large patch of RE 12.3.6 in two separate locations.
Will the action adversely affect habitat critical to the survival of an ecological community	<b>Yes.</b> Commonwealth conservation advice for this TEC identifies that areas/habitat critical to the survival of the ecological community are those where the hydrological regime remains reasonably intact such that the



Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	<p>vegetative diagnostic features are maintained characterised as being of high condition (i.e., non-native species comprise &lt; 20% of total ground layer vegetation cover). In addition, large patches (i.e., &gt;5 ha) are considered to have the greatest condition class.</p> <p>The area proposed to be impacted is a large patch that contains relatively few weeds. Therefore, the proposed action will adversely affect habitat critical to the survival of the ecological community.</p>
Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	<b>No.</b> As part of the proposed works, mitigation measure will be implemented to ensure that the existing hydrological regimes, nutrient cycles and abiotic factors remain unchanged (i.e., culverts).
Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	<b>No.</b> Mitigation measures will be implemented to ensure that there is no substantial change in the species composition or loss of ecological functionality.
<p>Will the action cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> <li>■ assisting invasive species, that are harmful to the listed ecological community, to become established, or</li> <li>■ causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community</li> </ul>	<b>No.</b> The action will not cause a substantial change in the quality or integrity of the occurrence of the ecological community. Mitigation measures will be implemented to ensure that hydrological regimes remain unaltered, and groundwater levels so not substantially changes as a result of the Project.
Will the action interfere with the recovery of an ecological community	<b>Yes.</b> The proposed action will interfere with the recovery of the ecological community by reducing the extent of the community and removing habitat critical to the survival of the community
Determination of assessment: <b>Significant impact likely</b>	

## Koala

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 B-2Table B-2.

**Table B-2 Significant impact assessment of Koala**

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
<b>Matter:</b> Koala	
Will the action reduce the area of occupancy of the species	<b>No.</b> 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	<b>No.</b> 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	<p><b>No.</b> 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%.</p> <p>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. 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.</p> <p>As such, the proposed works are considered unlikely to adversely affect habitat critical to the survival of Koala.</p>
Will the action disrupt the breeding cycle of a population	<b>No.</b> 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



Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	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	<b>No.</b> 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	<p><b>No.</b> Invasive species identified within the proposed works area are not considered a primary threat for Koala (DCCEEW 2022).</p> <p>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.</p> <p>As such, the proposed works area considered unlikely to result in invasive species becoming established in habitat that are harmful to a vulnerable species.</p>
Will the action introduce disease that may cause the species to decline	<p><b>No.</b> 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.</p> <p>Pathogens, such as Myrtle rust (<i>Austropuccinia psidiior</i>) and Phytophthora (<i>Phytophthora cinnamomi</i>), 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 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.</p> <p>As such, the Proposed Action is considered unlikely to introduce disease that may cause these species to decline.</p>
Will the action interfere with the recovery of the species.	<b>No.</b> 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.



Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
	As such, the proposed works is considered unlikely to interfere substantially with the recovery of the species.
Determination of assessment: <b>Significant impact unlikely</b>	





## Greater Glider

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 Greater glider is provided in Table B-3Table B-2.

**Table B-3 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	<p><b>No.</b> Field-based surveys conducted to date 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</p> <p>It is noted that targeted Greater glider field surveys will occur between 20-24th February 2023 to further assess potential presence of the species within the Project area. This significant impact assessment criteria response will be updated should field surveys confirm the species presence within the Project area, noting that the Project is proceeding with an assessment of 'significant impact' for the Greater glider due to the clearance of critical habitat.</p>
Will the action reduce the area of occupancy of a population	<p><b>No.</b> Field-based surveys conducted to date 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.</p> <p>It is noted that targeted Greater glider field surveys will occur between 20-24th February 2023 to further assess potential presence of the species within the Project area. This significant impact assessment criteria response will be updated should field surveys confirm the species presence within the Project area, noting that the Project is proceeding with an assessment of 'significant impact' for the Greater glider due to the clearance of critical habitat.</p>
Will the action fragment an existing population into two or more populations	<p><b>No.</b> Field-based surveys conducted to date 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.</p> <p>It is noted that targeted Greater glider field surveys will occur between 20-24th February 2023 to further assess potential presence of the species within the Project area. This significant impact assessment criteria response will be updated should field surveys confirm the species presence within the Project</p>



Significant impact criteria	Assessment of the Project against the Significant impact criteria
	area, noting that the Project is proceeding with an assessment of 'significant impact' for the Greater glider due to the clearance of critical habitat.
Will the action adversely affect habitat critical to the survival of a species	<b>Yes.</b> 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	<b>No.</b> The proposed Action is unlikely to disrupt the breeding cycle of a population of the Greater glider.  It is noted that targeted Greater glider field surveys will occur between 20-24th February 2023 to further assess potential presence of the species within the Project area. This significant impact assessment criteria response will be updated should field surveys confirm the species presence within the Project area, noting that the Project is proceeding with an assessment of 'significant impact' for the Greater glider due to the clearance of critical habitat.
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	<b>No.</b> 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	<b>No.</b> 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. Mitigation strategies, including weed management will be implemented during the life of the Project to manage potential impacts from invasive species. As such, the Project activities are considered unlikely to result in invasive species becoming established in habitat areas for the Greater glider.
Will the action introduce disease that may cause the species to decline	<b>No.</b> The proposed action is unlikely to introduce disease which may lead to decline of the Greater glider. 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. Pathogens, such as Myrtle rust ( <i>Austropuccinia psidii</i> ) and Phytophthora ( <i>Phytophthora cinnamomi</i> ), 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 to manage potential impacts from invasive species. As such, the Project is considered unlikely to introduce disease that may cause these species to decline.
Will the action interfere with the recovery of the species.	<b>Possible.</b> 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:	<b>Significant impact likely</b>

## Grey-headed flying-fox

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

- Lead to a long-term decrease in the size of an important population of a species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations
- Adversely affect habitat critical to the survival of a species




- Disrupt the breeding cycle of an important population
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- Introduce disease that may cause the species to decline, or
- Interfere substantially with the recovery of the species.

An assessment of the Proposed Action against the Commonwealth's Significant Impact Guideline for the Grey-headed flying-fox is provided in Table B-4. **Error! Reference source not found..**

**Table B-4 Significant impact assessment of Grey-headed flying-fox**

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
<b>Matter:</b> Grey-headed flying-fox	
Will the action lead to a long-term decrease in the size of an important population of a species	<p><b>No.</b> Grey-headed flying-fox are considered to form one single interbreeding population across most states of Australia. As such, local populations of the species may be considered to be an important population.</p> <p>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.</p> <p>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.</p> <p>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%.</p> <p>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.</p>
Will the action reduce the area of occupancy of an important population	<p><b>No.</b> 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.</p> <p>The proposed works area is not considered to significantly reduce the area of occupancy of an important population of this species.</p>
Will the action fragment an existing population into two or more populations	<p><b>No.</b> 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.</p>
Will the action adversely affect habitat critical to the survival of a species	<p><b>Yes.</b> 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.</p> <p>The action associated with the proposed works are considered likely to adversely affect habitat critical to the survival of a species.</p>



Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
Will the action disrupt the breeding cycle of a population	<p><b>No.</b> 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%.</p> <p>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.</p>
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	<p><b>Possible.</b> As there is habitat Critical to the survival of the species within the Project site, 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.</p> <p>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.</p>
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	<p><b>No.</b> Invasive species identified within the proposed works area are not considered a primary threat for Grey-headed flying-fox (DCCEEW 2021b).</p> <p>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.</p> <p>As such, the proposed works are considered unlikely to result in invasive species that are harmful becoming established in habitat for this species.</p>
Will the action introduce disease that may cause the species to decline	<p><b>No.</b> 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 disease free, no additional risk to the health of these species is considered likely as a result of construction of the proposed works.</p> <p>Pathogens, such as Myrtle rust (<i>Austropuccinia psidior</i>) and Phytophthora (<i>Phytophthora cinnamomi</i>), 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.</p>
Will the action interfere with the recovery of the species	<p><b>Possible.</b> 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.</p> <p>The proposed works are considered likely to interfere with the recovery of the species.</p>
Determination of assessment:	<b>Significant impact <u>likely</u></b>



## White-throated needletail


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

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

An assessment of the Proposed Action against the Commonwealth's Significant Impact Guideline for the White-throated needletail is provided in Table B-5Table B-5.

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

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
<b>Matter:</b> White-throated needletail	
Will the action lead to a long-term decrease in the size of an important population of a species	<b>No.</b> 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).  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	<b>No.</b> 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	<b>No.</b> 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	<b>No.</b> 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	<b>No.</b> 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	<b>No.</b> 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, the Proposed Action is considered unlikely to modify, destroy, remove or



Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
extent that the species is likely to decline	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	<b>No.</b> 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	<b>No.</b> 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.  As such, the Proposed Action is considered unlikely to interfere substantially with the recovery of the species
Determination of assessment: <b>Significant impact unlikely</b>	

## Migratory species

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 B-6.

**Table B-6 Significant impact assessment of listed migratory species**

Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
<b>Matter:</b> Migratory species: Fork-tailed swift ( <i>Apus pacificus</i> ) Oriental cuckoo ( <i>Cuculus optatus</i> ) Spectacled Monarch ( <i>Symposiachrus trivirgatus</i> ) Satin flycatcher ( <i>Myiagra cyanoleuca</i> )	





Significant impact criteria	Assessment of the proposed action against the Significant impact criteria
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	<b>No.</b> 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	<b>No.</b> 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	<b>No.</b> 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: <b>Significant impact unlikely</b>	



## Appendix C

# Commonwealth Offset Assessment Guide

<b>Offsets Assessment Guide</b>	
For use in determining offsets under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> 2 October 2012	
This guide relies on Macros being enabled in your browser.	

Matter of National Environmental Significance	
Name	Greater Glider
EPBC Act status	Endangered
Annual probability of extinction <small>Based on IUCN category definitions</small>	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	Habitat for Greater glider	Area	17.4	Hectares	Extent validated by ground-truthing and detailed field investigations
				Quality	6	Scale 0-10	
				Total quantum of impact	10.44	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
	Mortality rate e.g Change in number of road kills per year	No					
	Number of individuals e.g. Individual plants/animals	No					

Offset calculator																					
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
	Ecological Communities																				
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset									
						Future area without offset (adjusted hectares)	0.0		Future area with offset (adjusted hectares)	0.0											
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
	Threatened species habitat																				
	Area of habitat	Yes	10.44	Adjusted hectares	55	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	55	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%								
						Future area without offset (adjusted hectares)	55.0		Future area with offset (adjusted hectares)	55.0	0.00	80%	0.00	0.00							
						Time until ecological benefit	20	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	7	3.00	80%	2.40	1.89				
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
	Number of features e.g. Nest hollows, habitat trees	No																			
	Condition of habitat Change in habitat condition, but no change in extent	No																			
	Threatened species																				
	Birth rate e.g. Change in nest success	No																			
	Mortality rate e.g. Change in number of road kills per year	No																			
	Number of individuals e.g. Individual plants/animals	No																			

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	10.44	10.40	99.60%	Yes	\$0.00	#DIV/0!	#DIV/0!
	Area of community	0				\$0.00		\$0.00
							\$0.00	#DIV/0!

<b>Offsets Assessment Guide</b>
For use in determining offsets under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> 2 October 2012
This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Grey-Headed Flying fox
EPBC Act status	Vulnerable
Annual probability of extinction <small>Based on IUCN category definitions</small>	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	Yes		Area		Hectares	
				Quality		Scale 0-10	
				Total quantum of impact	0.00	Adjusted hectares	
	Threatened species habitat						
	Area of habitat	Yes	Habitat for Grey-headed flying fox	Area	17.42	Hectares	Extent validated by ground-truthing and detailed field investigations
				Quality	6	Scale 0-10	
				Total quantum of impact	10.45	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species							
Birth rate e.g. Change in nest success	No						
Mortality rate e.g. Change in number of road kills per year	No						
Number of individuals e.g. Individual plants/animals	No						

Offset calculator																						
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source		
	Ecological Communities																					
	Area of community	Yes		Adjusted hectares		Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset		0.00		0.00	0.00	0.00	#DIV/0!	#DIV/0!		
								Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0											
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)										0.00
	Threatened species habitat																					
	Area of habitat	Yes	10.45	Adjusted hectares	45.4	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	45.4	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	80%	0.00	0.00	10.47	100.16%	Yes		
								Future area without offset (adjusted hectares)	45.4	Future area with offset (adjusted hectares)	45.4											
						Time until ecological benefit	20	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	7									
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source		
	Number of features e.g. Nest hollows, habitat trees	No																				
	Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																						
Birth rate e.g. Change in nest success	No																					
Mortality rate e.g. Change in number of road kills per year	No																					
Number of individuals e.g. Individual plants/animals	No																					

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	10.452	10.47	100.16%	Yes	\$0.00	N/A	\$0.00
	Area of community	0	0.00	#DIV/0!	#DIV/0!	\$0.00	#DIV/0!	#DIV/0!
						\$0.00	#DIV/0!	#DIV/0!

<b>Offsets Assessment Guide</b>
For use in determining offsets under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> 2 October 2012
This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Swamp Sclerophyll TEC
EPBC Act status	Endangered
Annual probability of extinction <small>Based on IUCN category definitions</small>	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	Yes	The assessed patch:**contains 33 diagnostic endemic species listed in Appendix A of the listing advice* contains 118 endemic species and 26 non-endemic species	Area	4.76	Hectares	Extent validated by ground-truthing and detailed field investigations
				Quality	6	Scale 0-10	
				Total quantum of impact	2.86	Adjusted hectares	
	Threatened species habitat						
	Area of habitat	Yes		Area		Hectares	
				Quality		Scale 0-10	
				Total quantum of impact	0.00	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
	Mortality rate e.g Change in number of road kills per year	No					
	Number of individuals e.g. Individual plants/animals	No					

Offset calculator																										
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source						
	Ecological Communities																									
	Area of community	Yes	2.86	Adjusted hectares	15.12	Risk-related time horizon (max. 20 years)	20	Start area (hectares)	15.12	Risk of loss (%) without offset	0%	Risk of loss (%) with offset	0%	0.00	80%	0.00	0.00	2.86	100.09%	Yes						
						Future area without offset (adjusted hectares)	15.1	Future area with offset (adjusted hectares)	15.1																	
						Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	8	3.00	80%	2.40	1.89									
	Threatened species habitat																									
	Area of habitat	Yes		Adjusted hectares		Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset		0.00		0.00	0.00	0.00	#DIV/0!	#DIV/0!						
										Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0													
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)		0.00		0.00	0.00									
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source						
	Number of features e.g. Nest hollows, habitat trees	No																								
	Condition of habitat Change in habitat condition, but no change in extent	No																								
	Threatened species																									
	Birth rate e.g. Change in nest success	No																								
Mortality rate e.g. Change in number of road kills per year	No																									
Number of individuals e.g. Individual plants/animals	No																									

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	0	0.00	#DIV/0!	#DIV/0!	\$0.00	#DIV/0!	#DIV/0!
	Area of community	2.856	2.86	100.09%	Yes	\$0.00	N/A	\$0.00
							\$0.00	#DIV/0!



# Appendix D

## PMST results





## 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: 11-May-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

## 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance (Ramsar):</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	3
<a href="#">Listed Threatened Species:</a>	30
<a href="#">Listed Migratory Species:</a>	15

### 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

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 <http://www.environment.gov.au/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.

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	19
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	None

### Extra Information

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

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">EPBC Act Referrals:</a>	1
<a href="#">Key Ecological Features (Marine):</a>	None
<a href="#">Biologically Important Areas:</a>	None
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None





## Details

### Matters of National Environmental Significance

#### 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
<a href="#">Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community</a>	Endangered	Community may occur	In feature area within area
<a href="#">Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland</a>	Endangered	Community may occur	In feature area within area
<a href="#">Lowland Rainforest of Subtropical Australia</a>	Critically Endangered	Community may occur	In feature area within 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
<b>BIRD</b>			
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Cyclopsitta diophthalma coxeni</a> Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Erythrotriorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area




Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Geophaps scripta scripta</a> Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Turnix melanogaster</a> Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In feature area

#### MAMMAL

<a href="#">Chalinolobus dwyeri</a> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Dasvurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Petauroides volans</a> Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Petaurus australis australis</a> Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area





Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#"><u>Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</u></a>			
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
<a href="#"><u>Pteropus poliocephalus</u></a>			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<b>PLANT</b>			
<a href="#"><u>Acacia attenuata</u></a>			
[10690]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#"><u>Bosistoa transversa</u></a>			
Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#"><u>Cossinia australiana</u></a>			
Cossinia [3066]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#"><u>Cryptostylis hunteriana</u></a>			
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#"><u>Cupaniopsis shirleyana</u></a>			
Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#"><u>Fontainea venosa</u></a>			
[24040]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#"><u>Macadamia integrifolia</u></a>			
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
<a href="#"><u>Macrozamia lomandroides</u></a>			
cycad [55406]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#"><u>Macrozamia pauli-guilielmi</u></a>			
Pineapple Zamia [5712]	Endangered	Species or species habitat likely to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Rhodomyrtus psidioides</a> Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Samadera bidwillii</a> Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<b>REPTILE</b>			
<a href="#">Delma torquata</a> Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Furina dunmalli</a> Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
<b>Listed Migratory Species</b>		<b>[ Resource Information ]</b>	
Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>Migratory Marine Birds</b>			
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
<b>Migratory Marine Species</b>			
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
<b>Migratory Terrestrial Species</b>			
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat likely to occur within area	In feature area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area






Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
<a href="#">Symposiachrus trivirgatus</a> as <a href="#">Monarcha trivirgatus</a> Spectacled Monarch [83946]		Species or species habitat likely to occur within area	In feature area
<b>Migratory Wetlands Species</b>			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> 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			



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Bubulcus ibis as Ardea ibis</a> Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area



Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Rostratula australis as Rostratula benghalensis (sensu lato)</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Symposiachrus trivirgatus as Monarcha trivirgatus</a> Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area	In feature area
<b>Reptile</b>			
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area



## Extra Information

EPBC Act Referrals			[ Resource Information ]	
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthm two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed	In feature area



# Appendix E

## High Risk SMP



# Queensland Train Manufacturing Program, Torbanlea Enabling Works

Species Management Program – High Risk of Impacts

**Department of Transport and Main Roads**

Reference: 511003-0000-REP-NN-0004

Revision: 1

---

2022-04-27





# Document control record

Document prepared by:

**Aurecon Australasia Pty Ltd**

ABN 54 005 139 873

Ground Floor, 25 King Street  
Bowen Hills QLD 4006

Locked Bag 331  
Brisbane QLD 4001  
Australia

**T** +61 7 3173 8000

**F** +61 7 3173 8001

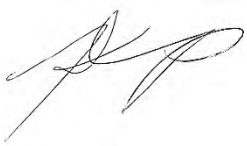
**E** brisbane@aurecongroup.com

**W** aurecongroup.com

A person using Aurecon documents or data accepts the risk of:

- a) Using the documents or data in electronic form without requesting and checking them for accuracy against the original hard copy version.
- b) Using the documents or data for any purpose not agreed to in writing by Aurecon.

Document control							aurecon
Report title		Species Management Program – High Risk of Impacts					
Project number		511003-	Document code		511003-0000-REP-NN-0004		
File path		TMR High Risk SMP - Wallum froglet.docx					
Client		Department of Transport and Main Roads					
Client contact		Helen Stevenson	Client reference		N/A		
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver	
1	2022-04-27	Draft for Review	KK	CS	HC	GO	
Current revision		1					

Approval			
Author signature		Approver signature	
Name	Kurtis Kemp	Name	Gabrielle Osborn
Title	Ecologist	Title	Principal Civil Engineer

# Contents



<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	Project background.....	1
1.2	Purpose of Document.....	1
1.3	Legislative framework.....	2
1.3.1	Nature Conservation Act 1992 and Nature Conservation (Animals) Regulation 2020 .....	2
<b>2</b>	<b>Application .....</b>	<b>4</b>
2.1	Approved agents .....	4
<b>3</b>	<b>Terms .....</b>	<b>5</b>
3.1	Terms of Approval .....	5
<b>4</b>	<b>Assessment of impacts.....</b>	<b>6</b>
4.1	Introduction .....	6
4.2	Field Assessment .....	6
4.2.1	Breeding Habitat.....	6
4.3	Species subject to this High Risk SMP .....	6
4.3.1	Wallum froglet.....	7
<b>5</b>	<b>Species Management Program .....</b>	<b>8</b>
5.1	Nature of Impact.....	8
5.1.1	Size of impact.....	8
5.1.2	Direct impact.....	8
5.2	Impact Management Solutions .....	8
5.2.1	Management actions .....	8
5.2.2	Responsibilities.....	8
5.2.3	Qualified persons.....	9
5.2.4	Monitoring and reporting.....	9
5.2.5	Training and awareness .....	9
5.3	Contingency planning .....	10
5.3.1	Animal breeding place incidents and corrective actions .....	10
5.3.2	Non-compliance reporting .....	11
5.3.3	Changes to species conservation status.....	11
5.3.4	Variations to the Species Management Program.....	11
5.4	Animal Breeding Place Register.....	11
5.5	Ecological performance auditing .....	12
<b>6</b>	<b>References.....</b>	<b>13</b>



## Appendices

Appendix A.....	0
MSES Search Results .....	0
Appendix B.....	0
Regulated Vegetation and Essential Habitat Mapping .....	0
Appendix C.....	0
Impact Mitigation Measures.....	0

## Figures

Figure 1	Enabling Works Project Area.....	3
Figure 2	Image of Wallum froglet ( <i>Crinia tinnula</i> ) – specimen not located within the subject site, but considered likely to occur. Inset provides an image of the Wallum froglet tadpole (adapted from Marion Anstis 2002 and Aaron Pyne 2016).....	7

## Tables

Table 1-1	Species Management Program Requirements.....	2
Table 2-1	Applicant details.....	4
Table 4-1	Fauna species to which the Project High Risk SMP applies .....	7
Table 5-1	Summary of potential project adverse impacts on local fauna assemblages.....	8
Table 5-2	Contact details in the event of an injury or death of native wildlife .....	10

# 1 Introduction

## 1.1 Project background

The Queensland Train Manufacturing Program (QTMP) is a large program of works initiated by the Queensland Government's Department of Transport and Main Roads (TMR) that will provide modern train and rail infrastructure proposed to integrate with and enhance South East Queensland's (SEQ) existing train fleet prior to the commencement of Cross-River Rail (CRR) services, and the Brisbane 2032 Olympic and Paralympic games.

As part of the QTMP, a train manufacturing facility is proposed in Torbanlea, Queensland, located approximately 20 km north of the Maryborough town centre, on Lot 35 CK3261. The manufacturing facility will deliver an initial fleet of 65 state-of-the-art six-car passenger trains to meet technical, accessibility and performance requirements and provide safe, reliable travel and improved passenger experience.

Development approval for the proposed train manufacturing facility will be obtained via ministerial infrastructure designation (MID) in accordance with Part 5 of the *Planning Act 2016*. The MID application was submitted to the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) on 18 February 2022 and is currently within the public notification stage.

To enable access during construction and operation of the proposed train manufacturing facility, the following road improvement works (hereinafter referred to as the Project) are proposed:

- Road improvements to Ritchie Road, Robertson Road, Gympie Street and Burgowan Road
- Road upgrade works to the Bruce Highway, including the widening of the Bruce Highway for approximately 2.6 km, a U-turn facility and a new entry point into Lot 35 on CK3261

An ecological field investigation was conducted within the Project area, as illustrated in Figure 1, by Aurecon on the 7 April 2022. During this survey, it was determined that potential breeding habitat for one species of frog, (Wallum froglet, *Crinia tinnula*), listed as Vulnerable under the provisions of the NC Act, was present within, and immediately adjacent to, the Project area. Potential breeding areas for this species are areas that consist of ephemeral acidic pools of water that occur after heavy rainfall events. Given the above, the Project requires the preparation of a Species Management Program (High Risk SMP) in accordance with Section 88 of the *Nature Conservation Act 1992* (Qld) (NC Act).

