Biodiversity Management Plan

Clarke Creek Wind Farm
EPBC 2018/8141

13 November 2025

Final

Prepared for Clarke Creek Energy Pty Ltd

ACN 614 169 096

Rev	Date	Issue	Author	Reviewed	Approved
1.0	29/04/2019	Draft	Hannah Weiss Kelly Matthews, Jasmine Vink	Beth Kramer Goldwind Australia	Beth Kramer
2.0	30/07/2019	Final Draft	Hannah Weiss	Beth Kramer, Kelly Matthews	Jane Mills
2.1	16/08/2019	Final Draft	Hannah Weiss	Beth Kramer	Beth Kramer
2.2	19/09/2019	Final Draft	Natalie Sheppard	Beth Kramer	Beth Kramer
3.0	11/02/2020	Final Draft	Hannah Weiss Natalie Sheppard Beth Kramer	Goldwind Australia	Beth Kramer
3.1	10/03/2020	Final Draft	Joe Adair	Beth Kramer	Beth Kramer
3.2	19/05/2020	Final/Issued	Beth Kramer	Goldwind Australia	Beth Kramer
3.3	19/07/2021	Final/Issued	Teagan McKillop	Claire Bonfield Goldwind Australia	Beth Kramer
3.4	10/09/2021	Final/Issued	Claire Bonfield	Beth Kramer Goldwind Australia	Beth Kramer
4.0	13/11/2025	Final/Issued	Jessica Cooke, Sheree Kidziak & Mirelle Gouws	Vince Chaplin & Alana Gordijn	Candice Somerville

This document was originally prepared by NGH Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622), with input and contributions from Green Tape Solutions. It has since been revised by Squadron Energy.

Confidentiality

Disclaimer

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DECLARATION OF ACCURACY

In making this declaration, I am aware that section 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed:	
Full name (please print):	Candice Somerville
Organisation (please print):	Clarke Creek Energy Pty Ltd
EPBC Referral Number:	2018/8141
Name of Action Management Plan this document and declaration refers to:	Biodiversity Management Plan (CoA 4)
Date:	27/11/2026

Key Terms

Term	Definition
BMP	Biodiversity Management Plan (this plan)
BOP	Balance of Plant
CCWF	Both CC1WF and CC2WF in their fully delivered state.
CC1WF	Clarke Creek Wind Farm Phase 1 comprising delivery and operation of Stage 1 and Stage 2 of the planning approval
CC2WF	Clarke Creek Wind Farm Phase 2 comprising delivery and operation of Stage 3 of the Planning Approval
CCEPL	Clarke Creek Energy Pty Ltd – proponent of CC1WF. ABN 34 614 169 096
CTMP	Cycad Translocation Management Plan
CIMP	Cycad Impact Management Plan
Cycad	General reference to the *Cycas Terryana* species found across CCWF and Broadsound and Connors Ranges, and which is listed as Vulnerable under the Queensland Nature Conservation Act 1992.
DCCEEW	(Commonwealth) Department of Climate Change, Energy, the Environmental and Water
DETSI	(QLD) Department of Environment, Science, Tourism and Innovation
DSDIP	Department of State Development, Infrastructure and Planning
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
OMP	Offset (area) Management Plan
OEMP	Operational Environmental Management Plan
Operation	Any activity which results in the production of electricity for contribution to the electricity grid, but does not include commissioning
Phase I / Phase II	The two phases the Proponent (Squadron Energy) will build the CCWF project in. • Phase I : by Clarke Creek Energy Pty Ltd – 100 turbines • Phase II : by Isaac Wind and Solar Energy Pty Ltd – being the remaining 96 turbines, 4 solar farms and a battery energy storage system (BESS).
Project	The Clarke Creek Wind Farm and all associated works
Proponent(s)	Clarke Creek Energy Pty Ltd for **CC1WF**, and Isaac Wind and Solar Energy Pty Ltd for **CC2WF**
SQE	Squadron Energy

1 Introduction

1.1 Context

This document is the Clarke Creek Wind Farm Biodiversity Management Plan (hereafter referred to as the 'BMP') and has been developed to address relevant conditions of approval for the Clarke Creek Wind Farm project (hereafter referred as 'the Project').

This BMP will be used to manage impacts to threatened and Least Concern flora and fauna during construction and operation of the Project. If the project is to be decommissioned, this plan will be revised and submitted for approval to minimise impacts from decommissioning activities.

This report addresses the requirements of the following three plans:

1. Biodiversity Management Plan (BMP), required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Commonwealth approval EPBC 2018/8141.
2. Vegetation and Flora Management Plan (VFMP), conditioned by the Queensland Department of State Development, Infrastructure and Planning (DSDIP) under the *Planning Act 2016* and Planning Regulation 2017
3. High risk Significant Species Management Program (SSMP), required under the Queensland *Nature Conservation Act 199*2 (NC Act) to manage impacts on animal breeding places.

This plan has been developed as a single road map for ease of use by Clarke Creek Energy Pty Ltd (CCEPL), the Contractors, subcontractors, and other relevant parties. The BMP sets out important project and site information, including a risk assessment and designation of roles and responsibilities.

1.2 Background

The Project is located approximately 150 kilometres (km) north-west of Rockhampton, 150 km south-west of Mackay and 80 km north of Marlborough. The Project Area is approximately 76,300 hectares (ha) across 11 freehold rural properties. The development footprint of the project covers approximately 1,922 ha. The lots comprising the Project Area are agricultural lots, primarily used for grazing.

The project location and wind farm layout are shown in Figure 1 - 1.

1.2.1 Project description

Table 1-1 Project description

Project name	**Clarke Creek Wind Farm**	
Proponent	Clarke Creek Energy Pty Ltd	
Project cost	$1.5 billion	
Construction start	Q1 2022 (Phase 1), Phase 2 is yet to commence construction	
Duration	Approximately 30 - 50 months for each respective Phase	
Project contact	Clarke Creek Energy Pty Ltd 0483 915 303 clarkecreek1@squadronenergy.com	
Local Government Authority (LGA)	Isaac Regional Council LGA Livingstone Regional Council LGA	
Location	Refer Figure 1 - 1	
Address	**Phase 1** **(Stage 1 & Stage 2)**	**Phase 2** **(Stage 3)**

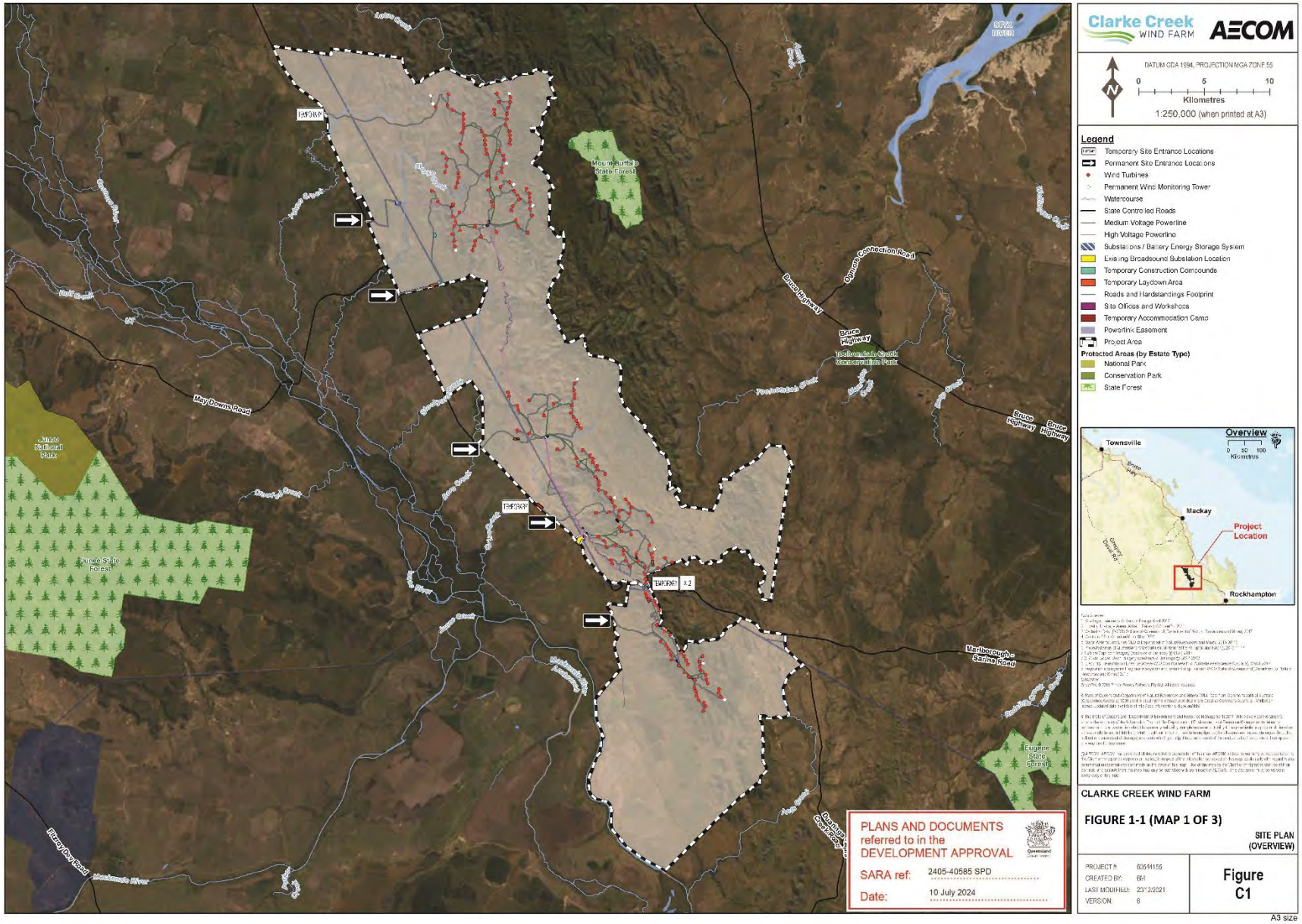
Project name	Clarke Creek Wind Farm	
	Lot 8 on ROP41 Lot 18 on RP848821 Lot 1 on RP801235 Lot 1 on SP303299 Lot 3 on RP801346 Lot 3 on ROP178 Lot 4 on ROP192	Lot 8 on RP614441 Lot 10 on RP614442 Lot 1 on SP153335 Lot 23 on CP896088

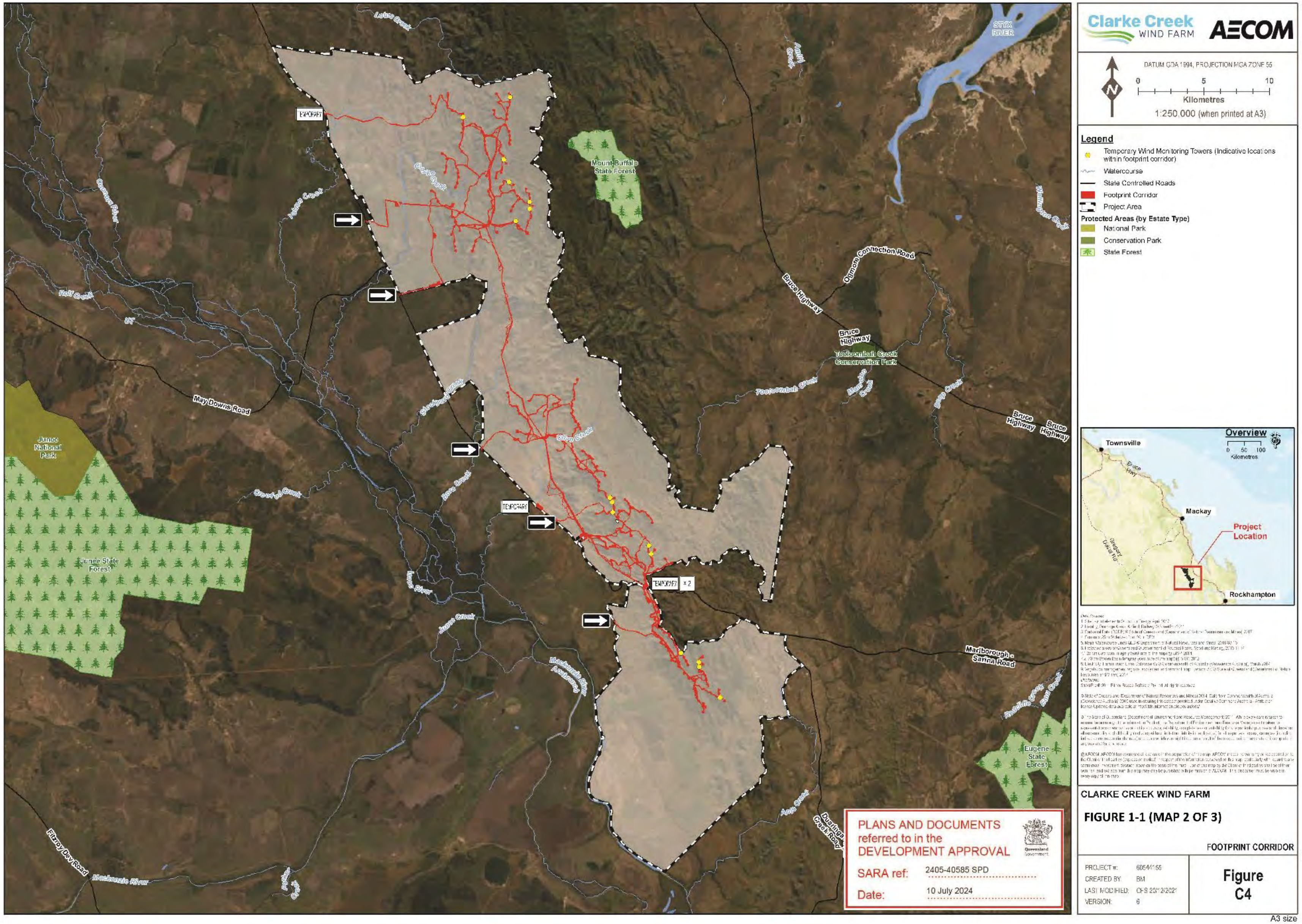
1.2.2 Key infrastructure components

Each key infrastructure component is described in Table 1-2, along with the total development footprint area.

Table 1-2 Key infrastructure and total development footprint area

Component	Quantity
Internal access roads	228 km
Overhead powerlines	111 km
Substations	5 total
Offices and workshops	4
Compounds	6
Laydown areas	17
Site accommodation camp	1
Total Development Footprint Area:	1,922 hectares


Clarke Creek WIND FARM
AECOM
DATUM GDA 1994, PROJECTION MGA ZONE 55
0 5 10
Kilometres
1:250,000 (when printed at A3)
Legend
Temporary Site Entrance Locations
Permanent Site Entrance Locations
Wind Turbines
Permanent Wind Monitoring Tower
Watercourse
State Controlled Roads
Medium Voltage Powerline
High Voltage Powerline
Substations / Battery Energy Storage System
Existing Broadsound Substation Location
Temporary Construction Compounds
Temporary Laydown Area
Roads and Hardstandings Footprint
Site Offices and Workshops
Temporary Accommodation Camp
Powerlink Easement
Project Area
Protected Areas (by Estate Type)
National Park
Conservation Park
State Forest
Overview
Townsville
Mackay
Project Location
Rockhampton
CLARKE CREEK WIND FARM
FIGURE 1-1 (MAP 1 OF 3)
SITE PLAN (OVERVIEW)
PROJECT #
CREATED BY:
LAST MODIFIED:
VERSION:
Figure C1
A3 size
PLANS AND DOCUMENTS referred to in the DEVELOPMENT APPROVAL
SARA ref: 2405-40585 SPD
Date: 10 July 2024
Mount Buffalo State Forest
Bruce Highway
May Downs Road
Eungella National Park
Eungella State Forest
Eugene State Forest
Marlborough-Sarina Road
Peak Downs Highway
Mackenzie River


Clarke Creek WIND FARM
AECOM
DATUM GDA 1994, PROJECTION MGA ZONE 55
0 5 10
Kilometres
1:250,000 (when printed at A3)
Legend
Temporary Wind Monitoring Towers (Indicative locations within footprint corridor)
Watercourse
State Controlled Roads
Footprint Corridor
Project Area
Protected Areas (by Estate Type)
National Park
Conservation Park
State Forest
Overview
Townsville
Mackay
Project Location
Rockhampton
Mount Buffalo State Forest
Junee National Park
Junee State Forest
Eugene State Forest
Bruce Highway
Marlborough - Sarina Road
May Downs Road
Duaringa Creek Road
Fitzroy Dev Road
Mackenzie River
Isaac River
PLANS AND DOCUMENTS referred to in the DEVELOPMENT APPROVAL
Queensland Government
SARA ref: 2405-40585 SPD
Date: 10 July 2024
CLARKE CREEK WIND FARM
FIGURE 1-1 (MAP 2 OF 3)
FOOTPRINT CORRIDOR
PROJECT #: 60544155
CREATED BY: BM
VERSION: 6
Figure C4
A3 size

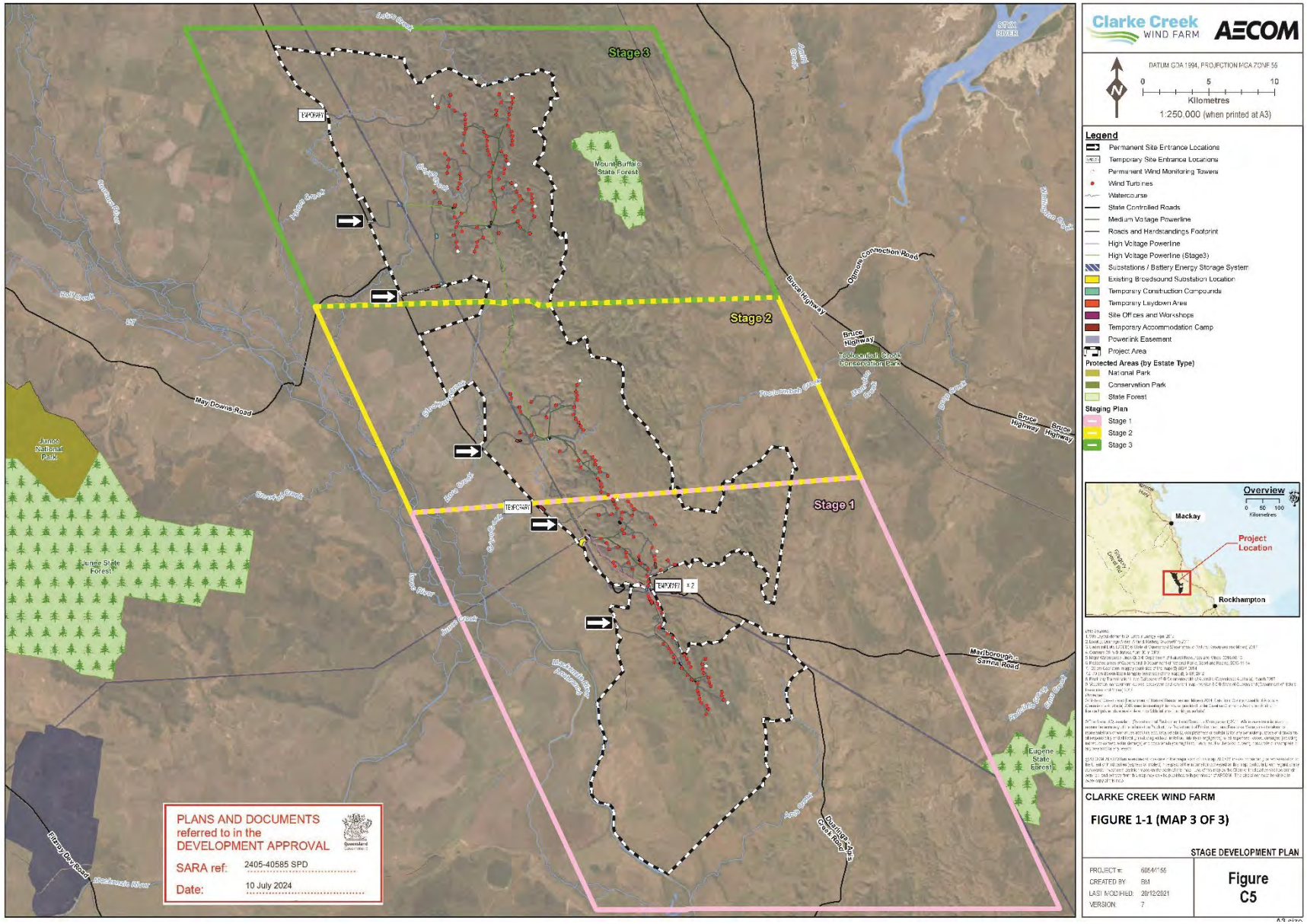


Figure 1 - 1 Project location map set– site plan, footprint corridor, and staged development

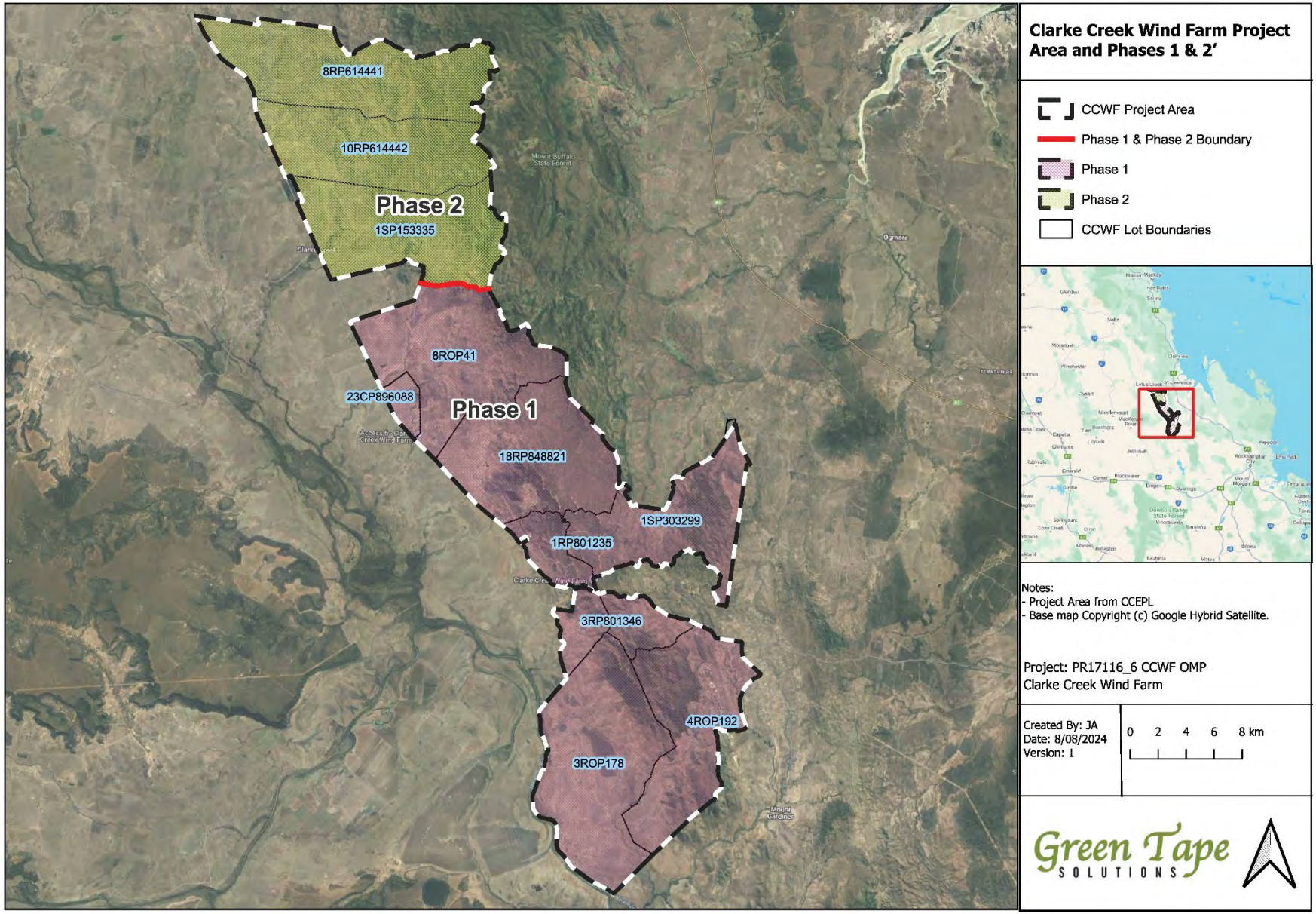


Figure 1 - 2 Project Phases 1 & 2, as per EPBC Act Approval 2018/8141

1.3 Schedule

1.3.1 Overview of Project Staging / Phasing

In accordance with the State Development Approval, the project comprises three Stages, as depicted in Figure 1 - 1.

In accordance with the EPBC Approval, the project comprises two Phases, as depicted in Figure 1 - 2. Phase 1 includes the delivery of Stages 1 and 2. Phase 2 includes the delivery of Stage 3.

1.3.2 Pre-construction early works

Pre-construction early works commenced in 2022 and included off-site road improvements, establishing the site entrances and the access and site preparation works for a temporary construction compound and the accommodation facilities. This process triggered ‘commencement’ of the action in accordance with the definition in the EPBC approval.

1.3.3 Construction

Construction of the Project started in 2022 and is staged as described in 1.3.1 (above). Expected construction duration for each phase is 2-4 years.

The wind farm is being designed, developed and constructed progressively.

For the construction of the Project, the following activities are expected to occur:

- Site establishment (temporary site facilities, lay down areas, mobilisation of equipment and materials)
- Earthworks, paving (with gravel cap) and drainage for access roads and wind turbine hardstands
- Excavation for the turbine foundations
- Construction of wind turbine foundations (bolt cage, reinforcement and concrete)
- Installation of electrical and communications cabling and equipment (including overhead lines and underground cables to the substation)
- Establishment of substations, in parallel with electrical reticulation works
- Delivery of wind turbine components to the Project area
- Installation of wind turbines using large mobile cranes, in parallel with component deliveries
- Commissioning and reliability testing of wind turbines
- Progressive rehabilitation and restoration of the Project area.

The activities listed above will predominately occur in the order listed, however some of these activities are being carried out concurrently (or at multiple construction fronts across the wind farm) to minimise the overall length of the construction programme and to minimise environmental risks.

This BMP contains information on the biodiversity and ecological values relevant to the Project and the measures to avoid, minimise and mitigate impacts to identified values. The Construction Environmental Management Plan (CEMP) applies the management measures described in this BMP during the construction period. The CEMP was submitted to the DSDIP (previously DSDMIP) prior to the commencement of construction, in accordance with the State Development Approval condition 12(a).

As of October 2025, construction of Phase 1 (Stages 1 & 2) is coming to an end, with commissioning of the final turbines on track to be completed by the end of November 2025. . Construction of Phase 2 (Stage 3) had not yet commenced.

1.3.4 Operation

The operational period is approximately 25 years. CCEPL is responsible, either directly or via a contractor, for the ongoing maintenance of the turbines following their commissioning and reliability testing. Maintenance personnel will be on site and responsible for the scheduled and unscheduled maintenance of the wind turbines and associated connection works. CCEPL, either directly or via a contractor, will undertake routine inspections of the wind turbines and other electrical infrastructure or complete the necessary scheduled (planned) maintenance activities. Ongoing maintenance of the access tracks and the electrical network will be required to maintain safe access at all times.

An Operational Environmental Management Plan will serve as the overarching environmental management framework for the operation and maintenance phase of CCWF. The OEMP will outline the environmental management strategies and requirements to ensure compliance and minimise environmental impacts during this phase.

1.3.5 Decommissioning

At the end of the operational life of the Project CCEPL may decommission the wind farm which will involve the removal of turbines and all other above-ground infrastructure on-site being dismantled and removed from the Project Site. This includes all the interconnection and substation infrastructure unless the infrastructure which is owned by a network operator or is required by the Network Operator for other purposes. The wind turbine towers will be removed, but the foundations will be kept in situ.

Alternatively, CCEPL may repower the wind farm (replace the wind turbines) or replace the wind turbine components, such as the nacelle, blades, generator, and hub.

Overhead lines will be removed once no longer required. The underground cables contain no harmful substances. They can be recovered, if economically attractive, or left in the ground. Gravel roads, hard standings and gravel areas associated with the project infrastructure will be left in situ for ongoing access.

1.3.6 Duration

The period of the project from start of construction to decommissioning could be ~30 years, considering the 2022 start date, the action would continue until the year 2051. Note, the EPBC Act Approval has effect until 30 November 2050, however if the project continues beyond 30 November 2050 a request will be made to extend the period of EPBC Act approval.

1.4 Objectives

1.4.1 Project objectives

The objective of the Project is to generate renewable electricity from wind turbines and connect the renewable electricity into the high voltage national electricity network for use throughout the state and wherever it is needed.

1.4.2 Environmental objectives and performance indicators

The environmental objectives and performance indicator for the Project are outlined in Table 1-3.

Table 1-3 Environmental objectives and performance indicators

Environmental objectives	Performance indicators
EPBC Act threatened species - flora	
No net loss of threatened Cycad individuals.	Threatened cycads within the disturbance footprint are successfully translocated or propagated (refer to Cycad Translocation and Management Plan (CTMP)).
Matters of State Environmental Significance (vegetation) (State)	

Environmental objectives	Performance indicators
Retain viable native vegetation communities in the Project Area. Riparian vegetation is retained and restored.	No more than the approved vegetation clearing: • 20.36 ha of remnant vegetation within a defined distance of a watercourse • 9.46 ha of Of Concern regional ecosystem 11.11.10
EPBC Act threatened species – fauna	
To protect **EPBC Act threatened fauna species** (including Koala, Greater Glider, White-throated Needletail, Squatter Pigeon, and Red Goshawk) and **EPBC Act threatened bird and bat species** (including White-throated Needletail, Rainbow Bee-eater, Rufous Fantail, Fork-tailed Swift, Satin Flycatcher, Red Goshawk and Corben's Long-eared Bat).	No mortality or injury to EPBC (or NC) Act threatened species as a direct result of the Project. Alternative habitat (nest boxes) provided for Greater Glider and in use by this species (refer to Section 5.4.5).
General biodiversity (applies to EPBC and NC Act threatened species and communities as well as to NC Act protected species and Least Concern communities)	
Successful rehabilitation of disturbed ground.	Areas of disturbed ground no longer required for operations will have at least 70% groundcover, in consideration of the local environmental conditions.
Bushfire risk will not increase as a result of the Project.	Activities associated with the Project will not cause a bushfire.
Pest animal activity will not increase as a result of the Project.	Pest animal presence is at the same (or reduced) level as during pre-construction surveys.
No new restricted weed species introduced as a result of the Project. No new outbreaks of restricted weeds within the Project Area.	Weed species diversity and location of infestations is at the same (or reduced level) as during pre-construction surveys.
Protected fauna will not be killed or injured as a result of the Project.	No mortality or injury to protected native fauna as a direct result of the Project.
Biodiversity performance monitored and reported on.	Annual compliance report prepared for each 12 month period from construction commencement and published on the Project website within 60 business days of the relevant 12 month period.

2 Statutory Context

2.1 Environmental legislation

Approval for the Project was granted under the *Planning Act 2016* by the DSDIP (previously DSDMIP) on 10 August 2018. Since then, changed decision notices have been approved on 4 June 2019, 23 December 2020, 24 March 2022, and most recently on 10 July 2024.

EPBC Act Approval 2018/8141 was granted by a delegate of the Federal Minister for the Environment, in accordance with the EPBC Act, on 9 November 2018. A variation to the EPBC Approval was approved by the Minister on 5 September 2024.

The following Commonwealth legislation is relevant to this BMP:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The following key Queensland State legislation is relevant to this BMP:

- Planning Act 2016

- Biosecurity Act 2014
- Environmental Protection Act 1994 (EP Act)
- Environment Protection Regulation 2008
- Nature Conservation Act 1992 (NC Act)
- Nature Conservation Regulations
- Fisheries Act 1994
- Vegetation Management Act 1999 (VM Act).

2.2 Biodiversity Management Plan – Conditions of Approval

The Commonwealth Government has specified the requirements of this Project BMP. Table 2-1 presents each relevant condition, along with the section of this BMP where these are addressed.

Table 2-1 Conditions of approval reference table (EPBC 2018/8141 – as varied on 5 Sept 2024)

No.	Condition	Section where this is addressed
1	**Construction/Clearance limits** The approval holder must not undertake any **clearing** or **construction** outside of the **project area.**	Section 5.1 and 5.3
3	The approval holder must not clear more than a. 1513 hectares (ha) of **Koala habitat**. b. 17.83 ha of **Greater Glider habitat** c. 17.83 ha of **Squatter Pigeon habitat**. d. 45.22 ha of **Semi-evergreen Vine Thicket within the project area.**	Section 4.1.2
4	**Environmental Management Plan** The approval holder must implement the **Biodiversity Management Plan** until the **completion of the action**.	This document
8	**Cycad(s) Management** The approval holder must not translocate any **Cycad(s)** otherwise than in accordance with the **Biodiversity Management Plan**.	Appendix G
26	**Reporting non-compliance** 26. The approval holder must notify the **department** electronically, within 2 **business days** of becoming aware of any **incident**, or potential or actual non-compliance with these conditions or commitments made in a **plan**. The approval holder must specify in each notification: a. any condition or commitment made in a **plan** which has not been or may have been not complied with; b. a short description of the **incident** or non-compliance; and c. the location (if applicable, including co-ordinates), date and time of the **incident** or non-compliance.	Section 6.4.3
27	The approval holder must provide to the **department** in writing, within 12 **business days** of becoming aware of an **incident**, or potential or actual non-compliance with these conditions or commitments made in a **plan**, the details of that **incident** or non-compliance. The approval holder must specify: a. all corrective measures and investigations which the approval holder has already taken in respect of the **incident** or non-compliance; b. the potential impacts of the **incident** or non-compliance; c. the method and timing of any corrective measures that the approval holder proposes to undertake to address the **incident** or non-compliance; and d. any variation of these conditions or revision of a plan that will be required to prevent recurrence of the **incident** or non-compliance, and/or to address its consequences.	Section 6.4.3
31	**Revision of action management plans** The approval holder may, at any time, apply to the **Minister** for a variation to a **plan** by the **Minister** as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**.	Section 7.5.4
32	The approval holder may choose to revise the **Biodiversity Management Plan**, without submitting it for approval under section 143A of the **EPBC Act,** if the taking of the action in accordance with the revised **Biodiversity Management Plan** would not be likely to have a **new or increased impact**.	Section 7.5.4

No.	Condition	Section where this is addressed
33	If the approval holder makes the choice under condition 32 to revise the **Biodiversity Management Plan** without submitting it for approval, the approval holder must: a. notify the **Department** in writing that the **Biodiversity Management Plan** has been revised and provide the **Department** with: i. an electronic copy of the revised **Biodiversity Management Plan**; ii. an electronic copy of the revised **Biodiversity Management Plan** marked up with track changes to show the differences between the current **Biodiversity Management Plan** and the revised **Biodiversity Management Plan;** iii. an explanation of the differences between current **Biodiversity Management Plan** and the revised **Biodiversity Management Plan**; iv. the reasons the approval holder considers that taking the action in accordance with the revised **Biodiversity Management Plan** would not be likely to have a **new or increased impact**; and v. written notice of the date on which the approval holder will implement the revised **Biodiversity Management Plan**, being at least 20 **business days** after the date of providing notice of the revision of the **Biodiversity Management Plan**, or a date agreed to in writing with the **Department**. b. subject to condition 35, implement the revised **Biodiversity Management Plan** from the implementation date.	Section 7.5.4
34	The approval holder may revoke its choice to implement a revised **Biodiversity Management Plan** under condition 32 at any time by giving written notice to the **department**. If the approval holder revokes the choice under condition 32, the approval holder must implement the previous version of the **Biodiversity Management Plan**.	Section 7.5.4
35	If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the revised **Biodiversity Management Plan** would be likely to have a **new or increased impact**, then: a. condition 32 does not apply, or ceases to apply, in relation to the revised **Biodiversity Management Plan**; and b. the approval holder must implement the version of the **Biodiversity Management Plan** specified by the **Minister** in the notice.	Section 7.5.4
36	At the time of giving the notice under condition 35, the **Minister** may also notify that for a specified period of time, condition 32 does not apply. **Note:** conditions 32, 33, 34 and 35 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised action management plan, at any time, to the **Minister** for approval.	Section 7.5.4

2.3 Vegetation and Fauna Management Plan – Terms of Approval

DSDIP (previously DSDMIP) has conditioned the development of a vegetation and fauna management plan (VFMP). The condition is set out in Table 2-2, along with the relevant section of this plan where each condition is addressed. Condition 8(a) and 8(b) must occur prior to the commencement of construction of each phase of the wind farm, and 8(c) must occur during construction.

Table 2-2 Condition of development approval – VFMP

No.	Condition	Section where this is addressed
8(a)	Prepare a Vegetation and Fauna Management Plan (VFMP) certified by a suitably qualified ecologist. The VFMP must include details of all measures to identify and avoid fauna resources and habitats prior to clearing.	Section 5.3 Appendix A

No.	Condition	Section where this is addressed
	The plan must include measures to protect and recover fauna during clearing operations, including presence of a qualified wildlife officer during clearing operations, pre-clearing inspections, staging and sequence of clearing, and recovery procedures.	Section 5.4 Appendix A Appendix D
	Measures to replace/relocate habitat and resources that will be unavoidably lost needs to be included.	Section 5 Also see Offset Strategy (prepared under EPBC 2018/8141 CoA 14-17)
8(b)	Submit the VFMP to DSDIP (previously DSDMIP) (windfarms@dsdmip.qld.gov.au)	n/a
8(c)	Implement the measures detailed in the VFMP	n/a

2.4 Species Management Program

While a Species Management Program (SMP) has not been conditioned by Federal or State Government, it is a requirement under the NC Act when tampering with animal breeding places. An SMP describes requirements to minimise impacts on identified animal breeding places for animals classified as: extinct in the wild, endangered, vulnerable, near threatened (EVNT), special least concern, colonial breeder or least concern. An SMP is required where an animal breeding place has been identified, and activities required to complete the scope of works would tamper with the breeding place.

The purpose of an SMP is to:

- Assess the threats to native animal breeding places resulting from a planned activity.
- Incorporate management actions that will avoid or minimise both the immediate and the long-term impact of removing or altering an animal breeding place.
- Set monitoring and reporting requirements that demonstrate the management actions in the SMP are effectively implemented and produce the intended results.

2.4.1 SMP approach at Clarke Creek Wind Farm

A High Risk SMP (SMP1711) was approved for this project and remains effective from 4 November 2024 to 3 November 2027. It covers the entire Project area (all Phases / Stages). Further application for SMP will be made as required.

The Project area is large, and vegetation clearing is being staged, likely to occur over a period of up to 30-50 months for each respective Phase (Section 1.2.1 and 1.3.3). Animal breeding place surveys were completed between 28 February 2021 and 8 March 2021 (over 10 days). These were undertaken in accessible parts of the Stage 1 and Stage 2 areas of the Project (Figure 1 - 1). Detailed animal breeding place surveys have been carried out for Stage 3 and this will be refreshed closer to construction commencing in this area. This will ensure that the survey is relevant to the Project footprint and detects change in the wildlife usage of the animal breeding places.

The Project will further identify animal breeding places during pre-clearance surveys which occur within one month of clearing (see Section 5.3). Data on breeding places from pre-clearance surveys will be forwarded to the Department of Environment, Tourism, Science and Innovation (DETSI) quarterly, and for Stage 3 prior to construction commencing in this area. The DETSI will be informed of unexpected finds/species not explicitly addressed in the SMP application/this BMP within five business days. Additional species will be addressed through a separate application to DETSI supported by this BMP.

2.5 Protected Plant Clearing Permit

CCEPL has obtained Protected Plant Clearing Permits (PPCP) under the *Nature Conservation (Plants) Regulation 2020,* for the clearing of *Cycas terryana* in accordance with a Cycad Impact Management Plan (CIMP):

- PPCP (WA0037101): For the clearing of 650 individuals (valid from 23 September 2021 – 22 September 2023);
- PPCP (WA0060507): For the clearing of:
  - 500 individuals as approved under APP126474;
  - 150 individuals under amendment application lodged 2 August 2024; and
  - 300 individuals under amendment application lodged 23 September 2024.

  and which is valid to 13 May 2026.

3 Existing environment

3.1 Landscape attributes

The Clarke Creek area is characterised by agricultural activities (primarily beef cattle production), and large areas of the region are extensively cleared to support these uses. There are also extensive patches of remnant and regrowth native vegetation in the Clarke Creek area, occurring predominantly along upper hills and ridges, as well as along some drainage systems. Much of the rest of the low-lying areas have been cleared to support the agricultural uses.

The Project area is characterised by agricultural activities (primarily beef cattle production). No production crops, including forestry, or other activities such as mining occur in the Project area or its immediate surrounds.

The hills and ridges of the Project area are characterised by undulating country on fine grained sedimentary rocks that generally have little or no deformation and usually form undulating landscapes. Typical rock types through these regions are made up of siltstones, mudstones, shales, calcareous sediments, and labile sandstones. Minor interbedded volcanics have the potential to occur. The land includes a diverse range of fine textured soils of moderate to high fertility, predominantly Vertosols, Sodosols, and Chromosols.

Mean daily maximum temperatures (from the temperature recording station located in St Lawrence [Bureau of Meteorology {BoM} station 33210] approximately 40 km northeast of the Project site) indicates that summer maximum temperatures average around 31°C (a high of 43.5°C has been recorded in November) with a minimum average of 22°C. In winter, average temperature ranges between 11°C and 24°C, but can be as low as 1°C. There is a high incidence of winter and early spring fogs.

Rainfall data from the BoM indicates that rainfall is seasonally distributed with a distinct wet season typically present from November through March and a drier season extending from April through October. The mean rainfall received during the summer wet season is approximately 170 mm/month; however, wet season rainfall is subject to a high degree of variability. Variability in rainfall depth throughout the winter dry season (April through October) is lower than during the wet season generally with mean monthly rainfall during the dry season approximately 33 mm, with August and September being the driest months.

3.2 Ecological survey and reporting

Detailed ecological field surveys were undertaken in March and September 2017. These surveys were undertaken to document existing vegetation communities, ground-truth State RE mapping, and to document fauna habitat types and communities. Targeted surveys were conducted for listed threatened fauna species. Surveys were in accordance with relevant guidelines and informed the project approval documentation, including:

- Preliminary documentation for EPBC Act assessment

- Ecological assessment report for assessment under Wind Farm State Code 23.

Further surveys occurred in 2018/19 to map Greater Glider habitat and to support a property map of assessable vegetation application. Bird utilisation surveys were repeated in 2020 and 2021.

Protected plant surveys were conducted in March 2021 to identify threatened cycads within the Stage 1 and 2 areas (Figure 1 - 1). The majority of the Stage 1 MCR2 disturbance footprint (supplied by Goldwind on 19 February 2021) was surveyed on foot or by vehicle except for these areas:

- Certain overhead high and medium voltage overhead lines
- Turbine hardstands and tracks to turbines 1-4 and 7-9.

In addition to recording cycads, ecologists also marked significant hollow bearing trees and other significant habitat features including (but not limited to) log piles, rock piles, dense vegetation (semi-evergreen vine thicket (SEVT)), arboreal termite mounds, nests, hollow logs, dams and burrows. The results of the habitat features survey are described in Section 3.2.3 below.

3.2.1 Flora and vegetation communities

A review of the regulatory vegetation maps established under the VM Act identified that the Project is affected by Regulated Vegetation. Thirty-nine (39) regional ecosystems (REs) or regional ecosystem associations consisting of a mix of dominant and co-dominant REs, were identified as having previously been mapped in the study area. Four main vegetation communities were found to be present in areas likely to be impacted by the Project. These vegetation communities are described as:

- Vegetation Community 1: *Eucalyptus crebra* Open Woodland
- Vegetation Community 2: Riparian Vegetation
- Vegetation Community 3: Semi-Evergreen Vine Thicket (SEVT)
- Vegetation Community 4: Alluvial plains.

Appendix A includes a map of these vegetation communities.

The dominant RE across the site is the *Eucalyptus crebra* Open Woodland, which is heavily disturbed within the Project Area. Fire and grazing have reduced the ecological condition of this vegetation community, and few mature hollow-bearing trees (HBT) were observed. The Riparian Vegetation community occurs along drainage lines, fringing levees and banks of streams. It displays a high level of connectivity and biodiversity value, with several threatened fauna species recorded within this RE. The Alluvial Plains vegetation community is restricted to the eastern portion of the site, outside of the footprint of the turbines and road. The dense nature of this community and the fire-retardant properties of the species found within creates a microhabitat that is relatively resistant to high level disturbance. This vegetation community held high fauna species diversity.

Semi-evergreen Vine Thicket (SEVT)

Ecological assessments undertaken as part of the original EPBC referral field assessment in 2018 identified the EPBC Act-listed *Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions* Threatened Ecological Community ('SEVT TEC') (associated with RE 11.4.1 and RE 11.8.3).

