Kaban Green Power Hub - Bird and Bat Adaptive Management Plan

Neoen Australia c/o AECOM Australia Pty Ltd

Level 1
30 Little Cribb Street
MILTON QLD 4064

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mail@e2mconsulting.com.au
www.e2mconsulting.com.au

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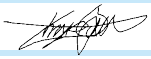
10	20/10/2021	Issued for Use	Georgia Day	Chays Ogston	

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Approved Action Details

EPBC Number	2018/8289
Project name	Kaban Green Power Hub
Proponent /approval holder and ACN or ABN	Kaban Wind Farm Pty Ltd as trustee for the Kaban Wind Farm Trust ACN: 637 687 622
Approved action	To construct and operate a wind farm with up to 29 turbines and associated infrastructure; as described in the referral received by the Department on 17 October 2018
Location of the action	80 km south-west of Cairns, in Kaban, far north Queensland
Date of preparation of the environmental management plan	20/10/2021

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,

CHAYS OGSTON

E2M PTY LTD

20/10/2021

EPBC Approval Conditions

Conditions of approval		Document reference
5	The approval holder must submit a Bird and Bat Adaptive Management Plan (BBAMP) for the Minister's approval prior to commissioning. The approval holder must not commence operation of the wind farm unless the Minister has approved the BBAMP in writing. The approval holder must implement the approved BBAMP throughout operation.	Entire Document
5A	The BBAMP must build on the Bird and Bat Management Plan to propose and justify methods and procedures which ensure that the action does not cause significant mortality by turbine strike on any EPBC Act listed bird or bat species within the life of the action by ensuring that the effects of wind turbines are managed, monitored and limited such that impacts to EPBC Act listed bird and bat species are reliably detected, quantified, reported and responded to.	Entire Document
6	To inform the risk profile of each turbine, the approval holder must undertake bird and bat utilisation surveys, including: (a) Prior to commissioning, the approval holder must undertake precommissioning bird and bat utilisation surveys over a period of at least 24 months, including at least one survey undertaken at or adjacent to each proposed wind turbine location in each of at least one wet season and one dry season in succession. (b) Commencing within 3 months after commissioning, the approval holder must undertake post-commissioning bird and bat utilisation surveys over a period of at least 24 months, including at least one survey at or adjacent to each wind turbine in each of at least two wet seasons and two dry seasons in succession.	Section 5.1
7	At least one survey in each 12 month period of bird and bat utilisation surveys required under condition 6 must be conducted within the migratory period of each EPBC Act listed migratory species.	Sections 5.1, 5.2 & 5.3
8	The approval holder must report in each compliance report (required under condition 35) on the results of all bird and bat utilisation surveys required under condition 6 undertaken in the period that is the subject of that compliance report.	Section 5.3
9	All bird and bat utilisation surveys must be undertaken by a suitably qualified ecologist.	Section 4.1
10	Prior to commissioning, the approval holder must assign a risk profile to each turbine within the project area using the results of the precommissioning bird and bat utilisation surveys required under condition 6(a).	Section 5.2
11	If, during bird and bat utilisation surveys required under condition 6 or during any other monitoring or incidental observation during operation, one or more individual of an EPBC Act listed bird or bat species is detected within the vicinity of a low-risk turbine, the approval holder must assign that turbine to be a high-risk turbine within five business days of the detection.	Section 6
12	During operation, the approval holder must include a list of the current risk profile of each turbine within the project area in each compliance report.	Section 5.3

13	During operation, the approval holder must undertake turbine strike monitoring in accordance with the Bird and Bat Adaptive Management Plan at monitoring sites identified in the Bird and Bat Adaptive Management Plan and at all high-risk turbines identified as required under conditions 10 and 11.	Section 5.3
14	The approval holder must annually evaluate the effectiveness of the measures implemented to avoid and mitigate impacts of turbine collision on EPBC Act listed bird and bat species and report on that evaluation, and performance against the impact triggers, in each annual compliance report required under condition 35.	Section 5.3
15	If an impact trigger is reached or exceeded, the approval holder must implement the relevant adaptive management procedure specified in the Bird and Bat Adaptive Management Plan. The approval holder must, on each occasion that an impact trigger is reached or exceeded, report on the steps taken and outcomes of implementing the adaptive management procedure, including details of the mitigation measures that have been or will be implemented and an assessment of their likely effectiveness in the first annual compliance report required under condition 35 following an impact trigger being reached or exceeded.	Section 6
16	Within 20 business days of an impact trigger being reached or exceeded, if application of the adaptive management procedure required under condition 15 identifies, in respect of any wind turbine or number of wind turbines, that additional mitigation measures are required but no alternative mitigation measures can or will be implemented; and (a) If the additional mitigation measures are required in respect of the Ghost Bat or Spectacled Flying-fox, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an impact trigger between sunset and sunrise each day; and/or (b) If the additional mitigation measures are required in respect of any nocturnal EPBC Act listed migratory species, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an impact trigger between sunset and sunrise each day during the migratory period of any EPBC Act listed migratory species for which an impact trigger has been reached or exceeded; and/or (c) If the additional mitigation measures are required in respect of any diurnal EPBC Act listed migratory species, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an impact trigger between sunrise and sunset each day during the migratory period of any EPBC Act listed migratory species for which an impact trigger has been reached or exceeded; and/or (d) If the additional mitigation measures are required in respect of any cathemeral EPBC Act listed migratory species or any EPBC Act listed migratory species for which diel activity is unknown, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an impact trigger the migratory period of any EPBC Act listed migratory species for which an impact trigger has been reached or exceeded.	Section 6
17	Any request by the approval holder to cease or reduce the curtailment required under condition 16 must demonstrate how the ceasing or reducing of the curtailment will not result in any additional impact on EPBC Act listed bird and bat species.	Section 6

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Definitions

Term	Definition
Carcass search area	The area around each turbine that will be search as part of mortality assessment monitoring.
Rotor Swept Area	The maximum height range in which bird and bat species may be susceptible to turbine collision.
Project Area	The approved clearing extent based on the proposed layout.
The site	The areas of Lot 1 on RP735194, Lot 33 on CWL374, Lot 35 on CWL391, Lot 2 on RP735194 and Lot 34 on CWL374 that were surveyed as part of the *Kaban Green Power Hub - Fauna Technical Report* (AECOM, 2017).
Suitable habitat	A species preferred environment required to sustain a viable population. Suitable habitat includes breeding, foraging and shelter resources for fauna.
Threatened species	Extinct (EX), extinct in the wild (XW), critically endangered (CE), endangered (E), vulnerable (V) or conservation dependent (CD) under the *Environmental Protection and Biodiversity Conservation Act 1999* or extinct in the wild (PE), Endangered, Vulnerable or Near Threatened (EVNT) under the *Nature Conservation Act 1992*.

Abbreviations

Abbreviation	Description
AECOM	AECOM Australia Pty Ltd
BBAMP	Bird and Bat Adaptive Management Plan
CASA	Civil Aviation Safety Authority
CPM Act	*Coastal Protection and Management Act 1995* (Qld)
DA	Development application
DAWE	Commonwealth Government Department of Agriculture, Water and the Environment
DEE	Commonwealth Government Department of the Environment and Energy
DES	Queensland Department of Environment and Science
E2M	E2M Pty Ltd
EOP	Environmental Offsets Policy
EO Act	*Environmental Offsets Act 2014* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
LGA	Local Government Area
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NC Act	*Nature Conservation Act 1992* (Qld)
RSA	Rotor Swept Area
SARA	Queensland State Assessment and Referral Agency
SDAP	State Development Assessment Provisions
TBC	To Be Confirmed
TRC	Tablelands Regional Council
VM Act	*Vegetation Management Act 1999* (Qld)

1 Introduction

1.1 Background

Neoen Australia Pty Ltd (Neoen) propose to develop the Kaban Green Power Hub (the project) in north Queensland to use the available wind resource to supply renewable energy to the national electricity market. The project is located near the township of Tumoulin, Queensland, within the Tablelands Regional Council (TRC) Local Government Area (LGA). The project consists of a wind farm development containing up to 28 wind turbines and ancillary infrastructure, located across the following land parcels (Figure 1), herein collectively referred to as 'the site':

- Lot 1 on Plan RP735194
- Lot 2 on Plan RP735194
- Lot 33 on Plan CWL374
- Lot 34 on Plan CWL374
- Lot 35 on Plan CWL391
- section of local road reserve

E2M Pty Ltd (E2M) has been commissioned by AECOM Australia Pty Ltd (AECOM) to provide supporting documentation, including a preliminary Bird and Bat Adaptive Management Plan (BBAMP) in accordance with *State Code 23: Wind farm development planning guideline* (Department of Infrastructure, Local Government and Planning, 2017) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) *Policy Statement 2.3 – Wind Farm Industry* (Department of Environment, Water, Heritage and the Arts, 2009). This document will act to provide detailed mitigation and management measures to limit impacts from turbine collision on Matters of State Environmental Significance (MSES) and Matters of National of National Environmental Significance (MNES) bird and bat species, while informing the assessment of:

1. the Development Application (DA) (Ref: 60528526) submitted to the State Assessment and Referral Agency (SARA); and.
2. the EPBC Act referral (Ref: 2018/8289) submitted to the Department of Agriculture, Water and the Environment (DAWE), formerly the Department of the Environment and Energy (DEE).

1.1.1 Project design amendment

The initial project design received approval under the EPBC Act on 21 April 2020 (EPBC 2018/8289) under conditions outlined in Appendix C. Included as part of the approval conditions (Appendix C), the project is limited to a maximum clearing limit of 129 ha of habitat for EPBC Act listed threatened species and communities within the project area. Since receiving approval, the 2020 project design has been amended to reflect the detailed design requirements undertaken by Vestas (the construction contractor) in January 2021. These design amendments have resulted in a reduced clearing impact area of 128 ha. As such, changes to the project do not exceed the maximum clearing limits as approved in EPBC 2018/8289: Approved 21 April 2020. This BBAMP has been amended to reflect changes in the project disturbance footprint to ensure currency and transparency of project documentation and reflect the subsequent changes in the proposed offset areas.

1.2 Scope and Objectives

The objective of this BBAMP is to detail how potential impacts from turbine collision on bird and bat species will be minimised and managed. This BBAMP will achieve this by providing the following information:

- a description of the nature and location of activities (Section 1.1 and Section 1.3).
- a description on the proposed project schedule (Section 1.3).

- a description of number and location of wind farm turbines proposed (Section 1.3).
- description of the bird and bat utilisation across the site (Section 3.2).
- description of roles and responsibilities associated with the management plan (Section 4.1).
- mitigation and management measures to be implemented during construction and operation to reduce significant residual impacts on bird and bats (Section 4), including but not limited to:
  - potential turbine shutdown periods during species migration periods
  - carrion removal programs
  - habitat improvement away from turbines
  - lighting on turbines and buildings
  - marking of powerlines; and
  - procedures for the treatment / removal of injured birds and bats from the site.
- monitoring and reporting requirements for pre-construction and post-construction / operation phases (Section 5), including but not limited to:
  - bird and bat utilisation monitoring; and
  - mortality detection monitoring.

1.3 Project description

The proposed project will include the construction and operation of:

- 28 wind turbines
- laydowns and facilities (including temporary concrete batching plant)
- access tracks (average width of 45m)
- substation and potential battery storage areas; and
- meteorology masts (met masts).

The proposed turbines to be utilised within the project area consist of the following dimensions:

- Hub height: 155 m
- Blade diameter: Max = 160 m, Min = 149 m
- Ground clearance: Max = 93 m, Min = 80 m
- Tip height: Max = 255 m, Min = 229 m

The proposed development layout is presented in Figure 1.

1.4 Project schedule

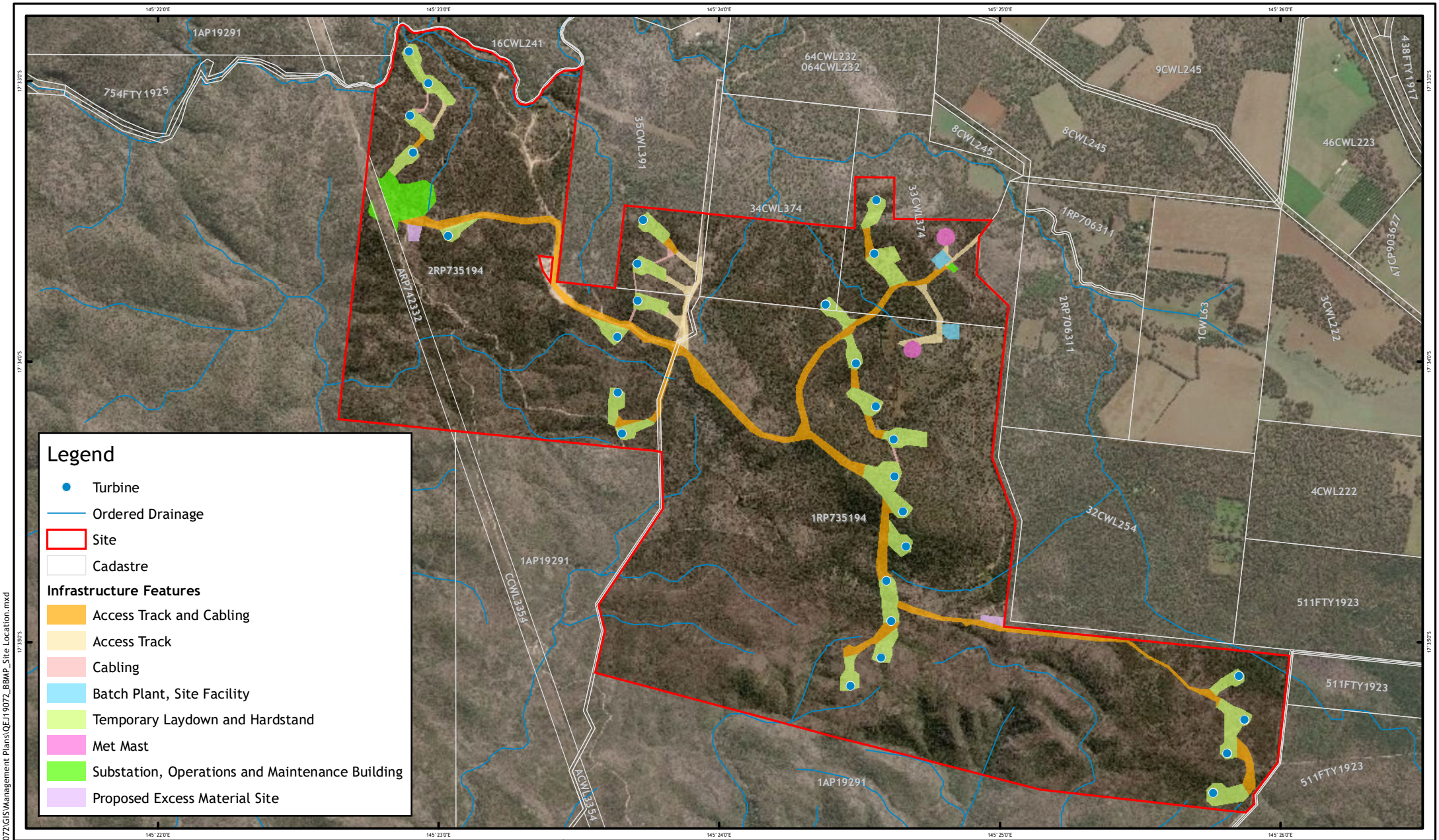
The current proposed project schedule is:

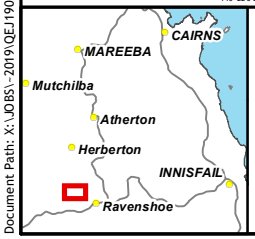
- March 2021 - Start of construction (physical work started on the site)
- December 2022 - End of construction (end of physical construction work at site)
- December 2022 to December 2047 - Operation (No construction works at site to be carried out)
- January 2048 - Decommissioning (Dismantle the operating asset).

1.5 Site description

The site consists largely of remnant eucalypt woodlands with small areas of non-remnant vegetation. The primary land use across the site is cattle grazing which has impacted the shrub and ground vegetation throughout the site (AECOM 2017). The site is bound by Bluff State Forest to the south and west, and rural properties to the north and east.

Refer to Figure 1 for an overview of the Kaban Green Power Hub development in relation to the site.





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Coordinate System: GCS GDA 1994

Document Path: X:\JOBS\~2019\QEJ19072\GIS\Management Plans\QEJ19072_BBMP_Site Location.mxd

Notes:
Aerial Imagery: © ESRI 2019
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7	Issued for Use	CD	CO	02/02/2021
6	Issued for Use	PR	CO	21/01/2021

FIGURE 1: SITE LOCATION AND DEVELOPMENT LAYOUT

Bird and Bat Management Plan
Kaban Green Power Hub

Map Number	Job Number	Rev
1 of 1	QEJ19072	7

2 Legislative context

2.1 Commonwealth legislative considerations

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act protects the environment in relation to MNES. Under the EPBC Act, if a development proposal involves an action that is likely to result in a significant impact on an MNES, referral to the Commonwealth Government Department of Agriculture, Water and the Environment (DAWE) is required. Subsequently, the project (termed a 'proposed action' by the DAWE) has been referred to the DAWE who concluded the proposed action is a 'controlled action'.

2.1.2 EPBC Act Environmental Offsets Policy

The EPBC Act Environmental Offsets Policy (EOP) outlines the federal government's approach to the use of environmental offsets under the EPBC Act, which is a streamlined national environment assessment and approvals process. The policy was finalised on 20 September 2012 and applies to any referrals and variations to approval conditions from 2nd October 2012.

Specifically, the EPBC Act EOP applies to project assessments and approvals under Parts 8 and 9 of the EPBC Act, in addition to strategic assessments under Part 10. Where appropriate, 'environmental offsets' are considered during the assessment phase of an environmental impact assessment under the EPBC Act. Offsets are relative and should compensate for 'residual significant impacts' an action has on MNES after all reasonable actions to avoid or mitigate environmental damage have been investigated.

2.2 State legislative considerations

2.2.1 Planning Act 2016

The *Planning Act 2016* (Planning Act) is Queensland's key piece of legislation pertaining to the strategic planning and development of the State. The Planning Act mandates the framework of planning instruments and process for development assessment whilst incorporating the regulatory requirements of other Queensland environmental statutory legislation, such as the *Vegetation Management Act 1999* (VM Act), *Coastal Protection and Management Act 1995* (CPM Act) and *Fisheries Act 1994* (Fisheries Act).

Subordinate to the Planning Act, the *Planning Regulation 2017* (Planning Regulation) details the mechanics for the operation of the Planning Act. This includes prescription of accepted, prohibited and assessable development, assessment benchmarks for assessable development and identification of the assessment manager (i.e. the chief executive or local government).