## 1.2 Purpose of Document

The Project is seeking approval to use the Department of Environment and Science (DES) High Risk SMP. This site-specific document has been prepared as the required 'additional report' to accompany the DES High Risk SMP.

It is noted that this High Risk SMP will address management actions for animal breeding places belonging to the Wallum froglet. This High Risk SMP refers specifically to the animal breeding place of the species and does not address species habitat or occurrence of the species within the Project. Specifically, the purpose of this document is to:

- Define the terms of approval (Section 3.1)
- Provide an overview of the ecological field assessment in relation to impacts to animal breeding places (Section 4)
- Assess the nature of impacts to animal breeding places (Section 5.1)
- Incorporate management actions that will avoid, minimise and/or mitigate both the potential immediate and long term impact/s of removing an animal breeding place (Section 5.2)
- Set monitoring and reporting requirements that demonstrate the management actions in this High Risk SMP are effectively implemented and produce the intended results (Section 5.3)

This document provides management measures to be implemented during Project works by TMR and their associated contractors, sub-contractors, and agents relevant to the Project, to avoid, minimise and/or mitigate impacts to animal breeding places with special consideration for the Wallum froglet.

Any additional environmental management not related to animal breeding places will be managed as per the *Transport and Main Roads Specifications MRTS51 Environmental Management* (MRTS51) and the Project specific Construction Environmental Management Plan (EMP(C)).

This High Risk SMP will not give authority for clearing or removal of habitat (excluding animal breeding places), which may require assessment under additional legislative pathways/provisions, nor will it prevent any reasonable action/s being undertaken by the applicant or its contractor/s or other Approved Entities to safeguard public and staff safety in the case of an emergency situation.

## 1.3 Legislative framework

### 1.3.1 Nature Conservation Act 1992 and Nature Conservation (Animals) Regulation 2020

The NC Act provides the legislative basis for the conservation of nature through the dedication, declaration and management of protected areas and the protection of native wildlife and its habitat.

A High Risk SMP is required under Section 88 of the NC Act and Section 335 of the *Nature Conservation (Animals) Regulation 2020* (Qld) (NC Animals Regulation) to authorise interference with animal breeding places.

Section 335 of the NC Animals Regulation prescribes that a person must not tamper with an animal breeding place unless, amongst other matters, the tampering (including removal of the breeding place but not the animal) is part of an approved SMP for animals of the same species.

An animal breeding place is defined under Schedule 7 of the NC Animals Regulation as:

*“...a bower, burrow, cave, hollow, nest or other thing that is commonly used by the animal to incubate or rear the animal’s offspring.”*

A Species Management Program (SMP) is required for varying classes of protected fauna, where an associated breeding place has been identified, and where tampering of the breeding place is necessary to complete the Project (refer to Table 1-1).

**Table 1-1 Species Management Program Requirements**

Low Risk SMP required for:	<ul style="list-style-type: none"> <li>■ Least concern animals (excluding Special least concern and colonial breeders)</li> </ul>
High Risk SMP required for:	<ul style="list-style-type: none"> <li>■ Least concern animals that are colonial breeders<sup>1</sup>; or</li> <li>■ Special least concern animals, as defined by the NC Animals Regulation; or</li> <li>■ Near threatened animals (as prescribed by the NC Animals Regulation); or</li> <li>■ Vulnerable animals (as prescribed by the NC Animals Regulation); or</li> <li>■ Endangered animals (as prescribed by the NC Animals Regulation); or</li> <li>■ Critically Endangered animals (as prescribed by the NC Animals Regulation)</li> </ul>

**Table note:**

- 1 Under the provisions of the NC Act, a ‘colonial breeder’ means a group of animals of the same kind co-existing in close association for breeding purposes



Source: Esri, Microsoft, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**aurecon**

### Legend

- Town
- Roads
- Proposed road designs
- Land parcel boundaries



## Department of Transport and Main Roads Queensland Train Manufacturing Program, Torbanlea Enabling Works

Job No: 511003 Coordinate system: GDA 1984 MGA Zone 56

**Figure 1:**  
Enabling works project area

**Figure 1** Enabling Works Project Area

**aurecon**



## 2 Application

The applicant's details are presented in Table 2-1.

On its approval by the chief executive, DES, this High Risk SMP will become recognised as an approved species management program and will apply to the Project.

Table 2-1 Applicant details

<b>Registered legal entity name</b>	Queensland Department of Transport and Main Roads
<b>ACN/ABN if applicable</b>	ABN: 39 407 690 291
<b>Registered address</b>	QLD, 4000
<b>Contact details</b>	Name: Helen Stevenson Phone: (07) 4181 1354 Email: <a href="mailto:Helen.a.stevenson@tmr.qld.gov.au">Helen.a.stevenson@tmr.qld.gov.au</a> Postal address: 23 Quay Street, Bundaberg QLD 4670 Locked bag 486, Bundaberg QLD 4670
<b>Name of Principal of Corporation:</b>	
<b>Nominated person in charge where activity is to be undertaken:</b>	Name: Phone: Email:

### 2.1 Approved agents

The following agents are approved to operate under this High Risk SMP:

- TMR
- Contractors
- Subcontractors
- Agents relating to the Project
- Suitably qualified and experienced<sup>1</sup> personnel
- Authorised wildlife carers and veterinarians.

<sup>1</sup> *Suitably qualified and experienced* means a person with formal qualifications and/or experience in fauna identification and life ecology and environmental management.

## 3 Terms

### 3.1 Terms of Approval

Project construction is scheduled to commence in mid-2022. To coincide with the primary construction period involving land disturbance, and to provide for any potential delays in construction, this High Risk SMP is to remain valid for 3 years from the date of issue.

This High Risk SMP is a dynamic document and will be updated as required during the construction and operational phases of the Project as further information, species sightings and records come to light.

This document is designed to detail actions and procedures to be followed during the pre-construction, construction and operational phases of the Project, in order to mitigate potential adverse Project impacts to species identified in Section 4.3 and their associated breeding places.

## 4 Assessment of impacts

### 4.1 Introduction

An ecological assessment of the Project area (Figure 1) was conducted by Aurecon on the 7<sup>th</sup> April 2022. Findings of this assessment included the identification of potential breeding habitat suitable for the Wallum froglet within and adjacent to the Project area.

The following sections provide a summary associated with the methodology used and the findings of the abovementioned ecological investigations.

### 4.2 Field Assessment

An ecological field assessment was undertaken on the 7<sup>th</sup> 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. Additional surveys will be required within the Project area 1-2 weeks prior to the commencement of site work. This is to identify any additional animal breeding places that may have been constructed/built since previous site-based assessments. This is detailed in the Impact Mitigation Measures in **Appendix C**.

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).

#### 4.2.1 Breeding Habitat

It was identified that potential breeding habitat for the Wallum froglet (*Crinia tinnula*) was present within the Project area. Potential breeding habitat consisted of low lying areas with varying amounts of vegetation that are seasonally inundated. These include natural and disturbed areas within the road reserve such as swampy soaks, drainage lines, and wheel ruts.

The likelihood of animal breeding places being present increases where the habitat is adjacent to areas of remnant Regional Ecosystem (RE) 12.3.6 (*Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains).

Due to the vegetation communities present adjacent to the Project area, and the acidic soils and hydrology of the area, it is likely that the entire Project area has the potential to provide breeding habitat for Wallum froglet under ideal conditions (i.e. during and following heavy rainfall). For this reason, this High Risk SMP is applicable to the entire Project area, including areas dominated by non-native grasses directly adjacent to the existing road, where water may accumulate. These areas are likely to be used by the Wallum froglet as breeding habitat in the cooler months of the year. Ecology of the species is discussed in Section 4.3.1.

### 4.3 Species subject to this High Risk SMP

Table 4-1 presents the species which are subject to this High Risk SMP based on field assessment within the Project area.

Table 4-1 Fauna species to which the Project High Risk SMP applies

Species name		Conservation status	Likelihood of occurrence	Animal breeding place identified within and adjacent to the Project area
Scientific name	Common name	NC Act		
<i>Crinia tinnula</i>	Wallum froglet	Vulnerable	likely to occur	Yes, areas that are likely to fill with acidic water following winter (breeding period) rainfall events were identified within and adjacent to the subject site

#### 4.3.1 Wallum froglet

Wallum froglet is typically a habitat specialist that is wholly or largely restricted to lowland sand plains, dunes and sand islands of coastal south-east Queensland and New South Wales (including coastal 'wallum'<sup>2</sup>). The species breeds in oligotrophic (nutrient poor) acidic (pH < 6.0) coastal swamps and/or lakes where competition from habitat generalist species, the Beeping froglet (*Crinia parinsignifera*) is very low (Meyer *et al*, 2006).

Wallum froglet is typically found amongst heath vegetation and sedges where water collects above organic hardpan layers forming 'perched' swamps and lakes. These acidic (pH < 6.0) swamps and lakes provide essential breeding habitat for wallum frog species. However, ephemeral waterbodies are also known to facilitate breeding activities for Acid frogs, particularly those with increased resistance to disturbance (i.e. *Crinia tinnula*).

For breeding habitat, the Wallum froglet is commonly associated with ephemeral swamps and soaks (Meyer *et al*, 2006), and have been identified as utilising roadside table drains as habitat following rainfall (S. Scott, *pers. com.*, 2017). As such, it is most likely that ephemeral waterbodies within and adjacent to the entire Project area may have the potential to function as breeding habitat for Wallum froglet where water of the correct pH and chemical characteristics is present during the species defined breeding periods.

The Wallum froglet typically breeds between autumn and winter (Anstis 2002). Tadpoles of the species are free-swimming, with larval duration up to 6 months (Anstis 2002). Larval development is directly associated with water temperature (within species specific limits) for all frog species.

Vegetation clearing and earthworks within the subject site will result in the direct removal of areas of potential breeding habitat for the Wallum froglet.

Potential impacts to Wallum froglet as a result of the Project are discussed further in Section 5.1.



Figure 2 Image of Wallum froglet (*Crinia tinnula*) – specimen not located within the subject site, but considered likely to occur. Inset provides an image of the Wallum froglet tadpole (adapted from Marion Anstis 2002 and Aaron Pyne 2016)

<sup>2</sup> Wallum refers to an Australian ecosystem of coastal south-east Queensland, extending into north-eastern New South Wales. It is characterised by flora-rich shrubland and heathland on deep, nutrient-poor, acidic, sandy soils, and regular wildfire. Wallum areas may be characterised into open (dry) heathland and shrublands on coastal plains, and closed (wet) heathland and sedgeland on coastal plains.

## 5 Species Management Program

### 5.1 Nature of Impact

#### 5.1.1 Size of impact

As part of the initial design process, it has been identified that vegetation clearing and earthworks are required in order to facilitate the road improvements associated with the road improvement works within the Project area (refer to Figure 1).

All areas subject to disturbance have the potential to provide habitat for Wallum froglet. The size of the impact will be relative to the disturbances made to seasonal acidic pools of water across the Project area. Construction efforts timed appropriately, may incur no impact to animal breeding places. Where seasonal acidic pools have formed must be removed or disturbed that are currently being utilised as breeding place, impacts may occur.

#### 5.1.2 Direct impact

Table 4.1 identifies potential Project adverse impacts on Wallum froglet. Impact management solutions to mitigate Project specific impacts are specified in Section 5.2 of this High Risk SMP.

**Table 5-1 Summary of potential project adverse impacts on local fauna assemblages**

Aspect	Potential impacts
Duration of construction	<ul style="list-style-type: none"><li>■ Construction impacts continuing over species breeding season may cause disruption to species' breeding patterns.</li><li>■ Displacement of Wallum froglet from habitats directly adjacent to works</li></ul>
Vegetation clearing and earthworks	<ul style="list-style-type: none"><li>■ Loss of habitat</li><li>■ Destruction potential ephemeral breeding sites</li><li>■ Removal of microhabitats (e.g. dense vegetation around ephemeral waterbodies)</li><li>■ Erosion and sedimentation</li><li>■ Change in microclimates</li><li>■ Reduction in Wallum froglet feeding and foraging areas (areas of habitat cleared)</li><li>■ Wallum froglet injury and/or mortality, mortality of eggs, tadpoles, and breeding individuals</li></ul>

### 5.2 Impact Management Solutions

#### 5.2.1 Management actions

Management actions described in this High Risk SMP follow the hierarchy of avoid, minimise, mitigate, and offset adverse effects. This High Risk SMP has adopted an adaptive management approach which aims to reduce uncertainty over time through feedback from monitoring and allows future management to be improved.

**Appendix C** presents mitigation measures to address potential impacts to animal breeding places which may occur as a result of the Project.

The mitigation measures detailed in **Appendix C**, are to be read and implemented in conjunction with those detailed in the DTMR Low Risk SMP (SMP 642).

#### 5.2.2 Responsibilities

The applicant will take full responsibility of the management of this High Risk SMP. Contractors working under the applicant may be responsible for individual tasks however the applicant will be responsible for all management actions and contingency planning.



The applicant must, where reasonably practicable, examine all reasonable options available to minimise the disturbance of animal breeding places by:

- Delaying works to avoid construction occurring during the species breeding period; and
- Considering options to vary Project designs or methodologies to minimise impact on the threatened species breeding places.

### 5.2.3 Qualified persons

The following qualified persons are required for the implementation of this High Risk SMP:

- Suitably qualified and experienced<sup>3</sup> Environmental Officers
- DES registered fauna spotter-catchers or ecologists with proven experience with the fauna species identified in this High Risk SMP
- Suitably qualified, experienced, and licenced veterinarians or wildlife carers

### 5.2.4 Monitoring and reporting

Recommended mitigation measures to be implemented to reduce Project related impacts upon Wallum froglet breeding places within the Project area are presented in **Appendix C**.

The Animal Breeding Place Register will be completed by the proponent and provided to DES at [wildlife@des.qld.gov.au](mailto:wildlife@des.qld.gov.au) within 24 hours of interactions with species subject to this High Risk SMP (Refer to Section 5.4).

Reporting associated with incidents involving Wallum froglet and non-compliance are detailed in Section 5.3.1 and Section 5.3.2 respectively.

### 5.2.5 Training and awareness

All Project personnel are required to complete an environmental awareness induction prior to commencing works on site. The induction will address the following as a minimum:

- Conservation significant species potentially present within the Project area and information on their associated breeding places provided in this document (refer to Section 4.2.1)
- Location of any sensitive areas (e.g. animal breeding places)
- Procedures and actions associated with encountering animal breeding places
- Responses and reporting of environmental issues
- The role of the DES registered fauna spotter-catcher and/or ecologist, being:
  - To undertake the pre-clearance survey and provide recommendations in relation to animal breeding places pursuant to this High Risk SMP, including:
    - Removal of breeding places, tadpoles, eggs, and the animals
    - Provide advice on the appropriate fauna exclusion devices and/or deterrent methods
    - Safe relocation of other fauna
    - Maintain communications with the Project manager
  - To provide advice about minimising any fauna injuries or deaths
  - The only person who may handle live animals
- The role of the licensed wildlife carer and licensed wildlife vet, being:

<sup>3</sup> *Suitably qualified and experienced* means a person with formal qualifications and/or experience in fauna identification and life ecology and environmental management.

- To receive and handle distressed, orphaned or injured animals
- To release animals once deemed fit to be returned to the wild
- The risk of fauna injury and deaths as a result of the proposed works
- Procedure for dealing with animals which are injured, stressed, or deceased

## 5.3 Contingency planning

The implementation and effectiveness of management measures detailed in **Appendix C** will be monitored through the compilation of reporting requirements undertaken in accordance with the aims and objectives of this High Risk SMP.

It is acknowledged that contingency measures and adjustments to the management strategies outlined in this High Risk SMP may need to be considered in the event that a detrimental impact is recorded and/or performance measures or targets are not met. Any new mitigation measures will be discussed with DES prior to implementation.

If the breeding place of a conservation significant species, other than those identified in this High Risk SMP, is recorded during Project works and will require tampering with, works will stop in the area immediately and DES consulted within 24 hours. Works will commence following direction and approval from DES.

### 5.3.1 Animal breeding place incidents and corrective actions

In the event that an animal breeding place is tampered with during Project works, the Project mitigation strategies will be reviewed in conjunction with a suitably qualified and experienced person and any recommended changes implemented.

If an animal breeding place is tampered with outside of the management actions identified in the Impact Management Measures in **Appendix C**:

- The Project environmental officer/representative must be contacted immediately to organise the possible capture of the animal by a DES registered fauna spotter-catcher or ecologist, for transportation to a specialist veterinarian or wildlife carer. The animal must only be handled by a person suitably qualified to do so. Contact details of the relevant parties are provided in Table 5-2 (contact supplied veterinary clinics prior to commencement of work to ensure injured wildlife can be taken to these locations).
- The location of the animal will be identified/marked so it can be found again. If the animal is moving, a note will be made of the direction in which it was headed
- The species of animal will be identified if possible and its approximate size determined
- The Animal Breeding Place Register will be completed by the applicant and provided to DES at [wildlife@des.qld.gov.au](mailto:wildlife@des.qld.gov.au) within 24 hours of tampering with the breeding place of species subject to this High Risk SMP. This will include information such as the location and type of animal breeding place, and its current active status (i.e. being prepared, eggs, juveniles present).

**Table 5-2 Contact details in the event of an injury or death of native wildlife**

Organisation	Contact details
Environmental Officer – TMR Helen Stevenson	Phone: (07) 4181 1354 Email: <a href="mailto:Helen.a.stevenson@tmr.qld.gov.au">Helen.a.stevenson@tmr.qld.gov.au</a>
RSPCA QLD – To report sick, injured or orphaned wildlife	1300 ANIMAL (1300 264 625)
Howard Veterinary Clinic, Howard	68 William St, Howard; (07) 4129 4336

Following the capture/recovery of the animal, an investigation into the cause of the event will be undertaken, including an assessment of the effectiveness of corrective and preventative actions currently in place.

Any corrective and preventative actions identified will be implemented. The risk register, relevant procedures, and documentation (including this High Risk SMP) will be reviewed and revised as necessary.

In the event that a control measure appears to be ineffective, the measure will be adjusted in consultation with DES. This High Risk SMP will be updated if necessary, to reflect any significant changes to control measures.

### 5.3.2 Non-compliance reporting

Where a non-compliance occurs with this High Risk SMP a report must be submitted to DES within five (5) business days. The report will outline the type of non-compliance and the remedial actions taken to ensure that the matter is resolved within a reasonable time frame. The timeframe will be specified in writing by DES.

### 5.3.3 Changes to species conservation status

Throughout Project duration, the applicant's environmental officer/representative will regularly review the conservation status of fauna species by keeping abreast of relevant legislation, literature and through consultation with DES.

This High Risk SMP will be updated as required during the life of the Project to revise management measures to reflect any changes to the conservation status of species identified within the Project area. The management of any previously unrecorded conservation significant species identified within the Project area will also be addressed.

### 5.3.4 Variations to the Species Management Program

Any revisions to this High Risk SMP after approval will require re-submission to DES for approval.

Until the revised High Risk SMP is approved by the Minister, Project works must be conducted in accordance with the original, accepted High Risk SMP. Once approved, the revised High Risk SMP will supersede the original.

## 5.4 Animal Breeding Place Register

The DES Animal Breeding Place Register will be maintained throughout the life of the Project. The Animal Breeding Place Register will document all animal breeding places known or suspected to have been tampered with (including destroyed) as a result of the Project works. The Animal Breeding Place Register will be completed at the end of each day that the tampering occurs.

The Animal Breeding Place Register will be provided to DES at [wildlife@des.qld.gov.au](mailto:wildlife@des.qld.gov.au) by the applicant:

- Upon DES request
- Within 6 months of interactions with species subject to this High Risk SMP
- Within 10 business days after the expiry of the High Risk SMP

For each animal breeding place tampered with as a result of the Project, the following information will be entered into the Animal Breeding Place Register:

- Date
- Time
- Species utilising the animal breeding place
- Location of animal breeding place, including lot and plan details and GPS co-ordinate
- Location (lot and plan details and GPS coordinate) and date of the animal breeding place relocation (if applicable)
- Action taken associated with the animal utilising the breeding place (ie animal released, animal released with first aid, animal death, investigation triggered)
- Any applicable comments (ie details of any further management practices put in place).

## 5.5 Ecological performance auditing

The regulatory agencies associated with environmental matters may conduct inspections of the Project works. The relevant Project Environmental Officers will attend these inspections.

The applicant will conduct internal compliance audits of the implementation of Project environmental management commitments regarding animal breeding places during the construction and operational phases of the Project, including:

- On-site audits of compliance with the High Risk SMP
- Audits of contractor's environmental management regarding animal breeding places
- Work area inspections and monitoring

Non-conformances identified during inspections will be documented, addressed with appropriate corrective and preventive actions and rectified within an agreed time frame.

## 6 References

- Anstis, M. (2002). *Tadpoles of South-eastern Australia: A guide with keys*. Reed New Holland, Sydney.
- Atlas of Living Australia (2020). Species profiles [online]. Available from: <https://www.ala.org.au/>. Accessed: April 2022.
- Barker, J., Grigg, G.C. and Tyler, M. J. (1995). 'A field guide to Australian frogs'. Surrey Beatty and Sons: Chipping Norton.
- Cogger, H. G. (2000). *Reptiles and amphibians of Australia*. Reed New Holland: Sydney.
- Department of Environment and Science. (2021). Species Profiles. Available from: <https://apps.des.qld.gov.au/species-search/>. Accessed: 20/04/2022
- Department of Environment and Science (DES) (2022), *Wildlife Online database*, Accessed: April 2022, Available: <https://environment.ehp.qld.gov.au/report-request/species-list/>
- Meyer, E., Hero, J-M., Shoo, L. and Lewis, B. (2006). *National recovery plan for the wallum sedgefrog and other wallum-dependent frog species*. Report to Department of the Environment and Water resources, Canberra. Queensland Parks and Wildlife Service, Brisbane.
- Queensland Herbarium (2015) *Regional Ecosystem Description Database (REDD)*, version 9.0, DSITIA: Brisbane.