After ground truthing seven (7) SEVT vegetation communities across the Project Area post-approval (within both Phase 1 and Phase 2), it was determined with high confidence through reference to the Department of Environment, Tourism, Science and Innovation (DETSI) RE technical descriptions that the SEVT communities present in both Bioregion 11 (Brigalow Belt) and 8 (Central Queensland Coast), corresponds respectively to the following RE's:

- RE 8.12.16 - "Deciduous to semi-evergreen microphyll vine thicket +/- *Brachychiton spp. +/- Araucaria cunninghamii* emergents of foothills and uplands (western areas) on Mesozoic to Proterozoic igneous rocks"; and
- RE 11.12.7 - "*Eucalyptus crebra* woodland with patches of semi-evergreen vine thicket on igneous rocks (boulder-strewn hillsides)".

The above RE's are not constituents of the EPBC Act-listed SEVT TEC. There is no EPBC-listed SEVT confirmed within Project Area.

Cycads

Two EVNT cycad species have previously been identified within the Project site, *Cycas megacarpa* and *C. ophiolitica*, with samples confirmed at that time by the Queensland Herbarium. Profiles for each of these are provided in Appendix E. In June 2021, the Queensland Herbarium reassessed previous advice and determined that *C. megacarpa* and *C. ophiolitica* were mis-identified, and that cycads within the Project Area have been redetermined to be the NC Act Vulnerable *C. terryana*.

3.2.2 Fauna habitat assessment

Habitat features of the site for native fauna consist of resources (e.g., foraging and breeding niches) of varying quality and condition. Regarding native fauna, the site provides the following habitat resources:

- Foraging resources in the form of acacia and eucalypts species
- Hollow-bearing trees
- Rocky outcrops
- Watercourses provide refuge areas
- Abundant dry grass and leaf litter across the site.

Suitable habitat for each EVNT species known to occur in the Project Area is discussed in Appendix E. Habitat for Koala, Greater Glider and Squatter Pigeon is shown in the Figures within Appendix A.

The project area is broadly characterised by undulating landforms which are terminated at the periphery by dissected, rocky ridge lines. Due to the large wind currents occurring at the top of the ridge, these ridges are the preferred locations for most of the wind turbines. The presence of water in a mostly dry landscape provides small nodes of plant habitats occurring in the sheltered positions. These watercourses have important ecological values.

The ridge country (e.g., areas of the site containing steep slopes and ridge tops), particularly within the southern and western aspect, features niche habitats in highly restricted situations for a unique range of species (e.g., vine thicket). Where trees have established along ridges, these are typically stunted, wind-sheared forms with coarse, often tessellated bark. Nearly all the ridges have patches of vine thickets occurring along the southern aspect.

The terrain of the project area creates several habitat types for flora and fauna. These habitats include:

- Dissected and rocky ridgelines of granite and rhyolite geology, including knolls of outcropping rock. The vegetation structure in these exposed situations rarely develops beyond woodland and is primarily sparse, open woodland. The vegetation structure within the rocky outcrop is open forest, probably due to the marginally higher shelter aspect and less exposure to constant wind.
- The western section is mainly comprised of lowland grassland that is relatively heavily grazed. Patches of Brigalow occur in this section, but the extent of grazing and past clearing has heavily disturbed this ecosystem.
- Undulating hills of less rugged terrain supporting woodland to open forest (occasionally). Trees on this landform are taller, have wider girths and present a number of tree hollows greater than 10 cm diameter. Kangaroo grass (*Themeda triandra*) and giant spear grass (*Heteropogon triticeus*) dominate the grass layer.
- Low bank environments adjacent to watercourses with temporary flow. This habitat type is characterised by large hollow-bearing trees including *Eucalyptus tereticornis*, *Corymbia citriodora*, *Lophostemon sp.* and some *Callitris* trees in places, which along with large, angular rocks and boulders create deep crevices and capture points for organic matter with higher moisture content compared to the surrounding woodland.

- Rock pavements, generally in elevated situations, that are moderately to highly exposed and support wind-sheared, heath-like plants. Trees, where present, are sparsely distributed, and are invariably stunted with gnarled forms. Wattles are more common and sometimes create dense, impenetrable thickets around bare rock surfaces where some semblance of soil development has occurred. This habitat is suitable for threatened fauna species such as the Northern Quoll, however, no evidence was found of this species occurring on site.
- Sheltered valleys and broad gullies supporting higher densities of trees and SEVT. Some of these areas are partially fire-resistant niches and are therefore relatively more important as refugia zones for fauna and nodes of mesophytic vegetation than the surrounding sclerophyll vegetation. These zones also support a longer-term, more stable soil-water status and promote a higher percentage foliage cover; where the vegetation structure merges to open forest communities the moisture gradient is highest and more persistent.
- Micro-gilgai and semi-aquatic environments. These are temporary features and dependent solely on rainfall, and thus evaporate relatively quickly. These are potential micro-habitats for semi-aquatic plants.

3.2.3 Hollow bearing trees and other habitat features

Hollow bearing trees were recorded within the Stages 1 & 2 (Phase 1) disturbance footprint (shown in Figure 3-1). Many of these trees were stags with multiple hollows.

Seven bird nests were recorded, including one large active Wedge-tailed Eagle (*Aquila audax*) nest. The nest was adjacent to the disturbance footprint, but consideration should be given to possible impacts to any breeding birds from construction activities.

Rock piles, boulder patches and rock covered slopes were common within the footprint and could provide habitat for many species of reptiles and small mammals. Habitat features which have been identified onsite are summarised in Table 3-1 and detailed in Appendix F.

Table 3-1 Habitat features recorded within the Stage 1 & 2 (Phase 1) disturbance footprint (shown in Figure 3-1)

Type	Number of individuals	Potential for use by (Least Concern as well as threatened)
Hollow bearing tree	474	Gliding mammals; birds; possums; reptiles; microbats
Nests	7	Birds
Rockpiles	403	Reptiles, mammals
Other habitat features (including dense vegetation, boulder fields, termite mounds, riparian vegetation, log piles, hollow logs)	136	Reptiles; mammals; amphibians
Dams	1	Reptiles, including turtles; fish; amphibians
Burrow	1	Echidna; pests, including rabbit, fox
Cracking clay	Area	Reptiles (i.e., Ornamental Snake).

At the time of survey, none of the habitat features identified within the disturbance footprint were confirmed as supporting a threatened species.

None of the hollow bearing trees were located within Greater Glider habitat and therefore these are unlikely to be Greater Glider denning trees. This is reflective of the fact that the disturbance footprint largely avoids identified Greater Glider habitat.

Hollows would be used by Least Concern birds, possums, gliders, reptiles and potentially microbats. At the time of survey, hollows were identified in use by a species of kingfisher and Red-winged Parrot (*Aprosmictus erythropterus*). Hollows will be checked prior to clearing to confirm their occupancy (Section 5.3.3).).

The burrow complex was considered likely to be Rabbit. An area of cracking clay has been identified, but this is in the Stage 3 area and outside the scope of this SMP.

The locations of the hollowing bearing trees and other habitat features (displayed in Figure 3-1) were considered in detailed design, and avoided where possible. This data has also been provided to the ecologists and/or spotter catchers undertaking the pre-clearance surveys so that they can assess equipment requirements and check if the hollows are being used prior to clearing.

3.2.4 Weeds and pests

A number of weed species were recorded on site, including Weeds of National Significance (WoNS), restricted invasive plants listed under the *Biosecurity Act 2014,* and other environmental weed species. Six pest animal species were confirmed in the Project Area, all of which are considered to be a restricted invasive animal under the Biosecurity Act. Refer to Appendix B for further information regarding the weed and pest species within the Project area.

3.3 Matters of National and State Environmental Significance

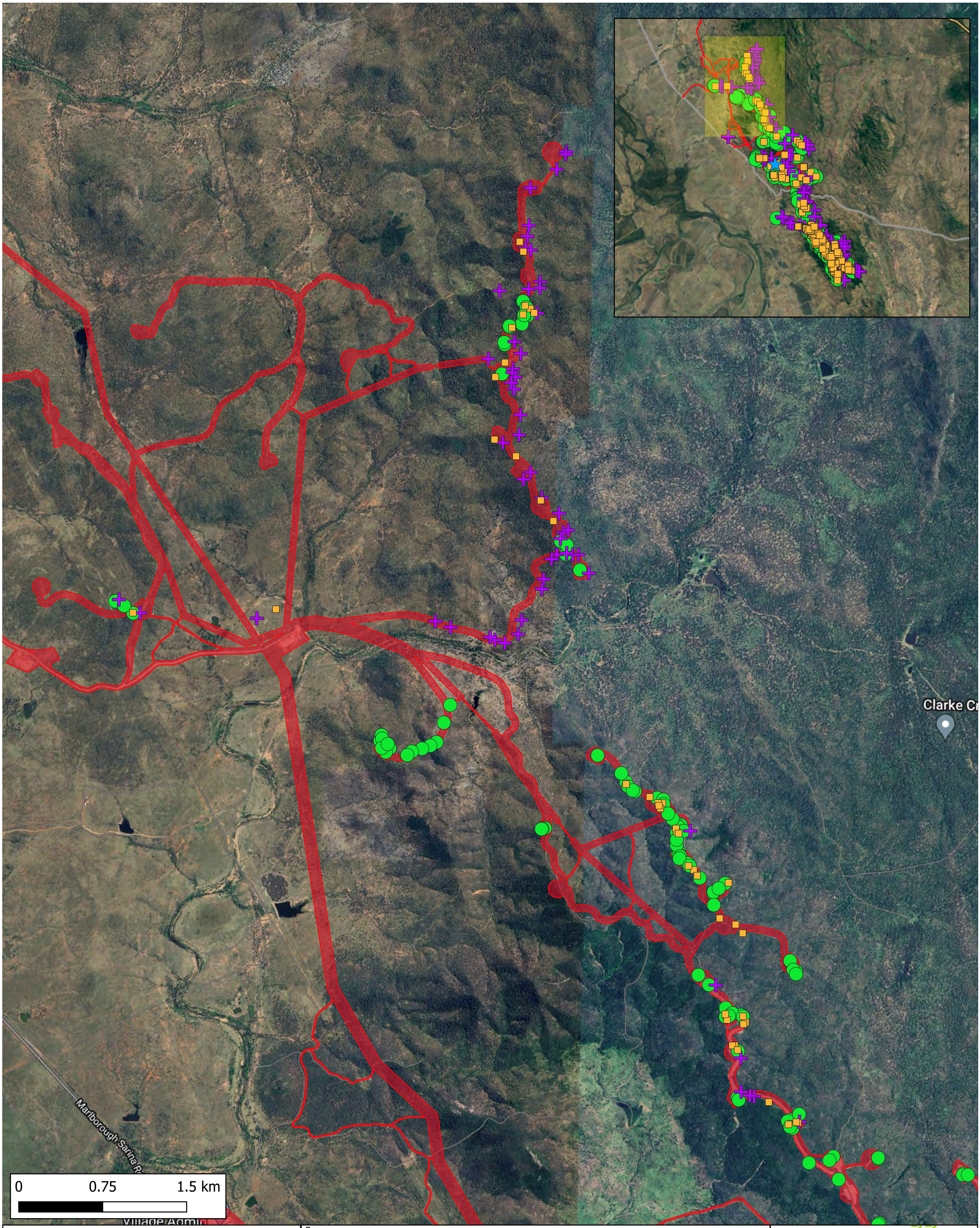
The following MNES and MSES were recorded (or were considered likely to occur) during the field surveys. These species and communities and their listings under the EPBC Act, NC Act or VM Act are identified in Table 3-2. A detailed profile has been provided for threatened species and the MNES TEC in Appendix E. A map has been provided within Appendix A to show the area of Koala, Greater Glider and Squatter Pigeon habitat, as well as vegetation communities which are MNES or MSES.

Table 3-2 MNES and MSES known or likely to occur within the Project Area

Matter	Listing Status*	
	MNES (EPBC Act)	MSES (NC Act or VM Act)
Flora		
Cycas megacarpa	E	E
Cycas ophiolitica	E	E
Cycas terryana	-	V
Vegetation Community		
SEVT RE 11.4.1	TEC	E
RE 11.3.21/11.3.3/11.3.27/11.3.1	-	E
RE 11.11.10	-	OC
RE 8.12.7/8.12.23	-	OC
RE 8.12.16	-	OC
RE 11.3.4	-	OC
Fauna		
Squatter Pigeon (southern) (*Geophaps scripta scripta*)	V	V
Koala (*Phascolarctos cinereus*)	V	V
Greater Glider (*Petauroides volans*)	V	V
Red Goshawk (*Erythrotriorchis radiates*)	V	V
Corben's Long-eared Bat (*Nyctophilus corbeni*)	V	V
Grey Falcon (*Falco hypoleucos*)	V	V
Grey-headed Flying-fox (*Pteropus poliocephalus*)	V	V
Ornamental Snake (*Denisonia maculate)*	V	V
Migratory Birds		

Matter	Listing Status*	
	MNES (EPBC Act)	**MSES (NC Act or VM Act)**
White-throated Needletail (*Hirundapus caudacutus*)	Mi, Ma, V[1]	V
Rainbow Bee-eater (*Merops ornatus*)	Ma	LC
Rufous Fantail (*Rhipidura rufifrons*)	Mi, Ma	SL
Fork-tailed Swift (*Apus pacificus)*	Mi, Ma	SL
Satin Flycatcher (*Myiagra cyanoleuca*)	Mi, Ma	SL
*** Status codes: E – Endangered, V – Vulnerable, OC – Of Concern, SL – Special Least Concern, LC – Least Concern, Ma – Marine (EPBC Act only), Mi – Migratory (EPBC Act only)**		

[1] The listing of this species as Vulnerable occurred after EPBC Act approval



LEGEND

- Disturbance Footprint
- Hollow bearing trees
- Rock piles
- Other habitat features

Company: Clarke Creek Energy Pty Ltd		SQUADRON ENERGY
Title: Figure 3-1 Identified potential animal breeding places		
Date: 27.09.2023	Projection: GDA 94 / MGA Zone 55	Drawing No: BMP Figure 3-1
Drawn By: A Gordijn	Checked By: S Kidziak	Sheet: Map 1 of 4

oadsound Substation

Marlborough Sarina Rd

Marlbor

ough Rd

Access 2 - Clarke Creek Wind Farm

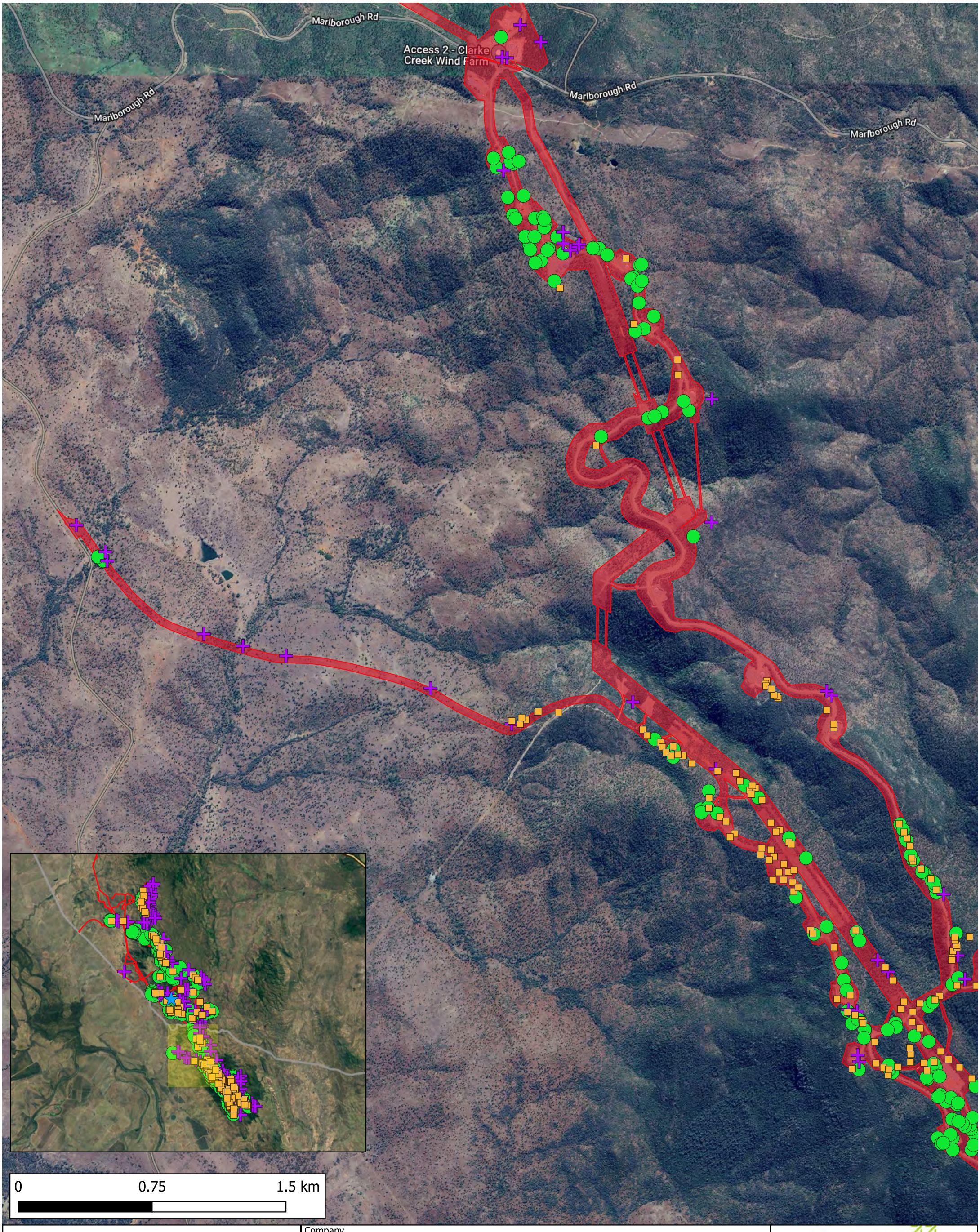
Marl

0 0.75 1.5 km

LEGEND

- Disturbance Footprint
- Hollow bearing trees
- Rock piles
- Other habitat features
- Burrow

Company: Clarke Creek Energy Pty Ltd		SQUADRON ENERGY
Title: Figure 3-1 Identified potential animal breeding places		
Date: 27.09.2023	Projection: GDA 94 / MGA Zone 55	Drawing No: BMP Figure 3-1
Drawn By: A Gordijn	Checked By: S Kidziak	Sheet: Map 2 of 4



LEGEND

- Disturbance Footprint
- Hollow bearing trees
- Rock piles
- Other habitat features

Company: Clarke Creek Energy Pty Ltd		SQUADRON ENERGY
Title: Figure 3-1 Identified potential animal breeding places		
Date: 27.09.2023	Projection: GDA 94 / MGA Zone 55	Drawing No: BMP Figure 3-1
Drawn By: A Gordijn	Checked By: S Kidziak	Sheet: Map 3 of 4

0 0.75 1.5 km

LEGEND

- Disturbance Footprint
- Hollow bearing trees
- Rock piles
- Other habitat features

Company: Clarke Creek Energy Pty Ltd		SQUADRON ENERGY
Title: Figure 3-1 Identified potential animal breeding places		
Date: 27.09.2023	Projection: GDA 94 / MGA Zone 55	Drawing No: BMP Figure 3-1
Drawn By: A Gordijn	Checked By: S Kidziak	Sheet: Map 4 of 4

4 Impacts

4.1 Key aspects and impacts

Key aspects of the Project that could result in impacts to biodiversity include:

- Site establishment, including installation of temporary facilities and mobilisation of equipment and materials
- Vegetation clearing
- Excavation and blasting
- Trenching works for installation of underground cabling
- Overhead power lines, hardstands and access track construction, including vegetation clearing, topsoil stripping, earthworks, and drainage works
- Installation of wind turbines
- Commissioning and operation of wind turbines and site compound facilities
- Vehicle movement during construction and operation.

4.1.1 Flora

Impacts to flora are expected to include:

- Clearing, translocation and potential loss of NC Act listed cycad species within the Project footprint
- Potential clearing and translocation of EPBC Act listed cycad species within the Project footprint
- The removal of remnant vegetation
- Increased competition from weed species which may be introduced to the Project Area or spread to new locations as a result of the Project.

4.1.2 Fauna

Impacts to fauna are expected to include:

- Vegetation clearance which may lead to:
  - Loss of vegetated habitat including hollow-bearing trees, bird nests and food resources
  - Damage or removal of ground-based habitat features including fallen timber, dead wood and bush rocks
  - Injury and mortality to fauna during vegetation clearing
- Fauna collisions with construction vehicles
- Light, noise and vibration impacts which may disturb nesting or roosting fauna
- Removal of up to 1,513 ha of suitable Koala habitat
- Removal of up to 17.83 ha of suitable habitat for Greater Glider and Squatter Pigeon
- Degradation of habitat through runoff and pollutant results from clearing and infrastructure
- Collision of bird and bat species with turbine blades.

5 Management actions and risk assessment

5.1 Avoid and minimise impacts

Avoidance of impacts to threatened species has been achieved through the design refinement process detailed in the Project's Preliminary Documentation Submission Report, which has guided the alignment of the Project to minimise impacts to ecologically significant areas. Following the ecological site investigations in 2015 and 2016, the wind farm was further designed to avoid environmental constraints. Originally, 234 turbine positions were surveyed. During project layout refinements, turbines were removed from the layout , resulting in a total of 195 turbines which were included in the approved action.

5.1.1 Final detailed design and micro-siting

Detailed design has considered how to further reduce vegetation clearing. The project detailed design is expected to result in an overall reduction of impact to MNES and MSES.

The following mitigation measures will be implemented for the detailed design, including micrositing of turbines, roads, underground cabling and other infrastructure, to reduce or avoid ecological impacts:

- Micrositing of turbines and access roads to minimise clearing SEVT TEC.
- Minimising clearing within the riparian vegetation community (which also incorporates core Greater Glider habitat).
- Final detailed design of road and overhead powerline alignments to minimise the overall clearing footprint to the greatest extent feasible, whilst also reducing the overall loss of Koala habitat.
- Micrositing infrastructure to avoid clearing listed Cycad spp. (or translocate in advance) and minimise the number of hollow bearing trees cleared.

5.2 Weed and pest management; pre-, during, and post-clearing

5.2.1 Weed management

Mitigation measures for managing weeds on site include:

- Managing existing weeds on site, including appropriate treatment and disposal
- Weed hygiene protocols
- Ongoing weed monitoring and control

The Weed & Pest Management Plan is detailed in Appendix B. The Contractor will take all reasonable steps to prevent the introduction, escape and/or spread of weeds through the Project Area and surrounds as a consequence of the use of the Site for the Works.

5.2.2 Feral animal control

The Weed & Pest Management Plan is detailed in Appendix B. Specific feral animal controls are outlined in this BMP as well as in the CTMP (Appendix G) and separate Offset Strategy/Offset Management Plan. The measures to be implemented include but are not limited to:

- Shooting
- Trapping
- Baiting

Squadron Energy is responsible for Feral Animal Control e.g. shooting, trapping and baiting (as required).

Site inductions and/or toolbox talks will include general training around minimising attraction for pest animal species, such as securing food scraps and rubbish bins, and not feeding wildlife.

5.3 Pre-clearance management actions

5.3.1 Confirming values and necessary approvals (including off-site clearing)

Prior to clearing a stage, the following assessment will be undertaken. This includes off-site clearing, which will be required to upgrade a road, bridge or drainage structure, or to allow clearance for over-size over-mass vehicles.

1. Identify on-site and off-site areas where clearing, earthworks and/or alterations to a waterway corridor (i.e., construction of bridges, culverts, etc) will be required.
2. Complete a desktop due diligence to identify potential values and legislative triggers including:
    - Protected plant trigger areas (DETSI, 2019)
    - Clearing of mapped remnant vegetation in accordance with the State and Federal approvals
    - Clearing/construction within mapped waterways or stream orders.
3. Confirm that the planned clearing is within the area identified by the Technical Agency Response Plan (TARP) approved by Queensland DSDIP (previously DSDMIP) and that it is also within the approved clearing limits (EPBC 2018/8141 and DSDIP Decision Notice). Squadron Energy is responsible for the overall coordination of clearing between the different project Contractors.
4. Pre-clearance survey must be undertaken prior to clearing (see below).

5.3.2 Delineating the clearing boundary

All plant operators will have access to spatial data for vegetation clearing boundary. Physical demarcation (e.g., pegging, temporary fencing or similar) will be used to delineate the disturbance footprint, especially in areas of dense vegetation or other high-risk areas (such as within riparian vegetation).

All areas outside of the approved disturbance footprint are to be designated as no-go areas and protected as follows:

- Surveyor’s pegs with brightly coloured flagging (or equivalent) will delineate the clearing boundary. These pegs are to be clearly placed and located so that contractors can easily discern the boundary of the area to be cleared.
- Trees will be felled away from retained vegetation, to ensure retained vegetation is not damaged.

5.3.3 Pre-clearance surveys

Prior to clearing works commencing, vegetation to be cleared will be inspected by an ecologist and/or suitably qualified fauna spotter (where they meet the definition in Appendix D). The fauna spotter for each Contractor will undertake a pre-clearance survey of vegetation within the clearing boundary of the Contractor’s respective scope of work, within one month of felling. This survey will identify, record, and mark:

- Presence of fauna and/or fauna habitat
- Threatened flora (i.e. Cycad spp.)
- Weeds
- Evidence of pest animal species.

The ecologist and/or suitably qualified fauna spotter will locate, record and mark the location of resting, roosting and denning habitat, including the following specific habitat features:

- Tree hollows
- Large fallen logs and branches
- Bird nests
- Complex rock fissures
- Boulder piles.

Fauna habitat features will be clearly recorded and marked, preferably with pink spray marking paint (or similar), in order to identify those which will be inspected immediately prior to clearing and then be felled or removed with care. This includes HBT, which are trees that provide or potentially provide a number of resources including:

- Hollows, fissures or cracks
- Hollow logs on ground
- Stags
- Trees with diameter at breast height (dbh) >400 mm
- Large canopy spread
- Significant foraging resources for fauna.

In areas with surface rocks and timber, the fauna spotter will search for terrestrial reptiles and mammals.

Breeding habitat sites are recorded and documented in the breeding habitat survey report. Survey reports are provided to the DETSI on a quarterly basis. If any other threatened species under the NC Act are identified throughout the project, DETSI are notified and consulted on any requirement for an additional permit or amendment to the SSMP (this plan).

5.3.4 Protected plants

The Project includes areas which are shown as high risk on the Protected Plants Flora Survey Trigger Map (DETSI, 2019). Pre-clearance surveys in these areas will follow the pre-translocation assessment process in the CTMP, which is an EPBC Act Condition of Approval.

Cycas megacarpa and *C. ophiolitica* had been identified within the Project footprint during seasonal ecological surveys undertaken in 2017 (NGH Environmental and Green Tape Solutions, 2018), however these have since been redetermined by the QLD Herbarium to be the NC Act Vulnerable *C. terryana*, which is not an EPBC-listed cycad species.

In June 2021, the Queensland Herbarium reassessed previous advice and determined that *C. megacarpa* and *C. ophiolitica* were mis-identified, and that the cycads within the Project Area have been redetermined to be the NC Act Vulnerable *C. terryana*.

Several targeted protected plant surveys have occurred since March 2021 and Protected Plants Clearing Permits secured from DETSI (refer to Section 2.5) to authorise the clearing of C*. terryana* in accordance with a Cycad Impact Management Plan*.*

If any additional threatened plants are identified within the Project Area, surveys will follow the Flora Survey Guidelines – Protected Plants (Department of Environment and Heritage Protection, 2016), and an online application for a Protected Plant Clearing Permit (DETSI) will be made prior to clearing.

Additional threatened plants (outside of cycad spp.) will require:

- Protected plant clearing permit to clear threatened plants
- Protected plant clearing permit OR exemption to clear in trigger map areas (i.e. south of Marlborough Road)
- Protected plant clearing permit to clear any unexpected threatened flora species found during pre-clearance surveys

- If any other EPBC Act listed threatened plant species are found within the project area, Cth DCCEEW will be notified and appropriate action determined in consultation with the Department prior to clearing commencing in the known location of a threatened flora species.

5.3.5 Wildlife caring

Licensed and qualified wildlife carers are contacted at least two weeks before the commencement of clearing to prepare for a potential admission of injured/orphan fauna. The Project will donate $50 for each admission. Appendix D.5 lists contact details for local wildlife carers, and veterinarians. Due to the need for bats to only be handled by people who are vaccinated for Australian Bat Lyssavirus, the ability of local wildlife carers and veterinarians to receive bats will be established by the fauna spotter consultancy prior to clearing commencing.

5.4 Management actions during vegetation clearing

5.4.1 Timing

Clearing and bulk earthworks will be avoided during and immediately following heavy rainfall events to protect soils and vegetation at the site.

If undertaking nightworks, lights (both during nightworks and operation where necessary) will be directed away from vegetation and adjacent habitats.

5.4.2 Fauna spotter activities

A suitably qualified fauna spotter catcher will undertake a visual inspection of habitat features within 24 hours of clearing to identify resident fauna species that will require relocation. The definition of suitably qualified fauna spotter catcher is outlined in Appendix D.1, and further details of fauna spotter activities are outlined in Appendix D.2

5.4.3 Clearing approach

Sequential and staged clearing approaches are being used. Trees are progressively cleared to enable fauna residing in, or near the clearing site, enough time to vacate the clearing area and move into adjacent woodland without human intervention.

Cleared vegetation is stockpiled or mulched, or where practical, may be relocated as fauna habitat:

- Where cleared vegetation has habitat features (such as hollow branches), these may be salvaged and relocated for use as replacement habitat outside the clearing footprint, as advised by the FSC. Salvaged hollows intended for Greater Glider use will be installed according to the specifications outlined in Section 5.4.5.
- Stockpiled vegetation may be suitable for use in erosion and sediment control and rehabilitation works. Stockpiled vegetation can provide habitat for fauna, and therefore a fauna spotter catcher is present where stockpiles are removed or mulched. Mulch will be used within the Project Area as a preventative erosion control, to improve soil condition, reduce weeds, retain moisture and increase ecological diversity.

5.4.4 Sensitive clearing technique

A sensitive clearing technique is being implemented to fell hollow bearing trees, particularly in areas of mapped Greater Glider habitat (Appendix A).

Hollow bearing trees are felled in a manner which reduces potential for fauna mortality. Trees are tapped before felling to allow for fauna to self-relocate. It is at the discretion of the fauna spotter whether tapping is

appropriate. The fauna spotter will also determine which trees will be felled using the sensitive clearing technique. This will consist of the trees being felled with an excavator or equivalent machinery using its boom to slow the trees fall. HBT are not to be pushed and allowed to fall under their own weight. After felling, HBT are inspected by a fauna spotter to determine if any animals are present. Fauna spotters will capture and safely release any uninjured fauna present. See detailed procedure in Appendix D.

5.4.5 Nest box installation – Greater Gliders

Clearing hollow bearing trees which show signs of use by Greater Glider will require provision of alternative habitat. Alternative hollows, such as nest boxes or relocated hollows, are installed in habitat suitable for Greater Glider outside of the clearing footprint.

Hollow bearing trees which have shown signs of use by Greater Glider are sensitively cleared. Felled trees with suitable hollows for relocation will have the hollows salvaged where possible and removed by chainsaw (operated by an appropriately qualified fauna spotter), where safe to do so. Constructed nest boxes are available on site in case natural hollows are not able to be salvaged and installed. The salvaged hollow or constructed nest box are installed at height (see below) by either:

- Cherry picker (or similar)
- Tree climber (suitably qualified arborist) operating in a team of two.

Nest boxes or salvaged hollows are installed according to the following specifications:

- Installation at a ratio of 4:1. Four nest boxes are installed for each hollow-bearing tree removed that shows sign of occupation by a Greater Glider (presence of nest or species) unless the suitable hollow can be salvaged. Suitable hollows have better use rate by Greater Glider than nest boxes, therefore, when the hollow can be salvaged (e.g. not damaged as a result of the clearing) and relocated, only one suitable nest box is installed for the same felled tree.
- Nest boxes are installed prior to removal of a hollow-bearing tree in active use by Greater Glider.
- Installation at a height of 6 to 10 m.
- Nest box design is in accordance with Franks and Franks (2003), i.e. hollow entrance 90 mm diameter, rear entrance (to avoid competition from Common Myna).

Fauna spotters will advise as to the most appropriate location for nest box installation. Nest boxes are installed outside the clearing footprint and as close to the impacted hollow bearing tree as possible. The location of all installed Greater Glider nest boxes are clearly recorded (including GPS), and monitoring of the nest box is undertaken in accordance with Section 6.1.

Any Greater Gliders which need to be relocated will be released into a nest box.

5.4.6 General measures

Prior to and during construction, the construction Contractors will implement erosion and sediment control procedures for their works as per the CEMP. Erosion and Sediment Control Management Plans (ESCPs) will include further details of sediment control measures. These measures will include:

- Preparing site-specific ESCPs prior to commencement of construction in an area.
- Training all personnel on effective erosion and sediment control practice.
- Designing works to minimise the extent and duration of disturbance.
- Installation of erosion and sedimentation controls as per ESCP.
- Stabilising disturbed ground and exposed soils.
- Progressive rehabilitation.

Weed management measures are implemented as outlined in Appendix B. Appendix C details rehabilitation measures.

5.4.7 Habitat features

Smaller rocks and logs are inspected by the fauna spotter during the pre-clearance survey. Larger rocks and logs are rolled using the excavator to search for fauna.

Where the fauna spotter considers grass or soil stripping has an elevated risk of encountering fauna, the fauna spotter will follow the bulldozer or grader and capture and relocate any uncovered fauna. The fauna spotter supervises and directs soil stripping until they are satisfied that no further fauna is uncovered.

Cleared vegetation is stockpiled along the edges of the disturbance footprint or may be mulched. Certain habitat features (such as tree hollows that can serve as breeding structures) is retained and relocated nearby as habitat for native fauna, if requested by the fauna spotter. Any such request is implemented by the bulldozer or grader operator, where safe and practical to do so.

Where salvaged and relocated hollow branches are intended for Greater Glider use, as advised by the FSC, they are installed according to the specifications outlined in Section 5.4.5.

5.4.8 Injured fauna

Procedures for handling injured fauna are outlined in Appendix D. This involves the use of suitably qualified fauna spotter catchers, licensed wildlife carers, and veterinarians.

5.4.9 Threatened species

The mitigation measures stated above generally cover a sensitive and best practice clearing technique for increasing fauna survival and allowing for successful relocation.

If a nocturnal threatened species, other than a Greater Glider, is recovered, it is promptly transported by the Fauna Spotter Catcher to a suitable location. The animal is released near to where it was found just after dusk. See Section 5.4.5 for the appropriate action to take for Greater Glider.

If other threatened species are recovered during the pre-clearance or clearance stages, the clearing methodology is modified to reduce potential risks.

If a threatened species is orphaned or injured by clearing activities, it is immediately transported to the nearest wildlife hospital for treatment. Any injuries or deaths of threatened fauna species must be reported immediately to the Site Environmental Coordinator and recorded as an environmental incident. For species listed as threatened under the NC Act, any death is reported to DETSI within 48 hours (best practice, timeframe not legislated) on 1300 130 372. Any death of a threatened fauna species listed under the EPBC Act is reported to Cth DCCEEW within 10 business days. Each Person Conducting a Business or Undertaking (PCBU) Contractor on site is responsible for reporting any deaths/injuries and incidents on site. All reportable incidents and deaths/injuries of fauna needs to be informed through Squadron Energy Environment Team who will report to DETSI.

5.5 Post-clearance management actions

5.5.1 Rehabilitation and revegetation

Implement rehabilitation protocol outlined in Appendix C.

Undertake progressive rehabilitation of the disturbed ground no longer required for construction or operation (e.g. hardstand and road batters, cable routes, etc). Where appropriate, topsoil is reinstated to these areas to create a soil bedding layer for seeding and natural regermination of vegetation.

Remedial revegetation works will include the following:

- Scarification of subsoil
- Application of topsoil

- Re-seeding with temporary cover crops (where future disturbance is anticipated prior to establishing long-term vegetation cover)
- Seeding with appropriate longer-term vegetation cover (where deemed necessary).

Monitoring (and maintenance) of rehabilitated areas will continue until the rehabilitation success criteria of at least 70% groundcover has been met, in consideration of the local environmental conditions (Appendix C).

Habitat features such as hollow branches may be salvaged and relocated for use as habitat, as outlined in Section 5.4.7.

5.5.2 Trenches

Trenches are backfilled within 48 hours to minimise potential fauna trapping. If trenches are left open for longer than a day, they are inspected daily (early in the morning) and any trapped fauna removed. Ramps or ladders in the trenches are placed, if practical, when leaving trenches overnight to facilitate the escape of trapped fauna.

5.6 Risk assessment

The following matrix methodology (Table 5-1) has been used to assess risks to environmental factors during the construction and operational phases of the Project. This risk assessment was undertaken by experienced ecologists who have been involved with the project during the ecological assessments, pre-approval and approvals phases. Input was also provided by environmental professionals with practical experience in implementing BMPs on wind farms in Queensland. Squadron Energy's environment manager, construction manager and project manager have all reviewed and contributed to this assessment.

Table 5-1 Risk matrix method for risk assessment

Measures	
Qualitative measure of likelihood	How likely is it that this event/circumstances will occur after management activities are implemented?
Almost Certain	Expected to occur in most circumstances
Likely	Will probably occur in most circumstances
Possible	More or less an even chance of occurring
Unlikely	Not expected to occur
Rare	Would only occur in exceptional circumstances
Qualitative measure of consequences	**What will be the consequence/result if the issue does occur?**
Insignificant	Localised event with no appreciable changes to the environment, contained within project boundaries; impacts recover quickly (days to week) with no remediation needed
Minor	Change from normal conditions within regulatory limits; effects are temporary and contained, requiring weeks to months for recovery and minor restoration efforts
Moderate	Potential harm largely contained to project boundaries; impacts may take 1 to 5 years to recover with necessary rehabilitation
Major	Uncontained harm affecting ecosystems outside project boundaries; recovery may take 5 to 10 years, requiring substantial rehabilitation
Severe	Irreversible large-scale damage with loss of valued ecosystems; recovery may be possible over 10+ years but requires significant efforts

Risk Matrix						
	Consequence					
Likelihood		**Insignificant**	**Minor**	**Moderate**	**Major**	**Severe**
	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	High
	Unlikely	Low	Medium	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

5.6.1 Results of risk assessment

The risk assessment (Table 5-2) considers the risk that the BMP's environmental objectives will not be met. These objectives are presented in the table below and have been developed with reference to established management objectives for MNES and MSES within recovery plans, conservation advice and other guidelines.

If monitoring (refer Section 6.1) or opportunistic observations indicate that a risk has been realised, a contingency response will identify appropriate and tailored corrective actions to rectify the specific event or circumstance.

Outcomes are communicated to relevant personnel (i.e. through ongoing training opportunities; Section 7.2). Risks and the suggested contingency response are provided in Table 5-2.

Table 5-2 Risk assessment

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
Flora species							
EPBC Act threatened species - flora							
No net loss of Commonwealth Endangered Cycad individuals	Direct disturbance and death of individual cycads during vegetation clearing.	**Pre-clearing:** • Pre-clearance surveys to identify and mark individual Cycads. • Micrositing infrastructure and roads to avoid or minimise removal of large stands of Cycads. • Implement CTMP. **During clearing:** • Where there is unavoidable clearing, individual Cycads within the construction footprint will translocated in accordance with the Cycad Translocation Plan.	Likely	Major	High	Pre-clearance surveys	Undertake seed collection, propagation and planting of cycads if translocation efforts have not reached desired success rates (in accordance with CTMP). Four propagated plants for any one mortality (for Commonwealth Endangered cycads).
	Death of mature cycads during and/or following translocation	Translocation of individual, mature cycads in accordance with CTMP (Appendix G).	Unlikely	Major	Medium	Health of translocated plants to be equal to or greater than baseline. Regular monitoring of temporary storage (if applicable) and recipient sites.	

[2] Management actions detailed in Section 5.1

[3] Monitoring detailed in Section 6

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
NC Act threatened species - flora							
No net loss of State Vulnerable *C. terryana*	Direct disturbance and death of individual cycads during vegetation clearing.	**Pre-clearing:** • Pre-clearance surveys to identify and mark individual Cycads. • Micrositing infrastructure and roads to avoid or minimise removal of large stands of Cycads. • Implement CIMP. During clearing: • Where there is unavoidable clearing, individual Cycads within the construction footprint will translocated in accordance with the CIMP.	Likely	Major	High	Pre-clearance surveys	Undertake seed collection, propagation and planting of cycads if translocation efforts have not reached desired success rates (in accordance with CIMP. 1:1 for State Vulnerable *C. terryana*.
	Death of mature cycads during and/or following translocation	Translocation of individual mature *C. terryana* in accordance with CIMP.	Likely	Major	High	Health of translocated plants to be equal to or greater than baseline. Regular monitoring of temporary storage (if applicable) and recipient sites.	
Vegetation Communities							
EPBC Act threatened communities							
Improve the condition and management of retained SEVT vegetation in the Project Area.	Areas of EPBC-listed SEVT in excess of approved clearing limits are damaged or removed.	**Pre-clearing:** • Micrositing infrastructure to avoid or minimise ground truthed SEVT **During clearing:** • Marking clearing boundaries prior to clearing	Rare	Major	Medium	Approved vegetation clearing limits are exceeded. Monitored by pre- and post-clearing data (clearing limit verification)	Investigate the incident in accordance with Section 7.1. Amendments proposed for relevant approvals and (where required) offsets to be provided.

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
		• Implement erosion and sediment controls in accordance with the ESCP (required to be submitted to DSDIP) **Post-clearing:** • Implement stormwater management measures in accordance with the CEMP • Implement Weed and Pest Management Plan (Appendix B)					
Of Concern and Least Concern vegetation communities (NC Act)							
Retain viable native vegetation communities in the Project Area	Areas of remnant vegetation in excess of approved clearing limits are damaged or removed.	**Pre-clearing:** • Micrositing infrastructure to further avoid or minimise remnant SEVT vegetation • Delineating clearing boundaries prior to clearing	Unlikely	Minor	Medium	Approved vegetation clearing limits are exceeded. Monitored by pre- and post- clearing data (clearing limit verification)	Investigate the incident in accordance with Section 7.1. Amendments proposed for relevant approvals and (where required) offsets to be provided.
Riparian vegetation is retained and restored	Removal of or damage to native vegetation associated with a waterway, impacting on waterway health.	**Pre-clearing:** • Micrositing infrastructure to minimise clearing within waterways and within a defined distance of a waterway • Waterway crossings designed in a manner that will not impede or alter stream flows. **Post-clearing:** • Undertake rehabilitation in accordance with the Rehabilitation Protocol (Appendix C).	Unlikely	Minor	Medium	Approved vegetation clearing limits are exceeded. Monitored by pre- and post- clearing data (clearing limit verification)	Investigate the incident in accordance with Section 7.1. Amendments proposed for relevant approvals and (where required) offsets to be provided.

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
Fauna							
EPBC Act threatened species - fauna							
To protect **EPBC Act threatened fauna species** (including Koala, Greater Glider, White-throated Needletail, Squatter Pigeon, Ornamental Snake and Red Goshawk) and **EPBC Act threatened bird and bat species** (including White-throated Needletail, Rainbow Bee-eater, Rufous Fantail, Fork-tailed Swift, Satin Flycatcher, Red Goshawk and Corben's Long-eared Bat)	Removal of habitat	**Pre-clearing:** • Pre-clearance surveys to identify threatened species, including active nests, hollows, and Koala presence. • Micrositing infrastructure (i.e. underground cable alignment) to minimise direct impacts to active nests, hollows and other habitat features in use by a threatened species. • Provide short-medium term alternative habitat (nest boxes) for Greater Glider, where active hollow bearing trees are to be removed.	Poss	Major	High	Threatened species found within clearing impact area. Pre-clearance surveys	Order stop work if threatened fauna found in clearing impact area. Review risk, with fauna spotter to advise on appropriate action. Nest box installed (1:4 for removal of hollow bearing tree with sign of use by Greater Glider).
	Injury or death during vegetation clearing	• During clearing: • Use sensitive clearing techniques in accordance with Appendix D. This will include tapping hollow-bearing trees to encourage self-relocation, and slowly lowering the trees down to the ground prior to inspection by fauna spotter. • Order stop works if threatened fauna is found within clearing area.	Rare	Major	Medium	Animal observed during clearing. Pre-clearance surveys/ fauna spotter observation during clearing.	Injured fauna transported to a wildlife carer. If a threatened species, report as per Section 5.4.9. Review risk, fauna spotter to assess whether clearing approach could be improved.
	Injury or death from vehicle/mobile plant strike	• Educate on-site staff • Strict enforcement of speed limits.	Rare	Minor	Low	Injuries or death of threatened species are an environmental incident and must be reported to the Site Environmental Coordinator within 48 hours (see Appendix D).	Review risk, may be appropriate to amend speed limit, install signage and conduct additional staff training.

