

Beerburrum to Nambour Rail Upgrade (B2N) Stage 1

Grey-headed Flying-fox Management Plan

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Approval Holder: Department of Transport and Main Roads (39 407 690 291)

Approved Action: To upgrade the North Coast Line between Beerburrum and Nambour, including a new rail corridor and associated infrastructure, Queensland [See EPBC Act referral 2020/8803] subject to the variation of the Action accepted by the Minister under section 156B on 9 July 2021.

Location of Action: Sunshine Coast, Queensland

ACKNOWLEDGEMENT OF COUNTRY

John Holland Seymour Whyte Joint Venture acknowledges the traditional owners, the Kabi Kabi/Gubbi Gubbi people of the land on which we live and work. We pay respect to local Indigenous Elders past, present and emerging and recognise the strength, resilience, and capacity of all Aboriginal and Torres Strait Islander peoples. We are committed to advancing human rights within a tolerant and inclusive environment, in which respect for Aboriginal and Torres Strait Islander people is fundamental.

Document control and amendment

The current reviewed and approved version of this Plan is available for all project personnel to access. Downloaded Plans are deemed uncontrolled and it is the responsibility of the user to ensure they are using the latest revision.

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Document Title	Grey-headed Flying-fox Management Plan

Revision record

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Approvals

Name	Position	Signature	Date
[Redacted]	Project Director, CJV	[Redacted]	28/06/2024

Declaration of accuracy (signed by the approval holder)

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: [Redacted]

Full Name (print): [Redacted], Project Director (Department of Transport and Main Roads)

EPBC Number: 2020/8803

Organisation: Department of Transport and Main Roads (39 407 690 291)

Date: 15/07/2024

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Glossary and Abbreviations

Term	Definition
Administrator	The Administrator is a person appointed by the Client to administer the contract between the Client and the Contractor.
Approval holder	Department of Transport and Main Roads
B2N Project	Beerburrum to Nambour Rail Upgrade Project Stage 1
COP	Code of Practice: Low impact activities affecting Flying-fox roosts <i>Nature Conservation Act 1992</i> ; and Code of Practice: Ecologically sustainable management of Flying-fox roosts <i>Nature Conservation Act 1992</i>
Clearing	Clearing means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds) (EPBC 2020/8803)
Congregation	A new congregation of Flying-foxes as defined by the <i>Interim policy for determining when a Flying-fox congregation is regarded as Flying-fox roost under section 88C of the Nature Conservation Act 1992</i> (DES 2021e).
Construction	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 (including pile driving); 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 (EPBC 2020/8803)
DES	Department of Environment and Science (Queensland)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DTMR	Department of Transport and Main Roads (Queensland)
EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Environmental Constraint Maps	Environmental Constraint Maps are a tool used to identify and communicate to project staff and customers the environmental conditions and controls to manage the risks related to activities within the project site, or particular areas of the project site.
Fauna Spotter Catcher	A person licenced under the Queensland <i>Nature Conservation Act 1992</i> to detect, capture, care for, assess, and release wildlife disturbed by vegetation clearance activities who has at least three years' experience undertaking this work with Koalas and Grey-headed Flying-foxes.
FSC	Fauna Spotter Catcher
GHFF	Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)
Heat stress event	A heat stress event is a day(s) on which the maximum temperature does (or is predicted to) meet or exceed 38°C (DCCEEW, 2015)
High risk times	1 October to 31 December.
JHSWJV	John Holland Seymour Whyte Joint Venture
NCR	Non-conformance Report
PER	Project Environmental Representative
Project alignment	The design alignment, including rail and road infrastructure that forms part of the project.

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Term	Definition
Project area	The Development Area defined by the EPBC approval EPBC 2020/8803
Occupied roost	A permanent roost as defined by the <i>Interim policy for determining when a Flying-fox congregation is regarded as Flying-fox roost under section 88C of the Nature Conservation Act 1992</i> (DES 2021e).
Suitably Qualified Ecologist	A person who has relevant professional qualifications and at least 3 years' work experience designing and implementing flora and fauna surveys and management plans for the Koala and/or the Grey-headed Flying-fox using relevant protocols, standards, methods and/or literature.
SCC	Sunshine Coast Council
Unacceptable level of stress	Unacceptable level of stress include behaviours such as: <ul style="list-style-type: none"> • Panting; • Saliva spreading; • located on or within 2m of the ground; • unusual vocalising; • >50% roost take flight; Flying-foxes in flight for more than 20 minutes; • Flying-foxes leave the roost during daylight hours; • adults moving away from dependant young; • adults carrying young being disturbed (Ecosure, 2021)
Soteria	JHSWJV Health, Safety, Environment, & Sustainability incident management, monitoring and reporting platform

1 Introduction

1.1 Purpose

This Grey-headed Flying-fox Management Plan provides a framework for avoiding and managing impacts to Grey-headed Flying-fox (*Pteropus poliocephalus*) during clearing and construction associated with the Beerburrum to Nambour Rail Upgrade Project Stage 1 (B2N Project). This Plan is applicable to all construction phase works associated with the B2N Project and includes measures to avoid and mitigate the impacts from construction activities on Grey-headed Flying-foxes (GHFF). The B2N Project area is provided in Figure 1.

This Plan has been prepared in accordance with the *Environmental Management Plan Guidelines, Commonwealth of Australia 2014*. The plan considered the findings and recommendations in the *Beerburrum to Nambour Rail Upgrade Project Commonwealth Matters Ecological Report* (ARUP, 2020) and the *Beerburrum to Nambour Rail Upgrade Project MNES Baseline Assessment* (ERM, 2021). Other relevant legislation and documentation listed in Table 1 has also been considered.

This plan does not apply to Stage 2 of the Beerburrum to Nambour Rail Upgrade Project as Stage 2 is not currently funded and timing for delivery is unknown. This plan will be updated, or a new plan will be created for Stage 2 once timing and funding has been confirmed. The Stage 2 Plan will be submitted to the Minister administering the *Environmental Protection and Biodiversity Act 1999* for approval prior to construction commencing.

1.2 Independent Endorsement

This Plan has been reviewed by an independent **Suitably Qualified Ecologist** who has relevant professional qualifications and experience designing and implementing management plans for the Grey-headed Flying-fox using relevant protocols, standards, methods and/or literature.

An endorsement letter from the **Suitably Qualified Ecologist** confirming that the Plan contains appropriate measures to avoid and minimise impacts to Grey-headed Flying-foxes is provided in Appendix A.

1.3 Project Scope

The B2N Project includes:

- road works to accommodate the new rail corridor and track infrastructure;
- public utility plant relocations and other enabling works;
- duplication of the section of rail between Beerburrum and Glass House Mountains on an improved alignment, and between Glass House Mountains and 2 km north of Beerwah within the existing corridor;
- Beerburrum Road and Steve Irwin Way intersection upgrade including a new road overpass on Beerburrum Road;
- replacement of the Barrs Road level crossing in Glass House Mountains with a new road overpass connecting Barrs Road to Moffatt Road;
- replacement of Burgess street road-over-rail bridge with a new road overpass;
- expansion of the park 'n' ride facility on the northern side of Beerburrum station (partial);

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- re-signalling of the corridor from Beerburrum to Beerwah with bi-directional 3 aspect signals including automatic train protection (ATP) and European Train Control System (ETCS) level 1 integration; and
- power systems upgrades required to facilitate the new track and capacity.

The B2N project will require the clearing of foraging habitat for the Grey-headed Flying-fox but is unlikely to require clearing of Grey-headed Flying-fox roosts based on information available at the time of preparation. Construction work is scheduled to commence in 2024 and is expected to be completed in 2028.



Figure 1: B2N Project area

1.4 Objectives

The objectives of this Plan are to:

1. Ensure Grey-headed Flying-fox welfare is a priority during all stages of work.
2. Clearly define roles and responsibilities.
3. Avoid negative perceptions of Grey-headed Flying-foxes within the community, which could lead to potentially unfavourable direct and indirect impacts to the species.
4. Clearly outline actions to mitigate impacts on Grey-headed Flying-fox and their roosts.
5. Clearly outline the procedure for Grey-headed Flying-fox related incidents.

1.5 Targets

Targets linked to the above objectives are:

- a. All clearing and construction activities are undertaken in accordance with this this Plan.
- b. No injuries or mortalities to Grey-headed Flying-fox as a result of clearing and construction activities.
- c. Avoid and minimise loss or degradation of Grey-headed Flying-fox roosts.
- d. Avoid and minimise noise, light and dust related impacts to Grey-headed Flying-foxes.
- e. Avoid and minimise loss or degradation to Grey-headed Flying-fox foraging habitat.
- f. Reduce the likelihood of injury or mortality to Grey-headed Flying-foxes due to new infrastructure.

2 Requirements

2.1 Applicable Legislation and Standards

Table 1 outlines the legislation, codes, standards and other documentation relevant to the preparation and implementation of this plan.

Table 1: Legislation and Guidance Documentation

Federal Legislation	State legislation	Codes / Standards / Existing Documentation
<i>Environmental Protection & Biodiversity Conservation Act 1999</i>	<ul style="list-style-type: none"> • <i>Nature Conservation Act 1992</i> • <i>Environmental Protection Act 1994</i> • <i>Environmental Protection Regulation 2019</i> 	<ul style="list-style-type: none"> • EPBC Act (Approval 2020-8803) • A review of noise, light and dust impacts on grey-headed Flying-fox camps, Ecosure, November 2021 • National Recovery Plan for the Grey-headed Flying-fox (DAWE, 2021) • Referral guideline for management actions in Grey-headed and Spectacled Flying-fox camps (DoE, 2015) • Environmental Management Plan Guidelines, Commonwealth of Australia 2014 • ARUP Commonwealth Matters Ecological Report 2020 • DTMR Preliminary Documentation Response – Beerburrum to Nambour (B2N) Rail Upgrade EPBC 2020/8803 • ERM MNES Baseline Report 2021 • Interim policy for determining when a Flying-fox congregation is regarded as Flying-fox roost under section 88C of the Nature Conservation Act 1992 (DES, 2021) • Code of Practice: Low impact activities affecting Flying-fox roosts <i>Nature Conservation Act 1992</i> • Code of Practice: Ecologically sustainable management of Flying-fox roosts <i>Nature Conservation Act 1992</i> • MRTS 51 Environmental Management • Sunshine Coast Council Regional Flying-fox Management Plan • Flying-fox Roost Management Guideline (DES) • John Holland Global Mandatory Requirements

2.2 Approval conditions

Table 2 is the conditions of approval reference table required by the *Environmental Management Plan Guidelines, Commonwealth of Australia 2014*. It lists the EPBC 2020/8803 approval conditions relevant to the preparation and implementation of this plan and demonstrates how the plan has met those conditions.