# Appendix A

## MSES Search Results



**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](mailto: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 . . . . . 4

Matters of State Environmental Significance (MSES) . . . . . 5

    MSES Categories . . . . . 5

    MSES Values Present . . . . . 6

    Additional Information with Respect to MSES Values Present . . . . . 7

        MSES - State Conservation Areas . . . . . 7

        MSES - Wetlands and Waterways . . . . . 7

        MSES - Species . . . . . 7

        MSES - Regulated Vegetation . . . . . 9

    Map 1 - MSES - State Conservation Areas . . . . . 11

    Map 2 - MSES - Wetlands and Waterways . . . . . 12

    Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals . . . . . 13

    Map 3b - MSES - Species - Koala habitat area (SEQ) . . . . . 14

    Map 3c - MSES - Wildlife habitat (sea turtle nesting areas) . . . . . 15

    Map 4 - MSES - Regulated Vegetation . . . . . 16

    Map 5 - MSES - Offset Areas . . . . . 17

Appendices . . . . . 18

    Appendix 1 - Matters of State Environmental Significance (MSES) methodology . . . . . 18

    Appendix 2 - Source Data . . . . . 19

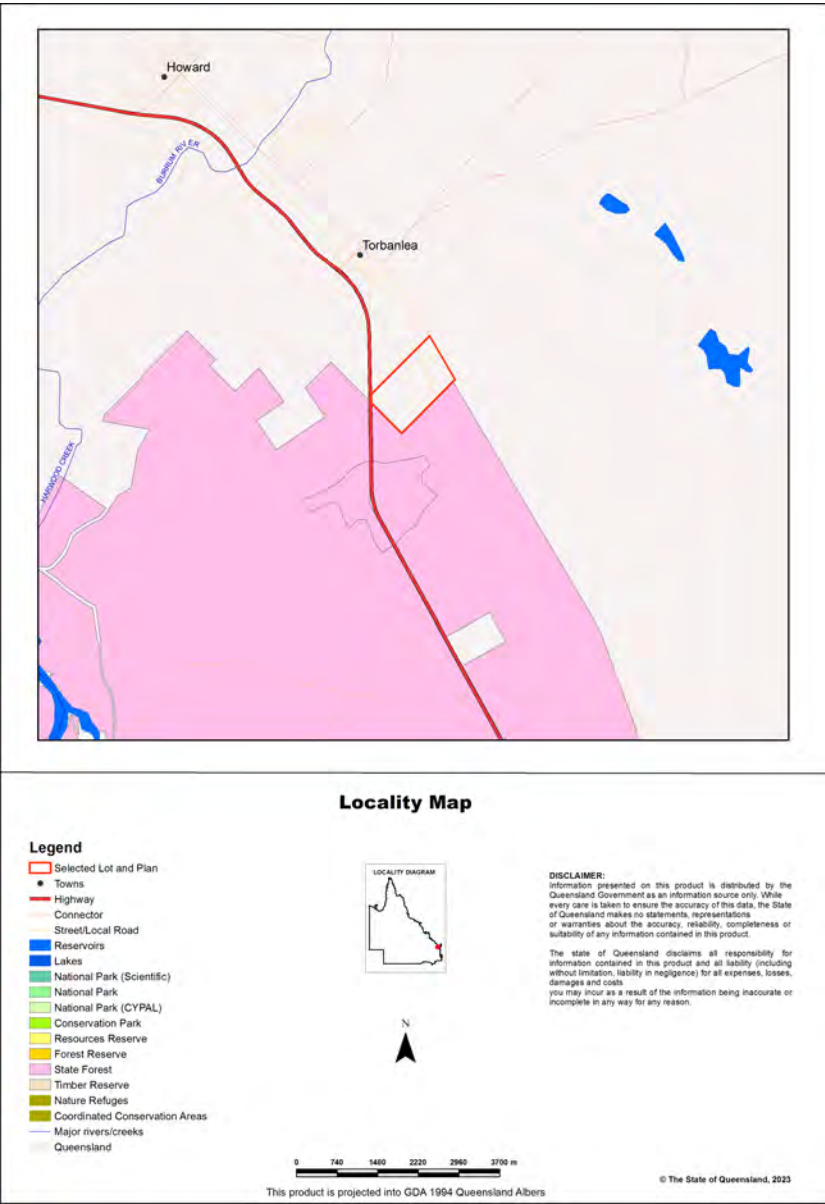
    Appendix 3 - Acronyms and Abbreviations . . . . . 20

## 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
<i>Boronia keysii</i>		V	None
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V	None
<i>Casuaris casuaris johnsonii</i>	Sthn population cassowary	E	None
<i>Crinia tinnula</i>	Wallum froglet	V	Core
<i>Denisonia maculata</i>	Ornamental snake	V	None
<i>Litoria freycineti</i>	Wallum rocketfrog	V	None
<i>Litoria olongburensis</i>	Wallum sedgefrog	V	None
<i>Macadamia integrifolia</i>		V	None
<i>Macadamia ternifolia</i>		V	None
<i>Macadamia tetraphylla</i>		V	None
<i>Melaleuca irbyana</i>		E	None
<i>Petaurus gracilis</i>	Mahogany Glider	E	None
<i>Petrogale persephone</i>	Proserpine rock-wallaby	E	None
<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	V	None
<i>Phascolarctos cinereus</i>	Koala - outside SEQ*	E	Core
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	E	None
<i>Xeromys myoides</i>	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)

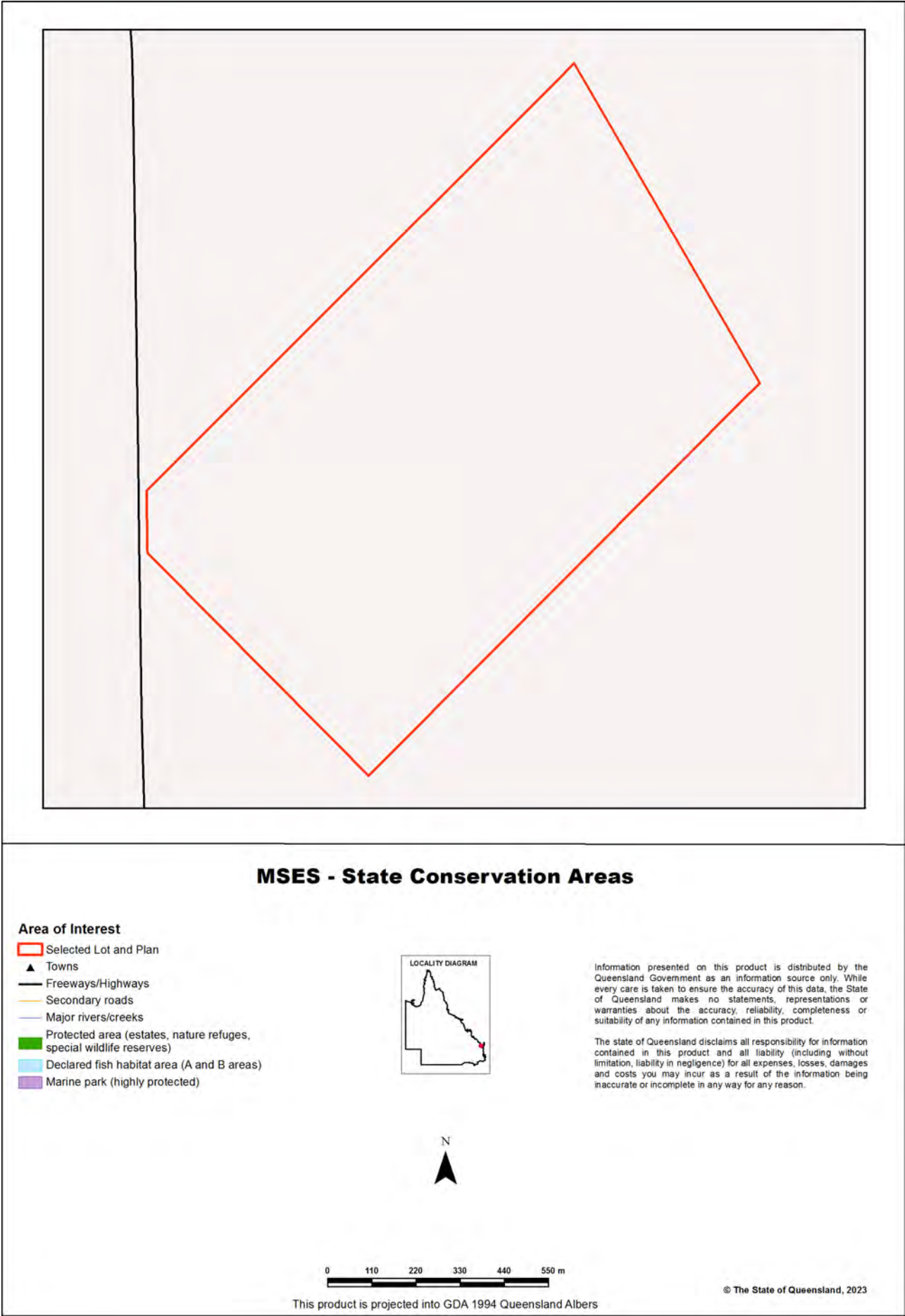
#### **9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation**

(no results)

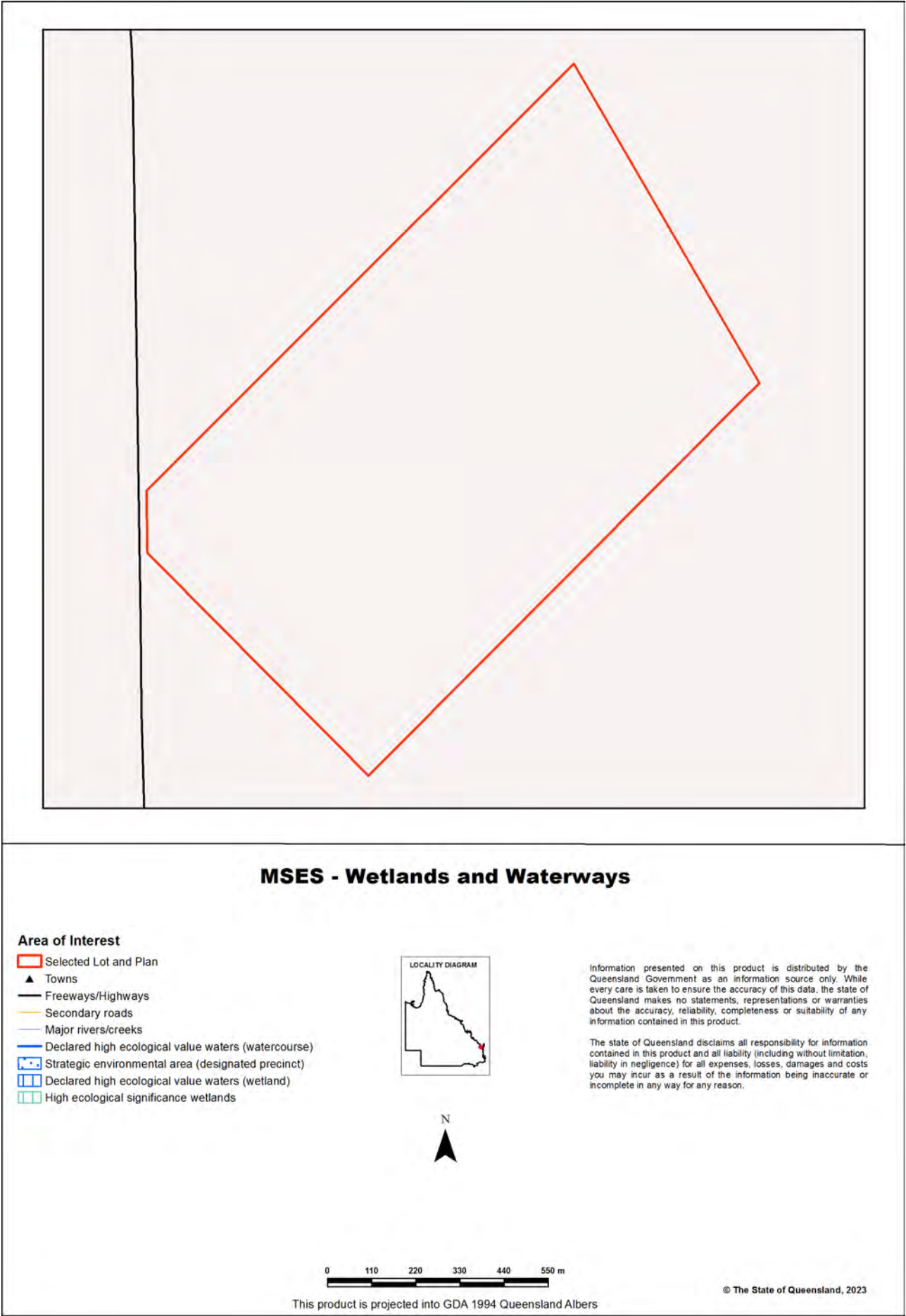
Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.



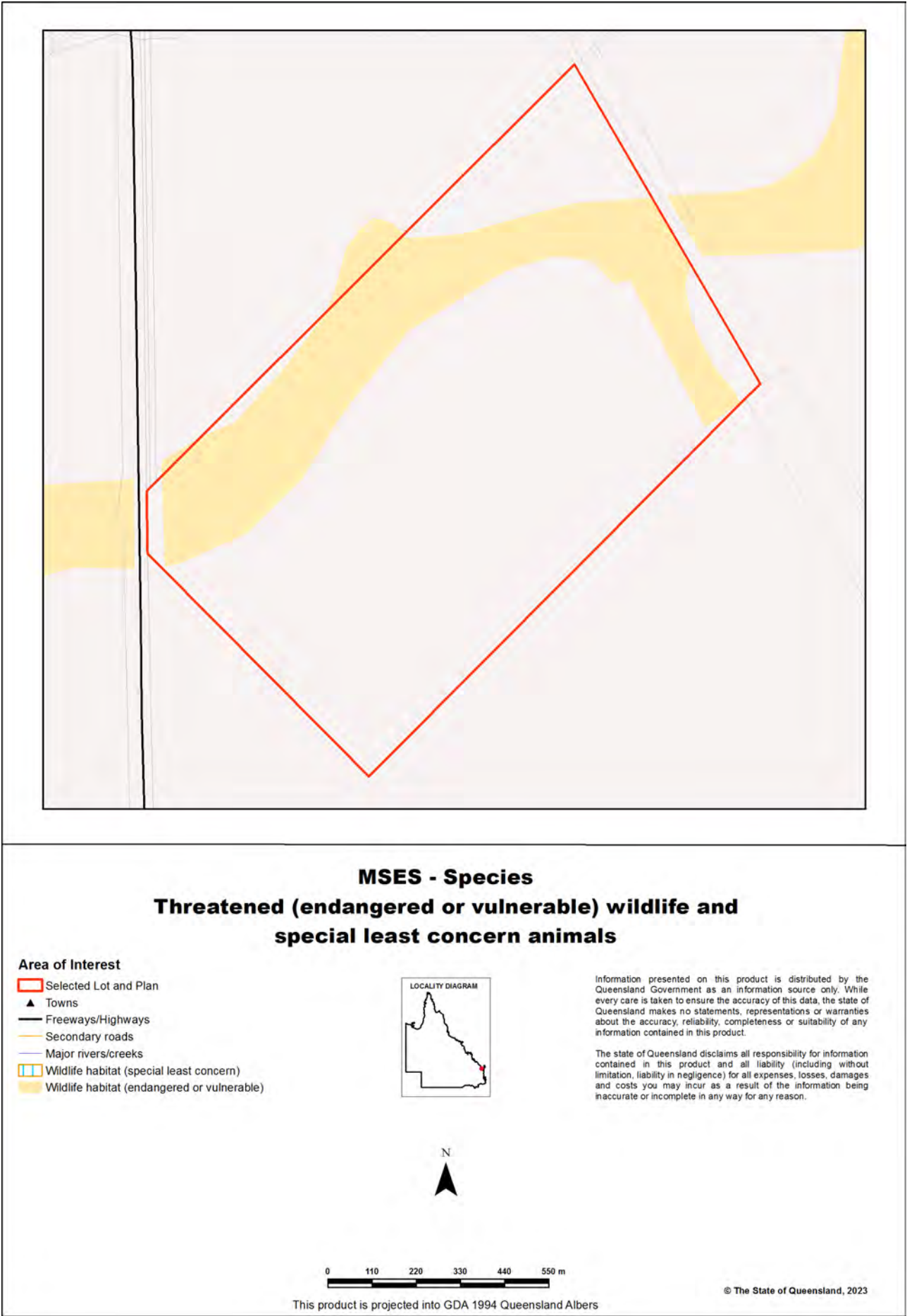
Map 1 - MSES - State Conservation Areas



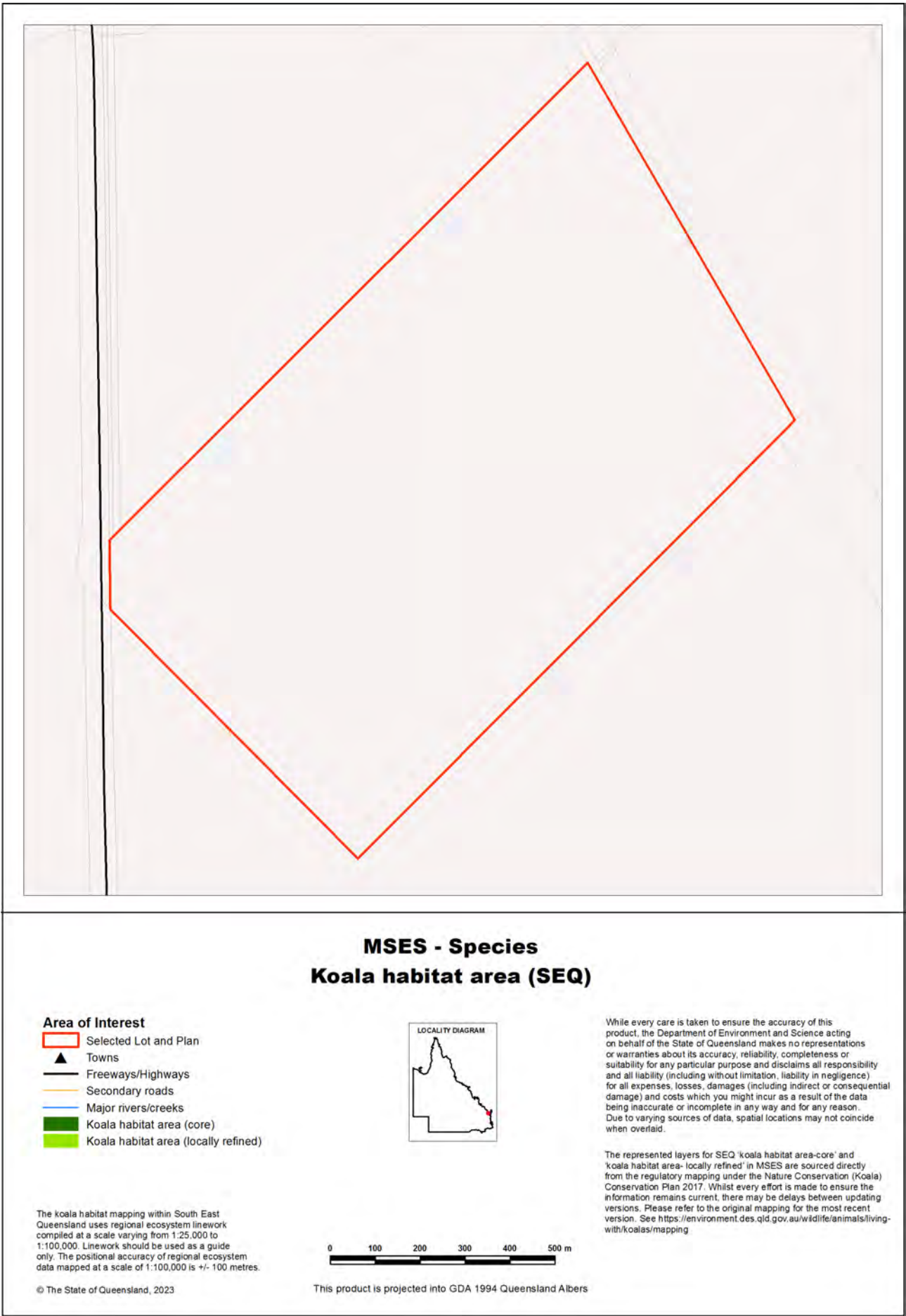
Map 2 - MSES - Wetlands and Waterways



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

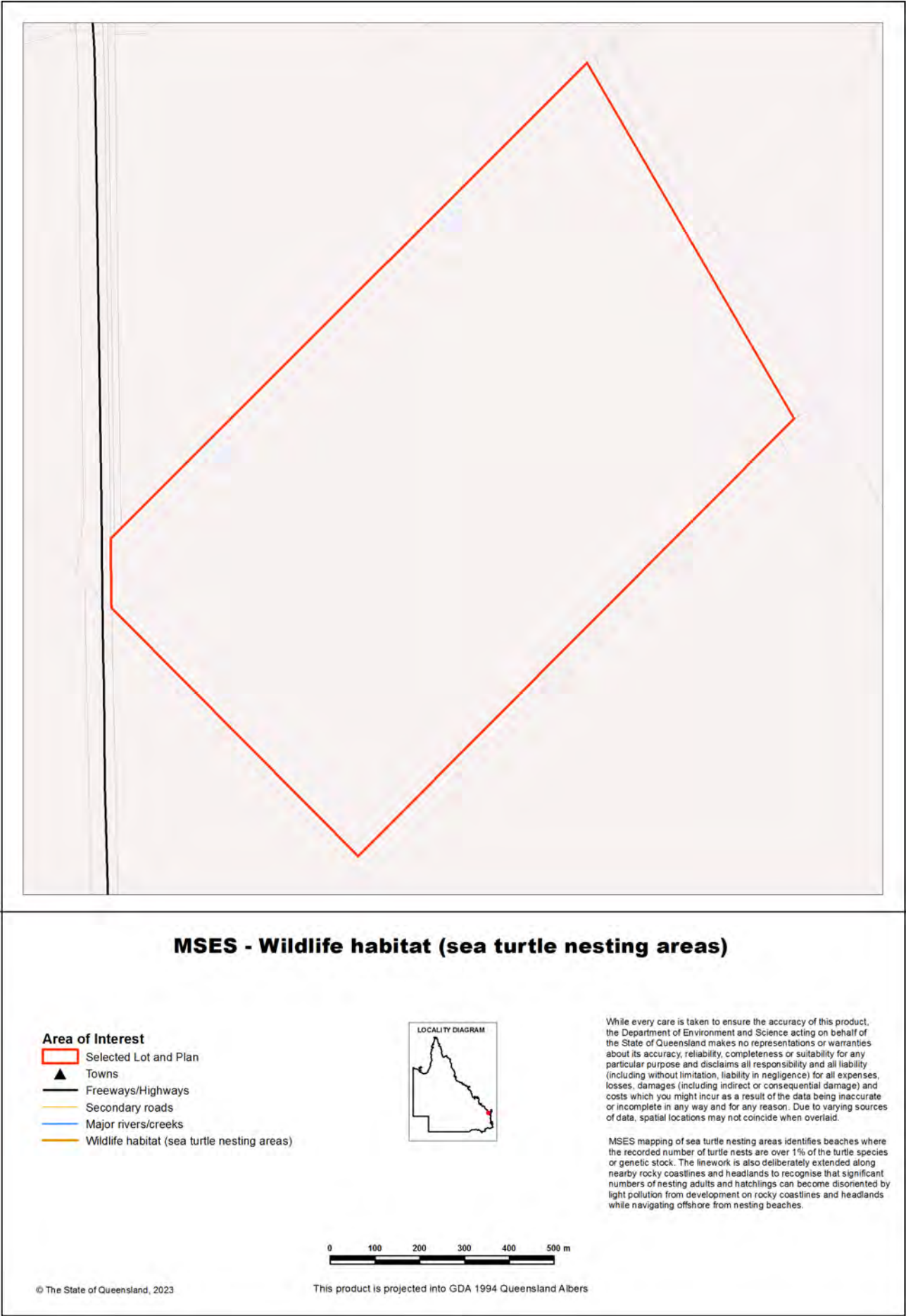


Map 3b - MSES - Species - Koala habitat area (SEQ)