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
	Injury or death from strike with wind turbine	Implement actions within the Bird and Bat Management Plan, (prepared under EPBC 2018/8141 CoA 9-13), including (but not limited to): • Stock forage control • Carrion removal • Using low lux lighting • Baffled lighting on buildings, directed to avoid light spill skyward or beyond target lit area.	Poss	Major	High	Dead/injured animal observed. Incidental/ carcass searches	Review risk in accordance with the Bird and Bat Management Plan. May necessitate additional controls or staff training
General biodiversity (applies to EPBC and NC Act threatened species and communities as well as to NC Act protected species and Least Concern communities)							
Successful rehabilitation of disturbed ground	Disturbed ground not rehabilitated, or rehabilitation fails, resulting in increased erosion (degrading adjacent areas, including potentially SEVT)	**Pre-, during and post clearing:** • Erosion and sediment control • Progressively rehabilitate disturbed ground	Poss	Major	High	70% groundcover rehabilitation target not met. Monitored through photo points and quadrat sampling.	Corrective action to be appropriate to local environmental conditions
Bushfire risk will not increase as a result of the Project.	Bushfire caused by Project activities	Contact fire authorities on 000 if an uncontrolled fire is seen on site. Implement the Bushfire Management Plan, which has been endorsed by the Queensland Fire and Emergency Service in accordance with DSDIP condition 10, including (but not limited to): • Hot work permit system • Specific mitigation measures relating to vehicle use, smoking, and use of flammable materials.	Rare	Severe	Medium	Bushfire or near miss	Investigate the incident in accordance with Section 7.1 and review risk. May necessitate additional controls or staff training. Corrective action may require: · Inspect and repair/clear fire breaks and widen if necessary · Reassess fuel load reduction practices (i.e. increase controlled stock access if appropriate, or increase control of invasive grasses with high biomass.
	Project unprepared for bushfire	Contact fire authorities on 000 if an uncontrolled fire is seen on site. Implement the Bushfire Management Plan, which has been endorsed by the Queensland Fire and Emergency Service	Unlikely	Severe	High		

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
		in accordance with DSDIP condition 10, including (but not limited to): • Established separation distances (buffer) between infrastructure and threat (vegetation). • Maintaining asset protection zones. • Mowing and slashing. • Fire-fighting equipment and water on hand. • Emergency service access clear.					
Pest animal activity will not increase as a result of the Project.	Pest animals attracted to the Project Area, i.e. by increased food resources	Conduct pest animal management measures in accordance with the Weed and Pest Management Plan (Appendix B).	Unlikely	Mod	Medium	Opportunistic sightings of feral species (direct sighting or evidence of presence)	Pest animal control and/or increase frequency of trapping events, additional staff training, review of attractants (i.e. unsecured bins with food waste).
No new restricted weed species introduced as a result of the Project. No new outbreaks of restricted weeds within the Project Area.	Weeds are spread by Project plant or equipment.	Conduct weed control measures in accordance with the Weed and Pest Management Plan (Appendix B). Weed and seed protocol to be implemented to wash down vehicles, plant and any machinery coming to site.	Poss	Mod	Medium	Weed survey data (pre-clearance surveys) and construction environmental compliance monitoring. New weed species observed, or weeds in a new location.	Weed control, reviewed weed hygiene practices. Adapt weed treatments with the advice of the weed management contractor. Upon being notified or becoming aware of new weed infestation relevant Contractor is to implement weed control measures within one month.
	Weed seeds introduced through mulch, topsoil or other material brought to site.	Imported materials such as sand, gravel and sediment controls materials will be sourced from sites which have been declared free of noxious weeds or Phytophthora infection by a suitably qualified person (included in glossary).	Unlikely	Mod	Medium		
Protected fauna will not be killed or injured as a result of the Project	Injury or death during vegetation clearing	**Pre-clearing:** • Micro-siting of infrastructure to avoid or minimise clearing native fauna habitat • Pre-clearance surveys to identify animal breeding places. **During clearing:** • Use sensitive clearing techniques in accordance with Appendix D Order	Poss	Major	High	Dead animal observed during clearing. Pre-clearance surveys/ fauna spotter observation during clearing.	Injured fauna transported to a wildlife carer. Review risk, fauna spotter to assess whether clearing approach could be improved.

Environmental objective	Risk event or circumstance	Management actions[2]	Residual risk			Trigger detection/ monitoring activity[3]	Contingency response and corrective action
			L	C	R		
		stop works if threatened fauna is found within clearing area					
	Injury or death from vehicle/mobile plant strike	• Educate on-site staff. • Strict enforcement of speed limits.	Unlikely	Mod	Medium	Injuries or death of threatened species are an environmental incident and must be reported to the Site Environmental Coordinator within 48 hours (see Appendix D).	Investigate the incident in accordance with Section 7.1. Review risk, may be appropriate to amend speed limit, install signage and conduct additional staff training.

6 Monitoring and Reporting

6.1 Monitoring

Environmental monitoring is undertaken to observe and report on the performance of proposed mitigation and management measures and performance indicators, with a focus on demonstrating:

- ‘early-control’ (that management actions are effective) and ‘early warning’ (corrective actions are required) functions, with respect to the performance targets
- early intervention and remediation of potential or realised non-conformances. Non-conformances include failure to achieve the plan objectives as measured by the plan’s performance targets and management triggers. The monitoring program will inform adaptive implementation and demonstrate whether the management objectives for protected matters have been, or are likely, to be met.

Suitably qualified personnel will design and conduct monitoring and survey activities and analyse monitoring results.

Table 6-1 Monitoring schedule

Environmental objective	Performance indicator	Monitoring activity	Location	Timing/frequency	Responsibility
EPBC Act threatened species - flora					
No net loss of Commonwealth Endangered Cycad individuals.	Threatened cycads within the disturbance footprint are successfully translocated or propagated (refer to CTMP).	Monitoring as per CTMP. Monitoring will include but not limited to collecting information on the cycads' health, reproductive status, growth status and presence of pests.	Temporary storage area and recipient site.	Cycad condition assessment to be performed monthly at the temporary storage site, followed by monthly (year 1), quarterly (year 2-5) (60 months), as described in the CTMP (for (Commonwealth Endangered cycads).	Fauna Spotter Catchers, specialist Cycad ecologists, CBOP Contractor, EBOP Contractor, Squadron Energy Environmental Advisor
NC Act threatened species - flora					
No net loss of State Endangered *C. terryana.*	Individual cycads impacted by the works are successfully translocated, or otherwise replaced through propagation and planting of seedling.	Monitoring as per CIMP. Monitoring will include but not limited to collecting information on the cycads' health, reproductive status, growth status and presence of pests.	Temporary storage area and recipient site.	Timing as per the CIMP.	Fauna Spotter Catchers, specialist Cycad ecologists, CBOP Contractor, EBOP Contractor, Squadron Energy Environmental Advisor
EPBC Act threatened communities					
Improve the condition and management of retained SEVT vegetation in the Project Area.	Loss of SEVT will be minimised, with no more than the approved vegetation clearing amount: • 45.22 ha of SEVT TEC (RE 11.4.1, RE 11.8.3) Condition of the SEVT will be improved by implementing fire and pest animal management, as well as by providing a SEVT offset in accordance with the offset strategy and management plan for the Project.	Project impact areas are inspected by environmental officer using drone survey to ensure consistency with design and clearing limits (i.e. clearing limits specified in CoA, and DSDIP approved clearing area [TARP]).	SEVT vegetation within Project area.	During weekly site inspections during clearing activities (Section 6.2). Periodically formalised via site drone/aerial survey and analysis (6 monthly during clearing activities).	Squadron Environmental Advisor Squadron Energy Engineering Team
Of Concern and Least Concern vegetation communities					

Environmental objective	Performance indicator	Monitoring activity	Location	Timing/frequency	Responsibility
Retain viable native vegetation communities in the Project Area. Riparian vegetation is retained and restored.	No more than the approved vegetation clearing: • 20.36 ha of remnant vegetation within a defined distance of a watercourse • 9.46 ha of Of Concern regional ecosystem 11.11.10 •	Project impact areas are inspected by drone survey ensure consistency with design and clearing limits (i.e. clearing limits specified in CoA, and DSDIP approved clearing area [TARP]).	Remnant vegetation within Project area.	During weekly site inspections during clearing activities (Section 6.2). Periodically formalised via site drone/aerial survey and analysis (6 monthly).	Squadron Environmental Advisor Squadron Engineering Team Squadron Environmental Advisor Squadron Engineering Team
EPBC Act threatened species - fauna					
To protect **EPBC Act threatened fauna species** (including Koala, Greater Glider, White-throated Needletail, Squatter Pigeon, Ornamental Snake and Red Goshawk) and **EPBC Act threatened bird and bat species** (including White-throated Needletail, Rainbow Bee-eater, Rufous Fantail, Fork-tailed Swift, Satin Flycatcher, Red Goshawk and Corben's Long-eared Bat).	No mortality or injury to EPBC Act threatened species as a direct result of the Project. Alternative habitat (nest boxes or relocated hollows) provided for Greater Glider for hollow bearing trees removed that shows sign of occupation by a Greater Glider (presence of nest or species).	**During clearing**: Fauna spotter methodology in Appendix D is adhered to by fauna spotters and clearing contractors. **During operation:** Incidental/carcass searches (see Bird and Bat Management Plan). **At all times:** Opportunistic observations.	Project area.	**During clearing:** By fauna spotter during clearing. **During operation:** In accordance with the Bird and Bat Management Plan. **At all times**: Injuries or death of threatened species are an environmental incident and must be reported to the Site Environmental Coordinator within 48 hours (see Appendix D).	Squadron Environmental Advisor Fauna Spotter Catchers
	Alternative habitat provided for Greater Glider and in use by this species.	Visual inspection of nest box (signs of decay, damage, pest animal/insect incursion). Signs of use/occupancy. Species occupying the box (if any).	Greater Glider habitat areas where nest boxes installed.	Twice yearly, for 24 months from nest box installation (or less, if nest box confirmed to be successfully in use).	Squadron Environmental Advisor Fauna Spotter Catcher
General biodiversity (applies to EPBC and NC Act threatened species and communities as well as to NC Act protected species and Least Concern communities)					

Environmental objective	Performance indicator	Monitoring activity	Location	Timing/frequency	Responsibility
Successful rehabilitation of disturbed ground.	Disturbed ground reaches at least 70% groundcover or equivalent to surrounding areas not disturbed by project.	Monitor implementation and success of progressive rehabilitation across project (including temporary groundcover in relevant construction areas). Before and after records are required for representative areas requiring treatment, Monitored through photo points and quadrat sampling. % cover of vegetation (native/non-native) and weed species is recorded.	Areas where the ground cover and substrate are disturbed by Project activities.	As part of weekly inspections regime during construction. During environmental audits, with the first within 3 months of construction commencing and then every 6 months thereafter during construction, and annually during operations until success criteria has been met (see Section 7.5.1).	Squadron Environmental Advisor / Operations Manager / Construction Manager
Bushfire risk will not increase as a result of the Project.	Activities associated with the Project do not cause a bushfire.	Visual inspection, including fire breaks.	Within the property boundaries.	At any time.	Squadron Energy Environmental Advisor Operations Manager Construction Manager
Pest animal activity will not increase as a result of the Project.	Pest animal presence is at the same (or reduced) level as during pre-approval ecological surveys.	Opportunistic sightings of feral species (direct sighting or evidence of presence).	Within the Project Area.	Opportunistic, sightings recorded.	Squadron Energy Environmental Advisor Fauna Spotter Catcher Construction Contractors
No new restricted weed species introduced as a result of the Project. No new outbreaks of restricted weeds within the Project Area.	Weed species diversity and location of infestations is at the same (or reduced level) as during pre-construction surveys.	Pre-clearance surveys (see Section 5.3). Weed species are noted and infestations marked by GPS, including an approximate extent and density.	Within the Project Area.	Pre-clearance. During environmental audits, with the first within 3 months of construction commencing and then every 6 months thereafter during construction, and annually during operations (see Section 7.5.1).	Squadron Energy Environmental Advisor Fauna Spotter Catcher Construction Contractors

Environmental objective	Performance indicator	Monitoring activity	Location	Timing/frequency	Responsibility
Protected fauna will not be killed or injured as a result of the Project.	No mortality or injury to protected native fauna as a direct result of the Project.	**During clearing**: Fauna spotter methodology in Appendix D is adhered to by fauna spotters and clearing contractors. **During operation:** Incidental/carcass searches (see Bird and Bat Management Plan). **At all times:** Opportunistic observations.	Project area.	**During clearing:** By fauna spotter during clearing. **During operation:** In accordance with the Bird and Bat Management Plan. **At all times**: Injuries or death of threatened species (i.e. under NC Act) are an environmental incident and must be reported to the Site Environmental Coordinator within 48 hours (see Appendix D).	Squadron Energy Environmental Advisor Fauna Spotter Catcher
Biodiversity performance monitored and reported on.	Annual compliance report prepared for each 12-month period from construction commencement, published on the Project website within 60 business days of the relevant 12-month period.	As described above.	Project area.	Annually (as per EPBC 2018/8141 CoA 25).	Squadron Energy Environmental Advisor Construction Manager Operations Manager

6.2 Environmental inspections

The relevant Contractor Site Environmental Coordinator and/or Site Engineers will regularly inspect work sites and critical activities throughout construction and commissioning of the Project. Site Environmental Coordinator/ Site Engineer inspections will occur on a weekly basis during construction and commissioning. Non-conformances are identified and corrective actions specified and prioritised for action at the completion of the inspection.

Each inspection, with observations, non-conformance, corrective actions and timeframes is documented and logged. Further detail on environmental inspections is provided in the CEMP.

6.3 Data handling

CCEPL or their nominated representative will oversee data collection, handling and storage.

Suitably qualified personnel are used to capture, analyse and report on data collected during the Project.

Data is stored electronically in consolidated databases (such as Excel) which is maintained by external consultant(s) with responsibility for implementing components of this BMP. External consultants will provide data annually (or as required by the Proponent) to CCEPL, who will include this data within the overarching Project Database, stored on the CCEPL server.

In accordance with Condition 24 of the EPBC Approval, the Approval holder will ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under a plan or conditions of this approval, is prepared in accordance with the Department's Guidelines for biological survey and mapped data(2018) and submitted electronically to the Department in accordance with the requirements of the plan.

6.4 Reporting

Environmental reporting requirements are summarised in Table 6-2 . The table sets out the environmental reporting requirements applicable to the Project, timing of the reporting, who is responsible for managing preparation of the reports and the intended recipient(s).

Additional reporting may be necessary as the works progress. In such a circumstance, Table 6-2 has been amended to reflect these changes.

Table 6-2 Summary of reporting requirements

No.	Report	Requirement	Timing	Responsibility	Recipient
1	EPBC Annual Compliance Report.	Reporting as per Condition 25 of the EPBC Approval (see section 6.4.1).	Annual (within 20 business days following the relevant 12-month period).	CCEPL	Project Website with notification to Cth DCCEEW by email.
2	Species management program reporting.	Data on breeding places from pre-clearance surveys.	Quarterly during construction.	Fauna spotter catcher contractor. Data also provided to Principal for overall project records.	Department of Environment, Tourism, Science and Innovation.
3	The Register – tampering with animal breeding places.	Data on any tampering or destruction of animal breeding places.	Within 6 months of the interactions with the high risk of impacts SMP species and the	CCEPL	Department of Environment, Tourism, Science and Innovation.

No.	Report	Requirement	Timing	Responsibility	Recipient
			complete register within 10 business days after the expiry of this SMP.		
4	Return of operations	Under a Scientific Purposes Permit	Annually	The permit holder; Fauna spotter catcher contractor. Data also provided to Principal for overall project records.	Department of Environment, Tourism, Science and Innovation.
5	Annual Returns	Under an Animal Ethics Committee certificate of approval	Annually	The permit holder; Fauna spotter catcher contractor. Data also provided to Principal for overall project records.	Queensland Department of Agriculture and Fisheries.
6	Independent Audit reporting	Independent Audit Report as per Condition 28 of the EPBC Approval (see section 7.5.2).	Within 3 months following the end of each Audit Period (see Section 7.5.2).	CCEPL	Cth DCCEEW Project Website (once the DCCEEW has agreed to the audit report).
7	Cycad rehabilitation/translocation report	Under Protected Plant Clearing Permit (WA0060507)	Within 10 business days after each annual period (ending Nov)	CCEPL (managed by GTS on behalf of CCEPL)	DETSI (wildlife.management@des.qld.gov.au)

6.4.1 EPBC Annual Compliance Reporting

Annual Compliance Reports are published on the project website within 20 business days following the end of the relevant 12-month period, in accordance with the relevant EPBC condition (CoA 25). To demonstrate compliance with the BMP, the annual compliance report will set out the following for the reporting period:

- impact avoidance, mitigation and/or rehabilitation measures implemented
- the timing of implementation of the above measures, and an assessment of the effectiveness of those measures; management triggers detected and risks realised, contingency response/s and corrective actions implemented
- an evidence-based assessment of whether and to what extent the BMP is achieving the plan's objectives.

6.4.2 Scientific permit reporting requirements

To address the requirements of a High Risk SMP, a copy of the electronic register for tampering with animal breeding places will be submitted to the DETSI within 6 months of the interactions with the high risk of impacts SMP species. The complete electronic register will also be supplied to DETSI upon expiry of the approved SMP. Squadron Energy will oversee compliance and maintain a register of tampering with animal breeding places, as the approved entity under the SMP.

The DETSI are informed of unexpected finds/species not explicitly addressed in the SMP application/this BMP to discuss the most appropriate course of action.

Further Permits may also be required depending on the type of activities being undertaken. These permits will be obtained and complied with by the fauna spotter/catcher or ecologist engaged by CCEPL. All reports required to be submitted to DETSI or Queensland Department of Agriculture and Fisheries (DAF) in accordance with the permit conditions will also be provided to Squadron Energy (CCEPL) within the respective timeframes.

- Scientific Purposes Permit (*Nature Conservation Act 1992*, Qld):

Required for scientific research, surveys, or monitoring activities involving the handling, capturing, or interference with protected wildlife. The permit holder (e.g. contracted fauna spotter services) must submit a Return of Operations and a research report to DETSI annually (within 10 business days of each 12-month period from the permit start date) and again within 10 business days of permit expiry. These returns must include details of species involved, survey locations, and any resulting publications or reports.

- Rehabilitation Permit (*Nature Conservation Act 1992*, Qld):

Required when fauna spotter/catcher services are needed to rehabilitate wildlife whose habitat has been destroyed by natural disaster or human activity, or when animals are captured and relocated for rehabilitation. The permit holder must submit a 'return of operations' report to DETSI quarterly and within 10 business days upon expiry of the permit. Wildlife data records must include, at minimum: collector's name, date, location, species identification, location and description of release, and any injury or fatality.

- Damage Mitigation Permit (*Nature Conservation Act 1992*, Qld):

Required when there is a need to capture, relocate, or otherwise manage protected wildlife to mitigate damage, including situations where animals are at risk due to construction, clearing, or other project activities. The permit holder must submit a 'return of operations' report to DETSI quarterly and within 10 business days upon expiry of the permit, including when no animals have been taken under the permit. Wildlife data records must include: collector's name, date, location, species identification, and capture and release locations.

- Animal Ethics Committee Certificate (*Animal Care and Protection Act 2001*, Qld; Australian Code for the Care and Use of Animals for Scientific Purposes):

Required for any project activity involving the use of animals for scientific purposes, including research, monitoring, or handling, and requiring ethical approval for animal welfare. The permit holder must be registered with Biosecurity Queensland and must submit an annual Animal Use Statistics (AUS) report to DAF by 31 May each year, detailing the number and type of animals used in the previous calendar year. For permit details, see Section 7.3.

6.4.3 Reporting of Incidents or Non-compliances

Incidents[4] or non-compliances with the Biodiversity Management Plan will be reported to DCCEEW in accordance with Conditions 26 and 27 of the EPBC Approval, as set out below.

- **Condition 26:** The approval holder must notify the department electronically, within 2 business days of becoming aware of any incident, or potential or actual non-compliance with these conditions or commitments made a **plan**. The approval holder will specify in each notification:
  a. any condition or commitment made in a **plan** which has not been or may have been not complied with;
  b. a short description of the **incident** or non-compliance; and
  c. the location (if applicable, including co-ordinates), date and time of the **incident** or noncompliance.

[4] Incident: means any event which has the potential to, or does, impact on protected matter(s).

- **Condition 27:** The approval holder will provide to the department in writing, within 12 business days of becoming aware of an incident, or potential or actual non-compliance with these conditions or commitments made a plan, the following details of that incident or non-compliance:
    a. all corrective measures and investigations which the approval holder has already taken in respect of the incident or non-compliance;
    b. the potential impacts of the incident or non-compliance;
    c. the method and timing of any corrective measures that the approval holder proposes to undertake to address the incident or non-compliance; and
    d. any variation of these conditions or revision of a plan that will be required to prevent recurrence of the incident or non-compliance, and/or to address its consequences.

7 Compliance

7.1 Compliance management

Compliance management, including non-conformity, corrective, and preventative actions, is addressed in the CEMP and OEMP and summarised in relation to this BMP below.

Non-conformances may be identified through routine weekly site inspections, impromptu site inspections and general observations, via the BMP review or audit process, or be incident or complaint based. Any member of the Project team may raise a non-conformance or improvement opportunity.

The BMP and associated management-plans are used as the reference to monitor and verify that environmental management objectives for threatened species are effectively implemented.

Environmental non-conformances might include:

- Failing to comply with the environmental regulations or license/permit conditions.
- Failure to implement commitments in the approved BMP or other environmental requirement.
- Carrying out work practices that have the potential to cause harm to threatened species.
- Activities that have caused actual harm to the environment not permitted by the project approvals or covered in the environmental assessment or management documentation.
- Deficiencies or concerns raised by client representatives and/or state and local authorities or agencies.

Upon detection, any of the above will trigger immediate steps to control the non-conformance and immediate reporting, investigation of the non-conformance and development of additional controls to prevent re-occurrence. A response is developed in consultation with relevant stakeholders (e.g. Cth DCCEEW if triggered) and is assigned to the appropriate personnel for close out. Records are kept of all corrective actions and follow-up processes to ensure close-out.

Environmental incidents are recorded and reported in a number of ways:

- As identified during inspections, audits or routine observations.
- Recorded on the Environmental Incidents Register (and if required by Law, reported to the regulator).
- Communicated to workers during toolbox talks to share lessons learnt.

7.2 Training

Details on training requirements are provided in the CEMP and OEMP. The requirements of the CEMP and OEMP (and sub-plans, including this BMP) is communicated through:

- Environmental induction
- Toolbox talks, training and awareness
- Environmental awareness training
- Daily Pre-Start meetings

In addition:

- Annotated site plans are displayed in lunchroom / site offices.
- Specific management required near constraints areas are discussed in toolbox talks and environmental work method statement (EWMS) inductions.

7.3 Relevant Permits and Licenses

The following permits and licenses are in place before undertaking vegetation clearing:

- Animal Welfare and Ethics, administered by the Queensland Department of Agriculture and Fisheries (DAF) under the *Animal Care and Protection Act 2001.*
- Registration as a Scientific User, administered by DAF under the *Animal Care and Protection Act 2001.*
- Scientific Purposes Permit, administered by DETSI under the NC Act.
- Rehabilitation permit, administered by DETSI under the NC Act and relevant to fauna spotter catcher activities.
- *Protected Plant Harvesting License*, administered by DETSI under the NC Act.
- Protected Plant Clearing (or Clearing Exemption) Permit, administered by DETSI under the NC Act.
- High Risk Species Management Plan (supported by this BMP).

7.4 Roles and Responsibilities

Roles and responsibilities for the implementation of this plan are described in Table 7-1.

Table 7-1 Project roles and responsibilities

Positions	Responsibilities	Activities
CCEPL (Owner / Principal)		
Principal's (CCEPL) Site Representative	Overall responsibility for project compliance	• Supervision of the Principal's responsibilities onsite • Coordination of construction Contractors and their activities to maintain overall project compliance • Reviewing planned works and controls, notifying contractors of unsatisfactory controls and required corrective action • Oversee management of cycads and heritage • Monitoring consistency of overall construction impacts against design • Provide leadership in relation to responsible environmental management and behaviours • Report to senior management.
Principal's (CCEPL) Site Environmental Advisor	Monitoring environmental compliance during construction	• Undertake site inspections and review records of audits to ensure contractor works are proceeding in compliance with project environmental obligations (e.g. approvals, permits, licences, management plans and relevant environmental legislation) • Reviewing and approving EWMS and ESCP plans prior to any clearing / earthworks • Supporting project environmental audits through provision of required information and availability for audit interviews • Following up on Contractor responses to environmental incident investigations, corrective actions and requests • Participate in environmental incident investigations and monitor corrective actions • Assist with responding to any complaints received regarding environmental issues
Project Contractors		

Positions	Responsibilities	Activities
Contractor Construction Manager	Overseeing Contractors scope of work	• Manage Contractor's scope of work in accordance with the project environmental documentation (e.g. BMP, CEMP, VFMP, Bushfire Management Plan) and contract requirements throughout the construction phase • Ensure processes are in place to include the necessary provisions of the project environmental requirements into works (as relevant to Contractor' scope) • Ensure workers are trained in the requirements of the environmental documentation • Monitoring consistency of Contractors' construction impacts against design • Ensure that the appropriate arrangements and agreements are in place for the management of Flora and Fauna • Ensure all the vegetation protection measures are implemented and maintained during the construction phase • Report incidents to the Principal's Site Representative and Site Environmental Advisor • Undertake incident investigation and corrective actions.
Contractor Site Environmental Coordinator	Overseeing Contractors' environmental activities during construction works	• Preparation of Contractor's EWMS and oversee their implementation • Coordinate the implementation of the relevant environmental management measures required for the respective scope of work • Coordinate the fauna spotter to implement the required fauna related actions • Respond to incidents advising Contractor Construction Manager and Principal's Representative of actions undertaken • Fulfil environmental management and reporting obligations • Inspect site works, provide inspection/compliance reports and follow up on the implementation of corrective actions.
Ecologist / suitably qualified Fauna Spotter Catcher	Pre-clearance surveys, and monitoring clearing activities	• Undertake the required pre-clearance survey within one month of clearing • Undertake a visual inspection of habitat features within 24 hours of clearing to identify resident fauna species that will require relocation • Monitor all clearing activities and relocate wildlife where required • Be on-call for duration of clearing activities for the project • Support the Civil Contractor in their endeavours to undertake the work in accordance with the relevant legislative requirement around the protection of native wildlife on site • Determine which trees will be felled using the sensitive clearing technique • Must be suitably qualified (defined in Appendix D) • Must hold a current DETSI license/permit with appropriate experience in surveying, monitoring, and rescuing fauna.

7.5 Audit and Review

7.5.1 Environmental auditing

Environmental auditing will occur as per the schedule identified in the CEMP and OEMP, depending on the phase the Project is in.

The project is subject to ongoing auditing throughout the project. The audits are undertaken at regular intervals throughout construction (within 2 months of construction commencing and every 6 months thereafter) and operations (annually). Details are outlined in the CEMP and OEMP.

Specific to the BMP, audits will focus on:

- Compliance with environmental and planning conditions, including the application of the BMP. This will include (but is not limited to) those performance indicators listed in Section 6.1.
- Document control and review.
- Incident reporting and closure.

7.5.2 Independent Audit of compliance with EPBC Approval conditions

In accordance with Conditions 28 of the EPBC Approval, an Independent Audit of compliance with the conditions must be conducted for every **audit period**[5] (unless otherwise specified in writing by the Minister).

The action commenced on the 7 March 2022, therefore the first audit period covers the period 7 March 2022 – 6 March 2027.

Independent Audits will be conducted in accordance with Conditions 29 – 30, and 30A – 30F of the EPBC Approval as follows:

- **Condition 29:** The approval holder must submit details of the proposed independent auditor and their qualifications to the department within 10 business days following the end of each audit period.
- **Condition 30:** The approval holder must ensure the scope of each independent audit is sufficient to determine the compliance status for each condition of approval, and each commitment made in each plan.
- **Condition 30A:** The approval holder must ensure the criteria for each independent audit and the undertaking of each independent audit are consistent with the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines*, Commonwealth of Australia 2019.
- **Condition 30B:** The approval holder must submit an audit report to the department for written agreement from the department within 3 months following the end of each audit period, or as otherwise directed by the Minister in writing.
- **Condition 30C:** The approval holder must ensure each audit report is completed to the satisfaction of the Minister and is consistent with the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines*, Commonwealth of Australia 2019.
- **Condition 30D:** The approval holder must publish each audit report on the website, in a format that is easily accessible and downloadable, within 10 business days of the date of the department agrees to the audit report in writing.
- **Condition 30E:** The approval holder must notify the department within 5 business days of the date the audit report is published on the website. In this notification the approval holder must provide the department with the web address for where the audit report is published on the website.
- **Condition 30F:** The approval holder must keep each audit report published on the website from the first date which that audit report must be published and until the expiry date of this approval.

7.5.3 Adaptive management and continuous improvement

This plan uses an adaptive management approach, whereby management measures set out in this BMP may be amended in accordance with EPBC 2018/8141 approval conditions 31 – 33 "*Revision of action management plans*" (see section 7.5.4) to ensure effective management and mitigation are implemented. A

[5] Audit period: means each 5-year period following the commencement of the action until the expiry date of this approval unless otherwise specified in writing by the Minister.

suitably qualified person will draft any amended management measures or monitoring, including training of personnel, data analysis, interpretation, and reporting.

To ensure the effectiveness of this BMP, all activities are subject to regular review and reporting. BMP reviews are undertaken as a minimum every three years as part of a continual improvement process. Triggers for a BMP review will include (but not be limited to):

- A reportable incident (any incident where material harm to the environment is caused or threatened, material harm being harm that is not trivial or negligible in nature, extent or context [s 16 *Environmental Protection Act 1994*]), including but not limited to:
  - Mortality of a listed matter
  - Injury of a listed matter requiring the matter to undergo care or transport to a wildlife facility
  - Identification of a threatened matter on site not listed under this plan
- Confirmed presence of a threatened species not covered by this plan
- Changes to the Project (methodology, activity, footprint).

The outcome of the reviews may result in amendments to the BMP and related documentation, risk assessment review, re-evaluation of the Project objectives and targets, as well as updates to other Project documents.

Continuous improvement of the BMP is achieved by the ongoing evaluation of environmental management performance against the Plan's objectives and performance targets, and subsequent review and regulatory approval of revised versions of the BMP.

The continuous improvement process will therefore:

- Ensure new data/information is collected and incorporated into the BMP, as a result of lessons learnt through BMP implementation, and new information from external sources
- Effectively coordinate, schedule and/or trigger monitoring, risk management, auditing and reporting activities
- Periodically review risks, including in response to changing circumstances or in light of the results from implementing contingency response/corrective actions
- Review the effectiveness of management measures upon which the BMP is highly dependent
- Address the consequences of significant environmental incidents
- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Assess attainment of BMP's environmental objectives against the performance indicators.

7.5.4 Requirements for revising the BMP

A revision to this BMP may be undertaken in accordance with either Condition 31 or Condition 32 of the EPBC Approval, as follows:

- **Condition 31:** The approval holder may, at any time, apply to the Minister for a variation to a plan by the Minister as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the EPBC Act.

- **Condition 32:** The approval holder may choose to revise the Biodiversity Management Plan, without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised Biodiversity Management Plan would not be likely to have a new or increased impact.

If the BMP is revised under Condition 32 of the EPBC Approval, then Conditions 33 – 36 are also relevant:

- **Condition 33:** If the approval holder makes the choice under condition 32 to revise the Biodiversity Management Plan without submitting it for approval, the approval holder must:
    a. notify the Department in writing that the Biodiversity Management Plan has been revised and provide the Department with:
        i. an electronic copy of the revised Biodiversity Management Plan;
        ii. an electronic copy of the revised Biodiversity Management Plan marked up with track changes to show the differences between the current Biodiversity Management Plan and the revised Biodiversity Management Plan;
        iii. an explanation of the differences between current Biodiversity Management Plan and the revised Biodiversity Management Plan;
        iv. the reasons the approval holder considers that taking the action in accordance with the revised Biodiversity Management Plan would not be likely to have a new or increased impact; and
        v. written notice of the date on which the approval holder will implement the revised Biodiversity Management Plan, being at least 20 business days after the date of providing notice of the revision of the Biodiversity Management Plan, or a date agreed to in writing with the Department.
    b. subject to condition 35, implement the revised Biodiversity Management Plan from the implementation date.
- **Condition 34:** The approval holder may revoke its choice to implement a revised Biodiversity Management Plan under condition 32 at any time by giving written notice to the department. If the approval holder revokes the choice under condition 32, the approval holder must implement the previous version of the Biodiversity Management Plan.
- **Condition 35**: If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the revised Biodiversity Management Plan would be likely to have a new or increased impact, then:
    a. condition 32 does not apply, or ceases to apply, in relation to the revised Biodiversity Management Plan; and
    b. the approval holder must implement the version of the Biodiversity Management Plan specified by the Minister in the notice.
- **Condition 36:** At the time of giving the notice under condition 35, the Minister may also notify that for a specified period of time, condition 32 does not apply.

8 References and resources reviewed

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Appendix A Significant area vegetation clearing maps

Phase 2

Phase 1

Layout / Boundaries

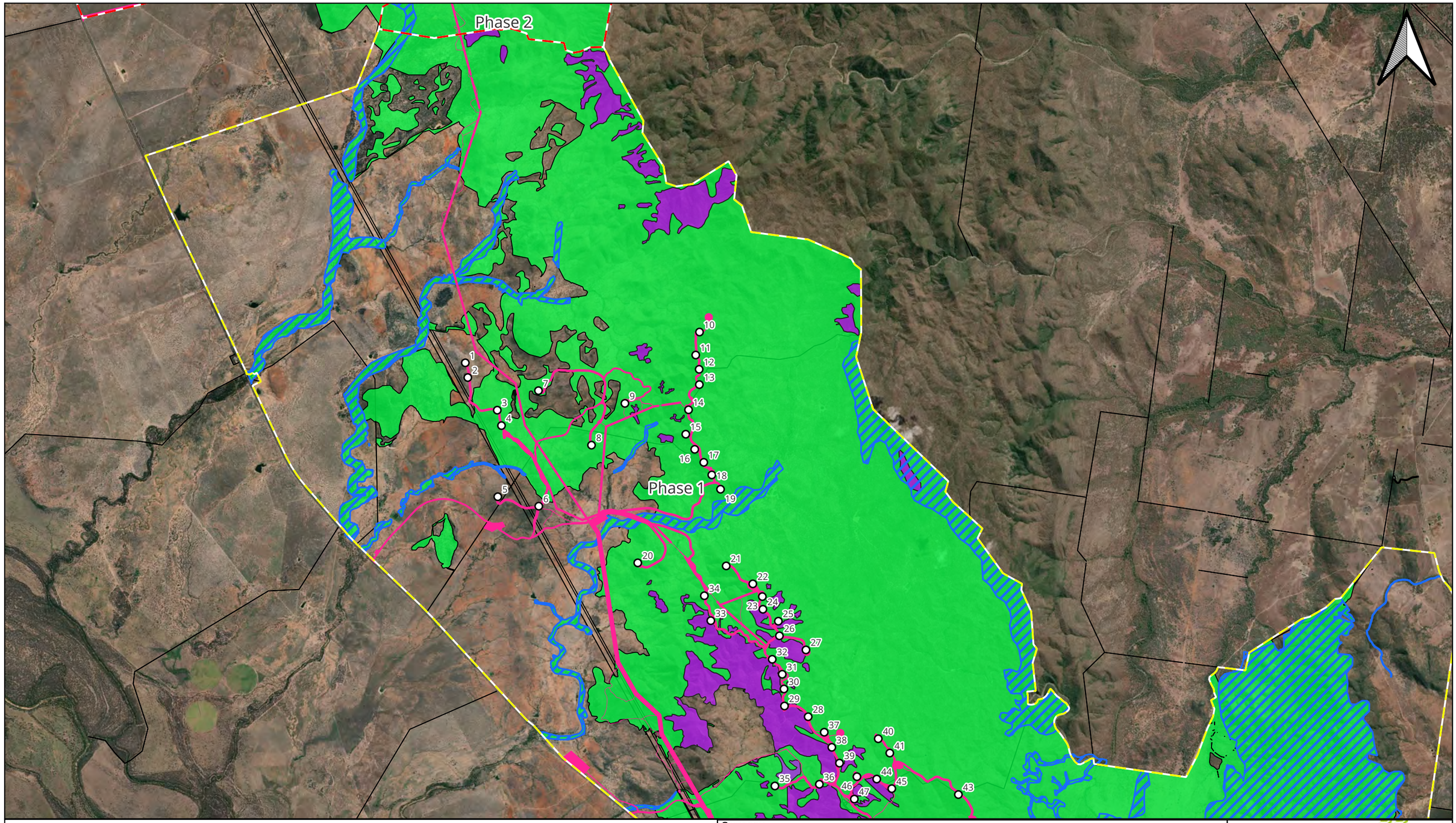
- Phase 1
- Phase 2
- Disturbance Footprint (MCR 4)
- WTG Layout (MCR 4) (195)
- Lot boundaries

Matters of National Environmental Significance

- Greater Glider & Squatter Pigeon habitat
- Semi-Evergreen Vine-Thicket
- Koala Habitat

0 2.5 5 7.5 10 km

Company: Clarke Creek Energy Pty Ltd				SQUADRON ENERGY
Title: BMP APPENDIX A: Matters of National Environmental Significance (Phase 2)				
Date: 25/11/2025	Projection: GDA2020 MGA55	Project Code: CCWF	Rev: 1A	
Drawn By: A Gordijn	Checked By: M Gouws	Sheet: 1	Scale: 1:95000	Size: A3



Layout / Boundaries
- Phase 1
- Phase 2
- Disturbance Footprint (MCR 4)
- WTG Layout (MCR 4) (195)
- Lot boundaries

Matters of National Environmental Significance
- Greater Glider & Squatter Pigeon habitat
- Semi-Evergreen Vine-Thicket
- Koala Habitat

0 2.5 5 7.5 10 km

Company: Clarke Creek Energy Pty Ltd

SQUADRON ENERGY

Title: BMP APPENDIX A: Matters of National Environmental Significance (Phase 1 - Map 1 of 2)

Date	Projection	Project Code	Rev
25/11/2025	GDA2020 MGA55	CCWF	1A

Drawn By	Checked By	Sheet	Scale	Size
A Gordijn	M Gouws	2	1:80000	A3

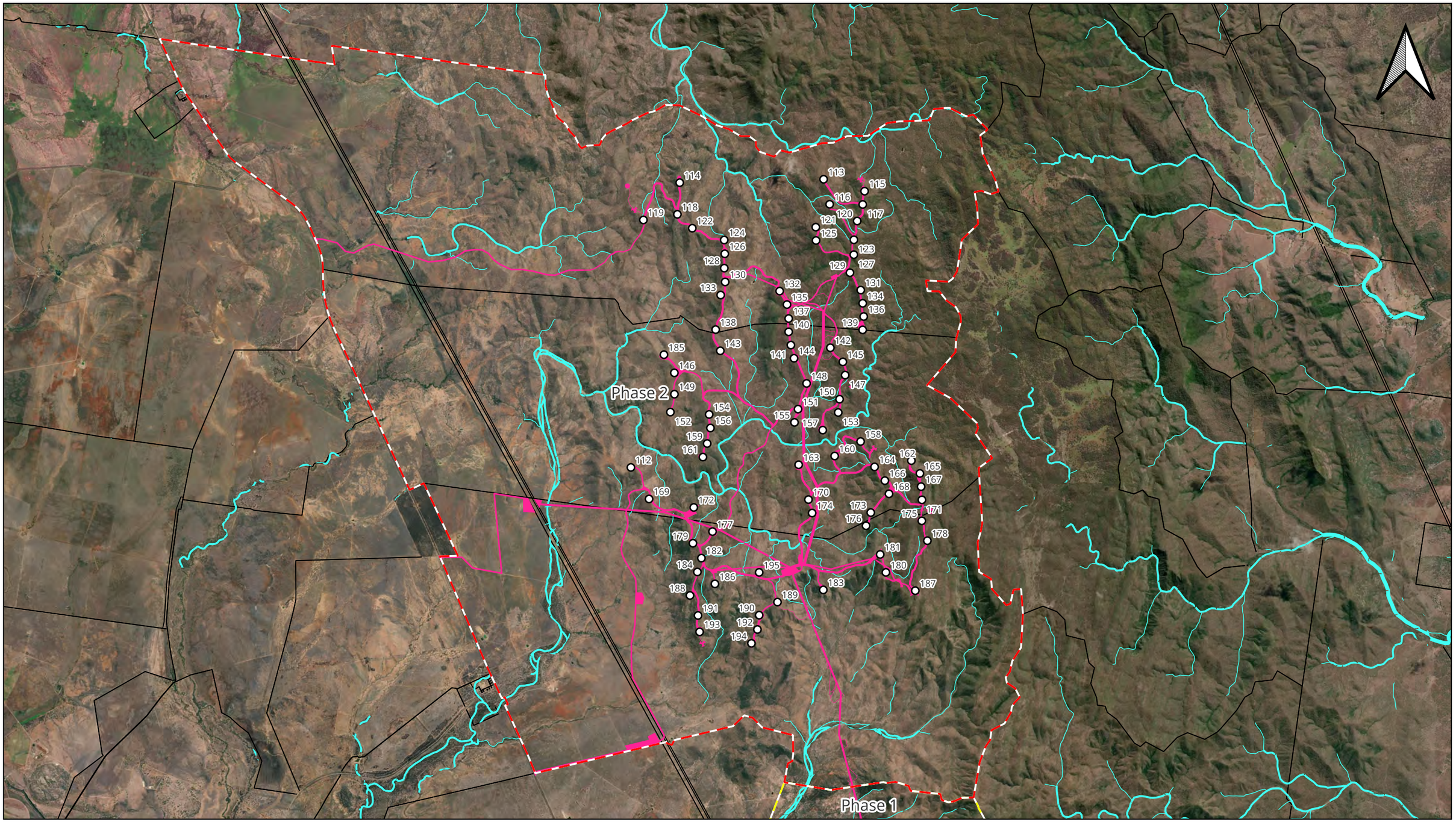
Phase 1

Layout / Boundaries
- Phase 1
- Phase 2
- Disturbance Footprint (MCR 4)
- WTG Layout (MCR 4) (195)
- Lot boundaries

Matters of National Environmental Significance
- Greater Glider & Squatter Pigeon habitat
- Semi-Evergreen Vine-Thicket
- Koala Habitat

0 2.5 5 7.5 10 km

Company	Clarke Creek Energy Pty Ltd			SQUADRON ENERGY	
Title	BMP APPENDIX A: Matters of National Environmental Significance (Phase 1 - Map 2 of 2)				
Date	Projection	Project Code	Rev		
25/11/2025	GDA2020 MGA55	CCWF	1A		
Drawn By	Checked By	Sheet	Scale	Size	
A Gordijn	M Gouws	3	1:80000	A3	



Layout / Boundaries

- Phase 1
- Phase 2
- Disturbance Footprint (MCR 4)
- WTG Layout (MCR 4) (195)
- Lot boundaries

Matters of State Environmental Significance

- Remnant vegetation within a defined distance of a watercourse
- Of Concern Regional Ecosystem 11.11.10

0 2.5 5 7.5 10 km

Company: Clarke Creek Energy Pty Ltd				SQUADRON ENERGY
Title: BMP APPENDIX A: Matters of State Environmental Significance (Phase 2)				
Date: 25/11/2025	Projection: GDA2020 MGA55	Project Code: CCWF	Rev: 1A	
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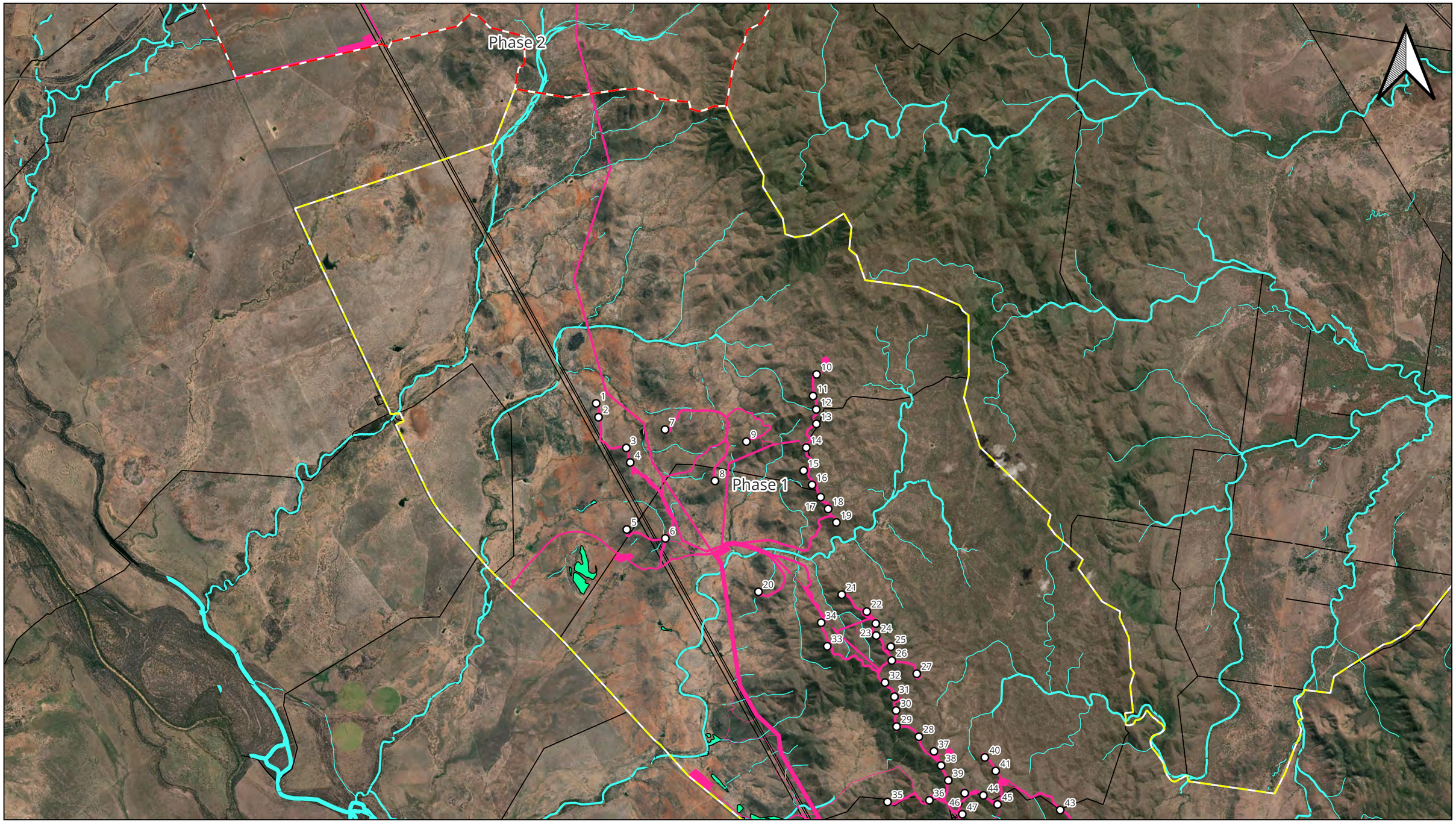

Layout / Boundaries

- Phase 1
- Phase 2
- Disturbance Footprint (MCR 4)
- WTG Layout (MCR 4) (195)
- Lot boundaries

Matters of State Environmental Significance

- Remnant vegetation within a defined distance of a watercourse
- Of Concern Regional Ecosystem 11.11.10

0 2.5 5 7.5 10 km

Company: Clarke Creek Energy Pty Ltd				SQUADRON ENERGY
Title: BMP APPENDIX A: Matters of State Environmental Significance (Phase 1 - Map 1 of 2)				
Date: 25/11/2025	Projection: GDA2020 MGA55	Project Code: CCWF	Rev: 1A	
Drawn By: A Gordijn	Checked By: M Gouws	Sheet: 5	Scale: 1:85000	Size: A3

Phase 1

Layout / Boundaries
- Phase 1
- Phase 2
- Disturbance Footprint (MCR 4)
- WTG Layout (MCR 4) (195)
- Lot boundaries

Matters of State Environmental Significance
- Remnant vegetation within a defined distance of a watercourse
- Of Concern Regional Ecosystem 11.11.10

0 2.5 5 7.5 10 km

Company: Clarke Creek Energy Pty Ltd			SQUADRON ENERGY
Title: BMP APPENDIX A: Matters of State Environmental Significance (Phase 1 - Map 2 of 2)			
Date: 25/11/2025	Projection: GDA2020 MGA55	Project Code: CCWF	Rev: 1A
Drawn By: A Gordijn	Checked By: M Gouws	Sheet: 6	Scale: 1:80000 / Size: A3

Appendix B Weed & pest management plan

1 Purpose

The purpose of this Weed and Pest Management Plan is to describe how significant weed and pest species present at the site is controlled throughout pre-construction, construction and operation of the Project. The objective and performance criteria for weeds and pest animals are presented in Table B-1.