Table 2: Conditions of approval reference table

Cond.	Condition Requirement	Plan Ref	Demonstration
1	To minimise impacts to the Koala and Grey-headed Flying-fox, the approval holder must not clear more than 64.15 hectares (ha) of Koala habitat and Grey-headed Flying-fox foraging habitat within the development area. The approval holder must not clear outside the development area.	Table 6, Items 08, 10, 11, 20	The following summarises the commitments outlined in this plan in relation to EPBC 2020/8803 condition 1: <ul style="list-style-type: none"> - Clearing extent designed so that no more than 56.26 ha of Koala and Grey-headed Flying-fox habitat is cleared within the Project area. - Prepare a Vegetation Protection Plan (Construction) that will detail clearing extents and vegetation to be protected within and adjacent to the site. - No-Go zones and EPBC boundary to be physically demarcated prior to work commencing. - No clearing shall occur outside of the approved clearing areas. - An approved B2N clearing permit must be obtained from the PER prior to any clearing activity.
2(a)	Ensure that a suitably qualified fauna spotter catcher is present during all clearing and given sufficient authority to ensure that Koalas and Grey-headed Flying-foxes have safely moved out of the area of works of their own volition before Koala habitat and Grey-headed Flying-fox foraging habitat is cleared.	Table 6, Item 14	The following summarises the commitments outlined in this plan in relation to EPBC 2020/8803 condition 2(a): A Fauna Spotter Catcher is to be present for the duration of all clearing activities. The Fauna Spotter Catcher has the authority to: <ul style="list-style-type: none"> - ensure that Grey-headed Flying-foxes have safely moved out of the area of works of their own volition before Koala and Grey-headed Flying-fox habitat is cleared; and - to implement any corrective actions deemed necessary to manage unacceptable levels of stress to Flying-foxes (i.e. temporary stop work in the area).
3(a)	For the ongoing protection of Grey-headed Flying-fox populations, the approval holder must: (a) Submit an Environmental Management Plan (EMP) for the Minister's approval that, to the satisfaction of the Minister, details avoidance and mitigation measures to manage	Table 6, Item 01, 02, 03, 04, 05, 06, 07, 08, 09,10, 11, 12, 13, 14, 15,16, 17, 18, 19, 20	This Plan is the Environmental Management Plan required by Condition 3(a). The following summarises the commitments outlined in this plan, in addition to those mentioned above, in relation to EPBC 2020/8803 condition 3(a): <ul style="list-style-type: none"> - Site inductions will include the following specific components for Grey-headed Flying-fox management:

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Cond.	Condition Requirement	Plan Ref	Demonstration
	the impacts from clearing and construction on Grey-headed Flying-fox roosts.		<ul style="list-style-type: none"> • Requirements when clearing and penalties (including fines) for over-clearing • No-go zones • Locations of known roost sites • Fauna interaction rules • Procedures if a Flying-fox is found on site injured, orphaned or dead - Develop Environmental Constraint Maps which clearly: <ul style="list-style-type: none"> • Identify development area and clearing boundary. • Detail relevant requirements and mitigation measures in this plan. • Map Grey-headed Flying-fox roost locations and habitat on and adjacent to site. - Environmental Constraint Maps must be communicated to all staff and displayed in respective work areas. - All occupied roosts within 300m of the Project area will be shown on plans and construction drawings. - Personnel must not attempt to touch or handle a Flying-fox. If interaction with a Flying-fox is required, a Fauna Spotter Catcher must be contacted - Equipment maintenance, construction access and ancillary facilities will be designed and located to not impact baseline conditions at occupied roosts. - A pre-clearing survey within vegetation to be removed must be undertaken between 10 and 20 calendar days prior to any clearing activities commencing. The survey is to be completed by a Suitably Qualified Ecologist and must include an assessment of accessible vegetation within 300m of the clearing area. - To minimise the risk associated with clearing of MNES habitat during peak breeding periods, bulk clearing will be conducted during the day to avoid impacts to foraging Flying-foxes at night. - Prepare a Vegetation Protection Plan (Construction) that will detail clearing boundary and vegetation to be protected within and adjacent to the site. - The clearing boundary and protected vegetation is to be physically demarcated on site by Surveyor in line

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Cond.	Condition Requirement	Plan Ref	Demonstration
			<p>with the Vegetation Protection Plan (Construction).</p> <ul style="list-style-type: none"> - Provide respite at least one day per week for clearing or construction activities that are above external noise criteria at occupied roosts within 300m of the Project area to allow flying-foxes to rest - For clearing works within 300m of an occupied roost, works are to be sequenced to commence at maximum distance away from the roost and then proceed towards roost. - Clearing extent designed so that no more than 56.26 ha of Koala and Grey-headed Flying-fox habitat is cleared within the Project area. - Habitat clearing to be surveyed and tracked during works. - No-Go zones and EPBC boundary to be physically demarcated prior to work commencing. - No clearing shall occur outside of the approved clearing areas.
3(b)	<p>For the ongoing protection of Grey-headed Flying-fox populations, the approval holder must:</p> <p>(b) Prepare the EMP in accordance with the Environmental Management Plan Guidelines.</p>	All	<p>This plan has been prepared in accordance with the Environmental Management Plan Guidelines, Commonwealth of Australia 2014.</p>
3(c)	<p>For the ongoing protection of Grey-headed Flying-fox populations, the approval holder must:</p> <p>(c) Not commence clearing or construction in the areas represented in Attachment A by the zones enclosed by the lines designated 'EPBC Stage 1 Main Works Boundary' and 'EPBC Stage 2 Boundary' identified by the aqua and green boundaries respectively, unless the Minister has approved the EMP in writing.</p>	n/a	<p>Clearing or construction is yet to commence.</p>

Cond.	Condition Requirement	Plan Ref	Demonstration
3(d)	For the ongoing protection of Grey-headed Flying-fox populations, the approval holder must: (d) Implement the approved EMP until the completion of the Action.	n/a	Once approved, this plan will be implemented until completion of the action.

3 Limitations

This plan is limited by the validity of Grey-headed Flying-fox roost data sourced from the Sunshine Coast Council (SCC) and DCCEE Flying-fox mapping at the time of plan development. This Plan assumes that these mapping sources are true and accurate at the time of the Plan was developed.

To alleviate this uncertainty, this Plan includes measures to detect the presence of Flying-fox roosts within the Project area during **construction**. Measures include: **Suitably Qualified Ecologists** conducting pre-clearing surveys prior to clearing; **Fauna Spotter Catchers** being present for all clearing works; weekly site inspections by the **Project Environmental Representative**; educating all project employees on identification and significance of Grey-headed Flying-foxes and their roosts.

4 Roles and Responsibilities

Table 3 outlines the high order roles and responsibilities associated with this plan. Table 6 in Section 7 details responsibilities for mitigation measures to specific roles.

Table 3: Roles and Responsibilities

Role	Responsibility
Approval Holder	<ul style="list-style-type: none"> Submit this plan to the Minister administering the EPBC Act for approval. Report any incident or non-compliance associated with this plan, or any non-conformance with EPBC 2020/8803 approval conditions to the Australian Government Agency responsible for administering the EPBC Act.
Project Director	<ul style="list-style-type: none"> Overall responsibility for the implementation of this plan. Monitor the achievement of objectives and targets in this plan. Ensures that all incidents and non-conformances reported are fully investigated.
Project Environmental Representative	<ul style="list-style-type: none"> Preparation and implementation of this plan. Monitor compliance with this plan during clearing and construction. Review and audit the effectiveness of this plan. Investigation, reporting and implementation of corrective actions for non-compliances and incidents associated with this plan. Notify the Administrator and Approval Holder any incidents or non-compliances.
Construction Manager	<ul style="list-style-type: none"> Manage and coordinate all construction activities. Ensure management measures required by this plan are implemented. Ensure Engineers and Supervisors are aware of the requirements of this plan.

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Role	Responsibility
Designer	<ul style="list-style-type: none"> Minimise extent of clearing of Koala and Grey-headed Flying-fox habitat in the project design Ensure occupied roosts within 300m of the Project area are included in design drawings.
Fauna Spotter Catcher¹	<ul style="list-style-type: none"> Be present for all clearing activities. Authority to stop clearing where there is a risk of harm to Grey-headed Flying-foxes. Authorised to interact with sick or injured Flying-foxes.
Suitably Qualified Ecologist²	<ul style="list-style-type: none"> Conduct pre-clearing surveys 10 – 20 days prior to clearing vegetation. Confirm location of occupied roosts. Monitoring occupied roosts within 300m of the project area when clearing or construction in accordance with Section 10.1.1 Baseline assessment and monitoring of roosts within 1000m of the Project area in accordance with Section 8.2 and 10.2. Guide dispersal of congregations identified within clearing areas Guide adaptive management responses where there are potential impacts to Grey-headed Flying-foxes and occupied roosts.
All personnel	<ul style="list-style-type: none"> Participate in the mandatory project/site induction program. Not attempt to touch or handle a Flying-fox.

5 Existing Environment

The Grey-headed Flying-fox is listed as 'Vulnerable' under the EPBC Act and is known to occur within the Project Area. The Project Area occurs in a small section of the distribution of the Grey-headed Flying-fox, which extends throughout eastern Australia.

Many myrtaceous tree species that make up the diet of the Grey-headed Flying-fox flower at different times of the year. Important spring vegetation communities are those that contain species of *Eucalyptus*, *Syncarpia*, *Lophostemon* and *Grevillea*. While key winter vegetation communities include *Eucalyptus*, *Melaleuca*, *Banksia* and *Corymbia* (Law et al., 2002).

The Project Area contains many of these myrtaceous species and rainforest species with fleshy fruits. The total amount of Grey-headed Flying-fox habitat within the Project area is 64.15 ha (Early Works: 2.57 ha, **Stage 1: 56.26 ha** and Stage 2: 5.32 ha). Conservative mapping and calculations of potential Flying-fox foraging resources within a 50 km radius of the Project Area determined that 344,510 ha of foraging resources are available. The impacts to 64.15 ha of resources within the Project Area equates to 0.018% of available habitat in the area (DTMR, 2021).