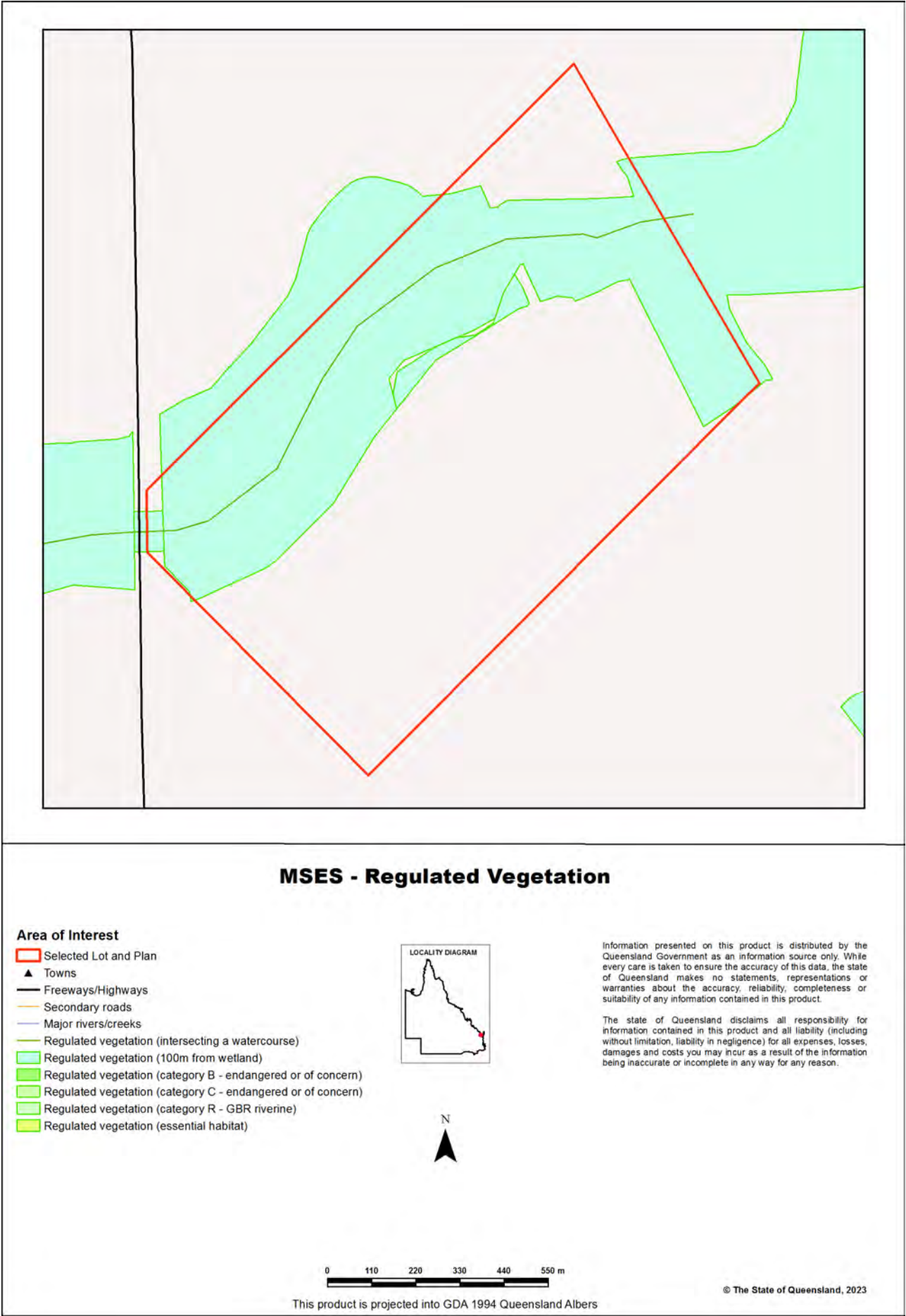




Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)

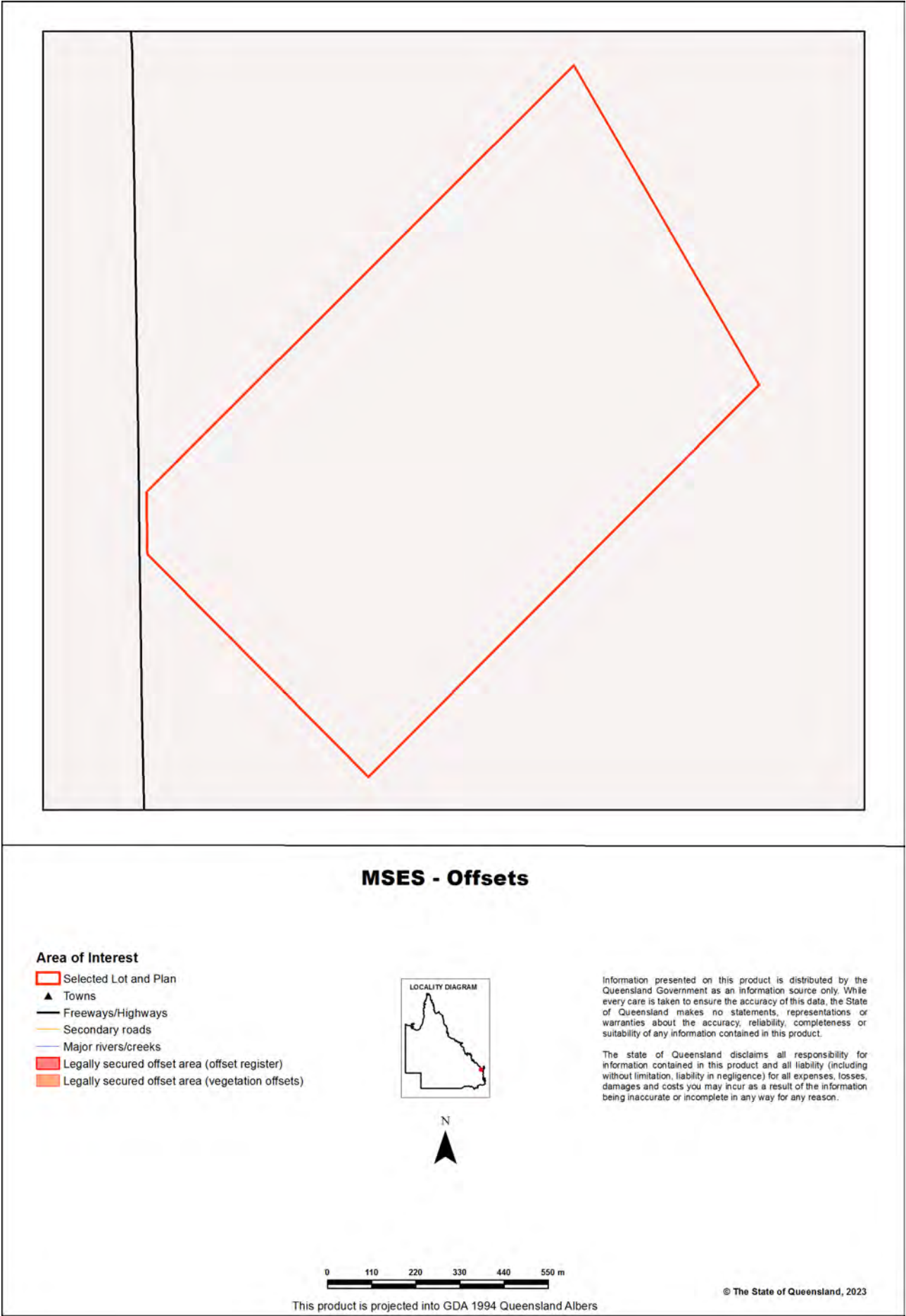


Map 4 - MSES - Regulated Vegetation





Map 5 - MSES - Offset Areas



## 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 ( <a href="http://qspatial.information.qld.gov.au">http://qspatial.information.qld.gov.au</a> )
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - 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: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	- WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019 - 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. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

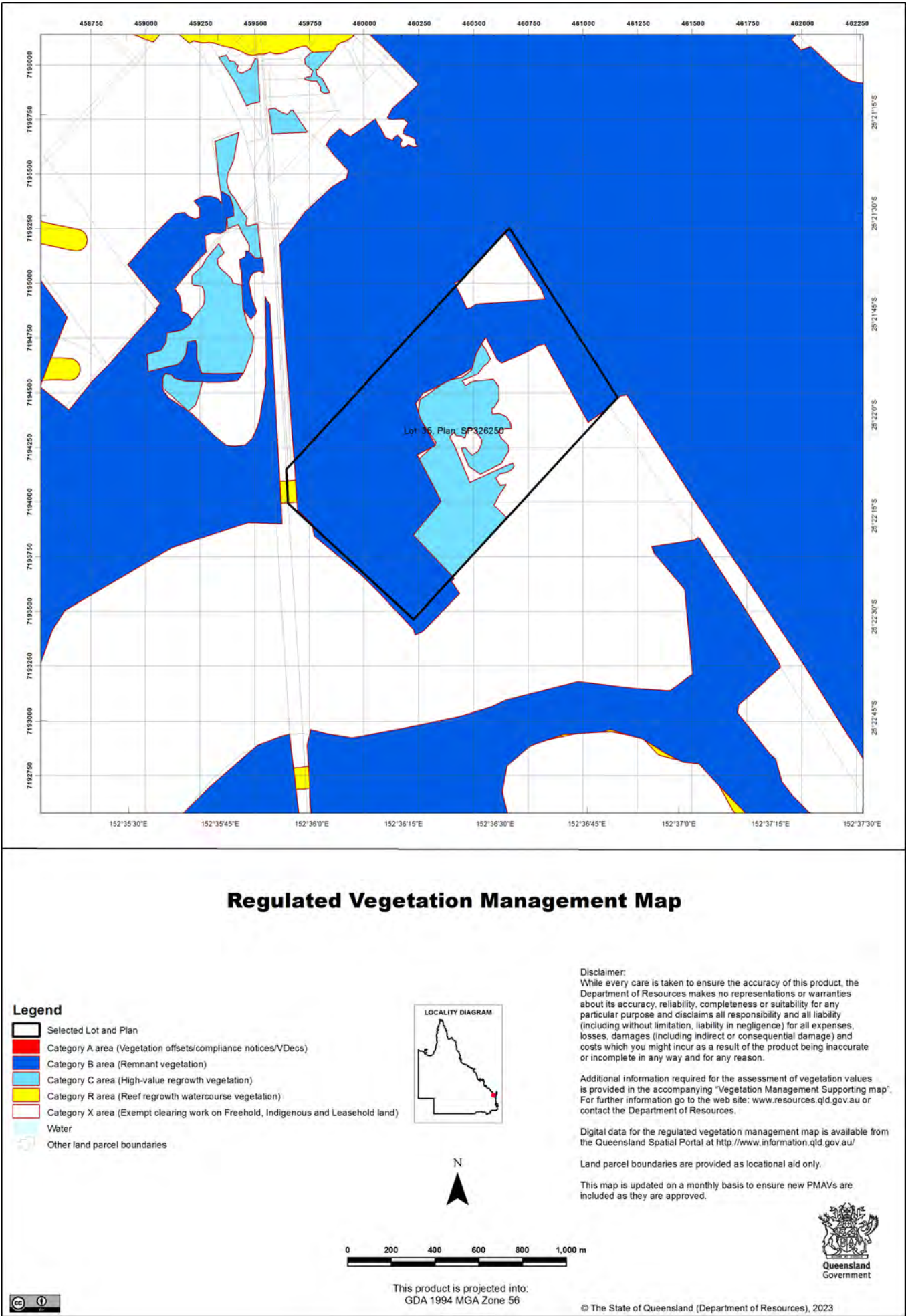
---

## Appendix 3 - Acronyms and Abbreviations

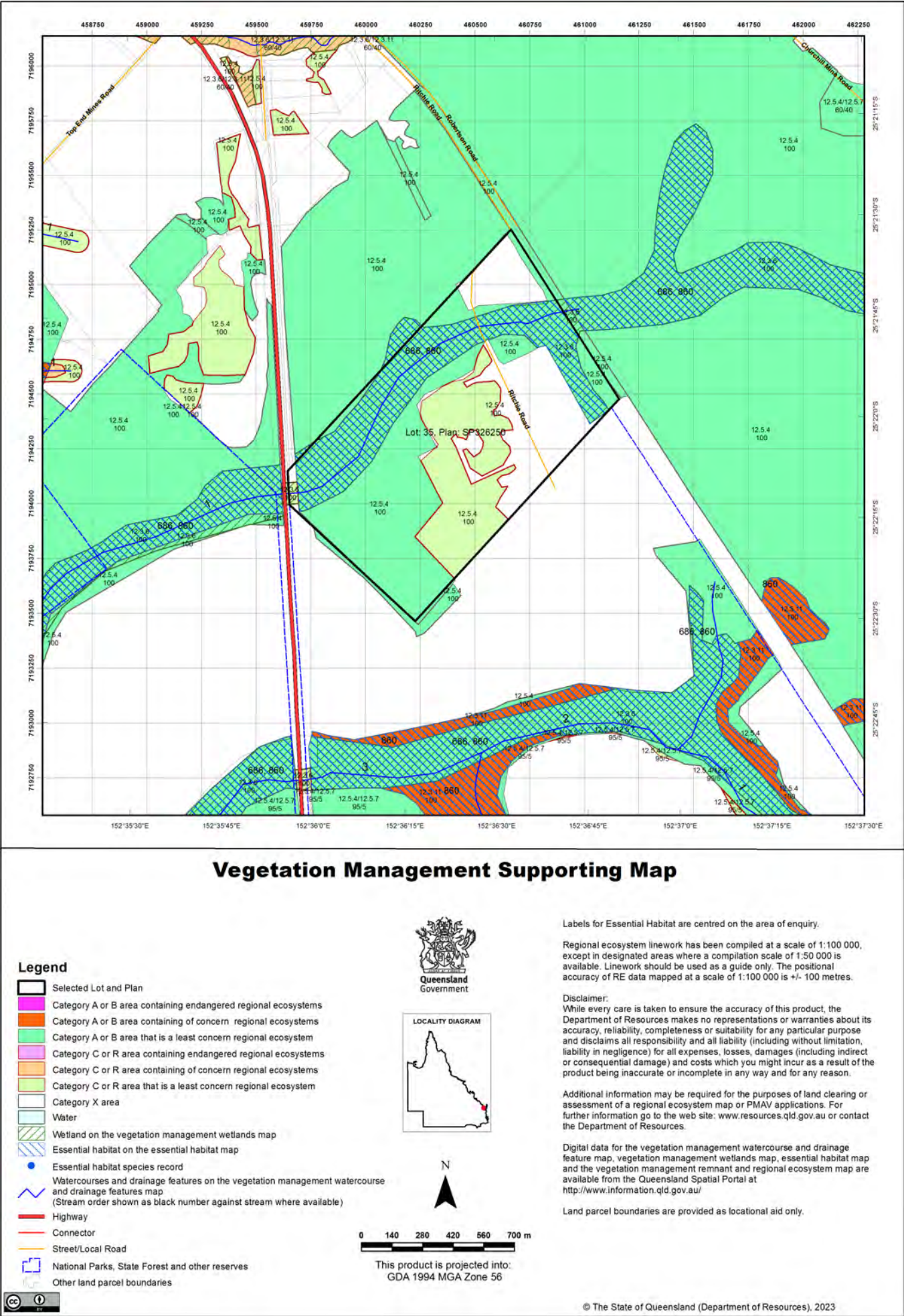
AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental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

# Appendix B

## Regulated Vegetation and Essential Habitat Mapping







# 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 amcnoides, Eucalyptus bancroftii, Eucalyptus biturbinata, Eucalyptus blakeyi, Eucalyptus brownii, Eucalyptus camaldulensis, Eucalyptus carnea, Eucalyptus chloroclada, Eucalyptus coolabah, Eucalyptus crebra, Eucalyptus dealbata, Eucalyptus drepanophylla, Eucalyptus dunni, 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 thozettiana, Eucalyptus tindalliae, 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 C

## Impact Mitigation Measures

## Impact mitigation measures

Timing	Performance objective	Action number	Control activity
<b>Pre-construction phase</b>	Disturbance of animals/animal breeding places is to be minimised, if not avoided	1.	Finalise construction site plans, including: <ul style="list-style-type: none"> <li>■ Extent of the clearing works</li> <li>■ Location of environmentally sensitive areas</li> <li>■ Identification of 'no go' zones, particularly for previously known animal breeding places and potential breeding habitat areas</li> </ul>
		2.	The Project design should consider the location of potential breeding habitat areas to ensure that Project impact on threatened species and their habitat features are avoided / minimised wherever possible
		3.	Where possible, Project works that are to occur within any potential breeding habitat areas to be planned outside of the species breeding season. This will involve planning construction outside of the Wallum froglet breeding season (winter) and/or during the drier periods where possible.
		4.	When undertaking works in species sensitive areas, activities will be restricted to the minimum area and duration required for them to be safely undertaken
<b>Construction Phase</b>	Appropriate personnel are identified and available for the Project	5.	Prior to commencement of works, the following suitably qualified and experienced personnel must be identified and be available for Project works: <ul style="list-style-type: none"> <li>■ DES registered fauna spotter-catcher; or</li> <li>■ Suitably qualified and experienced ecologist; and</li> <li>■ licensed wildlife veterinarian.</li> </ul> <p>The above persons are to be appropriately experienced in managing the species subject to this High Risk SMP (i.e. Wallum froglet).</p> <p>The contact details (refer to Table 5-2) of the persons identified above must be placed at the site office or in another location easily found by site staff.</p>
	Animal breeding places belonging to species subject to this High Risk SMP are identified within the Project area prior to vegetation/ habitat clearing	6.	A DES registered fauna spotter-catcher or ecologist will conduct a pre-clearance survey prior to the commencement of impacts to identify any animal breeding places (in particular those that are active) that may be present within the Project area. <p>The survey will pay particular attention to the Wallum froglet and will use information listed in Section 4.2.1 to identify these breeding places.</p> <p>Any additional conservation significant animal breeding places identified within the Project area which are not subject to this High Risk SMP will be added and then reviewed by DES before construction works.</p> <p>The Project will require a pre-clearance survey report detailing all evidence of animal breeding places located within the Project area. The Fauna spotter-catcher or ecologist will:</p> <ul style="list-style-type: none"> <li>■ Identify and clearly mark and map any areas of Wallum froglet active breeding habitat immediately prior to vegetation clearing (1-2 weeks). These will be retained wherever practicable until such time as all frogs, eggs and tadpoles have been removed from the area and translocated into an area of analogous habitat that will not be impacted by the proposed works</li> <li>■ Handling of frogs, frog eggs and tadpoles will be undertaken in such a way as to reduce the potential spread of Chytrid fungus (i.e. all equipment cleaned prior to handling frogs – refer to DES technical manual “interim hygiene protocol for handling amphibians”)</li> </ul>

Timing	Performance objective	Action number	Control activity
	A suitably qualified and experienced person is present to provide appropriate management to animal breeding places	7.	A DES registered fauna spotter-catcher(s) or ecologist will be present during all clearing works and ground disturbance works where the ground is wet or where there is inundation.  If for any reason the fauna spotter-catcher or ecologist is required to leave the machinery they are allocated to, clearing works for that machine are to immediately cease and recommence only when the fauna spotter-catcher or ecologist returns
	Appropriate management of animal breeding places ( <b>frog egg mass and tadpoles</b> )	8.	All management of amphibians will be done in conjunction with Action 9.  Where an egg mass is located within the Project area, the DES registered fauna spotter-catcher or ecologist will remove the egg mass (along with attached microhabitat and/ or breeding place where applicable) and relocate into the same waterbody in a position with similar microhabitat features (vegetation, waterflow, shade etc.) outside the Project area.  Where tadpoles or metamorphose froglets are identified within the Project area, a DES registered fauna spotter-catcher or ecologist will capture and relocate the individuals into the same waterbody in a position with similar microhabitat features (vegetation, waterflow, shade etc.) outside the Project area.  If suitable relocation sites are unavailable, eggs/tadpoles/froglets will be transported to a suitably qualified and experienced person to care for until they can be released.  All data should be collected pursuant to the Animal Breeding Place Register reporting requirements (refer to Section 5.4).
	Appropriate management of amphibian breeding places/ breeding habitat and individuals  Prevent the spread of chytrid fungus	9.	Where working in amphibian habitat and it is necessary to handle/release frogs, all works will be pursuant to the DES <i>Wildlife Management Technical Manual – interim hygiene protocol for handling amphibians</i> to prevent the spread of Chytrid Fungus.  Measures will include: <ul style="list-style-type: none"> <li>■ Isolation of frogs to prevent cross contamination</li> <li>■ Use of single-use gloves</li> <li>■ Use of disinfected instruments/material</li> <li>■ Captured frogs will not be released to a different waterbody where they could introduce infection</li> </ul>
		10.	Avoid the use of environmentally harmful chemicals near watercourses/drainage features
		11.	No fuel storage, stockpiles or equipment maintenance activities should occur within 100m of any watercourses/drainage features
	Increase potential for future animal breeding places	12.	Where possible retain large woody debris, especially large hollow bearing logs. Relocate large hollow bearing logs to areas of adjoining habitat on TMR owned land. If unable to be relocated at time of disturbance, stockpile these habitat features onsite until relocation once construction stage is over.
	Reduce disturbance to animal breeding places	13.	Dust suppression mechanisms will be put in place to ensure excessive dust deposition does not occur
		14.	All truck loads will be covered as required for potentially dusty materials exiting the site



Timing	Performance objective	Action number	Control activity
	All staff are made aware of their responsibilities under this High Risk SMP Reduce incidence of harm to animal breeding places	15.	Prior to site entry, all Project personnel are required to complete an environmental awareness induction prior to commencing works on site (refer to Section 5.2.5). The induction will address significant species, animal breeding place and breeding habitat locations, responsibilities and reporting requirements, role of the suitably qualified personnel, and procedure when dealing with animal breeding places subject to this High Risk SMP.
		16.	Contact details for suitably qualified persons in Table 5-2 are to be outlined and provided to relevant staff
		17.	In the event of injury to fauna, works in the area will cease immediately and not recommence until appropriate management actions have been undertaken and a review of appropriate management actions to ensure the risk of reoccurrence is minimised
	Comply with reporting requirements Contingency plan	18.	The DES Animal Breeding Place Register will be maintained throughout the life of the Project (refer to Section 5.4). The Animal Breeding Place Register will be completed at the end of each day that the tampering occurs. The Animal Breeding Place Register will be made available to DES by the applicant upon request and will be provided to DES at <a href="mailto:wildlife@des.qld.gov.au">wildlife@des.qld.gov.au</a> by the applicant within 24 hours of interactions with the high risk of impacts SMP species and upon expiry of this Project High Risk SMP.
		19.	The applicant will report any environmental incidents as described in Section 5.3.1 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.
		20.	In the event of a non-compliance to this plan, the applicant will issue a “stop work” order, upon which work will cease until the non-compliance has been rectified and measures implemented to prevent the breach re-occurring.
Post-construction phase	Create microhabitat for future animal breeding places	21.	Where practical and possible to do so, re-establish stockpiled microhabitat features that were not able to be relocated during construction phase in a functionally suitable position.



Document prepared by

**Aurecon Australasia Pty Ltd**

ABN 54 005 139 873

Ground Floor, 25 King Street  
Bowen Hills QLD 4006

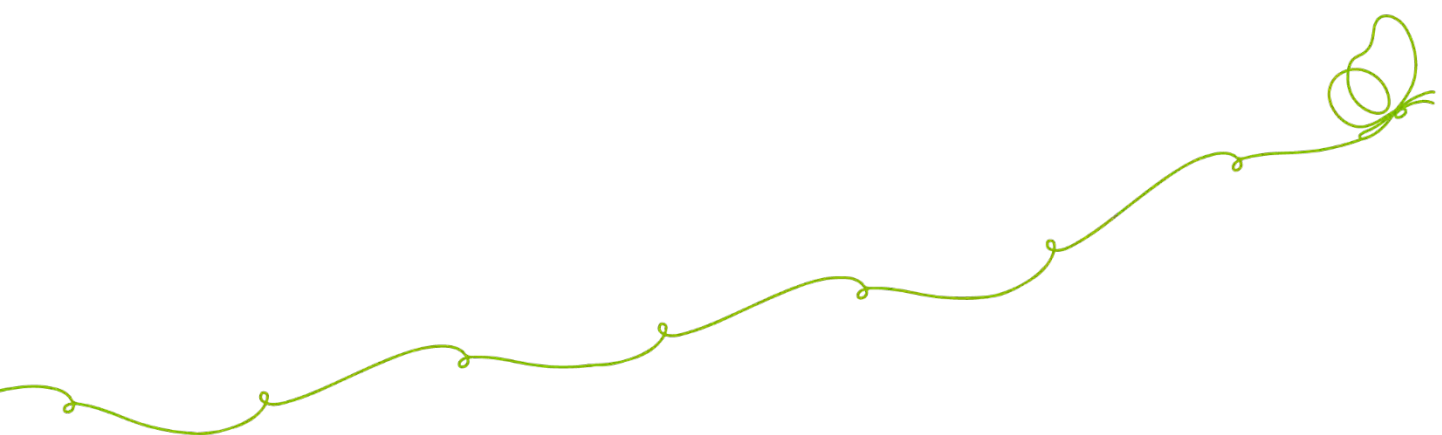
Locked Bag 331  
Brisbane QLD 4001  
Australia

**T** +61 7 3173 8000

**F** +61 7 3173 8001

**E** [brisbane@aurecongroup.com](mailto:brisbane@aurecongroup.com)

**W** [aurecongroup.com](http://aurecongroup.com)



# Appendix E: Protected Plants Report

# Rollingstock Expansion Project

## Protected Plants Flora Survey Report

### Department of Transport and Main Roads

Reference: 511003

Revision: 1

---

2021-08-17



# Document control record

Document prepared by:

**Aurecon Australasia Pty Ltd**

ABN 54 005 139 873

Ground Floor, 25 King Street  
Bowen Hills QLD 4006

Locked Bag 331  
Brisbane QLD 4001  
Australia

**T** +61 7 3173 8000

**F** +61 7 3173 8001



**E** brisbane@aurecongroup.com

**W** aurecongroup.com

A person using Aurecon documents or data accepts the risk of:

- a) Using the documents or data in electronic form without requesting and checking them for accuracy against the original hard copy version.
- b) Using the documents or data for any purpose not agreed to in writing by Aurecon.