Table B-1 Weed and pest management objectives and performance criteria

Objective	Performance criteria
Pest animal activity will not increase as a result of the Project.	Pest animal presence is at the same (or reduced) level as during pre-approval ecological surveys.
No new restricted weed species introduced as a result of the Project. No new outbreaks of restricted weeds within the Project Area.	Weed species diversity and location of infestations is at the same (or reduced level) as during pre-construction surveys.

2 Existing environment

2.1 Significant weed species

Significant weed species present at the site include Weeds of National Significance (WoNS), restricted invasive plants listed under the *Biosecurity Act 2014,* and other environmental weed species. Landowners and land managers are responsible for managing WoNS. Under the Biosecurity Act, a General Biosecurity Obligation requires all reasonable and practical steps be taken to minimise the risks associated with restricted invasive plant species. Restrictions specific to Category 3 restricted invasive plants are that they must not be given away, sold or released into the environment without a permit. Table B-2 lists the significant weed species identified on site.

Table B-2 Significant weed species recorded within the broader Project Area to date (during ecological surveys and/or reported by landowners)

Scientific name	Common name	WoNS status	Status under *Biosecurity Act 2014* (Qld)
Ageratum houstonianum	Blue Billy Goat Weed	-	Environmental weed
Cenchrus ciliaris	Buffel Grass	-	Environmental weed
Cryptostegia grandiflora & C. madagascarensis	Rubber vine	√	Restricted invasive plant
Gomphocarpus fruticosus	Balloon Cotton	-	Restricted invasive plant
Lantana camara	Lantana	√	Restricted invasive plant (Cat 3)
Leucaena leucocephala	Leucaena	-	Environmental weed
Neonotonia wightii	Glycine	-	Environmental weed
Opuntia stricta	Prickly Pear	√	Restricted invasive plant (Cat 3)
Opuntia tomentosa	Tree Pear	√	Restricted invasive plant (Cat 3)
Parkinsonia aculeata	Parkinsonia	√	Restricted invasive plant
Parthenium hysterophorus	Parthenium	√	Restricted invasive plant (Cat 3)

Scientific name	Common name	WoNS status	Status under *Biosecurity Act 2014* (Qld)
Sida cordifolia	Flannel Weed	✓	Environmental weed
Sporobolus pyramidalis, S. natalensis, S. jacquemontii & S. fertilis	Giant Rats Tail Grass, American rats tail grass, Giant Parramatta grass	-	Restricted invasive plant
Xanthium spinosum	Bathurst burr	-	Environmental weed
Xanthium strumarium	Noogoora burr	-	Environmental weed / poisonous to stock

2.2 Pest animal species

Six invasive animal species were recorded on site. These are identified in Table B-3, including notation of their pest status under the Biosecurity Act.

Table B-3 Pest species recorded on site

Scientific name	Common name	Status under *Biosecurity Act 2014* (Qld)
Canis lupus dingo	Wild Dog/Dingo	Restricted invasive animal
Cervus timorensis rusa	Deer (Rusa)	Restricted invasive animal
Felis catus	Feral Cat	Restricted invasive animal
Oryctolagus cuniculus	Rabbit	Restricted invasive animal
Sus scrofa	Feral Pig	Restricted invasive animal
Vulpes vulpes	Red Fox	Restricted invasive animal

3 Construction impacts and risks

Key aspects of the Project that could result in the introduction of weeds to the site, spread of weeds within the site, or transportation of weeds from the site, include:

- Movement of vehicles, plant, equipment and personnel on, off and around the Project site.
- Movement and stockpiling of weed infested topsoil.
- Clearing, grubbing and stockpiling of weed infested mulch.
- Inappropriate disposal of weeds.

Potential impacts associated with weeds at the Project area include:

- Spread of weeds into previously non-infested areas (both inside and outside the Project area).
- Degradation of native flora and fauna habitat, including remnant vegetation and TECs.
- Introduction of new weeds to Project area.

Potential impacts associated with pest animals in the Project area include:

- Consumption of native plants by herbivorous pests.
- Trampling of native flora and fauna habitat, such as leaf litter mats.
- Predation of native fauna.

4 Mitigation measures

Mitigation measures to manage weeds and pests include:

- Recording incidental weed infestations and pest animal observations
- Weed management and disposal
- Implementing weed hygiene protocols
- Ongoing weed control and monitoring
- Implementing, on an annual basis, pest animal control mechanisms consistent with best practice guidelines in response to the detection of pest animals in the Project area. Relevant guidelines include:
  - *Australian Pest Animal Strategy 2017 – 2027*, Invasive Plants and Animals Committee, Cwth Department of Agriculture and Water Resources, 2017
  - *Principles of pest management*, Queensland Department of Agriculture and Fisheries http://www.agriculture.gov.au/SiteCollectionDocuments/pests-diseases-weeds/consultation/apas-final.pdf
  - *Controlling pest animals on your property,* Business Queensland https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/pests/controlling/chemical

4.1 Management of pest animal species

Mitigation measures to manage pest animal species at the site may include those listed in Table B-4.

Table B-4 Control measures for pest animal species.

Pest animal	Key control measures*
Canis lupus dingo Dingo/wild dog	Shooting, poisoning, trapping and fencing.
Cervus timorensis rusa Deer (Rusa)	Shooting, exclusion fencing.
Felis catus Feral Cat	Multiple methods including night shooting, poisoning and rubber-jawed leg-hold traps placed near territorial markers
Oryctolagus cuniculus Rabbit	Warren ripping or harbour destruction (most-effect method for long-term control). Integrated approach combines destroying warrens, baiting, rabbit-proof fencing, fumigation, trapping and shooting.
Sus scrofa Feral Pig	Poisoning (the most efficient and effective way to reduce pig population).
Vulpes vulpes Red Fox	Shooting (to control small populations). Trapping, using padded or offset laminated jawed traps (minimal impact on non-target species and is effective when used as part of an integrated approach). Baiting (the most economical and effective control method).

*Queensland Government, Business Queensland, Restricted invasive animals - Control

4.2 Management of existing weeds

Environmental mitigation measures to manage existing weeds at the site will include:

- Identification and mapping of significant weeds occurring in construction areas prior to disturbance; with monitoring occurring as part of the pre-clearance surveys. Log GPS point/tracks, species, and extent of infestation. This will support a clear determination of ‘clean’ and ‘infested’ construction zones to assist in weed management.
- Where significant weeds are recorded within the disturbance footprint (including topsoil stockpile locations); treat or remove weeds progressively prior to construction commencing in each area. Key control measures for the significant weeds present at the site are outlined in the table below.

Table B-4 Control measures for significant weeds.

Significant Weed	Key Control Measures (Reference)
Ageratum houstonianum Blue Billy Goat Weed	Foliar spray or complete removal (cut and remove) for small numbers in early growth stages before they produce seed. https://weeds.brisbane.qld.gov.au/weeds/blue-billygoat-weed
Cenchrus ciliaris Buffel Grass	Combination of physical and chemical treatments. Small, isolated plants can be dug out from key sites before seeding. Foliar spray when leaves are bright green and glossy. Follow up is essential. *Australian Association of Bush Regenerators Weed Guides – Buffel Grass
Gomphocarpus fruticosus Balloon Cotton	Foliar spray or complete removal https://weeds.brisbane.qld.gov.au/weeds/balloon-cotton-bush
Lantana camara Lantana	Integrated approach including herbicides, mechanical removal, fire, biological control and revegetation. Long-term follow up control is required after initial attempts. Weeds of national significance Weed Management Guide, Lantana – *Lantana camera*
Neonotonia wightii Glycine	Cut stump then foliar spray https://weeds.brisbane.qld.gov.au/weeds/glycine
Opuntia stricta Prickly Pear	Herbicide and biological control https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-nagement/health-pests-weeds-diseases/weeds-diseases/invasive-plants/prohibited/prickly-pear
Opuntia tomentose Tree Pear	Herbicide and biological control https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-nagement/health-pests-weeds-diseases/weeds-diseases/invasive-plants/prohibited/prickly-pear
Parthenium hysterophorus	Pasture management and herbicide treatment with a knockdown herbicide to kill plants and a residual herbicide to control future germinations. Repeated spraying within one growing season. DAF 2016 https://www.daf.qld.gov.au/__data/assets/pdf_file/0004/68602/IPA-Parthenium-PP2.pdf
Sida cordifolia Flannel Weed	Foliar spray when actively growing Northern Territory Government 2015. Weed Management Handbook.

4.3 Weed hygiene protocols

All plant and machinery that enters the site must be cleaned and inspected as free from mud and weed seed. The wheels of all machinery and equipment is washed down before transportation to the site, to avoid the risk of importation of root-rot fungus, other pathogens or weeds into the local area. Plant and equipment

is inspected and cleaned before leaving a worksite that is infested with weeds, to remove any soil and vegetation. This will occur in dedicated washdown areas, where practical.

A weed hygiene declaration shall be completed and supplied to Squadron by contractors for every new piece of plant/machinery on site.

4.4 Weed stockpiling, transportation and disposal

All Category 3 restricted invasive plant species on site are not to be distributed (i.e. within mulch or stockpiled soil). If they are to be disturbed all material is disposed of in accordance with legislative requirements:

- Burying the matter in the ground at a depth that ensures any seeds or vegetative material cannot grow; or
- Transporting the matter directly to a waste facility if the matter is –
  - In a sealed container or a covered vehicle; or
  - Covered in a way that prevents the restricted matter from being lost or released during transport; or
- Sealing the matter in plastic and leaving the matter in the sun until any vegetative material being disposed has decomposed.

Under no circumstances are weeds or exotic species to be used for mulch.

4.5 Ongoing control and monitoring

Regular monitoring throughout construction is required to determine the success of weed and pest control treatments. An ongoing monitoring and management regime will involve monitoring of:

- The presence of pest animals. This monitoring is undertaken using observations made by suitably qualified and experienced Fauna Spotter Catchers in the field and camera traps and incidental records. Additional monitoring is undertaken if the trigger outlined in the risk assessment is met (i.e. if the project has resulted in an increase of pest animals in the project area). To measure this, camera traps would be setup at representative sites (i.e. near water, site compound, along tracks) to monitor the movement and abundance of pests. This monitoring would be repeated every six months during construction and operation for a period of 5 years. Records of pest animal sightings would be kept. Active pest animal control will only commence following additional pest animal sightings, or if there is observable impact from these animals, e.g. feral pig damage to translocated cycads.
- Weed infested areas to determine effectiveness of weed control measures until weed densities are less or equal to the pre-disturbance density, similar densities to surrounding areas not subject to project activities, or new species infestations are eradicated. If previous weed treatments are found to have been ineffective, a review of the weed management activities would be undertaken and treatments modified as necessary.

Appendix C Rehabilitation protocol

1 Objectives of rehabilitation

The objective of rehabilitation is to re-establish stable ground surfaces, resistant to erosion and weed ingress, and to maximise the potential for colonisation by native ground cover. This section applies to the construction phase however monitoring and maintenance will be required to varying levels throughout the life of the Project.

2 Rehabilitation methods

The key to effective rehabilitation is using strategies appropriate to the location and condition of the area disturbed. Ideally, rehabilitation will be achieved with vegetative cover. However, this will not be achievable where there is insufficient topsoil to support vegetative growth. These include:

- Areas which are geologically stable and resistant to erosion, e.g. Rocky outcrops (where seeding would be ineffective)
- Large cuts where weathered rock is present and where plants are not able to establish.

In lieu of seeding in these areas, catch drains or raised berms will be constructed to minimise the erosion of rock faces and to re-direct water flows away from exposed and stable earth surfaces.

3 Areas to be rehabilitated

Areas disturbed during construction will be stabilised progressively during construction. Areas which will be rehabilitated include:

- Access track and crane hard standing batters
- Underground cable routes
- Temporary construction compounds, laydown sites or stockpile sites.

Roads are maintained to remain passable for over-size over-mass vehicle loads in the event of a blade replacement during operation, or other maintenance. Therefore, no trees that could grow to become future obstructions will be allowed to grow where large oversailing blades could be transport in. This also applies over underground cable routes where roots from large trees could over time damage the underground cable.

Pre-approval documentation (NGH *et al.* 2017) proposed that Koala habitat would be reinstated around infrastructure, roads and hardstand. As Project design has progressed, it is apparent that there are challenges to effectively revegetating with Koala trees. For example, cleared areas will need to be maintained as bushfire buffers, and/or to allow for oversized loads to be brought on site throughout operation. To compensate for this, the entirety of vegetation clearing associated with Koala habitat will be addressed through the Offsets Strategy/Management Plan.

4 Stockpile, mulching and reuse of organic waste

- Topsoil is stripped and set aside for use in progressive site rehabilitation, close to the point of origin. Relevant areas which are no longer influenced by traffic/machinery will have topsoil reinstated, thereby creating a soil bedding layer for the natural and assisted germination of vegetation.

- Cleared vegetation is stockpiled or mulched for use in erosion and sediment control and rehabilitation works.
- Stockpiling of felled vegetation and soil from earthworks activities is to remain within the development footprint. Stockpiles must not be placed within 30 m of a waterway.

5 General measures for rehabilitation

- Where appropriate, plantings and/or seeding within rehabilitated areas will incorporate local indigenous species, with the primary objective of addressing erosion and sedimentation issues, but also to be consistent with the biodiversity values of the existing surrounding vegetation (e.g. species selections are to be consistent with the surrounding vegetation community (RE) composition).
- Appropriate planting and/or seeding techniques to be specified by the Contractor for the different areas of the site, in consideration of climatic conditions (e.g. sterile cover crops or soil tacifier) is required as an intermediate step to ensure early stabilisation of disturbed areas.
- Include monitoring to demonstrate whether ground cover establishment targets have been met (see Section 6.1).

6 Rehabilitation benchmarks and indicators

Areas disturbed during construction is stabilised progressively during and following construction. Areas to be revegetated must achieve at least 70% groundcover (which includes rock cover), or equivalent groundcover to surrounding areas not disturbed by the project.

Before and after records are required for areas requiring treatment, including site notes and photographs. Rehabilitation objectives (i.e. stabilisation, revegetation) will differ depending on site characteristics.

Generally, the objective is to:

- Stabilise steep rocky areas with limited topsoil and vegetation cover.
- Restore vegetation cover n flatter terrain or where vegetation cover currently occurs (through a mixture of natural and assisted regeneration).

7 Timing of rehabilitation

Rehabilitation is undertaken progressively as the works are completed. Disturbed areas planned for rehabilitation are rehabilitated as soon as practicable following completion of works in each disturbance area. Temporary stabilisation methods during construction will likely be required to minimise the risk of erosion and the transport of sediment (e.g. hydroseeding of sterile cover crop/seedmix or soil tackifier on bare batters and stockpiles).

Appendix D Fauna spotting and vegetation clearing procedure

1 Suitably qualified fauna spotter

A suitably qualified fauna spotter is one who (from Hangar and Nottidge 2009):

- Holds current relevant permits and licences
- Is competent in survey techniques and identification of fauna, including legislatively significant species
- Is competent in humane capture, trapping, and handling of fauna
- Is competent in humane techniques for emergency euthanasia
- Is suitably equipped to capture a range of fauna species (different size and weight)
- Is appropriately vaccinated (i.e. for bat handling).

2 Fauna spotter activities

In accordance with DETSI requirements for tampering with breeding animal places (DEHP, 2010), the approved fauna spotter must:

- Contribute to implementing this plan to ensure protected wildlife and their respective breeding places are appropriately managed during clearing operations;
- Work with the Construction Contractor to achieve procedural uniformity in terms of understanding and implementing this plan;
- Assist the Construction Contractor to incorporate this plan into contract documentation;
- Use their discretion to inform DETSI where they identify unusual incidents (i.e. critically endangered species, multiple individuals, unexpected species/out of range)
- Any injuries or deaths of threatened fauna species must be reported immediately to the Site Environmental Coordinator. Any death is reported to DETSI within 48 hours (best practice, timeframe not legislated) on 1300 130 372. Any death of a threatened fauna species listed under the EPBC Act is reported to Cth DCCEEW within 10 business days.
- Consultation with the project Principal's Representative will occur prior to consultation or reporting to external regulatory authorities.

Construction procedures will also: (see also Section 5.3):

- Provide for fauna movement where exclusion fencing or footprint demarcation is necessary, as well as clearing and worker safety requirements.
- include mechanisms to facilitate fauna movement away from clearing activities.

The fauna spotter will educate staff as well as the Construction Contractor regarding the potential risks of fauna injury and deaths and how to best manage animals that may become injured or displaced, including those species listed as threatened and/or migratory under the NC Act and/or EPBC Act.

Where actual or potential animal breeding places are identified, the fauna spotter will comply with the actions identified within Table D-1 below and details of the breeding place/s recorded.

Table D-1 details relevant species management practices to be implemented, and where practicable be applied to all fauna spotter activities to minimise disturbance to breeding animals and/or their young. Where the removal of eggs/animals is required, the fauna spotter will engage a suitably qualified and licensed

wildlife carer/facility to incubate all viable (undamaged) eggs removed and to raise young animals, and will adequately store the eggs/animals until they are supplied to the wildlife carer.

Table D-1 Authorised Species Management Actions with Respect to Animal Breeding Places

Species group	Breeding place status	Management action
Least concern – special least concern or colonial breeding	All	Implementation of mitigations measures outlined in this BMP.
Other least concern species	Contains young or eggs	Avoid unnecessary disturbance. Breeding place will be removed, and eggs/young handed over to a licensed wildlife carer/facility. It is preferable to allow eggs to hatch and/or young to mature before moving them away from a breeding place. As a last resort, eggs may be destroyed[1].
Other least concern species	No eggs or young	Proceed with caution. Remove breeding place if applicable.

Source: (DEHP, 2010)

[1]Where the removal or translocation of wildlife is required, the 'take' must be facilitated by a suitably licensed and experienced person. There are two acceptable methods for destroying or terminating eggs: quickly breaking and crushing its contents; or reducing the temperature of the egg to less than 4 degrees Celsius for at least 4 hours.

Fauna spotters will direct the salvage of relevant hollows and relocate these to nearby habitat that will be retained.

The decision to rehabilitate an animal must consider the ability for it to be successfully released and availability of appropriate natural habitat within the vicinity of where the animal was found. Where the removal of eggs/animals is required, the fauna spotter must engage a suitably qualified and licensed wildlife carer/facility to incubate all eggs removed and to raise young animals, and adequately store the eggs/animals until the wildlife carer's arrival.

The fauna spotter must maintain a register to document any tampering with animal breeding places (checklist). The checklist must record the number of obvious animal breeding places destroyed and/or relocated and a description of each. Where the SMP does not apply, DETSI's authority is required for tampering with breeding places of species. Furthermore, the register must be made available to DETSI upon their request.

3 Prior to undertaking fauna spotting

- The area proposed to be cleared will be surveyed by a competent surveyor and delineated on the ground using pickets, markers or equivalent.
- A pre-clearance habitat survey will be undertaken by an Ecologist or suitably qualified FSC.
- Pre-clearance habitat surveys will consist of:
  - Traversing the area marked to be cleared no more than a month before clearing is to take place.
  - Physically marking HBT's or other habitat features (e.g. Using flagging tape or spray paint).
  - Breeding habitat sites will be recorded and documented in the breeding habitat survey report.
  - Searching for and identifying fauna habitat/s that have the potential to be used by threatened fauna and other fauna (e.g. Fresh tracks outside of burrows, latent trees with hollows etc.). This will involve inspecting bark from trees, turning rocks and logs and inspecting hollows where feasible within the area of disturbance. Active (and likely) breeding places will be marked.
  - Potential habitat includes burrows, loose bark, rocks and rock piles, logs, dead and live trees with hollows, bird and possum nests and cracking clay soil.

- Just before clearing, the fauna spotter will traverse the area again to ensure all habitat marking remains and search for additional fauna and specifically search for Koalas.

3.1 Specific to Koalas

If a Koala is found during the pre-clearance assessment, they must be managed in accordance with the following:

- Leaving a 30m buffer of vegetation around the Koala tree in addition to a corridor of vegetation to the nearest vegetated area.
- Not felling any tree that has the potential to fall on or near the tree the Koala is residing in.
- Monitoring the Koala location and its visible stress levels. If the Koala is appearing visibly stressed and agitated, move the clearing front further from the Koala until they appear calm.
- Allow the Koala to self-relocate of its own volition.
- Koalas are not to be interfered with unless they have been injured. Injured Koalas are to be handled by experienced personnel, stored in a large carry crate suitable for Koalas and immediately transported to the nearest vet with wildlife capabilities or to an experienced Koala carer. If a Koala is injured on site, follow steps outlined in Appendix D.5.

3.2 Specific to Eastern Long-eared Bat

If juvenile Eastern Long-eared Bats, or any juvenile microbat, are located they must be transported to a suitably qualified bat carer as soon as possible with the mother bat. If the mother bat can’t be identified, then any female bat from the colony must stay with the juvenile bat. Microbats with young attached are not to be released or placed into translocated hollows. Bats are to be kept warm, above 30 degrees and kept within the colony they were found in. The Australian Bat Clinic will be contacted on 0490 708 884 for advice on correct care and to organise a suitably qualified carer. Bats will not to be kept overnight without hydration. Hydration will be administered through a subcutaneous injection administered by the fauna spotter catcher, wildlife carer or vet.

3.3 Specific to Greater Glider

See Section 5.4 for details about installing nest boxes where hollow bearing trees in use by Greater Glider are going to be cleared.

4 During vegetation clearing

- At least one fauna spotter on site will have training and experience in basic wildlife first aid and wildlife health assessments.
- During clearing works, the fauna spotter and plant operator must maintain positive two-way radio contact.
- The fauna spotter will supervise vegetation clearing and the removal of habitat features. This includes the removal of trees and understory, grass and soil stripping and any dewatering.
- The fauna spotter will follow the bulldozer or grader during soil and grass stripping.
- For safety purpose, the fauna spotter will maintain a distance of at least 25m (in the opposite direction of the tree fall) during the felling of a tree.

4.1 Sensitive clearing technique

In addition to the vegetation clearing steps outlined above, sensitive clearing techniques are implemented to fell hollow bearing trees, particularly in areas of mapped Greater Glider habitat.

- The fauna spotter will communicate to the machine operator when they are approaching a HBT and will advise on the clearing procedure that is to be undertaken.
- Excavators or equivalent machinery will be used to clear HBTs. If the habitat is a tree hollow, the fauna spotter will instruct the machine operator by two-way radio if it is suitable to tap the tree with the ripper or bucket (to encourage fauna inside the hollow to move out of the hollow).
- Once the tree has been tapped and if no fauna is detected, the fauna spotter will give positive communication that the tree can be felled. If fauna is seen, the fauna spotter will use their discretion to as whether to continue the tree felling or to let the tree remain overnight to encourage self-relocation.
- The excavator or equivalent machinery operator will slowly lower HBT trees. HBTs will not be pushed and left to fall under their own weight as this can cause direct injury or death to animals.
- The fauna spotter will approach the tree to check the hollow/s and remove any fauna into a handling bag. The fauna spotter will release the fauna into the designated release area (a distance of ~50m outside the clearing footprint).
- If the hollow is in good condition and the fauna is not injured, the fallen tree will be marked and left in situ over night to allow the fauna to self-relocate.

4.2 Other fauna habitat

- Any area of water must be inspected by a fauna spotter before it is disturbed. For larger areas of water, a dewatering will need to be undertaken where the water is pumped out while the fauna spotter supervises. For smaller areas of ephemeral water, the fauna spotter will request the plant operator to use their bucket to dig around the water to recover frogs and turtles.
- Stockpiled areas of vegetation left for longer than 48 hours are considered habitat and a fauna spotter will need to be present to supervise any impacts to these stockpiles.
- If a threatened species is identified, the above process outlined above in D.4 (points 14-16) will be followed.

4.3 Threatened fauna – unexpected find

- If a new threatened species is encountered on site (species that has not being recorded during previous fauna searches), vegetation clearing in that area must cease, and the fauna spotter must contact their supervisor and Squadron Energy's Representative. Squadron Energy's Representative will facilitate contact with the appropriate State or Federal Department in relation to an appropriate course of action. Changes to the clearing methodology in response to new threatened species may be subject to state government approval of a revised SMP (this document).
- Clearing of the specific area of concern will not recommence until approval has been granted by the relevant agency.

5 Injured fauna

- All animals recovered during clearing must be thoroughly checked for injuries. If the fauna spotter who captured the animal is not experienced in health assessments, the animals is transported to an experienced fauna spotter with experience assessing injuries and viability for that animal. The fauna spotter will in contact their supervisor or an experienced wildlife carer or vet for advice on viability.

- All animal care and transport must be undertaken in line with the Care of Sick, Injured or Orphaned Protected Animals in Queensland Code of Practice (DETSI 2013).
- Preferably the fauna spotter will have wildlife caring experience and be able to hydrate and care for fauna in the short term until transport can be arranged. This can include the ability to give pain medication, keep an animal comfortable and ensure animals are kept at an appropriate temperature.
- Viably injured animals need to be transported to a suitably experienced wildlife carer or vet as soon as possible. If pain relief can be given and the animal kept comfortable in a suitable enclosure, this can be within 24 hours. If the animal cannot be subcutaneously hydrated, they need to be transported within 12 hours.
- The capture coordinates of the animal need to be provided to the vet or wildlife carer at time of drop off.
- Captured animals are handled in a way that minimizes the risk of injury or stress-induced disease. This can be best achieved by:
  - Firm and quiet handling
  - Keeping handling and restraint time to the minimum needed
  - Using techniques and timing appropriate to the species.
- Housed animals are kept in a way appropriate to their biology and in circumstances that ensure they are safe from harm, environmental stresses and other adverse conditions. Mammals and reptiles can be held in cloth bags and frogs in plastic bags with some water for short term storage. For longer term storage plastic terrariums, large cat carry cages or secure dog crates are used.
- When transported in vehicles, cloth or plastic bags are kept within hard plastic containers to prevent animals from being inadvertently squashed. Containers are cleaned / disinfected frequently to minimise chances of spread of parasites and disease.
- Animals are transported in a suitable secure container protected by a blanket or other material to provide darkened conditions. Transportation is by air-conditioned vehicle and aims to ensure the trip is as brief and comfortable as possible.

Vet and wildlife carer details for the local region are identified in Table D-2 below.

Table D-1 Vet and wildlife carer details for the local region

Name	Phone	Location/Address	Bats (Y/N?)
Wildlife Rockhampton	0429 GO WILD (0429 469 453)	PO Box 2066 Wandal QLD 4700	Yes
RSPCA	1300 ANIMAL (1300 264 625)	391 Yaamba Rd, North Rockhampton QLD 4701	Yes
Rockhampton Vet Clinic QLD	(07) 4928 4266	Dean St, Frenchville QLD 4701	No
Rockhampton Wildlife Rescue Association Inc	0437 556 744	North Rockhampton QLD 4701	Yes
Alma Street Veterinary Hospital	(07) 4922 8138	67 Alma St, Rockhampton QLD 4700	No

6 Designated release area

- Release areas are located outside of the disturbance footprint and a distance of at least 50 metres from the boundary of the clearing area.

- Fauna must be released into adjacent area of vegetation allowing fauna to stay within their home range.
- When releasing the animal, the spotter must check for predation and release the animals in a safe spot.
- Nocturnal fauna (e.g. microbat) must be kept in a bag during the day and must be released at dusk.

7 Field data records and photographs

- The fauna spotter will maintain a record of all fauna encountered and the action taken to relocate, euthanise or rehabilitate the animal/s. The app ‘Sightings’ (or a similar system) is used to record the location of all fauna.
- Photo of the vegetation/habitat must be taken when dealing with threatened species.

8 Safety requirements

- The plant operator and fauna spotter must maintain positive radio communication at all times.
- The fauna spotter must wear Personal Protective Equipment (PPE) consistent with site requirements and additional PPE including snake gaiters (optional), gloves etc. GLOVES MUST BE WORN AT ALL TIME WHEN RESCUING / HANDLING BATS.
- The fauna spotter must carry with them a snake bite kit on them at all times and enough water for the period that the fauna spotter is in the field.
- Regular breaks must be taken so that the fauna spotters can ensure that they remain hydrated.

9 References

DES (2013). Code of Practice - Care of Sick, Injured or Orphaned Protected Animals in Queensland - Nature Conservation Act 1992. D. o. E. a. S. Conservation and Biodiversity Operations Branch. Brisbane.

Appendix E MNES and MSES Profiles

1 Threatened fauna species

1.1 Squatter Pigeon

Squatter Pigeon (Southern) - *Geophaps scripta scripta*

https://www.discoverlife.org/mp/20p?see=I_LHT9871&res=6

Listing Status:

- **EPBC Act:** Vulnerable
- **NC Act:** Vulnerable

Description
Medium sized (30 cm) ground dwelling pigeon. They have black and white stripes on face and throat, black beaks, dark-brown irises, and dull purple legs and feet. Blue-grey skin around the eye is a distinguishing feature of the southern subspecies.

Ecology

- **Breeding** habitat occurs on stony rises occurring on sandy or gravelly soils, within 1 km of a suitable, permanent waterbody.
- Ground covering vegetation layer in foraging and breeding habitat is considerably patchy consisting of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs.
- In QLD, foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills and lateritic (duplex) soils on low 'jump-ups' and escarpments.
- Occurs mostly in grassy woodlands and open forests dominated by eucalypts, usually with ready access to water.
- Habitat occurs on Project area in northern, central, and southern sections, however only likely to be impacted on project works occurring in central and southern section

During site surveys, were observed in proximity to water bodies throughout project area. Population is low throughout the site; higher populations occur outside the project area.

Impacts

- A maximum of 17.83 ha of suitable habitat for Squatter Pigeon (riparian vegetation) will require removal for the project. As this clearing is linear, there are large tracts of retained habitat surrounding the clearing for wildlife to disperse into.
- Project noise and vibration has the potential to disturb nesting individuals, though no nests were found during site surveys.
- Species at low risk of mid-flight collision with turbines.
- This species occurs primarily along more open woodland and grasslands in the lower-lying areas. Unlikely to be impacted by operations, although some chance of minor impact during construction
- Ecological assessment determined the project would have low impact on Squatter Pigeons, particularly when incorporating mitigation measures. No significant residual impact predicted to occur.

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened fauna species.*
- Management measures which benefit Squatter Pigeon within the Project Area, and which have regard for conservation priorities suggested in TSSC (2015) include:
  - Further avoidance of Squatter Pigeon habitat through the detailed design stage, and micrositing (Section 5.1.1).
  - Nests identified through pre-clearance surveys (Section 5.3.3).

Squatter Pigeon (Southern) - *Geophaps scripta scripta*

- Habitat enhanced and increased through the offset provided for Greater Glider (Clarke Creek Wind Farm Offsets Strategy & Management Plan).

References

- Cth DCCEEW, SPRAT Profile: *Squatter Pigeon (Southern)* http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64440
- Marine and Freshwater Species Conservation (2015). Consultation Documentation on Listing Eligibility and Conservation Actions, *Geophaps scripta scripta* (squatter pigeon (southern)). http://www.environment.gov.au/system/files/pages/8fa30240-7787-49eb-a987-d18300b21c3d/files/squatter-pigeon-south-consultation.pdf
- Threatened Species Scientific Committee (2015). Conservation Advice *Geophaps scripta scripta* squatter pigeon (southern). http://www.environment.gov.au/biodiversity/threatened/species/pubs/64440-conservation-advice-31102015.pdf
- NGH Environmental *et al.* (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour

1.2 Koala

Koala - *Phascolarctos cinereus*

Photo: Jasmine Vink

Listing Status:

- **EPBC Act**: Vulnerable
- **NC Act**: Vulnerable

Description
Medium-sized marsupial, mostly grey fur, stocky body and large round ears.

Ecology

- Female Koalas able to produce one offspring each year. Births occur between October and May. Young are independent from 12 months old.
- Habitat: Occurs in Eucalypt woodlands and forests throughout eastern Australia and may prefer certain Eucalypt species within any local or regional area.
- Confirmed to occur at the site in north, central and southern areas.

Impacts

- Potential project-related impacts include fragmentation of habitat, vehicle / plant strike and disease.
- Preparation of this BMP, including pre-clearance surveys, combined with mobile nature of species means that direct impacts during construction are unlikely.
- Fragmentation of habitat likely to be minor given narrow roads that are used on a very infrequent basis. No concerns over ongoing operational impacts.

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened fauna species.*
- Management measures which will benefit Koala within the Project Area, and which have regard for conservation priorities suggested in DoEE (2012) and Natural Resource Management Ministerial Council (2009) include:
  - Mitigating the risk of vehicle strike by educating on-site contractors, and by enforcing strict speed limits (Section 5.6.1).
  - Koalas identified through pre-clearance surveys (Section 5.3.3) and avoided during clearing.
  - Bushfires can be a threat to the conservation of this species (through loss of habitat and direct mortality). Appropriate burning practices and other procedures to minimise fire threat at the Project Area include maintained separation distances between infrastructure and vegetation, commitment to mowing and slashing to reduce fuel load, fire-fighting equipment and water on site (Section 5.6.1).
  - Pest animal management which will reduce threat of predation (Appendix B).

Koala - *Phascolarctos cinereus*

- Condition and extent of Koala habitat is further enhanced through actions under the Clarke Creek Wind Farm Offsets Strategy & Management Plan.

References

- NGH Environmental (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour
- Threatened Species Scientific Committee, DoEE (2012), *Approved Conservation Advice for Phascolarctos cinereus*. http://www.environment.gov.au/biodiversity/threatened/species/pubs/197-conservation-advice.pdf
- Cth DCCEEW, SPRAT Profile: *Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) – Koala* http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=85104
- EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory), Commonwealth of Australia, 2014. http://www.environment.gov.au/system/files/resources/dc2ae592-ff25-4e2c-ada3-843e4dea1dae/files/koala-referral-guidelines.pdf
- Natural Resource Management Ministerial Council (2009), *National Koala Conservation and Management Strategy 2009-2014*, report to the Department of the Environment, ater, Heritage and the Arts, Canberra.

1.3 Greater Glider

Greater Glider - *Petauroides Volans*

Photo: Jasmine Vink

Listing Status:

- **EPBC Act**: Vulnerable
- **NC Act**: Vulnerable

Description

Largest gliding possum in Australia, with a head and body length of 35−46 cm and a non-prehensile furry tail measuring 45−60 cm. Has thick fur, colour is white or cream below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has large furry ears and a short snout.

Ecology

- Diet mostly comprises eucalypt leaves and occasionally flowers.
- Females birth single offspring between March and June. Sexual maturity reached in the second year.
- Occurs in open woodlands and open forests in eastern Australia. Shelters in large tree hollows during the day, active at night. Home ranges typically 1–4 ha with home ranges overlapping between individuals. Individuals will also share the same hollows at different times.
- Sensitive to forest clearance, logging and wildfire. Slow to recover after major disturbance due to their reliance on large hollows.
- Confirmed to occur on Project area in north, central and southern areas in riparian vegetation.

Impacts

- A maximum of 17.83 ha of suitable habitat for Greater Glider will require removal for the project. As this clearing is linear, there are large tracts of retained habitat surrounding the clearing footprint for wildlife to disperse into.
- Potential project-related impacts include habitat loss through clearing.
- Direct impacts during tree clearing are possible.
- Fragmentation of habitat likely to be minor given narrow roads that are used on a very infrequent basis through suitable habitat.
- No concerns with regards to ongoing operational impacts.
- Preparation of this BMP, including pre-clearance surveys, combined with mobile nature of species means that direct impacts during construction are unlikely.

Greater Glider - *Petauroides Volans*

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened fauna species.*
- Management measures which benefit Greater Glider within the Project Area, and which have regard for conservation priorities suggested in TSSC (2016) include:
  - Further avoidance of Greater Glider habitat through the detailed design stage, and micrositing (Section 5.1.1).
  - Active hollows identified through pre-clearance surveys (Section 5.3.3).
  - Sensitive clearing techniques in Greater Glider habitat areas (Section 5.4.4).
  - Provision of alternative hollows (nest boxes) where hollow bearing trees showing signs of Greater Glider use are to be removed (Section 5.4.5), including ongoing monitoring (Section 6.1).
  - Bushfires are a threat to the conservation of this species (through loss of habitat and direct mortality). Appropriate burning practices and other procedures to minimise fire threat at the Project Area include maintained separation distances between infrastructure and vegetation, commitment to mowing and slashing to reduce fuel load, fire-fighting equipment and water on site (Section 5.6.1).
  - Condition and extent of Greater Glider habitat is further enhanced through actions under the Clarke Creek Wind Farm Offsets Strategy & Management Plan.

References

- NGH Environmental *et al.* (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour
- Threatened Species Scientific Committee, DoEE (2016), *Conservation Advice, Petauroides volans*. conservation advice
- Cth DCCEEW, SPRAT Profile: *Petauroides Volans* – Greater Glider http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=254
- Threatened Species Scientific Committee (2016). Conservation Advice *Petauriodes volans*. http://www.environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-20160525.pdf

1.4 Red Goshawk

Red Goshawk - *Erythrotriorchis radiatus*

Photo: David Stowe Photography

Listing Status:

- **EPBC Act**: Vulnerable
- **NC Act**: Endangered

Description

Large, swift and powerful reddish-brown hawk, with long and broad wings, deeply 'fingered' wing-tips, and heavy yellow legs.

Ecology

- Breeding habitat is not well known but is likely to be in Spring and Summer in Southern Qld, in a stick nest in a tall tree (>20m tall), within 1km of a watercourse or wetland (Aumann & Baker-Gabb 1991).
- The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins 1993). It prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water.
- Red Goshawk are solitary and very sparsely dispersed. They usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. They often hunt from perches early in the morning and late in the day and tend to hunt more on the wing at other times of the day (NSW Office of Environment 2019).
- Foraging habitat has to be open enough for fast attack and manoeuvring in flight but provide cover for ambushing of prey. Therefore, forests of intermediate density are favoured. They avoid very dense and very open habitats (Marchant & Higgins 1993).
- Not recorded on site during surveys but potential habitat is found across the Project area.

Red Goshawk - *Erythrotriorchis radiatus*

Impacts

- Potential impacts include the disturbance of a breeding place, rotor strike and the avoidance of the area.
- These impacts are considered unlikely as the species has not been recorded on site. It is unlikely that the site constitutes a usual area of home range and it is further deemed unlikely that breeding occurs at the site.
- Low probability of population-level impact

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened bird and bat species.*
- Management measures which benefit Red Goshawk within the Project Area, and which have regard for conservation priorities suggested in Department of Environment and Resource Management (2012) include:
  - Previously unknown nesting sites (considered unlikely to occur) may be identified through pre-clearance surveys (Section 5.3.3).
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation) (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan).

References

- Aumann, T. & D. Baker-Gabb (1991). RAOU Report 75. A Management Plan for the Red Goshawk. RAOU. Royal Australasian Ornithologists Union, Melbourne.
- Marchant, S. & P.J. Higgins, eds. (1993). Handbook of Australian, New Zealand and Antarctic Birds. Volume 2 - Raptors to Lapwings. Melbourne, Victoria: Oxford University Press.
- NSW Office of Environment & Heritage (2017). Threatened Species: Red Goshawk – profile. [ONLINE: Accessed 9 April, 2018. https://www.environment.nsw.gov.au/ threatenedspeciesapp/profile.aspx?id=10279)
- Queensland Department of Environment and Resource Management (2012) National Recovery Plan for the red goshawk *Erythrotirorchis radiatus*. Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra. Queensland Department of Environment and Resource Management, Brisbane.

1.5 Corben's Long-eared Bat

Corben's long-eared bat - *Nyctophilus corbeni*

Photo: Jasmine Vink

Listing Status:

- **EPBC Act**: Vulnerable
- **NC Act**: Vulnerable

Description

A relatively large for a microbat with a head to body length of up to 75mm. Females weigh more than males, up to 21g (DoE 2013). They are a light brown colour on the back, have a lighter stomach colour and long distinct ears.

Ecology

N. corbeni are insectivorous, hunting prey aerially, by foliage gleaning or by hunting on the ground. Prey includes a variety of insects such as moths, beetles, grasshoppers and crickets. They predominantly forage around groups of the trees in the landscape and share this foraging ground with member of their own species and others (DoE 2013). They generally roost alone in dead trees, dead hollows or branches of live trees or under bark. They are highly mobile, choosing a new roost site almost nightly.

- Breeding: Breeding colonies consisting of 10-20 bats have been found in dead trees including ironbarks, cypress and buloke. Their breeding ecology is not well known but lactating females have been captured in QLD and NSW in November (Schulz and Lumsden 2010).

Corben's long-eared bat - *Nyctophilus corbeni*

- Habitat: They are found in a variety of woodland habitat including brigalow, ironbark/cypress woodlands, buloke woodlands, mallee and river red gum forest. They are the most common in the iron bark/cypress pine woodlands in large stands of vegetation. They prefer areas with a distinct tree canopy with a dense mid and understory. The disturbed condition of the vegetation at the Project site suggests that this does not represent core habitat for this species.
- *N. corbeni* have not been confirmed on site but their calls cannot be distinguished from other members of their genus. *Nyctophilus spp.* calls were recorded across the site and two Least Concern *Nyctophilus spp (N. geoffroyi* and *N. gouldi*) were confirmed (captured in harp trap) close to the unconfirmed echolocation records. Potential habitat on site includes highly vegetated gullies, waterways, vine thicket edges and areas of dense vegetation.

Impacts

- Direct death and injury of bats during vegetation clearing.
- Impacts from turbine strike—considered unlikely due to their ecology.
- disturbance of maternity roosts—could be significant for local populations as they seem to naturally have a low population density.

Management approach

- The project environmental objective is *to protect EPBC (and NC) Act threatened bird and bat species*.
- Management measures which will assist to protect *N. corbeni* include (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan):
  - Sensitive clearing techniques for potential HBTs (Section 5.4.4).
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).
  - Bushfires are a threat to the conservation of this species (through loss of habitat and direct mortality). Appropriate burning practices and other procedures to minimise fire threat at the Project Area include maintained separation distances between infrastructure and vegetation, commitment to mowing and slashing to reduce fuel load, fire-fighting equipment and water on site (Section 5.6.1).