¹ A Fauna Spotter Catcher is a person licenced under the Queensland Nature Conservation Act 1992 to detect, capture, care for, assess, and release wildlife disturbed by vegetation clearance activities who has at least three years' experience undertaking this work with Koalas and Grey-headed Flying-foxes.

² A Suitably qualified ecologist is a person who has relevant professional qualifications and at least 3 years' work experience designing and implementing flora and fauna surveys and management plans for the Koala and/or the Grey-headed Flying-fox using relevant protocols, standards, methods and/or literature.

A desktop review of a 1000m area around the Project area has identified:

- There are no nationally important roosts within 1000m.
- There are three known roosts within 1000m (Parkside Drive, Beerwah; Mellum Creek Esplanade, Landsborough; and Bowen Road, Glasshouse Mountains).
- The area is comprised of residential, commercial and rural land uses.
- An operational quarry and a numerous other construction projects are present within 1000m.

5.1 Species Profile

The Grey-headed Flying-fox is the largest Australian bat with a wingspan of up to one metre (DAWE, 2021). It has dark-grey body fur, a grey head, and a distinctive reddish-brown collar (Eby and Lunney, 2002). It is protected under Queensland's *Nature Conservation Act 1992* and listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), affording it additional protection.

All Grey-headed Flying-fox throughout Australia are regarded as part of one mobile population, with roosts ranging from the central Queensland coastline to South Australia (Eby et al., 1999). They are highly adapted for night activity and congregate in large social groups (roosts) during daylight hours to rest and breed (Eby and Lunney, 2002).

The Grey-headed Flying-fox forages and roosts within rainforests, open forests, closed and open woodlands (including melaleuca swamps, eucalyptus and banksia woodlands) and can be found urban and agricultural areas where food trees exist (Eby, 1998).

During dusk and dawn, they exit and enter the roosting site en masse, this is known as 'fly-out' and 'fly-in' respectively (DAWE, 2021). Grey-headed Flying-fox have a foraging radius of up to 50 kilometres from their roost and have been recorded travelling over 500 kilometres over 48 hours when moving from one roost to another (Roberts, 2012). Grey-headed Flying-fox generally show a high level of fidelity to roost sites, returning year after year to the same site. This may be one of the reasons Flying-foxes continue to return to small urban bushland blocks that may be remnants of historically used larger tracts of vegetation (SEQ Catchments, 2012).

5.2 Life cycle

The life cycle of the Grey-headed Flying-fox is represented in Figure 2. Grey-headed Flying-foxes are seasonal breeders, with a single breeding event per year (DAWE, 2021). Large roosts are used during the mating season spanning March to April. Females give birth to a single pup and the majority of births occur from October to December, however, due to seasonal variability births may also occur in September (Sunshine Coast Regional Council, 2022). Pups are carried by the mother (including during flight) for four to five weeks, after this, the young are left at the roost during the night in a crèche until they begin foraging with their mother between January and March. At four months, Flying-foxes are weaned and become fully independent and move to a winter roost (Eby and Lunney, 2002).

Management measures for Grey-headed Flying-fox roosts will be implemented in consideration of risks of impact based on their life cycle as detailed in the Sunshine Coast Council (SCC) Regional Flying-fox Management Plan, 2022. October to December represents this highest risk of impact to Grey-headed Flying-fox roosts due to the majority of births and early rearing occurring at this time. January and September are medium risk times as Grey-headed Flying-fox could be birthing (September) or rearing (January) due to

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seasonal variability (Sunshine Coast Regional Council, 2022). The remainder of the year is considered low risk of impact. The Grey-headed Flying-fox life cycle and risk levels are outline in Figure 2.



Figure 2: Grey-headed Flying-fox breeding cycle and associated risk levels

5.3 Known Roosts

An assessment of known roosts within 1000m the project has been undertaken using [Sunshine Coast Council](#) (SCC) and [DCCEEW](#) mapping. Table 4 lists the Grey-headed Flying-fox roosts within 1000m of the B2N Project. Appendix A contains the mapped locations of known roosts listed in Table 4.

The Project will use the 'Interim policy for determining when a Flying-fox congregation is regarded as Flying-fox roost under section 88C of the Nature Conservation Act 1992' (DES 2021e) to identify any roosts not listed in Table 4. The decision to use this document is based on a review of the following Commonwealth documents, which do not clearly define roosts, camps or congregations of Grey-headed Flying-foxes other than Nationally important roosts:

- *Ecosure 2021 'A review of noise, light and dust impacts on grey-headed Flying-fox camps'*
- *Commonwealth of Australia 2021 'National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus'*
- *Commonwealth of Australia 2015 'Referral guideline for management actions in grey-headed and spectacled Flying-fox camp'*

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Table 4: Grey-headed Flying-fox roosts within 1000m of the Project

Location	Distance to Project	Occupancy and Population	Source
Mellum Creek Esplanade, Landsborough	380m	Site unoccupied since 2022	SCC BatMap (May 2024)
Bowen Road, Glasshouse Mountains	1000m	1 Grey-headed Flying-fox (October 2022)	SCC BatMap (May 2024)
Parkside Drive, Beerwah	330m	736 Grey-headed Flying-fox (May 2024)	SCC BatMap (May 2024)

Nationally important roosts are those that have contained 10,000 Grey-headed Flying-foxes in more than one year in the last 10 years or have been occupied by more than 2,500 Grey-headed Flying-foxes permanently or seasonally every year for the last 10 years. There are no nationally important roosts within 1000m of the Project area. Table 5 lists the nationally important roosts within 40km of the project site from SCC and DCCEEW mapping.

Table 5: Nationally Important Roosts within 40km of the B2N project (Jan 2024)

Location	Distance to Project	Occupancy data	Source
Stella Maris, Maroochydore	20.3km	0 (August 2021)	DCCEEW interactive map
Jubilee Drive, Palmwoods	14km	1 - 499 (August 2018)	DCCEEW interactive map
Vidler Court, Landsborough	1.1km	0 (August 2018)	DCCEEW interactive map
Tesch Park, Maleny	12.4km	500 – 2,499 (May 2022)	DCCEEW interactive map
Webb Lane, Woodford	17.8km	1 - 499 (May 2022)	DCCEEW interactive map
Wararba Creek, Caboolture	13.8km	500 – 2,499 (May 2022)	DCCEEW interactive map

6 Potential Impacts

This section details the potential direct and indirect impacts from the project to Grey-headed Flying-foxes and their foraging and roosting habitat.

In order to appropriately identify and manage impacts to Grey-headed Flying-fox roosts, the Project has used a 300m buffer around the Project area to identify occupied roosts that could potentially be impacted by the Project. This buffer has been endorsed by an independent Suitably Qualified Ecologist (refer Appendix A) and is consistent with a 2021 report prepared by Ecosure for the Department of Agriculture, Water and the Environment, “A review of noise, light and dust impacts on grey-headed flying-fox camps” which recommends a 300m minimum buffer, noting that some activities require greater distances.

This risk of these potential impacts has been assessed in Section 7.

6.1 Potential Direct Impacts

6.1.1 Loss/degradation of foraging habitat.

The B2N project is approved to clear up to 56.26ha of Grey-headed Flying-fox habitat within the Stage 1 project area (EPBC 2020/8803). Conservative mapping has determined that this disturbance for the whole B2N project will impact 0.018% of the 344,510ha of potential Grey-headed Flying-fox foraging resources within a 50km radius (ARUP, 2020). Therefore, considering the highly mobile nature of the species, the removal of foraging resources within the project area is not considered a significant loss at a regional scale and the long-term viability of the population is not anticipated to be significantly impacted (ARUP, 2020).

The Project is not anticipated to introduce invasive species that are harmful to the Grey-headed Flying-fox. However, clearing and disturbance activities can result in germination of weed species which have the potential to impact on foraging habitat adjacent to the project. While it is noted that some roosting and foraging habitat may consist of introduced plants including environmental weeds that are food sources (Roberts, 2006), the Project must still meet its General Biosecurity Obligation under the Queensland *Biosecurity Act 2014*. As such, activities during construction and operation of the project will adopt and follow biosecurity measures to mitigate the introduction or further spread of invasive species in the Project Area. Weed species will be managed in accordance with the Code of Practice - Low impact activities affecting Flying-fox roosts (DES, 2021c).

6.1.2 Impacts to roosting Flying-foxes.

Work in the vicinity of **occupied roosts** has the potential to impact pregnant females and crèching young. Spring to summer is the higher risk period in the Grey-headed Flying-fox breeding cycle, with the highest risk being 1 October to 31 December (i.e. birthing months and when dependent young are present) (Sunshine Coast Regional Council, 2022). Summer is also when Flying-foxes are susceptible to **heat stress events** (Welbergen et al., 2008), and the lowest risk of impact is outside the breeding season during autumn and winter.

6.1.3 Interaction with people, plant and vehicles.

Flying-fox interaction with construction plant/vehicles and personnel is a potential impact, especially during work being conducted at times when Grey-headed Flying-fox fly-in and fly-out of roosts, i.e. dawn and dusk (DAWE, 2021). The Project is located in an urban / semi-urban area where risk of interaction is already present (ARUP, 2020). While this risk is present, the Project will implement appropriate measures to minimise the risk.

6.2 Potential Indirect Impacts

6.2.1 Construction activities disturbing nearby roosts.

Ecosure (2021) states that a roost's tolerance to noise, light and human activity is highly variable and appears to be correlated with the location's regular level and occurrence of these impacts. The proportion of animals responding varies greatly depending on previous experience, season, group size, age and sex composition, on-going activity, motivational state, reproductive condition, terrain, weather, temperament, and other natural factors (Ecosure 2021).

Understanding habituation or Flying-fox tolerance to stimuli relies on the ability of an observer to understand normal Flying-fox behaviours versus stress induced behaviours (Ecosure 2021). Predicted tolerance, or intolerance, of a roost to stimuli based on normal exposure to those stimuli at that location should be considered when assessing the likelihood of significant impacts (Ecosure 2021). Taking this into consideration,

a **Suitably Qualified Ecologist** will conduct monitoring of **occupied roosts** within 1000m of the Project area in accordance with Section 10.2.

Due to the urbanised local environment and the distance between occupied roosts and the construction boundary, **construction** light, noise and dust are considered unlikely to adversely affect the breeding cycle of local colonies of Grey-headed Flying-fox (ARUP, 2020; ERM, 2021). Despite the relatively low risk of construction impacts, management measures and monitoring activities for noise, dust and light have been developed to ensure the protection of Grey-headed Flying-fox roosts.