Document control						aurecon	
Report title		Protected Plants Flora Survey Report					
Document code		511003-0000-REP-NN-0002		Project number		511003	
File path		pw:\\designshare.au.aurecon.info:PW_AUDC1_01\Documents\Projects\511xxx\511003 - Rollingstock Expansion Project - CA\5 Deliver design\505 Field investigations\Environmental\NC Act Protected Plant Report\Final\Protected Plant Flora Survey Report.docx					
Client		Department of Transport and Main Roads					
Client contact		Daniel Nel		Client reference		TBA	
Rev	Date	Revision details/status		Author	Reviewer	Verifier (if required)	Approver
0	2021-05-28	Draft for client comment		CS	LB		LB
1	2021-08-17	Final for issue		CS	LB		LB
Current revision		1					

Approval			
Author signature		Approver signature	
Name	Dr Chris Schell	Name	Leesa Bignill
Title	Associate	Title	Manager



# Contents

<b>1</b>	<b>Introduction .....</b>	<b>5</b>
1.1	Project background.....	5
1.2	Project location .....	5
1.3	Purpose of report.....	5
<b>2</b>	<b>Desktop assessment .....</b>	<b>8</b>
2.1	Desktop assessment methodology .....	8
2.2	Desktop assessment results .....	8
2.2.1	Protected plant flora survey trigger map .....	8
2.2.2	Essential habitat .....	9
2.2.3	Threatened flora species .....	9
<b>3</b>	<b>Survey Methodology .....</b>	<b>11</b>
3.1	Clearing impact area .....	11
3.2	Timed meander survey.....	12
3.3	Survey timing.....	12
3.4	Permits to conduct works .....	16
3.5	Nomenclature .....	16
3.6	Survey limitations .....	16
3.7	Suitably qualified persons .....	16
3.7.1	Suitably qualified person certification .....	17
<b>4</b>	<b>Survey results .....</b>	<b>18</b>
4.1	Flora survey area.....	18
4.2	Existing environment .....	18
4.2.1	Habitat Type A - Remnant vegetation (RE 12.3.6).....	18
4.2.2	Habitat Type B – Remnant vegetation (RE 12.5.4).....	19
4.2.3	Habitat Type C – Non-remnant areas .....	20
4.3	Flora species .....	21
4.4	Restricted invasive plants.....	22
<b>5</b>	<b>Conclusion .....</b>	<b>23</b>
<b>6</b>	<b>References .....</b>	<b>24</b>

## Appendices

<b>Appendix A</b>	<b>Database search results .....</b>	<b>25</b>
<b>Appendix B</b>	<b>Likelihood of occurrence assessment for Threatened and Near-threatened flora species .....</b>	<b>26</b>
<b>Appendix C</b>	<b>Curricula vitae.....</b>	<b>30</b>
<b>Appendix D</b>	<b>Observed Flora species .....</b>	<b>31</b>

## Figures

Figure 1	Torbanlea Project area .....	6
Figure 2	Clearing Impact Area .....	7
Figure 3	Habitat Types.....	14

Figure 4	Protected plant flora survey .....	15
----------	------------------------------------	----

## Tables

Table 2-1	Threatened and Near-threatened flora species identified as potentially occurring within a 10 km radius of the clearing impact area based on database investigations .....	9
Table 3-1	Personnel, qualification and experience .....	16



# 1 Introduction

## 1.1 Project background

The Queensland Train Manufacturing Program (QTMP) will deliver 65 new trains to support Queensland's population and economic growth, including generating hundreds of manufacturing and rail jobs for Queenslanders.

The program also includes the construction of a purpose-built manufacturing facility in Torbanlea, outside of Maryborough, and will be owned and operated by the Queensland Government, supporting the long-term or future requirements of the South East Queensland rail network.

As a result of this requirement for new rollingstock, the Department of Transport and Main Roads (DTMR) has started the Queensland Train Manufacturing Program (QTMP) to address the requirements for new rollingstock and associated infrastructure.

## 1.2 Project location

The Torbanlea site is located on Lot 35 on SP326250, approximately 25 km North of Maryborough. The site is bordered by the Bruce Highway (along the western boundary) and the existing North Coast Rail Line (along the eastern boundary) (refer Figure 1).

## 1.3 Purpose of report



The purpose of the Department of Environment and Science (DES) Protected Plants Flora Survey Trigger Map is to identify areas of potential habitat for Threatened and Near-threatened flora species as listed under the provisions of the *Nature Conservation Act 1992* (QLD) (NC Act). On the trigger mapping, areas shown as 'High risk areas' identify regions that are considered likely to support habitat that is conducive to support EVNT flora species. Typically, an EVNT species is known to occur within 2 km of an area identified as a 'High risk area'. When an area is proposed for disturbance within a 'High risk area', a Protected Plant Flora Survey is required in accordance with the Protected plant flora survey guidelines.

Most of the Project area has been mapped as a 'High risk area' and therefore a Protected Plant Flora Survey is required under the provisions of the NC Act to identify Threatened and Near-threatened flora species that may be present within this area (refer Figure 2).

The purpose of this report is to report on the findings of the Protected plant flora survey for the Project. Specifically, this report provides advice regarding the requirement to apply for a protected plant clearing permit (where a Threatened or Near-threatened flora species is detected 'in the wild') or to apply for an exemption (where no Threatened or Near-threatened flora species are identified as occurring 'in the wild'). This report supplies sufficient detail to act as supporting documentation for either of these options.



**Legend**

-  Property boundary
-  Model disturbance footprint

Map by: C:\Users\Andy.Dalton\Documents\ArcGIS\Projects\Torbanlea\Torbanlea.aprx Date: 30/01/2023 14:27



A3 scale: 1:17,000  
0 175 350 525Meters








Job No: P511003  
Coordinate system: GCS WGS 1984





### Legend

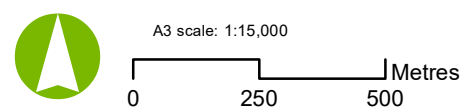
#### DCDB Cadastre

-  Easement
-  Lot Boundary
-  Road Reserve
-  Rail (100K)
-  State Controlled Roads
-  Torbanlea Project Area
-  NC Act Flora Survey Trigger Area

#### Notes:

Date: 27/05/2021

Version: 1



Job No: 511003  
Coordinate System: GDA 1994 MGA Zone 56

## REP Protected plant flora survey

Figure 2: Clearing impact area



## 2 Desktop assessment

### 2.1 Desktop assessment methodology

In accordance with the Section 5.2 of the Flora Survey Guidelines (DES 2020), prior to the commencement of the Protected Plants Flora Survey a desktop assessment was completed to identify potential habitat available for NC Act Threatened and Near-threatened flora species which may occur 'in the wild' (as defined under the provisions of the NC Act), within the Project clearing impact area.

The following desktop resources were review and assessed:

- Protected Plants Flora Survey Trigger Map (DES 2021) (refer Figure 2)
- Wildlife Online Database (DES 2021a)
- Protected Matters Search Tool (DoEE 2021)
- Regulated Vegetation Management Mapping (DNRME 2021)
- Essential Habitat Mapping (DNRME 2021)
- Matters of State Environmental Significance (DES 2021b).

The desktop resources reviewed, as mentioned above, have been included in Appendix A to this report.

### 2.2 Desktop assessment results

The following sections provide a summary of the desktop assessment results.

#### 2.2.1 Protected plant flora survey trigger map

Most of the Project area has been mapped as 'High risk' on the DES Protected Plants Flora Survey Trigger Map (refer Figure 2). This necessitates surveys to be undertaken in accordance with the protected plant flora survey guidelines (refer Section 1.3).

### 2.2.2 Essential habitat

There were no areas of essential habitat for threatened flora species identified within the Project area. However essential habitat for two fauna species (ie. Koala and Wallum Froglet) has been mapped over large portions of the Project area. This mapping is not relevant to the current investigations or scope of this report.

### 2.2.3 Threatened flora species

A search of DES's Wildlife Online database was completed for the Project clearing impact area, using a 10 km search buffer, to identify NC Act threatened flora species which may be present, or have the potential to be present, within the clearing impact area (refer to Appendix A). The results identified 12 NC Act listed Threatened and Near-threatened flora species which have been previously recorded within, or have potential to occur, within the search area (refer to Table 2-1). Species with a moderate potential to occur were specifically targeted during field investigations.

To identify the likely presence of NC Act Threatened and Near-threatened flora species within the Project clearing impact area, and to inform the Protected Plant Flora Survey, a likelihood of occurrence assessment was conducted for the species identified in Table 2-1 (refer to Appendix B).

**Table 2-1 Threatened and Near-threatened flora species identified as potentially occurring within a 10 km radius of the clearing impact area based on database investigations**

Species name	Common name	NC Act status	Likelihood of occurrence within the project impact area <sup>1</sup>
<b>Flora</b>			
<i>Acacia attenuata</i>	Attenuated wattle	V	Moderate
<i>Cossinia australiana</i>	Cossinia	E	Low
<i>Cryptostylis hunteriana</i>	Leafless tongue-orchid	SLC	Moderate
<i>Cupaniopsis shirleyana</i>	Wedge-leaf tuckeroo	V	Low
<i>Fontainea venosa</i>	NCN	V	Low
<i>Macadamia integrifolia</i>	Queensland nut tree	V	Low
<i>Macadamia tetraphylla</i>	Rough-shelled macadamia nut	V	Low
<i>Macrozamia pauli-guilelmi</i>	Pineapple zamia	E	Moderate
<i>Phaius australis</i>	Lesser swamp-orchid	E	Moderate
<i>Prasophyllum exilis</i>	Thin leek orchid	NT	Moderate
<i>Rhodomyrtus psidoides</i>	Native guava	CE	Moderate
<i>Samadera bidwillii</i>	Quassia	V	Moderate

**Table notes:**

NC Act status = *Nature Conservation Act (1992)* (Qld) management status      NCN = No common name      E: Endangered  
NT = Near-threatened      V= Vulnerable      1 = Justification provided in Appendix B

Seven (7) NC Act Threatened / Near-threatened flora species were considered to have a moderate likelihood of occurrence within the Project clearing impact area, based on the species preferred habitat potentially being present and consideration of the species known area of distribution (refer Table 2-1). Five (5) NC Act threatened flora species were considered to have a low likelihood of occurrence within the Project clearing impact area, due to the Project clearing impact area either being situated outside of the species known area of distribution or preferred habitat for the species being absent from the Project clearing impact area (refer Table 2-1).



## 3 Survey Methodology

### 3.1 Clearing impact area

In accordance with the Protected plant flora survey guidelines, it is a requirement that a clearing impact area is established around the Project area. As defined by the guidelines, the clearing impact area is the area to be disturbed to the extent it is within a high-risk area plus a buffer zone of 100 m around the boundary of the area to be disturbed.

Four (4) properties are situated within portions of the clearing impact area, which is considered highly unlikely to be impacted by the proposed development as they are separated from the area to be cleared by an area of highly modified environment that is at least 30 m wide.

The properties which have been removed from the Clearing Impact Area include:

- Lot 2 on RP215252 – Located to the west of the Bruce Highway and parallel powerline easement, approximately 50 m in width
- Lot 1294 FTY1888 – Located to the west of the Bruce Highway and parallel powerline easement, approximately 50 m in width
- Lot 14 AP23033 – Located to the east of the North Coast Rail Line, approximately 35 m in width
- Lot 226 on M371064 – Located to the east of the North Coast Rail Line, approximately 35 m in width.

The Bruce Highway (including a parallel powerline easement) and the North Coast Rail Line are considered to be consistent with Section 5.2.1 of the Flora Survey Guidelines definition of a 'highly modified environment' as they:

- Are a gravel or bitumen road
- Are an impervious surface
- Land that is regularly being mowed, slashed or ploughed
- Are greater than 30 m in width.

Lot 1294 FTY1888, located to the south of the proposed area to be cleared, has also been removed from the Clearing Impact Area. Lot 1294 FTY1888 is a forestry lot consisting of planted Slash pine (*Pinus elliottii*). The lot is considered to be actively managed, regularly slashed and shrub/ground stratum vegetation controlled

The clearing impact area for the Project subject to this report is illustrated in Figure 1. Within the Clearing impact area, there are three (3) distinct habitat types. These are illustrated in Figure 3 and discussed in Section 4.2 .

### 3.2 Timed meander survey

Protected Flora Surveys were conducted on the 18<sup>th</sup> and 19<sup>th</sup> of May 2021, to identify NC Act Threatened and Near-threatened flora species which may be present within the Project clearing impact area (refer Figure 32).

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

The timed meander survey methodology involved the following:

- The selection of a starting point and the time noted
- To maximise the coverage of potential Threatened and Near-threatened flora species habitat, the vegetation community was traversed in a random manner
- Any Threatened or Near-threatened flora species or potential EVNT flora species observed during the random meander were recorded along with samples and locational data (potential EVNT species observations were recorded for later confirmation)
- The time was recorded every 2 to 5 minutes during the survey
- The survey ceased once no new flora species (Threatened or Near-threatened species) had been recorded for a period of 30 minutes or the entire area of habitat type was surveyed, whichever occurred first
- Timed meander surveys were undertaken at the rates per area of habitat type specified in Section 6.2.2 of the Flora Survey Guidelines (DES 2020), that is:
  - Areas of habitat type less than 2 ha: one timed meander survey
  - Areas of habitat type between 2 ha and 10 ha: two timed meander surveys.

The clearing impact area for the Project subject to this report is approximately 128.26 ha. A total of 16 timed meanders were completed, to assess each area of identified habitat. The location of the time meanders which were undertaken for the survey is demonstrated by the track log points illustrated in Figure 4.

### 3.3 Survey timing

Whilst the duration of the Protected Plant Flora Survey is considered adequate, the timing of the survey was undertaken during the autumn months, when some species may not be at their optimum detectability (i.e. absence of flowers or reproductive structures). However, most of the targeted NC Act Threatened and Near-threatened flora species may be considered distinctive, even when reproductive material is absent, in order to overcome the limitations of surveying in autumn. A desktop review and likelihood of occurrence assessment was completed prior to completing the survey to inform field assessment. The desktop review of relevant literature and databases was used to identify potential Threatened and Near-threatened flora species on site. In addition to targeted searches, the Protected Plant Survey included a habitat value assessment for EVNT flora species within the clearing impact area to determine their likelihood

of occurrence for Threatened and Near-threatened flora species potentially occurring (refer to Appendix B). The likelihood of occurrence assessment also included a review of the known fruiting and flowering periods of the species.





Legend

DCDB Cadastre

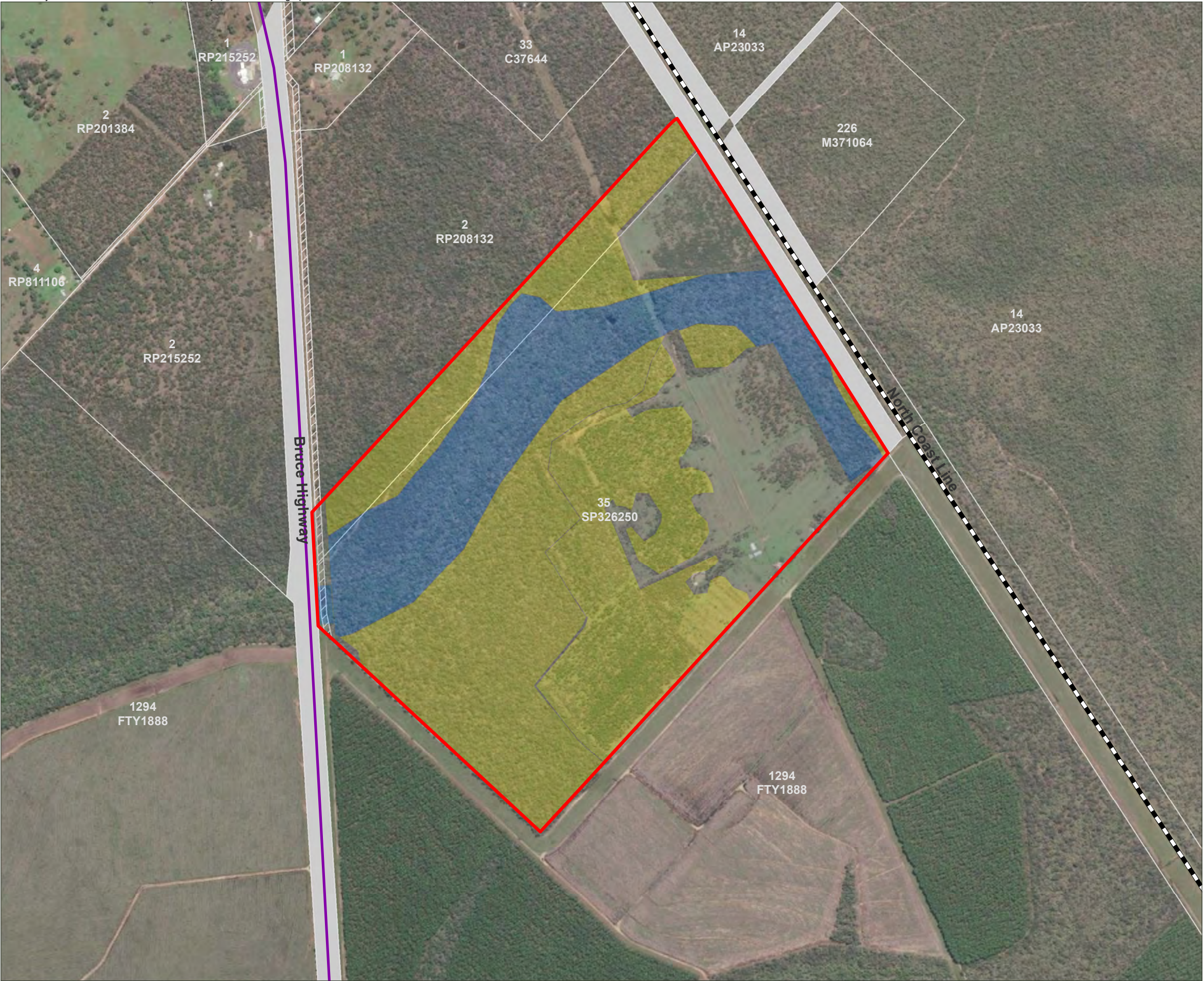
- Easement
- Lot Boundary
- Road Reserve
- Rail (100K)

State Controlled Roads

Project Area

Habitat Types

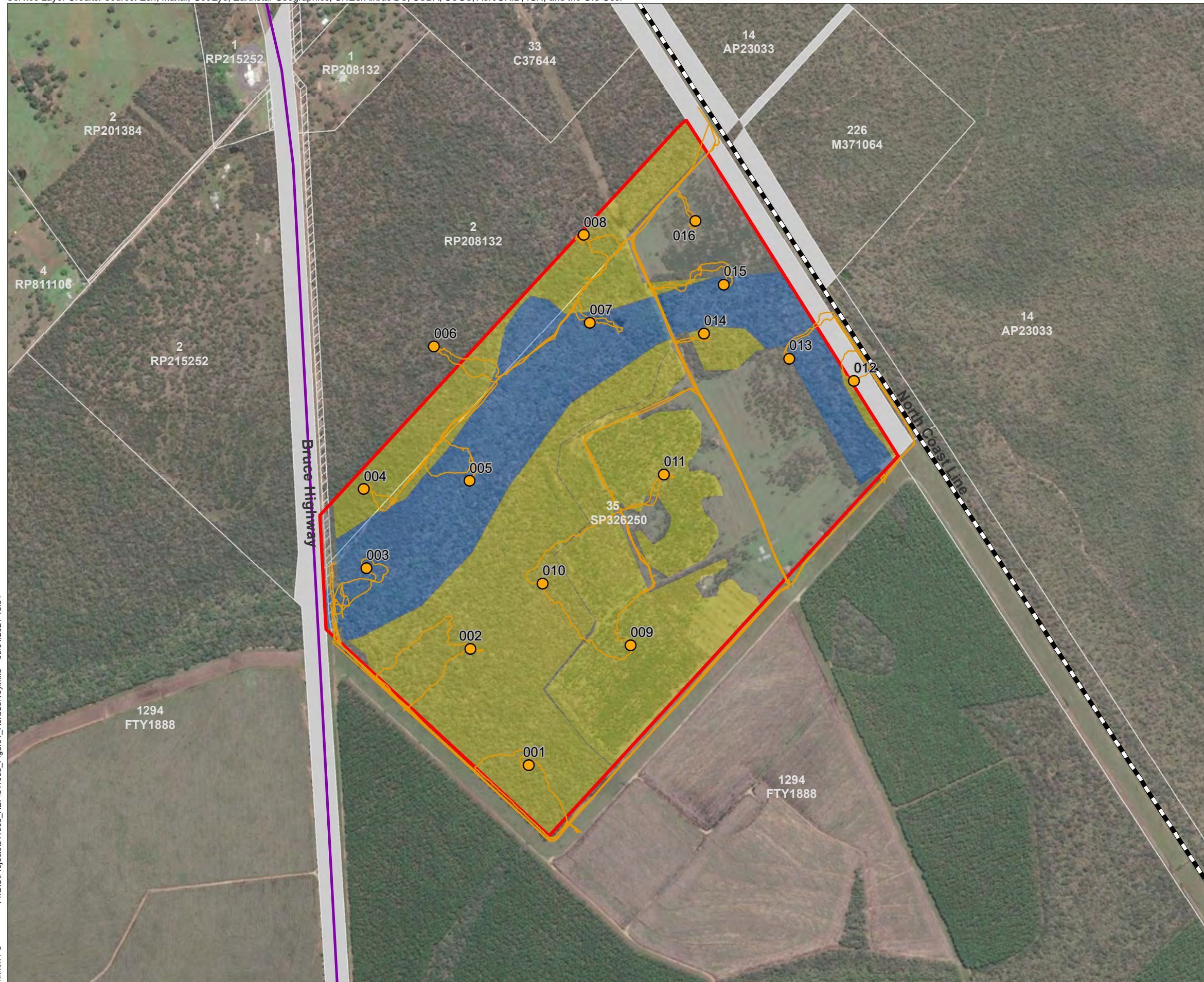
- Habitat Type A = RE 12.3.6
- Habitat Type B = 12.5.4
- Habitat Type C = non remnant areas



Notes:

Date: 27/05/2021 Version: 1





### Legend

#### DCDB Cadastre

- Easement
- Lot Boundary
- Road Reserve
- Rail (100K)

- State Controlled Roads

- Project area

#### Habitat Types

- Habitat Type A = RE 12.3.6
- Habitat Type B = 12.5.4
- Habitat Type C = non remnant areas

- Site survey locations

- Flora survey track log

#### Notes:

Date: 27/05/2021

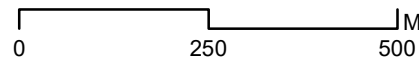
Version: 1



A3 scale: 1:10,000

Job No: 511003

Coordinate System: GDA 1994 MGA Zone 56



## REP Protected plant flora survey

Figure 4: Protected Plant Flora Survey



### 3.4 Permits to conduct works

The Protected Plant Flora Survey was conducted in accordance with Aurecon's Scientific Purposes Permit, WISP14453114 (valid between 20 April 2019 and 19 April 2024).

### 3.5 Nomenclature

Scientific and common names used in this report to describe flora species were obtained from the Census of the Queensland Flora (Jessup 2019).