2.2.1.1 State Planning Policy (July 2017)

The purpose of State planning instruments such as the State Planning Policy (SPP) (July 2017), is to guide local and State government in land-use planning and development by defining the Queensland Government policies relating to matters of State interest. Local governments must consider the State interest and reflect appropriately when amending local planning schemes and, in some cases, assessing development applications.

2.2.1.2 State Development Assessment Provisions – State Code 23 Wind Farm Development

The purpose of *State Code 23: Wind farm development planning guideline*, of the State Development Assessment Provisions (SDAP) is to provide assistance in the preparation of development applications for

new or expanding wind farms and assist in responding to the performance outcomes and acceptable outcomes of the code. As wind farms pose a unique risk to birds and bats through turbine collision, this code prescribes the requirement of a BBAMP to mitigate potential impacts.

2.2.2 Nature Conservation Act 1992

The primary purpose of the *Nature Conservation Act 1992* (NC Act) is to conserve biodiversity by creating and managing protected areas, managing and protecting native flora and fauna and managing the spread of introduced/non-native (i.e. pest) wildlife. Proposed developments must take into consideration wildlife and natural areas protected under the NC Act and associated regulations and determine if permits or approvals are required to undertake the proposed works.

2.2.3 Environmental Offsets Act 2014

The *Environmental Offsets Act 2014* (EO Act) outlines the framework for environmental offsets within Queensland and how they should be provided. As defined within Section 7 of the EO Act, an environmental offset is an *activity undertaken to counterbalance a significant residual impact of a prescribed activity on a prescribed environmental matter*, such as matters of national, State or Local significance.

Environmental offsets are not an assessment trigger but are imposed as a condition for a proposed activity. Categorising instruments such as the Planning Regulation and local planning schemes identify assessment benchmarks that require prescribed activities to firstly demonstrate how all reasonable avoidance and mitigation measures have been, or will be, undertaken. Following this, if a significant residual impact on the prescribed environmental matter remains, an environmental offset may be required and conditioned.

3 Baseline surveys and findings

3.1 Baseline surveys

Baseline surveys were undertaken by AECOM and Brett Lane & Associates during January 2017 which coincides with the early wet season period. These surveys formed the basis of the *Kaban Green Power Hub – Fauna Technical Report* (AECOM, 2017) and included:

- Bird census surveys;
- Spotlighting for nocturnal bird species;
- Call playback for *Tyto novaehollandiae kimberli* (masked owl) - northern;
- Microchiropteran bat call detection; and
- Bird and bat utilisation surveys (Brett Lane & Associates Pty Ltd, 2018).

Additional targeted surveys were also undertaken by E2M during late March – early April 2019, which coincides with the late wet season period. This survey targeted specific threatened species identified in the EPBC Act referral Request for Information (RFI), and included:

- Diurnal bird surveys;
- Active microchiropteran bat call detection surveys;
- Spotlighting for nocturnal bird species; and
- Call playback for *Tyto novaehollandiae kimberli* (masked owl) – Northern.

3.2 Baseline survey findings

3.2.1 Birds

Baseline bird surveys identified 83 bird species occurring on site and an additional seven threatened bird species as having a moderate to high likelihood of occurrence within the site (AECOM 2017, E2M 2019) Bird utilisation surveys undertaken as part of the fauna technical survey identified that based on total bird numbers, 99.8% of birds recorded fly at a height below the Rotor Swept Area (RSA) and therefore have a low risk of turbine strike (Brett Lane & Associates Pty Ltd, 2018). Of the species recorded within the site, species from the raptor and waterbird groups were considered the most susceptible to turbine collision (Brett Lane & Associates 2018).

Of the eight threatened bird species identified as known to occur or considered high or moderate likelihood of occurrence within the site, five species are considered to have potential interactions with turbines due to either their foraging or migratory flight behaviour overlapping with the RSA (Table 1)(Brett Lane & Associates Pty Ltd, 2018). The report also identified, that although individual collisions for these species may occur, the likely impact on overall populations are considered negligible, except for *Erythrotriorchis radiatus* (red goshawk) which has a moderate potential to be impacted (AECOM 2017; E2M 2019).

Table 1: Threatened and migratory bird species with a moderate or high likelihood of occurrence

Species	Conservation Status[1]		Likelihood of Occurrence	RSA utilisation
	NC Act	EPBC Act (Migratory Convention[2])		
Apus pacificus (fork-tailed-swift)	SLC	Migratory (CAMBA, JAMBA, ROKAMBA)	High	Foraging
Cuculus optatus (oriental cuckoo)	SLC	Migratory (CAMBA)	High	Migration
Erythrotriorchis radiatus (red goshawk)	E	V	High	Foraging
*Gallinago hardwickii (*Latham's snipe)	SLC	Migratory (Bonn, JAMBA, ROKAMBA)	High	Unlikely
Hirundapus caudacutus (white-throated needletail)	SLC	Migratory (CAMBA, JAMBA, ROKAMBA)	High	Foraging
Myiagra cyanoleuca (satin flycatcher)	SLC	Migratory (Bonn)	High	Migration
Rhipidura rufifrons (rufous fantail)	SLC	Migratory (Bonn)	Known	Unlikely
Tyto novaehollandiae kimberli (masked owl) - Northern	V	V	High	Unlikely

[1]Conservation Status: SLC = Special Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered, CE = Critically Endangered

[2]Migratory Convention: Bonn = Convention on the Conservation of Migratory Species of Wild Animals, CAMBA = China-Australia Migratory Bird Agreement, JAMBA = Japan-Australia Migratory Bird Agreement, ROKAMBA =Republic of Korea-Australia Migratory Bird Agreement.

While *Monarcha melanopsis* (black-faced monarch) is listed within the definition of EPBC Act listed migratory species under the EPBC Act Approval Conditions (EPBC 2018/8289), the species has been previously assessed within the *Fauna Technical Report* (AECOM, 2017) and *RFI Ecological Assessment Report* (E2M, 2019) and deemed 'unlikely to occur' due to the limited extent of suitable habitat present within the project area. Therefore, black-faced monarch has been excluded from consideration within the BBAMP.

3.2.2 Bats

Baseline bat surveys identified 12 microchiropteran bat species or species complexes within the site, with one, *Macroderma gigas* (ghost bat), being a listed threatened species (Table 2) (AECOM 2017, E2M 2019). Surveys also identified one threatened megachiropteran bat species, *Pteropus conspicillatus* (spectacled flying-fox), as occurring within the site (Table 2) (AECOM 2017, E2M 2019). Assessment of the potential RSA utilisation of the species within the site determined that the species are either unlikely to utilise the RSA areas within the site on a frequent basis or in high numbers, and therefore the potential impact on the species is considered low (Table 2) (AECOM 2017, E2M 2019). Specifically, while spectacled flying-fox is known to occur within the site and has a moderate RSA utilisation, the species has only been recorded infrequently and in low abundances, with the nearest recorded roost 25 km from the site.

Table 2: Threatened bat species with a moderate or high likelihood of occurrence

Species	Conservation Status[1]		Likelihood of Occurrence	RSA utilisation
	NC Act	EPBC Act		
Macroderma gigas (ghost bat)	V	V	Known	Unlikely
Pteropus conspicillatus (spectacled flying-fox)	V	V	Known	Moderate

[1]Conservation Status – SLC = Special Least Concern, NT = Near Threatened, V = Vulnerable, E = Endangered, CE = Critically Endangered

4 Mitigation and management measures

Mitigation and management measures prescribed in this section are derived from current best practice. These include information detailed in the following guidelines and procedures as well as recently approved BBAMP:

- EPBC Act *Policy Statement 2.3 – Wind Farm Industry* (Department of Environment, Water, Heritage and the Arts, 2009)
- *Draft National Wind Farm Development Guideline* (Environment Protection and Heritage Council, 2010)
- *State Code 23: Wind Farm Development Planning Guideline* (Department of Infrastructure, Local Government and Planning, 2017);
- Wind Farms and Birds: Interim Standards for Risk Assessment (Australian Wind Energy Association, 2005);
- Bird & bat adaptive management plan for Silverton Wind Farm (Biosis, 2018a);
- Implementation Plan for two species of bats at Mount Emerald Wind Farm, Queensland (Biosis, 2018b);
- Crudine Ridge Wind Farm bird and bat adaptive management plan (Brett Lane & Associates Pty Ltd, 2017a);
- Salt Creek Wind Farm bat and avifauna management plan (Jacobs, 2017); and
- Glen Innes Wind Farm bird and bat adaptive management program (Environmental Property Services, 2016).

4.1 Roles and Responsibilities

The roles and responsibilities assigned to individuals are outlined in Table 3.

Table 3: Roles and Responsibilities

Roles	Responsibility	Activities
Site Project Manager	Overseeing construction works	• Ensure processes are in place to include the necessary provisions of the BBAMP into works/projects • Ensure that contractual arrangements with the contractors specify the need for adequate training to be provided to all members of the staff involved in the project • Ensure all workers are trained in the procedures of the BBAMP • Implement monitoring programs • Undertake and record corrective actions; and • Report to regulatory authorities.

Roles	Responsibility	Activities
Site Environment Officer	Ensure the contractors are implementing the requirements of BBAMP throughout the construction phase.	• Supervise monitoring in accordance with the BBAMP; and • Implementation of carrion removal program.
Carrion Removal Officer (site personnel trained to identify and handle carrion)	Undertake carrion removal program	• Receive training of the identification and handling of carrion; and • Carrion removal program and incidental carcass removal.
Suitably Qualified Ecologist	Pre-construction, and operation phase surveys	• Undertake pre-construction and operation phase surveys and monitoring in accordance with the BBAMP • Train carcass search personnel • Produce annual mortality assessment reporting; and • Provide ecological advice as required including identification of bird and bat species (either living or deceased).
Carcass search personnel	Conduct carcass searches	• Receive training from suitably qualified ecologist on the prescribed carcass search methodology; and • Undertake carcass searches in accordance with the training provided and the methodology prescribed.
All site personnel	Construction	• Receive training • Abide by BBAMP requirements; and • Report environmental incidents including carcass discovery.

4.2 Training requirements

The effectiveness of the BBAMP will depend on those responsible for its implementation. Those responsible must be familiar with the content of the BBAMP to ensure successful implementation of the management actions. The site manager will ensure relevant individuals are trained in the procedures of the BBAMP and are capable of implementation. This will involve a site induction or "toolbox" training outlining the contents of the BBAMP including monitoring and fauna incident notification requirements. For the duration of the operation phase, a copy of this BBAMP will be retained and displayed at the site office at all times.

4.3 Mitigation measures

4.3.1 Turbine shutdown periods for migratory species

As baseline surveys identified a low potential risk to migratory species, potential turbine shutdown periods are not considered to be required. If monitoring identifies significant impacts on migratory species, turbine shutdown periods will be assessed as a future potential mitigation measure.

4.3.2 Low wind-speed curtailment

A Biosis (2018b) study evaluated potential mechanisms that may assist in reducing turbine collision risk for spectacled flying-fox and *Saccolaimus saccolaimus nudicluniatus* (bare-rumped sheathtail bat) at the Mount Emerald Wind Farm, located approximately 45 km north of the Kaban project. Study findings are presented in the *Implementation Plan for two species of bats at Mount Emerald Wind Farm, Queensland* (Biosis, 2018b).

Low wind speed curtailment was identified as a potentially suitable mechanism for reducing turbine collision; however, no research has been undertaken within Australia to determine its effectiveness (Biosis, 2018b). Low wind-speed curtailment experiment is currently underway at the Mount Emerald Wind Farm to determine effectiveness to reduce turbine collision on spectacled flying-fox and bare-rumped sheathtail bat.

Given the low potential risk of turbine collision on spectacled-flying fox at Kaban, similar studies are not planned to be undertaken.

4.3.3 Carrion removal surveys

Carrion is defined as decaying flesh of dead animals and is often utilised as a food source for numerous bird species, primarily raptors. The presence of carrion within the project area may attract raptors and in turn increase their potential risk of turbine collision. As such, a Carrion Removal Program in accordance with the procedures detailed below will be implemented throughout the operation phase of the project.

- A Carrion Removal Officer will undertake monthly carrion monitoring that will include the following:
  - Inspection of the project area (e.g. access tracks, hardstands, laydowns, etc.) to identify carrion (e.g. dead kangaroo, cattle, etc.). Searches will be undertaken via vehicle;
  - Removal and disposal of all carrion identified. Where possible disposal of carrion should remain within the site but be placed at least 500 m from turbines, to avoid attracting birds to turbines; and
  - Record information in Environmental Incidents Register. Information collected should be consistent with the information prescribed in the carcass detection procedure (Section 5.2.2.3) but also include the GPS location of disposal area.
- Operational staff and landowners will be required to notify the Carrion Removal Officer immediately after identification of any carrion within the project area.
- Once a year, for the duration of operation, a Carrion Removal Report will be prepared detailing search results and incidental carcass observations and removal. The report will be made publicly available on the Kaban website.

Note: Carrion determined to be caused by turbine collision should not be disposed of but treated in accordance with the carcass detection procedure (Section 5.2.2.3). Only a dead, injured or feather spots of individuals located within the maximum potential fall distance (180 metres) of the turbine will be deemed to be killed due to turbine collision (Section 5.2.2).

4.3.4 Locate rehabilitation areas away from turbine locations

Rehabilitation works should be undertaken in areas away from turbines, to limit bird utilisation around turbines. This would include rehabilitating non-remnant areas located outside the project area instead of areas directly adjacent to turbines. Rehabilitation works within 200 m of turbines will be limited to soil stabilisation and revegetation with native dominant grasses (*Themeda triandra* (kangaroo grass)). Full rehabilitation works will be completed in these areas following decommissioning.

4.3.5 Infrastructure lighting

Infrastructure lighting may lead to increased risks to birds and bats through the attraction of them into turbine RSA (Gauthreaux & Belser 2006, Jones 2000). This may occur through disorientation of nocturnal migrating birds or attraction of birds and bats through increased insect abundances (Gauthreaux & Belser 2006, Jones 2000). For these reasons' infrastructure lighting should be minimised and directed to minimise light spillage, particularly skywards. Additionally, subject to the Civil Aviation Safety Authority (CASA) requirements, aviation safety lighting located on turbines should consist of low intensity blinking LED red lights to reduce insect attraction and potential bird orientation.

4.3.6 Injured bird and bat response plan

Where an injured bird or bat is identified by any site personnel, the personnel should notify the Site Project Manager immediately. The Site Project Manager will then proceed to have the animal collected by an appropriately trained person, who will place the individual in a dark place (e.g. cloth bag) and transfer the animal to the nearest veterinarian or wildlife carer (Queensland Government, 2018). It is recommended that all site personnel frequently visiting site should be trained and provided with the necessary equipment to collect and transfer the birds and bats themselves. This will reduce time taken for injured animals to be placed in the care of veterinarians or wildlife carers.

Location and contact details of the nearest veterinary clinics and wildlife carers are provided below:

- Tableland Veterinary Service
  - (07) 4097 7923
  - 26 Moffat St, Ravenshoe, Qld, 4888
- Eagles Nest Wildlife Hospital
  - (07) 4097 6098
  - 161 River Rd, Millstream, Qld, 4888

5 Monitoring and survey requirements

Monitoring and survey requirements prescribed in this section are derived from current best practice. These include information detailed in the following guidelines and procedures as well as recently approved BBAMP:

- *Draft National Wind Farm Development Guideline* (Environment Protection and Heritage Council, 2010)
- *State Code 23: Wind Farm Development Planning Guideline* (Department of Infrastructure, Local Government and Planning, 2017);
- Wind Farms and Birds: Interim Standards for Risk Assessment (Australian Wind Energy Association, 2005);
- Bird & bat adaptive management plan for Silverton Wind Farm (Biosis, 2018a);
- Implementation Plan for two species of bats at Mount Emerald Wind Farm, Queensland (Biosis, 2018b);
- Crudine Ridge Wind Farm bird and bat adaptive management plan (Brett Lane & Associates Pty Ltd, 2017a);
- Salt Creek Wind Farm bat and avifauna management plan (Jacobs, 2017); and
- Glen Innes Wind Farm bird and bat adaptive management program (Environmental Property Services, 2016).

5.1 Pre-commissioning Surveys

5.1.1 Bird and bat utilisation surveys

Three additional baseline bird and bat utilisation surveys will be undertaken over a 24 month period prior to commissioning to supplement data collected during the initial baseline pre-construction survey (Brett Lane & Associates Pty Ltd, 2018). The additional surveys will involve one wet season and two dry seasons, as the initial survey was undertaken in wet season (January 2018). Additional surveys will also be timed to maximise the opportunity for detection of potentially occurring migratory species. As such, wet season surveys will occur in March or April and dry season surveys will occur in September or October (Appendix B). Methods utilised will be in accordance with the methods prescribed in the *Neoen Kaban Wind Farm - Bird and Bat Pre-Construction Utilisation Survey* (Brett Lane & Associates Pty Ltd, 2018). Annual monitoring reports, including survey data, mitigation measures implemented and recommendations for next year, will be delivered within three months of completion of each yearly monitoring event.

5.2 Operation phase surveys

5.2.1 Bird and bat utilisation surveys

Four bird and bat utilisation surveys (two wet season and two dry season) will be undertaken during the first two years of operation using the methods prescribed in the *Neoen Kaban Wind Farm - Bird and Bat Pre-Construction Utilisation Survey* (Brett Lane & Associates Pty Ltd, 2017b). At least one survey will be conducted in each 12 month period within the migratory period of each EPBC Act listed migratory species. Annual monitoring reports, including survey data, mitigation measures implemented and recommendations for next year, will be delivered within three months of completion of each yearly monitoring event.

5.2.2 Mortality assessments

Mortality assessments will be undertaken to determine the impact of the project on birds and bats by quantifying the number of individuals killed or injured by turbine strike each year. These assessments will provide information on relative species risks, seasonal variation in collision frequency and the potential impacts on threatened species. Only a dead, injured or feather spots of individuals located within the maximum potential fall distance (180[1] metres) of the turbine will be deemed to be killed due to turbine collision. Detection may occur through both carcass searches, carrion removal surveys and incidental observation by wind farm personnel. The following sections describe the detailed requirements for each mortality assessment. A summary of the mortality assessments, associated frequencies, reporting obligations and responsibilities has been included in Section 5.3

5.2.2.1 Turbine selection

Turbine selection for carcass searches was based on obtaining adequate representation of habitat types, elevational variations and spatial distribution across the site. A total of 15 turbines is considered adequate to cover these variations and provide sufficient statistical power. Dimensions of the 15 turbines selected for assessment are presented in Table 4, with their locations depicted in Figure 2.