References

- DoEE (2013) Species Profile and Threats Database: *Nyctophilus corbeni* — Corben's Long-eared Bat, South-Eastern Long-eared Bat. http://apps.internal.environment.gov.au/cgibin/sprat/intranet/showspecies.pl?taxon_id=83395
- Schulz M and Lumsden L (2010). Draft national recovery plan for the south-eastern long-eared bat *Nyctophilus corbeni*. Victorian Government Department of Sustainability and Environment. Melbourne, Australia.

1.6 Grey Falcon

Grey Falcon - *Falco hypoleucos*

Photo: David Stowe Photography

Listing Status

- **EPBC Act:** Vulnerable
- **NC Act**: Vulnerable

Sensitivity: Low

Description

30-45cm in length. The wings are grey with black tips and the wings and tails are lightly barred. The underside is pale grey to white and their feet, eye rings and nostrils are yellow.

Ecology

- Home range is estimated to be more than 100km^2.
- Grey falcons will use unoccupied stick nests, generally from crows and ravens, to nest in. They lay 2-3 eggs between winter and late spring (NSW Scientific Committee 2009).
- Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, they are occasionally found in open woodlands near the coast during drought. Also occurs near wetlands where surface water attracts prey.

Grey Falcon - *Falco hypoleucos*

- Only a single individual was seen on one occasion. Very few records of species in the area, suggesting this individual may be a vagrant. Low probability of population-level impact.
- One sighting of this species above a ridgeline in the central portion of the Project area.

Impacts

- Potential impacts include the disturbance of a breeding place, rotor strike and the avoidance of the area due to operating wind turbines.
- These impacts are considered unlikely, due to the high likelihood of the single sighted bird (during pre-approval ecological surveys) being a vagrant. It is unlikely that the site constitutes a usual area of its home range and it is further deemed unlikely that breeding occurs at the site.

Management Approach

- The project's environmental objective is that *protected fauna will not be killed or injured as a result of the Project.*
- Management measures which benefit Grey Falcon within the Project Area, and which have regard for conservation priorities suggested in Department of the Environment (2019) include:
  - Supporting improved fire management: Appropriate burning practices and other procedures to minimise fire threat at the Project Area include maintained separation distances between infrastructure and vegetation, commitment to mowing and slashing to reduce fuel load, fire-fighting equipment and water on site (Section 5.6.1).
  - Identifying nesting trees (considered unlikely to occur) through pre-clearance surveys (Section 5.3.3).
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation) (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan).

References

- NGH Environmental (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour
- NSW Scientific Committee (2009) Grey Falcon *Falco hypoleucos*. Review of current information in NSW. July 2009. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.
- Department of the Environment (2019). Consultation Documentation on Listing Eligibility and Conservation Actions *Falco hypoleucos* (Grey Falcon). Australian Government. https://www.environment.gov.au/system/files/consultations/ad34afee-a901-4c94-8e71-654e9f15f29c/files/consultation-document-falco-hypoleucos.pdf

1.7 Ornamental Snake

Ornamental Snake – *Denisonia maculata*

Listing Status:

- **EPBC Act**: Vulnerable
- **NC Act**: Vulnerable

Description

A member of the Elapidae family, the Ornamental Snake is venomous and feeds exclusively on frogs. It has a stout body, growing up to 50 cm in length. Brown, grey-brown or black in colour with lighter coloured smooth body scales, often with darker streaks/flecks. The crown of the head is darker brown/black with lighter flecks, it has distinctly barred lips with enlarged hollow fangs in the front of the mouth. The belly is a white/cream with dark spots/flecks on the outer edges, (Cogger 2000).

Ecology

- The Ornamental Snake is a viviparous species with a mean litter size of 6.8 (range of 3–11, n = 4). Minimum snout-vent length of sexually mature animals is 24.7 cm for females and 23.0 cm for males (Shine 1983).

Ornamental Snake – *Denisonia maculata*

- Habitat: The Ornamental Snake's preferred habitat is within, or close to, habitat that is favoured by its prey; frogs. The species is known to occur in Brigalow (*Acacia harpophylla)* woodlands and open forests associated with moist areas, particularly around gilgai formations (melon-hole) in swelling and deep cracking clay soils on alluvial floodplains). Gilgai formations are found where deep-cracking alluvial soils with high clay contents occur (Brigalow Belt Reptiles Workshop 2010). This species is capable of flattening its body to squeeze through narrow spaces or cracks in the earth.
- Confirmed to occur within the road reserve in the Stage 3 area (identified during targeted surveys in May; NGH, 2021)
- Highly likely to occur in areas where there is suitable habitat, i.e., cracking clay soil
- Considered unlikely to occur in Stage 1 and 2 area.

Impacts

- Potential project-related impacts include direct removal of habitat and through direct mortality during clearing, also indirect impacts through loss of habitat for prey species (frogs) e.g. removal of drainage depressions during construction that provide habitat for frogs.
- The ornamental snake inhabits deep cracks in the soil and is often killed during earthworks when the cracks are excavated.
- They are difficult to trap which makes pre-clearance trapping ineffective.
- Preparation of this BMP, including pre-clearance surveys, combined with mobile nature of species means that direct impacts during construction are unlikely.

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened fauna species.*
- Management measures which benefit the ornamental snake within the Project Area, and which have regard for conservation priorities include:
  - Increasing community awareness and species knowledge
  - Implementing land management practices to reduce threats to individuals and broader populations
  - Maintain habitat connectivity and retain microhabitat features
  - Mitigating the risk of vehicle strike by educating on-site contractors, and by enforcing strict speed limits (Section 5.6.1).
  - Species and potential habitat identified through pre-clearance surveys (Section 5.3.3) and avoided during clearing.
  - Bushfires can be a threat to the conservation of this species (through loss of habitat and direct mortality). Appropriate burning practices and other procedures to minimise fire threat at the Project Area include maintained separation distances between infrastructure and vegetation, commitment to mowing and slashing to reduce fuel load, fire-fighting equipment and water on site (Section 5.6.1).
  - Pest animal management which will reduce threat of predation (Appendix B).

References

- Atlas of Living Australia (ALA) Denisonia maculata : Ornamental Snake | Atlas of Living Australia (ala.org.au)
- Cth DCCEEW, SPRAT Profile: Denisonia maculata —Ornamental Snake. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1193
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011m). Survey guidelines for Australia's threatened reptiles. EPBC Act survey guidelines 6.6 . Canberra, ACT: DSEWPaC
- NGH (2021), Due diligence ecological assessment: Clarke Creek Wind Farm Offsite roads, produced for Gold Wind Australia

2 Migratory birds

2.1 White-throated Needletail

White-throated Needletail - *Hirundapus caudacutus*

Photograph by Roland Speck, distributed under a CC BY 2.0 license

Listing Status:

- **EPBC Act**: Vulnerable, Migratory and Marine
- **NC Act**: Vulnerable

Description

- The White-throated Needletail is a large (20 cm in length and approximately 115–120 g in weight) swift with a thickset, cigar-shaped body, stubby tail and long pointed wings.
- Breeding does not occur in Australia
- In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1,000 m above the ground (Coventry 1989; Tarburton 1993). Because of this, conventional habitat descriptions are inapplicable (Cramp, 1985).
- It forages over a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats (Tarburton 1993; Templeton 1991),
- Migratory aerial species, found in Australian Eastern states and Territories.
- Recorded at the Site in the northern and central areas.

Impacts

- Potential impacts include rotor strike and avoidance of the area.
- Less than 5% of the habitat within the study area will be removed with large tracts of habitat available in the surrounding area. No high use flight paths are known or were identified during the site survey. No breeding areas or ecologically significant areas were identified within the project footprint. Given the above, it is unlikely that the project will have a significant impact on this species.

Management Approach

- The project environmental objective is *to protect EPBC (and NC) Act threatened bird and bat species*.
- Management measures which will assist to protect White-throated Needletail include (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan):
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).

References

- Coventry, P. (1989). Comments on airborne sightings of White-throated Needletails Hirundapus caudacutus. Australian Bird Watcher. 13:36-37.
- Cramp, S. (1985). Handbook of the Birds of Europe, the Middle East and North Africa: The Birds of the Western Palearctic. Volume 4. Oxford: Oxford University Press.
- NGH Environmental (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour
- Tarburton, M.K. (1993). Radiotracking a White-throated Needletail to roost. Emu. 93:121--124.
- Templeton, M.T. (1991). Birds of scientific area S.A.16, Marbletop, Nanango, Queensland. Sunbird. 21:19-25.:

2.2 Rainbow Bee-eater

Rainbow Bee-eater - *Merops ornatus*

Photo: David Stowe Photography

Listing Status:

- **EPBC Act**: Marine
- **NC Act:** Least Concern

Description

- Rainbow bee-eaters are brilliantly coloured birds that grow to be 19–24 cm (max 28 cm) in length, including the elongated tail feathers.
- They are a common species and are widely distributed across mainland Australia.
- Rainbow bee-eaters are very social birds and when they are not breeding, they roost together in large groups in dense undergrowth or large trees.
- They occur mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation (Higgins, 1999).
- The nest is located in an enlarged chamber at the end of long burrow or tunnel that is excavated in flat or sloping ground, in the banks of rivers, creeks or dams, in roadside cuttings, in the walls of gravel pits or quarries, in mounds of gravel, or in cliff-faces (Fry 1984).
- Rainbow bee-eaters are a common species and were recorded frequently throughout the site. This included around water bodies and along ridgelines.

Impacts

- Potential impacts include rotor strike and avoidance of the area.
- Less than 5% of the habitat within the study area is to be removed with large tracts of habitat available in the surrounding area. No high-use flight paths are known or were identified during the site survey. No breeding areas or ecologically significant areas were identified within the project footprint. Given the above, it is unlikely that the project will have a significant impact on this species.

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened bird and bat species*.
- Management measures which will assist to protect Rainbow Bee-eater include (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan):
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).

References

- Fry, C.H. (1984). The Bee-eaters. In: Book. Poyser, Calton, England.
- Higgins, P.J. (ed.) (1999). Handbook of Australian, New Zealand and Antarctic Birds. Volume Four – Parrots to Dollarbird. Melbourne: Oxford University Press.
- NGH Environmental *et al.* (2017), Ecological Assessment: Clarke Creek Wind Farm Project, produced for Lacour

2.3 Rufous Fantail

Rufous Fantail – *Rhipidura rufifrons*

Photograph by Greg B Miles, distributed under a CC BY-SA 2.0 license

Listing Status:

- **EPBC Act**: Migratory and Marine
- **NC Act:** Special Least Concern

Description

- Rufous Fantails are medium sized birds (15cm) with an orange-reddish-brown back, rump and base of tail. They have a black and white breast that grades into a white colour on the chin and throat (Higgins et al, 1999).
- The Rufous Fantail inhabits moist and moderately dense habitats. Within these areas, it has large variations in habitat requirements. They can be found in Eucalyptus forests, mangroves, rainforests and woodlands (usually near a river or a swamp).
- Rufous Fantails will generally occupy the lower levels of their habitat, the understorey or the subcanopy, straying no further than 6m from the ground.
- Rufous fantails were recorded in the northern, central and southern portions of the site.

Impacts

- Potential impacts include rotor strike and avoidance of the area.
- Less than 5% of the habitat within the study area is to be removed with large tracts of habitat available in the surrounding area. No high use flight paths are known or were identified during the site survey. No breeding areas or ecologically significant areas were identified within the project footprint. Given the above, it is unlikely that the project will have a significant impact on this species.

Management Approach

- The project's environmental objective is *to protect EPBC (and NC) Act threatened bird and bat species*.
- Management measures which will assist to protect Rufous Fantail include (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan):
  - Project design has minimised clearing along waterways (suitable habitat for this species).
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).

References:

- Fry, C.H. (1984). The Bee-eaters. In: Book. Poyser, Calton, England.
- Higgins, P.J. (ed.) (1999). Handbook of Australian, New Zealand and Antarctic Birds. Volume Four - Parrots to Dollarbird. Melbourne: Oxford University Press.
- NGH Environmental *et al.* (2017), Ecological Assessment: Clarke Creek Wind Farm Project, produced for Lacour

2.4 Satin Flycatcher

Satin Flycatcher - *Myiagra cyanoleuca*

Photograph by Aviceda at English Wikipedia, distributed under a CC BY 3.0 license

Listing Status:

- **EPBC Act:** Migratory and Marine
- **NC Act:** Special Least Concern

Description

- The Satin Flycatcher is a small blue-black and white bird with a small crest. Male Satin Flycatchers have a glossy blue-black head, breast and upperparts that give the species its name. Females have prominent brownish orange feathers on the throat and chin.
- Ecology: The Satin Flycatcher is a very active, mobile bird that is almost never still. They dart from branch to branch or make dashing flights to catch insects. Even when they land on a branch they are continually on the move, wagging the tail from side to side or quivering it up and down (Birdlife Australia 2019).
- Breeding: Satin Flycatchers prefer to nest in a fork of outer branches of trees, such as paperbarks, eucalypts, and banksias. They nest in the same locality each year, and sometimes in the same tree (BA NRS 2002)
- Habitat**:** Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (Emison *et al*. 1987).
- Satin flycatchers were recorded in the northern, central and southern portions of the site.

Impacts

- Potential impacts include rotor strike and avoidance of the area.
- Less than 5% of the habitat within the study area is to be removed with large tracts of habitat available in the surrounding area.
- No high use flight paths are known or were identified during the site survey. No breeding areas or ecologically significant areas were identified within the project footprint.
- Given the above, it is unlikely that the project will have a significant impact on this species.

Management Approach

- The project's environmental objective is *to protect EPBC Act threatened bird and bat species*.
- Management measures which will assist to protect the Satin Flycatcher include (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan):
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).

References

- NGH Environmental *et al*. (2017), Ecological Assessment: Clarke Creek Wind Farm Project, produced for Lacour
- Birdlife Australia, [Website, accessed 12/4/2019] Satin Flycatcher] http://www.birdlife.org.au/bird-profile/satin-flycatcher
- Emison,W.B., C.M. Beardsell, F.I. Norman, R.H. Loyn & S.C. Bennett (1987). *Atlas of Victorian Birds*. Melbourne: Department of Conservation (Forest & Lands) & Royal Australian Ornithological Union.
- BA NRS (2002). Birds Australia Nest Record Scheme.

2.5 Fork-tailed Swift

Fork-tailed Swift – *Apus pacificus*

Photo: Robert Pudwill (wikipedia commons)

Listing Status:

- **EPBC Act**: Migratory and Marine
- **NC Act:** Special Least Concern

Description

- The fork-tailed swift is a medium sized swift with a wingspan of 40-42cm. Its colouration is predominantly black with a white band across its tail. It is defined by a long and deeply forked tail.
- Fork-tailed swifts do not breed in Australia but can be found in every state. They occupy Australia from October to mid-April.
- This species is almost entirely aerial ranging from 1-300m in height and probably higher (DoE 2019).
- They forage aerially, following low pressure systems. Their diet is not well studied but it consists of various insects (Higgins 1999).
- They are predominantly found over inland plains but can also be found over coastal areas, cliffs, beaches, foothills and out to sea.
- Not recorded on site but suitable habitat occurs in gully heads, ridge lines, deep valleys and escarpments across the site.

Impacts

- Potential impacts include rotor strike and avoidance of the area.
- There are no significant threats to this species in Australia, and given the wide range, impacts within Australia are thought to be negligible.
- Less than 5% of the suitable habitat for this species within the study area is to be removed, with large tracts of habitat available in the surrounding area. No high use flight paths are known or were identified during the site survey. No breeding areas or ecologically significant areas were identified within the project footprint. Given the above, it is unlikely that the project will have a significant impact on this species.

Management Approach

- The project's environmental objective is *to protect EPBC Act threatened bird and bat species*.
- Management measures which will assist to protect Fork-tailed Swift include (management, including monitoring and mitigation measures are detailed in the separate Clarke Creek Wind Farm Bird and Bat Management Plan):
  - Operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).

References

- Department of the Environment (2019). *Apus pacificus* in Species Profile and Threats Database, Department of the Environment, Canberra. http://www.environment.gov.au/sprat. Accessed Thu, 11 Apr 2019
- Higgins, P.J. (ed.) (1999). Handbook of Australian, New Zealand and Antarctic Birds. Volume Four - Parrots to Dollarbird. Melbourne: Oxford University Press.
- NGH Environmental *et al.* (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour

3 Threatened flora

3.1 Cycad species

Cycas megacarpa

Photo: Jasmine Vink

Listing Status:

- **EPBC Act**: Endangered
- **NC Act**: Endangered

Description

- Ecology: small to medium sized Cycad with an erect trunk. Stands around 3 m tall and approximately 15 cm wide. Leaves are 70 – 110 cm long, with 120 – 170 leaflets.
- *C. megacarpa* is visually similar to Cycas media (listed as Least Concern under the NC Act) which also occurs within the area. These two species can be distinguished by *C. megacarpa* having larger seeds, shorter and more strongly keeled leaves with fewer leaflets and a slender trunk. *C. megacarpa* is distinguished from *C. ophiolitica* by the green new growth and larger seeds.
- Seeds are ripe from March onwards. Seeds drop from the megasporophylls, and do not germinate for at least nine months.
- Habitat: Found in woodland and open forest, often in conjunction with a grassy understory. Found in habitat dominated by *Eucalyptus crebra* and *Corymbia citriodora.*
- *C. megacarpa* may occur within the Project area (**Figure 1 - 1**). Cycad species were mainly recorded in good quality remnant patches of woodland and open forest dominated by narrow-leaved ironbark (*Eucalyptus crebra*) (regional ecosystem, RE 11.12.1/11.12.1a) and to a lesser extent, spotted gum (*Corymbia citriodora*) open forest (RE 11.12.6a).

Impacts

- Potential impacts include the disturbance and removal of individuals during the clearing process.
- Due to the low impact that the project will have on the habitat for this species and the proposed mitigation measures, it is considered that no significant residual impact will occur on this species.

Management Approach

- The project's environmental objective: *No net loss of threatened Cycad individuals*. This aligns with the recovery plan objective (Queensland Herbarium, 2007), which is to prevent further loss of individuals, populations, pollinator species and habitat critical to the species survival. This objective applies to any cycads threatened under the EPBC Act and/or the NC Act.
- Management measures consistent with Queensland Herbarium (2007) which benefit threatened Cycads within the Project Area include:
  - Cycads are being translocated with a commitment to appropriate, long-term management at the recipient site
  - Propagation will compensate for any failed translocation
  - Loss of individuals and populations from illegal harvesting and destruction are prevented by ensuring all translocation is under relevant permits and licences, and the storage and recipient site are secured and monitored.
  - Monitoring is long-term (10 years), contributing to an understanding of the effects of management practices on a population over time.

References

- NGH Environmental *et al.* (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour
- Queensland Herbarium (2007). National Multi-species Recovery Plan for the cycads, *Cycas megacarpa, Cycas ophiolitica, Macrozamia cranei, Macrozamia lomandroides, Macrozamia pauli-guilielmi* and *Macrozamia platyrhachis* Report to the Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane.

Cycas ophiolitica

Photo: Luke Hogan

Listing Status:

- **EPBC Act**: Endangered
- **NC Act**: Endangered

Description

- Ecology: small to medium sized cycad with an erect trunk and rounded crown. Grows to 2 m tall, though it can reach 4 m, with a trunk diameter of 4–20 cm. The glossy blue-green / dark green leaves are 95–140 cm long, with 170–220 pinnae (leaflets). New growth is bluish-green, densely hairy with grey-white or pale orange-brown hairs that persist as leaves age.
  Figure E.3.1 below compares the character state of ***C. ophiolitica*** with ***C. media*** and ***C. terryana***, which are challenging to distinguish between.
- Seeds are ripe from March onwards. Seeds drop from the megasporophylls, and do not germinate for at least nine months.
- Habitat: Found on hills and slopes in sparse, grassy open forests, in association with *Corymbia dallachiana, Eucalyptus crebra,* and *Eucalyptus tereticornis.*
- Cycad species were mainly recorded in good quality remnant patches of woodland and open forest dominated by narrow-leaved ironbark (*Eucalyptus crebra*) (regional ecosystem, RE 11.12.1/11.12.1a) and to a lesser extent, spotted gum (*Corymbia citriodora*) open forest (RE 11.12.6a).

Impacts

- Potential impacts include the disturbance and removal of individuals during the clearing process.
- Due to the low impact that the project will have on the habitat for this species and the proposed mitigation measures, it is considered that no significant residual impact will occur on this species.

Management Approach

- As per *C. megacarpa*.

References

- Forster, P. (2011). *Cycas terryana* P.I.Forst. (Cycadaceae), a new species from central Queensland. *Austrobaileya* 8(3): 356-363
- NGH Environmental *et al.* (2017), *Ecological Assessment: Clarke Creek Wind Farm Project*, produced for Lacour
- Queensland Herbarium (2007) National Multi-species Recovery Plan for the cycads, *Cycas megacarpa, Cycas ophiolitica, Macrozamia cranei, Macrozamia lomandroides, Macrozamia pauli-guilielmi* and *Macrozamia platyrhachis* Report to the Department of the Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane.

Character State	*C. media*	*C. ophiolitica*	*C. terryana*
Mature leaf indumentum	glabrous	tomentose below and on rhachis	tomentose below and on rhachis
Leaflet insertion	± flat to weakly keeled	strongly keeled	keeled
Leaflet number	160–300	170–220	184–320
Leaflet colour mature leaves	glossy green	glaucous grey-blue	glossy green to glaucous green-grey
Leaflet texture	flexible to weakly brittle	flexible	strongly brittle
New growth indumentum colour	pale orange-brown	mixture of grey-white and pale orange-brown	pale grey-fawn
Cataphyll indumentum colour	orange-brown	orange-brown	pale grey-fawn
Megasporophyll indumentum	ferruginous or grey	brown	fawn-tan
Megasporophyll width (mm)	17–30	12–30	30–38
Seed sarcotesta colour	green becoming orange-yellow, not pruinose	green becoming yellowish, pruinose	green becoming orange, not or only weakly pruinose
Seed size: length × wide (mm)	31–38 × 26–32	29–33 × 28–32	37–40 × 30–35

Figure E.3.1 Comparison of character states for *C. media, C. ophiolitica* and *C. terryana* (from Forster, 2011).

4 Threatened vegetation communities

4.1 Semi-Evergreen Vine Thickets of the Brigalow Belt

Semi-Evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions

Photo: Green Tape Solutions

Listing Status:

- **EPBC Act**: Threatened Ecological Community
- **NC Act**: Endangered

Description

- Composed of Semi-Evergreen Vine Thicket (SEVT) with emergent eucalypts and/or Brachychiton species.
- Generally restricted to hillsides, and typically observed in small pockets and on western-facing slopes. Often found on poor, rocky soil, but with high levels of organic matter/leaf litter.
- Resistant to high-level disturbance, due to its dense nature and fire-retardant species. Susceptible to weed incursion after disturbance (TSSC 2001).
- Contained evidence of threatened species (Koala, *Cycas megacarpa*, Grey Falcon sighting).
- This vegetation community is found throughout the site in the north, central and southern portions. Some larger tracts are located in the west, east and south (see Appendix A).

Impacts

- Potential project-related impacts include the direct clearing of this vegetation community, edge effects from clearing, weed incursion from clearing and fragmentation.
- A maximum of 45.22 ha of SEVT will be cleared as a result of the Project.
- Ground truthing found large areas of this vegetation community which were not mapped by DNRME. Impacts will be to less than 1% of SEVT within the project area. This clearing area is considered to be a negligible reduction in the extent of the SEVT EEC at both a local and regional scale.

Management Approach

- The Project's environmental objective: *Improve the condition and management of retained SEVT* vegetation in the Project Area. This considers the overall recovery objective for this TEC, which is to 'maintain and conserve the environmental values of the semi-evergreen vine thicket ecological community over the long term, by minimising the loss of both remnant and regrowth SEVT and improving their condition and management' (McDonald 2010).
- Management measures consisted with McDonald (2010) which will benefit SEVT TEC within the Project Area include:
  - Appropriate burning practices and other procedures to minimise fire damage to remnant areas of SEVT, including maintained separation distances between infrastructure and vegetation, commitment to mowing and slashing to reduce fuel load (outside of SEVT TEC), fire-fighting equipment and water on site (Section 5.6.1).
  - Sediment and erosion controls in place and maintained to reduce impacts from runoff (Section 5.6.1).
  - Pest animal management program to control/manage feral animals (Appendix B).
  - Condition and extent of SEVT will be further enhanced through actions under the Clarke Creek Wind Farm Offsets Strategy & Management Plan.

References

- NGH Environmental et al. (2017), Ecological Assessment: Clarke Creek Wind Farm Project
- Threatened Species Scientific Committee (2001) Commonwealth Listing Advice on Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions www.ea.gov.au/biodiversity/threatened/communities/sevt.html.
- McDonald, W.J.F (2010). National recovery plan for the "Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions" ecological community. Report to Department of the Environment, Water, Heritage and the Arts, Canberra. Queensland Department of Environment and Resource Management, Brisbane. In effect under the EPBC Act from 12-Mar-2010.

Appendix F Habitat features including animal breeding places (2021 survey)

Latitude	Longitude	Date	Habitat feature	Notes
-22.9379	149.4974	3/03/2021	other habitat feature	Entire edge of turbine pad is rocky escarpment
-22.9371	149.4977	3/03/2021	rock pile	Several large outcrops over 40m radius on turbine pad
-22.9319	149.4954	3/03/2021	rock pile	
-22.9374	149.4971	3/03/2021	hollow bearing tree	E.crebra 8m 10cm wide ×2
-22.9343	149.4973	3/03/2021	hollow bearing tree	E.crebra 4m high 5cm wide
-22.9343	149.4973	3/03/2021	hollow bearing tree	E.crebra 8m high 5cm wide
-22.9366	149.4979	3/03/2021	rock pile	Outcrop
-22.9353	149.4978	3/03/2021	rock pile	
-22.9305	149.4935	3/03/2021	hollow bearing tree	E.crebra 8m 30cm horizontal
-22.9303	149.4938	3/03/2021	rock pile	
-22.9303	149.493	3/03/2021	rock pile	3 large outcrops in vicinity within 20m of each other
-22.9304	149.4933	3/03/2021	hollow bearing tree	E.crebra 4m 10cm
-22.931	149.4947	3/03/2021	hollow bearing tree	E.crebra 6m 10cm and 5cm
-22.9312	149.4948	3/03/2021	hollow bearing tree	Stag dead 4m 15cm
-22.9305	149.4942	3/03/2021	rock pile	Several outcrops in radius 50m
-22.9308	149.4944	3/03/2021	hollow bearing tree	4m 5cm stag
-22.9328	149.4977	3/03/2021	hollow bearing tree	4m high dead stag 20cm wide
-22.9332	149.4979	3/03/2021	hollow bearing tree	6m off the ground E. crebra 10cm wide
-22.9322	149.4978	3/03/2021	hollow bearing tree	Possibly actively inhabited. 4m high 10cm wide E. crebra
-22.9325	149.4975	3/03/2021	hollow bearing tree	10m high E. crebra 10cm
-22.8882	149.4655	3/03/2021	rock pile	
-22.8883	149.4665	3/03/2021	rock pile	Strangely more rocky on the hillside... going back to track.
-22.9337	149.4975	3/03/2021	hollow bearing tree	Microbat habitat
-22.9338	149.4975	3/03/2021	hollow bearing tree	Stag 4m high 10cm wide
-22.932	149.4982	3/03/2021	rock pile	Large outcrop 30m thicker veg
-22.9317	149.4977	3/03/2021	rock pile	Outcrop
-22.934	149.4972	3/03/2021	hollow bearing tree	10m E.crebra 10cm wide
-22.9327	149.498	3/03/2021	hollow bearing tree	8m high E.crebra 10cm wide
-22.9318	149.4976	3/03/2021	hollow bearing tree	E.crebra 6m high 30cm wide stag
-22.9319	149.4976	3/03/2021	hollow bearing tree	4m E. crebra 5cm wide
-22.9318	149.4976	3/03/2021	hollow bearing tree	
-22.9318	149.4975	3/03/2021	rock pile	
-22.9247	149.5028	4/03/2021	hollow bearing tree	
-22.9239	149.5019	4/03/2021	rock pile	
-22.9259	149.5048	4/03/2021	rock pile	
-22.9257	149.5041	4/03/2021	rock pile	
-22.9217	149.4978	4/03/2021	hollow bearing tree	Corymbia sp. 15m &17m 30cm & 15cm

-22.9218	149.4973	4/03/2021	hollow bearing tree	
-22.9234	149.4996	4/03/2021	Nest	Eagle nest about 10m down slope 12m up dead Corymbia sp. Well maintained i.e. witnessed 2 wedgetailed Eagles soaring near ridge.
-22.9217	149.4982	4/03/2021	hollow bearing tree	E.crebra 12m 8cm
-22.9279	149.509	4/03/2021	rock pile	
-22.9277	149.5082	4/03/2021	hollow bearing tree	E.crebra 12m 5cm ×2
-22.9269	149.5104	4/03/2021	rock pile	Rocky outcrop and edge of escarpment
-22.9276	149.5096	4/03/2021	hollow bearing tree	E.crebra 10m 15cm
-22.9268	149.5068	4/03/2021	rock pile	
-22.9267	149.5064	4/03/2021	rock pile	
-22.9277	149.5081	4/03/2021	rock pile	
-22.927	149.5071	4/03/2021	rock pile	
-22.9251	149.4914	3/03/2021	rock pile	
-22.9239	149.4913	3/03/2021	rock pile	
-22.9221	149.4917	3/03/2021	rock pile	Creek bed
-22.9252	149.4919	3/03/2021	hollow bearing tree	E.crebra 4m 10cm
-22.9288	149.4928	3/03/2021	rock pile	
-22.9294	149.493	3/03/2021	rock pile	
-22.9243	149.4916	3/03/2021	rock pile	
-22.9284	149.4926	3/03/2021	rock pile	Thicket
-22.9211	149.4951	4/03/2021	rock pile	
-22.92	149.4942	4/03/2021	rock pile	
-22.9219	149.4956	4/03/2021	rock pile	Large outcrop Gully line
-22.9212	149.4952	4/03/2021	hollow bearing tree	E.crebra 6m 10cm
-22.9263	149.4929	3/03/2021	rock pile	
-22.9231	149.492	3/03/2021	hollow bearing tree	Dead E.crebra stag 6m 10cm
-22.9197	149.4925	4/03/2021	rock pile	
-22.9192	149.4914	4/03/2021	rock pile	Rocky Gully line
-22.9141	149.4992	4/03/2021	hollow bearing tree	E.crebra 3m 4cm
-22.9188	149.5014	4/03/2021	hollow bearing tree	Stag 6m 10cm
-22.9137	149.4991	4/03/2021	hollow bearing tree	E.crebra 6m 20cm
-22.9137	149.4992	4/03/2021	hollow bearing tree	E.crebra 3m 20cm spout
-22.9177	149.5001	4/03/2021	hollow bearing tree	E.crebra 6m 30cm
-22.9177	149.5001	4/03/2021	hollow bearing tree	E.crebra 6m 15cm
-22.9188	149.5013	4/03/2021	hollow bearing tree	E.crebra 8m 10cm
-22.9188	149.5013	4/03/2021	rock pile	
-22.9122	149.4987	4/03/2021	hollow bearing tree	E.crebra 5m 5cm
-22.9121	149.4988	4/03/2021	hollow bearing tree	E.crebra 6m 10cm
-22.9117	149.4973	4/03/2021	hollow bearing tree	Stag
-22.9121	149.4976	4/03/2021	hollow bearing tree	E.crebra 6m 5cm
-22.913	149.4993	4/03/2021	hollow bearing tree	E.crebra 8m spout 20cm
-22.9135	149.4992	4/03/2021	rock pile	Thicket
-22.9122	149.499	4/03/2021	hollow bearing tree	E.crebra 4m 5cm
-22.9127	149.4995	4/03/2021	rock pile	

-22.9233	149.5082	4/03/2021	hollow bearing tree	Stag
-22.9234	149.5082	4/03/2021	rock pile	Outcrop with vine thicket
-22.9228	149.5091	4/03/2021	rock pile	Several outcrops surround the edge of the turbine pad.
-22.9229	149.5089	4/03/2021	hollow bearing tree	E.crebra 5m 10cm
-22.9257	149.5094	4/03/2021	rock pile	
-22.9262	149.5096	4/03/2021	rock pile	
-22.9242	149.5085	4/03/2021	hollow bearing tree	E.crebra 8m 8cm wide
-22.9249	149.5095	4/03/2021	rock pile	Large outcrop 30m
-22.9162	149.4996	4/03/2021	hollow bearing tree	E.crebra 8m 15cm
-22.9161	149.4996	4/03/2021	hollow bearing tree	E.crebra 6m 10cm
-22.9175	149.4999	4/03/2021	hollow bearing tree	Stag 4m 10cm
-22.9171	149.4998	4/03/2021	hollow bearing tree	E.crebra 8m 5cm
-22.9303	149.5134	4/03/2021	hollow bearing tree	Stag 3m 10cm
-22.9303	149.5132	4/03/2021	hollow bearing tree	Stag 8m 30cm
-22.9163	149.4999	4/03/2021	hollow bearing tree	Stag 8m 30cm
-22.9299	149.5131	4/03/2021	hollow bearing tree	E.crebra 10m 10cm
-22.866	149.4606	4/03/2021	hollow bearing tree	
-22.8657	149.4605	4/03/2021	rock pile	
-22.8674	149.4629	4/03/2021	rock pile	With SEVT species
-22.8653	149.4616	4/03/2021	hollow bearing tree	
-22.8639	149.4564	4/03/2021	rock pile	
-22.862	149.4557	4/03/2021	hollow bearing tree	Large number of hollow bearing trees along ridgeline
-22.8659	149.461	4/03/2021	hollow bearing tree	
-22.8636	149.4561	4/03/2021	hollow bearing tree	
-22.8923	149.4761	4/03/2021	hollow bearing tree	
-22.8925	149.4761	4/03/2021	rock pile	
-22.8907	149.4754	4/03/2021	rock pile	Many rock piles on corridor and ridgeline
-22.8915	149.4759	4/03/2021	rock pile	
-22.894	149.4775	4/03/2021	rock pile	
-22.8942	149.4775	4/03/2021	hollow bearing tree	
-22.8932	149.4768	4/03/2021	hollow bearing tree	
-22.8936	149.4773	4/03/2021	hollow bearing tree	
-22.8577	149.4538	4/03/2021	hollow bearing tree	
-22.8575	149.4541	4/03/2021	hollow bearing tree	
-22.8603	149.4538	4/03/2021	hollow bearing tree	
-22.8576	149.4536	4/03/2021	hollow bearing tree	
-22.9097	149.4957	4/03/2021	rock pile	
-22.9104	149.497	4/03/2021	rock pile	
-22.8571	149.4535	4/03/2021	hollow bearing tree	
-22.9095	149.4953	4/03/2021	rock pile	
-22.8625	149.4554	4/03/2021	hollow bearing tree	
-22.8627	149.455	4/03/2021	hollow bearing tree	
-22.8613	149.455	4/03/2021	hollow bearing tree	
-22.8619	149.4558	4/03/2021	hollow bearing tree	

-22.8613	149.4545	4/03/2021	hollow bearing tree	
-22.8604	149.4539	4/03/2021	hollow bearing tree	Many HBT s on ridgeline
-22.862	149.4548	4/03/2021	hollow bearing tree	
-22.8618	149.4547	4/03/2021	hollow bearing tree	
-22.8619	149.4582	4/03/2021	hollow bearing tree	Multiple
-22.8617	149.4571	4/03/2021	other habitat feature	Arboreal termite mound
-22.8622	149.459	4/03/2021	hollow bearing tree	Multiple habitat trees. Radius 10m
-22.8619	149.4585	4/03/2021	hollow bearing tree	Multiple habitat trees in area. Radius of 15
-22.862	149.4566	4/03/2021	other habitat feature	Arboreal termite mound
-22.8616	149.4562	4/03/2021	other habitat feature	Arboreal termite mound/ hollow
-22.8618	149.457	4/03/2021	other habitat feature	Arboreal termite mound
-22.8621	149.4565	4/03/2021	hollow bearing tree	
-22.8635	149.4609	4/03/2021	hollow bearing tree	Arboreal termite mound
-22.8633	149.4604	4/03/2021	hollow bearing tree	
-22.8646	149.4607	4/03/2021	hollow bearing tree	Stag
-22.8637	149.4607	4/03/2021	hollow bearing tree	Multiple
-22.8626	149.4608	4/03/2021	hollow bearing tree	
-22.8627	149.4607	4/03/2021	hollow bearing tree	Multiple
-22.8634	149.4603	4/03/2021	hollow bearing tree	Multiple
-22.8624	149.46	4/03/2021	rock pile	
-22.8579	149.4528	4/03/2021	hollow bearing tree	Stag
-22.8574	149.4527	4/03/2021	hollow bearing tree	Multiple
-22.8593	149.4543	4/03/2021	hollow bearing tree	
-22.858	149.4529	4/03/2021	other habitat feature	Arboreal termite mound
-22.8838	149.468	4/03/2021	rock pile	
-22.8836	149.4681	4/03/2021	rock pile	
-22.8764	149.4639	4/03/2021	hollow bearing tree	Many HBTs
-22.8839	149.468	4/03/2021	rock pile	
-22.8607	149.4555	4/03/2021	hollow bearing tree	Red winged parrots x3/ multiple hollows
-22.8609	149.4555	4/03/2021	hollow bearing tree	Multiple
-22.8613	149.4562	4/03/2021	hollow bearing tree	Multiple x3 stags
-22.8611	149.4562	4/03/2021	other habitat feature	Arboreal termite mound x2
-22.8604	149.4553	4/03/2021	hollow bearing tree	Arboreal termite mound
-22.8604	149.455	4/03/2021	hollow bearing tree	Arboreal termite mound
-22.8605	149.4555	4/03/2021	hollow bearing tree	Stag
-22.8603	149.4554	4/03/2021	hollow bearing tree	Multiple
-22.8908	149.4755	4/03/2021	hollow bearing tree	Multiple along ridge line/corridor
-22.891	149.4757	4/03/2021	hollow bearing tree	
-22.8858	149.4718	4/03/2021	rock pile	
-22.8859	149.4718	4/03/2021	rock pile	
-22.8916	149.4759	4/03/2021	hollow bearing tree	
-22.8919	149.476	4/03/2021	rock pile	
-22.8912	149.4757	4/03/2021	rock pile	
-22.8915	149.4758	4/03/2021	hollow bearing tree	Multiple
-22.884	149.4683	4/03/2021	rock pile	

-22.8843	149.4685	4/03/2021	rock pile	
-22.919	149.4907	4/03/2021	hollow bearing tree	C dallachiana 3m 20cm diam
-22.884	149.4683	4/03/2021	rock pile	
-22.8841	149.471	4/03/2021	other habitat feature	Arboreal termite mound
-22.8843	149.4712	4/03/2021	other habitat feature	Arboreal termite mound
-22.8844	149.4686	4/03/2021	rock pile	
-22.8845	149.4687	4/03/2021	rock pile	
-22.8974	149.4784	4/03/2021	Other	Wild pig
-22.8704	149.4614	4/03/2021	hollow bearing tree	Multiple habitat trees
-22.8973	149.4784	4/03/2021	rock pile	
-22.8976	149.4784	4/03/2021	rock pile	
-22.8695	149.4633	4/03/2021	hollow bearing tree	
-22.8694	149.4644	4/03/2021	other habitat feature	Arboreal termite mound
-22.8703	149.4617	4/03/2021	hollow bearing tree	
-22.8701	149.4621	4/03/2021	hollow bearing tree	
-22.893	149.4767	4/03/2021	rock pile	
-22.8931	149.4767	4/03/2021	hollow bearing tree	Multiple
-22.8926	149.4762	4/03/2021	hollow bearing tree	
-22.8926	149.4762	4/03/2021	rock pile	
-22.8939	149.4774	4/03/2021	hollow bearing tree	Stag
-22.8943	149.4775	4/03/2021	other habitat feature	Arboreal termite mound
-22.8935	149.4772	4/03/2021	rock pile	
-22.8937	149.4774	4/03/2021	hollow bearing tree	Stag
-22.925	149.5086	4/03/2021	hollow bearing tree	E crebra 7m 12cm diam
-22.926	149.5093	4/03/2021	other habitat feature	E crebra c dallachiana ow
-22.9235	149.5079	4/03/2021	rock pile	Minor e crebra ow
-22.9242	149.5082	4/03/2021	hollow bearing tree	E crebra 8m 14cm diam
-22.9277	149.5089	4/03/2021	rock pile	E crebra ow w scattered vine scrub species
-22.9266	149.507	4/03/2021	rock pile	Open woodland w scattered vine scrub species
-22.9271	149.51	4/03/2021	hollow bearing tree	E crebra 3m 14cm diam
-22.9277	149.5094	4/03/2021	other habitat feature	Mainly e crebra, c dallachiana ow w xanthorrhoea johnsoni
-22.9283	149.5098	4/03/2021	other habitat feature	Rocky slope w lots xanthorrhoea
-22.9261	149.5095	4/03/2021	rock pile	Bottle tree in e crebra ow
-22.928	149.5104	4/03/2021	hollow bearing tree	E crebra x2 12m 6 diam
-22.9284	149.5104	4/03/2021	other habitat feature	Rocky slope with xanthorrhoea
-22.9221	149.5091	4/03/2021	rock pile	E crebra ow w scattered vine scrub species
-22.9219	149.5087	4/03/2021	hollow bearing tree	E crebra 12m stage 18cm diam
-22.9224	149.5091	4/03/2021	rock pile	E crebra ow w scattered vine scrub species
-22.9223	149.5092	4/03/2021	rock pile	E crebra ow
-22.9222	149.4962	4/03/2021	hollow bearing tree	E crebra 7m 22cm diam
-22.9216	149.4954	4/03/2021	hollow bearing tree	E crebra 1m 12cm diam
-22.922	149.497	4/03/2021	other habitat feature	Narrow saddle, steep ridge both sides
-22.9221	149.4961	4/03/2021	other habitat feature	Steep boulder gully, difficult construction? Culvert?