### 3.6 Survey limitations

The information presented in this report is subject to survey limitations. The Protected Plant Flora Survey was conducted to identify the presence of NC Act EVNT flora species within the Project clearing impact area. The report is specific to the findings of the Protected Plant Flora Survey and does not provide a description of the entire ecological values of the Project clearing impact area.

To inform the Project area survey, Geographical Information Systems (GIS) environmental constraint layers were uploaded to a handheld GPS device. 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  $\pm 5$  m is expected due to the limitations of the device used and the recording environment.

### 3.7 Suitably qualified persons

In accordance with Section 4.2.1 of the Flora Survey Guidelines (DES 2020), the Protected Plant Flora Survey was conducted by the suitably qualified person indicated in Table 3-1. Curricula Vitae for the suitably qualified person, Dr Chris Schell, is provided in Appendix C.

Table 3-1 Personnel, qualification and experience

Assessment component <sup>1</sup>	Conditions	Points	Response	Points allocated <sup>1</sup>
<b>COMPONENT 1: QUALIFICATION KNOWLEDGE AND ABILITY</b>				
A relevant qualification from a recognised institution (e.g. University, TAFE) that results in a thorough knowledge of plant identification and flora surveys.	General training (not Aust. or QLD focussed); OR	30	N/A	0
	Australian focussed training; OR	40	Completed a PhD in Sydney which required knowledge of floristic communities	40
	Queensland focussed training	50	N/A	0
Regional ecosystem training by a recognised and qualified institution, such as the Queensland Herbarium	-	5	Completed RE training and BioCondition Training run by the Qld Herbarium	5

Assessment component <sup>1</sup>	Conditions	Points	Response	Points allocated <sup>1</sup>
Member of a recognised group / certificate program relevant to ecology/botany, where skills/knowledge are demonstrated to be granted membership. E.g. Certified Environmental Practitioner (CEnvP) Program	-	5	Member of EIANZ	5
Lead author of articles/papers published in peer reviewed journals in relation to Qld flora surveys, Qld plant identification, or Qld threatened plants or near threatened plants	10 points per paper to a maximum of 50 points	10	Preparation of "peer reviewed" management plans that were adopted by commonwealth government	10
<b>COMPONENT 2: FIELD EXPERIENCE</b>				
Experience within the last 2 years and a total of at least 5 years at leading flora surveys in a field-based environment at a rate of no less than 5 comprehensive botanical surveys that focus on locating and identifying threatened plant or near threatened plants, per year.	General (not Aust. based); OR	40	N/A	0
	Australian based survey experience; OR	50	N/A	0
	Qld based field flora surveys experience	60	Extensive experience within Qld leading flora surveys, requiring the identification of threatened and near-threatened flora species	60
Number of plant specimens you have collected that have been retained/incorporated into the Queensland Herbarium collection:	5 points per 5 plant specimens retained/incorporated, to a maximum of 40 points	5	At least 8 specimens that I have submitted to the Qld herbarium have been retained for their collection	40
<b>Total accumulated points</b>				<b>160</b>

**Table note:**

1 As per the Flora Survey Guidelines – Protected Plants (DES 2020)

### 3.7.1 Suitably qualified person certification

"I certify that (a) I have adhered to all statutory requirements and *flora survey guideline* requirements, and (b) the flora survey report is an accurate and full account of the flora survey."

Dr Chris Schell

Name



Signature

25 May 2021

Date

## 4 Survey results

### 4.1 Flora survey area

During the Protected Plant Flora Surveys which were conducted on the 18<sup>th</sup> and 19<sup>th</sup> of May 2021, timed meander surveys were completed for each habitat type present within the Project clearing impact area.

In total, sixteen (16) timed meander surveys were completed for the Project clearing impact area. This included:

- Six (6) timed meander surveys in habitat type A, comprised of remnant RE 12.3.6 (approximating 31.67 ha in size)
- Seven (7) timed meander in habitat type B, comprised of remnant RE 12.5.4 (approximating 67.32 ha in size)
- Three (3) timed meander in habitat type C, non-remnant vegetation communities (approximating 29.27 ha in size)

The extent of habitat types A, B and C is illustrated in Figure 3.

### 4.2 Existing environment

The majority of the Project area is comprised of remnant vegetation (ie Category B regulated vegetation) comprising of two distinct Regional Ecosystems (REs) (ie RE 12.3.6 and RE 12.5.4). however, smaller areas of non-remnant vegetation (ie Category X regulated vegetation) exists within the Project area. These non-remnant areas are typically dominated by pasture grasses (eg. African lovegrass – *Eragrostis curvula*), or infestation by Slash Pine (*Pinus elliottii*) or Black Wattle (*Acacia leiocalyx*).

The Project area currently support low intensity cattle grazing, and a single dwelling is location within areas of non-remnant vegetation. The following sections further describe the flora habitat subject to the protected plant survey and their potential to support EVNT flora species. The total area subject to investigation approximates 128.26 ha.

#### 4.2.1 Habitat Type A - Remnant vegetation (RE 12.3.6)

Habitat type A approximates 31.67 ha in area and is analogous to remnant (Category B regulated vegetation) includes remnant RE 12.3.6, which 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.

Habitat Type A provides relatively high value habitat for the following Threatened flora species:

- Attenuated wattle (*Acacia attenuata*)
- Lesser swamp-orchid (*Phaius australis*)
- Thin leek orchid (*Prasophyllum exilis*)

There is relatively low intrusion of non-native species within Habitat Type A, and when present, these species are in relatively low densities.

Photographs of habitat Type A are provided in Photo Plate 4-1.



**Photo Plate 4-1 Typical vegetation associated with Habitat type A**

#### **4.2.2 Habitat Type B – Remnant vegetation (RE 12.5.4)**

Habitat type B approximates 67.32 ha in area and is analogous to remnant (Category B regulated vegetation) RE 12.5.4, which consists 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.

Habitat Type B provides relatively high value habitat for the following Threatened flora species:

- Attenuated wattle (*Acacia attenuata*)
- Leafless tongue-orchid (*Cryptostylis hunteriana*)
- Pineapple zamia (*Macrozamia pauli-guilelmi*)
- Native guava (*Rhodomyrtus psidoides*)
- Quassia (*Samadera bidwillii*).

There is relatively low intrusion of non-native species within Habitat Type A, and when present, these species are in relatively low densities.

Photographs of habitat Type B are provided in Photo Plate 4-2.





**Photo Plate 4-2 Typical vegetation associated with Habitat type B**

#### **4.2.3 Habitat Type C – Non-remnant areas**

Habitat type C approximates 29.27 ha in area and is analogous to non-remnant vegetation (Category X regulated vegetation). This habitat Type has extensively disturbed and also includes areas that are cleared, and those that have regenerated to be dominated by non-native trees (eg Slash pine *Pinus elliotii*), or native pioneering species (eg. 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*).

Habitat Type C provided relatively low habitat value for threatened and/or Near-threatened species as listed under the provisions of the NC Act due to the prevalence of highly competitive non-native, and native pioneering species. However, it is noted that the following species may occur on the interface of remnant and non-remnant areas:

- Attenuated wattle (*Acacia attenuata*)
- Quassia (*Samadera bidwillii*).

Photographs of habitat Type C are provided in Photo Plate 4-3.





**Photo Plate 4-3 Typical vegetation associated with Habitat type C**

### 4.3 Flora species

In total, 104 flora species were identified within the Project Clearing Impact area during the during the Protected Plant Flora Surveys (refer Appendix D). Of these species, 86 (82.7%) were native and 18 (17.3%) were non-native. Of the non-native species 2 (11.1%) were restricted matters (refer Section 4.4). No Threatened or Near-threatened flora species were identified within the Project clearing impact area during site investigations.

Of the native species, eight (9.3%) were Special Least Concern (SLC) flora species as listed under the provisions of the NC Act. These species consisted of the following:

- *Dipodium variegatum* (Slender hyacinth orchid)
- *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 grass tree)
- *Xanthorrhoea johnsonii* (Forest grass tree).

Special Lest Concern (SLC) flora are protected due to their vulnerability to harvesting. A protected plant harvesting licence is required to harvest SLC flora species, however an application to clear these species is not required.

## 4.4 Restricted invasive plants

Restricted invasive plants 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 clearing impact area during the Protected Plant Flora Survey:

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

The two restricted invasive plants identified within the Project clearing impact area during the Protected Plant Flora Survey are Category 3 restricted invasive plants. Category 3 restricted invasive plants are subject to Category 3 restrictions whereby a person must not release these invasive plants into the environment, give away or sell as a plant or something infested with its seeds. A person must not distribute a Category 3 restricted invasive plant either by sale or gift or release the plant into the environment.

## 5 Conclusion

The Project will require clearing within an area of vegetation mapped as a 'High risk area' on the DES Protected Plants Flora Survey Trigger Map. Consequently, a Protected Plant Flora Survey was required under the provisions of the NC Act to identify Threatened and Near-threatened flora species that may be present, prior to works commencing.

On the 18<sup>th</sup> and 19<sup>th</sup> May 2020, Aurecon conducted Protected Plant Flora Surveys of the Project clearing impact area in accordance with DES's Flora Survey Guidelines (DES 2020). The clearing impact was defined as the Project area as it intersects with the 'High risk area', and the surrounding 100 m buffer zone. However, it is noted that the clearing impact area was modified as described in Section 3.1.

No threatened or near-threatened flora species, as listed under the provisions of the NC Act, were detected within or immediately adjacent to the Project clearing impact area during the Protected Plant Flora Survey. Special least concern flora were identified during site investigations and these species are protected due to their vulnerability to harvesting. A protected plant harvesting licence is required to harvest protected plants, however an application to clear these species is not required.

It is proposed that the works qualify as exempt under Section 261ZA of the NC Reg as the species recorded were either Least Concern or not deemed to be 'in the wild'.

Prior to the commencement of ground disturbance and clearing activities, the proponent is required to complete an 'Exempt clearing notification (protected plants) form' to notify DES of the proposed clearing and receive a 'receipt of submission' at least one week prior to the commencement of works. It is noted that this Flora Survey Report must be submitted with the 'Exempt clearing notification form' and that this report is valid for a period of 12 months post field work (ie valid until 18<sup>th</sup> May 2022).

## 6 References

- Department of Environment and Science (DES) (2020), Flora Survey Guidelines – Protected Plants Nature Conservation Act 1992, version 2.01, Accessed: May 2021, Available: [https://www.qld.gov.au/data/assets/pdf\\_file/0028/99901/gl-wl-pp-flora-survey.pdf](https://www.qld.gov.au/data/assets/pdf_file/0028/99901/gl-wl-pp-flora-survey.pdf)
- Department of Environment and Science (DES) (2021), Protected plants flora survey trigger map, Accessed: May 2020, Available: <https://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/map-request.php>
- Department of Environment and Science (DES) (2021a), Wildlife Online database, Accessed: May 2020, Available: <http://www.ehp.qld.gov.au/wildlife/wildlife-online/index.html>
- Department of Environment and Science (DES) (2021b), Matters of State Environmental Significance, Accessed: May 2020, Available: <https://apps.des.qld.gov.au/report-request/environment/>
- Department of Environment and Energy (DoEE) (2021), Protected Matters Search Tool, Accessed: May 2020, Available: <http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/protected>
- Department of Natural Resources, Mines and Energy (DNRME) (2021), Regulated vegetation management map and essential habitat map, Accessed: May 2021, Available: <https://www.dnrm.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form>
- Jessup, L.W. (2019). Ebenaceae. In Brown GK, and Bostock, PD (2019), Census of the Queensland Flora 2019. Queensland Department of Environment and Science: Brisbane, Accessed: May 2020, Available: <https://data.qld.gov.au/dataset/census-of-the-queenslandflora-2019>
- Queensland Herbarium (2021), Regional Ecosystem Description Database (REDD), version 11.1, DSITIA: Brisbane.

## Appendix A      Database search results





Queensland Government

Department of Environment and Science

Environmental Reports

## **Matters of State Environmental Significance**

For the selected area of interest

Longitude: 152.6062 Latitude: -25.3673 with 2 kilometre radius

## Appendix B Likelihood of occurrence assessment for Threatened and Near-threatened flora species

Species name	Common name	NC Act status	Description and habitat associations	Likelihood of occurrence within the project impact area
<b>Flora</b>				
<i>Acacia attenuata</i>	NCN	V	<p><i>Acacia attenuata</i> 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.</p> <p>Across this range <i>A. attenuata</i> 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.</p> <p><i>Acacia attenuata</i> has been recorded growing in shrublands with <i>Leptospermum whitei</i> and <i>Baeckea frutescens</i>; in wallum with <i>Banksia aemula</i> and <i>Eucalyptus robusta</i>; in woodlands with <i>Corymbia trachyphloia</i>, <i>E. umbra</i> and <i>Banksia oblongifolia</i>; and in open forests of <i>E. umbra</i>, <i>E. racemosa</i> and <i>Melaleuca quinquenervia</i>.</p>	<p><b>Moderate</b></p> <p>The species has been previously recorded within the wider region and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Cossinia australiana</i>	Cossinia	E	<p><i>Cossinia australiana</i> is a shrub to small slender tree, growing to 7 m in height with a sparse crown.</p> <p>Cossinia is known from fragmented relict patches of Araucarian vineforests or vine thickets on fertile soils.</p>	<p><b>Low</b></p> <p>The proposed site is not considered to provide preferred habitat for the species (i.e., rainforest and vine thicket vegetation).</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Cryptostylis hunteriana</i>	Leafless tongue-orchid	SLC	<p>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</p> <p>The species does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland (DOTE 2014)</p>	<p><b>Moderate</b></p> <p>The species has been previously recorded within the wider region and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>

Species name	Common name	NC Act status	Description and habitat associations	Likelihood of occurrence within the project impact area
<i>Cupaniopsis shirleyana</i>	Wedge-leaf tuckeroo	V	<p>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</p> <p>Distribution of the species has been recorded between Brisbane and Mount Larcom.</p>	<p><b>Low</b></p> <p>The proposed site is not considered to provide preferred habitat for the species (i.e., rainforest and vine thicket vegetation).</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Fontainea venosa</i>	NCN	V	<p>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 (DEWHA 2008c).</p>	<p><b>Low</b></p> <p>The proposed site is not considered to provide preferred habitat for the species (i.e., rainforest and vine thicket vegetation).</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Macadamia integrifolia</i>	Queensland nut tree	V	<p>Queensland nut tree occurs from Mt Bauple, near Gympie, to Currumbin Valley in the Gold Coast hinterland, southeast Queensland.</p> <p>Queensland nut tree grows in remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges (DEWHA 2008). This species occurs within the Northern Rivers (NSW) and southeast Queensland Natural Resource Management regions.</p> <p>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 (DoEE 2018).</p>	<p><b>Low</b></p> <p>The proposed site is not considered to provide preferred habitat for the species (i.e., rainforest and vine thicket vegetation).</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Macadamia tetraphylla</i>	Rough-shelled macadamia nut	V	<p>Rough-leaved Queensland nut occurs from northeast NSW (chiefly in the Richmond and Tweed River areas) to southeast Queensland (Mt Glorious, near Brisbane) (DoEE 2018). 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.</p>	<p><b>Low</b></p> <p>The proposed site is not considered to provide preferred habitat for the species (ie rainforest and vine thicket vegetation).</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>

Species name	Common name	NC Act status	Description and habitat associations	Likelihood of occurrence within the project impact area
<i>Macrozamia pauli-guilelmi</i>	Pineapple zamia	E	<p><i>Macrozamia pauli-guilelmi</i> is a small cycad with an underground ovoid trunk and spiral leaves. The species is distinguished by its very narrow and pale-green leaflets.</p> <p>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</p>	<p><b>Moderate</b></p> <p>The species has been previously recorded within the wider region and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Phaius australis</i>	Lesser swamp-orchid	E	<p>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).</p> <p>This species is associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved paperbark (<i>Melaleuca leucadendra</i>) or Swamp mahogany (<i>Eucalyptus robusta</i>) 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.</p>	<p><b>Moderate</b></p> <p>The species has been previously recorded within the wider region and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Prasophyllum exilis</i>	Thin leek orchid	NT	<p><i>Prasophyllum exilis</i> 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.</p> <p><i>Prasophyllum exile</i> grows in damp, grassy places in coastal and near-coastal forest and woodland.</p>	<p><b>Moderate</b></p> <p>The species has been previously recorded within 2 km of the proposed site and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>
<i>Rhodomyrtus psidoides</i>	Native guava	CE	<p>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 (DAWE, 2021)</p>	<p><b>Moderate</b></p> <p>The species has been previously recorded within the wider region and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>

Species name	Common name	NC Act status	Description and habitat associations	Likelihood of occurrence within the project impact area
<i>Samadera bidwillii</i>	Quassia	V	<i>Samadera bidwillii</i> commonly occurs in lowland rainforest often with <i>Araucaria cunninghamii</i> 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.	<p><b>Moderate</b></p> <p>The species has been previously recorded within the wider region and the proposed site provides potential suitable habitat for the species.</p> <p>The species was not identified within the proposed site during ecological field investigations conducted in May 2021.</p>

**Table note:**

Unlikely: Identified from database searches only and no suitable habitat exists within the Proposed site

Low: Records for the species are from a reliable data source but not specifically recorded within the Proposed site. Suitable habitat for this species does not exist within the Proposed site

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

Known: The species has been recorded within the Proposed site



## Appendix C      Curricula vitae



### Dr. Chris Schell

#### Associate, Environment and Planning

Chris is a scientist with over 20 years of industry experience in natural resource management and 30 years of experience in research.

Chris has significant experience in undertaking ecological surveys and investigation for environmental impact statements and has extensive experience in the preparation of Environmental Impact Statements (EIS) in addition to the preparation of environmental management plans and environmental monitoring programs pertaining to both flora and fauna.

Chris has been extensively involved in environmental compliance assessments and is familiar with environmental legislative requirements including (but not limited to) the *Vegetation Management Act 1999*, *Nature Conservation Act 1992* and associated regulations, and the *Environment Protection and Biodiversity Conservation Act 1999*.

#### Qualifications and Professional Memberships

Associate Diploma (Bio and Chem Tech), University of Western Sydney 1984.

BSc (Hons), University of Western Sydney 1988.

PhD (Zoology), University of Western Sydney 2003.

Certified Environmental Practitioner (CEnvP 265), Environmental Institute of Australia and New Zealand, 2009.

#### Specialisation

Development of species habitat models.

Terrestrial and aquatic ecology (flora and fauna).

Environmental impact assessment.

Matters of National Environmental Significance.

#### Years in industry

20

### Relevant Experience

#### Advisory

**Technical review of EPBC referral documentation associated with the Karara Wind Farm Project | Clean Co | July 2020 | Independent verifier.**

On behalf of the Queensland Government (Clean Co), Chris was engaged to undertake a technical review of the Ecological components of material associated with the EPBC Act referral documentation associated with the proposed Karara Wind Farm as Karara, within southern Queensland. As part of the review process, technical adequacy/compliance with the relevant commonwealth assessment requirements were assessed.

**Technical review of ecological assessment reports associated with the Dulacca Renewal Energy Project and the Ironpot Windfarm project | Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSPIP) | 2018 – 2019 | Independent verifier.**

On behalf of the Queensland Government, Chris was engaged to undertake a technical review of the Ecological components of material associated with the application to approve two large wind farms within southern Queensland (i.e. Dulacca and Ironpot). As part of the review process, technical adequacy/compliance with the relevant state codes were assessed.

#### Transport

**Inland Rail – Delivery of five Environmental Impact Statements (EIS's) | Australian Rail and Track Corporation (ARTC) | 2018 – present | Manager / Ecology Discipline Lead.**

Chris was the ecology discipline lead for the preparation and delivery of ecology components associated with five separate EIS's, which were prepared concurrently for the proposed Inland Rail. Four of these EIS packages (i.e. Border to Gowrie, Gowrie to Helidon, Helidon to Calvert, and Calvert to Kagaru) were located within Queensland, with the fifth (i.e. North-star to Border) located within northern New South Wales.

### Dr. Chris Schell

#### Principal, Environment and Planning

Preparation of ecological material associated with the separate EIS packages required assessment against the stipulated guidelines (i.e. ToR, SEAR and specific legislative guidelines), a high level of coordination and project management, data analysis and a very high level of reporting to meet the specified requirements.

**Toowoomba Second Range Crossing, Collared Delma Translocation Management Plan – Development and Implementation | Nexus Delivery | 2016 – 2019 | Manager / Senior Ecologist.**

Chris was the principal scientist responsible for the preparation and implementation of the Collared Delma (*Delma torquata*) translocation management plan. The plan was prepared in consultation with the Queensland Department of Transport and Main Roads (DTMR), the Queensland Department of Environment and Heritage Protection (DEHP) and the Commonwealth Department of the Environment (DoE). This project constituted a world first for the translocation of this vulnerable reptile and has become the benchmark for future translocation projects for conservation significant reptile species. Information derived from this project constitutes ground-breaking discoveries regarding the species micro-habitat requirements, growth rates, behavioural responses to threatening processes and activity patterns in response to natural and anthropogenic stimuli.

**Toowoomba Second Range Crossing, EVNT protected plant surveys | Nexus Delivery | 2016 – 2019 | Senior Ecologist, Aurecon Brisbane.**

Chris was the principal scientist responsible for the survey design and reporting for multiple protected plant (EVNT) surveys associated with the TSRC project. These were undertaken in accordance with legislative requirements.

**Gold Coast Airport Project LIFT | Queensland Airport Limited | 2016 | Senior Ecologist.**

Project LIFT involved the expansion of the existing terminal building and apron of the Gold Coast Airport to facilitate a forecast increase in air traffic. Chris was involved in undertaking field assessments and reporting to identify and assess potential biodiversity offsets (using the NSW Biobanking Methodology) in accordance with the Commonwealth government's EPBC Act Environmental Offsets Policy. This project involved confirmation of the mapped vegetation communities in accordance with the NSW Vegetation Information System (VIS) Classification database and targeted fauna habitat mapping for species protected under the provisions of the *Threatened Species Conservation Act 1995* and/or the *Environment Protection and Biodiversity Conservation Act 1999*.

#### Energy, Resources & Water

**Cooper Basin, Cooper Basin Jackson/Naccowah Discharge Monitoring – Design and implementation of Ecological Monitoring Plan | Santos | 2014 – 2015 | Senior Ecologist.**

Chris was responsible for the development and implementation of the Ecological Monitoring Plan for the Jackson and Naccowah Facility within the Santos oil and gas fields within the Cooper Basin. The monitoring plan was developed in consultation within EHP. Results from the monitoring plan were used in future planning for both the Jackson and Naccowah facilities.