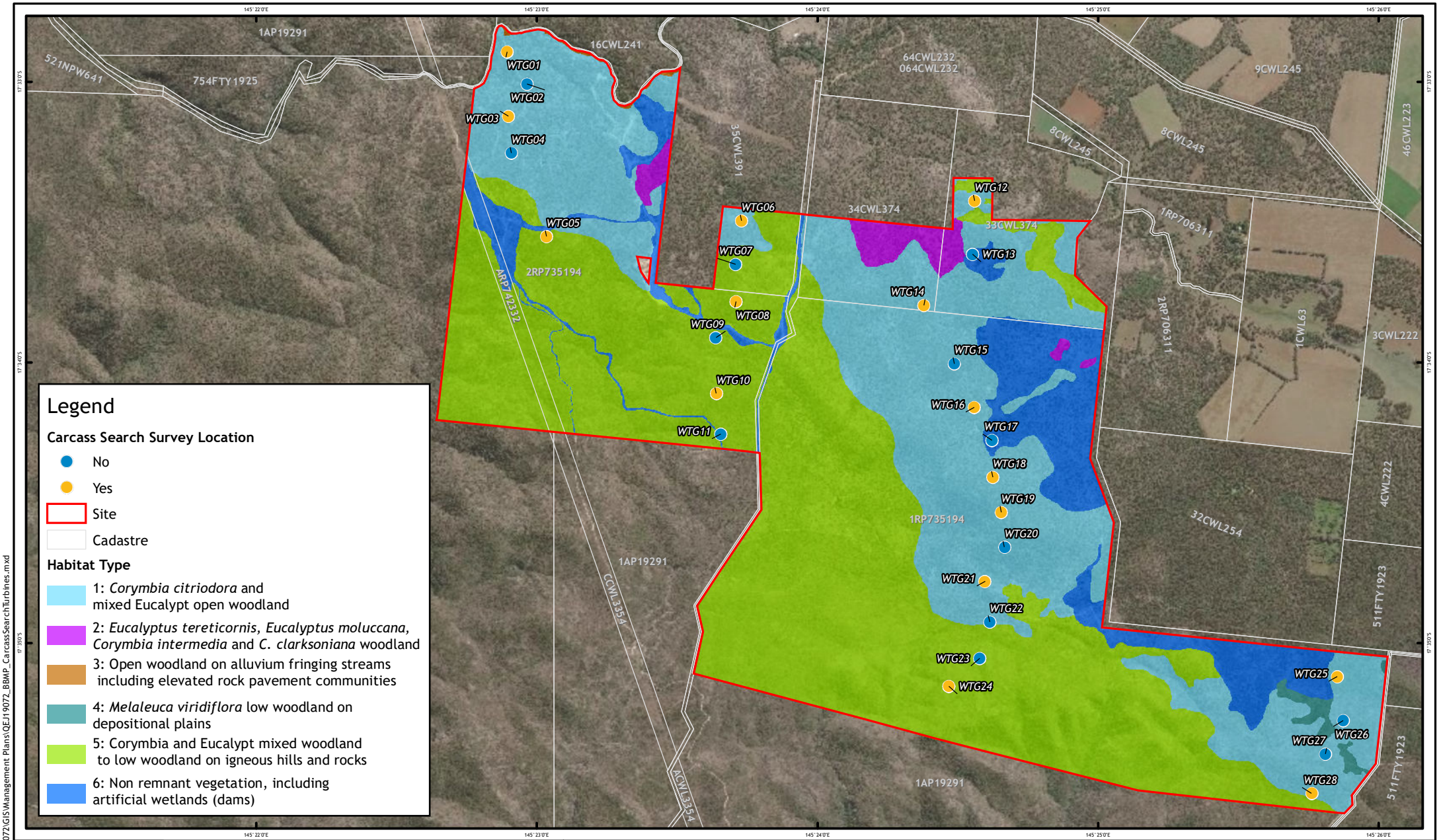
In accordance with Condition 13 of the EPBC Act Approval, turbine selection will be continually updated based on survey results and incidental observations. While the 15 turbines specified in Table 4 will be the base turbines surveyed during all carcass search monitoring events, any additional turbine that is classified as "high-risk" during the life of the project will be added to the survey effort. The turbine selection process is depicted in Figure 3.

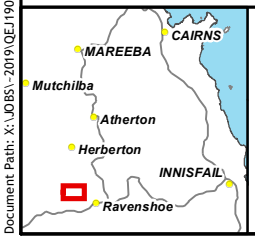
A "high-risk" turbine is defined as any turbine that any EPBC listed threatened or migratory bird or bat species has been opportunistically or systematically detected within 350 metres radius of the turbine. A "high-risk" turbine may be downgraded to a "low-risk" turbine, if an EPBC listed threatened or migratory bird or bat species is not detected within 350m radius of the turbine for a minimum of two years.

Table 4: Turbines selected for carcass search surveys

Turbine ID	Latitude/ Longitude	Base elevation (m)	Maximum overall turbine height (m)	Habitat Type
WTG01	-17.54821 / 145.381571	897	1152	1
WTG03	-17.552032 / 145.38164	937	1192	1
WTG05	-17.559171 / 145.383913	965	1220	5
WTG06	-17.558235 / 145.395489	945	1201	1
WTG08	-17.563049 / 145.395164	1003	1258	5
WTG10	-17.568497 / 145.393995	1002	1257	5
WTG12	-17.557059 / 145.409343	943	1198	1
WTG14	-17.563257 / 145.406316	955	1210	1
WTG16	-17.569325 / 145.409316	973	1228	1
WTG18	-17.573464 / 145.410426	1035	1290	1
WTG19	-17.575547 / 145.410928	1060	1315	1
WTG21	-17.579659 / 145.40995	1020	1275	1
WTG24	-17.585886 / 145.407813	1022	1277	5
WTG25	-17.585312 / 145.430873	974	1229	1
WTG28	-17.592252 / 145.429351	961	1216	1

[1] Calculated based on formula presented in Hull and Muir 2010.





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Document Path: X:\JOBS\~2019\QEJ19072\GIS\Management Plans\QEJ19072_BBMP_CarcassSearchTurbines.mxd

Notes:
Aerial Imagery: © ESRI 2019
Ordered Drainage: © DNRME 2016
Cadastre: © DNRME 2018
Infrastructure: © Neoen 2021

Rev	Description	Drawn	Approved	Date
7	Issued for Use	CD	CO	02/02/2021
6	Issued for Use	PR	CO	21/01/2021

FIGURE 2: TURBINES SELECTED FOR CARCASS SEARCH SURVEYS

Bird and Bat Management Plan
Kaban Green Power Hub

Map Number	Job Number	Rev
1 of 1	QEJ19072	7

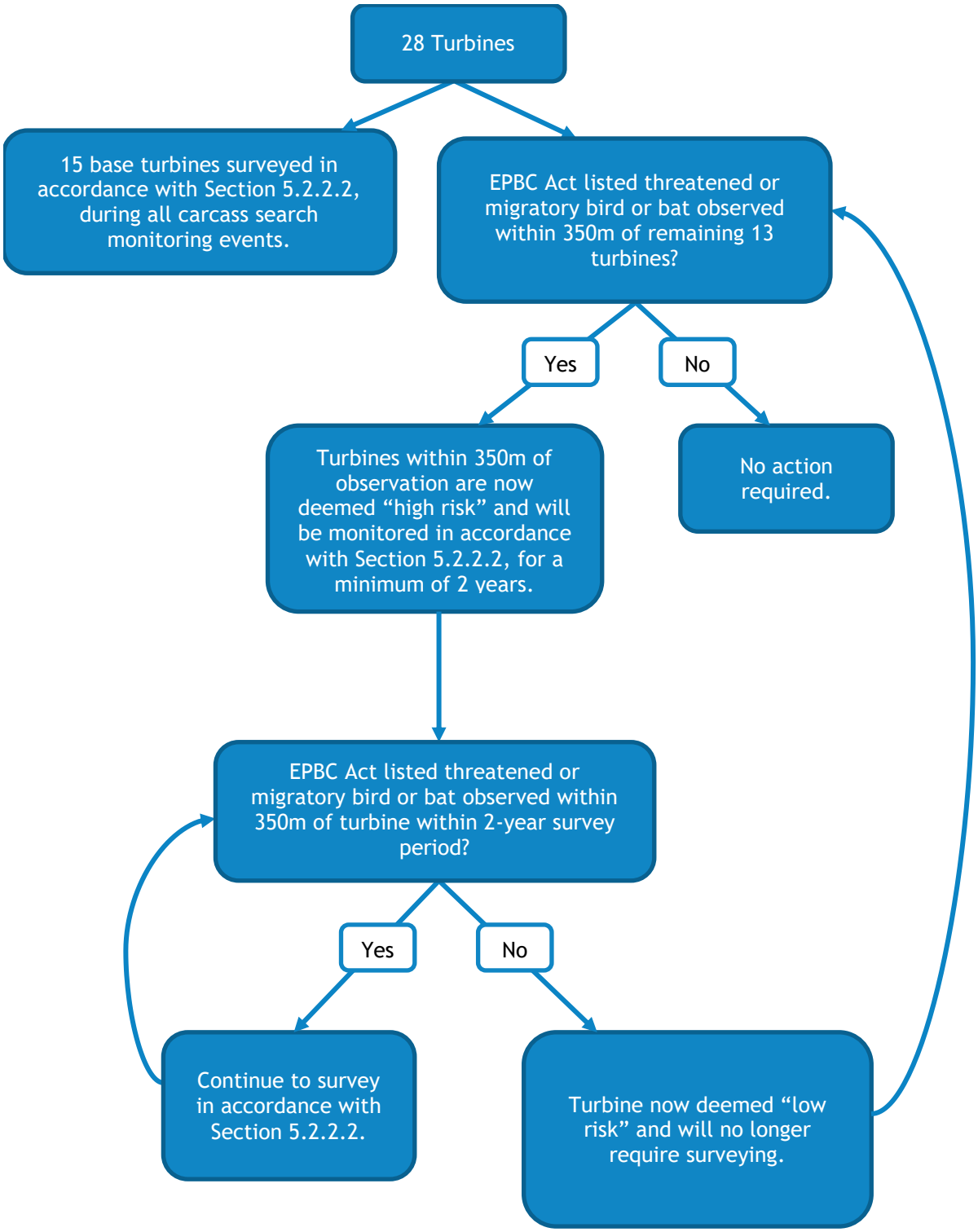

Figure 3: Turbine survey selection flowchart

5.2.2.2 Carcass search surveys

5.2.2.2.1 Carcass search area

Existing research identifies that likely fall zones of bird and bats are dependent on multiple factors including body mass of the bird or bat, turbine hub height, blade length and maximum rotation speed (Hull & Muir, 2010). Previous research examining suitable search areas based on these factors concluded that distance from the base of a turbine is an important factor in dispersion of carcasses, with density of carcasses decreasing with increased distance from the turbine (Hull & Muir, 2010; Huso & Dalthorp, 2014).

Hull & Muir (2010) have developed a simple model to estimate the survey search areas and corresponding carcass capture rates. The results of the model output suggest that a search radius of 157.3 m is required to capture 95% of carcasses. However, this model was based on the biometrics of a large bird (4 kg), noting that larger birds tend to fall further from the turbine. The largest threatened bird/bat relevant to the project is the spectacled flying-fox, with a mass of up to 850 g (Richards, 1990), suggesting that a smaller search radius would be sufficient. In addition, given the rugged terrain at the project site, a large search radius is considered impractical as search area increases with the square of distance from the turbine. An overly large search area is economically impractical and likely to lead to a loss of observer acuity (Hull and Muir 2010). Furthermore, previous studies have found that the incidence of carcasses decreases exponentially with distance from turbine and that surveys beyond 90 m are expensive and inefficient (Maurer et al 2020). Therefore, 120 metres is considered an appropriate search radius for the project.

5.2.2.2.2 Carcass search method

Given the rugged terrain within the site, the preferred carcass search method within the site is carcass detection dogs. However, while Neoen will preferentially use carcass detection dogs, given the uncertainty in the availability of detection dogs throughout the life of the project, human search survey methods have also been prescribed and will be undertaken when dogs are not available.

Detection dog search method

Where dogs are available for carcass detection, the entire carcass search area (refer to Section 5.2.2.2.1) will be thoroughly searched by the dog and accompanying trainer.

Human detection survey method

As large birds are generally sent a greater distance from turbines following collisions than small birds and bats and that the probability of finding larger carcasses is greater than smaller carcasses, the carcass search area (refer to Section 5.2.2.2.1) will be divided into two search zones (inner and outer) (Hull & Muir, 2010). The inner search zone formed by a 60m radius around the turbine will be searched more intensively with transects to be placed 6 metres apart, while the outer search zone (60 – 120 m from turbine base) which is expected to contain predominantly larger birds will be searched using 12 metre wide transects.

In some areas searching of the full carcass search area may not be practical due to steep terrain or high natural ground cover. Where this is the case, the proportion of area searched should be recorded and used to estimate total fatalities. As both the density of carcases and visibility tends to be higher closer to the turbine base, calculation of estimated total mortality will be done using methodologies which take this into account, such as those prescribed in Huso and Dulthorpe (2014) and Huso *et al.* (2017).

5.2.2.2.3 Carcass search frequency

All turbines specified in Section 5.2.2.1 (including all "high-risk" turbines) will be surveyed twice monthly for the first two years of operation. Following this, data collected during this period will be collated and assessed to determine frequency of future monitoring. Final determination of future monitoring frequency will be determined through discussion with DAWE and DES.

Monthly surveying will involve undertaking an initial search followed by another follow-up search three days later. This follow-up search assists in determining frequency of collisions, because there is a high probability that carcasses identified during the follow-up search were killed in the preceding three days.

5.2.2.3 Carcass detection procedure

Where carcasses are recorded the following information will be collected:

- Date and time
- Sample ID number
- GPS location of carcass
- Species
- Sex (if possible)
- Visible signs of injury
- Weather conditions; and
- Photo of carcass for further assessment by a qualified person if required.

The carcass will then be removed to avoid re-recording of the same individual and reduce carrion within the project area that may attract additional individuals. Removal of carcasses should be undertaken using rubber gloves, with carcasses placed in plastic bag, wrapped in newspaper then placed in a secondary plastic bag which contains the sample ID number. Following collection all specimens should be retained in a freezer, until identification can be confirmed by a suitably qualified ecologist. Additionally, these frozen carcasses should be kept for the first 2 years for utilisation in scavenger rate surveys or searcher efficiency trials.

5.2.2.4 Scavenger rate surveys

Carcasses resulting from turbine collision may be intermittently removed by scavengers, which in turn may impact total fatality calculations based on carcass search results. As such, scavenger rate surveys will be undertaken to inform frequency of carcass search surveys and provide a 'correction factor' to accurately estimate the annual number of birds and bats killed by turbine collision. Two scavenger rate surveys will be undertaken within the first year of operation (one dry season and one wet season). Following this, data collected during this period will be collated and assessed to determine frequency of future monitoring. Final determination of future monitoring frequency will be determined through discussion with DAWE and DES.

Remote cameras will be utilised to determine scavenger rates as they provide the exact time of which carcasses are removed and limit the requirement for daily carcass inspections. Cameras will be established at each of the 15 turbines selected for carcass search surveys. A single camera will be placed randomly within each turbine search area and baited with a single individually marked carcass from one of the four size categories[2] (micro-bat, small bird, medium sized bird, large bird). Where possible a minimum of three carcasses from each size category will be utilised in each survey event. Each carcass will be individually marked to limit potential of confusion with collision carcasses. Cameras will be left out for a period of one month, with a single check occurring after two weeks.

[2] Size categories are derived from those prescribed in Hull and Muir 2010

5.2.2.5 Searcher efficiency trials

As all carcasses are not always identified during carcass searches, it is necessary that searcher efficiency be determined to accurately estimate total fatalities. Searcher efficiency will be determined through undertaking two trials (one wet season and one dry season) throughout the first year of operation. Following this, data collected during this period will be collated and assessed to determine frequency of future monitoring. Final determination of future monitoring frequency will be determined through discussion with DAWE and DES.

Efficiency trials will be run by a person not involved in monthly monitoring, with monthly carcass searchers not aware of when trials will be undertaken. Trials will include placement of 5 carcasses of each size category[1] randomly across the turbines to be searched. These will be placed early morning prior to carcass searches being undertaken to limit potential of scavenging. Carcasses will be randomly placed within the inner and outer search zones, and individually marked with the location noted (using GPS). Following the completion of carcass searches the person who placed the carcasses will collect any remaining undetected carcasses. The number and type of carcasses found during the searcher efficiency trials will be compared with the known number of and type of carcasses placed under the turbines.

5.2.2.6 Incidental carcass plan

Wind farm personnel and landowners may occasionally locate carcasses during general operational and maintenance activities. When carcasses are discovered, personnel will be required to notify the Carrion Removal Officer / Site Environment Officer, who will follow the carcass detection procedure specified in Section 5.2.2.3. Any carcasses determined to be caused by turbine collision will be included in total fatality estimations. Only a dead, injured or feather spots of individuals located within the maximum potential fall distance (180 metres) of the turbine will be deemed to be killed due to turbine collision.

5.3 Monitoring and Reporting Schedule

Monitoring and reporting will be undertaken on a regular basis to ensure mitigation measures are preventing impact triggers outlined in Section 6 from being met or exceeded. The monitoring and reporting requirements for each of the mortality assessments, as described in Section 5.2.2, according to each relevant project phase is presented in Table 5. In accordance with EPBC Act Conditions 12, 14 and 35, compliance reports will be submitted annually and must include:

- survey results
- evaluation of the effectiveness and performance of avoidance and mitigation measures implemented
- recommendations for the following year; and
- current risk profiles of each turbine.

Table 5: Monitoring schedule and reporting requirements

Activity	Frequency	Reporting	Responsibility
Pre-operation			
Bird and Bat utilisation survey	Three (one wet season and two dry season)[C]	Baseline Bird and Bat Utilisation Report	Suitably Qualified Ecologist
Operation			
Carrion removal	Incidental	Carrion Removal Report	Carrion Removal Officer / Site Environment Officer
Identification of threatened species carcass	Incidental or as part of carcass search surveys	Report to regulatory authority within 48hrs	Site Project Manager
Carrion removal survey	Monthly[A]	Carrion Removal Report	Carrion Removal Officer
Carcass searches	Twice Monthly[A]	Annual Mortality Assessment Report	Carcass search personnel
Bird and bat utilisation survey	Twice in first two years of operation (one wet season and one dry season)[A C]	Bird and Bat Utilisation Report	Suitably Qualified Ecologist
Scavenger surveys	Twice in first year of operation (one wet season and one dry season)[B]	Annual Mortality Assessment Report	Suitably Qualified Ecologist
Searcher efficiency surveys	Twice in first year of operation (one wet season and one dry season)[B]	Annual Mortality Assessment Report	Suitably Qualified Ecologist

A = Frequency to be re-assessed following first two years of operation

B = Frequency to be re-assessed following first year of operation

C = At least one survey in each 12 month period of bird and bat utilisation surveys will be conducted within migratory period of each EPBC Act listed migratory species.