6.2.2 Noise

Flying-fox roosts are notoriously loud, even in a roost surrounded by heavy industry and rail infrastructure (Clyde roost, Sydney), the colony noise with the animals' own calls (57 dBA at 10 m) was louder than the surrounding environmental noise (51 dBA) at the site (Pearson and Clarke 2018). Pearson and Clarke (2018) suggest that the way Grey-headed Flying-foxes communicate (e.g. loud vocalising in close proximity to one another) could account for their tolerance of relatively high anthropogenic noise pollution levels in urban habitats.

Limited noise monitoring carried out during other construction projects near Flying-fox roosts indicates that Grey-headed Flying-foxes can tolerate construction noise impacts of around 74 dBA (Ecosure, 2021). However, when monitoring noise, baseline and background levels are required to determine 'normal' ranges for the roost and to establish appropriate construction noise criteria (Ecosure, 2021). Taking this into consideration, the Project will adopt a risk-based approach to model, assess, mitigate and monitor potential construction noise impacts on **occupied roosts** within 300m of the Project area.

6.2.3 Dust

There is a paucity of studies on the impacts of dust on Flying-foxes. Ecosure (2021) states the potential for indirect impacts including reduced habitat/food sources due to reduced plant growth and fruit production; and ingestion of toxic substances via grooming. Taking into account the existing potential sources of dust from traffic, heavy rail, agriculture, quarry operations and other construction projects; and the distance between the Project area and the nearest **occupied roost**, dust impacts associated with the Project are considered moderately low risk. However, the Project will adopt a risk-based management approach for the mitigation of dust impacts, undertaking baseline air quality assessments and conducting regular monitoring of dust to ensure **occupied roosts** within 300m of the Project area are not impacted from **clearing** or **construction**.

6.2.4 Light

Flying-foxes have large, forward-facing eyes giving them binocular vision, while mirror-like retinas reflect and capture the limited available light (Ecosure, 2021). Artificial light is known to adversely affect some bat species behaviour including reproduction and communication. However, as detailed in the *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023), Flying-foxes do not appear to avoid moonlit areas and are known to roost in artificial light drenched areas, suggesting little or no behavioural impact from artificial light. They are also known to roost in artificial light-drenched areas suggesting they are unlikely to be significantly impacted by artificial light (DCCEEW, 2023). Taking this into consideration, and the proximity of the Beerwah roost to existing light sources (i.e. adjacent service station and shopping centre), it is expected that artificial light from the **clearing** or **construction** will not have a significant impact on **occupied roosts** within 300m of the Project area. However, the Project will adopt a risk-based management approach for the mitigation of light impacts, undertaking a baseline assessment of existing light levels at **occupied roosts** within 300m of the Project area.

6.2.5 Injury / mortality due to interactions with new infrastructure.

Flying-fox interaction with new infrastructure, including overhead wiring, is a potential impact (DAWE, 2021). Given the Project upgrades existing infrastructure in an urban / semi-urban area where these hazards are already present the likelihood of impact is considered low (ARUP, 2020). However, in line with Recovery Objective 9 of the National Recovery Plan for Grey-headed Flying-fox (DAWE, 2021), flying-fox friendly design principles will be considered in the design of new rail infrastructure.

7 Risk Assessment and Management

The risk of each potential impact in Section 6 has been assessed in the Risk Assessment Table (refer Table 6). The Risk Assessment Table identifies likelihood and consequence (risk) of each potential impact, the mitigation measures that will be implemented and monitoring activities that will take place to ensure the risk is being appropriately managed. Risks were assessed using the criteria outlined in Appendix C, with each risk given an initial rating (prior to implementing mitigation measures) and a residual rating (post the implementation of mitigation measures).

After the implementation of the relevant mitigation measures, all potential impacts identified have been concluded to have medium or low residual risk ratings.

7.1 Buffer Area

To manage potential impacts from **clearing** and **construction** to **occupied roosts**, the Project will utilise a 300m buffer around **occupied roosts**. This approach is consistent with the distance recommended in “A review of noise, light and dust impacts on grey-headed flying-fox camps” (Ecosure, 2021) which recommends a 300m minimum buffer, noting that some activities require greater distances. The Project has received endorsement of the 300m buffer from an independent **Suitably Qualified Ecologist** (see Appendix A).

Clearing or **construction** occurring within the 300m of **occupied roosts** will be managed based time of year, time of day and climatic conditions. Details of the implementation of the 300m buffer are outlined in the management measures in Table 6 and decision flowchart in Figure 3.

Table 6: Risk Assessment and Management Measures

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
<p>No injuries or mortalities to Grey-headed Flying-fox as a result of clearing or construction activities.</p> <p>Avoid and minimise loss or degradation of Grey-headed Flying-fox roosts.</p> <p>Avoid and minimise noise, vibration light and dust related stress to Grey-headed Flying-foxes.</p> <p>Avoid and minimise loss or degradation to Grey-headed Flying-fox foraging habitat.</p> <p>Reduce the likelihood of injury or mortality to Grey-headed Flying-foxes due to new infrastructure.</p>	<p>Interaction with people, plant and vehicles.</p>	<p>Project personnel interacting with Grey-headed Flying-fox</p>	<p>Unlikely</p>	<p>High</p>	<p>Medium</p>	01	<p>Site inductions will include the following specific components for Grey-headed Flying-fox management:</p> <ul style="list-style-type: none"> - Requirements when clearing and penalties (including fines) for over clearing - No-go zones - Locations of occupied roosts - Fauna interaction rules - Procedures if a Flying-fox is found on site injured, orphaned or dead 	<p>Prior to commencing works</p>	<p>Rare</p>	<p>Moderate</p>	<p>Low</p>	<p>Project induction will be reviewed by Project Environmental Representative prior to issue for use.</p> <p>Quarterly Independent Audits</p>	<p>Project induction not incorporating the required components.</p> <p>No evidence is available to demonstrate that site inductions have been communicated to all staff.</p>	<p>Required components included in induction.</p>
						02	<p>Develop Environmental Constraint Maps which clearly:</p> <ul style="list-style-type: none"> - Identify development area and clearing boundary. - Detail relevant requirements and mitigation measures in this plan. - Map occupied roost locations and habitat on and adjacent to site. <p>Environmental Constraint Maps must be communicated to all staff and displayed in respective work areas.</p>	<p>Prior to commencing works</p> <p>All work locations</p>				<p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p>	<p>No evidence is available to demonstrate that Environmental Constraint Maps have been communicated to all staff.</p> <p>Environmental Constraint Maps is not displayed in respective work areas.</p>	<p>Non-compliance must be reported immediately in line with section 12.</p> <p>Prepare/update Environmental Constraint Maps and communicate to workforce.</p>
						03	<p>All occupied roosts within 300m of the Project area will be shown on plans and construction drawings.</p>	<p>Prior to commencing works</p>				<p>Quarterly Independent Audits</p>	<p>Occupied roosts within 300m not included in plans and/or drawings</p>	<p>Plans/drawings must be updated.</p> <p>Communicate requirements to all staff</p>
						04	<p>Personnel must not attempt to touch or handle a Flying-fox. If interaction with a Flying-fox is required, a Fauna Spotter Catcher must be contacted (section 12.1).</p> <p>Fauna handling will be managed by a qualified Fauna Spotter Catcher and be in accordance with: <i>Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland, Nature Conservation Act 1992</i>, approvals, licences, permits.</p> <p>Any injured Flying-foxes found onsite will be taken to: Australia Zoo Wildlife Hospital 1638 Steve Irwin Way Beerwah QLD 4519 Ph: (07) 5436 2097</p>	<p>At all times</p> <p>Site Wide</p>				<p>Flying-fox incident procedure (Section 12.1)</p> <p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p>	<p>Unqualified personnel interaction with Flying-fox.</p> <p>Flying-fox Incident Response process (Section 12.1) not implemented</p>	<p>Communicate requirements to all staff</p> <p>Non-compliance must be reported immediately in line with section 12.</p>
		<p>Construction vehicles and machinery interacting with Grey-headed Flying-fox.</p>	<p>Unlikely</p>	<p>High</p>	<p>Medium</p>	07	<p>Equipment maintenance, construction access and ancillary facilities will be designed and located to not impact baseline conditions at occupied roosts within 300m of the Project area.</p>	<p>Prior to commencing works</p> <p>Site Wide</p>	<p>Rare</p>	<p>Moderate</p>	<p>Low</p>	<p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p> <p>Baseline assessment in accordance with Section 8</p> <p>Monitoring in accordance with Section 10.2</p>	<p>Roost condition monitoring (Section 10.2) indicates changes to baseline behaviours at occupied roost.</p>	<p>Apply adaptive management process.</p> <p>Facility layout to be reviewed and adjusted if required.</p> <p>Non-compliance must be reported immediately in line with section 12.</p>
						03	<p>All occupied roosts within 300m of the Project area will be shown on plans and construction drawings.</p>	<p>Prior to commencing works</p>				<p>Quarterly Independent Audits</p>	<p>Occupied roosts within 300m not included in plans and/or drawings</p>	<p>Plans/drawings must be updated.</p> <p>Communicate requirements to all staff</p>