-22.9203	149.4948	4/03/2021	rock pile	Minor in open woodland
-22.9195	149.4923	4/03/2021	other habitat feature	Rocky creek crossing
-22.9215	149.4954	4/03/2021	other habitat feature	Steep rocky slope and gully to north east 20degrees
-22.9213	149.4953	4/03/2021	hollow bearing tree	E crebra 2m 11cm diam
-22.9259	149.5057	4/03/2021	hollow bearing tree	E crebra 7m 14cm diam
-22.9257	149.5052	4/03/2021	hollow bearing tree	E crebra 8m 15cm diam
-22.9262	149.5064	4/03/2021	hollow bearing tree	E crebra 11m 12cm diam
-22.926	149.5059	4/03/2021	rock pile	Minor in open woodland w few vine scrub species
-22.9219	149.4981	4/03/2021	hollow bearing tree	E crebra 2m 21cm diam
-22.9218	149.4973	4/03/2021	hollow bearing tree	E crebra 5m 25cm diam
-22.9244	149.503	4/03/2021	hollow bearing tree	E crebra 4m 16cm diam
-22.9133	149.499	4/03/2021	rock pile	Minor in e crebra ow w few vine scrub species
-22.9196	149.5016	4/03/2021	rock pile	Quartz? Around crest In e crebra ow
-22.9127	149.4984	4/03/2021	rock pile	Minor w few vine scrub species
-22.9131	149.4989	4/03/2021	hollow bearing tree	E crebra 2m 18cm diam
-22.9198	149.5009	4/03/2021	rock pile	Quartz ? At base of crest in e crebra ow
-22.9191	149.5005	4/03/2021	hollow bearing tree	E crebra 7m 12cm diam
-22.9198	149.5014	4/03/2021	hollow bearing tree	E crebra 8m 18cm diam
-22.9197	149.5012	4/03/2021	hollow bearing tree	E crebra 12m 12cm diam
-22.91	149.4954	4/03/2021	rock pile	Minor in e crebra ow
-22.9102	149.4948	4/03/2021	rock pile	Broad rocky shelf to north in e crebra ow w brachychiton, jasminum
-22.803	149.4163	5/03/2021	hollow bearing tree	Multiple habitat trees along ridge line
-22.8029	149.4166	5/03/2021	rock pile	
-22.9131	149.4987	4/03/2021	rock pile	Larger vine scrub patch in e crebra ow
-22.9129	149.4987	4/03/2021	hollow bearing tree	E crebra 10m 18cm diam
-22.9119	149.4979	4/03/2021	rock pile	Minor in e crebra ow
-22.9156	149.4992	4/03/2021	hollow bearing tree	E crebra 6m 23cm diam
-22.9299	149.5133	4/03/2021	hollow bearing tree	E crebra 5m 21cm diam
-22.9164	149.4993	4/03/2021	hollow bearing tree	E crebra stag 6m 16cm diam
-22.9163	149.4992	4/03/2021	hollow bearing tree	E crebra 12m 16cm diam
-22.9274	149.511	4/03/2021	hollow bearing tree	E crebra stag 8m 20cm diam
-22.9278	149.5104	4/03/2021	other habitat feature	Rocky crest with lots xanthorrhoea
-22.9294	149.5136	4/03/2021	other habitat feature	Open rocky scree w scattered vine scrub species
-22.9295	149.5133	4/03/2021	hollow bearing tree	E crebra 7m 17cm diam
-22.9183	149.5001	4/03/2021	hollow bearing tree	E crebra 12m 12cm diam
-22.9178	149.5	4/03/2021	hollow bearing tree	E crebra 4m 16cm diam
-22.9188	149.5003	4/03/2021	hollow bearing tree	E crebra 7m 15cm diam
-22.9185	149.5001	4/03/2021	hollow bearing tree	E crebra 5m 14cm diam
-22.9167	149.4995	4/03/2021	hollow bearing tree	E melanophloia stag 5m 21cm diam
-22.9165	149.4995	4/03/2021	hollow bearing tree	E exserta? 6m 24cm diam
-22.9178	149.4999	4/03/2021	hollow bearing tree	E crebra 4m 12cm diam
-22.9174	149.4997	4/03/2021	rock pile	Minor few vine scrub species
-22.7701	149.4164	5/03/2021	rock pile	

-22.7701	149.4161	5/03/2021	hollow bearing tree	
-22.8019	149.4192	5/03/2021	hollow bearing tree	Several trees
-22.8017	149.4202	5/03/2021	hollow bearing tree	
-22.7776	149.4139	5/03/2021	hollow bearing tree	Stag
-22.7802	149.4163	5/03/2021	hollow bearing tree	Multiple habitat trees along ridge
-22.7705	149.4156	5/03/2021	hollow bearing tree	
-22.777	149.4222	5/03/2021	hollow bearing tree	Multiple
-22.7894	149.4228	5/03/2021	rock pile	Very steep of edge
-22.7893	149.4226	5/03/2021	rock pile	
-22.7873	149.4183	5/03/2021	other habitat feature	Thick SEVT
-22.7887	149.4229	5/03/2021	hollow bearing tree	
-22.8029	149.4158	5/03/2021	hollow bearing tree	
-22.803	149.416	5/03/2021	hollow bearing tree	
-22.7893	149.4223	5/03/2021	other habitat feature	SEVT across whole site, disturbed condition
-22.8028	149.4153	5/03/2021	hollow bearing tree	
-22.7897	149.4221	5/03/2021	hollow bearing tree	Multiple
-22.7895	149.422	5/03/2021	rock pile	SEVT
-22.7876	149.4176	5/03/2021	hollow bearing tree	Multiple hollows, arboreal termite mound
-22.7898	149.4223	5/03/2021	hollow bearing tree	Stag
-22.7893	149.4222	5/03/2021	Other	Rainbow bee-eaters, approximately 4
-22.8024	149.4186	5/03/2021	Other	Rainbow bee-eaters, several numbers in locations approximately 5-10
-22.7892	149.4219	5/03/2021	hollow bearing tree	Multiple
-22.7891	149.4221	5/03/2021	hollow bearing tree	Multiple habitat trees along track
-22.7809	149.4163	5/03/2021	hollow bearing tree	
-22.7836	149.4175	5/03/2021	hollow bearing tree	
-22.7807	149.4163	5/03/2021	rock pile	
-22.7811	149.4165	5/03/2021	rock pile	
-22.7836	149.4174	5/03/2021	rock pile	
-22.7832	149.417	5/03/2021	rock pile	SEVT
-22.7832	149.4172	5/03/2021	rock pile	
-22.9119	149.4969	5/03/2021	other habitat feature	Rocky gully slopes to west
-22.7709	149.4151	5/03/2021	hollow bearing tree	
-22.9123	149.4951	5/03/2021	rock pile	Rocky slope in e crebra ow
-22.912	149.4965	5/03/2021	other habitat feature	Rocky gully line
-22.7773	149.4224	5/03/2021	hollow bearing tree	With orchids
-22.7774	149.4225	5/03/2021	hollow bearing tree	
-22.7708	149.4151	5/03/2021	hollow bearing tree	
-22.7708	149.4151	5/03/2021	hollow bearing tree	
-22.9133	149.4899	5/03/2021	hollow bearing tree	E crebra 5m 12cm diam
-22.913	149.4913	5/03/2021	other habitat feature	Rocky gully line in e crebra ow
-22.9137	149.4881	5/03/2021	rock pile	Rocky slope to east
-22.9137	149.4888	5/03/2021	hollow bearing tree	C erythrophlioa 2m 14cm diam
-22.9125	149.4945	5/03/2021	hollow bearing tree	E tereticornis 12m18 cm diam
-22.9123	149.4947	5/03/2021	hollow bearing tree	C erythrophlioa 2m 8cm diam

-22.9126	149.4938	5/03/2021	other habitat feature	West bdy of riparian corridor
-22.9126	149.4943	5/03/2021	other habitat feature	Rocky creek crossing E tereticornis riparian vegetation
-22.7806	149.4169	5/03/2021	hollow bearing tree	
-22.7808	149.4166	5/03/2021	hollow bearing tree	
-22.7808	149.4178	5/03/2021	rock pile	
-22.7807	149.4177	5/03/2021	hollow bearing tree	
-22.7869	149.4172	5/03/2021	other habitat feature	SEVT very steep slope
-22.7872	149.418	5/03/2021	other habitat feature	SEVT
-22.7842	149.4171	5/03/2021	other habitat feature	SEVT
-22.7874	149.4175	5/03/2021	hollow bearing tree	
-22.7734	149.4171	5/03/2021	rock pile	
-22.7729	149.4157	5/03/2021	rock pile	
-22.7771	149.4224	5/03/2021	hollow bearing tree	
-22.7763	149.4219	5/03/2021	hollow bearing tree	Several on ridge
-22.7815	149.4179	5/03/2021	rock pile	
-22.7808	149.4179	5/03/2021	hollow bearing tree	
-22.7783	149.4148	5/03/2021	other habitat feature	SEVT
-22.7783	149.4148	5/03/2021	hollow bearing tree	
-22.9053	149.4937	5/03/2021	hollow bearing tree	C dallachiana 6m 8cm diam
-22.9058	149.4939	5/03/2021	rock pile	With jasminum
-22.9049	149.4939	5/03/2021	rock pile	Rocky crest with vine scrub species
-22.905	149.4936	5/03/2021	rock pile	With vine scrub species
-22.9053	149.4964	5/03/2021	hollow bearing tree	E crebra 3m 32 cm diam
-22.9048	149.4963	5/03/2021	other habitat feature	E crebra grassy open woodland
-22.9061	149.4939	5/03/2021	rock pile	Minor with scattered vine scrub species
-22.9045	149.497	5/03/2021	other habitat feature	Steep slope with cycas, too steep to clear
-22.8995	149.4966	5/03/2021	Nest	Kingfisher nest hollow
-22.8997	149.4959	5/03/2021	hollow bearing tree	E melanophloia 4m 6cm diam
-22.7194	149.3977	6/03/2021	rock pile	Steep rocky ridge line all the way here from southern turn off
-22.7224	149.3976	6/03/2021	other habitat feature	Steep granite Boulder slope with high density of cycas
-22.9043	149.4936	5/03/2021	hollow bearing tree	E crebra 8m 17cm diam
-22.9013	149.4943	5/03/2021	other habitat feature	E crebra ow burnt w xanthorrhoea and brush box regrowth
-22.9038	149.4933	5/03/2021	rock pile	Rocky edge to crest
-22.915	149.4957	5/03/2021	hollow bearing tree	E melanophloia 8m 14cm diam
-22.9146	149.4951	5/03/2021	other habitat feature	Riparian corridor w gravelly creek bed
-22.9156	149.4965	5/03/2021	hollow bearing tree	E crebra 6m 12cm diam
-22.9152	149.4958	5/03/2021	hollow bearing tree	E crebra 10m 22cm diam
-22.9152	149.4924	5/03/2021	rock pile	Rocky outcrop w scattered vine scrub species
-22.9152	149.4925	5/03/2021	hollow bearing tree	E crebra ow 3m 19cm diam
-22.9145	149.4935	5/03/2021	other habitat feature	Scree slope enters rocky gully flowing to east down slope
-22.9148	149.4931	5/03/2021	other habitat feature	Rocky slope w xanthorrhoea in open woodland
-22.9066	149.4942	5/03/2021	hollow bearing tree	E crebra 5m 11cm diam

-22.9075	149.4941	5/03/2021	rock pile	Minor rocky slope with jasminun
-22.9057	149.4947	5/03/2021	rock pile	Rocky slope in e crebra ow w jasminum
-22.9068	149.4945	5/03/2021	hollow bearing tree	E crebra 6m 18cm diam
-22.9163	149.4979	5/03/2021	rock pile	Densely vegetated area on top of slope to south
-22.916	149.4971	5/03/2021	hollow bearing tree	E crebra 4m 17cm diam
-22.9085	149.4944	5/03/2021	hollow bearing tree	E crebra 5m 22cm diam
-22.9088	149.4945	5/03/2021	rock pile	Minor rocky slope with extensive Jasminum
-22.765	149.4114	6/03/2021	hollow bearing tree	
-22.7659	149.4124	6/03/2021	other habitat feature	Steep slope
-22.7637	149.4105	6/03/2021	rock pile	
-22.7638	149.4106	6/03/2021	hollow bearing tree	
-22.7667	149.4118	6/03/2021	hollow bearing tree	Tow
-22.7676	149.412	6/03/2021	hollow bearing tree	
-22.7659	149.4124	6/03/2021	hollow bearing tree	
-22.7662	149.412	6/03/2021	rock pile	
-22.7621	149.4073	6/03/2021	hollow bearing tree	
-22.7624	149.4075	6/03/2021	hollow bearing tree	
-22.76	149.4048	6/03/2021	hollow bearing tree	
-22.7633	149.4101	6/03/2021	hollow bearing tree	
-22.7634	149.4106	6/03/2021	hollow bearing tree	
-22.7627	149.4079	6/03/2021	hollow bearing tree	
-22.7632	149.4094	6/03/2021	rock pile	
-22.7127	149.3999	6/03/2021	other habitat feature	Rocky slope with granite boulders all the way down to P5
-22.724	149.3983	6/03/2021	rock pile	
-22.7113	149.4007	6/03/2021	other habitat feature	Granite boulder ledger
-22.7186	149.3973	6/03/2021	rock pile	Rocky outcrop with few vine scrub species
-22.7191	149.3973	6/03/2021	other habitat feature	Steep slope with granite boulders halfway down footprint
-22.7173	149.3975	6/03/2021	other habitat feature	Continuous rocky crest on ridge
-22.7181	149.3974	6/03/2021	other habitat feature	Continuous rocky edge to crest of ridge
-22.7687	149.413	6/03/2021	hollow bearing tree	
-22.7695	149.4137	6/03/2021	rock pile	
-22.768	149.4122	6/03/2021	hollow bearing tree	
-22.7686	149.4128	6/03/2021	hollow bearing tree	
-22.7243	149.3984	6/03/2021	other habitat feature	Outcropping boulders from crest lower north east slope
-22.7243	149.3987	6/03/2021	rock pile	Steep slope with boulder outcrops
-22.7697	149.4139	6/03/2021	hollow bearing tree	
-22.7255	149.3968	6/03/2021	rock pile	Large boulders in mid ridge in e crebra ow
-22.766	149.4118	6/03/2021	rock pile	
-22.7661	149.4118	6/03/2021	hollow bearing tree	
-22.7656	149.412	6/03/2021	hollow bearing tree	Multiple
-22.7658	149.4117	6/03/2021	rock pile	
-22.7679	149.412	6/03/2021	hollow bearing tree	
-22.7682	149.4121	6/03/2021	hollow bearing tree	

-22.7671	149.4118	6/03/2021	hollow bearing tree	Multiple
-22.7678	149.4119	6/03/2021	hollow bearing tree	
-22.7637	149.4101	6/03/2021	rock pile	
-22.7639	149.4102	6/03/2021	rock pile	
-22.7622	149.4073	6/03/2021	rock pile	
-22.7628	149.4081	6/03/2021	hollow bearing tree	
-22.7652	149.4116	6/03/2021	hollow bearing tree	
-22.7655	149.4122	6/03/2021	hollow bearing tree	Multiple
-22.7641	149.4104	6/03/2021	rock pile	
-22.7646	149.411	6/03/2021	hollow bearing tree	Multiple habitat trees along ridge
-22.7599	149.3887	6/03/2021	hollow bearing tree	
-22.7596	149.3896	6/03/2021	hollow bearing tree	
-22.76	149.3864	6/03/2021	hollow bearing tree	
-22.7602	149.3883	6/03/2021	hollow bearing tree	
-22.766	149.4001	6/03/2021	hollow bearing tree	
-22.7659	149.4001	6/03/2021	hollow bearing tree	
-22.7594	149.3903	6/03/2021	hollow bearing tree	
-22.7575	149.3914	6/03/2021	hollow bearing tree	
-22.7719	149.4152	6/03/2021	hollow bearing tree	Multiple habitat trees along ridge
-22.7586	149.386	6/03/2021	hollow bearing tree	
-22.7688	149.4129	6/03/2021	rock pile	
-22.7691	149.4134	6/03/2021	rock pile	
-22.7596	149.386	6/03/2021	hollow bearing tree	
-22.7599	149.3863	6/03/2021	hollow bearing tree	
-22.7589	149.3861	6/03/2021	hollow bearing tree	
-22.7591	149.3859	6/03/2021	hollow bearing tree	
-22.8179	149.4094	7/03/2021	hollow bearing tree	
-22.8189	149.4177	7/03/2021	other habitat feature	SEVT on line
-22.8185	149.4104	7/03/2021	hollow bearing tree	Multiple
-22.8185	149.4102	7/03/2021	hollow bearing tree	Nest
-22.8206	149.4128	7/03/2021	hollow bearing tree	Side of corridor
-22.82	149.4127	7/03/2021	rock pile	
-22.821	149.4106	7/03/2021	other habitat feature	Small watercourse
-22.8217	149.411	7/03/2021	hollow bearing tree	On ug cable
-22.8242	149.4306	7/03/2021	rock pile	
-22.8243	149.4306	7/03/2021	hollow bearing tree	
-22.8238	149.4308	7/03/2021	rock pile	
-22.824	149.4307	7/03/2021	rock pile	
-22.8184	149.4118	7/03/2021	rock pile	
-22.8186	149.4108	7/03/2021	hollow bearing tree	Nest/ multiple habitat trees in creek bed
-22.8244	149.4304	7/03/2021	other habitat feature	Arboreal termite mound
-22.8196	149.4106	7/03/2021	hollow bearing tree	Orchid
-22.7591	149.3908	6/03/2021	hollow bearing tree	
-22.7561	149.3919	6/03/2021	hollow bearing tree	
-22.7593	149.3866	6/03/2021	hollow bearing tree	

-22.7596	149.3867	6/03/2021	hollow bearing tree	
-22.7614	149.4069	6/03/2021	hollow bearing tree	
-22.7659	149.4004	6/03/2021	hollow bearing tree	
-22.8189	149.4105	7/03/2021	hollow bearing tree	
-22.749	149.3642	6/03/2021	other habitat feature	Log pile
-22.819	149.4116	7/03/2021	hollow bearing tree	
-22.8188	149.4115	7/03/2021	other habitat feature	Grass trees
-22.7486	149.3766	6/03/2021	rock pile	
-22.7491	149.3642	6/03/2021	hollow bearing tree	Multiple habitat trees along ridge
-22.749	149.3642	6/03/2021	rock pile	
-22.7427	149.4013	7/03/2021	hollow bearing tree	C dallachiana 3m 31cm diam
-22.7425	149.4007	7/03/2021	other habitat feature	Crest of slope to south west
-22.7453	149.4032	7/03/2021	other habitat feature	Gently sloping on crest w e crebra, c dallachiana
-22.7438	149.4023	7/03/2021	other habitat feature	Rocky slope to south west
-22.7392	149.399	7/03/2021	other habitat feature	Steep rocky slope to east , e crebra ow
-22.7372	149.398	7/03/2021	other habitat feature	Rocky crest
-22.742	149.4009	7/03/2021	other habitat feature	Steep rocky slope on north east side
-22.7411	149.4007	7/03/2021	rock pile	Scattered boulders on gently saddle
-22.7458	149.3993	7/03/2021	other habitat feature	Gently slope on ridge in e crebra ow
-22.7442	149.4	7/03/2021	other habitat feature	E crebra ow on gentle slope on ridge
-22.7491	149.3974	7/03/2021	other habitat feature	E crebra on gently ridge in grazing country
-22.7466	149.3992	7/03/2021	other habitat feature	E crebra on flatter grazed land
-22.7438	149.4018	7/03/2021	hollow bearing tree	E crebra 4m 18cm diam
-22.7438	149.4004	7/03/2021	other habitat feature	Top of slope with rocky shelf to crest
-22.7437	149.4013	7/03/2021	other habitat feature	Steep rocky
-22.7276	149.397	7/03/2021	other habitat feature	Rocky slope gradually rising to south
-22.7267	149.3964	7/03/2021	other habitat feature	Flat saddle area in e crebra ow
-22.7292	149.3963	7/03/2021	other habitat feature	Rocky crest
-22.7289	149.3963	7/03/2021	other habitat feature	Rocky granite outcrop at crest
-22.8236	149.4308	7/03/2021	hollow bearing tree	
-22.7234	149.3977	7/03/2021	hollow bearing tree	C erythrophlioa 5m 23cm diam
-22.819	149.4174	7/03/2021	rock pile	
-22.7326	149.397	7/03/2021	other habitat feature	Open forest at base of slope from west
-22.7305	149.3964	7/03/2021	other habitat feature	Rocky crest
-22.7348	149.3955	7/03/2021	other habitat feature	Steep slope to south
-22.7342	149.397	7/03/2021	other habitat feature	Rocky crest in e crebra ow w steep rocky slope to west
-22.7295	149.3966	7/03/2021	other habitat feature	Steep rocky slope to east
-22.7293	149.396	7/03/2021	hollow bearing tree	E crebra 7m 15cm diam
-22.7281	149.3942	7/03/2021	other habitat feature	Crest with outcropping rock, e crebra ow the
-22.73	149.3962	7/03/2021	other habitat feature	Considerable slope to west
-22.9135	149.4898	5/03/2021	rock pile	
-22.9135	149.4903	5/03/2021	rock pile	Gully line
-22.9138	149.4884	5/03/2021	rock pile	Gully line

-22.9135	149.4897	5/03/2021	hollow bearing tree	E.crebra 3m 15cm
-22.9129	149.4922	5/03/2021	rock pile	
-22.9128	149.4933	5/03/2021	hollow bearing tree	Stag 20cm wide at 8m
-22.9133	149.4915	5/03/2021	rock pile	Gully line
-22.913	149.4918	5/03/2021	rock pile	
-22.9146	149.4958	5/03/2021	hollow bearing tree	E.crebra 15m 5cm
-22.9145	149.4952	5/03/2021	rock pile	Creek line
-22.9121	149.4961	5/03/2021	hollow bearing tree	E.crebra 6m crack 5cm wide micro bat
-22.9125	149.4959	5/03/2021	rock pile	
-22.9153	149.4916	5/03/2021	hollow bearing tree	E.crebra 3m 4cm
-22.9145	149.4895	5/03/2021	hollow bearing tree	15m 20cm
-22.9145	149.4932	5/03/2021	rock pile	Gully line
-22.9151	149.4923	5/03/2021	rock pile	
-22.7498	149.3913	6/03/2021	other habitat feature	Rocky open area on gentle slope, e crebra ow thinned
-22.9121	149.497	5/03/2021	hollow bearing tree	Stag 8m 10cm ×3
-22.912	149.4974	5/03/2021	rock pile	
-22.751	149.396	7/03/2021	other habitat feature	Ion country
-22.7503	149.3972	7/03/2021	other habitat feature	E crebra in thinned grazing country
-22.7506	149.3947	7/03/2021	other habitat feature	Narrow Melaleuca bracteata, M fluviatilis riparian corridor 10-15m wide
-22.7508	149.3951	7/03/2021	other habitat feature	Patch of denser vegetation leading down to gully crossing
-22.9126	149.4939	5/03/2021	hollow bearing tree	E.crebra 12m & 15m 5cm hollow & 15cm spout
-22.9126	149.494	5/03/2021	rock pile	
-22.9128	149.4935	5/03/2021	hollow bearing tree	Several off one branch 15m horizontal E.crebra
-22.9127	149.4937	5/03/2021	hollow bearing tree	12m spout 15cm
-22.9122	149.4954	5/03/2021	hollow bearing tree	Large stag 8m 30cm
-22.9121	149.4966	5/03/2021	rock pile	Gully line
-22.9125	149.495	5/03/2021	hollow bearing tree	Large stag Corymbia sp. 15m 30cm
-22.9125	149.4951	5/03/2021	rock pile	
-22.8059	149.4567	2/03/2021	rock pile	With SEVT whole ridge line has many rocks Granite
-22.8415	149.4523	2/03/2021	hollow bearing tree	
-22.8433	149.4516	2/03/2021	rock pile	
-22.8045	149.4554	2/03/2021	rock pile	
-22.8035	149.4546	2/03/2021	rock pile	
-22.8068	149.4574	2/03/2021	hollow bearing tree	Many trees on ridge line
-22.8046	149.4556	2/03/2021	hollow bearing tree	
-22.8193	149.4088	1/03/2021	hollow bearing tree	Stag
-22.819	149.4091	1/03/2021	hollow bearing tree	
-22.8185	149.4083	1/03/2021	hollow bearing tree	
-22.8188	149.4084	1/03/2021	hollow bearing tree	Multiple
-22.817	149.4084	1/03/2021	other habitat feature	Hollow log
-22.817	149.4078	1/03/2021	other habitat feature	Koala habitat tree
-22.8182	149.4095	1/03/2021	hollow bearing tree	Stag

-22.8168	149.4088	1/03/2021	hollow bearing tree	
-22.7977	149.4298	1/03/2021	hollow bearing tree	
-22.7976	149.4301	1/03/2021	rock pile	20m wide
-22.7983	149.4407	1/03/2021	hollow bearing tree	
-22.792	149.4259	1/03/2021	hollow bearing tree	Several trees with hollows
-22.8192	149.4091	1/03/2021	other habitat feature	Watercourse
-22.8178	149.4092	1/03/2021	hollow bearing tree	Large hollow in centre of tree
-22.8172	149.4051	1/03/2021	Other	Shrub
-22.8205	149.4081	1/03/2021	hollow bearing tree	Large melaleuca trees in watercourse
-22.8012	149.452	2/03/2021	rock pile	
-22.7933	149.4372	1/03/2021	hollow bearing tree	
-22.8013	149.4522	2/03/2021	rock pile	
-22.8012	149.4521	2/03/2021	hollow bearing tree	
-22.7956	149.4398	1/03/2021	other habitat feature	SEVT small patch
-22.798	149.4411	1/03/2021	hollow bearing tree	
-22.7932	149.4372	1/03/2021	hollow bearing tree	
-22.7933	149.4376	1/03/2021	hollow bearing tree	
-22.8059	149.4569	2/03/2021	hollow bearing tree	
-22.8058	149.4569	2/03/2021	rock pile	
-22.8095	149.4573	2/03/2021	hollow bearing tree	
-22.8088	149.457	2/03/2021	hollow bearing tree	Multiple
-22.804	149.4543	2/03/2021	hollow bearing tree	Stag
-22.8029	149.4532	2/03/2021	hollow bearing tree	Multiple
-22.805	149.4559	2/03/2021	rock pile	
-22.8045	149.4555	2/03/2021	hollow bearing tree	Multiple
-22.8154	149.439	2/03/2021	rock pile	
-22.8159	149.4385	2/03/2021	other habitat feature	Log pile
-22.8174	149.4519	2/03/2021	hollow bearing tree	
-22.815	149.4393	2/03/2021	dam	Dam
-22.8152	149.4364	2/03/2021	other habitat feature	Arboreal termite mound
-22.8051	149.4561	2/03/2021	Nest	Nest
-22.8159	149.4382	2/03/2021	rock pile	
-22.8158	149.4371	2/03/2021	other habitat feature	Arboreal termite mound
-22.8039	149.4297	1/03/2021	hollow bearing tree	
-22.7923	149.4256	1/03/2021	hollow bearing tree	Multiple
-22.8046	149.4313	1/03/2021	hollow bearing tree	Multiple
-22.8052	149.4318	1/03/2021	hollow bearing tree	Multiple
-22.7984	149.3714	1/03/2021	Nest	Nest
-22.8182	149.4084	1/03/2021	other habitat feature	Exfoliating bark & multiple hollows
-22.7939	149.4264	1/03/2021	hollow bearing tree	Stag
-22.7986	149.3714	1/03/2021	Nest	Nest
-22.805	149.4318	1/03/2021	hollow bearing tree	Multiple
-22.8046	149.4318	1/03/2021	Other	
-22.8025	149.453	2/03/2021	other habitat feature	Scratch marks
-22.8043	149.4318	1/03/2021	Nest	Nest

-22.8045	149.4319	1/03/2021	Other	
-22.8043	149.4318	1/03/2021	Other	
-22.8182	149.4086	1/03/2021	other habitat feature	Arboreal termite mound
-22.8045	149.432	1/03/2021	Other	
-22.8914	149.4665	1/03/2021	rock pile	
-22.8905	149.4656	1/03/2021	rock pile	
-22.8922	149.4684	1/03/2021	rock pile	
-22.8921	149.4679	1/03/2021	rock pile	
-22.8321	149.4669	2/03/2021	rock pile	
-22.8341	149.4683	2/03/2021	hollow bearing tree	Multiple
-22.8373	149.457	3/03/2021	rock pile	
-22.8367	149.4578	3/03/2021	other habitat feature	Habitat log
-22.8943	149.4697	1/03/2021	rock pile	Brachychiton patch 10x20m
-22.8938	149.4697	1/03/2021	rock pile	
-22.8933	149.4689	1/03/2021	rock pile	
-22.8937	149.4692	1/03/2021	rock pile	With patchy vine thicket species
-22.8929	149.4692	1/03/2021	rock pile	Screw slope w a few vine forest species
-22.8925	149.4686	1/03/2021	rock pile	Small brachychiton patch 20x20m
-22.8932	149.4697	1/03/2021	rock pile	
-22.8933	149.4694	1/03/2021	rock pile	
-22.8356	149.448	2/03/2021	hollow bearing tree	Multiple
-22.8358	149.4479	2/03/2021	hollow bearing tree	
-22.835	149.4477	2/03/2021	hollow bearing tree	
-22.8352	149.4479	2/03/2021	hollow bearing tree	Stag
-22.8347	149.4472	2/03/2021	hollow bearing tree	
-22.8179	149.4524	2/03/2021	rock pile	
-22.836	149.4477	2/03/2021	other habitat feature	Arboreal termite mound
-22.836	149.4473	2/03/2021	hollow bearing tree	
-22.84	149.4623	2/03/2021	hollow bearing tree	Multiple
-22.8399	149.4624	2/03/2021	rock pile	
-22.8369	149.4695	2/03/2021	hollow bearing tree	Multiple
-22.8401	149.4623	2/03/2021	hollow bearing tree	Unstable
-22.8421	149.4523	2/03/2021	hollow bearing tree	Multiple
-22.8445	149.4527	2/03/2021	rock pile	
-22.8402	149.4626	2/03/2021	hollow bearing tree	Stag
-22.8401	149.4546	2/03/2021	Nest	Nest
-22.9032	149.4731	1/03/2021	rock pile	W vine scrub species
-22.9032	149.4734	1/03/2021	hollow bearing tree	E crebra 2m 8cm diam
-22.9007	149.4763	1/03/2021	rock pile	Minor in e crebra ow
-22.9016	149.4737	1/03/2021	hollow bearing tree	E crebra dead 3m 16cm dia
-22.9009	149.4736	1/03/2021	rock pile	Vine scrub species present
-22.9007	149.4736	1/03/2021	rock pile	Wallaby resting place
-22.9019	149.4742	1/03/2021	Other	Parsons is ?
-22.9018	149.4743	1/03/2021	rock pile	Some vine scrub species esp downslope to East

-22.8962	149.4732	1/03/2021	hollow bearing tree	E crebra 8m 5cm diam
-22.8967	149.4734	1/03/2021	hollow bearing tree	E crebra 8m 5cm diam
-22.8926	149.4704	1/03/2021	hollow bearing tree	E crebra 4m 10cm diam
-22.8962	149.4731	1/03/2021	rock pile	Brachychiton in rocky gully line
-22.8997	149.4759	1/03/2021	rock pile	Steep slope e crebra ow
-22.9002	149.4763	1/03/2021	rock pile	Minor
-22.898	149.4748	1/03/2021	rock pile	Base of scree slope from north east
-22.8987	149.4752	1/03/2021	rock pile	Open woodland, cycas habitat
-22.8978	149.4724	1/03/2021	hollow bearing tree	E crebra 4m, 18cm diam
-22.8992	149.4727	1/03/2021	hollow bearing tree	E crebra 3m, 7cm diam
-22.8987	149.4725	1/03/2021	hollow bearing tree	E crebra 2m,27cm diam
-22.896	149.4716	1/03/2021	hollow bearing tree	E crebra 4m , 20cm diam
-22.894	149.47	1/03/2021	rock pile	With vine a few scrub species
-22.897	149.472	1/03/2021	rock pile	
-22.8962	149.4707	1/03/2021	rock pile	With vine scrub incl flindersia
-22.9003	149.4728	1/03/2021	hollow bearing tree	E crebra 4m, 17cm diam
-22.9008	149.4735	1/03/2021	hollow bearing tree	E crebra6m 10cm diam
-22.9007	149.4734	1/03/2021	hollow bearing tree	E crebra 4m, 15cm diam
-22.9005	149.4732	1/03/2021	rock pile	Scree with vine scrub species
-22.8995	149.4729	1/03/2021	rock pile	E crebra ow
-22.8999	149.4725	1/03/2021	Other	Olearia??
-22.9003	149.4731	1/03/2021	Other	Marsdenia sp ? Larcomesis
-22.9026	149.4838	1/03/2021	Other	Marsdenia sp?
-22.9012	149.4827	1/03/2021	rock pile	
-22.9033	149.4836	1/03/2021	hollow bearing tree	E crebra 4m 20cm
-22.903	149.4836	1/03/2021	rock pile	Extensive open scarp area
-22.9003	149.4826	1/03/2021	rock pile	
-22.9001	149.4828	1/03/2021	rock pile	With vine scrub species
-22.901	149.4827	1/03/2021	other habitat feature	Den?
-22.9005	149.4826	1/03/2021	hollow bearing tree	E crebra 6m 8cmx3
-22.8994	149.4778	1/03/2021	rock pile	E crebra ow
-22.9031	149.4842	1/03/2021	rock pile	With dense patch vine scrub species
-22.8997	149.4774	1/03/2021	hollow bearing tree	E crebra 7m 14cm diam
-22.8996	149.4775	1/03/2021	rock pile	
-22.9047	149.4854	1/03/2021	rock pile	Scattered vine scrub species
-22.9039	149.4849	1/03/2021	rock pile	Minor
-22.9062	149.4862	1/03/2021	rock pile	Scattered vine scrub species
-22.9055	149.4861	1/03/2021	rock pile	Scattered vine scrub species
-22.8892	149.4672	1/03/2021	rock pile	Minor
-22.8895	149.4677	1/03/2021	hollow bearing tree	E crebra 7m 11cm diam
-22.8902	149.4646	1/03/2021	hollow bearing tree	E crebra 5m 10cm diam
-22.8896	149.465	1/03/2021	rock pile	Minor
-22.8915	149.4694	1/03/2021	hollow bearing tree	E crebra 4m 13cm diam
-22.8919	149.4696	1/03/2021	rock pile	Minor
-22.8896	149.4679	1/03/2021	rock pile	Above steep gully

-22.8911	149.4689	1/03/2021	rock pile	E crebra ow
-22.8996	149.4817	1/03/2021	rock pile	
-22.8979	149.4805	1/03/2021	rock pile	Cleared around tower
-22.8997	149.4827	1/03/2021	rock pile	Scattered vine scrub species
-22.8998	149.482	1/03/2021	rock pile	
-22.8989	149.4787	1/03/2021	rock pile	Crest in ow w xanthhohoea
-22.8903	149.4646	1/03/2021	hollow bearing tree	E crebra 4m 8cm diam
-22.8988	149.4806	1/03/2021	rock pile	
-22.8989	149.4798	1/03/2021	rock pile	Minor
-22.9069	149.4798	2/03/2021	hollow bearing tree	E crebra 3m 13cm diam
-22.9072	149.4797	2/03/2021	hollow bearing tree	E crebra 2m 18cm diam
-22.9058	149.4792	2/03/2021	hollow bearing tree	Stag 4m 17cm diam
-22.9059	149.4796	2/03/2021	hollow bearing tree	Stag 7m 20cm diam
-22.9076	149.4805	2/03/2021	hollow bearing tree	E crebra 4m 12cn diam
-22.9078	149.4807	2/03/2021	rock pile	Minor
-22.9074	149.4804	2/03/2021	hollow bearing tree	E crebra 6m 20cm diam
-22.9076	149.4805	2/03/2021	rock pile	Few vine scrub species
-22.9069	149.4781	2/03/2021	hollow bearing tree	E crebra 4m 12cm diam
-22.9069	149.478	2/03/2021	hollow bearing tree	E crebra 8m 22cm diam
-22.9066	149.4786	2/03/2021	hollow bearing tree	E crebra 4m 17cm diam
-22.9072	149.4787	2/03/2021	hollow bearing tree	E crebra 6m 20cm diam
-22.9066	149.4778	2/03/2021	hollow bearing tree	E crebra 2m 12cm diam
-22.9121	149.483	2/03/2021	rock pile	Vine scrub species present
-22.912	149.483	2/03/2021	Other	Olearia ?
-22.912	149.4827	2/03/2021	rock pile	Vine scrub bdy
-22.9012	149.475	1/03/2021	hollow bearing tree	E crebra 6m 18cm diam
-22.9	149.4772	1/03/2021	hollow bearing tree	E crebra 8m 25cm diam
-22.912	149.4831	2/03/2021	rock pile	Scattered vine scrub species
-22.9115	149.483	2/03/2021	hollow bearing tree	E crebra 5m 10cm diam
-22.9092	149.4822	2/03/2021	rock pile	Few vine scrub species
-22.9093	149.4825	2/03/2021	rock pile	Scattered vine scrub species
-22.9084	149.481	2/03/2021	hollow bearing tree	E crebra 3m 16cm dbh
-22.9091	149.4816	2/03/2021	hollow bearing tree	E crebra 2m 14cm diam
-22.9115	149.4823	2/03/2021	rock pile	Bottle scrub
-22.9118	149.4823	2/03/2021	rock pile	Bottle tree scrub
-22.9099	149.4826	2/03/2021	rock pile	Minor
-22.9146	149.4864	2/03/2021	hollow bearing tree	E crebra 6m 9cm diam
-22.9146	149.4869	2/03/2021	hollow bearing tree	E crebra 10m 6cm diam
-22.9152	149.4887	2/03/2021	rock pile	With vine scrub species present
-22.915	149.4881	2/03/2021	rock pile	Minor
-22.9132	149.4863	2/03/2021	rock pile	Minor
-22.9127	149.486	2/03/2021	hollow bearing tree	E crebra 3m 10cm diam
-22.9142	149.4874	2/03/2021	hollow bearing tree	E crebra 2m 30cm diam
-22.9135	149.4866	2/03/2021	rock pile	Rocky gully
-22.9158	149.491	2/03/2021	hollow bearing tree	E melanophloia 2m6cm diam

-22.9156	149.4907	2/03/2021	rock pile	Rock slope around crest
-22.9161	149.4915	2/03/2021	other habitat feature	Rocky gully to south
-22.9161	149.4916	2/03/2021	hollow bearing tree	E crebra 5m 23cm diam
-22.9152	149.489	2/03/2021	hollow bearing tree	E crebra 10m 6cm diam
-22.9154	149.489	2/03/2021	rock pile	With vine scrub species present
-22.9158	149.4905	2/03/2021	hollow bearing tree	E crebra 5m 14cm diam
-22.9156	149.4894	2/03/2021	rock pile	With vine scrub species present
-22.901	149.4754	2/03/2021	hollow bearing tree	E crebra 4m, 6m hollows x8cm diam
-22.9015	149.4764	2/03/2021	hollow bearing tree	E crebra 3m 18cm diam
-22.9029	149.4744	2/03/2021	rock pile	E crebra ow
-22.902	149.4739	2/03/2021	Other	Marsdenia sp smalll flower?
-22.9056	149.4786	2/03/2021	hollow bearing tree	Stag 4m 12cm diam
-22.9064	149.4785	2/03/2021	hollow bearing tree	E crebra 4m 14cm diam
-22.903	149.4776	2/03/2021	hollow bearing tree	E crebra 8m 15cm diam
-22.9028	149.4775	2/03/2021	hollow bearing tree	E crebra 7m13cm diam
-22.9114	149.4843	2/03/2021	rock pile	Scattered vine scrub species
-22.9116	149.4831	2/03/2021	rock pile	Minor
-22.9124	149.4856	2/03/2021	hollow bearing tree	E crebra 6m 6cm diam
-22.9118	149.4849	2/03/2021	hollow bearing tree	E crebra 10m 16cm diam
-22.9033	149.4753	2/03/2021	hollow bearing tree	E crebra 2m 18cm diam
-22.9035	149.4751	2/03/2021	rock pile	Few vine scrub species
-22.9048	149.4783	2/03/2021	hollow bearing tree	E crebra 4m 20cm diam
-22.9044	149.4779	2/03/2021	hollow bearing tree	E crebra 4m 6cm diam
-22.9143	149.4886	2/03/2021	other habitat feature	Rocky open gully
-22.9145	149.4896	2/03/2021	hollow bearing tree	E crebra 8m 16cm diam
-22.8843	149.4493	2/03/2021	other habitat feature	Buffel grass in open paddock
-22.914	149.4881	2/03/2021	rock pile	Brachychiton on steep slope
-22.9146	149.4903	2/03/2021	hollow bearing tree	Stag 4m 24cm diam
-22.9146	149.4905	2/03/2021	rock pile	Minor in e crebra ow
-22.9146	149.49	2/03/2021	rock pile	E crebra ow
-22.9146	149.49	2/03/2021	hollow bearing tree	E crebra 4m 10 ck diam
-22.8776	149.4315	2/03/2021	other habitat feature	Lots of ground litter timber etc
-22.8779	149.4314	2/03/2021	hollow bearing tree	E crebra 12n 20cm diam
-22.8858	149.455	3/03/2021	rock pile	Rock shelf scattered trees
-22.8763	149.4299	2/03/2021	other habitat feature	Regular remnant trees in paddock to creek
-22.8817	149.4369	2/03/2021	other habitat feature	Scattered e crebra in buffel grass paddock
-22.8828	149.4414	2/03/2021	other habitat feature	Buffel grass in open paddock
-22.8781	149.4317	2/03/2021	hollow bearing tree	E crebra 15m 15cm diam
-22.8781	149.4316	2/03/2021	other habitat feature	Rocky Creek crossing w m fluviatalis, m bracteata
-22.9201	149.4909	2/03/2021	hollow bearing tree	E crebra 3m 32cm diam
-22.9188	149.4912	2/03/2021	rock pile	Open w scattered vine scrub species
-22.9213	149.4916	2/03/2021	rock pile	Rocky open gully line
-22.921	149.4913	2/03/2021	hollow bearing tree	E crebra 5m 12cm diam
-22.9175	149.4913	2/03/2021	other habitat feature	Steep gully ow (re change? W c erythrophlioa, brush box u/s)

-22.9165	149.4913	2/03/2021	other habitat feature	Rocky slope to south
-22.9185	149.4911	2/03/2021	other habitat feature	Steep slope gully line, eastern edge unsuited to clearing?
-22.9185	149.4911	2/03/2021	hollow bearing tree	E crebra 10m 27cm diam
-22.9226	149.4903	2/03/2021	rock pile	E crebra w scattered vine scrub species
-22.9225	149.4906	2/03/2021	rock pile	Minor
-22.9203	149.4904	2/03/2021	hollow bearing tree	E crebra 7m 10cm diam
-22.9225	149.4904	2/03/2021	hollow bearing tree	E crebra 5m 12cm diam
-22.9221	149.4914	2/03/2021	other habitat feature	Open gully line in e crebra ow
-22.9216	149.4917	2/03/2021	other habitat feature	Open rocky gully line
-22.9223	149.4911	2/03/2021	rock pile	Minor
-22.9222	149.4914	2/03/2021	hollow bearing tree	E crebra 10m 16cm diam
-22.9336	149.4979	3/03/2021	hollow bearing tree	E crebra 5m 12cm diam
-22.9339	149.4983	3/03/2021	hollow bearing tree	E crebra 10m 18cm diam
-22.9339	149.4969	3/03/2021	rock pile	Minor in open woodland
-22.9339	149.4972	3/03/2021	hollow bearing tree	E crebra x2 7m 10-16cm diam
-22.9337	149.499	3/03/2021	rock pile	Edge to c dallachiana, c tessellated ow
-22.9365	149.4976	3/03/2021	hollow bearing tree	E crebra 8m 20 cm diam
-22.9362	149.4976	3/03/2021	rock pile	Rocky escarpment with scattered vine scrub species
-22.9373	149.4972	3/03/2021	hollow bearing tree	E crebra 7m 25cm diam
-22.9371	149.4976	3/03/2021	rock pile	
-22.9344	149.4972	3/03/2021	rock pile	Rocky escarpment extends south ward in open woodland along western slope
-22.9343	149.497	3/03/2021	rock pile	Minor in open woodland
-22.9355	149.4975	3/03/2021	rock pile	Continuous Rocky escarpment on western slope
-22.9347	149.4974	3/03/2021	rock pile	
-22.8871	149.463	3/03/2021	hollow bearing tree	E crebra 4m 18cm diam
-22.887	149.463	3/03/2021	rock pile	Steep rocky slope to north, c erythrophlioa ow
-22.8875	149.4636	3/03/2021	rock pile	Small patch with vine scrub species incl sterculia quadrifa
-22.8874	149.4633	3/03/2021	rock pile	Contours rocky slope rising to south
-22.886	149.4538	3/03/2021	other habitat feature	Gentle slope with scattered remnant trees downslope
-22.886	149.4546	3/03/2021	rock pile	Major rocky shelf
-22.8868	149.4623	3/03/2021	rock pile	Rock scree on steep slope to north, scattered ow
-22.8867	149.462	3/03/2021	hollow bearing tree	C erythrophloia 4m 10cm diam
-22.934	149.4975	3/03/2021	hollow bearing tree	E crebra 6m 12cm diam
-22.934	149.4975	3/03/2021	hollow bearing tree	E crebra x2 6m 17cm diam
-22.934	149.4983	3/03/2021	hollow bearing tree	E crebra 6m 30cm diam
-22.9338	149.4977	3/03/2021	hollow bearing tree	E crebra 7m 16cm diam
-22.8892	149.465	3/03/2021	hollow bearing tree	C erythrophlioa 3m 8cm diam
-22.8879	149.464	3/03/2021	rock pile	Continuous steep rocky slope on north east edge
-22.8889	149.4674	3/03/2021	rock pile	Extreme slope down to north , vine scrub species
-22.889	149.4676	3/03/2021	rock pile	Minor in open woodland
-22.9262	149.4916	3/03/2021	rock pile	Already disturbed for track, e crebra ow

-22.9266	149.4919	3/03/2021	rock pile	Few vine scrub species
-22.9252	149.4918	3/03/2021	hollow bearing tree	E crebra 6m 16cm diam
-22.9254	149.4918	3/03/2021	rock pile	Northern end of rocky crest with escarpment to west, rocky slope to east
-22.9275	149.4913	3/03/2021	rock pile	Scattered vine scrub species incl ficus
-22.9276	149.4913	3/03/2021	hollow bearing tree	E crebra 10m 26diam
-22.927	149.4915	3/03/2021	rock pile	Crest with xanthhorhoea, rocky around crest 40x40m
-22.9273	149.4913	3/03/2021	hollow bearing tree	E crebra 11m 13cm diam
-22.9261	149.4931	3/03/2021	other habitat feature	Rocky gully to east, Mel bracteata downslope
-22.9248	149.4928	3/03/2021	other habitat feature	Deep rocky gully to east
-22.8274	149.4598	3/03/2021	rock pile	
-22.9269	149.4934	3/03/2021	hollow bearing tree	E crebra 8m 15cm diam
-22.9234	149.4907	3/03/2021	rock pile	Edge of corridor w rocky patches, few vine scrub species
-22.924	149.4911	3/03/2021	rock pile	Scattered vine scrub species
-22.9238	149.4925	3/03/2021	other habitat feature	Southern end of dense regrowth area on rocky scree
-22.9231	149.4906	3/03/2021	rock pile	Scattered vine scrub species
-22.9313	149.495	3/03/2021	rock pile	Minor in open woodland
-22.9324	149.4958	3/03/2021	rock pile	Southern end of extensive rocky area on crest 50x50m
-22.9306	149.4946	3/03/2021	rock pile	With scattered vine scrub species
-22.931	149.4949	3/03/2021	rock pile	Several on eastern edge with few vine scrub species
-22.9382	149.4973	3/03/2021	rock pile	Open rock face to southeast
-22.9376	149.4971	3/03/2021	rock pile	Open, occurs around base of saddle where turbine proposed
-22.933	149.4964	3/03/2021	rock pile	Minor in open woodland
-22.9336	149.4972	3/03/2021	hollow bearing tree	E crebra 7m 12cm diam
-22.9284	149.4929	3/03/2021	rock pile	Scattered vine scrub species
-22.9292	149.4933	3/03/2021	rock pile	Minor in open woodland
-22.928	149.4919	3/03/2021	hollow bearing tree	C dallachiana 6m 12cm diam
-22.9281	149.4924	3/03/2021	hollow bearing tree	E crebra 8m 14cm diam
-22.9302	149.494	3/03/2021	hollow bearing tree	E crebra 7m 24cm diam
-22.9302	149.4943	3/03/2021	rock pile	Continuous outcrops on eastern edge
-22.9294	149.4938	3/03/2021	rock pile	Open rocky scree on eastern slope
-22.9295	149.494	3/03/2021	hollow bearing tree	E crebra 6m 16cm diam
-22.8463	149.4532	3/03/2021	other habitat feature	Caution dangerous rocky slope
-22.8268	149.4244	3/03/2021	Other	Rainbow bee-eater (flock) estimated 25
-22.8477	149.4531	3/03/2021	other habitat feature	Arboreal termite mound
-22.8464	149.4532	3/03/2021	hollow bearing tree	Arboreal termite mound
-22.8268	149.4244	3/03/2021	rock pile	
-22.8269	149.4242	3/03/2021	rock pile	
-22.8191	149.417	3/03/2021	rock pile	
-22.819	149.452	3/03/2021	Other	Black-necked stork
-22.8364	149.473	2/03/2021	hollow bearing tree	Large number of HBTs in the turbine footprint
-22.8362	149.4729	2/03/2021	rock pile	