6 Impact triggers and adaptive management procedure

Whilst ideally the project will not result in any negative impact on birds and bats, it is considered likely that some impacts may occur. To ensure these potential impacts do not significantly impact any native bird and bat populations, impact triggers have been established. Where triggers occur, adaptive management measures will be used to assess the potential for future impact, determine the effectiveness of current mitigation measures and identify additional measures that may need to be implemented.

6.1 Impact triggers

6.1.1 Turbine profiles

If one or more individuals of an EPBC Act listed bird or bat species is detected within the 350 m of a low-risk turbine during monitoring events or incidentally, that turbine must be reassigned as a "high-risk" turbine within five business days of the detection, as per Conditions 6 and 11.

6.1.2 Threatened species

Due to the low potential risk of the project on threatened species, the impact trigger for these species is the identification of any threatened[3] bird or bat species carcass (or recognisable parts thereof) within 180[4] metres of any wind turbine. Where an impact trigger, is met the adaptive management procedure described in Section 6.2 will be followed.

Note: Calculation of the mortality rate for each species must account for the results of the searcher efficiency trails, scavenger rate surveys and the number of turbines surveyed. Migratory species

Determination of the impact trigger for migratory species are based on the Draft – Referral guideline for 14 birds listed as migratory species under the EPBC Act (Department of the Environment, 2015). These guidelines prescribe that impacts to 0.1% of a species total population[5] to be nationally important. For this reason, the impact trigger for turbine collision on migratory species has been set at half of the nationally significant proportion of a each species population (0.05%). This reduced impact trigger will allow an early identification of potential significant impacts on the species.

A turbine collision impact on a migratory species is considered the identification of a migratory species carcass (or recognisable parts thereof) within 180[5] metres of a turbine. Specific impact trigger levels for each of the six migratory species considered known, likely or moderate occurrences within the site are prescribed in Table 6. Population estimates nominated in this BBAMP have been derived from DAWE's *Draft – Referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015). Should DAWE revise the currently recognised population estimates, the impact trigger levels for each species will be re-calculated and applied moving forward. Where carcasses of other migratory species not listed within Table 6 are identify within the site, calculation of impact triggers will be determined using the method prescribed in the *Draft – Referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015).

Where an impact trigger is met the adaptive management procedure described in Section 6.2 will be followed.

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[3] Species listed as Critically Endangered, Endangered, Vulnerable or Near Threatened, under the EPBC Act or NC Act.
[4] Maximum fall distance based on formula presented in Hull and Muir 2010.
[5] Based on recorded densities published in the Handbook of Australian, New Zealand and Antarctic Birds

Note: Calculation of the mortality rate for each species must account for the results of the searcher efficiency trails, scavenger rate surveys and the number of turbines surveyed.

Table 6: Impact triggers for migratory species considered known, likely or moderate occurrences

Species	Impact trigger (0.05% of total population)
Apus pacificus (fork-tailed-swift)	50†
Cuculus optatus (oriental cuckoo)	500†
*Gallinago hardwickii (*Latham's snipe)	15*
Hirundapus caudacutus (white-throated needletail)	5†
Myiagra cyanoleuca (satin flycatcher)	850†
Rhipidura rufifrons (rufous fantail)	2,400†

† = Based on recorded densities published in the Handbook of Australian, New Zealand and Antarctic Birds

* = Based on Species Profile and Threats Database (DAWE, 2021)

6.1.3 Non-threatened species

The impact trigger level for non-threatened bird and bat species is where a total of at least four carcasses of a single species (or recognisable parts thereof) are identified within 180[6] metres of the same turbine in two consecutive months (i.e. four individuals recorded each month).

Where an impact trigger is met, the adaptive management procedure described in Section 6.2 will be followed.

Note: Calculation of the mortality rate for each species must account for the results of the searcher efficiency trails, scavenger rate surveys and the number of turbines surveyed.

[6] Maximum fall distance based on formula presented in Hull and Muir 2010.

6.2 Adaptive management procedure

Where impact triggers are met the adaptive management procedure presented in Figure 4 should be followed. As it is difficult at this stage to determine the cause of impact triggers being met, additional mitigation measures that may be investigated and potentially implemented are identified in Table 7.

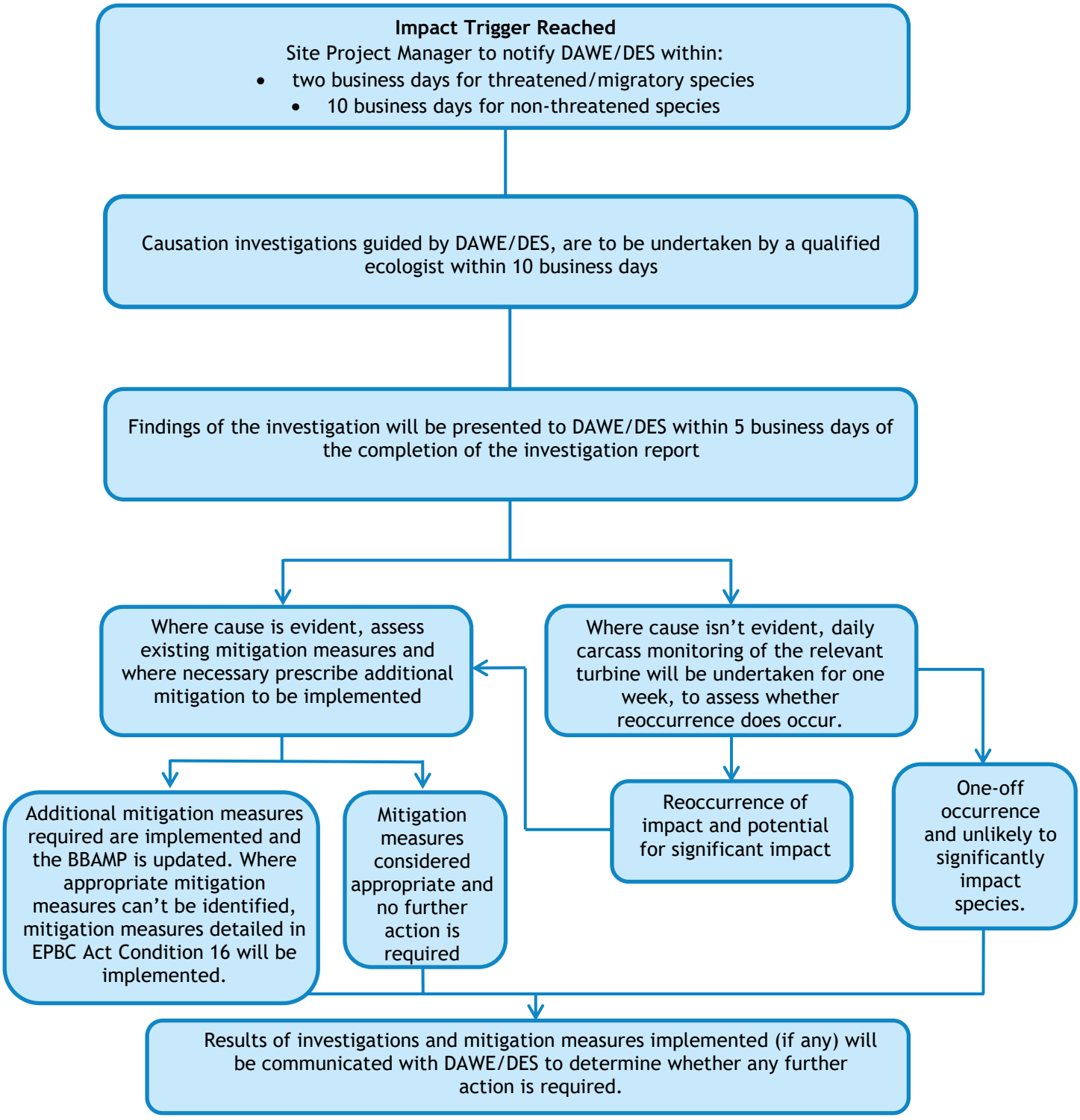

Figure 4: Adaptive management procedure to be followed if impact trigger is met

Table 7: Example additional mitigation measures to be investigated following impact triggers being met

Potential impact cause	Mitigation measure	Likelihood of impact continuing	Implementation schedule
Infrastructure lighting attracting individuals to wind farm area	• Minimise/shield/baffle external lighting • Switch off lights except when needed for service work • Synchronise flashing lights	Low	As soon as possible
Foraging resource attracting individuals to wind farm area	• Consider use of acoustic deterrents (e.g. loud music) • Consider attracting species to areas outside of the windfarm area through use of social attractants (i.e. call playback) • Review agricultural practices that might attract feeding birds (subject to landowner agreement)	Low	As soon as possible
Species nesting near turbine	• Discourage nesting through relocation of nests • Consider establishment of artificial hollows outside of windfarm area	Low	Prior to breeding season

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Appendix A Threatened Bird and Bat Species Profiles

Apus pacificus (fork-tailed-swift)	
EPBC Act Status	Migratory
NC Act Status	SLC
Likelihood of Occurrence	High
Species Description[7]	• *characterized by a long and deeply forked tail* • *mainly blackish with a white band across the rump* • *white patch on the chin and throat* • *length of 18-21 cm, a wingspan of 40-42 cm and weighs around 30-40 g* • *long scythe-shaped wings that taper to finely pointed tips*
Habitat Description	The fork-tailed swift is predominantly aerial and occurs over inland areas and occasionally above the foothills in coastal areas with dry and open habitat. They can also occur over low scrub, heathland, saltmarsh and riparian woodlands and are associated with low pressure systems that favour the occurrence of insect prey (DAWE, 2021).
Relevant Biology / Ecology	Non-breeding migrant that arrives into Australia between October and late April. The species is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground (DAWE, 2021).

Source: H.B.W. Alive via the Internet Bird Collection

[7] Species descriptions have been directly adapted from the species relevant Species Profile and Threats Database (DAWE, 2021)

Cuculus optatus (oriental cuckoo)	
EPBC Act Status	Migratory
NC Act Status	SLC
Likelihood of Occurrence	Moderate
Species Description[8]	• *bill part yellow* • *eye, eye-ring and feet yellow* • *underparts whitish, wavily barred black*
Habitat Description	Monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides, mangroves, islands (Pizzey & Knight, 2007).
Relevant Biology / Ecology	Breeds in Asia but migrates to Australia Sept-May (Pizzey & Knight, 2007).

Source: Atlas of Living Australia

[8] Species descriptions have been directly adapted from (Pizzey & Knight, 2007)

Erythrotriorchis radiatus (red goshawk)	
EPBC Act Status	V
NC Act Status	E
Likelihood of Occurrence	Moderate
Species Description[7]	• *boldly mottled and streaked, with rufous scalloping on the back and upper wings, rufous underparts that are brightest and lack streaking on the thighs, and with massive yellowish legs and feet, and boldly barred underwings* • *growing to a length of 45-60 cm, with a wingspan of 100-135 cm* • *broad 'six-fingered' wings that are held at slightly angled planes when soaring* • *long tail which is square-tipped to slightly rounded at the tip*
Habitat Description	The red goshawk prefers landscapes containing a mosaic of habitats including coastal and sub-coastal tall open forest, woodland and rainforest edges (Marchant & Higgins, 1993). Forests of intermediate density are particularly favoured, as are ecotones between variably dense habitats (i.e. ecotone between rainforest and sclerophyll forest). Large bird populations (the primary prey of this species) are also an important determinant of red goshawk habitat utilisation (DAWE, 2021). It generally avoids open habitats and is only rarely encountered over agricultural land. Nesting occurs in tall trees within one kilometre of permanent water, generally in open, biologically rich forest or woodland (Marchant & Higgins, 1993). The species is sparsely dispersed across approximately 15 per cent of coastal and sub-coastal Australia. The species occurs at low densities occupying home ranges estimated between 50 – 220 km^2 (DAWE, 2021).
Relevant Biology / Ecology	Habitat has to be open enough for fast attack and manoeuvring in flight but provide cover for ambushing of prey. The Red Goshawk breeds solitarily, in forested or wooded areas, within one km of permanent water, and in a large (> 20 m tall) tree. Breeding occurs generally in the spring with eggs laid between May and October in the north (Aumann & Baker-Gabb, 1991), and between August and October in the southeast of its range (Debus & Czechura, 1988). More Red Goshawk breeding records and activity have been recorded from August through November than in other months (Aumann & Baker-Gabb, 1991; Debus & Czechura, 1988).

Source: http://www.endangered-animals.com.au

Gallinago hardwickii (Latham's snipe)	
EPBC Act Status	Migratory
NC Act Status	SLC
Likelihood of Occurrence	Moderate
Species Description[7]	• *length of 29-33 cm, a wingspan of 50-54 cm and a mass of 150-230 g* • *cryptic plumage is intricately marked with barring and chevrons of buff, black and various shades of brown, with blackish-brown stripes across the crown and cream streaks down the back* • *colour of the bill varies from pale-brown to olive, becoming blackish at the distal third and olive-yellow at the base*
Habitat Description	Occurs in permanent and ephemeral wetlands up to 2000 m above sea-level (Chapman, 1969; Naarding, 1981). They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (Frith et al., 1977; Naarding, 1983). Various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains (Frith et al., 1977; Naarding, 1981, 1983).
Relevant Biology / Ecology	Breeds in Japan and eastern Russia, residing in Australia from July to April. The entire global population of Latham's Snipe is thought to migrate to Australia (P. Smith, 1990; Watkins, 1993). Foraging habitats are mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g. low, dense vegetation) (Frith et al., 1977; Todd, 2000). Roost on the ground near (or sometimes in) their foraging areas, usually in sites that provide some degree of shelter, e.g. beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable (Frith et al., 1977; Naarding, 1982, 1983). Feeds on seeds and other plant material and on invertebrates including insects (mainly flies and beetles), earthworms and spiders and occasionally molluscs, isopods and centipedes (Frith et al., 1977; Todd, 2000).

Source: Leo via Living Atlas of Living Australia

Rhipidura rufifrons (rufous fantail)	
EPBC Act Status	Migratory
NC Act Status	SLC
Likelihood of Occurrence	Known
Species Description[7]	• *14.5 - 18.5 cm in length and approximately 10 g in weight* • *forehead is a rich reddish-brown colour across the eyes* • *eyes have a white arc underneath* • *top of the head, back of the neck and the upper back, transition from an olive to reddish-brown colour, which then blends into a blackish-brown, long, fan-shaped tail* *blackish-brown tail, contrasts with the base of the tail, which is tipped with a paler colour, often white*
Habitat Description	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts; usually with a dense shrubby understorey often including ferns (Department of the Environment and Energy 2019).
Habitat Description	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts; usually with a dense shrubby understorey often including ferns (Department of the Environment and Energy 2019).
Relevant Biology / Ecology	Populations possibly move altitudinally in the Atherton Region (Wet Tropics) where reporting rates >500 m above sea level were 37% in summer and 0% in winter. At elevations of >600 m above sea level in south-east Australia, they breed November to January. Nests are placed in a wide variety of plant species, from shrubs to trees (Department of the Environment and Energy 2019). The species is insectivorous, mainly foraging in the low to middle strata of forests, sometimes in or below the canopy or on the ground; in northern Australia they also forage in mangroves (Department of the Environment and Energy 2019).

Source: Birdlife Australia

Hirundapus caudacutus (white-throated needletail)	
EPBC Act Status	Migratory
NC Act Status	SLC
Likelihood of Occurrence	High
Species Description[7]	• *20 cm in length and approximately 115-120 g* • *cigar-shaped body, stubby tail and long pointed wings* • *adults have a dark-olive head and neck, with an iridescent gloss on the crown* • *upper wings are blackish, sometimes with a greenish gloss, with a contrasting white patch at the base of the trailing edge* • *face is dark-olive with a narrow, white band across the forehead*
Habitat Description	In Australia, almost exclusively aerial (1-1000 m above ground) yet occurs over a variety of habitats with a preference for wooded areas (DAWE, 2021).
Relevant Biology / Ecology	Breeds in Asia. Disperses from its breeding grounds in Asia in September and departs Australia in March. Observed roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows (Corben et al., 1982; Day, 1993; Quested, 1982). Eats a wide variety of insects, including beetles, cicadas, flying ants, bees, wasps, flies, termites, moths, locusts and grasshoppers (Madden, 1982).

Source: Birdlife Australia

Macroderma gigas (ghost bat)	
EPBC Act Status	E
NC Act Status	V
Likelihood of Occurrence	Known
Species Description[7]	• *carnivorous bat* • *light to dark grey fur above and paler below* • *head and body length is 10-13 cm, while the forearm lengths is 10-11 cm* • *wingspan reaches up to 60 cm* • *large ears that are joined together, large eyes, a simple nose leaf and no tail*
Habitat Description	The species occurs across a range of habitats, from arid Pilbara to tropical savanna woodlands and rainforests. During the daytime they roost in caves, rock crevices and old mines. Roost sites used permanently are generally deep natural caves or disused mines with a relatively stable temperature of 23°–28°C and a moderate to high relative humidity of 50–100 percent (DAWE, 2021). The average foraging distance is approximately 2 km from the daytime roost (Tidemann & Vardon, 1997).
Relevant Biology / Ecology	Permanent roosts are in deep natural cave systems or large disused mines. Only 14 maternity colonies are currently known. Carnivorous, feeding on large insects such as grasshoppers and beetles, and also frogs, lizards, birds and mammals (including small bats) (DAWE, 2021).