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
						<p>In line with Recovery Objective 2 of the <i>National Recovery Plan for Grey-headed Flying-fox</i> (DAWE, 2021) and <i>Referral guideline for management actions in grey-headed Flying-fox camps</i> (DCCEEW, 2015), the B2N Project will <u>not</u> directly impact nationally important Grey-headed Flying-fox roost sites.</p> <p>A pre-clearing survey within vegetation to be removed must be undertaken between 10 and 20 calendar days prior to any clearing activities commencing.</p> <p>The survey is to be completed by a Suitably Qualified Ecologist and must include an assessment of accessible vegetation within 300m of the clearing area to determine if works are likely to impact occupied roosts.</p> <p>If a Flying-fox congregation is identified within the clearing area during pre-clearing surveys, the congregation will be dispersed in accordance with Queensland regulatory requirements, as endorsed by the <i>Referral guideline for management actions in grey-headed Flying-fox camps</i> (DCCEEW, 2015)</p>	<p>Prior to commencing works</p> <p>Site Wide</p>				<p>Clearing permit in place prior to clearing</p> <p>Pre-clearing surveys completed</p> <p>Baseline assessment in accordance with Section 8</p> <p>Monitoring in accordance with Section 10.2</p> <p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p>	<p>Clearing Permit not in place</p> <p>Pre-clearing survey not undertaken.</p> <p>Flying-fox congregation is identified during pre-clearing surveys</p> <p>Roost condition monitoring (Section 10.2) indicates changes to baseline behaviours at occupied roost.</p>	<p>Stop works in the area until pre-clearing survey undertaken/permit issued.</p> <p>Works will not commence until Grey-headed Flying-fox congregation within clearing area is dispersed under SQE guidance.</p> <p>Apply adaptive management process.</p> <p>Non-compliance must be reported immediately in line with section 12.</p>	
					14	<p>A Fauna Spotter Catcher is to be present for the duration of all clearing activities. The Fauna Spotter Catcher has the authority to:</p> <p>a) ensure that Grey-headed Flying-foxes have safely moved out of the area of works of their own volition before Koala and Grey-headed Flying-fox habitat is cleared; and</p> <p>b) implement necessary corrective actions to manage unacceptable levels of stress to Flying-foxes as per the adaptive management process in Section 11.</p>	<p>Prior to commencing works</p> <p>Site Wide</p>				<p>Clearing permit in place prior to clearing</p> <p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p>	<p>Clearing permit not obtained</p> <p>Fauna Spotter Catcher not on site for clearing works.</p>	<p>Stop works in the area. Works will not recommence until Fauna Spotter Catcher is present and clearing permit obtained.</p> <p>Training on clearing process will be undertaken with staff involved.</p> <p>Non-compliance must be reported immediately in line with section 12.</p>	
					02	<p>Develop Environmental Constraint Maps which clearly:</p> <ul style="list-style-type: none"> - Identify development area and clearing boundary. - Detail relevant requirements and mitigation measures in this plan. - Map occupied roost locations and habitat on and adjacent to site. <p>Environmental Constraint Maps must be communicated to all staff and displayed in respective work areas.</p>	<p>Prior to commencing works</p> <p>All work locations</p>				<p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p>	<p>No evidence is available to demonstrate that Environmental Constraint Maps have been communicated to all staff.</p> <p>Environmental Constraint Maps is not displayed in respective work areas.</p>	<p>Non-compliance must be reported immediately in line with section 12.</p> <p>Prepare/update Environmental Constraint Maps and communicate to workforce.</p>	
					05	<p>To minimise the risk associated with clearing MNES habitat during peak breeding periods, bulk clearing will be conducted during the day to avoid interactions with Flying-foxes foraging at night.</p>	<p>During construction</p> <p>Site Wide</p>				<p>Clearing permit in place prior to clearing</p> <p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p> <p>Baseline assessment in accordance with Section 8.2</p> <p>Monitoring in accordance with Section 10.2</p>	<p>Bulk clearing occurs during the night.</p> <p>Roost condition monitoring (Section 10.2) indicates changes to baseline behaviours at monitored roosts.</p>	<p>Communicate requirements to all staff.</p> <p>Non-compliance must be reported immediately in line with section 12.</p> <p>Apply adaptive management process</p>	

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
<p>Avoid and minimise loss/ degradation of Grey-headed Flying-fox roosts.</p> <p>Avoid and minimise loss or degradation to Grey-headed Flying-fox foraging habitat.</p>	<p>Damage to Grey-headed Flying-fox roosts.</p> <p><i>(the Project is not expected to directly impact any occupied Grey-headed Flying-fox roosts)</i></p>	<p>Personnel conducting clearing unaware of Grey-headed Flying-fox roost locations.</p>	Likely	High	High	02	<p>Develop Environmental Constraint Maps which clearly:</p> <ul style="list-style-type: none"> - Identify development area and clearing boundary. - Detail relevant requirements and mitigation measures in this plan. - Map occupied roost locations and habitat on and adjacent to site. <p>Environmental Constraint Maps must be communicated to all staff and displayed in respective work areas.</p>	<p>Prior to commencing works</p> <p>All work locations</p>	Rare	High	Low	<p>Weekly environmental inspections and liaison with the engineering team.</p> <p>Quarterly Independent Audits</p>	<p>No evidence is available to demonstrate that Environmental Constraint Maps have been communicated to all staff.</p> <p>Environmental Constraint Maps is not displayed in respective work areas.</p>	<p>Non-compliance must be reported immediately in line with section 12.</p> <p>Prepare/update Environmental Constraint Maps and communicate to workforce.</p>
						03	<p>All occupied roosts within 300m of the Project area will be shown on plans and construction drawings.</p>	<p>Prior to commencing works</p>				<p>Quarterly Independent Audits</p>	<p>Occupied roosts within 300m not included in plans and/or drawings</p>	<p>Plans/drawings must be updated.</p> <p>Communicate requirements to all staff</p>
		<p>Clearing outside of approved EPBC Boundary.</p>	Likely	Major	High	01	<p>Site inductions will include the following specific components for Grey-headed Flying-fox management:</p> <ul style="list-style-type: none"> - Requirements when clearing and penalties (including fines) for over clearing - No-go zones - Locations of occupied roosts - Fauna interaction rules - Procedures if a Flying-fox is found on site injured, orphaned or dead 	<p>Prior to commencing works</p>	Rare	High	Low	<p>Project induction will be reviewed by Project Environmental Representative prior to issue for use.</p> <p>Quarterly Independent Audits</p>	<p>Project induction not incorporating the required components.</p> <p>No evidence is available to demonstrate that site inductions have been communicated to all staff.</p>	<p>Required components included in induction.</p>
						08	<p>Prepare a Vegetation Protection Plan (Construction) that will detail clearing boundary and vegetation to be protected within and adjacent to the site. The clearing boundary and protected vegetation is to be physically demarcated on site by Surveyor in line with the Vegetation Protection Plan (Construction).</p>	<p>Prior to commencing works</p> <p>Site Wide</p>				<p>Plan approved for use by Administrator prior to clearing</p> <p>Clearing permit in place prior to clearing</p> <p>Pre-clearing surveys completed</p> <p>Quarterly Independent Audits</p> <p>Weekly environmental inspections and liaison with the engineering team.</p>	<p>Vegetation Protection Plan not in place prior to clearing.</p> <p>Clearing boundary not physically demarcated.</p>	<p>Stop works in the area. Clearing will not recommence until plan approved and boundary demarcated.</p> <p>Non-compliance must be reported immediately in line with section 12.</p>
					10	<p>An approved B2N clearing permit must be obtained from the Project Environmental Representative prior to any clearing activity.</p>	<p>Prior to commencing works</p> <p>Site Wide</p>	Rare	High	Low	<p>Clearing permit in place prior to clearing</p> <p>Quarterly Independent Audits</p> <p>Weekly environmental inspections and liaison with the engineering team.</p>	<p>Clearing Permit not obtained.</p>	<p>Stop works in the area until permit issued.</p> <p>Communicate requirements to all staff.</p> <p>Non-compliance must be reported immediately in line with section 12.</p>	

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
		New Grey-headed Flying-fox congregation within the Project area.	Possible	High	Medium	09	In line with Recovery Objective 2 of the <i>National Recovery Plan for Grey-headed Flying-fox</i> (DAWE, 2021) and <i>Referral guideline for management actions in grey-headed Flying-fox camps</i> (DCCEEW, 2015), the B2N Project will <u>not</u> directly impact nationally important Grey-headed Flying-fox roost sites. A pre-clearing survey within vegetation to be removed must be undertaken between 10 and 20 calendar days prior to any clearing activities commencing. The survey is to be completed by a Suitably Qualified Ecologist and must include an assessment of accessible vegetation within 300m of the clearing area to determine if works are likely to impact occupied roosts . If a Flying-fox congregation is identified within the clearing area during pre-clearing surveys, the congregation will be dispersed in accordance with Queensland regulatory requirements, as endorsed by the <i>Referral guideline for management actions in grey-headed Flying-fox camps</i> (DCCEEW, 2015)	Prior to commencing works Site Wide	Possible	Moderate	Medium	Clearing permit in place prior to clearing Pre-clearing surveys completed Baseline assessment in accordance with Section 8 Monitoring in accordance with Section 10.2 Weekly environmental inspections and liaison with the engineering team. Quarterly Independent Audits	Clearing Permit not in place Pre-clearing survey not undertaken. Flying-fox congregation is identified during pre-clearing surveys Roost condition monitoring (Section 10.2) indicates changes to baseline behaviours at occupied roost .	Stop works in the area until pre-clearing survey undertaken/permit issued. Works will not commence until Grey-headed Flying-fox congregation within clearing area is dispersed under SQE guidance. Apply adaptive management process. Non-compliance must be reported immediately in line with section 12.
Avoid and minimise noise, vibration or light and dust related stress to Grey-headed Flying-foxes. No injuries or mortalities to Grey-headed Flying-fox as a result of clearing and construction activities. Avoid and minimise loss or degradation of Grey-headed Flying-fox roosts. Avoid and minimise loss or degradation to Grey-headed Flying-fox foraging habitat	Construction activities disturbing nearby Grey-headed Flying-fox roosts.	Noise, dust and light from clearing and construction activities impacting occupied roosts .	Possible	High	Medium	21	Prior to clearing or construction occurring within 300m of an occupied roost undertake a baseline assessment of noise, dust and light at the roost in accordance with Section 8.1. During high risk times implement noise, dust and light monitoring at occupied roosts if clearing or construction is occurring within 300m of an occupied roost .	Prior to commencing works Work within 300m of an occupied roost	Unlikely	Moderate	Low	Baseline assessment in accordance with Section 8.1 Monitoring in accordance with Section 10.1.2	Baseline not undertaken Monitoring not undertaken	Stop work until baseline assessments are completed. Stop work until monitoring is implemented. Undertake monitoring at the roost for unacceptable levels of stress . Non-compliance must be reported immediately in line with section 12.
						22	Undertake noise modelling of clearing or construction activities occurring within 300m of an occupied roost and avoid clearing or construction during high risk times if modelling shows external noise criteria (Table 7) is exceeded at the roost.	Work within 300m of an occupied roost				Modelling in accordance with Section 8.1.1	Modelling not undertaken	Stop work until modelling determines that work can proceed. Undertake monitoring at the roost for unacceptable levels of stress Apply the adaptive management process
						23	A Suitably Qualified Ecologist will monitor occupied roosts within 300m of the Project area if clearing or construction : - Occurs within high risk times ; or - if noise modelling shows external noise criteria (Table 7) is exceeded at the roost outside high risk times .	Work within 300m of an occupied roost				Monitoring in accordance with Section 10.1.1	Signs of unacceptable levels of stress at the occupied roost	Stop work and apply the adaptive management process
						13	Noise reduction measures detailed below will be implemented for the duration of the Project as standard procedure: - ensure all plant and equipment is regularly inspected and maintained to ensure optimal operation - Position plant and equipment at the furthest possible distance from sensitive receivers - avoid shouting and the use of unnecessary use of radios and stereos - loud hailers, whistlers and horns shall not be used, except for emergencies - limit the amount of plant and equipment working concurrently - hydraulic or electric units shall be used instead of noisier diesel units where possible	Prior to commencing works Site Wide				Unlikely	Moderate	Low