-22.8393	149.4406	3/03/2021	rock pile	
-22.8272	149.4594	3/03/2021	rock pile	
-22.8513	149.453	3/03/2021	hollow bearing tree	Multiple
-22.8523	149.4529	3/03/2021	other habitat feature	Arboreal termite mound
-22.8402	149.462	2/03/2021	rock pile	
-22.8523	149.4527	3/03/2021	other habitat feature	Arboreal termite mound
-22.8355	149.4266	3/03/2021	rock pile	
-22.8353	149.4264	3/03/2021	rock pile	
-22.8378	149.4288	3/03/2021	rock pile	
-22.8352	149.4271	3/03/2021	rock pile	
-22.8397	149.4411	3/03/2021	hollow bearing tree	Multiple
-22.8269	149.4597	3/03/2021	rock pile	
-22.8357	149.4363	3/03/2021	rock pile	
-22.8396	149.4412	3/03/2021	rock pile	
-22.8251	149.4289	3/03/2021	hollow bearing tree	Stag
-22.8251	149.429	3/03/2021	burrow	
-22.8264	149.4237	3/03/2021	hollow bearing tree	
-22.8262	149.424	3/03/2021	rock pile	
-22.8378	149.4342	3/03/2021	hollow bearing tree	
-22.8378	149.4284	3/03/2021	hollow bearing tree	Stag
-22.8382	149.4367	3/03/2021	rock pile	
-22.838	149.4345	3/03/2021	hollow bearing tree	Multiple
-22.8946	149.4699	1/03/2021	hollow bearing tree	E. crebra 10cm wide about 5m off the ground.
-22.8937	149.4686	1/03/2021	rock pile	
-22.8964	149.4709	1/03/2021	hollow bearing tree	
-22.8964	149.4708	1/03/2021	rock pile	
-22.8916	149.4662	1/03/2021	rock pile	
-22.8515	149.4548	3/03/2021	other habitat feature	Small watercourse
-22.8927	149.4684	1/03/2021	rock pile	
-22.8924	149.4679	1/03/2021	rock pile	
-22.9012	149.4738	1/03/2021	hollow bearing tree	Large stag hollow at 4m about 15cm wide
-22.9012	149.4737	1/03/2021	hollow bearing tree	E crebra 2 hollows 5cm wide around 3m high
-22.9025	149.473	1/03/2021	other habitat feature	Brachychiton sp.
-22.9025	149.473	1/03/2021	other habitat feature	Rock outcrop with vines and thicker scrub
-22.9003	149.4728	1/03/2021	rock pile	
-22.8997	149.4722	1/03/2021	rock pile	
-22.9003	149.4729	1/03/2021	other habitat feature	Brachychiton sp.
-22.9002	149.4725	1/03/2021	other habitat feature	Brachychiton sp. and vine thicket 50×50
-22.83	149.4357	3/03/2021	hollow bearing tree	Several trees in this area
-22.8316	149.4366	3/03/2021	other habitat feature	SEVT on side of hill
-22.8279	149.4356	3/03/2021	rock pile	
-22.8296	149.436	3/03/2021	rock pile	
-22.8355	149.4276	3/03/2021	rock pile	With SEVT SPECIES
-22.8395	149.4407	3/03/2021	rock pile	With SEVT

-22.8323	149.4381	3/03/2021	rock pile	
-22.8357	149.4271	3/03/2021	hollow bearing tree	Several trees
-22.8262	149.4245	3/03/2021	rock pile	
-22.8261	149.4242	3/03/2021	rock pile	
-22.8506	149.4536	3/03/2021	other habitat feature	Small watercourse
-22.8188	149.4177	3/03/2021	rock pile	
-22.8242	149.4302	3/03/2021	rock pile	
-22.8277	149.4354	3/03/2021	other habitat feature	SEVT species
-22.8245	149.4293	3/03/2021	other habitat feature	Termite mound
-22.8241	149.4301	3/03/2021	rock pile	
-22.9009	149.4829	1/03/2021	rock pile	
-22.9008	149.4824	1/03/2021	rock pile	
-22.9003	149.4819	1/03/2021	hollow bearing tree	Large spout
-22.9002	149.4818	1/03/2021	rock pile	
-22.9003	149.4822	1/03/2021	rock pile	
-22.9026	149.4843	1/03/2021	rock pile	With thicket
-22.902	149.484	1/03/2021	rock pile	
-22.9033	149.4846	1/03/2021	hollow bearing tree	
-22.9033	149.4848	1/03/2021	rock pile	
-22.9011	149.4832	1/03/2021	rock pile	Escarpment
-22.901	149.483	1/03/2021	rock pile	Continuing
-22.9018	149.4838	1/03/2021	rock pile	
-22.9014	149.4834	1/03/2021	rock pile	
-22.8918	149.4694	1/03/2021	rock pile	Outcrop
-22.8977	149.474	1/03/2021	other habitat feature	Gully- rocky outcrop
-22.8908	149.4684	1/03/2021	rock pile	
-22.8912	149.4687	1/03/2021	rock pile	Outcrops
-22.9008	149.4754	1/03/2021	hollow bearing tree	6m high about 10cm wide
-22.9028	149.4731	1/03/2021	other habitat feature	Brachychiton sp.
-22.8982	149.4746	1/03/2021	other habitat feature	Gully rainforest thicket
-22.9001	149.4757	1/03/2021	rock pile	
-22.8982	149.4806	1/03/2021	rock pile	
-22.8985	149.4788		other habitat feature	
-22.8996	149.4814	1/03/2021	rock pile	Line of rocks from two previous points
-22.8978	149.4808	1/03/2021	hollow bearing tree	
-22.8901	149.465	1/03/2021	rock pile	
-22.8901	149.465	1/03/2021	hollow bearing tree	
-22.8988	149.4785	1/03/2021	hollow bearing tree	Stag
-22.8904	149.4655	1/03/2021	hollow bearing tree	
-22.9061	149.4796	2/03/2021	hollow bearing tree	
-22.9064	149.4798	2/03/2021	hollow bearing tree	
-22.9059	149.4792	2/03/2021	hollow bearing tree	
-22.906	149.4793	2/03/2021	hollow bearing tree	
-22.9076	149.4808	2/03/2021	hollow bearing tree	
-22.9076	149.4807	2/03/2021	rock pile	

-22.9067	149.4801	2/03/2021	hollow bearing tree	
-22.9068	149.4803	2/03/2021	hollow bearing tree	
-22.903	149.4789	2/03/2021	rock pile	Outcrop
-22.9046	149.4785	2/03/2021	hollow bearing tree	
-22.9036	149.4772	2/03/2021	hollow bearing tree	
-22.9035	149.4779	2/03/2021	hollow bearing tree	
-22.9049	149.4788	2/03/2021	hollow bearing tree	
-22.9055	149.4797	2/03/2021	hollow bearing tree	
-22.9036	149.4796	2/03/2021	rock pile	
-22.9048	149.4789	2/03/2021	hollow bearing tree	
-22.9041	149.4848	1/03/2021	rock pile	
-22.9039	149.4847	1/03/2021	rock pile	
-22.9039	149.4848	1/03/2021	hollow bearing tree	
-22.9058	149.4849	1/03/2021	rock pile	
-22.9036	149.4845	1/03/2021	rock pile	
-22.9033	149.4846	1/03/2021	hollow bearing tree	
-22.9036	149.4842	1/03/2021	rock pile	
-22.9035	149.4843	1/03/2021	rock pile	
-22.9092	149.4826	2/03/2021	rock pile	
-22.9097	149.483	2/03/2021	rock pile	
-22.9083	149.4816	2/03/2021	hollow bearing tree	
-22.909	149.4824	2/03/2021	rock pile	
-22.911	149.4827	2/03/2021	hollow bearing tree	
-22.9108	149.4829	2/03/2021	rock pile	
-22.9101	149.4833	2/03/2021	rock pile	
-22.9103	149.4833	2/03/2021	rock pile	
-22.9057	149.4789	2/03/2021	hollow bearing tree	
-22.9046	149.478	2/03/2021	hollow bearing tree	
-22.9116	149.4844	2/03/2021	hollow bearing tree	
-22.9116	149.4843	2/03/2021	rock pile	
-22.9031	149.4748	2/03/2021	rock pile	Large rocky outcrop 50+ radius
-22.903	149.4751	2/03/2021	hollow bearing tree	
-22.9045	149.4778	2/03/2021	hollow bearing tree	
-22.9045	149.4778	2/03/2021	hollow bearing tree	
-22.9152	149.4866	2/03/2021	rock pile	Large outcrop thicket
-22.9148	149.4861	2/03/2021	rock pile	
-22.9156	149.4888	2/03/2021	rock pile	Outcrop
-22.9152	149.487	2/03/2021	rock pile	Same outcrop 30m
-22.9118	149.4848	2/03/2021	rock pile	Outcrop
-22.9117	149.4848	2/03/2021	rock pile	
-22.9146	149.486	2/03/2021	rock pile	
-22.9123	149.485	2/03/2021	rock pile	
-22.9028	149.477	2/03/2021	rock pile	Creek bed and small escarpment
-22.9028	149.4776	2/03/2021	rock pile	
-22.9022	149.4779	2/03/2021	rock pile	

-22.9032	149.4772	2/03/2021	rock pile	
-22.9036	149.4772	2/03/2021	hollow bearing tree	
-22.9026	149.4783	2/03/2021	rock pile	
-22.903	149.4756	2/03/2021	rock pile	
-22.9028	149.4763	2/03/2021	rock pile	
-22.9032	149.4751	2/03/2021	rock pile	
-22.9032	149.4751	2/03/2021	hollow bearing tree	Stags
-22.9011	149.4768	2/03/2021	rock pile	
-22.9017	149.4772	2/03/2021	hollow bearing tree	
-22.9024	149.4763	2/03/2021	rock pile	Creek
-22.9021	149.4762	2/03/2021	rock pile	
-22.9147	149.4896	2/03/2021	hollow bearing tree	2 stags
-22.9142	149.4879	2/03/2021	rock pile	
-22.9143	149.4881	2/03/2021	hollow bearing tree	
-22.915	149.4905	2/03/2021	rock pile	
-22.915	149.4908	2/03/2021	rock pile	
-22.9147	149.49	2/03/2021	hollow bearing tree	
-22.9148	149.4903	2/03/2021	rock pile	Outcrop and creek
-22.8894	149.4673	3/03/2021	rock pile	
-22.8871	149.4624	3/03/2021	rock pile	Outcrop
-22.8887	149.4667	3/03/2021	rock pile	Entire slope steep and rocky.
-22.8889	149.467	3/03/2021	hollow bearing tree	Stag 3m high 20cm wide vertical
-22.8857	149.4547	3/03/2021	rock pile	Escarpment
-22.8823	149.4391	2/03/2021	other habitat feature	M. bracteata regrowth on rocky Creek. W rubber vine dense.
-22.8865	149.4616	3/03/2021	rock pile	
-22.8862	149.4613	3/03/2021	rock pile	
-22.9171	149.4908	2/03/2021	rock pile	
-22.9169	149.4909	2/03/2021	hollow bearing tree	
-22.9181	149.4907	2/03/2021	hollow bearing tree	
-22.9175	149.491	2/03/2021	hollow bearing tree	
-22.9159	149.4905	2/03/2021	rock pile	
-22.9159	149.4891	2/03/2021	rock pile	Many piles around 50m
-22.9168	149.4909	2/03/2021	hollow bearing tree	Stag
-22.9166	149.4905	2/03/2021	rock pile	
-22.9222	149.4901	2/03/2021	rock pile	Outcrop
-22.922	149.4901	2/03/2021	rock pile	
-22.9199	149.4902	2/03/2021	hollow bearing tree	
-22.9223	149.4902	2/03/2021	hollow bearing tree	
-22.9213	149.4913	2/03/2021	hollow bearing tree	
-22.9211	149.4912	2/03/2021	rock pile	Creek
-22.9218	149.4902	2/03/2021	rock pile	
-22.9216	149.4904	2/03/2021	rock pile	
-22.7115	149.4006	6/03/2021	other habitat feature	Large rocky outcrop
-22.7142	149.3976	6/03/2021	other habitat feature	Steep boulder field ~40

-22.7239	149.398	6/03/2021	hollow bearing tree	Stag 8m 30cm spout ×2
-22.7238	149.3979	6/03/2021	rock pile	Rocky outcrop and boulder field down the slope between the two towers.
-22.7223	149.3986	6/03/2021	other habitat feature	Rocky outcrop and boulders. Very steep dropoff
-22.9	149.4962	5/03/2021	hollow bearing tree	Stag 8m 30cm
-22.7193	149.3977	6/03/2021	other habitat feature	Steep dropoff
-22.7218	149.3986	6/03/2021	other habitat feature	Boulders and steep
-22.7252	149.3976	6/03/2021	hollow bearing tree	Stag
-22.7246	149.3981	6/03/2021	hollow bearing tree	Stag
-22.7255	149.3965	7/03/2021	hollow bearing tree	C. dellachiana 8m 10cm
-22.7254	149.3965	7/03/2021	hollow bearing tree	Stag 12m 10 &15cm
-22.7245	149.3977	6/03/2021	rock pile	
-22.7239	149.398	6/03/2021	hollow bearing tree	Stag 10 & 12 m spout 30 and 20cm
-22.7247	149.3978	6/03/2021	hollow bearing tree	Stag
-22.7245	149.3978	6/03/2021	hollow bearing tree	Stag several hollows
-22.9073	149.495	5/03/2021	other habitat feature	Rocky outcrops and eacarpment
-22.9077	149.4946	5/03/2021	rock pile	
-22.9053	149.4941	5/03/2021	hollow bearing tree	E.crebra 10m 30cmspout
-22.9053	149.4941	5/03/2021	rock pile	Outcrop with large boulders.large outcrop for about 50m+ with thicket
-22.9085	149.4945	5/03/2021	hollow bearing tree	E.crebra 8m 10cm crack
-22.9088	149.4948	5/03/2021	hollow bearing tree	E.crebra 5m spout 30cm
-22.9084	149.4944	5/03/2021	hollow bearing tree	E.crebra 10m 5cm
-22.9084	149.4945	5/03/2021	hollow bearing tree	Stag 6m 30cm spout
-22.9015	149.4939	5/03/2021	other habitat feature	Thicker veg on edge escarpment
-22.9027	149.4936	5/03/2021	rock pile	30m radius
-22.9001	149.4961	5/03/2021	hollow bearing tree	Stag ×3 30+cm
-22.9006	149.4958	5/03/2021	hollow bearing tree	Stag 8m ×2 20cm
-22.9036	149.4939	5/03/2021	rock pile	
-22.9035	149.4939	5/03/2021	hollow bearing tree	E.crebra 10m 5cm
-22.9037	149.4938	5/03/2021	hollow bearing tree	E.crebra 5m 10cm
-22.9036	149.4938	5/03/2021	hollow bearing tree	E.crebra 10m 5cm
-22.7359	149.3973	7/03/2021	rock pile	Outcrops
-22.7346	149.3954	7/03/2021	rock pile	Steep slope and rocky outcrops
-22.7394	149.3995	7/03/2021	rock pile	Outcrop and steep slope
-22.7378	149.3974	7/03/2021	other habitat feature	Steep slope
-22.7269	149.3962	7/03/2021	hollow bearing tree	Stag 15m 20cm
-22.7267	149.3961	7/03/2021	hollow bearing tree	Stag 12m 30cm
-22.7295	149.3954	7/03/2021	rock pile	
-22.7284	149.3962	7/03/2021	rock pile	
-22.743	149.4019	7/03/2021	hollow bearing tree	Stag 15m crack microbat
-22.7418	149.4014	7/03/2021	other habitat feature	Outcrops and boulders
-22.745	149.403	7/03/2021	hollow bearing tree	E.crebra stag 10 and 15m 30 and 20cm

Appendix G Cycad Translocation and Management Plan (EPBC listed species)

Clarke Creek WIND FARM

Cycad Translocation and Management Plan

CLARKE CREEK WIND FARM

NOVEMBER 2021

Green Tape SOLUTIONS
ENVIRONMENTAL CONSULTING

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ACRONYMS AND ABBREVIATIONS

CTD	Cycad Translocation Database
CTMP	Cycad Translocation and Management Plan
Cwth	Commonwealth
DAWE	(Cwlth) Department of Agriculture, Water and the Environment – formerly DoEE
DEHP	(Qld) Department of Environment and Heritage Protection (now DES)
DES	(Qld) Department of Environment and Science
DoEE	(Cwlth) Department of the Environment and Energy
EPBC	(Cwth) *Environment Protection and Biodiversity Conservation Act 1999*
EMP	Environmental Management Plan
GBO	General biosecurity obligation under the *Biosecurity Act 2014* (Qld)
ha	hectares
m	metres
MNES	Matters of national environmental significance under the EPBC Act
OMP	Offset management plan
sp.	Species (singular)
spp.	Species (plural)
TEC	threatened ecological community (EPBC Act)
VM Act	(Qld) *Vegetation Management Act 1999*
WoNS	Weeds of national significance

1 INTRODUCTION

1.1 PURPOSE

This Cycad Translocation and Management Plan (CTMP) (the 'Plan') has been prepared for the Clarke Creek Wind Farm (the 'Project') to satisfy the requirements of Condition 8 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval for the Project (EPBC 2018/8141).

The CTMP specifies the activities required to minimise the impact of the Project on populations of listed *Cycas megacarpa and Cycas ophiolitica* within the Project Area, including assessment, management, monitoring and reporting objectives and actions to be implemented prior to, during and following translocation of cycad individuals from the Project development footprint.

The CTMP has been developed in accordance with the *National Multi-Species Recovery Plan for Cycads* (Queensland Herbarium, 2007), the *Guidelines for the Translocation of Threatened Plants in Australia* (Commander et al., 2018) and the conditions stipulated under the EPBC Act approval.

The CTMP (version 4.3) was approved by the Department of Agriculture, Water and the Environment (DAWE) in accordance with Condition 4 of the approval for EPBC 2018/8141 on12th June 2020. Since that time additional cycad surveys have been completed and information obtained which require the CTMP to be updated.

The project comprises of three stages. The first two stages will be developed first comprising up to 111 wind turbines. Targeted cycad surveys were conducted in the Stage 1 and Stage 2 development corridor (i.e. Southern and Central portions of the Project) from 28 February to 7 March 2021. These surveys identified about 2,850 Cycads occurring within the broader approved disturbance corridor for Stage 1 and Stage 2 of the project, however a reduced number of approximately 650 Cycads are expected to require translocation. The final numbers will be confirmed during the detailed design phase.

The Queensland Herbarium was consulted in relation to the survey and it was concluded that the populations within the study area are considered to be exclusively *Cycas terryana* (as confirmed by the Queensland Herbarium on 23rd June 2021 – refer to Appendix C). Cycas terryana is listed as Vulnerable under the QLD *Nature Conservation Act 1992*, however it is not listed under the EPBC Act. The EPBC-listed *C. megacarpa* and *C. ophiolitica* may also be present within the Project Area and were previously confirmed by the Queensland Herbarium from samples, but were later re-determined to be *C. terryana* (refer to Appendix C). Cycas terryana that cannot be avoided will be managed in accordance with the Queensland Protected Plants Clearing Permit requirements, which includes translocation.

This CTMP remains relevant for any project works which interact with *C. megacarpa* or *C. ophiolitica* individuals. The CTMP will be implemented and will remain in effect until such time as the performance measures within this Plan are achieved.

Appendix A describes the ecology of the two EPBC-listed cycad species in addition to a comparison table with the state-listed *C. terryana*.

1.2 OBJECTIVES

The objectives of this management plan are to:

- meet the EPBC condition of approval related to the protection and translocation of *C. megacarpa* and *C. ophiolitica* individuals within the Project Area, including:

  - To establish salvaged and propagated healthy *Cycas* spp. individuals within the translocation recipient area. Establishment of *Cycas* spp. includes replacing salvaged and translocated plants which do not survive at a 4:1 ratio with seedlings or juvenile cycads of the same species.
  - To protect, maintain and monitor translocated cycads in line with the performance measures of this Plan.
- provide information in relation to the Project impact area, temporary storage area and translocation site, describing suitability of these areas;
- outline a translocation program and protocol for the salvage, propagation and planting of *C. megacarpa* and *C. ophiolitica;*
- describe the proposed management measures to ensure the success of the translocation program; and
- identify parameters and performance criteria to monitor and assess the success of the translocation program.

1.3 CONDITIONS OF EPBC APPROVAL

This plan has been prepared to address Condition 8 of the EPBC Act Approval (EPBC 2018/8141). Table 1-1 states the relevant approval conditions and where each requirement of Condition 8 is addressed within the Plan, with additional reference to how the cycad translocation program will meet the Guidelines for the translocation of threatened plants (Commander et al., 2018)

Table 1-1 Relevant approval requirements under EPBC Act Approval

Specific requirements of EPBC Act Approval – Condition 8	**Relevant Section of the CTMP where requirement is addressed**
For the protection of listed Cycad(s) species, the approval holder must include within the Environmental Management Plan, a Cycad(s) translocation program that:	
• is in accordance with the *National multi-species recovery plan* and the *Guidelines for the translocation of threatened plants* (the Guideline)	This plan (whole document), and specifically the sections of the guideline described below.
• Section 4.2 of the Guideline: Selection of recipient sites	Figures 2.1, 2.2 and Section 3 – Pre-Translocation Assessment
• Section 4.3 of the Guideline: Site selection beyond the known range	Not applicable as cycads will be translocated within the known range for each species / population within the Clarke Creek Project Area – See Figures 2.1 and 2.2.
• Section 6.1 of the Guideline: Logistical assessment 1. Personnel 2. Resource requirements	 Suitably Qualified Personnel Definition: Persons with demonstrated ecological knowledge and experience in the management and translocation of cycads. Section 6 – Resource Requirements

Specific requirements of EPBC Act Approval – Condition 8	Relevant Section of the CTMP where requirement is addressed
• Section 6.2 of the Guideline – Scheduling for translocation activities - 6.2.1 Timeline for translocation planting - 6.2.2 Single verses staggered planting	Section 6.2 of this plan.
• Section 6.3 of the Guideline – Collection of source material - 6.3.1 How much material can be collected from each source plant? - 6.3.2 Collection of material and preparation for whole plant transplantation. - 6.3.3 Collection licence requirements - 6.3.4 Record keeping requirements during propagation	Section 6.3 of this plan.
• Section 6.4 – Establishment and maintenance of an ex-situ collection - 6.4.1 – Storage and propagation of seeds - 6.4.2 – Vegetative propagation - 6.4.3 – Phytosanitary considerations during propagation - 6.4.4 – Propagation monitoring and recording	Section 6.4 of this plan.
• Section 6.5 – Learning from the translocation – experimental design - 6.5.1 Pilot studies - 6.5.2 Translocation as a scientific experiment - 6.5.3 Designing an experiment	Section 6.5 of this plan.
• Section 6.6 – Identification of post translocation management, monitoring and evaluation methods - 6.6.1 – Ongoing management - 6.6.2 – Monitoring and evaluation	Section 6.6, Section 8 - Monitoring and evaluation) and Appendix B of this plan.
• Section 6.7: Pre-translocation site preparation	Section 6.7 and Section 2.3 – Translocation Recipient Site.
• Section 7.1 – 7.4: Implementing translocation and ongoing maintenance	Section 4 – Translocation Plan and Section 7 – Management and Maintenance.
• Section 8.2 – 8.5: Translocation monitoring and evaluation	Section 8 – Monitoring and Evaluation.
• specifies the number of Cycad(s) that cannot be avoided by the action;	Section 2.1 – Impact Site and Section 7 – Pre-translocation Assessment.
• specifies the procedure for the relocation of Cycad(s) to areas outside of the impact areas suitable for their survival;	Section 4 – Translocation Plan.
• identifies where Cycad(s) will be translocated to;	Figure 2-1 and Section 2.3.

Specific requirements of EPBC Act Approval – Condition 8	Relevant Section of the CTMP where requirement is addressed
• specifies ongoing management to enable the successful re-establishment of translocated cycads;	Section 7 – Management and Maintenance
• specifies the process for monitoring and reporting the progress and ultimate success (health) of translocated individuals; and	Section 8 - Monitoring and Evaluation
• specifies the program for propagating Cycad(s) to replace any relocated individuals that have not survived the translocation process.	Section 5 – Seed Collection and Propagation

2 BACKGROUND INFORMATION

2.1 IMPACT SITE

Cycas megacarpa and *C. ophiolitica* had been identified within the Project footprint during seasonal ecological surveys undertaken in 2017 (NGH Environmental and Green Tape Solutions, 2018), however these have since been redetermined by the QLD Herbarium to be *C. terryana*, which is not an EPBC-listed cycad species (refer to Appendix C). Nonetheless, potential remains for the EPBC-listed Cycads to occur within the Project Area, particularly within the Stage 3 area (northern portion of site), therefore this CTMP remains relevant. Cycads have predominantly been recorded in good quality remnant patches of woodland and open forest within the northern, eastern and southern sections of the Project Area (Figure 2-1 and Figure 2.2)

The March 2021 survey did not identify any EPBC-listed cycads within the Stage 1 and Stage 2 development corridor.

Without appropriate mitigation, the Project has the potential to impact EPBC-listed cycads due to clearing for the construction of infrastructure.

Wherever feasible, the project design will seek to avoid or minimise impacts to EPBC-listed cycads through the detailed design of the Project layout It is not expected that the number of EPBC-listed cycad plants impacted would be greater than 500 plants; however, if this number of plants is exceeded, the CTMP will be updated and submitted to DAWE for approval.

Avoiding clearance of some cycads will not be possible due to constraints associated with Project construction (e.g., topography, geology and location of cycads). Where impacts are unavoidable, cycads will be salvaged and translocated. The Project is considered unlikely to result in a significant impact EPBC-listed cycads populations within the Project area when the management measures recommended in this Plan are implemented.

Cycad salvage and translocation is a proven method of mitigating the impacts of land clearing on cycad populations. Translocation of cycads from clearing impact areas to establish ex situ populations has been undertaken successfully for both species (Queensland Herbarium, 2007).

2.2 TEMPORARY STORAGE SITE

Past cycad translocation experience indicates that temporary storage and horticultural management of salvaged cycads can improve the survival rate of translocated individuals, especially if they have incurred damage during the salvage process (Australian Pacific LNG, 2014). Salvaged cycads that are not immediately translocated to a permanent recipient site will be stored and maintained at a temporary storage facility prior to being planted at their permanent recipient site. The exact location of the temporary storage site will be determined once the detailed design of the wind farm are completed. Figures 2.1 and 2.2 illustrates suitable areas that could be used for the temporary storage site.

The temporary storage site will meet the following criteria:

- Large enough to adequately store the salvaged cycads, collected seedlings and propagated cycads before planting into the recipient site(s
- Appropriate security measures will be implemented and discussed with the contractor (e.g., padlocked gates and security measures, if required).

- The current land use does not negatively impact on the health of cycads in storage e.g., aerial spraying will not be undertaken within proximity of the site. Fencing installed around the compound will ensure no disturbance by livestock and feral pests (cattle, feral pigs and browsing herbivores).
- There will be no significant infestations of listed restricted weeds or environmental weed species within the proposed compound and compound surrounds. Where weed infestations exist within the temporary storage site, they will be managed to avoid any negative impacts upon stored cycads for the duration of the holding.
- The site will provide an acceptable level of shade. This is particularly important during the hotter months of the year.
- The site will be in an area where there is minimal risk of flooding events.
- The soils within the storage site will not be sodic or prone to significant erosion in a way that could impact stored cycads.
- Water will be available at the site.
- A firebreak can be established around the storage compound to reduce the risk of wildfire impacting cycads whilst in storage, if deemed necessary.
- Cycads are naturally occurring at the site or nearby thereby increasing the likelihood that local pollinators are present.

2.3 TRANSLOCATION RECIPIENT SITE

Cycad individuals salvaged from the Project footprint and any specimens propagated from seed will be translocated back into suitable sites within the Project Area (see Figures 2.1 and 2.2), which may include project biodiversity offset areas. The final recipient site/s will be defined following the completion of the detailed design and further consultation with the respective landowners.

The suitability of a translocation site is informed by a range of factors including:

- the final number of cycads to be salvaged from the Project footprint;
- site constraints such as topography and proximity to existing and future infrastructure (in particular, access tracks) which will dictate accessibility for translocation and ongoing management
- suitable environmental conditions, including suitable habitat and microclimate i.e. similar vegetation community type as the impact site which is to be in good condition and have good connectivity to other patches of supporting habitat and connectivity of cycad individuals within the wider area. Other conditions include the size, structure, condition and status of supporting habitat;
- the presence of required ecological function e.g., necessary pollinators; and
- any potential threats to translocated individuals (e.g., proximity to bushfire-prone vegetation, cattle grazing/damage pressures, current level of weed infestation and pest animal activity, soil stability) and the management effort to control these potential threats.

Suitable translocation recipient sites located within the Project area are shown on Figure 2-1, although there are many other suitable locations across the project area which could be chosen once final investigations are completed.

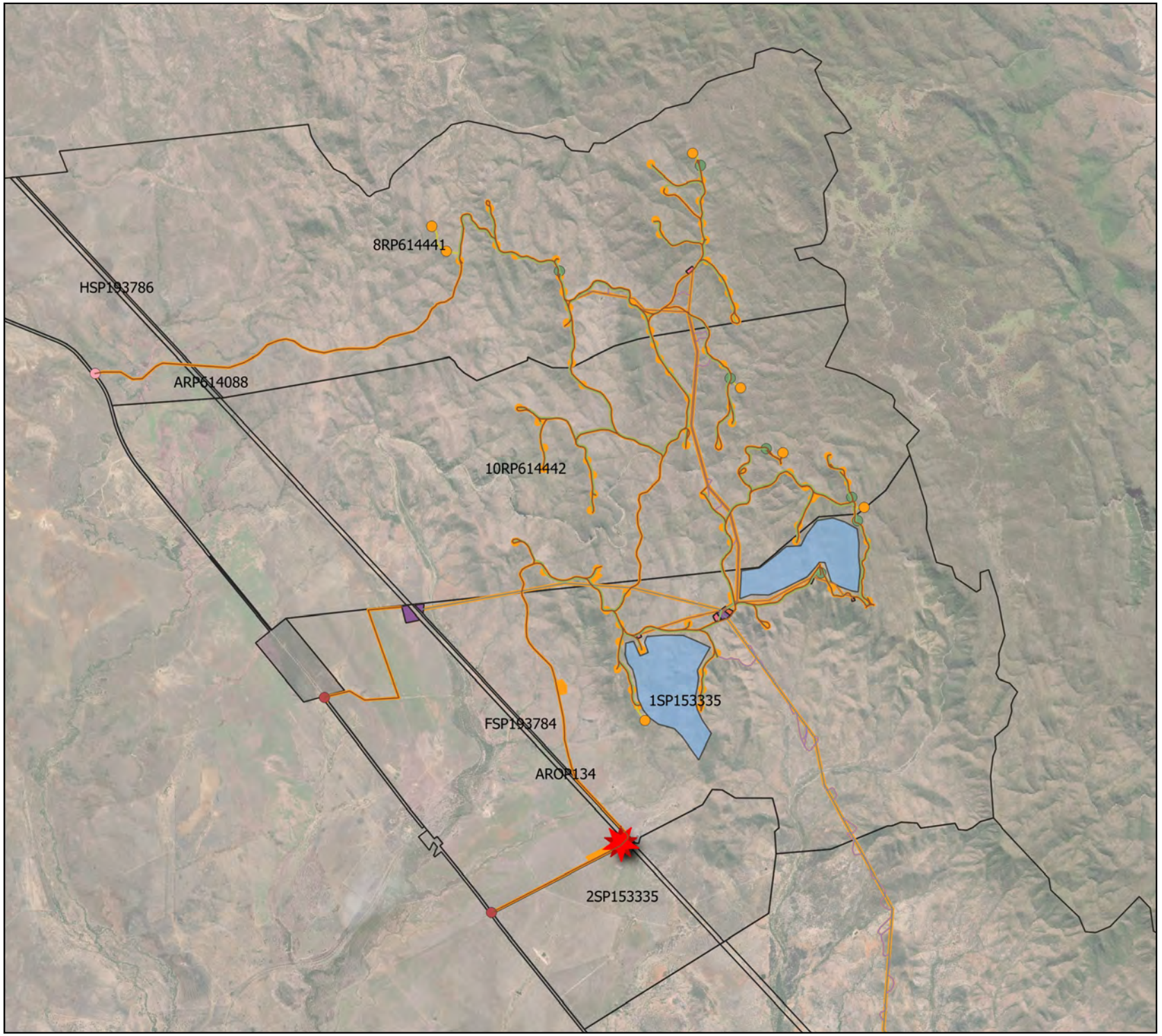

Figure 2-1 Indicative location of recipient sites and temporary storage location within the Stage 3 (Northern) area.

Project: PR17116 - Clarke Creek Wind Farm

Temporary Storage Location

CTMP Translocation Sites

MCR3_Disturbance_Stage3

Cadastre

0 1 2 3 4 5 km

Notes:
-Flora Survey by Green Tape Solutions and NGH Environmental 2021
-Site Infrastructure and Impact Areas from Client

Created By: JA
Date: 8/11/2021
Version: 2

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Figure 2-2: Indicative location of recipient sites and temporary storage location within the Stage 1 & 2 (Central and Southern) areas.

Project: PR17116 - Clarke Creek Wind Farm

- Temporary Storage Location
- CTMP Translocation Sites
- MCR3_Disturbance_Stage1 & 2
- MCR3_Disturbance_Stage 3
- Cadastre

0 1 2 3 4 5 km

Notes:
-Flora Survey by Green Tape Solutions and NGH Environmental 2021
-Site Infrastructure and Impact Areas from Client
-Base map Copyright (c) Esri and its data suppliers. Copyright (c) State of Queensland (DNRME)

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3 PRE-TRANSLOCATION ASSESSMENT

Pre-translocation surveys will be undertaken prior to the commencement of vegetation clearing, including during the infrastructure micro-siting process. These surveys will be done by qualified ecologists and may be combined with pre-clearance fauna surveys. Areas will be surveyed approximately four weeks prior to clearing (or earlier where possible). The purpose of these surveys is to:

- Confirm the total number of cycad individuals for each species that are impacted by the Project.
- Map and tag the extent and individual locations of cycads within the Project footprint.
- Record baseline data for each cycad within the impact area, which will be used to monitor individuals following translocation, to inform management actions for translocated specimens and to evaluate the ongoing and overall success of the translocation program.
- Confirm suitable location for a temporary storage site (refer to Section 2.2); and
- Confirm suitability of habitat for translocation recipient site/s within the Project area (refer to Section 2.3).

The pre-translocation surveys of cycads within the Project impact area will consist of a systematic walk-through of the development footprint. The location of all EPBC-listed cycad individuals within the Project footprint will be recorded with a hand-held GPS receiver. Each individual cycad will be assigned a unique identification number that is to be recorded on fire-proof tags (e.g., aluminium plant tags) that are attached in a secure manner to the plant (e.g., with fine-gauge wire at the base of a mature but not senescent leaf). The Queensland Herbarium (or other approved organisation) will be consulted to confirm the cycad species type where this cannot be confirmed by the on-site qualified ecologist.

The following data will also be recorded:

- Age class/maturity – seedling, juvenile, adult at reproductive maturity (refer to Table 3-1);
- Height class, with classes based on 25 cm intervals (i.e. seedling, 0 - 25 cm, 26 - 75 cm, 76 – 100 cm etc.);
- Sex (if identifiable);
- Evidence of current disturbance factors e.g., recent fire event, insect damage and defoliation;
- Severity of any damage arising from current disturbance factors; and
- Georeferenced photographs of each plant

This data will be collated into a database in an appropriate format (e.g., GIS Esri Shapefile, MS Excel spreadsheet or MS Access database). The Stage 1 and Stage 2 areas were surveyed in March 2021 with no EPBC-listed cycads identified.

Table 3-1 Definitions of cycad maturity (Australian Pacific LNG, 2014).

Age class	Definition
Seedling	• A newly formed plant that is not attached to an older individual (i.e., is not a 'pup'[1]) • The sub-surface stem and subterranean trunk is less than 5 cm in length; • Does not have an above-ground stem or a formed crown; and

[1] A 'pup' is the growth of a new cycad, they are genetic clones of their parent plant, and typically develop around and attached to the parent plant near or just below the soil level. Both male and female plants can produce pups.

Age class	Definition
	• Has less than five (5) active fronds which are usually less than 50 cm in length (total rachis length).
Juvenile	• Is a singular plant that is not attached to an older individual (i.e., is not a 'pup'); • The crown has started to gain shape; • The plant has a surface height up to 5 cm (from ground to crown base); • The sub-surface stem and subterranean trunk is usually 5 – 25 cm in length but may be up to 40 cm; and • The plant has 5 or more active fronds.
Sub-adult	• Is a singular plant not attached to an older specimen/individual (not a pup); • The crown has fully developed; and • The plant has a surface height between 5 and 55 cm (from ground to crown base). Or: • Is a pup or multitude of pups attached to an older specimen/individual (usually at or near the base); and • The tallest stem has a surface height of 0 – 55 cm (from ground to crown base).
Adult (of reproductive capacity)	• Is a singular plant not attached to an older specimen/individual (not a pup); • The crown has fully developed; and • The plant has a surface height greater than 55 cm (from ground to crown base). Or: • Is a pup or multitude of pups attached to an older specimen/individual (usually at or near the base); and • The tallest stem has a surface height greater than 55 cm (from ground to crown base).

4 TRANSLOCATION PLAN

In general, cycads are straightforward to translocate and are widely used as landscape plants in the nursery industry. There have been at least four *C. megacarpa* and *C. ophiolitica* translocation programs in Central Queensland with varying degrees of success. The data collected and work methods utilised in these programs have been adapted for this Project and will be used in conjunction with the general policies and guidelines proposed by Commander et al. (*Guidelines for the Translocation of Threatened Plants in Australia;* 2018) and the *National Multi-Species Recovery Plan for Cycads* (Queensland Herbarium, 2013).

Commander et al., 2018 detail actions that should be undertaken prior to the translocation of the cycads into the recipient site(s), with the key action being the removal of any threats from the translocation recipient site(s).

All cycads located within the Project disturbance area that cannot be avoided will be salvaged and translocated as part of this Plan. However, some cycads may be inaccessible and unable to be salvaged for translocation due to OH&S requirements, and the location of plants that cannot be salvaged will be recorded along with the justification.

4.1 SALVAGE FROM IMPACT SITE

Cycads may be successfully translocated at any time of the year; however, the optimal time is immediately prior to the start of new growth, generally in the cooler months (i.e., winter and spring) and before the onset of the wet season. Cycads are generally tolerant of some root damage, however as with most species, better results are achieved with the retention of a solid root ball. Following a review of the available information for cycad species, including the three documented translocation projects for *C. megacarpa* (Australian Pacific LNG, 2014, Santos GLNG, 2013, QGC, 2016), a multi-step plan has been developed for the salvage and translocation of cycad individuals, as follows:

1. Establish and maintain a "Cycad Translocation Database[2]" (CTD) to record actions required for delivery of this CTMP. The CTD will record the following:
    i. the chain of custody for cycads salvaged and seeds collected;
    ii. details of management actions;
    iii. details of seed collection and propagation;
    iv. details of translocation to recipient site and final location of translocated or propagated cycad.

    Appendix B details the records which will be collected and retained.
2. Site preparation will be undertaken prior to salvage e.g., preparation to ensure unimpeded access, weed treatment (where relevant) to minimise the risk of transporting weed propagules, collection of data records etc.
3. Marker paint or fluorescent dye will be used to mark the north side of each mature plant. This will ensure that the plants are replanted with a similar north-south orientation.
4. Clear the area surrounding the individual plants by hand.
5. Trim fronds back to where the rachis is attached to the stems.
6. Spray trunks and around the crown area (not the crown itself) with an anti-transpirant (e.g., Envy®) to prevent the plants drying out.

[2] The database acts as a chain of custody identifying each plant and seed used during the project and prevents unlawful transactions in plants and plant parts of an endangered species.

7. Removal will entail hand-digging where required, for example on steep slopes or when individuals are located against trees or boulders. Otherwise, mechanical removal will be undertaken where topography and soil characteristics allow for it e.g., on gentle slopes and soft soils.
8. To avoid bruising the trunks/stems of the cycads, care will be taken whilst transporting the plants. Any large or heavy plants will be loaded using a soft sling (or equivalent) on a backhoe or excavator bucket and packed using rolls of hessian sacking or similar.
9. Where applicable, damaged roots will be trimmed with clean/sterile secateurs and fungicide powder (e.g., Banrot®, Formula 20®) applied to prevent infection. Vitamin B or seaweed emulsion will also be applied to encourage root growth.
10. The plants will be positioned in the temporary storage site or directly in the recipient site (refer to Section 4.3) with the north marked side facing north.
11. The cycads at the temporary storage site will be potted up into pots or woven grow bags depending on the size of the individual.
12. The rootball of each plant will be re-packed with sandy loam to provide a suitable free draining soil medium for new roots to grow. This soil will be free of weed seeds. Backfill around the plant will use topsoil removed from the hole.

Any significant damage incurred to an individual plant as part of the salvage process will be recorded in the translocation database. This will assist in identifying any immediate or future horticultural requirements and will inform the analysis of monitoring results when tracking the progress of individual plants (particularly in the event of plant death during storage or following translocation). Where appropriate, damage to cycads will be treated with an appropriate disinfection and/or protection product (e.g., wound sealant or dressing) to minimise the risk of pathology.

4.2 STORAGE AT TEMPORARY STORAGE SITE

A suitably qualified horticulturist (see Table 6-1) with relevant experience in the management of native cycad species will be engaged to manage the temporary storage site.

All specimens stored at the temporary site will be potted up into either plastic pots or appropriately sized woven grow bags, depending on the size of the individual. Plastic posts will be of 1:2 diameter to depth ratio (i.e., deep pots) and along with grow bags, will be elevated off the surface of the storage facility to facilitate drainage of excess water in pots / bags. Care will be taken to ensure that cycads are not over watered to prevent roots rotting.

4.3 TRANSLOCATION TO PERMANENT RECIPIENT SITE

Actions undertaken prior to the translocation of Cycad individuals will include, at a minimum:

- The removal of significant weed species from within the immediate vicinity and surrounds of the recipient site, for example, through an initial controlled burn to weed and fuel loads with follow up mechanical removal or targeted weed treatment with herbicides (note: pre-emergent herbicides are not to be used).
- Where present in material numbers, the management of pest animal species from within the immediate vicinity and surrounds of the recipient site through trapping, baiting or exclusion fencing. Note pest animals to cycads include include feral pigs, cattle, horses and deer which may dig up or trample cycad plants and seedlings. Firebreaks will be constructed, where deemed beneficial and not already established.

- Suitable watering arrangements, for example, the installation of a water tank and watering infrastructure or suitable access for a water cart.

Translocating cycads to the permanent recipient site will include the following steps:

1. To avoid bruising the trunks/stems of the cycads, care will be taken whilst transporting the plants to the recipient site(s). Any large or heavy plants will be loaded using a soft sling on a backhoe or excavator bucket and packed using rolls of hessian sacking or similar.
2. Establish the transplant holes at the recipient site(s). The holes will not be too much deeper than the rootball of the plants being transplanted. The soil within the new holes will also be loosened.
3. Carefully remove each plant from its pot whilst preserving the rootball(s) of soil to retain as much soil around the rootball(s) as possible to avoid damaging the root system.
4. If there is any hessian sacking around the plant(s) it will be removed as they are placed into their new location.
5. Where applicable, trim any damaged roots with clean/sterile secateurs and apply fungicide powder (e.g., Banrot®, Formula 20®) to prevent infection. Vitamin B or seaweed will also be applied to encourage root growth.
6. The plants will be positioned with the marked side facing north.
7. The rootball of each plant will be re-packed with sandy loam to provide a suitable medium for new roots to grow. This soil will be free of weed seeds. Backfill around the plant using the topsoil removed from the hole.
8. Where necessary, the plants will be staked with multiple stakes for stability or rocks used.
9. If deemed necessary, spray the trunks of the plants again with an anti-transpirant (e.g., Envy®) to minimise moisture loss.
10. The crown and any remaining foliage on each plant may be sprayed with an insecticide (Confidor® at an application rate of 10ml/9L water or Crown® at an application rate of 5ml/9L water).
11. Using ordinary water, thoroughly water around each translocated plant

Planting patterns and ratio of *C. megacarpa / C. ophiolitica* relative to composition of species collected from impact sites will be considered to ensure that *C. ophiolitica / C. megacarpa* are not introduced into incompatible populations and are planted into populations of similar composition to where they were salvaged from.