Source: Bruce Thomson via Department of Science, Information Technology and Innovation

Myiagra cyanoleuca (satin flycatcher)	
EPBC Act Status	Migratory
NC Act Status	SLC
Likelihood of Occurrence	Moderate
Species Description[7]	• *length around 17.5 cm, a wingspan of 23 cm and a weight of 17 g* • *characterised by an upright posture, short erectile crest, and a distinctive habit of quivering the tail when perched* • *Males are glossy blue-black above, with a blue-black chest and white below, while females are duskier blue-black above, with a orange-red chin, throat and breast, and white underparts and pale-edged wing and tail feathers*
Habitat Description	Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than the Leaden Flycatcher, *Myiagra rubecula*, often occurring in gullies (Blakers et al., 1984; Emison et al., 1987). They also occur in eucalypt woodlands with open understorey and grass ground cover and are generally absent from rainforest (Emison et al., 1987). Mainly recorded in eucalypt forests, especially wet sclerophyll forest, often dominated by eucalypts such as Brown Barrel, Mountain Gum, Mountain Grey Gum, Narrow-leaved Peppermint, Messmate or Manna Gum, or occasionally Mountain Ash. They sometimes also occur in dry sclerophyll forests and woodlands, usually dominated by eucalypts such as Blakely's Red Gum, Mugga Ironbark, Yellow Box, White Box, Manna Gum or stringybarks, including Red Stringybark and Broad-leaved Stringybark, usually with open understorey (Ford & Bell, 1981; Traill et al., 1996).
Relevant Biology / Ecology	Occur singly or in pairs, and sometimes in groups of three or four (Longmore, 1978; L. E. Smith & Chafer, 1987). Each pair occupies a discrete territory. They nest in loose colonies, or nests are at least clustered (BA NRS, 2002). Nest in a fork of outer branches of trees, such as paperbarks, eucalypts, and banksias (BA NRS, 2002; Gilbert, 1935). They nest in the same locality each year, and sometimes in the same tree (BA NRS, 2002). The average height of the nest is 12.3 m. In Queensland, eggs have been recorded in December (BA NRS, 2002). Mainly insectivorous, preying on arthropods, mostly insects, although very occasionally they will also eat seeds. Arboreal foragers. Move north in autumn to spend winter in northern Australia and New Guinea.

Source: Birdlife Australia (male and female right and left respectively)

Pteropus conspicillatus (spectacled flying-fox)	
EPBC Act Status	V
NC Act Status	V
Likelihood of Occurrence	Known
Species Description[7]	• *distinctive straw-coloured fur which surrounds the eyes* • *head and body ranges between 220-240 mm* • *forearm length and weight range is 160-180 mm and 580-850 g for males, and 155-175 mm and 500-650 g for females*
Habitat Description	Associated with, but not restricted to, tropical rainforests. Also uses eucalypt forests, melaleuca swamps, littoral and coastal mixed forests and mangroves, farmlands, and urban and suburban gardens. Colonies tend to be within or near rainforest. One study showed that the Spectacled Flying-fox roosts within 6.5 km of rainforest (Richards, 1990), although a roost 16 km from rainforest has also been observed (Shilton et al., 2008). The Mabi Forest (Complex Notophyll Vine Forest 5b) is considered a key habitat for the Spectacled Flying-fox.
Relevant Biology / Ecology	Forage widely, easily covering 50-100 km each night. Individuals move between camps regularly. Eats fruits and blossoms (Department of Environment and Resource Management, 2010). Disperses seeds, mosses, micro-organisms, and pollen (DAWE, 2021). Roosts in large colonies, in the exposed branches of canopy trees. Throughout the year an unknown proportion of animals roost away from camps, either solitarily or in small groups (Department of Environment and Resource Management, 2010). Spectacled Flying-foxes are highly mobile and have complex and irregular movement patterns primarily determined by seasonal nectar flows (DAWE, 2021). The number of Spectacled Flying-foxes in particular sites varied five-fold through the year.

Source: Martin Schulz via Department of Environment and Resource Management (Qld)

Tyto novaehollandiae kimberli (masked owl) - Northern	
EPBC Act Status	V
NC Act Status	V
Likelihood of Occurrence	Moderate
Species Description[7]	• *large owl with prominent heart-shaped facial disc, owl with prominent heart-shaped facial disc* • *plumage highly patterned by speckling, and generally darker on the back and paler below*
Habitat Description	Mostly in coastal and upland areas. Sclerophyll forest and woodland, often near ecotones with open areas, such as grassland, heath or cane fields, and typically grassy or with a mosaic of sparse and dense ground-cover (DAWE, 2021).
Relevant Biology / Ecology	Roosting sites are tree-hollows, caves, or dense foliage (3-8 m above the ground), and rarely buildings. Preys mainly on terrestrial mammals, particularly rodents, up to bandicoot-size. Also takes arboreal mammals (e.g. small gliders), and some birds, frogs, lizards, and large insects. Resident in large home ranges of 400-1500 ha, sometimes > 3000 ha. Nests Feb-Oct. Nest in a large hollow in a big old eucalypt, usually live but sometimes dead. Nest entrance is 10 – 45 m above the ground, more than 20 cm wide, and the chamber at least 45 cm wide and up to 500 cm deep (DAWE, 2021).

Source: D.P. Lewis via Cape York NRM Plan and Investment Strategy

Appendix B Migratory species predicted time of occurrence within the site

Species	Wet Season						Dry Season					
	November	December	January	February	March	April	May	June	July	August	September	October
Fork-tailed swift (*Apus pacificus*)												
Latham's snipe (*Gallinago hardwickii*)												
oriental cuckoo (*Cuculus optatus*)												
rufous fantail (*Rhipidura rufifrons*)												
satin flycatcher (*Myiagra cyanoleuca*)												
white-throated needletail (*Hirundapus caudacutus*)												

= Optimum survey timing

Data Sources:

- Species Profile and Threats Database (DAWE 2020)
- The Field Guide to the Birds of Australia (Pizzey & Knight 2007)
- Handbook of Australian, New Zealand and Antarctic Birds (Higgins 1999)

Appendix C EPBC Approval Conditions

Australian Government
Department of Agriculture, Water and the Environment

VARIATION OF CONDITIONS ATTACHED TO APPROVAL
Kaban Green Power Hub, Kaban, Queensland (EPBC 2018/8289)

This decision to vary conditions of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Approved action

Person to whom the approval is granted	Kaban Wind Farm Pty Ltd as trustee for the Kaban Wind Farm Trust ACN: 637 687 622
Approved action	To construct and operate a wind farm with up to 29 turbines and associated infrastructure 80 km south-west of Cairns, in Kaban, far north Queensland; as described in the referral received by the Department on 17 October 2018 [See EPBC Act referral 2018/8289].

Variation

Variation of conditions attached to approval	The variation is: Delete conditions 5, 8, 9, 12, 13 and 15 and substitute with the conditions specified in the table below. Add condition 5A specified in the table below. Delete definitions of Commissioning/Commissioned, Fauna Management Plan, Incident, Impact trigger, Offset Area Management Plan, Project area and Vegetation Management Plan attached to the approval and substitute with the definitions specified in the table below. Add the definition of Commissioned specified in the table below. Delete Appendix A, Appendix B, Appendix C, Appendix D, Appendix E and Appendix F attached to the approval and substitute with the appendices specified in the table below.
Date of effect	This variation has effect on the date the instrument is signed

Person authorised to make decision

Name and position	Kim Farrant Assistant Secretary Environment Assessments (Vic, Tas) and Post Approvals Branch
Signature	
Date of decision	28 May 2021

Date of decision	Conditions attached to approval
Original dated 21/04/2020	**Maximum clearing limits** 1. To minimise impacts on **EPBC Act listed threatened species and communities**, the approval holder must not **clear** more than 129 hectares (ha) of habitat for **EPBC Act listed threatened species and communities** within the **project area**, including no more than: (a) 95.2 ha of **Prostanthera habitat**. (b) 3 ha of **Magnificent Brood Frog habitat**. (c) 61.2 ha of **Greater Glider habitat**. (d) 100 ha of **Northern Quoll habitat**, including no more than 5.6 ha of **Northern Quoll denning habitat**.
Original dated 21/04/2020	**EPBC Act listed threatened and migratory species management** 2. The approval holder must implement the **Vegetation Management Plan** and **Fauna Management Plan** for the duration of this approval.
Original dated 21/04/2020	3. The approval holder must report against each performance criterion specified in the **Vegetation Management Plan** and **Fauna Management Plan** and provide an evaluation of the effectiveness of the measures implemented to avoid and mitigate impacts of the action on **EPBC Act listed threatened species and communities** and **EPBC Act listed migratory species** in each annual **compliance report** required under condition 35.
Original dated 21/04/2020	4. To minimise **impacts** on *Prostanthera clotteniana*, the approval holder must undertake **pre-clearance surveys** of all potential **Prostanthera habitat**. The approval holder must prevent any direct or indirect impacts to any *Prostanthera clotteniana* individual.
As varied on the date this instrument was signed	*Turbine strike monitoring and management* 5. The approval holder must submit a Bird and Bat Adaptive Management Plan (BBAMP) for the **Minister's** approval prior to **commissioning**. The approval holder must not commence **operation** of the wind farm unless the **Minister** has approved the BBAMP in writing. The approval holder must implement the approved BBAMP throughout **operation**.
As varied on the date this instrument was signed	5A. The BBAMP must build on the **Bird and Bat Management Plan** to propose and justify methods and procedures which ensure that the action does not cause significant mortality by turbine strike on any **EPBC Act listed bird or bat species** within the life of the action by ensuring that the effects of wind turbines are managed, monitored and limited such that **impacts** to **EPBC Act listed bird and bat species** are reliably detected, quantified, reported and responded to**.**
Original dated 21/04/2020	6. To inform the **risk profile** of each turbine, the approval holder must undertake bird and bat utilisation surveys, including: (a) Prior to **commissioning**, the approval holder must undertake pre-commissioning bird and bat utilisation surveys over a period of at least

Date of decision	Conditions attached to approval
	24 months, including at least one survey undertaken at or adjacent to each proposed wind turbine location in each of at least one wet season and one dry season in succession. (b) Commencing within 3 months after **commissioning**, the approval holder must undertake post-commissioning bird and bat utilisation surveys over a period of at least 24 months, including at least one survey at or adjacent to each wind turbine in each of at least two wet seasons and two dry seasons in succession.
Original dated 21/04/2020	7. At least one survey in each 12 month period of bird and bat utilisation surveys required under condition 6 must be conducted within the **migratory period** of each **EPBC Act listed migratory species**.
As varied on the date this instrument was signed	8. The approval holder must report in each **compliance report** (required under condition 35) on the results of all bird and bat utilisation surveys required under condition 6 undertaken in the period that is the subject of that **compliance report**.
As varied on the date this instrument was signed	9. All bird and bat utilisation surveys must be undertaken by a **suitably qualified ecologist**.
Original dated 21/04/2020	10. Prior to **commissioning**, the approval holder must assign a **risk profile** to each turbine within the **project area** using the results of the pre-commissioning bird and bat utilisation surveys required under condition 6(a).
Original dated 21/04/2020	11. If, during bird and bat utilisation surveys required under condition 6 or during any other monitoring or incidental observation during **operation,** one or more individual of an **EPBC Act listed bird or bat species** is detected within the **vicinity** of a **low-risk turbine**, the approval holder must assign that turbine to be a **high-risk turbine** within five **business days** of the detection.
As varied on the date this instrument was signed	12. During **operation**, the approval holder must include a list of the current **risk profile** of each turbine within the **project area** in each **compliance report**.
As varied on the date this instrument was signed	13. During **operation**, the approval holder must undertake turbine strike monitoring in accordance with the Bird and Bat Adaptive Management Plan at monitoring sites identified in the Bird and Bat Adaptive Management Plan and at all **high-risk turbines** identified as required under conditions 10 and 11.
Original dated 21/04/2020	14. The approval holder must annually evaluate the effectiveness of the measures implemented to avoid and mitigate **impacts** of turbine collision on **EPBC Act listed bird and bat species** and report on that evaluation, and performance against the **impact triggers**, in each annual **compliance report** required under condition 35.
As varied on the date this instrument was signed	15. If an **impact trigger** is reached or exceeded, the approval holder must implement the relevant adaptive management procedure specified in the

Date of decision	Conditions attached to approval
	Bird and Bat Adaptive Management Plan. The approval holder must, on each occasion that an **impact trigger** is reached or exceeded, report on the steps taken and outcomes of implementing the adaptive management procedure, including details of the mitigation measures that have been or will be implemented and an assessment of their likely effectiveness in the first annual **compliance report** required under condition 35 following an **impact trigger** being reached or exceeded.
Original dated 21/04/2020	16. Within 20 **business days** of an **impact trigger** being reached or exceeded, if application of the adaptive management procedure required under condition 15 identifies, in respect of any wind turbine or number of wind turbines, that additional mitigation measures are required but no alternative mitigation measures can or will be implemented; and (a) If the additional mitigation measures are required in respect of the Ghost Bat or Spectacled Flying-fox, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an **impact trigger** between sunset and sunrise each day; and/or (b) If the additional mitigation measures are required in respect of any nocturnal **EPBC Act listed migratory species**, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an **impact trigger** between sunset and sunrise each day during the **migratory period** of any **EPBC Act listed migratory species** for which an **impact trigger** has been reached or exceeded; and/or (c) If the additional mitigation measures are required in respect of any diurnal **EPBC Act listed migratory species**, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an **impact trigger** between sunrise and sunset each day during the **migratory period** of any **EPBC Act listed migratory species** for which an **impact trigger** has been reached or exceeded; and/or (d) If the additional mitigation measures are required in respect of any cathemeral **EPBC Act listed migratory species** or any **EPBC Act listed migratory species** for which diel activity is unknown, the approval holder must cease to operate any wind turbine that contributed to reaching or exceeding an **impact trigger** the **migratory period** of any **EPBC Act listed migratory species** for which an **impact trigger** has been reached or exceeded.
Original dated 21/04/2020	17. Any request by the approval holder to cease or reduce the curtailment required under condition 16 must demonstrate how the ceasing or reducing of the curtailment will not result in any additional **impact** on **EPBC Act listed bird and bat species**.
Original dated 21/04/2020	**Environmental offsets** 18. To compensate for the **clearance** of **Magnificent Brood Frog habitat** and **Greater Glider habitat** as specified in condition 1(b)-(c), the approval

Date of decision	Conditions attached to approval
	holder must legally secure all environmental offsets proposed in the **Offset Area Management Plan** within 12 months of the **commencement of the action**. The **Offset Area Management Plan** must be attached to the legal mechanism used to **legally secure** the offset areas.
Original dated 21/04/2020	19. The approval holder must notify the Department within five **business days** of the legal security mechanism for each offset area being executed.
Original dated 21/04/2020	20. The legal mechanism used to **legally secure** the offset areas must remain in force for at least the duration of this approval.
Original dated 21/04/2020	21. To ensure that the offsets required under condition 18 provide a conservation gain in accordance with the **EPBC Act Environmental Offsets Policy**, the **completion criteria** must be achieved within 20 years of the **commencement of the action** and then be maintained or improved for the duration of the approval.
Original dated 21/04/2020	22. To ensure that the offsets required under condition 18 provide ongoing habitat for the Magnificent Brood Frog and Greater Glider, the key habitat features identified in the **Offset Area Management Plan** must be maintained or improved for the duration of the approval.
Original dated 21/04/2020	23. To ensure that the **completion criteria** will be achieved, performance against **performance targets** must be reported in each annual **compliance report** required under condition 35.
Original dated 21/04/2020	24. If a **performance target** is not met at the completion of each five year period, the approval holder must, on each occasion that a **performance target** is not met, report on the corrective action/s that will be implemented and an assessment of their likely effectiveness in the first annual **compliance report** required under condition 35 following a **performance target** not being met and all subsequent **compliance reports** required under condition 35 for the life of the approval.
Original dated 21/04/2020	25. If any of the **completion criteria** are not met within 20 years of the **commencement of the action**, the approval holder must, within 10 **business days** of the 20th anniversary of the **commencement of the action**, notify the **Department** of the **completion criteria** that have not been met. Within 6 months of the 20th anniversary of the **commencement of the action**, if the approval holder has not met all of the **completion criteria**, the approval holder must submit a supplementary Offset Area Management Plan that details the additional and/or revised management measures that will be implemented and/or alternative offset or offsets that will be provided to compensate for the failed offset and submit it to the **Department** to be approved in writing by the **Minister**. If approved in writing by the **Minister**, the approval holder must implement the approved supplementary Offset Area Management Plan.
Original dated 21/04/2020	26. At least 12 months and no more than 24 months following **commissioning**, the approval holder must submit a Residual Impacts Report which details

Date of decision	Conditions attached to approval
	the actual residual **impact** of the action on **Magnificent Brood Frog habitat** and **Greater Glider habitat** to the Department. The Residual Impacts Report must be informed by a scientifically robust program of monitoring that has been endorsed by an **independent suitably qualified amphibian expert** and conducted by a **suitably qualified ecologist**. The Residual Impacts Report must be prepared by an **independent suitably qualified ecologist**.
Original dated 21/04/2020	27. If the actual residual **impact** of the action on **Magnificent Brood Frog habitat** or **Greater Glider habitat** is greater than the **impact** of the action on **Magnificent Brood Frog habitat** or **Greater Glider habitat** already offset, the approval holder must provide an environmental offset to compensate for the additional residual **impact** consistent with the **EPBC Act Environmental Offsets Policy**. The approval holder must, within 60 **business days** of submitting the Residual Impacts Report required under condition 26, submit a supplementary Offset Area Management Plan to the **Department** to be approved in writing by the **Minister**. If approved in writing by the **Minister**, the approval holder must implement the approved supplementary Offset Area Management Plan.
Original dated 21/04/2020	28. The supplementary Offset Area Management Plan, whether submitted under the requirements of condition 23 or condition 25, must include: (a) Details to demonstrate how the offset compensates for the residual **impact** on **Magnificent Brood Frog habitat** and **Greater Glider habitat** in accordance with the principles of the **EPBC Act Environmental Offsets Policy**; (b) A description of the offset, including location, size, condition, environmental values present and surrounding land uses; (c) Baseline data and other supporting evidence that documents the presence of each **listed threatened species** and the quality of each **listed threatened species** habitat within the offset area; (d) An assessment of **site habitat quality** using a method agreed to in writing by the **Department**; (e) Details of how the offset area will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for each **listed threatened species**; (f) Maps and **shapefiles** to clearly define the location and boundaries of the offset area, accompanied by **offset attributes**; (g) Specific offset completion criteria derived from the **site habitat quality** to demonstrate the improvement in the quality of each **listed threatened species** habitat in the offset area over the duration of this approval; (h) Details of the management actions, and timeframes for implementation, to be carried out to meet the offset completion

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	criteria; (i) Interim performance targets that set targets at appropriate intervals for progress towards achieving the offset completion criteria; (j) Details of the nature, timing and frequency of monitoring to inform progress against achieving the interim performance targets (the frequency of monitoring must be sufficient to track progress towards each set of interim performance targets, and sufficient to determine whether the offset area is likely to achieve those interim performance targets in adequate time to implement all necessary corrective actions); (k) Proposed timing for the submission of monitoring reports which provide evidence demonstrating whether the interim performance targets have been achieved; (l) Timing for the implementation of corrective actions if monitoring activities indicate the interim performance targets will not or have not been achieved; (m) Evidence of how the management actions and corrective actions take into account relevant **approved conservation advices** and are consistent with relevant **recovery plans** and **threat abatement plans**; and (n) Details of the legal mechanism for **legally securing** the offset area, such that legal security remains in force over the offset area for at least the duration of this approval.
Original dated 21/04/2020	**Notification of date of commencement of the action** 29. The approval holder must notify the **Department** in writing of the date of **commencement of the action** and the date of **commissioning** within 10 **business days** after the date of **commencement of the action**. The approval holder must notify the **Department** in writing of the date of **commissioning** within 10 **business days** after the date of **commissioning**.
Original dated 21/04/2020	30. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.
Original dated 21/04/2020	***Compliance records*** 31. The approval holder must maintain accurate and complete **compliance records**.
Original dated 21/04/2020	32. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request. Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the

Date of decision	Conditions attached to approval
	conditions. Summaries of the result of an audit may be published on the **Department**'s website or through the general media.
Original dated 21/04/2020	**Preparation and publication of plans** 33. The approval holder must: (a) submit **plans** electronically to the **Department**; (b) publish each **plan** on the website within 20 **business days** of the date of this approval, unless otherwise agreed to in writing by the **Minister** or, if a **plan** requires the approval of the **Minister**, within 20 **business days** of the date of the **Minister** approving the **plan**; (c) exclude or redact **sensitive ecological data** from **plans** published on the website or provided to a member of the public; and (d) keep **plans** published on the **website** until the end date of this approval.
Original dated 21/04/2020	34. The approval holder must ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under a **plan** and 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** and conditions.
Original dated 21/04/2020	**Annual compliance reporting** 35. The approval holder must prepare a **compliance report** for each 12-month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must: (a) publish each **compliance report** on the **website** within 60 **business days** following the relevant 12-month period; (b) notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within five **business days** of the date of publication; (c) keep all **compliance reports** publicly available on the **website** until this approval expires; (d) exclude or redact **sensitive ecological data** from **compliance reports** published on the website; and (e) where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within five **business days** of publication. **Note**: **Compliance reports** may be published on the **Department**'s website.