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
													behaviours at occupied roost.	
						06	Provide respite at least one day per week for clearing or construction activities that are above external noise criteria (refer Section 8.1.1) at occupied roosts within 300m of the Project area to allow flying-foxes to rest (Ecosure, 2021).	During works Site Wide	Unlikely	Moderate	Low	Baseline assessment in accordance with Section 8 Monitoring in accordance with Section 10.1 and 10.2 Weekly environmental inspections and liaison with the engineering team. Quarterly Independent Audits	Respite day not provided. Roost condition monitoring (Section 10.2) indicates changes to baseline behaviours at occupied roost .	Stop work and implement 24 hour respite period. Suitably Qualified Ecologist to monitor condition of roost to determine impact. Apply adaptive management process Non-compliance must be reported immediately in line with section 12.
						16	For clearing works within 300m of an occupied roost , works are to be sequenced to commence at maximum distance away from the roost and then proceed towards roost.	During construction Site Wide	Unlikely	Moderate	Low	Clearing permit in place prior to clearing Weekly environmental inspections and liaison with the engineering team. Baseline assessment in accordance with Section 8.1 Monitoring in accordance with Section 10.1 and 10.2	Clearing not conducted in line with requirements. Flying-foxes displaying unacceptable level of stress (Section 10.1.1). Roost condition monitoring (Section 10.2) indicates changes to baseline behaviours at occupied roost .	Stop works in the area for at least 2 hours. Suitably Qualified Ecologist to implement adaptive management process (see section 11) before works can recommence. Non-compliance must be reported immediately in line with section 12.
		Construction lighting impacting occupied roosts .	Possible	Moderate	Medium	17	Light reduction measures detailed below will be implemented for the duration of the project as standard procedure: <ul style="list-style-type: none"> Artificial construction lighting will be oriented specific to the purpose of the work and to minimise light spill, i.e. keep lights close to the ground, directed at the work area and shielded to avoid light spill. Use the lowest intensity lighting appropriate for the task and safety requirements. 	During construction Site Wide	Rare	Minor	Low	Weekly environmental inspections and liaison with the engineering team Quarterly Independent Audits Baseline assessment in accordance with Section 8.1 Monitoring in accordance with Section 10.1 and 10.2	Construction lighting directed at roost. Monitoring shows light levels at roost exceed baseline (see section 8.1). Flying-foxes displaying unacceptable level of stress .	Stop works in the area for at least 2 hours. Suitably Qualified Ecologist to implement adaptive management process (see section 11) before works can recommence. Non-compliance must be reported immediately in line with section 12.
		Introduction of weeds to nearby foraging habitat as a result of clearing and construction	Possible	Moderate	Medium	18	Weed/biosecurity control measures detailed below will be implemented for the duration of the Project as standard procedure: <ul style="list-style-type: none"> A baseline weed survey of the entire site must be completed prior to construction commencing. Pre-clearing surveys to identify weed species/extents and nominate adequate treatment methods. All weeds identified in pre-clearing surveys will be treated at least 2 weeks prior to clearing or disturbance occurring. Construction vehicles and plant are to be certified weed free prior to use on site. Weekly environmental inspections to include weed abundance. Annual Weed Surveys to monitor the effectiveness of weed management against the baseline survey. 	During construction Site Wide	Rare	Moderate	Low	Baseline Weed Survey and Annual Weed Surveys Weekly environmental inspections and liaison with the engineering team.	Weed abundance worse than baseline (EPBC 2002/8803 Condition 4e)	Immediate weed treatment to take place in affected areas.

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
		Construction dust impacting occupied roosts.	Possible	Moderate	Medium	19	Dust suppression measures detailed below will be implemented for the duration of the project as standard procedure: <ul style="list-style-type: none"> Ensure all plant and equipment is regularly inspected and maintained to ensure optimal operation Adopt construction methods that minimise dust production. Regular water spraying or apply soil binder post clearing, to open earth areas and stockpiles Utilise wet cutting methods. Seal or regularly water spraying construction tracks and haul roads. 	During Construction Site Wide	Rare	Minor	Low	Daily pre-start inspections and plant/vehicle logbooks Weekly environmental inspections and liaison with engineering and construction team. Quarterly Independent Audits Baseline assessment in accordance with Section 8.1 Monitoring in accordance with Section 10.1 and 10.2	Monitoring shows dust levels at roost exceed baseline (see section 8.1). Flying-foxes displaying unacceptable level of stress .	Stop works in the area for at least 2 hours. Suitably Qualified Ecologist to implement adaptive management process (see section 11) before works can commence. Non-compliance must be reported immediately in line with section 12.
Avoid and minimize loss/ degradation to Flying-fox foraging habitat.	Loss of Grey-headed Flying-fox foraging habitat.	Clearing outside of approved areas.	Possible	Major	High	08	Prepare a Vegetation Protection Plan (Construction) that will detail clearing boundary and vegetation to be protected within and adjacent to the site. The clearing boundary and protected vegetation is to be physically demarcated on site by Surveyor in line with the Vegetation Protection Plan (Construction).	During construction Site Wide	Unlikely	Moderate	Low	Plan approved for use by Administrator prior to clearing Clearing permit in place prior to clearing Pre-clearing surveys completed Quarterly Independent Audits Weekly environmental inspections and liaison with the engineering team.	Vegetation Protection Plan not in place prior to clearing. Clearing boundary not physically demarcated.	Stop works in the area. Clearing will not recommence until plan approved and boundary demarcated. Non-compliance must be reported immediately in line with section 12.
						10	An approved B2N clearing permit must be obtained from the Project Environmental Representative prior to any clearing activity.	Prior to commencing works Site Wide				Clearing permit in place prior to clearing Quarterly Independent Audits Weekly environmental inspections and liaison with the engineering team.	Clearing Permit not obtained.	Stop works in the area until permit issued. Communicate requirements to all staff. Non-compliance must be reported immediately in line with section 12.
		20				Clearing extent designed so that no more than 56.26 ha of Koala and Grey-headed Flying-fox habitat is cleared within the Project area. Habitat clearing to be surveyed and tracked during works.	Prior to commencing works Site Wide	Clearing permit in place prior to clearing. Weekly environmental inspections and liaison with the engineering team. Quarterly Independent Audits. Progressive tracking of clearing quantities during construction.				Clearing permit not obtained Clearing exceeds 56.26 ha of koala and Grey-headed Flying-fox habitat	Stop clearing works in Koala and Grey-headed Flying-fox habitat. Non-compliance must be reported immediately in line with section 12.	
		08				Prepare a Vegetation Protection Plan (Construction) that will detail clearing boundary and vegetation to be protected within and adjacent to the site. The clearing boundary and protected vegetation is to be physically demarcated on site by Surveyor in line with the Vegetation Protection Plan (Construction).	During construction Site Wide	Plan approved for use by Administrator prior to clearing Clearing permit in place prior to clearing Pre-clearing surveys				Vegetation Protection Plan not in place prior to clearing. Clearing boundary not physically demarcated.	Stop works in the area. Clearing will not recommence until plan approved and boundary demarcated. Non-compliance must be reported immediately in line with section 12.	

Target/s	Potential impact	Event or Circumstance	Risk Rating			Item	Mitigation Measure	Timing/Location	Residual Risk			Monitoring Activity / Documentation	Management Trigger	Corrective Action
			Likelihood	Consequence	Risk Level				Likelihood	Consequence	Risk Level			
											completed			
						11	No-Go zones and EPBC boundary to be physically demarcated prior to work commencing. No clearing shall occur outside of the approved clearing areas.	Prior to commencing works Site Wide				Quarterly Independent Audits Weekly environmental inspections and liaison with the engineering team.		
						10	An approved B2N clearing permit must be obtained from the Project Environmental Representative prior to any clearing activity.	Prior to commencing works Site Wide				Clearing permit in place prior to clearing Vegetation Protection Plan issued for use prior to clearing Weekly environmental inspections and liaison with the engineering team. Quarterly Independent Audits	Clearing in No-Go zones or outside Project area.	Stop works in the area. Works will not recommence until areas physically demarcated. Non-compliance must be reported immediately in line with section 12.
	Degradation of Grey-headed Flying-fox foraging habitat.	Revegetation with non-Grey-headed Flying-fox foraging species.	Likely	Moderate	Medium	15	In line with Recovery Objective 1 of the <i>National Recovery Plan for Grey-headed Flying-fox</i> (DAWE, 2021) revegetation or rehabilitation of construction areas outside the rail corridor will include use of native flowering nectar trees to replace foraging resources removed. Winter and spring flowering species that occur in the surrounding vegetation and provide seasonal nectar resources include Pink Bloodwood (<i>Corymbia intermedia</i>), Swamp Mahogany (<i>Eucalyptus robusta</i>) and Broad-leaved Paperbark (<i>Melaleuca quinquenervia</i>).	Design Site Wide	Unlikely	Minor	Low	Design Review process ³ Environmental Design Report	Landscaping design does not include relevant species	Revise design to include the relevant species.
Avoid injuries or mortality to Flying-fox due to new infrastructure.	Grey-headed Flying-fox injury or mortality due to interactions with new infrastructure.	Design elements injuring/entrapping Grey-headed Flying-fox	Possible	Moderate	Medium	12	In line with Recovery Objective 9 of the <i>National Recovery Plan for Grey-headed Flying-fox</i> (DAWE, 2021), flying-fox friendly design principles will be adopted including removal of barbed/razor wire from design elements that do not require additional security to critical assets in the rail corridor.	Design Site Wide	Rare	Minor	Low	Design Review process ³ Environmental Design Report	Flying-fox friendly infrastructure not in design.	Revise design to exclude these elements.