**Cooper Basin, Cooper Basin Environmental Sensitivity Profile (ESP) Model – Stage 2 validation | Santos | 2013 – 2015 | Senior Ecologist.**

Working as part of a team, Chris was responsible for assessing the validity of the desktop-based ESP model. Due to the scale of the Cooper Basin project area and the limited existing ecological information, Aurecon used a combination of both desktop validation and field validation together with the combination of predictive GIS model which had been negotiated with regulatory agencies and approved on other Santos operations in the Gas fields and the Gas Transmission Pipeline. Chris was also responsible for the preparation and incorporation of predictive habitat modelling for federally listed, conservation significant species into the ESP model.

aurecon

aurecon

## Appendix D Observed Flora species

### 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	<i>Pseuderanthemum variable</i>	Pastel flower	LC	-						X			X		X							X
Acanthaceae	<i>Rostellularia adscendens</i>	Rostellularia	LC	-									X		X			X	X			X
Adiantaceae	<i>Cheilanthes sieberi</i>	Cloak fern	LC	-		X	X						X	X				X			X	X
Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena weed	-	-	non-native									X		X						X
Apiaceae	<i>Centella asiatica</i>	Penny wort	LC	-									X					X			X	X
Apiaceae	<i>Platysace linearifolia</i>	Platysace	LC	-													X	X			X	X
Apocynaceae	<i>Gomphocarpus physocarpus</i>	Balloon cottonbush	-	-	non-native											X					X	X
Apocynaceae	<i>Parsonsia straminea</i>	Monkey rope	LC	-			X	X		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
Asteraceae	<i>Ageratum houstonianum</i>	Blue billygoat weed	-	-	non-native																	
Asteraceae	<i>Emilia sonchifolia</i>	Emilia	-	-	non-native									X		X					X	X
Asteraceae	<i>Praxelis clematidea</i>	Praxelis	-	-	non-native		X						X	X		X		X	X		X	X
Campanulaceae	<i>Lobelia purpurascens</i>	White root	SLC	-	Special least concern species	X	X	X		X		X		X		X	X	X	X	X	X	X
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black sheoak	LC	-				X	X	X	X		X		X					X		X
Cyperaceae	<i>Baumea articulata</i>	Jointed twigrush	LC	-				X														X
Cyperaceae	<i>Baumea teretifolia</i>	Twigrush	LC	-				X		X		X								X		X
Cyperaceae	<i>Cyperus difformis</i>	Rice sedge	LC	-				X						X		X						X
Cyperaceae	<i>Cyperus exaltatus</i>	Tall flatsedge	LC	-				X														X
Cyperaceae	<i>Cyperus gracilis</i>	Small sedge	LC	-				X														X
Cyperaceae	<i>Cyperus polystachyos</i>	Bunchy sedge	LC	-				X														X
Cyperaceae	<i>Cyperus prolifer</i>	Dwarf papyrus	-	-	non-native																	
Cyperaceae	<i>Fimbristylis ferruginea</i>	Sedge	LC	-		X											X					X
Cyperaceae	<i>Gahnia sieberiana</i>	Sword grass	LC	-		X	X	X	X	X	X		X		X	X	X	X	X	X		X
Cyperaceae	<i>Isolepis inundata</i>	Swamp club rush	LC	-				X														X
Cyperaceae	<i>Lepidosperma laterale</i>	Variable sword sedge	LC	-																		
Cyperaceae	<i>Lepironia articulata</i>	Tall reed	LC	-																		
Dilleniaceae	<i>Hibbertia vestita</i>	Hibbertia	LC	-		X	X			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
Droseraceae	<i>Drosera burmanni</i>	Annual sundew	SLC	-	Special least concern species																	X
Droseraceae	<i>Drosera peltata</i>	Pale sundew	SLC	-	Special least concern species					X							X					X
Ericaceae	<i>Acrotriche aggregata</i>	Red cluster heath	LC	-			X		X						X				X			X
Fabaceae	<i>Desmodium rhytidophyllum</i>	Native desmodium	LC	-															X			X
Fabaceae	<i>Glycine clandestina</i>	Glycine pea	LC	-		X	X								X							X
Fabaceae	<i>Glycine tabacina</i>	Glycine pea	LC	-		X	X						X							X		X
Fabaceae	<i>Gompholobium pinnatum</i>	Poor mans gold	LC	-		X	X		X		X											X
Fabaceae	<i>Macroptilium atropurpureum</i>	Siratiro	-	-	non-native									X							X	X
Fabaceae	<i>Pultenaea myrtoides</i>	Eggs and bacon	LC	-		X	X		X													X
Fabaceae	<i>Stylosanthes scabra</i>	Stylo pea	-	-	non-native													X			X	X
Goodeniaceae	<i>Goodenia rotundifolia</i>	Goodenia	LC	-		X	X	X											X			X
Goodeniaceae	<i>Velleia spathulata</i>	Wild pansies	LC	-		X		X			X						X					X
Haemodoraceae	<i>Haemodorum tenuifolium</i>	Blood root	LC	-		X		X														X
Iridaceae	<i>Patersonia sericea</i>	Purple flag	LC	-		X																X
Juncaginaceae	<i>Triglochin procerum</i>	Water ribbons	LC	-																		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
Lamiaceae	<i>Westringia tenuicaulis</i>	Tufted westringia	LC	-				X														X
Lauraceae	<i>Cassytha filiformis</i>	Dodder laurel	LC	-		X									X				X			X
Laxmanniaceae	<i>Eustrephus latifolius</i>	Wombat berry	LC	-															X			X
Laxmanniaceae	<i>Laxmannia gracilis</i>	Slender wire lily	LC	-		X																X
Laxmanniaceae	<i>Lomandra confertifolia</i>	Small matrush	LC	-		X	X		X			X	X				X					X
Laxmanniaceae	<i>Lomandra longifolia</i>	Long leaved matrush	LC	-			X	X		X		X								X		X
Laxmanniaceae	<i>Lomandra multiflora</i>	Many headed matrush	LC	-		X			X				X		X		X			X		X
Malvaceae	<i>Sida cordifolia</i>	Flannel weed	-	-	non-native		X						X	X					X		X	X
Malvaceae	<i>Sida rhombifolia</i>	Paddy's lucerne	-	-	non-native									X				X			X	X
Mimosaceae	<i>Acacia leiocalyx</i>	Black wattle	LC	-		X	X		X	X	X	X	X	X	X		X	X	X	X	X	X
Myrtaceae	<i>Angophora leiocarpa</i>	Rusty gum	LC	-							X	X							X			X
Myrtaceae	<i>Corymbia intermedia</i>	Pink bloodwood	LC	-		X	X	X	X									X				X
Myrtaceae	<i>Corymbia trachyphloia</i>	Brown bloodwood	LC	-		X	X				X		X		X		X			X		X
Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint	LC	-				X		X			X		X		X		X	X		X
Myrtaceae	<i>Eucalyptus latisinensis</i>	Mahogany	LC	-				X	X		X	X	X		X		X	X	X	X		X
Myrtaceae	<i>Eucalyptus siderophloia</i>	Grey ironbark	LC	-															X			X
Myrtaceae	<i>Eucalyptus tereticornis</i>	Queensland blue gum	LC	-						X	X		X									X
Myrtaceae	<i>Leptospermum polygalifolium</i>	Tantoon	LC	-						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
Myrtaceae	<i>Lophostemon suaveolens</i>	Swamp box	LC	-		X		X			X	X	X				X			X		X
Myrtaceae	<i>Melaleuca quinquenervia</i>	Swamp paperbark	LC	-		X	X	X		X		X	X		X			X		X	X	X
Orchidaceae	<i>Geodorum densiflorum</i>	Pink nodding orchid	SLC	-	Special least concern species																	X
Orchidaceae	<i>Pterostylis nutans</i>	Greenhood orchid	SLC	-	Special least concern species	X	X			X												X
Oxalidaceae	<i>Oxalis chnoodes</i>	Wood sorrel	LC	-										X						X	X	X
Passifloraceae	<i>Passiflora subpeltata</i>	White passion flower	-	-	non-native	X	X		X	X			X					X	X	X		X
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee bush	LC	-			X						X			X			X			X
Phyllanthaceae	<i>Glochidion ferdinandi</i>	Cheese tree	LC	-				X		X						X						X
Phyllanthaceae	<i>Phyllanthus virgatus</i>	Green phyllanthus	LC	-			X	X	X				X	X	X				X			X
Picrodendraceae	<i>Petalostigma pubescens</i>	Quinine tree	LC	-		X																X
Pinaceae	<i>Pinus elliotii</i>	Slash pine	-	-	non-native	X	X			X		X		X		X						X
Pittosporaceae	<i>Pittosporum viscidum</i>	Black-fruited thornbush	LC	-					X													X
Plantaginaceae	<i>Limnophila aromatica</i>	Aromatic limnophila	LC	-																		X
Poaceae	<i>Alloteropsis semialata</i>	Cockatoo grass	LC	-			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
Poaceae	<i>Aristida vagans</i>	Awne grass	LC	-		X					X						X	X				X
Poaceae	<i>Cymbopogon refractus</i>	Barbed-wire grass	LC	-						X									X			X
Poaceae	<i>Digitaria brownii</i>	Finger grass	LC	-								X										X
Poaceae	<i>Entolasia stricta</i>	Wiry panic	LC	-		X	X		X	X			X		X		X			X		X
Poaceae	<i>Eragrostis brownii</i>	Brown's lovegrass	LC	-			X	X	X	X			X	X			X				X	X
Poaceae	<i>Eragrostis curvula</i>	African lovegrass	-	-	non-native			X		X			X	X		X		X			X	X
Poaceae	<i>Heteropogon contortus</i>	Black speargrass	LC	-		X											X			X		X
Poaceae	<i>Imperata cylindrica</i>	Blady grass	LC	-		X						X		X			X	X	X	X		X
Poaceae	<i>Ischaemum australe</i>	Ischaemum	LC	-							X	X	X				X			X	X	X
Poaceae	<i>Melinis repens</i>	Red natal grass	-	-	non-native									X								X
Poaceae	<i>Oplismenus aemulus</i>	Creeping shade grass	LC	-							X									X		X
Poaceae	<i>Ottolochloa gracillima</i>	Pademelon grass	LC	-							X									X		X
Poaceae	<i>Sporobolus fertilis</i>	Giant Parramatta grass	-	-	non-native, RESTRICTED MATTER									X							X	X
Poaceae	<i>Urochloa decumbens</i>	Signal grass	-	-	non-native					X				X								X
Proteaceae	<i>Banksia integrifolia</i>	Coastal banksia	LC	-		X	X		X													X
Proteaceae	<i>Banksia robur</i>	Broad-leaved banksia	LC	-				X		X		X	X									X
Proteaceae	<i>Grevillea banksii</i>	Pink grevillea	LC	-		X		X	X		X		X		X			X	X	X	X	X
Proteaceae	<i>Grevillea leiophylla</i>	Wallum grevillea	LC	-													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
Proteaceae	<i>Hakea actites</i>	Wallum hakea	LC	-													X					X
Proteaceae	<i>Persoonia virgata</i>	Small-leaved geebung	LC	-		X																X
Proteaceae	<i>Xylomelum salicinum</i>	Woody pear	LC	-																		X
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap tree	LC	-		X	X	X	X	X		X	X		X	X		X	X	X	X	X
Rubiaceae	<i>Psydrax odorata</i>	Hat stand	LC	-															X			X
Solanaceae	<i>Solanum stelligerum</i>	Devil's needles	LC	-		X								X		X						X
Stylidiaceae	<i>Stylidium graminifolium</i>	Grassy-leaved trigger-flower	SLC	-	Special least concern species																	X
Thymelaeaceae	<i>Pimelea linifolia</i>	Rice flower	LC	-		X					X		X		X		X					X
Verbenaceae	<i>Lantana camara</i>	Lantana	-	-	non-native, RESTRICTED MATTER		X							X		X		X			X	X
Verbenaceae	<i>Verbena litoralis</i>	Tall verbenia	-	-	non-native											X						X
Violaceae	<i>Hybanthus stellarioides</i>	Spade flower	LC	-													X	X				X
Xanthorrhoeaceae	<i>Xanthorrhoea fulva</i>	Swamp grasstree	SLC	-	Special least concern species	X	X	X	X	X	X	X	X		X		X					X
Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>	Grasstree	SLC	-	Special least concern species		X		X						X							X

**Table Notes:**

SLC = Special least concern; LC = Least concern; - = Not listed; X = Species observed

Document prepared by

**Aurecon Australasia Pty Ltd**

ABN 54 005 139 873

Ground Floor, 25 King Street  
Bowen Hills QLD 4006

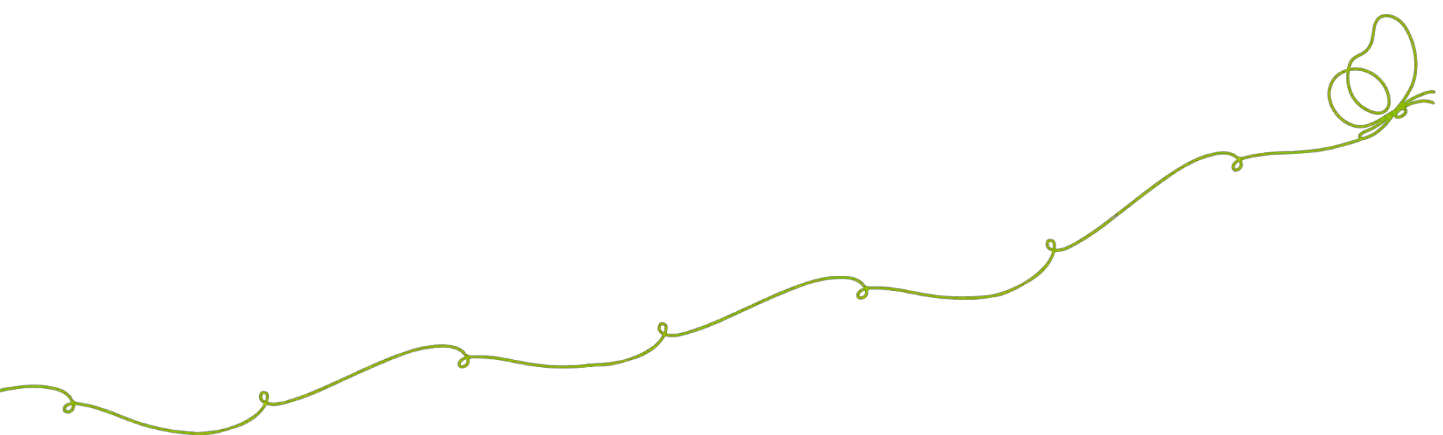
Locked Bag 331  
Brisbane QLD 4001  
Australia

**T** +61 7 3173 8000

**F** +61 7 3173 8001

**E** [brisbane@aurecongroup.com](mailto:brisbane@aurecongroup.com)

**W** [aurecongroup.com](http://aurecongroup.com)



## Appendix F: Koala survey by detection dogs



# **CN-19503 (1804863) Koala Survey by Detection**

## **Dogs - Torbanlea**



**THE UNIVERSITY  
OF QUEENSLAND**  
A U S T R A L I A

**Prepared for the Queensland Department of Transport and Main Roads**

By the University of Queensland

Associate Professor Celine Frere

September 2022

## Disclaimer

*This report was prepared in accordance with the scope of work agreed with the Department of Transport and Mains Roads and is subject to the specific time, cost and other constraints as defined by the scope of work.*

*This report is subject to copyright protection and the copyright owner reserves its rights.*

## Scope of works

Associate Professor Celine Frere from the University of Queensland (UQ), School of Biological Sciences, in partnership with OWAD were contracted by the Queensland Department of Transport and Main Roads (QTMR) to conduct koala scat surveys using detection dogs across potential koala habitat located within a 2 kilometres buffer radius of the proposed Torbanlea Train Manufacturing Upgrade project area. The aim was to conduct fine-scale detection dog surveys to determine and map potential koala habitat via the presence of koala scats. Two handler and dog teams were deployed to survey a list of ear-marked properties identified by QTMR, UQ and Aurecon (see Figure 1).

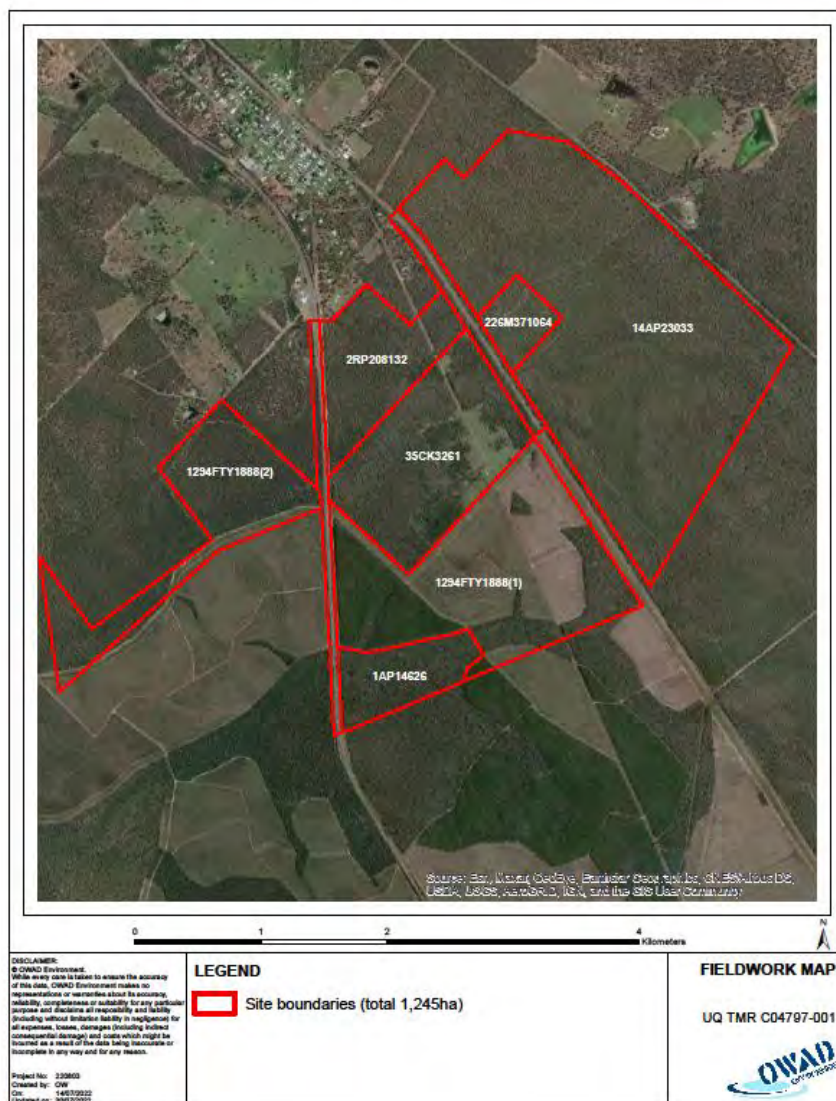


Figure 1. Map of ear-marked properties for detection dog koala scat surveys

## 2- Methodology & Quality Assurance

### 2.1 Detection dogs and full search surveys

Purpose-bred professional detection dogs are a powerful tool to identify presence of koala scats. Here, we deployed two purpose-bred professional detection dogs to undertake full search surveys of defined target sites detailed in Figure 1. To ensure the animal welfare of the detection dogs, all target sites were confirmed by QTMR and relevant authorities to have no 1080 or PAPP baiting. Surveys were conducted over a 10 days' period from the 15<sup>th</sup> to the 30<sup>th</sup> of August 2022. Full search surveys methodology was selected as the best method for the scope set by QTMR: limiting the chance of false negatives. To maximise the chances of locating koala scats which were expected to occur at low density, the detection dogs and their handlers conducted full searches of selected target sites. Detection dogs will typically search anywhere between 10km to 30km/day using this search methodology. The detection dogs are fitted with a GPS collar to record the survey tracks and if a koala scat is found, its GPS position is taken and collected for DNA analysis.

### 2.2 Field Quality Assurance procedures

Field quality assurance (FQA) procedures are undertaken to ensure that the data collected in the field is representative of the true site conditions and is therefore valid for interpretation. These procedures include the use of experienced Koala ecology expert staff, Certified Environmental Practitioners, purpose-bred field detection dogs raised and trained by certified experts for the task, certification of both the dogs and their handlers for each target, extensive field trials conducted over several consecutive full days for each new dog and/or each new target prior to the canine being deployed on project work for said target, the use of appropriate study designs and protocols, and the implementation of daily field quality control (FQC) searches.

FQC searches are performed each day on all applied projects. In the case of a Koala study, either the detection dog finds a naturally deposited Koala scat or a Koala (alive or dead) within the first few minutes or hours of working each day, in which case there is no need to deposit a Koala scat for FQC purposes. Or, if no naturally deposited scats/or no Koalas are found within the first few minutes or hours of commencing work each day, then the field assistant randomly deposits a Koala scat, ensuring the handler does not know when or where an FQC scat has been placed. When a scat is deposited for FQC purposes, the field assistant starts a chronometer (without the handler knowing) when the dog/handler team is within approximately 100 metres from the FQC scat and records the time it takes the dog/handler team to find a target (whether the FQC scat or naturally deposited Koala scats/or a live Koala, whichever is found first).

An FQC search enables the assessment of the dog/handler team's ability to find a target in the specific conditions of a particular site at a particular time, within a maximum time of 5 minutes. This ensures

that there are no exceptional circumstances or factors that may be disabling the dog/handler team's ability to find targets (e.g. a scent that may be obscuring target odours for the dog; handler fatigue or distraction which may affect the handler's ability to correctly handle the dog, etc.). Crucially, the handler is never informed in advance where or when Koala scats are deposited for FQC purposes. Not disclosing this information is crucial to ensuring there is no bias in how the handler handles the dog. It is only after the dog/handler team has found a target during an FQC search that the field assistant discloses it was an FQC scat. At least one FQC search per dog/handler team is performed on any given day; however, the field assistant may choose to perform more than one FQC search per dog/handler team on any given day. The FQC search interpretation is as follow:

1. Should the dog/handler team find a deposited FQC scat within 5 minutes, the FQC search is marked as successful, the time is recorded for record-keeping purposes and work continues. The coordinates of the FQC scat are recorded for QA purposes, but results are not included as an actual result in the survey as this was not a naturally occurring scat. These are, however, recorded on the survey map for information (e.i. see green circles in Figure 2).
2. Should the dog/handler team find a naturally deposited target scat/or a live Koala within 5 minutes after an FQC search has started, the FQC search is marked as successful, the time is recorded for record-keeping purposes and work continues. The coordinates of the naturally deposited scat/or live Koala found are included as a result in the survey.
3. Should the dog/handler team fail to find a target scat within 5 minutes after an FQC search has commenced (whether the deposited FQC scat or a naturally deposited target scat), the field assistant would immediately stop the handler and disclose that an FQC search has failed. In the event that an FQC search were to fail, the survey team would cease work immediately to try and identify the reason for failure. Upon identification of the potential cause, a second controlled search would be immediately conducted to confirm the reason for initial failure. Should the second controlled search also fail, the study team would reassess the site conditions / the environmental conditions / the detection dog(s) / the handler(s) / the search protocol etc. If the cause for failure cannot be quickly identified and remediated, the study team would liaise with the client. No further survey work would be conducted until the reason(s) for failure is or are identified and remediated. Please note that to date, this has never happened.

### 2.3 External Quality Assurance on Koala scat identification

The accuracy of detection dogs must be undertaken by external parties to ensure conflicts of interest are managed appropriately. To date, more than 5000 scats collected to date have been submitted and analysed by an external laboratory for DNA testing. 100% of these were found to be koala scats. This external QA process by a third-party laboratory is crucial and necessary to ensure scientific integrity and data transparency in any field of science.



## 2.4 Field Assessment and Permits

Field assessment was conducted by Olivia Woosnam (senior koala ecologist, Certified Environmental Practitioner, professional detection dog handler), Alex Dudkowski (field ecologist, Certified Environmental Practitioner, professional detection dog handler) and two professional detection dogs. This field assessment was conducted under OWAD's external Animal Ethics Committee Approval CA2021/01/1446 for "Targeted species surveys using professional detection dogs" and OWAD's Scientific Use Registration SUR000554 issued by the Queensland Government Department of Agriculture and Fisheries. The surveys were conducted in accordance with a Letter of Authority and Permit to Collect granted to TMR from the Department of Science, valid until 28 February 2021, issued under Section 9 of the *Nature Conservation (Administration) Regulation 2017* and Section 131 of the *Nature Conservation (Protected Areas Management) Regulation 2017*, and Section 56 of the *Forestry Act 1959*.

## 3 - Results

The detection dogs searched a total transect length of 174.8 kilometres during the 10 days of surveys from the 15<sup>th</sup> to the 30<sup>th</sup> of August 2022. The survey tracks in each of the sites are presented in Figures 2. We found no evidence of koala scats.