Date of decision	Conditions attached to approval
Original dated 21/04/2020	**Reporting non-compliance** 36. The approval holder must notify the **Department** in writing of any: **incident;** non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than two **business days** after becoming aware of the **incident** or non-compliance. The notification must specify: (a) any condition which is or may be in breach; (b) a short description of the **incident** and/or non-compliance; and (c) the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.
Original dated 21/04/2020	37. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying: (a) any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; (b) the potential impacts of the **incident** or non-compliance; and (c) the method and timing of any remedial action that will be undertaken by the approval holder.
Original dated 21/04/2020	**Independent audit** 38. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted as requested in writing by the Minister.
Original dated 21/04/2020	39. For each **independent audit**, the approval holder must: (a) provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**; (b) only commence the **independent audit** once the audit criteria have been approved in writing by the **Department**; and (c) submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.
Original dated 21/04/2020	40. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.
Original dated 21/04/2020	**Completion of the action** 41. Within 30 days after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Date of decision	Definitions attached to approval
Original dated 21/04/2020	**Approved conservation advices** means a conservation advice approved by the **Minister** under section 266B(2) of the **EPBC Act**.
Original dated 21/04/2020	**Bird and Bat Management Plan** means the *Kaban Green Power Hub – Bird and Bat Management Plan* dated 10 February 2020, or a subsequent version currently approved by the **Minister** in writing.
Original dated 21/04/2020	**Business day** means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.
Original dated 21/04/2020	**Clear/cleared/clearing** means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds – see the Australian weeds strategy 2017 to 2027 for further guidance).
Variation dated 25/08/2020	**Commencement of the action/commence the action** means the first instance of any specified activity associated with the action including **clearing** and **construction**. **Commencement of the action/commence the action** does not include minor physical disturbance necessary to: (a) undertake pre-clearance surveys or monitoring programs; (b) install signage and/or temporary fencing to prevent unapproved use of the project site (as defined in the **preliminary documentation**); and (c) protect environmental and property assets from fire, weeds and pests, including maintenance or use of existing surface access tracks; and (d) undertake Unexploded Ordinance (UXO) remediation works, Geotechnical Investigations, and Topographical surveys so long as these are undertaken in accordance with the limitations specified in Appendix F.
As varied on the date this instrument was signed	**Commission/ing** means the first date on which a complete wind turbine is installed.
As varied on the date this instrument was signed	**Commissioned** means all activities, including turning of turbines, after the components of the first complete wind turbine are installed.
Original dated 21/04/2020	**Completion criteria** means the performance criteria as stated in the **Offset Area Management Plan**.
Original dated 21/04/2020	**Completion of the action** means the time at which all approved conditions have been fully met.
Original dated 21/04/2020	**Completion data** means an environmental report and spatial data information clearly detailing how the conditions of this approval have been met. The **Department's** preferred spatial data format is **shapefile**. This includes, but is not limited to the: (a) area of each **listed threatened species and community** habitat **cleared**; and (b) quality of each **listed threatened species and community** habitat in the offset area at the end date of this approval.
Original dated 21/04/2020	**Compliance records** means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in

Date of decision	Definitions attached to approval
	the approval holder's possession or that are within the approval holder's power to obtain lawfully.
Original dated 21/04/2020	**Compliance reports** means written reports: (a) providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and **plans**; (b) consistent with the **Department's** *Annual Compliance Report Guidelines* (2014) (or subsequent revision); (c) include a **shapefile** of any **impact** on any habitat for **listed threatened species** undertaken within the relevant 12-month period; and (d) identifying the version/s of the **plans** prepared and in existence in relation to the conditions of this approval during the relevant 12-month period.
Original dated 21/04/2020	**Construction** means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground; the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of temporary fences and signage.
Original dated 21/04/2020	**Department** means the Australian Government agency responsible for administering the **EPBC Act**.
Original dated 21/04/2020	**EPBC Act** means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
Original dated 21/04/2020	**EPBC Act Environmental Offsets Policy** means the **EPBC Act** *Environmental Offsets Policy* (2012), or subsequent revision, including the **Offset Assessment Guide**.
Original dated 21/04/2020	**EPBC Act listed migratory species** means the migratory fauna species listed under the **EPBC Act** for which this approval has effect, including: (a) White-throated Needletail (*Hirundapus caudacutus*); (b) Fork-tailed Swift (*Apus pacificus*); (c) Oriental Cuckoo (*Cuculus optatus*); (d) Latham's Snipe (*Gallinago hardwickii*); (e) Black-faced Monarch (*Monarcha melanopsis*); (f) Satin Flycatcher (*Myiagra cyanoleuca*); (g) Rufous Fantail (*Rhipidura rufifrons*).
Original dated 21/04/2020	**EPBC Act listed bird or bat species** means the **EPBC Act listed threatened species** and **EPBC Act listed migratory species** for which this approval has effect that are bird or bat species.

Date of decision	Definitions attached to approval
Original dated 21/04/2020	**EPBC Act listed threatened species** means the threatened flora and fauna species listed under the **EPBC Act** for which this approval has effect, including: (a) *Prostanthera clotteniana* (Prostanthera); (b) Magnificent Brood Frog (*Pseudophryne covacevichae*); (c) Greater Glider (*Petauroides volans*); (d) Northern Quoll (*Dasyurus hallucatus*); (e) Spectacled Flying-fox (*Pteropus conspicillatus*); (f) Ghost bat (*Macroderma gigas*).
As varied on the date this instrument was signed	**Fauna Management Plan** means the *Kaban Green Power Hub – Fauna Management Plan Rev 8* dated 10 May 2021, or a subsequent version currently approved by the **Minister** in writing.
Original dated 21/04/2020	**Greater Glider habitat** means all areas of eucalypt forests or woodlands that contain hollow-bearing trees, designated 'Great glider, red goshawk and black footed tree-rat' in Appendix D.
Original dated 21/04/2020	**High-risk turbine** means any turbine that any **EPBC listed threatened species** or **EPBC listed migratory species** that are bird or bat species have been detected within 350 metres radius of the turbine.
Original dated 21/04/2020	**Impact/s/ed** (verb) means to cause any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action. **Impact** (noun) means any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.
As varied on the date this instrument was signed	**Impact trigger** means the identification, within 180 m of any wind turbine of: (a) any **EPBC Act listed threatened bat species** (or recognisable part thereof); or (b) accounting for scavenger rate and searcher efficiency, half of the nationally significant proportion of a population of any **EPBC Act listed migratory species**, as listed in the **Department's** *Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act September 2015*, or a subsequently revised population estimate currently recognised by the **Department**.
As varied on the date this instrument was signed	**Incident** means any event which has the potential to, or does, **impact** on any **protected matter** except as authorised by this approval.
Original dated 21/04/2020	**Independent** means a person(s) that does not have an individual or by employment or family affiliation, any conflicting or competing interests with the approval holder; the approval holder's staff, representatives or associated persons; or the project, including any personal, financial, business or employment relationship, other than receiving payment for undertaking the role for which the condition requires an independent person.
Original dated 21/04/2020	**Independent audit/s** means an audit conducted by an **independent** and **suitably qualified person** as detailed in the ***EPBC Act*** *Independent Audit and Audit Report Guidelines* (2015), or subsequent revision.
Original dated 21/04/2020	**Legally secure/ing** means to secure a legal agreement under relevant Queensland legislation, in relation to a site, to provide enduring protection for the site against development incompatible with conservation.

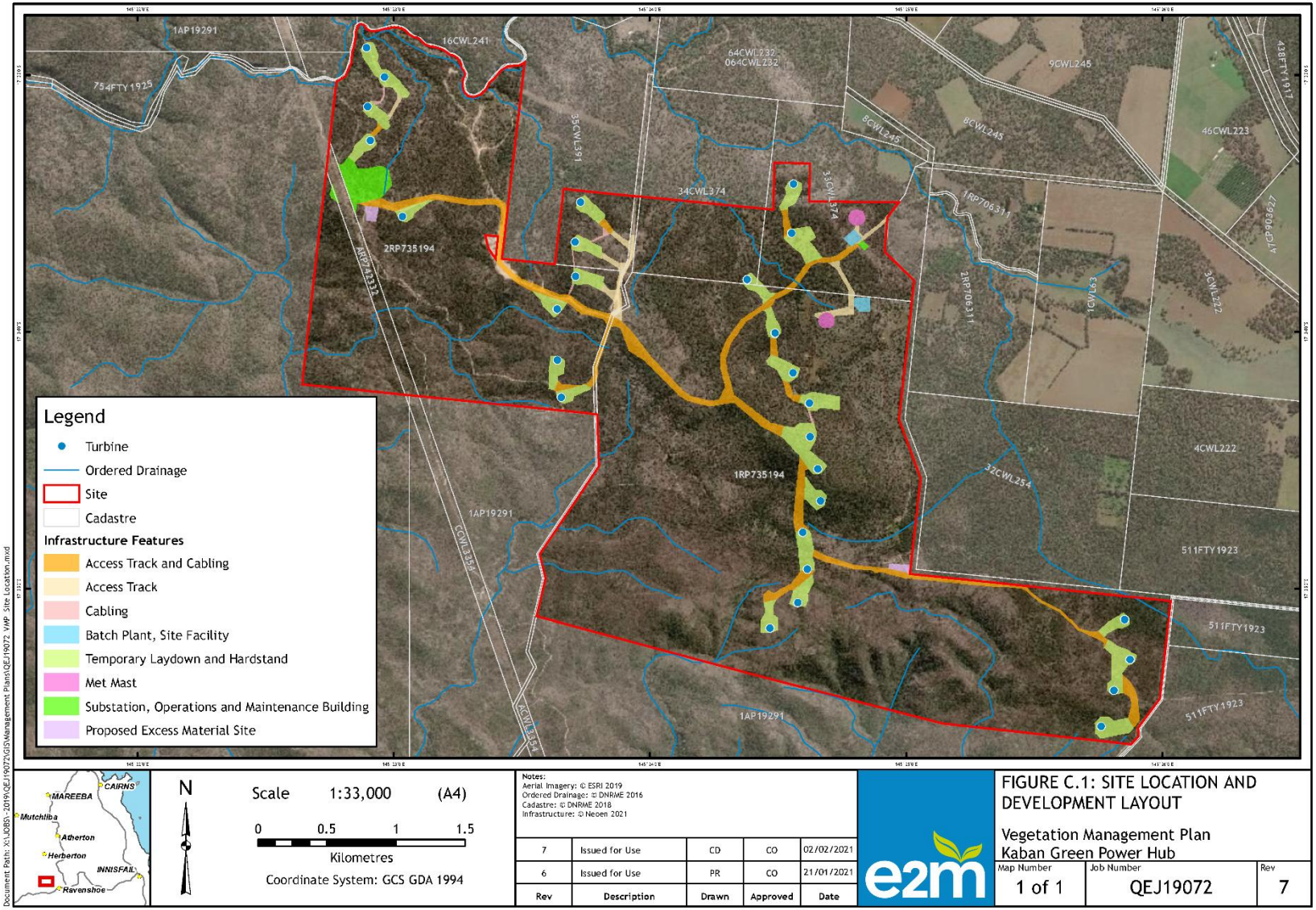
Date of decision	Definitions attached to approval
Original dated 21/04/2020	**Low-risk turbine** A turbine is considered to be a **low-risk turbine** if **EPBC listed bird or bat species** are not detected within 350 metres radius of the turbine for a minimum of two years.
Original dated 21/04/2020	**Magnificent Brood Frog habitat** means all areas of seeps and drainage channels in eucalypt forests or woodlands with an understorey containing *Themeda triandra*, designated 'Magnificent Brood Frog low suitable habitat' and 'Magnificent Brood Frog high suitable habitat' in Appendix C.
Original dated 21/04/2020	**Migratory period** means the period of time during which each **EPBC Act listed migratory species** is likely to be found in north-eastern Australia, in accordance with the movement patterns for each **EPBC Act listed migratory species** as described in the **Department's** Species Profile and Threats database or another source endorsed by the **Department**.
Original dated 21/04/2020	**Minister** means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.
Original dated 21/04/2020	**Monitoring data** means the data required to be recorded under the conditions of this approval.
Original dated 21/04/2020	**Northern Quoll denning habitat** means all areas of rocky outcrops and escarpments, designated 'Northern quoll habitat – Den' in Appendix E.
Original dated 21/04/2020	**Northern Quoll habitat** means all areas of eucalypt forests or woodlands, designated 'Northern quoll habitat – Den' and 'Northern quoll habitat – Foraging' in Appendix E.
As varied on the date this instrument was signed	**Offset Area Management Plan** means the *Kaban Green Power Hub – Offset Area Management Plan Rev 5* dated 10 May 2021, or a subsequent version currently approved by the **Minister** in writing.
Original dated 21/04/2020	**Offset Assessment Guide** means the guidance document titled *How to use the Offsets assessment guide*, which includes the requirements for **habitat quality scores**, provided by the **Department** to assist users of the **EPBC Act Environmental Offsets Policy**.
Original dated 21/04/2020	**Operation** means all activities from the date of **commissioning**.
Original dated 21/04/2020	**Performance targets** means the five-yearly habitat quality completion criteria as stated in the **Offset Area Management Plan**.
Original dated 21/04/2020	**Plan/s** means any of the documents required to be submitted to the **Department**, implemented by the approval holder and/or published on its **website** in accordance with these conditions.
Original dated 21/04/2020	**Preliminary documentation** means the *Kaban Green Power Hub EPBC 2018/8289 - Preliminary Documentation,* dated 10 December 2019, provided to the **Department** on 11 December 2019.
As varied on the date this instrument was signed	**Project area** means the area where the **construction** and **operation** of the action will be undertaken, shown marked within the red outline and labelled as 'Site' in Appendix A.
Original dated 21/04/2020	**Prostanthera habitat** means all areas of eucalypt forests or woodlands on granite or shallow clay rhyolite-derived soils, designated '*Prostanthera clotteniana* habitat' in Appendix B.
Original dated 21/04/2020	**Protected matter/s** means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.
Original dated 21/04/2020	**Recovery plan** means a recovery plan made or adopted by the **Minister** under the **EPBC Act**.
Original dated 21/04/2020	**Sensitive ecological data** means data as defined in the Australian Government Department of the Environment *Sensitive Ecological Data – Access and Management Policy V1.0* (2016), or subsequent revision.