³ Each design package will undergo internal and external reviews throughout each of the Design phases. Comments or outcomes of these reviews may include annotated drawings and all comments will be summarised on the package review spreadsheet provided with each design package. For each design package and at each stage, the review/verification process will involve internal and external reviews.

8 Baseline Assessments at Occupied Roosts

8.1 Noise, Dust and Light Baselines

Baseline assessments of noise, dust and light will be undertaken at **occupied roosts** within 300m of the project prior to **clearing** or **construction** commencing in order to effectively avoid and minimise potential impacts from **clearing** and **construction** activities.

8.1.1 Noise baseline and modelling

To assess potential noise impacts, baseline noise monitoring will be conducted at **occupied roosts** within 300m of the Project area prior to work commencing to determine the rating background level (RBL) at that roost. This assessment will be undertaken in accordance with *Transport Noise Management Code of Practice: Volume 2 – Construction Noise and Vibration (DTMR 2023)* as recommended in *A review of noise, light and dust impacts on grey-headed Flying-fox camps (Ecosure 2021)*. This baseline assessment will be documented and available upon request.

Prior to **clearing** or **construction** commencing within 300m of an **occupied roost**, noise modelling of the activities will be undertaken to assess whether the external noise criteria stated in the *Transport Noise Management Code of Practice: Volume 2 – Construction Noise and Vibration (DTMR 2023)*, included at Table 7, will be exceeded at the **occupied roost** and determine what mitigation measures need to be implemented.

Table 7: External Noise Criteria (DTMR 2023)

Work period		External noise level ($L_{Aeq,adj,15-minute}$) ^[4, 5] dB(A)	
		Lower limit	Upper limit ^[6]
Standard hours Monday–Friday 7:00am to 6:00pm Saturday 8:00am to 1:00pm		RBL + 10 ^{[1][2][3]}	75 Where: RBL > 55
			70 Where: 40 < RBL ≤ 55
			65 Where: RBL ≤ 40
Non-standard hours	Evening Monday–Friday 6:00pm to 10:00pm Saturday 1:00pm to 10:00pm Sunday 7:00am to 10:00pm	RBL + 5	RBL + 5
	Night-time Monday–Sunday 10:00pm to 7:00am		

8.1.2 Dust baseline

A baseline assessment of dust will be conducted prior to construction commencing within 300m of **occupied roosts**. Baseline will be measured at the **occupied roosts** in accordance with *Australian Standard AS/NZS 3580.10.1:2003 Methods for sampling and analysis of ambient air, Method 10.1: Determination of particulate matter—Deposited matter—Gravimetric method* and the *Queensland Environmental Protection (Air) Policy 2019*. Baseline assessments prior to construction will determine existing levels of dust at the roost and will assist in determining whether construction activities are impacting the roost. Construction activities will be monitored against the baseline data and dust criteria in Table 8.

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Table 8: Dust Criteria (Queensland Environmental Protection (Air) Policy 2019)

Parameter	Dust Criteria
Dust Deposition (monthly average)	4g/m ² /month
PM ₁₀ (24hr Average)	50 µg/m ³

8.1.3 Light baseline

Temporary construction lighting is an essential safety requirement for construction work occurring at night. To minimise artificial light impacts to occupied roosts, the project will adopt 'best practice' lighting management measures during construction, in accordance with the *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023).

Currently there are no generally agreed methods for measuring biologically relevant light for wildlife or for quantifying skyglow (DCCEEW, 2023). *National Light Pollution Guidelines for Wildlife* (DCCEEW, 2023) recommends qualitative descriptive data on visible light types, location and directivity to be collected, as well as monitoring roost behaviours.

To determine a baseline, night time inspections will check and measure the placement, intensity and orientation of existing artificial lighting (DCCEEW, 2023) near **occupied roosts** within 300m of the Project area. This baseline assessment will be conducted for a night prior to construction commencing within 300m of **occupied roosts**, be documented and available upon request.

8.2 Occupancy and Behaviour Baseline

Baseline data on roost extents, occupancy and flying-fox behaviours will be monitored by a **Suitably Qualified Ecologist** at roosts within 1000m of the Project area prior to **clearing and construction** commencing. Monitoring during and after construction will be undertaken in accordance with Section 10.2.

Data will also be collected at three comparative control roosts in the local area away from the alignment to allow the **Suitably Qualified Ecologist** to assess if changes to roosts within 1000m of the Project area are attributed construction activities or to natural environmental variation (e.g. flying-fox food availability, seasonal variation).

The **Suitably Qualified Ecologist** will collect baseline data in accordance with Section 3.2.1 of "A review of noise, light and dust impacts on grey-headed flying fox camps" (Ecosure, 2021).

9 Management Approach

The following management approaches for **clearing** or **construction** occurring within 300m of **occupied roosts** and vegetation clearing have been developed by compiling the relevant mitigation measures identified in Table 6.

9.1 Works within 300m of occupied roost

Clearing or construction activities to be conducted within 300m of an **occupied roost** will be:

- undertaken in accordance with Figure 3, below; and
- avoided during **heat stress events**; and
- scheduled to provide respite at least one day per week from activities that are above the noise baseline (Section 8.1.1) to allow flying-foxes to rest (Ecosure, 2021).

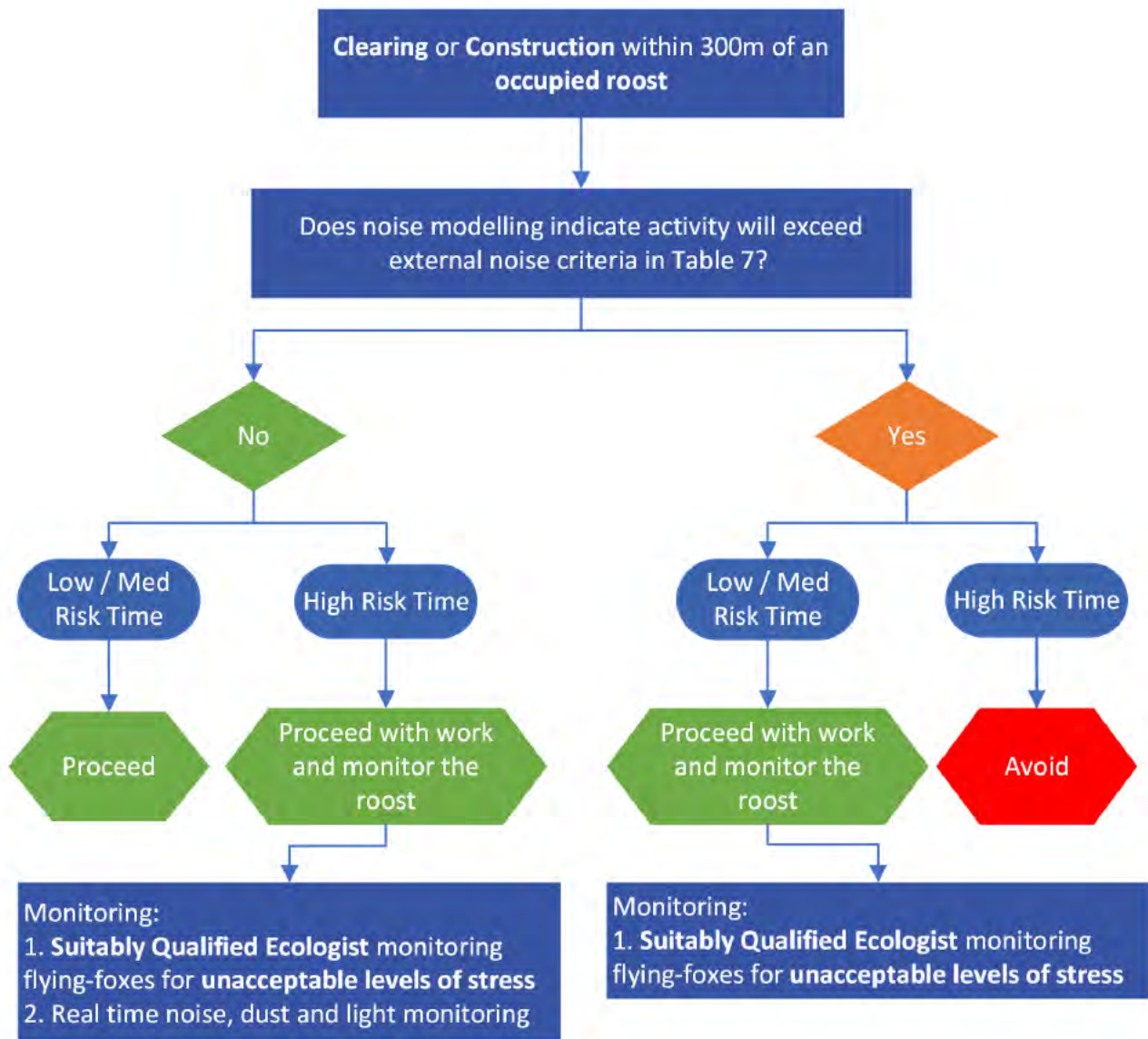


Figure 3: Process for assessing work within 300m of occupied roost

9.2 Vegetation Clearing

The following measures must be implemented for **clearing** activities:

- An approved B2N **clearing** permit must be obtained from the Project Environmental Representative prior to any **clearing** activity.
- The **clearing** boundary and protected vegetation to be physically demarcated on site by Surveyor in line with the Vegetation Protection Plan (Construction).
- To minimise the risk associated with clearing of MNES habitat during peak breeding periods, bulk clearing will be conducted during the day to avoid impacts to Flying-foxes foraging at night.
- A pre-clearing survey within vegetation to be removed must be undertaken between 10 and 20 calendar days prior to any **clearing** commencing. The survey is to be completed by a **Suitably Qualified Ecologist**. Pre-clearing surveys must include an assessment of accessible vegetation within 300m of the **clearing** activity to determine if **occupied roosts** are present. In the case that vegetation is inaccessible (e.g. privately owned) the **Suitably Qualified Ecologist** will survey as far as practicable from surrounding public land and will consider the use of thermal drones and fly-out searches to inform the survey.
- If a Flying-fox **congregation** is identified within the **clearing** area during pre-clearing surveys, the **congregation** will be dispersed in accordance with Queensland regulatory requirements, as endorsed by the *Referral guideline for management actions in grey-headed Flying-fox camps* (DCCEEW, 2015)
- **Clearing** within 300m of an **occupied roost** will be sequenced to commence at maximum distance away from the roost and then proceed towards roost.
- A **Fauna Spotter Catcher** is to be present for the duration of all **clearing** activities. The **Fauna Spotter Catcher** has the authority to:
 - ensure that Grey-headed Flying-foxes have safely moved out of the area of works of their own volition before Koala and Grey-headed Flying-fox habitat is cleared; and
 - to implement any corrective actions deemed necessary to manage **unacceptable levels of stress** to Flying-foxes (i.e. temporary stop work in the area).