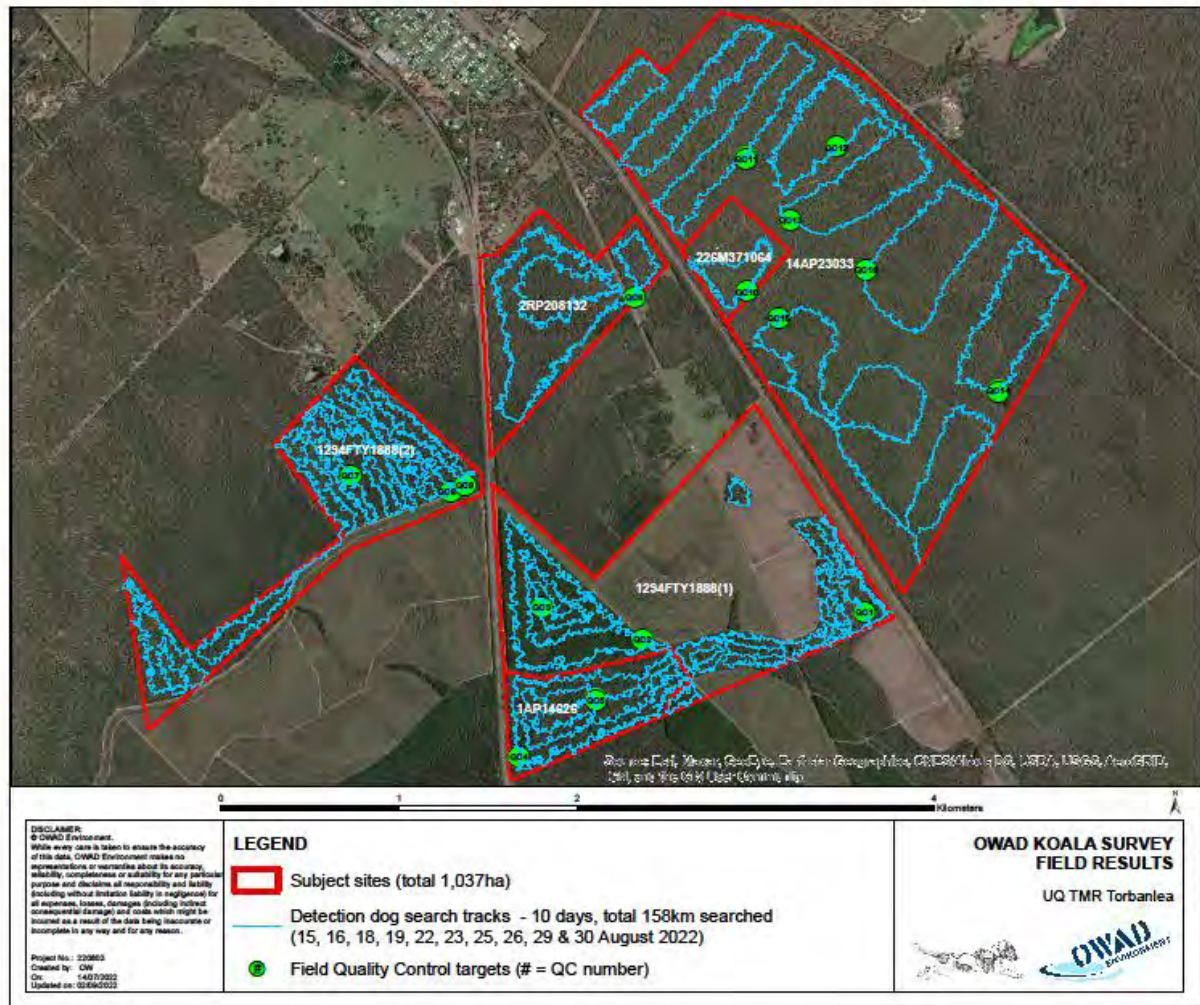


Figure 2. Results of koala scat full search surveys

## 4 - Discussion and Limitations

Despite the intensity of the searches and the amount of ground covered, we found no evidence of koala scats. Research has, however, shown that koala scats decay is heavily influenced by weather events, in particular moisture and heavy rain (Cristescu et al. 2012). Therefore, and as discussed with QTMR prior to scheduling detection dog surveys, the large amount of rain that fell in the vicinity of the project area (e.i. Torbanlea) from February to, and including, July 2022, would have increased the rate of koala scat decay likely limiting our ability to detect koala scats older than 2 months. It is therefore important to acknowledge that koala use of the surveyed footprint older than 2 months cannot be guaranteed.

## 5 - References

Cristescu, R. H., K. Goethals, P. B. Banks, F. N. Carrick, and C. Frère. 2012. Experimental Evaluation of Koala Scat Persistence and Detectability with Implications for Pellet-Based Fauna Census. *International Journal of Zoology* **2012**:631856.

## Appendix G: Summarised Proposed Management Plan

The table below provides a list of information regarding management plans and proposed specifications that are relevant to MNES. It is noted that a summary and frequency/duration/timing information has already been provided for the management plans in the response to RFI documentation.

**Table F Management plan summary**

<b>Management plan title</b>	<b>Summary of the plan. Including purpose of the plan.</b>	<b>How the Specific Measurable Achievable Relevant Timebound (SMART) principles have been addressed in each document</b>	<b>Frequency/Duration/Timing for the monitoring, success benchmarks</b>	<b>Guidance/Regulations- upholding State or Commonwealth actions</b>
Offset Area Management Plan (OAMP) - QTMP	<p>The QTMP Offset Area Management Plan (OAMP) provides information to address Item 6.3 of the Commonwealth Department of Climate Change, Energy, the Environment and Water's (DCCEEW) Request for Information (RFI).</p> <p>The purpose of the OAMP is to provide high level guidance for the implementation of the offsets through use of primary mechanisms that include:</p> <ul style="list-style-type: none"> <li>■ The dedication of a total offset area of 55 ha of vegetation comprising of the Swamp Sclerophyll TEC (15.12 ha) and habitat suitable for the Greater glider (55 ha) and Grey-headed flying fox (45.4 ha) (noting that the Greater glider and Grey-headed flying fox habitat will be provided as a composite offset)</li> <li>■ Rehabilitation and revegetation management to improve the condition of low and medium quality patches within the offset areas to achieve high quality condition and size within the offset area</li> <li>■ Implementation of a management plan for the integrity of existing remnant vegetation.</li> </ul>	Specific management actions and performance requirements (SMART principles) are provided within Sections 7 and 8 of the OAMP.	Specific information related to the timing of monitoring, performance requirements and reporting are provided within Sections 7 and 8 of the OAMP.	Required as part of compliance with the EPBC Act Offset Policy.
Construction Environmental Management Plan (Construction EMP)	In accordance with TMR Specification MRTS51 Environmental Management, a Construction EMP will be prepared which will be valid/implemented throughout the duration of the Construction period. The Construction EMP will provide detailed information on the management of Water quality, Erosion and sedimentation, Cultural heritage, Noise, Vibration, Air quality, Acid sulfate soils, Contaminated	The Construction EMP will be prepared in accordance with TMR Specification MRTS51 Environmental Management. Detailed SMART principles are provided within Section 8 of MRTS51. The plan will use TARP (Trigger Action Response Plan)	The Construction EMP will be prepared in accordance with TMR Specification MRTS51 Environmental Management. Detailed SMART principles are provided within Section 8 of MRTS51.	Construction EMP will be prepared in accordance with State Government (Qld) (i.e., TMR) technical specification related to Environmental Management (i.e., MRTS51).

	sites, Native fauna, Vegetation, Biosecurity, Waste, Chemicals and fuel, and the sourcing construction materials. The Construction EMP will also provide detailed performance requirements and corrective actions, as well as monitoring and reporting timeframes.	principles to ensure mitigations are in place in the event of non-compliance.		
Project EMP	In accordance with TMR Specification MRTS51 Environmental Management, a Project EMP will be prepared which will be valid/implemented throughout the duration of the Operational period. The Project EMP will provide detailed information on the management of Water quality, Erosion and sedimentation, Noise, Vibration, Air quality, Native fauna, Vegetation, Biosecurity, Waste, Chemicals and fuel. The Construction EMP will also provide detailed performance requirements and corrective actions, as well as monitoring and reporting timeframes	The Project EMP will be prepared in accordance with TMR Specification MRTS51 Environmental Management. Detailed SMART principles are provided within Section 8 of MRTS51. The plan will use TARP (Trigger Action Response Plan) principles to ensure mitigations are in place in the event of non-compliance.	The Project EMP will be prepared in accordance with TMR Specification MRTS51 Environmental Management. Detailed SMART principles are provided within Section 8 of MRTS51.	Project EMP will be prepared in accordance with State Government (Qld) (i.e., TMR) technical specification related to Environmental Management (ie MRTS51).
Storm Water Management Plan	The primary purpose of a stormwater management plan is to identify management measures to reduce the impacts of runoff upon the surrounding environment.	Plan has yet to be prepared. SMART principles will be incorporated into the document.	The frequency, duration and timing for monitoring for compliance/success will be clearly articulated in the plan.	Required as part of the projects secondary approval process under the State government (Qld).
Bushfire Management Plan	The bush fire management plan will be prepared to provide for the effective management of the risk of bushfire to the QTMP and the proposed offset areas as defined in the OAMP.	Plan has yet to be prepared. SMART principles will be incorporated into the document.	The frequency, duration and timing for monitoring for compliance/success will be clearly articulated in the plan.	Required as part of the projects secondary approval process under the State government (Qld).
Species Management Program	A Species Management Program (SMP) authorises activities that will impact on breeding places of protected animals that are classified as extinct in the wild, critically endangered, endangered, vulnerable, near threatened, special least concern, colonial breeder or least concern. An SMP is only required where an animal breeding place has been identified and activities are required to tamper with the breeding place in order to complete the scope of works. Animal breeding places include obvious structures such as bird nests and tree hollows, as well as more cryptic places such as amphibian or reptile habitat where breeding takes place.	Plan has yet to be prepared. SMART principles will be incorporated into the document.	The frequency, duration and timing for monitoring for compliance/success will be clearly articulated.	Required to comply with the provisions of the <i>Nature Conservation 1992</i> (Qld), for interference with the breeding places of native fauna species.
Adoption of recommendations contained within the TMR Fauna sensitive road design manual	The aim of this manual is to provide guidelines for preferred practices to reduce or eliminate the impact of road infrastructure on fauna. Specifically, this manual outlines preferred practices and provides recommendations to achieve fauna sensitive road design	SMART principles and design specifications are provided throughout the manual.	Guiding principles supported by literature and case studies are provided throughout the manual.	State Government (Qld) (i.e., TMR) guideline related to the design of road infrastructure to minimise impact to fauna (ie the TMR Fauna Sensitive Road Design Manual).

Adoption of recommendations contained within the TMR road drainage manual (Sep 2019)	This manual represents the policy of the Department of Transport and Main Roads with respect to the planning, design, operation and maintenance of road drainage infrastructure and must be applied on all road infrastructure projects for which the department is responsible. As such, the manual applies equally to all personnel, departmental or not, that are involved in the drainage aspects of departmental Projects. This manual facilitates the development and implementation of drainage solutions for state-controlled roads and roads within Queensland that are part of the National Land Transport Network.	The manual integrates best practice and environmental management techniques into the provision of road drainage. It includes technical governance requirements for the selection, design and construction of appropriate drainage structures that satisfy hydraulic requirements while minimising the potential for environmental and asset harm. The manual provides technical specifications required to achieve outcomes that uphold environmental values.	Recommendations and maintenance requirements for specific drainage infrastructure are provided throughout the manual.	State Government (Qld) (i.e., TMR) guideline related to the design of drainage structures and features.
Compliance with TMR Specifications MRTS16 Landscape and Revegetation	This Technical Specification applies to the construction of landscape and revegetation treatments in road works. This Technical Specification forms part of the Transport and Main Roads Specifications Manual.	Technical specification provides clear, repeatable and acceptable guidance related to rehabilitation and landscape treatments. Section 9 (Establishment and Monitoring) of the Specification provides SMART principles.	As per the specification. Post construction and upon completion of the rehabilitation activities.	State Government (Qld) (i.e., TMR) technical specification related to the Landscape and rehabilitation associated with roads.
Compliance with TMR Specifications MRTS51 Environmental Management	This Technical Specification applies to environmental management requirements applicable to Work under the Contract. Where other statutory requirements (for example, <i>Environmental Protection Act 1994<sup>Qld</sup></i> ) demand higher standards of environmental management, the higher standards require adoption. This Technical Specification is not intended to address environmental management related to planning and design of transport infrastructure or activities related to transport infrastructure.	Technical specification provides the requirements that must be assessed/managed in relation to environmental management (eg. Water quality, Erosion and sedimentation, Cultural heritage, Noise, Vibration, Air quality, Acid sulfate soils, Contaminated sites, Native fauna, Vegetation, Biosecurity, Waste, Chemicals and fuel, and Sourcing construction materials). The specification provides SMART principles within each subsection related to each environmental aspect that is required to be contained within any EMP prepared for the project (refer Section 8 of the specification).	As per the specification. Compliance monitoring is required pre-disturbance, during construction, and post completion of the project.	State Government (Qld) (i.e., TMR) technical specification related to Environmental Management.

The Trigger Action Response Plan (TARP) example table in Table G outlines the various environmental issues and associated triggers that may arise during the construction, along with the corresponding corrective actions and verification and validation measures to be implemented in response. The purpose of this TARP table is to



provide a clear and comprehensive guide for identifying and addressing environmental issues as they arise, in order to minimize the impact of construction activities on the environment.

**Table G Trigger Action Response Plan example table**

Issue	Trigger	Immediate actions	Root cause analysis	Corrective actions	Verification and validation
<b>Chemical spill during construction</b>	<ul style="list-style-type: none"> <li>Accidental spill or release of hazardous chemicals during storage, transport, or use</li> <li>Equipment failure or malfunction resulting in a spill or leak</li> <li>Human error or negligence in handling or disposing of chemicals</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Alert the project team and relevant stakeholders.</li> <li>Evacuate workers and bystanders from the area.</li> <li>Stop the source of the spill if possible.</li> <li>Contain the spill to prevent further spread of chemicals.</li> <li>Notify the appropriate regulatory agencies, as required.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the cause of the spill, e.g. equipment failure, human error, etc.</li> <li>Determine if there were any warning signs that were missed or ignored.</li> <li>Identify opportunities for improvement to prevent similar spills from happening in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Clean up the spill and dispose of contaminated materials in a safe and environmentally responsible manner.</li> <li>Implement remediation plan</li> <li>Repair or replace any damaged equipment or facilities.</li> <li>Implement additional training or procedures to prevent future spills.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm that the spill has been fully cleaned up and that the site is safe for workers and the environment.</li> <li>Re-evaluate the current spill prevention and response plan to ensure that it is effective.</li> </ul>
<b>Clearing in a non-permitted area:</b>	<ul style="list-style-type: none"> <li>Unauthorized clearing of vegetation in areas not designated for development</li> <li>Violation of environmental laws and regulations related to land use and development</li> </ul>	<ul style="list-style-type: none"> <li>Stop all clearing activities.</li> <li>Identify the area that was cleared and document the extent of the damage.</li> <li>Notify the project team, regulatory agencies, and</li> </ul>	<ul style="list-style-type: none"> <li>Determine how the clearing occurred, e.g. human error, lack of training, etc.</li> <li>Identify if there were any warning signs that were missed or ignored.</li> <li>Determine if there are opportunities to</li> </ul>	<ul style="list-style-type: none"> <li>Restore the area to its original condition or an agreed-upon acceptable condition with DCCEEW.</li> <li>Implement additional training or procedures to ensure compliance with permitting and clearance processes.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm that the area has been restored to its original condition or an agreed-upon acceptable condition.</li> <li>Re-evaluate the permitting and clearance processes to ensure that they are effective.</li> </ul>

Issue	Trigger	Immediate actions	Root cause analysis	Corrective actions	Verification and validation
	<ul style="list-style-type: none"> <li>Lack of proper permits and approvals for land clearing activities</li> </ul>	<ul style="list-style-type: none"> <li>other stakeholders as required.</li> </ul>	<ul style="list-style-type: none"> <li>improve the permitting and clearance processes to prevent similar occurrences in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Consider the use of physical barriers or other measures to prevent future non-permitted clearing.</li> </ul>	
<b>Erosion</b>	<ul style="list-style-type: none"> <li>Heavy rainfall or flooding</li> <li>Inadequate or lack of erosion control measures</li> <li>Removal or modification of vegetation that stabilizes soil and prevents erosion</li> </ul>	<ul style="list-style-type: none"> <li>Identify the areas where erosion is occurring and document the extent of the damage.</li> <li>Notify the project team, regulatory agencies, and other stakeholders as required.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the cause of the erosion, e.g. poor drainage, construction activities, etc.</li> <li>Identify if there were any warning signs that were missed or ignored.</li> <li>Determine if there are opportunities to improve the design or construction processes to prevent similar occurrences in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Stabilize the eroded areas to prevent further erosion.</li> <li>Implement additional measures to improve drainage or prevent future erosion.</li> <li>Consider the use of vegetation or other natural erosion control methods.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm that the eroded areas have been stabilized and that the site is safe for workers and the environment.</li> <li>Re-evaluate the design and construction processes to ensure that they are effective.</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>Use of heavy equipment or machinery that generates noise levels above permitted limits</li> <li>Continuous or prolonged noise from construction activities that</li> </ul>	<ul style="list-style-type: none"> <li>Identify the source of the noise and the affected areas.</li> <li>Notify the project team, regulatory agencies, and other stakeholders as required.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the cause of the noise, e.g. construction activities, equipment, etc.</li> <li>Identify if there were any warning signs that were missed or ignored.</li> <li>Determine if there are opportunities to improve the design or</li> </ul>	<ul style="list-style-type: none"> <li>Implement additional measures to reduce noise levels, such as sound barriers, equipment mufflers, or changing construction hours.</li> <li>Consider the use of noise monitoring equipment to ensure compliance with applicable noise regulations.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm that the measures implemented have effectively reduced noise levels.</li> <li>Re-evaluate the design</li> </ul>

Issue	Trigger	Immediate actions	Root cause analysis	Corrective actions	Verification and validation
	<p>affects nearby residents or wildlife</p> <ul style="list-style-type: none"> <li>Lack of or inadequate noise barriers or sound insulation measures.</li> </ul>	<ul style="list-style-type: none"> <li>Implement measures to reduce the noise level as soon as possible.</li> </ul>	<p>construction processes to reduce noise.</p>		
<b>Significant changes in hydrology</b>	<ul style="list-style-type: none"> <li>Groundwater movement or subsurface water flow</li> <li>Soil saturation or compaction due to construction activities</li> <li>Alteration of vegetation downstream</li> </ul>	<ul style="list-style-type: none"> <li>Identify the areas where changes in hydrology have occurred and document the extent of the changes.</li> <li>Notify the project team, regulatory agencies, and other stakeholders as required.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the cause of the changes in hydrology, e.g. construction activities, excavation, etc.</li> <li>Identify if there were any warning signs that were missed or ignored.</li> <li>Determine if there are opportunities to improve the design or construction processes to prevent similar occurrences in the future.</li> </ul>	<ul style="list-style-type: none"> <li>Stabilize the affected areas to prevent further changes in hydrology.</li> <li>Restore the area to its original condition or an agreed-upon acceptable condition with DCCEEW.</li> <li>Implement measures to manage the water flows and reduce the potential for flooding or erosion.</li> <li>Consider the use of vegetation or other natural methods to control erosion and manage water flow.</li> </ul>	<ul style="list-style-type: none"> <li>Confirm that the affected areas have been stabilized and that the site is safe for workers and the environment.</li> <li>Confirm that the affected area has been restored to its original condition or an agreed-upon acceptable condition with DCCEEW.</li> <li>Re-evaluate the design and construction processes to ensure that they are effective.</li> </ul>
<b>Weeds &amp; Biosecurity</b>	<ul style="list-style-type: none"> <li>Presence of new invasive species or pests on the site</li> <li>Introduction of invasive species or pests through construction</li> </ul>	<ul style="list-style-type: none"> <li>Identify the presence of any weeds or other invasive species on the site.</li> <li>Notify the project team, regulatory agencies, and other</li> </ul>	<ul style="list-style-type: none"> <li>Determine how the invasive species were introduced to the site, e.g. through construction equipment or workers.</li> <li>Identify if there were any warning signs that</li> </ul>	<ul style="list-style-type: none"> <li>Implement measures to control the spread of invasive species, such as herbicide treatment, manual removal, or quarantine.</li> <li>Provide training and education to workers to prevent the introduction</li> </ul>	<ul style="list-style-type: none"> <li>Confirm that the invasive species have been controlled and that the site is free from invasive species.</li> <li>Re-evaluate the prevention and control measures to ensure that they are effective.</li> </ul>

Issue	Trigger	Immediate actions	Root cause analysis	Corrective actions	Verification and validation
	<p>equipment, vehicles, or workers</p> <ul style="list-style-type: none"> <li>Inadequate or lack of biosecurity measures to prevent the spread of invasive species</li> </ul>	<p>stakeholders as required.</p> <ul style="list-style-type: none"> <li>Implement measures to prevent the spread of invasive species to other areas.</li> </ul>	<p>were missed or ignored.</p> <ul style="list-style-type: none"> <li>Determine if there are opportunities to improve the prevention and control measures to prevent future introductions.</li> </ul>	<p>and spread of invasive species.</p> <ul style="list-style-type: none"> <li>Consider the use of native vegetation or other methods to prevent the establishment of invasive species.</li> </ul>	
<b>Acid Sulphate Soils</b>	<ul style="list-style-type: none"> <li>Identification of acid sulphate soils during site assessments or soil testing</li> <li>Disturbance or excavation of acid sulphate soils during construction activities</li> <li>Inadequate or lack of measures to prevent the disturbance of acid sulphate soils.</li> </ul>	<ul style="list-style-type: none"> <li>Identify the areas where acid sulphate soils are present and their potential impact on the environment.</li> <li>Notify the project team, regulatory agencies, and other stakeholders as required.</li> <li>Implement measures to prevent the disturbance of acid sulphate soils.</li> </ul>	<ul style="list-style-type: none"> <li>Determine how the acid sulphate soils were identified and if there were any warning signs that were missed or ignored.</li> <li>Identify if there are opportunities to improve the identification and management of acid sulphate soils.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and map the extent of acid sulphate soils on the site and adjacent areas through comprehensive site assessments and soil testing.</li> <li>Excavate and remove acid sulphate soils from the site where necessary, and transport and dispose of them at an approved waste disposal facility.</li> <li>Implement measures to prevent the recontamination of excavated areas by acid sulphate soils or other contaminated materials.</li> <li>Monitor and measure the pH levels of soils and water on the site to ensure that they remain within acceptable limits.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct regular site inspections and soil testing to verify the effectiveness of the ASSMP in preventing and minimizing the disturbance of acid sulphate soils.</li> <li>Monitor and measure the pH levels of soils and water on the site to validate that they remain within acceptable limits.</li> <li>Review and update the ASSMP as necessary to address any identified deficiencies or changes in site conditions.</li> <li>Engage an independent third-party environmental consultant to conduct periodic audits of the ASSMP and verify its effectiveness in managing acid sulphate soils.</li> </ul>

Issue	Trigger	Immediate actions	Root cause analysis	Corrective actions	Verification and validation
Native Fauna	<ul style="list-style-type: none"> <li>■ Presence of native fauna on the site or in adjacent areas</li> <li>■ Habitat destruction or modification due to construction activities</li> <li>■ Noise, vibration, or light pollution that affects the behavior or survival of native fauna</li> </ul>	<ul style="list-style-type: none"> <li>■ Identify the presence of any native fauna on the site and their habitat requirements.</li> <li>■ Notify the project team, regulatory agencies, and other stakeholders as required.</li> <li>■ Implement measures to protect the native fauna and their habitats.</li> </ul>	<ul style="list-style-type: none"> <li>■ Determine how the native fauna were affected, e.g. through habitat destruction, noise, or light pollution.</li> <li>■ Identify if there were any warning signs that were missed or ignored.</li> <li>■ Determine if there are opportunities to improve the design or construction processes to prevent future impacts.</li> </ul>	<ul style="list-style-type: none"> <li>■ Implement measures to protect the native fauna and their habitats, such as relocation, fencing, or habitat restoration.</li> <li>■ Provide training and education to workers to ensure that they are aware of the presence of native fauna and their requirements.</li> <li>■ Consider the use of best management practices to minimize the impact of construction activities on native fauna.</li> </ul>	<ul style="list-style-type: none"> <li>■ Confirm that the native fauna and their habitats have been protected and that the site is safe for workers and the environment.</li> <li>■ Re-evaluate the design and construction processes to ensure that they are effective.</li> </ul>