Date of decision	Definitions attached to approval
Original dated 21/04/2020	**Shapefile** means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx', '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes.
Original dated 21/04/2020	**Suitably qualified amphibian expert** means a person with at least a postgraduate degree (or equivalent) in a suitable area (such as herpetology) and a minimum of 10 years relevant experience in amphibian monitoring, including at least one year of experience in Australia.
Original dated 21/04/2020	**Suitably qualified ecologist** means a person who has professional qualifications and at least three years of work experience designing and implementing surveys for the **listed threatened species** and their habitat, and can give an authoritative assessment and advice on the presence and habitat requirements of the **listed threatened species** using relevant protocols, standards, methods and/or literature.
Original dated 21/04/2020	**Suitably qualified person** means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.
Original dated 21/04/2020	**Threat abatement plans** means a threat abatement plan made or adopted by the **Minister** under the **EPBC Act**.
Original dated 21/04/2020	**Risk profile** means the risk of an individual wind turbine having an impact on an **EPBC listed bird and bat species**. A turbine is considered to be a **high-risk turbine** if **EPBC listed threatened species** or **EPBC listed migratory species** that are bird or bat species are detected within 350 metres radius of the turbine. A turbine is considered to be a **low-risk turbine** if **EPBC listed bird or bat species** are not detected within 350 metres radius of the turbine for a minimum of two years. A **high-risk turbine** may be downgraded to a **low-risk turbine** if no **EPBC listed threatened species** or **EPBC listed migratory species** that are bird or bat species are detected within the **vicinity** of the turbine for a minimum of two years.
As varied on the date this instrument was signed	**Vegetation Management Plan** means the *Kaban Green Power Hub – Vegetation Management Plan Rev 8* dated 10 May 2021, or the subsequent approved version.
Original dated 21/04/2020	**Vicinity** means within 350 metres radius of the turbine.
Original dated 21/04/2020	**Website** means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Australian Government
Department of Agriculture, Water and the Environment

As varied on the date this instrument was signed

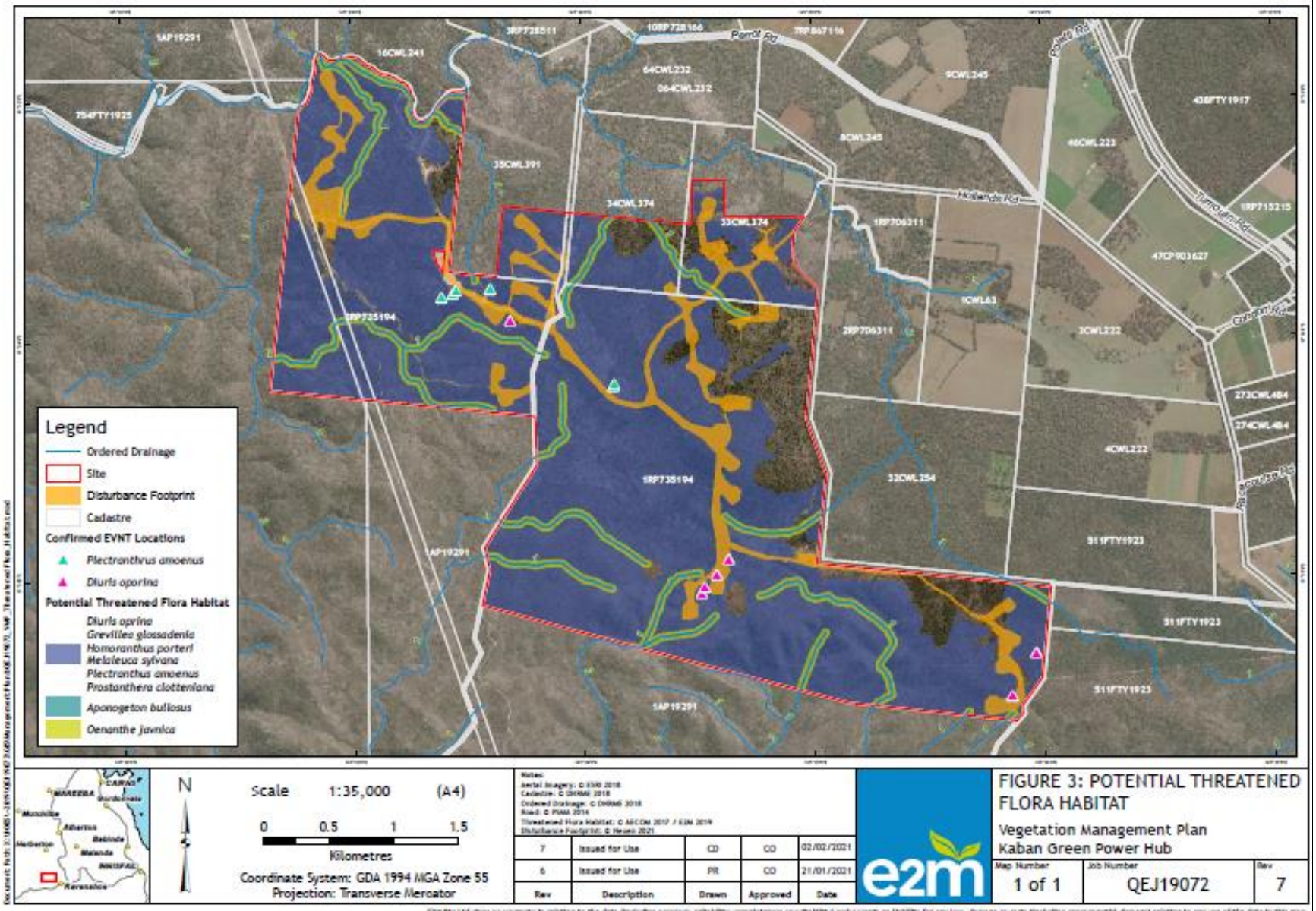
Appendix A: Project area



E2M Pty Ltd gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability for any loss, damage or costs (including consequential damage) relating to any use of the data in this map.

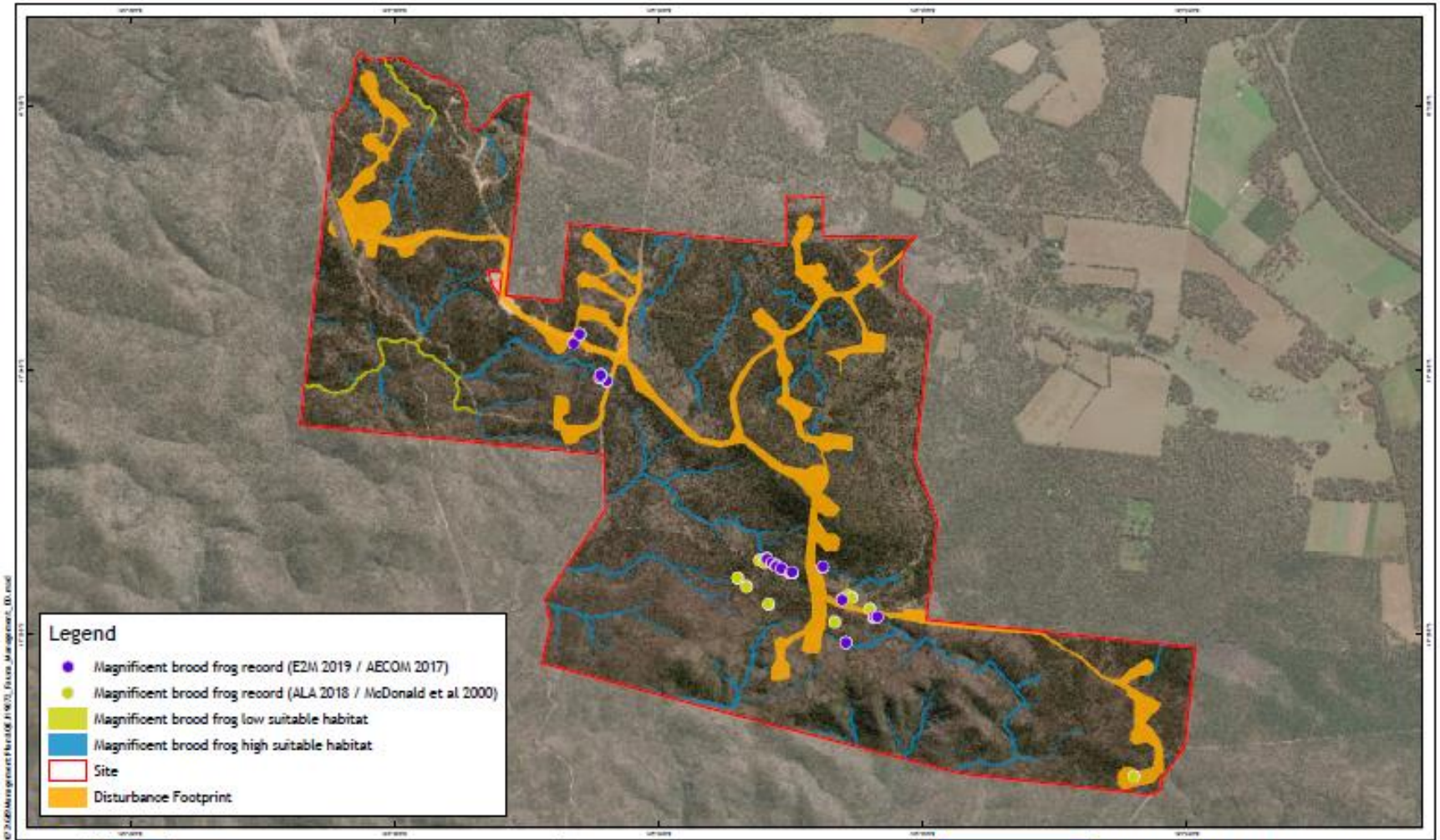
As varied on the date this instrument was signed

Appendix B: Prostanthera habitat



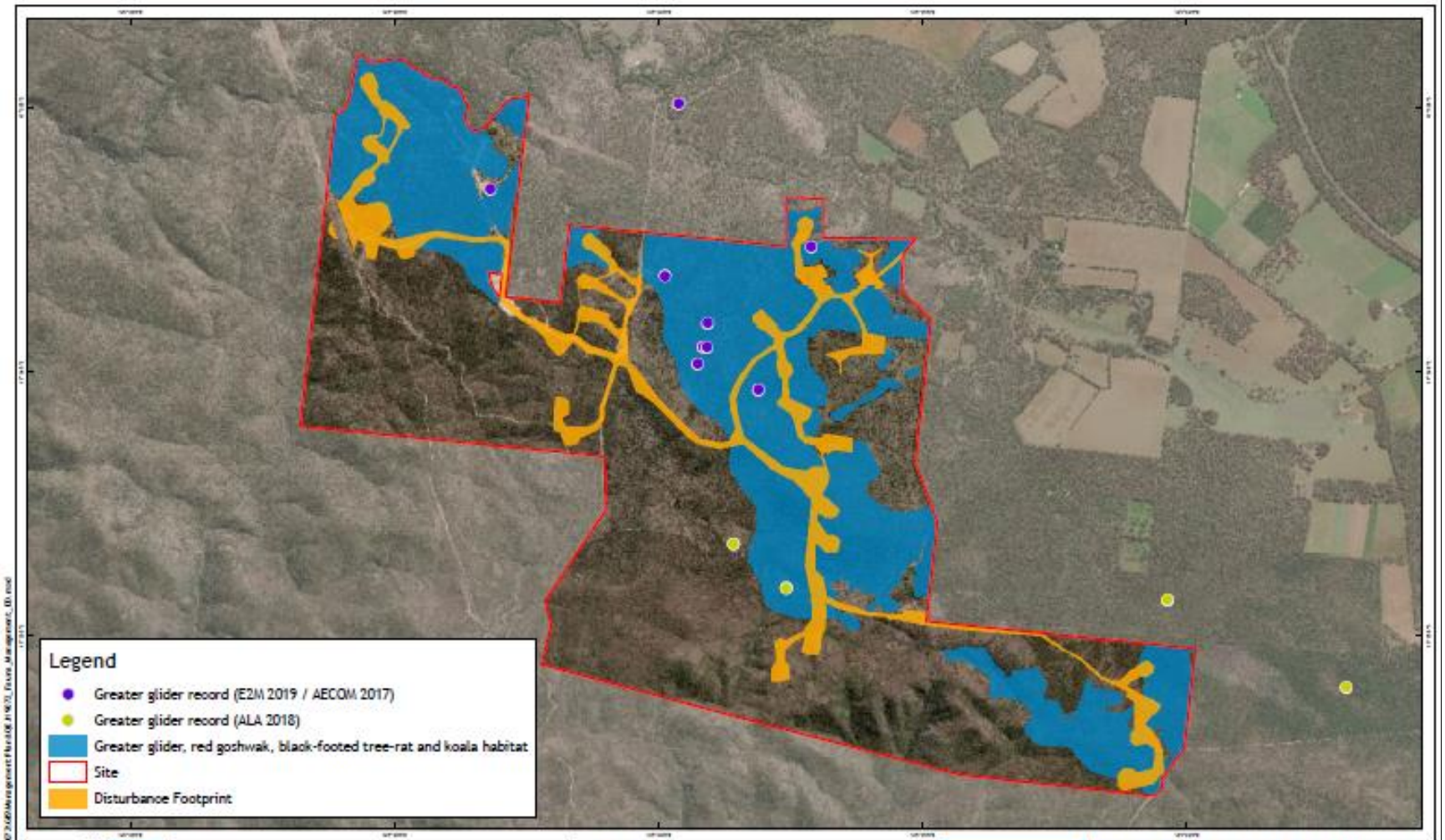
As varied on the date this instrument was signed

Appendix C: Magnificent Brood Frog habitat



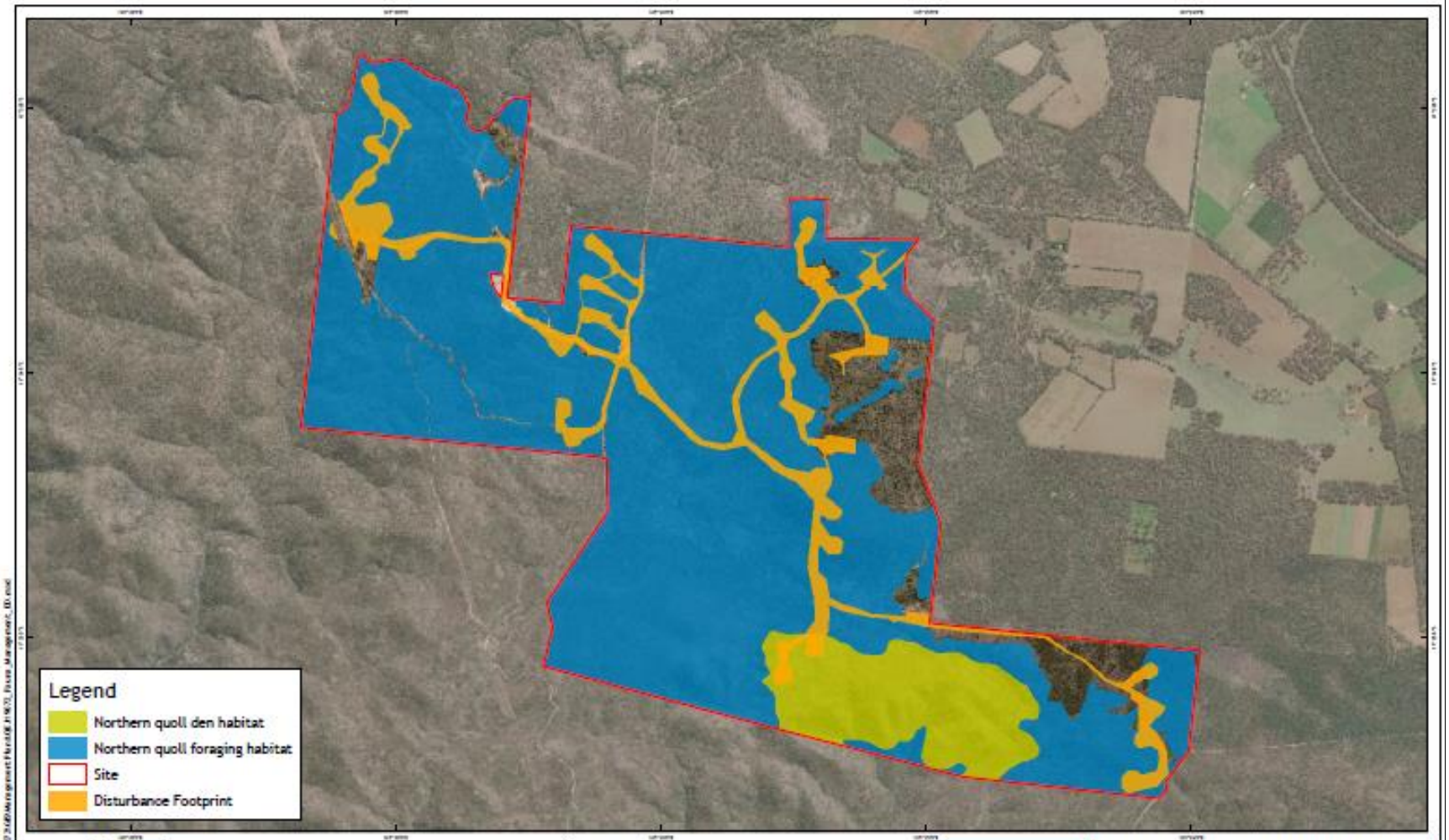
As varied on the date this instrument was signed

Appendix D: Greater Glider habitat



As varied on the date this instrument was signed

Appendix E: Northern Quoll habitat and Northern Quoll denning habitat



As varied on the date this instrument was signed

Appendix F: Early Works Description

Early Works activities will be limited as follows:

a) Unexploded Ordinance (UXO) remediation works

Ground based UXO survey carried out on only foot with a handheld UXO scanner. Slashing of ground stratum vegetation only in dense areas and if taller than waist height. No woody vegetation will be cleared. Areas of vegetation that are too dense to walk through will be GPS marked and revisited when vegetation removal is permitted.

Ground based UXO surveys will commence at the high risk UXO zone (substation area) and work outwards to the lower risk areas.

No vegetation clearing or disturbance to ground will occur within 50 m of mapped Magnificent Brood Frog habitat, herein referred to as the 'Early Works Exclusion Zone' (EWEZ, shown in Figures 1, 1a and 1b).

The presence, location and means of recognising the boundary of the EWEZ will be communicated to all workers prior to undertaking clearing or ground disturbance.

If vegetation clearing or disturbance works are to occur within 20 m of the EWEZ, the boundary of the EWEZ in that vicinity will be demarcated by temporary fencing.

If and when the handheld UXO scanner gives a strong signal but the source is beyond the limits of hand digging, then a small excavator will be brought to the site and an excavation will be undertaken cautiously limiting the area of the hole to approximately 1 m x 1 m.

Should UXO be discovered, the Army will be called to site. At the discretion of the Army the UXO is likely to detonated.

Ground based UXO survey carried out on only foot with a handheld UXO scanner will also check all locations where geotechnical investigation ground intrusive works are proposed.

b) Geotechnical Investigations

No vegetation clearing or disturbance to ground will occur within EWEZ.

Previously disturbed areas will be prioritised for investigations, focusing on locations that are accessible with minimal understorey vegetation impact. No canopy vegetation will be cleared.