5 SEED COLLECTION AND PROPAGATION

In accordance with Condition 8(g) of the EPBC Act approval, the CTMP must specify a program for propagating cycads to replace any relocated individuals that have not survived the translocation process. To address this requirement, seeds will be collected, propagated and maintained within the temporary storage facility or suitable alternative location (e.g. offsite nursery) until the replacement plants are planted out within recipient sites. Seed collection will be undertaken by the Project ecologist or other suitably experienced personnel while propagation will be undertaken by a propagation contractor (see Table 6-1).

Previous translocation programs undertaken in Central Queensland determined that the mortality rate for translocated cycads was highest within the first 12 months following translocation (Wain, 2018), with 19% of deaths occurring within the first 12 months and approximately 32% after 4 years. Adult plants were noted to take at least 6 months to die, however numbers within the adult age class stabilised after approximately 18 months. Based on this observed mortality rate, sufficient seed will be collected to replace a minimum of 50% of the total number of individuals translocated, with additional seed collected to account for other factors such as non-viable seed, seedling mortality and survival rate of propagated stock following planting. Seed will be collected from cycad individuals across the Project area to ensure that the genetic variability of the source population is maximised.

5.1 COLLECTION METHODOLOGY

Collection will be conducted in accordance with the conditions of the licence, any additional DES requirements, collection guidelines and all relevant requirements outlined in the Code of Practice for the harvest and use of Protected Plants (DES, 2017). The collection methodology is as follows:

- Landholder protocols and communication will be followed in line with the project requirements.
- Personnel involved in seed collection will take care to minimise damage to any understorey plants through trampling or by vehicles.
- Personnel involved in seed collection will take precautions to prevent the spread of weed seeds, propagules and pathogens into and out of seed collection areas, whether by vehicle or on a person's clothing, footwear etc. This will include measures such as the disinfection of tools and equipment, removal and appropriate disposal of weed seeds and propagules from clothing, cleaning of boots and vehicle wash-downs as per the project requirements.
- Personnel involved in seed collection will take precautions to minimise damage to soils, roads and tracks, especially in wet conditions.
- To ensure sufficient genetic variation within the translocated population, seed collection will not be restricted to those individuals being directly impacted by the Project. Seed will be taken from five or more maternal parent plants at least 100 metres apart.
- Only fully ripe fruit is to be collected – seed must have been shed or on the point of being shed.
- Cuts to remove fruits will be made with clean, disinfected equipment as close to the base as possible.
- No more than 20% of the total number of fruits will be collected from any one plant in any 12-month period.
- Seeds from multiple plants will not be mixed into the one collection bag or container.
- Seeds from adult plants will not be mixed with seeds found on the ground if the origin of seeds on the ground is uncertain.

- At collection, all seed collection bags/containers will be clearly labelled with the species, date, place of collection (GPS coordinates or waypoint), total number of seeds collected from that point, collector's name and the relevant licence number.
- Seed collection records will be kept at the propagation premises and be made available upon request to a conservation officer appointed under S 127 of the NC Act (i.e., maintain the CTD).

Seed collection information will identify the origin of each seed. All seed collection data will be collated into an appropriate data management tool or equivalent system for record keeping, to track the progress and survival rate of propagated individuals through the entire process, from the point of collection. This tool also supports inputs that allow seed viability and fitness for each maternal plant to be tracked over time.

5.2 PROPAGATION METHODOLOGY

Propagation of collected cycad seed must be undertaken in accordance with a valid Protected Plants Growing Licence and the *Code of Practice for the harvest and use of Protected Plants* (DES, 2017).

Seed collection and propagation will be undertaken by suitably qualified and experienced seed collectors and a propagation contractor with experience in propagating native cycad species (see Table 6-1). Propagation will be undertaken off site at a propagation nursery.

The specific methodology for seed collection and propagation will be developed in consultation with the propagation contractor in accordance with the best practice management. This would include watering, monitoring and management of pest infestation or disease, fertiliser application (as relevant), and appropriate cleanliness and hygiene of nursery.

6 PRE-TRANSLOCATION PREPARATION

6.1 LOGISTICAL ASSESSMENT

Key roles in delivery of this Plan include:

- Cycad translocation team to oversee the delivery and implementation of the CTMP. A qualified ecologist and project manager with the skills and experience will oversee the delivery of the program.
- Horticulturists/ecologists who will undertake seed propagation and maintenance of the ex-situ cycads salvaged from the construction footprint.
- Translocation specialists experienced in salvage of cycads from the construction footprint and translocating into the recipient site/s.
- The Queensland Herbarium takes an active interest in the management of these cycad species. The aim is to reinstate the plants into the province from which they originate, where this is not possible the Queensland Herbarium will be consulted to ensure there are no genetic suppression or regression impacts to affected cycad population(s) from the proposed translocation arrangements.

Note: the same person may fulfill one or more of the above roles provided they meet the relevant requirements of each role.

6.1.1 Personnel

Arrangements for engaging personnel to implement this Cycad Translocation and Management Plan are in progress. The proponent is assessing potential contractors to undertake the works and will ensure that all elements of the CTMP implementation are satisfied. Table 6-1 defines suitably qualified personnel to implement the CTMP.

Table 6-1 Definitions of suitably qualified personnel

Terms for the purpose of the CTMP	Definitions
Ecologist	Qualified ecologist must have professional ecological qualifications, training, skills and experience related to cycad translocation activities. The ecologist will give authoritative independent assessment, advice and analysis on performance relative to the cycad translocation using the relevant protocols, standards, methods and/or literature.
Seed collectors	Persons trained, or have skills, in seed collection of threatened plants, particularly cycads.
Horticulturist/Propagation contractor	Professional with qualifications, training, skills and experience related to the propagation of cycads with knowledge, skills and experience in cycad translocation activities. (horticulture or other training considered relevant).

6.1.2 Resource requirements

The preparation and implementation of this CTMP is a condition of EPBC Approval 2018/8141. Accordingly, the proponent will implement this plan to meet the approval conditions for the project. This section specifically addresses Chapter 6 of the Guidelines for the Translocation of Threatened Plants in Australia (the Guidelines). The Clarke Creek Wind Farm is a long-term project and as such, will continue to fund and support the implementation of the CTMP.

While the implementation arrangements for the CTMP are not finalised, there is sufficient detail to inform the resource requirements to deliver the plan. Personnel engaged on the project have considerable experience in cycad translocation and conservation and a wide range of experience in threatened species conservation projects and delivery. Details of personnel who are suitably qualified botanists and cycad specialists (as per Table 6-1) engaged to date in the project are as follow:

- Joseph Adair (Green Tape Solutions), 30 years' experience. Joseph has managed an on-ground sub-contractor and supervised two successful cycad translocation projects in Queensland. His role was project oversight and preparation / finalisation of the report CTP approvals from State and Commonwealth agencies, selection of the nursery to undertake cycad care and maintenance, development of the protocols for custody control and the production of seedlings for the project, audit of the activities undertaken and quality control. He led the selection of the offset site for the Santos project on Red Shirt and development of the Offset Management Plan for the project including planting of cycads. Before this while with QPWS, his team developed protocols for managing and working with protected plants, including cycads for several projects undertaken by council and Main Roads, one of which was on the Calliope Range Road upgrade project which involved removal and reinstating cycads on the range.
- Carla Perkins (Green Tape Solutions), 13 years' botanical experience. Carla has strong experience in protected plant translocation works including field collection, storage and propagation of reproductive material (cuttings and seed) for threatened plants in Central Queensland with SANTOS and APLNG. Species included *Acacia pedelyii, Apatophyllum teretifolium, Cadellia pentastylis, Desmodium macrocarpum, Macropteranthes leiocaulis, Solanum johnsonianum* and *Wahlenbergia islensis*.

Financial assessment of the following elements is shown in Table 6-2, noting that costs are indicative only and will be subject to a tendering process. These components will be refined as the project progresses.

Table 6-2 High level estimated resource requirements to implement the CTMP on the basis of 500 individuals

Item	Status / comment	Cost (approximate)	Annual cost 1st year	Ongoing annual costs	Total Cost
Pre-translocation research into biology and ecology	Complete – refer to past Cycad translocation projects	Minimal – desktop assessment	$6,000	$0	$6,000
Genetic and taxonomic studies, where necessary	Complete – refer to past Cycad translocation projects	Minimal – desktop assessment	$600	$0	$600
Surveys for source and recipient translocation sites	Complete – initial surveys complete, and identification of potential translocation sites are provided in this plan	$15,000	$18,000	$0	$18,000
Collection and where necessary storage of seeds	Seeds to be collected from the Project Area (4 to 1 ratio). Plants that do not survive translocation replaced at a ratio of 4:1, applying the Qld offset ratio. Note that dead mature/seeding plants are replaced by seedlings/juveniles	$20,000	$24,000	$0	$24,000
Propagation and management of plants	Nursery site to be confirmed, horticulturist to be confirmed.	$80,000	$48,000	$0	$96,000
Translocation recipient site preparation	Control of threats such as grazing, fencing, restoration work and feral animal control.				
		$180,000 establishment	$180,000	$0	$180,000
Fire management	Install fire breaks, initial prescribed burn to reduce fuel loads if necessary.	$6,000 annually (10 years)	$24,000	$6,000	$84,000
Personnel training	As required to maintain currency for the duration of the project.	$12,000	$1,200	$1,200	$12,000
Planting equipment	Shade house, pots and grow bags.	$12,000	$12,000	$0	$12,000
Machinery and transport for whole plant transplantation	Rubber tyre mini-excavator and operator. Light truck / trailer to salvage plants and transport them to temporary storage site or recipient site.	$150,000	$180,000	$0	$180,000

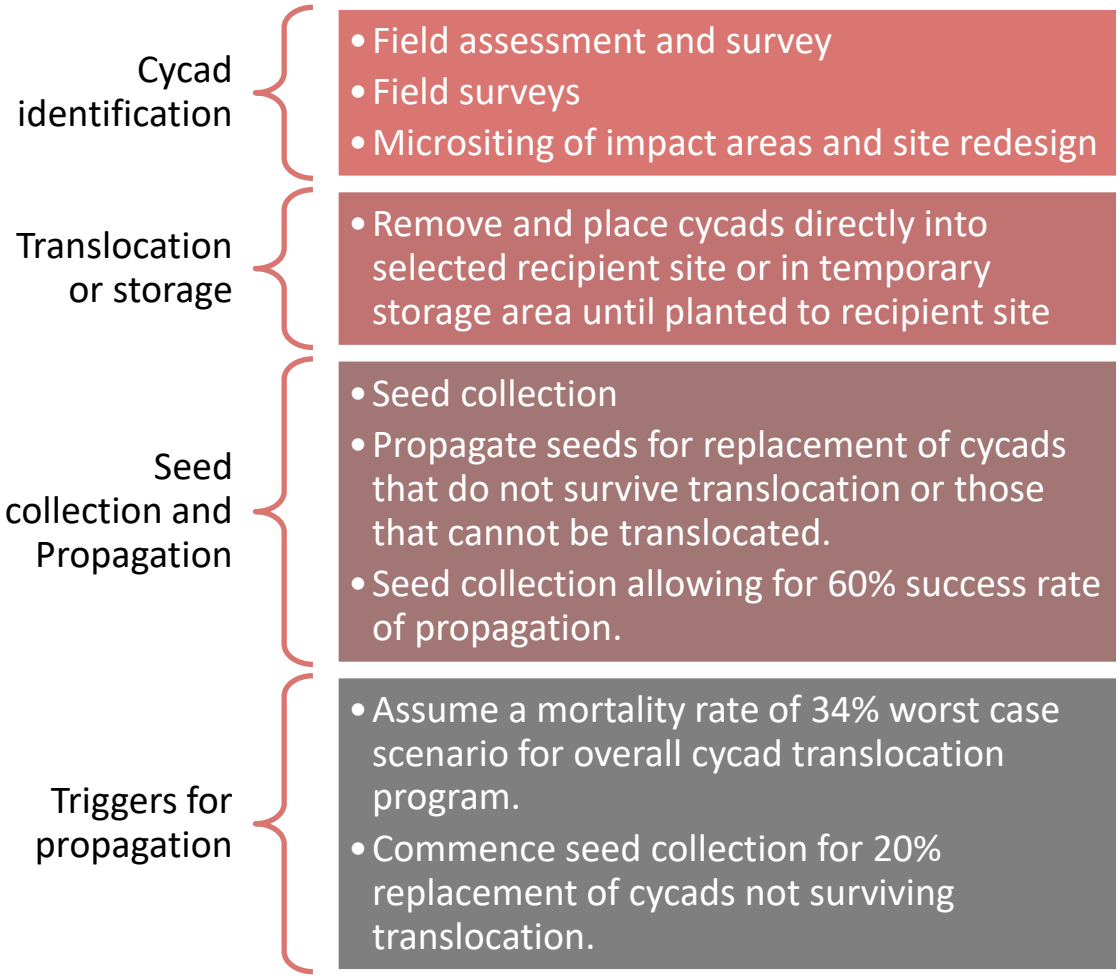
Item	Status / comment	Cost (approximate)	Annual cost 1st year	Ongoing annual costs	Total Cost
After-planting management requirements including watering	Translocation site management and maintenance.	$18,000 yearly first 5 years / reducing to $4,000 for next 5 years	$18,000	$18,000	$114,000
Long-term monitoring and evaluation programs; and	Establish and develop and maintain CTMP data base, monitoring and evaluation.	Monthly – year 1	$6,000	$0	$6,000
Long-term monitoring and evaluation programs; and	Establish and develop and maintain CTMP data base, monitoring and evaluation.	Quarterly for years 2 -5	$2,400	$0	$9,600
Long-term monitoring and evaluation programs; and	Establish and develop and maintain CTMP data base, monitoring and evaluation.	Annually for years 6 - 10	$1,200	$0	$6,000
Intervention	Allow for three (3) incidents during the program.	$1,000 - $15,000 per incident.	$0	$18,000	$54,000
			$521,400	**$68,400**	**$802,200**
Allowance for inflation in the defined management period	~ 2.5% inflation annually (10 years).			*$19,159*	*$224,696*

6.2 SCHEDULING TRANSLOCATION ACTIVITIES

The timeline for translocation activities is dependent upon finalising the construction timeframes for the Project. The translocation program will be developed to adapt to the construction program and will involve staggered planting if the project is staged or staggered. Construction of the first two stages of the project is expected to commence approximately early-2022 and is anticipated to progress over a two (2) year period. Cycad pre-translocation assessment and translocation activities are expected to commence from early-2022, with translocation from impact areas expected within the first year. The Stage 3 (Northern) area will be developed at a later time.

The cycad translocation process is summarised in the Figure 6-1 below.

Figure 6-1: Cycad Translocation Process



The schedule to implement the CTMP is summarised below (dependent on construction commencement):

- Assessment and identification of cycads for removal from site: Early 2022 or earlier. Site access to cycads will be concurrent with pre-clearance surveys.
- Select and secure direct cycad translocation sites within the project area (early 2022 or earlier).
- Secure the temporary cycad storage site: Early 2022 once construction site compounds established.
- Prepare translocation program: Early 2022
    - Personnel
    - Equipment
    - Vehicles
    - Chain of custody
- Prepare recipient sites (early 2022)
- Collect cycads: Commencing Q2, 2022 and continuing throughout vegetation clearing.
- Translocate suitable cycads to recipient site/s or store at temporary storage facility
- Care and maintenance of translocated cycads mid 2022 onwards.
- Seed collection: Assessment as for cycad inspections (collection from source plants to be translocated and from plants adjacent to the construction footprint) – Commencing mid-2022.
    - Seed collection – 2022, year 1,
    - Propagation of seed 2022-23, year 2 (seeds need to dormant for up to 12 months before germination and propagation).
- Planting propagated cycads .
    - Initial – replanting of translocated cycads into recipient site/s – late 2022 onwards.
    - Ensure suitable water and maintenance supply for translocated cycads.
    - Planting out of seedlings and juvenile cycads as available once suitable cortex is achieved and climatic conditions are suitable.
    -

6.2.1 Timelines for translocation planning

Table 6-3 below shows the likely times and duration for these actions. The schedule may be amended to address construction schedules which are being developed, weather and environmental conditions required to collect suitable seed and planting into the recipient site/s.

Table 6-3 Indicative timeline for implementation of the Cycad Translocation Management Plan

Year 1: 2022	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Planning	Planning for CTMP implementation			Prepare recipient site(s) and temporary storage location (if needed)								
Cycad salvage and translocation. Seed collection				Salvage and translocate cycads. Collect seed								
Cycad monitoring, care and recipient site mgt.				Care and maintenance of translocated cycads								
Year 2: 2023	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Propagation	Additional collection of seed and seed propagation – number dependant on cycad survival rates.											
Cycad salvage and translocation.	Continue cycad salvage and translocation as construction front progresses											
Cycad monitoring, care and offset site mgt.	Maintenance of translocated cycads in recipient site(s) and recipient site maintenance.											
Seedling care	Care of seedlings in the nursery											
Cycad care	Care of salvaged cycads in the ex-situ storage facility – monitor progress, additional seed collection if necessary											
Year 3: 2024	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Seedling care	Care of seedlings in the nursery – further collection of seed if required. Potential planting of propagated cycads into recipient site											
Cycad monitoring, care and recipient site mgt.	Maintenance of translocated cycads in recipient site(s) and recipient site maintenance.											
Cycad care and planting	Care of salvaged cycads in the ex-situ storage facility*				Planting of salvaged cycads from storage site into recipient site.				Maintenance of cycads in recipient site and recipient site maintenance.			
Year 4: 2025	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Seedling care and planting	Care of seedlings in the nursery – monitor progress, additional seed collection if necessary. Planting of propagated seedlings into recipient site											
Cycad monitoring, care and offset site mgt.	Maintenance of translocated cycads in recipient site(s).											
Year 5: 2026	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Recipient site	Care and maintenance of cycads in recipient site(s)											
Seedling care and planting	Care of seedlings in the nursery – monitor progress. Planting of propagated seedlings into recipient site											
Year 6: 2027	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Seedling planting into recipient site	Planting of propagated seedlings into recipient site											
Cycad monitoring, care and recipient site mgt.	Maintenance of translocated cycads in recipient site(s) and recipient site maintenance.											
Year 7-10: 2028 - 2031	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Cycad monitoring, care and recipient site mgt..	Maintenance of translocated cycads in recipient site and recipient site maintenance.											

6.2.2 Single verses staggered plantings

Seed propagation and planting is reliant on the ripeness of the seed on the cycads and seed availability in the vicinity of the project area. Seed germination and propagation is likely to take up to 12 months as the seed will need time to pass through a period of dormancy. This is typical of cycad propagation processes. Given the unknown status of seed propagation success, planting out of the seedlings into the recipient site will be staged. Seedlings will be planted out once the cortex of the seedling is appropriately sized (typically 4 cm or greater). Planting out is contingent on suitable weather and climatic conditions, being cooler weather and suitable moisture conditions, generally in late Autumn to early Spring. This allows time for the seedlings to establish before the hot summer months. A local water supply will be required in the event of dry weather to water the seedlings during establishment in the first two to three years. Planting additional seedlings into the recipient site/s will aid in ensuring that the necessary number of plants are successfully propagated.

6.3 COLLECTION OF SOURCE MATERIAL

The seed collection methodology is described in Section 5.1. Seed collection will be from the properties where the impact to cycads occurs (Table 6-4):

Table 6-4 Properties from which cycads and cycad seed will be salvaged as relevant to each project stage.

Lot	Plan	Shire
8	RP614441	Isaac
10	RP614442	Isaac
1	SP153335	Isaac
8	ROP41	Isaac
23	CP896088	Isaac
18	RP848821	Isaac/Livingstone
1	RP801235	Isaac/Livingstone
1	SP303299	Livingstone
3	RP801346	Livingstone
3	ROP178	Livingstone
4	ROP192	Livingstone

6.3.1 How much material will be collected from each source plant?

Collection will be in accordance with the Queensland "Code of practice for the harvest and use of protected plants" and Department of Environment and Science Protected Plant growing licence held by the propagator or other responsible person. Typically, collection of seed is limited to no more than 20% of the seed, or other propagative material, from any one plant in any 12-month period. Seed will preferentially be collected from cycads to be translocated from the construction footprint. Any required additional seed will be collected from cycads within the local province.

6.3.2 Collection licence requirements

Plant and seed collection and translocation must only be carried out under a valid Protected Plants Harvesting Licence issued by the Department of Environment and Science (DES) (Table 4-1). Some authorities are still to be obtained for the CTMP. Details will be provided as these are available.

Table 6-5 QLD DES Authorities for salvage, seed collection and growing protected plants for this CTMP

Responsible person	Authority details (licence / permit)
WA0037101	Salvage of protected plant – Clearing permit
Tba	Licence to grow protected plants

6.3.3 Note: Only one licence (a protected plant harvesting licence (DOC, 290KB)) is required to harvest protected plants. If a licensed harvester intends to grow protected plants from harvested plant parts then only a protected plant growing licence (DOC, 273KB) is required. Record keeping for the CTMP

Records to be kept for the CTMP are required by Australian and State government agencies (DAWE and DES). DES requires that a protected plant harvest record (XLS, 113KB) must be created and kept by the person or entity when harvesting whole restricted plants or restricted plant parts harvested under a licence or exemption. The harvest record must include the information required in the Code of practice for the harvest and use of protected plants (PDF, 260KB) and be kept in a written or electronic record system. This is to ensure a person or entity undertaking a harvest can maintain specific details of the harvest for compliance purposes, while also demonstrating the plant or plant part was lawfully harvested from the wild.

DES further requires that details of the flora survey trigger map used to identify high-risk areas for endangered, vulnerable or near threatened plants is retained by the proponent. Information collected from the flora survey must be reported to the QLD using the DES WildNet data entry form (XLS, 543KB).

Further records to be kept for the CTMP are described in Appendix B which describe records for each plant and seed interacted with during the program. The intent of these records is to ensure relevant data on the implementation of the project is retained for salvage, seed collection and nursery management and translocation into the selected recipient site. This data will ensure the establishment and maintenance of a chain of custody and record the management actions to implement the plan. The data will aid in decision making should adaptive management actions be required during the project.

6.4 ESTABLISHING AND MAINTAINING AN EX-SITU POPULATION

The selected nursery will be responsible for the establishment and management of the ex-situ population and seed propagation. The selected nursery will have relevant experience in nursery *C. megacarpa* and *C. ophiolitica* propagation methods and operate under the Australian Standards for maintenance of plant health and the Nursery Industry and Garden Australian Standard. Seed will be stored in cool, dry and dark environment until ready for use.

6.5 LEARNING FROM THE TRANSLOCATION – EXPERIMENTAL DESIGN

Since 2012 there have been several projects whereby *C. megacarpa* and *C. ophiolitica* have been propagated and translocated. Some of these are:

- Santos GLNG Gas Transmission Pipeline project;
- QGC Gas Transmission Pipeline project;
- APLNG Gas Transmission Pipeline project;
- Calliope to Biloela Highway upgrade – Department of Transport and Main Roads (DTMR);
- Panorama Drive road construction – Yeppoon;
- Mt Archer road repair and picnic area upgrade – Rockhampton; and
- Bajool Quarry expansion – Bajool.

The persons engaged in the preparation of this CTMP for this Project have hands-on experience in translocating cycads. In each case the learning from the past project is incorporated into the next program. As described in section 6.3, the data kept for these works allows for learning and adaptive management in the delivery of the project.

This project will apply this collective knowledge in delivering the project using known techniques to salvage, propagate and translocate cycads. Where there are learnings from the project these will be recorded and provided to DAWE and DES during project reporting.

Data from the CTMP will be made available through the project annual compliance reporting (Condition 25 of EPBC 2018-8141). Additional details regarding the CTMP can be requested from the proponent to assist any relevant third-party research.

The CTMP has been developed for the purpose of the CCWF and additional research or experimental design is not proposed.

6.6 IDENTIFICATION OF POST-TRANSLOCATION MANAGEMENT, MONITORING AND EVALUATION METHODS

6.6.1 Ongoing management

As part of the post translocation management requirements, the nursery seedlings will be monitored by a qualified ecologist(s) for a period of up to 5 years following planting. The monitoring and reporting requirements for these seedlings are provided below. Management and mitigation measures are also outlined in Section 7.

Monitoring of nursery grown Cycad seedlings and salvaged cycads

As a minimum, each survey will involve the following tasks:

- Visually inspect translocated and propagated Cycads.
- Visually inspect a sample of seedlings within the control site, which is separate from the translocation site. The control site is a reference site to aid in determining performance of the plants in the translocation site.
- Observation data will be recorded against the respective unique identification code on a spreadsheet pro-forma.

- If a plant appears to have died, a photograph of the individual will be taken during the field inspection.
- Monthly rainfall data from the onsite rain gauge.
- Input of collected survey data into the data management tool for analysis.

If a fire (prescribed or wildfire) occurs in the translocation site, the following information will be collected from each individual noticeably impacted:

- Level of impact to plants (e.g. has the plant died; only partially burnt, etc.).
- Rate of recovery (new growth).

6.6.2 Reference Site Suitability Assessment

Establishment of a reference site will allow for comparison between the recipient and reference site cycads, translocation outcomes and performance of site management to improve land condition. The reference site will be a representative sample of the naturally occurring population(s) of similar height classes and similar topography and aspect to those translocated as part of the project works.

This site will be in a nearby area that can be accessed during the life of the monitoring program and will be located in an area not subject to future development.

6.6.3 Correction and Prevention

General maintenance

The primary management goal of the translocation site is to establish and secure a population of threatened cycads.

Advice will be given to regulators on the following events:

- Severe stress/death of a significant number of plants.
- Severe pest attack resulting in death.

In each case corrective actions will be targeted to the specific threat to the plant/s if deemed necessary. Where pesticides are to be used, this will be at the direction of the supervising horticulturist and ecologist. Use of any herbicides, insecticides, fungicides and other chemicals will be carefully assessed to ensure suitability of application and does not cause environmental damage or off-target impacts.

Plants will be watered during extremely dry and prolonged weather periods if deemed necessary to prevent the death of the plants.

6.6.4 Monitoring and evaluation

Monitoring and evaluation methods are described in Section 8 and the items to be monitored are described in Appendix B. Monitoring will be in accordance with the schedule below.

0-12 months- Monthly basis the first inspection will take place following the completion of the Cycads being placed in their permanent recipient site)).

12-60 months **-** Quarterly basis .

60 – 120 months - Annual until final inspection

7 MANAGEMENT AND MITIGATION

Table 7-1 illustrates the threats and related management actions identified for the translocated and propagated cycads.

Table 7-1 Risk and management actions

Risks	Detail	Management Actions	Timeframe
Desiccation	Insufficient water can lead to the plants failing to thrive at the storage and recipient sites.	• Controlled watering during exceptionally dry periods will aid in ensuring the cycads survive. • Have water available on site ensuring that translocated plants and seedlings receive necessary water while they are being established during dry seasons, and to provide a fire management capacity.	Duration of watering will be determined by the contractor to ensure the survival of the plants and establishment of translocated/propagated Cycads.
Water logging	Over watering of cycads can lead to root rot and loss of plants in storage.	• Monitor water delivery to ensure that plants are not over watered. Soil in pots / bags will be damp and not wet. • Monitor root health periodically to ensure there is no rot occurring. Treat rot with suitable fungicide such as Banrot® Formula 20® or similar.	Duration of watering will be determined by the contractor to ensure the survival of the plants and establishment of translocated/propagated Cycads.
Invasive or declared weeds	Dense stands of Lantana (*Lantana camara*) increase the fuel loads which may fuel uncontrolled hot fires at translocation recipient site.	<u>Weed control</u> • Manual control and targeted control in accordance with manufacturer's label or an off-label permit issued by the Australian Pesticides and Veterinary Medicines Authority. Splatter gun treatment may be required in heavily infested areas of Lantana. Also, introduced grasses or other competitive weeds will be controlled using selective recommended herbicides. • Herbicides will only be used by trained personnel, in accordance to manufactures instructions and with appropriate Personal Protective Equipment (PPE).	Until establishment of translocated/propagated Cycads. Likely most relevant during recipient site establishment
	Invasive or declared weeds (e.g. Lantana) have the potential to limit the successful recruitment of	<u>Weed prevention/hygiene</u> • The potential for the introduction or spread of weeds will be minimised by restricting vehicle and livestock access to the recipient site and implementation of weed control measures.	

Risks	Detail	Management Actions	Timeframe
	Cycas sp. at the recipient site.	• Prior to translocations being undertaken, declared weeds will be identified and managed at the recipient location/s.	
Grazing	Livestock damage to young plants	<u>Fencing</u> • Livestock will be excluded from the recipient site if impacts are considered to be a significant risk at each recipient site. <u>Livestock access / grazing</u> • Pulse grazing for fuel control may be permitted at appropriate times once *Cycas sp.* plantings are sufficiently established, as determined by a suitably qualified Ecologist. • At intervals during and at the conclusion of the pulse grazing period a suitably qualified Ecologist will monitor for potential impacts of livestock on the translocated plants and condition of the recipient site.	Until establishment of translocated/propagated Cycads
Feral animal control	Feral animals including pigs, horses, cattle and to a lesser extent wild deer can impact on the translocated or propagated new plants.	<u>Pest animal management</u> • Record incidental observations of pest animal impacts on the translocated and naturally regenerating populations. If impacts are considered to be a significant risk specific control measures will be implemented. • Controls may include shooting, trapping and/or baiting. Notice of access and proposed pest control methods and/or chemical usage (including material safety data sheets) must be provided to the landholder two weeks prior to any events occurring. <u>Secure fencing</u> • Establishing a fence suitable to restrict access of feral animals where deemed necessary.	Until establishment of translocated/propagated Cycads
Fire	Wild fires have the potential to burn the recipient site and destroy the planting.	• The recipient area will preferentially be located within the offset site, in which case there will be a maintained fire break. Alternatively, the recipient area will be chosen for reduced adjacent fuel load. • Fuel loads will be monitored by field personnel to determine if fuel load and climatic conditions have the potential to cause a fire that could be detrimental to the planted population. Where the potential for detrimental fires exists, further actions will be implemented to reduce fuel loads to an acceptable level at appropriate times.	Until establishment of translocated/propagated Cycads

Risks	Detail	Management Actions	Timeframe
		• Biomass/fuel loads will primarily be managed through a combination of grazing across the recipient site and where necessary, slashing (hand held equipment) around the *Cycas sp*. • Grazing will only be undertaken once *Cycas sp*. are sufficiently established as determined by a suitably qualified Ecologist based on the results of regular monitoring. • Where applicable and feasible, cool (trickle burns) fuel reduction burns in a rotational mosaic pattern will be conducted to reduce the hazard of uncontrolled fires.	
Insect attack and fungal infections	A range of boring insects have potential to attack cycads and can cause significant damage to the plants.	• Periodic inspections will be conducted as per the monitoring program outlined in this Plan to identify if significant insects are present and check for other issues. • Where fungal infections and damage (likely to cause death) is evident treatment with a fungicide powder (e.g. Banrot®, Formula 20®). • Where insect damage occurs apply an insecticide if the insect damage is considered likely to cause death to the cycad individual, (e.g. Crown, Bugmaster, Rogor, Supracide, Dipel but not a pyrethrum based one), and add a wetting agent (e.g. a few drops of dish washing liquid).. • Insect and fungicide treatment may require removal of leaves and trunk material to remove rotten wood. Where trunk wood is removed it must be covered with a suitable tar solution (e.g. Steri-prune paint) to prevent further damage and drying out.	Until establishment of translocated/propagated Cycads
Unauthorised access	Damage caused by unauthorised entry or use of the recipient site	<u>Restricted access</u> • Access to the recipient site will be restricted to approved personnel; approved contractors and guests (e.g. DES and DAWE) and the landholder; • Access to the recipient site will be within the project area which will have controlled access points. All access points will be secure and padlocked to restrict entry to authorised personnel.	Until establishment of translocated/propagated Cycads
Land degradation	Erosion and sediment related impacts caused by construction activities	• The recipient site will be located outside the project disturbance area. Therefore, it is unlikely to be impacted from erosion or sediment resulting from the construction activities. Construction related erosion and sediment will be controlled through the CEMP and EMP.	Until establishment of translocated/propagated Cycads
	Erosion and sediment impacts from poor agricultural land management practice	• Erosion and sediment management measures will be implemented if this is considered to be an issue.	On establishment of recipient site.

Risks	Detail	Management Actions	Timeframe
Intervention triggers	Triggers for intervention	• The following criteria are triggers for corrective actions to ensure this plan achieves its objectives: o If monitoring shows less than ▪ 80% success of salvaged plants surviving in storage, ▪ 50% seed propagation success, ▪ 60% of translocated plants surviving at the translocation site.	Until establishment of translocated/propagated Cycads
	Corrective actions	• Corrective actions described in this table above and will be applied as necessary.	Until establishment of translocated/propagated Cycads

8 MONITORING AND EVALUATION

8.1 REPORTING REQUIREMENT

The implementation of this Plan will be reported as part of the annual EMP performance report. The reporting mechanisms will align with approved EMP reporting and review to demonstrate compliance. All monitoring and translocation actions will be recorded in the CTD.

Reports will detail the actions of this translocation program and results of works to achieve a sustaining population of *C. megacarpa* and *C. ophiolitica.* The report will include but not be limited to the following:

- Collection of cycads from the project footprint.
- Establishment of temporary holding facility and maintenance of collected cycads.
- Collection of seed for propagation.
- The progress and success (health) of translocated individuals.
- The permanent recipient site/s for the translocated plants and final planting of seedlings.
- Translocation of plants from project footprint into the recipient site.
- Planting of seedlings into recipient site.
- Any issues and actions to address these and the success or otherwise of these measures.
- Persons engaged in the program, including suitably quality horticulturalists and ecologists (see Table 6-1).
- Management of the storage and recipient sites in accordance with this plan.

Reporting will occur on an annual basis in accordance with the compliance reporting requirements (Condition 25 of EPBC Approval).

8.2 MONITORING OF TEMPORARY STORAGE AND RECIPIENT SITE

To monitor the health of the salvaged cycads whilst in temporary storage, the potted cycads will be inspected by a suitably qualified ecologist / horticulturist (as per Table 6-1) on a monthly basis with inputs from the transplant contractor. The first inspection will take place one month following commencement of salvage activities and will continue until all cycads are transplanted from the temporary storage to their permanent recipient site.

Once translocated, cycad individuals will be monitored by a qualified ecologist for a period of 10 years following their translocation into the permanent recipient site(s). Monthly inspections will be undertaken for the first 12 months following translocation (Year 1), quarterly for Years 2 – 5 and annually until Year 10. The findings at the end of the monitoring period will determine the success of the program.

8.3 PERFORMANCE CRITERIA

Table 8-1 specifies the criteria for measuring the success of management activities within the recipient site, and establishment of translocated/propagated Cycads. Once the translocation completion criteria have been achieved (see table below), further cycad propagation, plantings and site management will not be conducted.

Table 8-1 Performance criteria for cycad translocation

Objectives	Measurable criteria for success
Successful translocation of impacted *C. megacarpa*. and *C ophiolitica* individuals	Impacted cycads are salvaged from the impact site prior to clearing where possible.
	All salvaged cycads are translocated to a project recipient site. If a cycad does not survive translocation four propagated cycads are planted in its place at the recipient site.
	At the completion of translocation activities, there is no net loss in the number of cycads as a result of project construction activities.

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APPENDIX A CYCAD SPECIES DESCRIPTIONS AND GENERAL ECOLOGY

CYCAD ECOLOGY

Most cycads rely on fire for successful reproduction. Whilst adult plants are generally resistant to most fires, growth may be impacted through the destruction of foliage and the trunks may be scarred. Seed and seedling are fire-sensitive and fire may result in significant impacts to a population through the mortality of seeds and seedlings (Queensland Herbarium, 2007). Both species occur in habitats within the Project area that are susceptible to periodic fire events of potentially varying intensities. Appropriate fire management is essential to the long-term success of both retained and translocated individuals within the Project area.

Both species are thought to be pollinated by small beetles. Fruiting cones (megasporophylls) are usually produced from late autumn to late summer (May to February), with seed dropping from the plant from autumn onwards (March). Due to a delayed fertilisation system that is unique to cycads, the seeds are not ready to germinate for at least nine months after they drop from the plant (Queensland Herbarium, 2007).

While there is little information on *C. megacarpa* and *C. ophiolitica* seed dispersal and recruitment, it is known that within cycad species there is generally limited dispersal of ripe seed via mammals. Plant distribution is usually strongly clustered as a result of a limited dispersal distance, with the bulk of seed dispersal localised to around the parent plants (Queensland Herbarium, 2007).

Cycad species have a number of insect predators which damage the foliage of specimens, including the leaf beetle *Lilioceris nigripes* and the lycaenid butterfly *Theclinesthes onycha* (Queensland Herbarium 2007).

Figure A- 1: Comparison of character states for C. media, C. ophiolitica and C. terryana (from Forster, 2011)

Character State	*C. media*	*C. ophiolitica*	*C. terryana*
Mature leaf indumentum	glabrous	tomentose below and on rhachis	tomentose below and on rhachis
Leaflet insertion	± flat to weakly keeled	strongly keeled	keeled
Leaflet number	160–300	170–220	184–320
Leaflet colour mature leaves	glossy green	glaucous grey-blue	glossy green to glaucous green-grey
Leaflet texture	flexible to weakly brittle	flexible	strongly brittle
New growth indumentum colour	pale orange-brown	mixture of grey-white and pale orange-brown	pale grey-fawn
Cataphyll indumentum colour	orange-brown	orange-brown	pale grey-fawn
Megasporophyll indumentum	ferruginous or grey	brown	fawn-tan
Megasporophyll width (mm)	17–30	12–30	30–38
Seed sarcotesta colour	green becoming orange-yellow, not pruinose	green becoming yellowish, pruinose	green becoming orange, not or only weakly pruinose
Seed size: length × wide (mm)	31–38 × 26–32	29–33 × 28–32	37–40 × 30–35

DESCRIPTION OF *CYCAS OPHIOLITICA*

Cycas ophiolitica (listed as endangered under the EPBC and NC Act, and vulnerable under the IUCN Red List) is endemic to central Queensland where the known populations are concentrated in two areas, around Marlborough and Rockhampton. *C. ophiolitica* occurs in open woodland, woodland or open forest dominated by eucalypts, often on serpentinite substrates. This species is closely related to *C. megacarpa*.

C. ophiolitica is a small to medium sized cycad with an erect trunk and rounded crown. It grows to 2 m tall, though it can reach 4 m, with a trunk diameter of 4 – 20 cm (Department of Environment and Science [DES], 2018). The glossy blue-green / dark green fronds are 95–140 cm long, with 170–220 pinnae (DoEE, 2017). New growth is bluish-green, densely hairy with grey-white or pale orange-brown hairs that persist as the leaves age.

Male plants produce brown, hairy cylindrical cones that are 14-17 cm long and 6-8 cm in diameter. The female plants produce loose, open cone-like structures at the top of the plant. Two to six seeds are borne on female sporophylls that are up to 30 cm long, have a broad flat spear-shaped tip (apical lobe) with an apical spine to 2 cm long. As the seeds mature, the stalks lengthen and spread away from the top of the plant.

The seeds are ovoid to spherical in shape, green becoming light-brown or yellowish-white, 29–33 mm long and 28–32 mm in diameter and often with a thin powdery coating. It is distinguished from *Cycas megacarpa* by its blue-green new growth, the orange wool within the crown, hairy petioles, narrower and more crowded leaflets and much smaller seeds (DoEE, 2017 and DES, 2018).

C. ophiolitica is distinguished from *C. media* by the orange wool in the crown, the hairy petioles and the narrower, more crowded leaflets. It is distinguished from *C. megacarpa* by the narrower, more crowded leaflets and much smaller seeds.

Forster and Holland (Queensland Herbarium, 2007) note that the degree of relationship between C*. megacarpa* and *C. ophiolitica is* not yet known, especially at the northern end of the range of forms and that systematic and genetic studies would be required to accurately determine species boundaries.

Figure A- 2: Male *Cycas ophiolitica*

DESCRIPTION OF *CYCAS MEGACARPA*

Cycas megacarpa is a small to medium sized cycad that is listed as endangered under the EPBC Act and the Queensland *Nature Conservation Act 1992* (NC Act), and vulnerable under the IUCN Red List of Threatened Species. *C. megacarpa* occurs in woodland or open woodland dominated by eucalypts, often on rocky substrates, in coastal areas ranging from Woolooga, north of Gympie to Rockhampton. Approximately 46 populations have been recorded across this distribution range, yet only eight of these known populations are considered to be viable in the long-term (i.e. have a population size of >3,500 individuals) (Queensland Herbarium, 2007).

At maturity, *C. megacarpa* has an erect trunk and grows to 3 m in height (sometimes to 8 m) with a trunk diameter of 8-15 cm. It has fronds measuring 70 – 110 cm in length, with 120 – 170 pinnae (leaflets). New growth is blue- green and densely hairy with orange-brown hairs that later fall off (Queensland Herbarium, 2007), while mature leaves are mid- to dark- green, semi- to highly glossy. All cycads are unisexual (i.e. male and female reproductive structures develop on separate plants). Female *C. megacarpa* plants produce loose open cone-like structures (megasporophylls) at the top of the plant (within the crown) that measure 14 – 25 cm long. Within this cone, two to four seeds are borne on individual sporophylls (seed bearing structures) that 15- 25cm long with a broad flattened spear shape tip (apical lobe) and an apical spine to 2 cm long. As the seeds mature, the stalks lengthen and spread away from the top of the plant. Male cones are ovoid (egg-shaped), 18 cm long, 7 cm in diameter and are coloured yellow to orange-brown. The seeds are ovoid in shape, 38–50 mm long and 35–45 mm in diameter and are green in colour turning yellow, pinkish or purplish as they mature (DoEE, 2019).

C. megacarpa is visually similar to *Cycas media* (listed as Least Concern under the NC Act and the IUCN Red List) which is also expected to occur within the area. These two species can be distinguished by *C. megacarpa* having larger seeds, shorter and more strongly keeled leaves with fewer leaflets and a slender trunk. *C. megacarpa* is distinguished from *C. ophiolitica* by the green new growth and larger seeds. A recently described species, *C. terryana* also potentially occurs within the Project area (Forster, 2011).

Figure A- 3 Female *Cycas megacarpa*

APPENDIX B DATABASE DESCRIPTION AND FIELDS

Cycads salvaged	Description
Plant ID	Sequential ID for each plant salvaged
Latitude (x)	Decimal Degrees
Longitude (y)	Decimal Degrees
Species	*Cycas megacarpa* or *Cycas ophiolitica*
Health	Health (Good, Fair, Poor, Dead)
Height class	Seedling, Juvenile, Sub-adult, Adult (reproductive capacity)
Action taken	Salvaged or Retained
Date salvaged	Date
Damage	Damage to plant during salvage
Seedling	Is the salvaged plant a Seedling (Yes) Only otherwise leave blank
Comment	Notes about the plant / salvage. Additional information about plant - (pups, subterranean trunk, crown numbers, pests evident, etc…)
Height	In metres
Gender	Male / Female (if known)
Fruit present	Yes / No
Cone size	No Cone if none, in millimetres if present (mm)
Insects present	Yes / No
Insect attack	Yes / No
New growth	Yes / No

Temporary Storage	Details
Plant ID	Number / code
Plant location within Temporary Storage	Row / location
Watering	Date watered
Insecticide	Date applied
Fungicide	Date applied
Other	Any other management actions
Comments	Other notes of management / resources used / repotting etc…

Seed collection	DESCRIPTION
Collection date	Date
Collector	Name of collector
Species	*Cycas megacarpa* or *Cycas ophiolitica*
Area number/name	Locality Name / Place descriptor
Latitude (x)	Decimal degrees
Longitude (y)	Decimal degrees
Parent plant id number	Plant ID - Parent if known for seedlings collected.

Bag number	Sequential bag number if from plants salvaged record (S 1, S2, …) If from wild stock (W1, W1, …)
Number of seeds in bag	Number of seeds taken from plant / or ground in bag
Comments	Any notes

Cycads translocated	**Description**
Plant ID (Salvage ID)	Plant ID from salvage site / if propagated - next sequential number
Latitude (x)	Decimal Degrees
Longitude (y)	Decimal Degrees
Species	*Cycas megacarpa*, *Cycas ophiolitica or Cycas terryana*
Date translocated	Date Cycad placed in recipient site
Damage	Damage to plant during translocation
Comment	Notes about the plant / translocation
Description	Additional information about plant - (pups, subterranean trunk, crown numbers, pests evident, etc…)

APPENDIX C QUEENSLAND HERBARIUM SPECIES CONFIRMATION ADVICE

Squadron Energy is Australia’s leading renewable energy company. Proudly Australian owned, our mission is to be a driving force in Australia’s transition to a clean energy future by providing green power to our customers.

We develop, operate and own renewable energy assets in Australia, with 1.1 gigawatts (GW) of renewable energy in operation and a development pipeline of 20GW.

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