No vegetation will be cleared for vehicular access as existing tracks will be utilised to access turbines WTG1, WTG2, WTG03, WTG7, WTG9, WTG10, WTG11, WTG12, WTG13, WTG15, WTG16, WTG18, WTG19, WTG20, WTG21, WTG24, WTG25, WTG28, WTG29 and the Substation area (Figure 1, 1a and 1b)

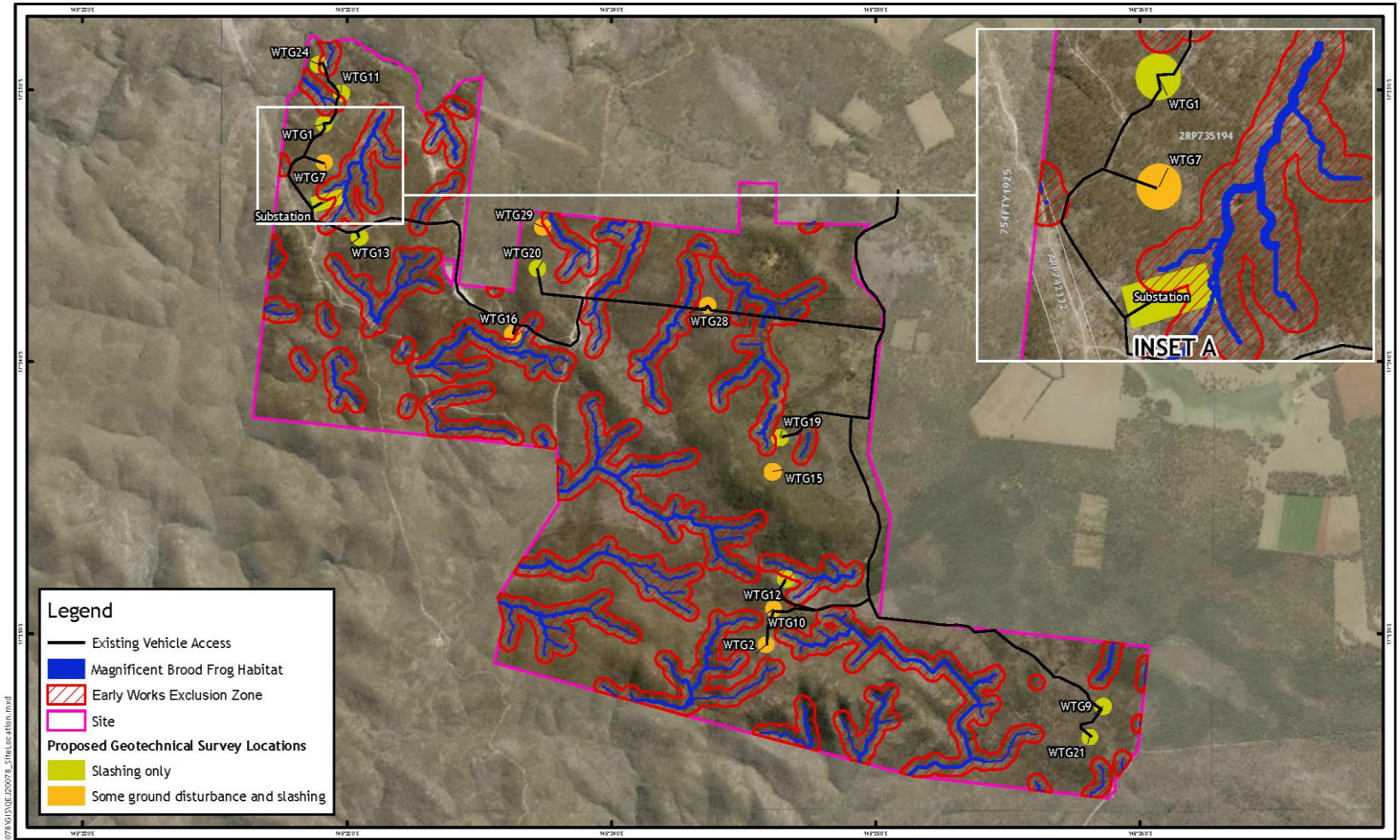
Ground disturbance/penetration caused by borehole drill rig (approximately 100mm diameter) and excavator test pits (approximately 1 m x 2 m for all turbine locations other than WTG 10 and WTG 12 which require 1 m x 22 m).

All wall holes and test pits associated with Geotechnical investigations will be back filled promptly and in any case prior to the first heavy rains.

	c) Topographical survey No vegetation clearing or disturbance to ground within the EWEZ. Ground based survey carried out on foot with a handheld scanner. Does not require any vegetation removal. **Additional mitigation and management measures** • No disturbance to ground or vegetation **clearing** within the early works exclusion zone (EWEZ); • No woody vegetation will be removed as part of UXO remediation works (i.e. clearing will be limited to slashing); • No vegetation will be cleared for construction of vehicle access; • All wall holes associated with Geotechnical investigations will be back filled; • No canopy vegetation will be removed as part of Geotechnical Investigation; • Potential impacts of the introduction/spread of chytrid fungus on potentially occurring MNES, specifically Magnificent Brood Frog, within the study area will be mitigated through implementing all requirements of state and federal disease control protocols throughout all phases of the project. These include: i. Hygiene protocols for the control of diseases in Australian frogs in accordance with Murray et al. 2011; and ii. Technical Manual: Interim hygiene protocol for handling amphibians (Department of Environment and Heritage Protection 2016). • Early works will be undertaken and completed prior to the first substantial rainfall event [100 mm over a five-day period] within the Magnificent Brood Frog breeding/calling period [December to May]; • Disturbance associated with Early Works will be restricted to areas of the approved EPBC Act disturbance footprint (Figure 1, 1A and 1B below); and The EWEZ will be demarcated where Early Works are to occur within 20 m of EWEZ.

Australian Government

Department of Agriculture, Water and the Environment



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Kilometres

Coordinate System: GCS GDA 1994

Notes:
Aerial Imagery: © DNRME 2020
Cadastre: © DNRME 2018
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FIGURE 1: EARLY WORKS EXCLUSION ZONE

Kaban Early Works Advice Letter
Kaban Green Power Hub

Map Number	Job Number	Rev
1 of 1	QEJ20078	A

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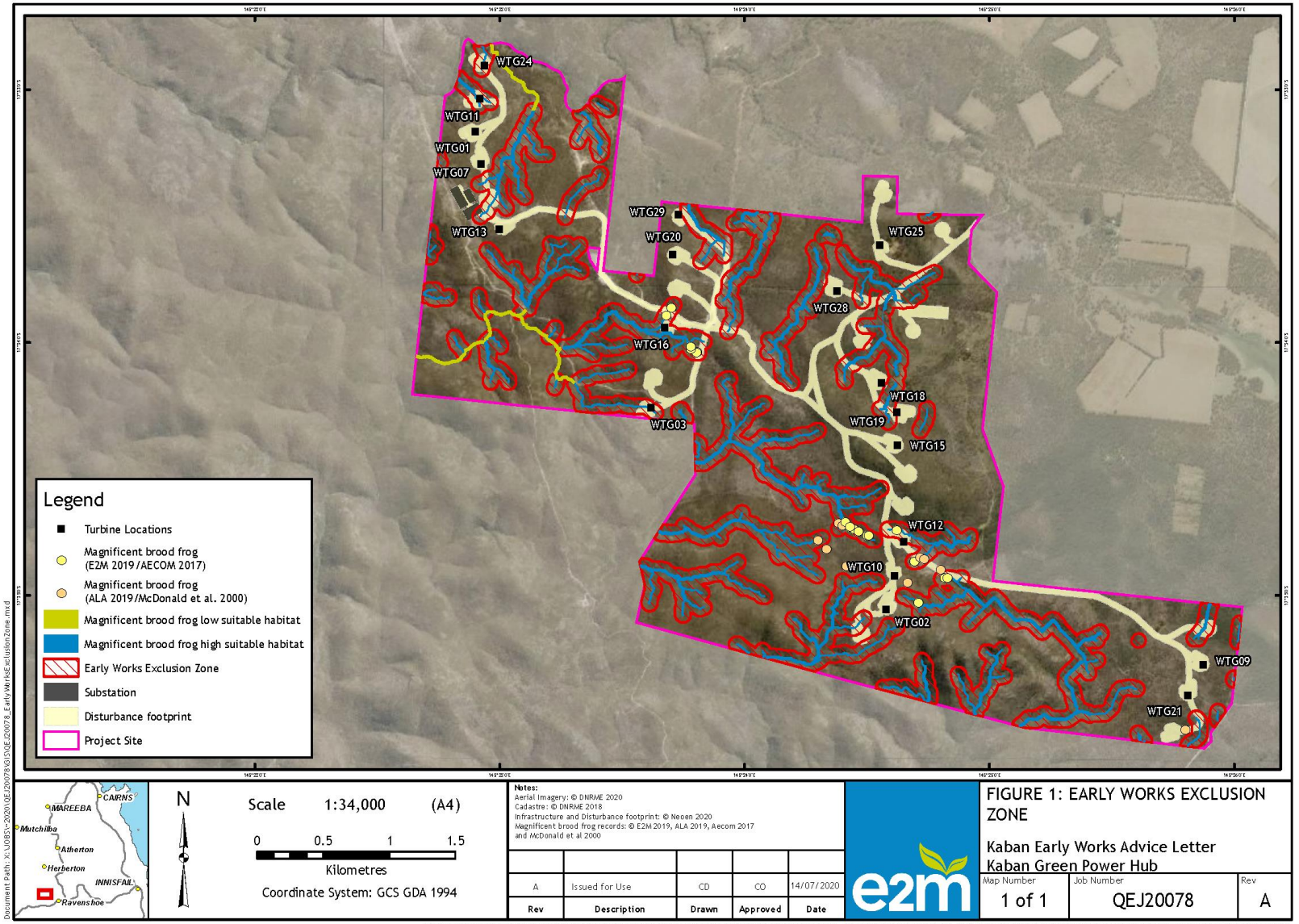
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WTG11
WTG01
WTG07
WTG13
WTG29
WTG20
WTG25
WTG28
WTG16
WTG18
WTG19
WTG03
WTG15
WTG12
WTG10
WTG02
WTG09
WTG21
Legend
Turbine Locations
Magnificent brood frog (E2M 2019/AECOM 2017)
Magnificent brood frog (ALA 2019/McDonald et al. 2000)
Magnificent brood frog low suitable habitat
Magnificent brood frog high suitable habitat
Early Works Exclusion Zone
Substation
Disturbance footprint
Project Site
CAIRNS
MAREEBA
Mutchilba
Atherton
Herberton
INNISFAIL
Ravenshoe
N
Scale 1:34,000 (A4)
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Kilometres
Coordinate System: GCS GDA 1994
Notes:
Aerial Imagery: © DNRME 2020
Cadastre: © DNRME 2018
Infrastructure and Disturbance footprint: © Neoen 2020
Magnificent brood frog records: © E2M 2019, ALA 2019, Aecom 2017 and McDonald et al 2000
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FIGURE 1: EARLY WORKS EXCLUSION ZONE
Kaban Early Works Advice Letter
Kaban Green Power Hub
Map Number 1 of 1
Job Number QEJ20078
Rev A
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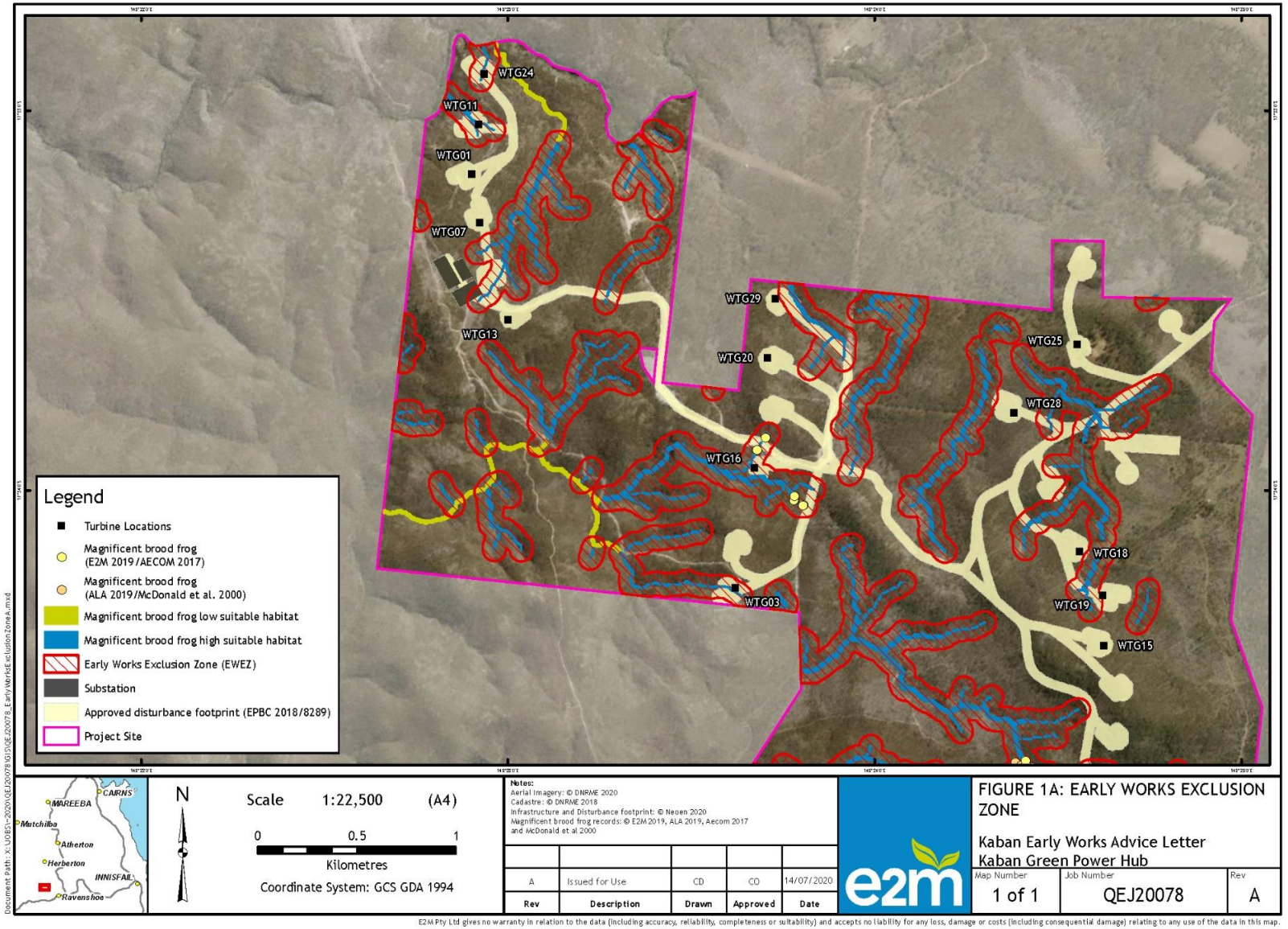
WTG24
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WTG07
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WTG28
WTG16
WTG18
WTG19
WTG15
WTG03
Legend
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Magnificent brood frog (ALA 2019/McDonald et al. 2000)
Magnificent brood frog low suitable habitat
Magnificent brood frog high suitable habitat
Early Works Exclusion Zone (EWEZ)
Substation
Approved disturbance footprint (EPBC 2018/8289)
Project Site
CAIRNS
MAREEBA
Mutchilba
Atherton
Herberton
INNISFAIL
Ravenshoe
N
Scale 1:22,500 (A4)
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Kilometres
Coordinate System: GCS GDA 1994
Notes:
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Infrastructure and Disturbance footprint: © Neoen 2020
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FIGURE 1A: EARLY WORKS EXCLUSION ZONE
Kaban Early Works Advice Letter
Kaban Green Power Hub
Map Number 1 of 1
Job Number QEJ20078
Rev A
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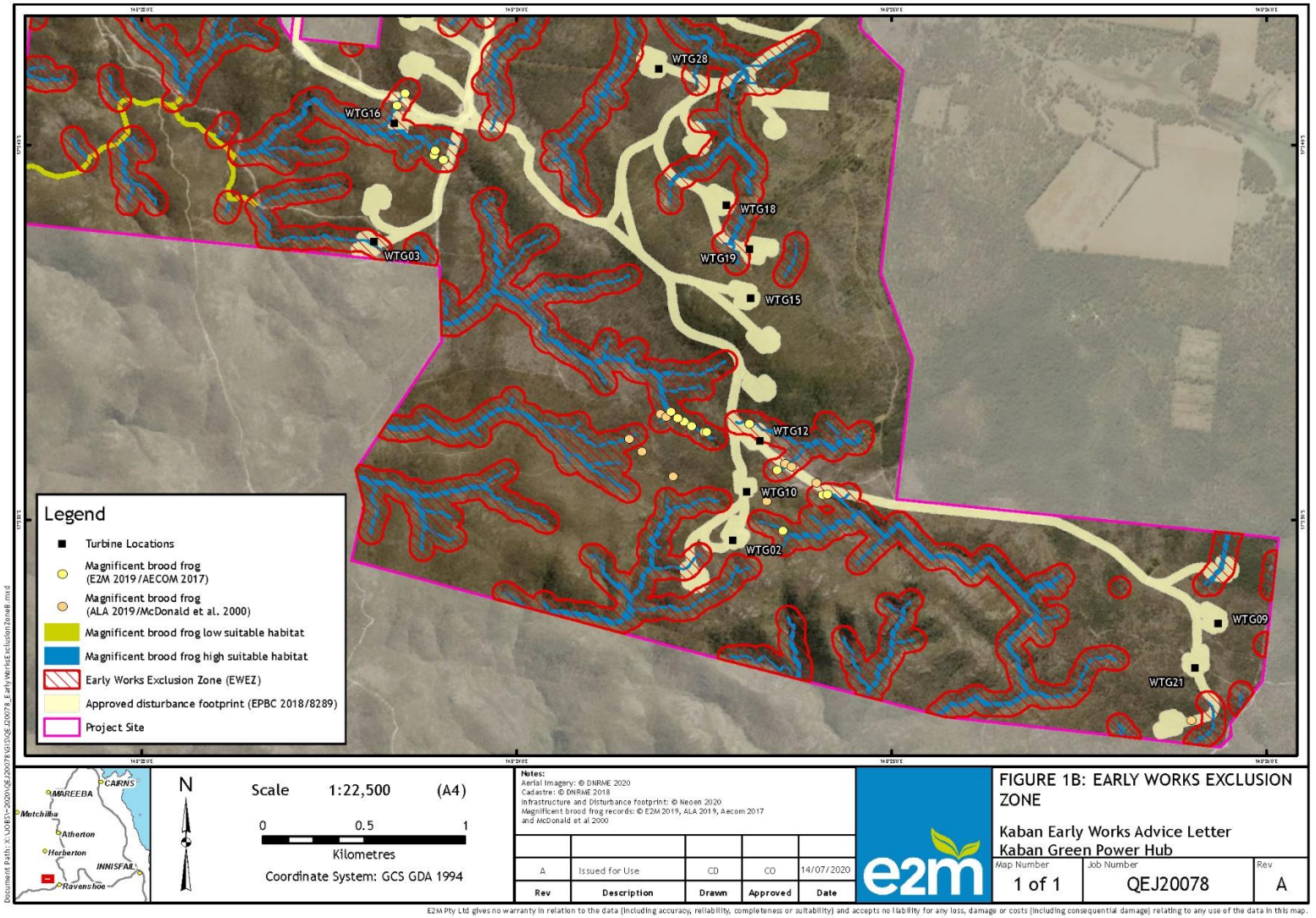
WTG28
WTG16
WTG18
WTG03
WTG19
WTG15
WTG12
WTG10
WTG02
WTG09
WTG21
Legend
Turbine Locations
Magnificent brood frog (E2M 2019/AECOM 2017)
Magnificent brood frog (ALA 2019/McDonald et al. 2000)
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Scale 1:22,500 (A4)
0 0.5 1
Kilometres
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FIGURE 1B: EARLY WORKS EXCLUSION ZONE
Kaban Early Works Advice Letter
Kaban Green Power Hub
Map Number 1 of 1
Job Number QEJ20078
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