10 Monitoring

10.1 Work within 300m of an occupied roost

10.1.1 Monitoring for Unacceptable Levels of Stress

For all work within 300m of an **occupied roost**, a **Suitably Qualified Ecologist** will monitor the roost for **unacceptable levels of stress**. Monitoring will be undertaken:

- once immediately prior to proposed activity
- during activity (duration of monitoring required to be determined by **Suitably Qualified Ecologist**)
- immediately following completion

The **Suitably Qualified Ecologist** has the authority to stop work and implement the adaptive management process (Section 11) to manage **unacceptable levels of stress** to flying-foxes.

10.1.2 Work During High Risk Times

When work is occurring within 300m of an **occupied roost** during **high risk times** (1 October to 31 December), noise and dust will be continuously monitored, adjacent to the **occupied roost**, and light assessed at the beginning of each night shift, for potential construction related exceedances from the baseline conditions at the roost (see Section 8.1).

Exceedances in the baseline criteria outlined in section 8.1 will trigger an inspection of the roost by a **Suitably Qualified Ecologist** to assess the source of the exceedance. If the Project is the likely source of the exceedance then the adaptive management process outlined in section 11 will be implemented.

10.2 Roost Condition Monitoring

Monitoring against the baseline assessment (Section 8.2) at the three roosts located within 1000m of the alignment (Mellum Creek Esplanade, Landsborough; Bowen Road, Glasshouse Mountains and Parkside Drive, Beerwah) will be undertaken by a **Suitably Qualified Ecologist** to evaluate the effectiveness of management measures implemented on the Project and to inform future management. Monitoring will be conducted every two months during construction and within two months of practical completion of the Project.

Data will also be collected at three comparative control roosts in the local area away from the alignment to allow the **Suitably Qualified Ecologist** to assess if changes to roosts within 1000m of the Project area are attributed construction activities or to natural environmental variation (e.g. flying-fox food availability, seasonal variation).

The **Suitably Qualified Ecologist** will determine the information to be recorded during monitoring but will be consistent with the data collected during the baseline assessment (Section 8.2).

If the **Suitably Qualified Ecologist** notes concerning behaviours during monitoring, they will assess whether the concerning behaviours are a result of work associated with the Project. If the behaviour is associated with the Project then the adaptive management measures outlined in section 11 will be implemented.

All monitoring events will be recorded in a monitoring register.

10.3 Monitoring Schedule

Table 9 details all monitoring associated with this Plan that will be undertaken on the Project.

Table 9: Monitoring Schedule

Activity	Parameter Measured	Location	Frequency
Pre-clearing survey	Presence of Grey-headed Flying-fox, roosts and foraging habitat.	Vegetation within 300m of area to be cleared	10 – 20 days prior to clearing
Fauna spotting/catching	Impact of clearing on Grey-headed Flying-foxes.	All clearing	During of clearing
Weekly Environmental Inspection	Implementation of field-based management measures identified in this plan.	Site wide	Weekly

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Activity	Parameter Measured	Location	Frequency
Noise, Dust, Light Monitoring	See section 10.1.2	Occupied roosts within 300m	As per section 10.1.2
Roost Condition Monitoring	See section 10.2	Roosts within 1000m and three control roosts	Bi-Monthly during construction Within 2 months of completion of construction
Monitoring for unacceptable levels of stress	See section 10.1.1	Occupied roosts within 300m	As per section 10.1.1
Quarterly Independent Audit	Implementation of this plan.	Site wide	Quarterly
EPBC 2020/8803 Independent Audit	Compliance with EPBC conditions.	Site wide	Every 36 months

11 Adaptive Management Process

Where monitoring undertaken in Section 10 identifies that management measures associated with **clearing** and **construction** are ineffective or inefficient in avoiding or minimising impacts to Grey-headed Flying-foxes then adaptive management measures will be implemented under the guidance and direction of a **Suitably Qualified Ecologist**. Adaptive management measures implemented on the Project and their outcomes will be recorded in a register for auditing purposes.

Adaptive management measures that may be adopted on the advice of a **Suitably Qualified Ecologist** include:

- continue works with **Suitably Qualified Ecologist** monitoring at the roost
- implement or extend Flying-fox respite periods
- adjust noise, dust and/or light mitigation measures being uses (e.g. increased frequency of water carts for dust suppression)
- implement real time noise, dust and/or light monitoring
- review proposed work activities and consider implementing alternative (less disruptive) methodology
- consider if works can be postponed to a different time of day or time of year

Conversely, if the **Suitably Qualified Ecologist** determines that Grey-headed Flying-foxes are unaffected by certain **clearing** or **construction** activities, with multiple monitoring instances to support this, monitoring frequency may be reduced for these activities. This will be at the discretion of the **Suitably Qualified Ecologist**.

12 Incident and Non-Compliance

12.1 Flying-fox Incident Procedure

For any incident onsite involving a Flying-fox the steps in Table 10 must be followed.

Table 10: Grey-headed Flying-fox Incident Procedure

Grey-headed Flying-fox Incident Procedure	
1.	Stop work until Suitably Qualified Ecologist confirms risk has been mitigated and that works can recommence
2.	Notify Supervisor and Project Environmental Representative (0419 720 571)
3.	Establish a 25m radius no-go zone around the animal(s) and notify a Fauna Spotter Catcher .
4.	Fauna handling will be managed by the Fauna Spotter Catcher and be in accordance with 'Code of Practice: Care of Sick, Injured or Orphaned Protected Animals in Queensland, Nature Conservation Act 1992', approvals, licences, permits
5.	Fauna Spotter Catcher to take injured fauna to: Australia Zoo Wildlife Hospital 1638 Steve Irwin Way Beerwah QLD 4519 Ph: (07) 5436 2097
6.	Notify relevant parties, including, the Administrator, DES (email wildlife.management@des.qld.gov.au) and the Australian Government Agency responsible for administering the EPBC Act.
7.	Enter incident into Soteria
8.	Investigate incident and implement corrective actions and/or adaptive management process to prevent reoccurrence

12.2 Incidents

A protected matter is that which is protected under a controlling provision in Part 3 of the EPBC Act for which EPBC Approval 2020/8803 has effect. In this instance the protected matter is Grey-headed Flying-fox.

An incident is any event which has the potential to, or does, impact on protected matters (Grey-headed Flying-fox) other than as authorised by EPBC Approval 2020/8803.

Incidents will be investigated by the Project Environmental Representative with a **Suitably Qualified Ecologist**. If the investigation determines that incident occurred due to management measures being insufficient, then the adaptive management process (Section 11) will be implemented.

12.3 Non-compliance

Any non-compliance with the commitments in this plan or conditions in EPBC Approval 2020/8803 must be immediately reported by the Project Environmental Representative to the Approval Holder.

A non-compliance may be identified through monitoring, inspections or audits.

Non-compliances will be investigated by the Project Environmental Representative. If the investigation determines that the non-compliance occurred due to management measures being insufficient, then the adaptive management process (Section 11) will be implemented.

12.4 Reporting Incidents and Non-compliance

The Approval Holder will maintain accurate and complete compliance records. 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.

Any incident or non-compliance must be reported by the Project Environmental Representative to the Administrator and Approval Holder within 24 hours after becoming aware of the incident or non-compliance.

The approval holder must notify the Australian Government Agency responsible for administering the EPBC Act 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 2 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
- 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.

The approval holder must provide to the Australian Government Agency responsible for administering the EPBC Act 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
- c) the method and timing of any remedial action that will be undertaken by the approval holder.

13 Inspections, Audits and Reporting

13.1 Weekly Environmental Inspection

Weekly environmental inspections will be undertaken by the Project Environmental Representative. The weekly environmental inspection must consider the effectiveness of measures in this plan. The inspections are to be recorded in Soteria and appropriate actions must be raised for any non-conformances identified.

Weekly Environmental Inspections will be provided to the Client as part of the Project Monthly Report.

13.2 Independent Audits

13.2.1 Quarterly environmental audits

Quarterly environmental audits will be undertaken by an independent environmental auditor approved by the Administrator and will audit compliance with the Project Environmental Management System, including this Plan.

The Administrator may undertake additional independent environmental audits of this Plan.

13.2.2 EPBC 2020/8803 Independent Audit

Condition 17 of EPBC 2020/8803 requires the Approval Holder to undertake independent audits of compliance with the conditions of the approval every 36 months. Compliance with this plan is likely to be audited as part of these independent audits. Independent audits will be organised by the Approval Holder.

13.3 Reporting

Table 11 details all the reporting that will be conducted by the Project.

Table 11: Reporting Schedule

Report	Content	Responsibility	Provided to	Timing
Pre-clearing survey report	Findings from pre-clearing surveys	Suitably Qualified Ecologist	Administrator	Prior to clearing
Fauna spotting/catching Post Work Report	The report must include: a) details of the Fauna Spotter Catcher ; b) information on the work completed including dates and process (including area Grey-headed Flying-fox habitat cleared); c) sightings and movement of Grey-headed Flying-fox; d) details of Flying-fox incidents (including injuries and fatality) during clearing; and e) measures implemented to reduce unacceptable levels of stress to sighted Grey-headed Flying-fox.	Fauna Spotter Catcher	Administrator	With Monthly Project Report
Roost Condition Monitoring Report	Report detailing the results of roost condition monitoring undertaken in accordance with Section 10.2	Suitably Qualified Ecologist	Project Environmental Representative	Bi-monthly
Monthly Project Report	Details progress of works, outcomes of monitoring and auditing and details of incidents.	Project Environmental Representative	Administrator	Monthly

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Report	Content	Responsibility	Provided to	Timing
Weekly Environmental Inspection	Findings from weekly environmental inspections.	Project Environmental Representative	Administrator	Weekly and included in Monthly Project Report
Quarterly Independent Audit	Findings from the quarterly independent audits.	Project Environmental Representative	Administrator	Quarterly
Annual Compliance Report	<p>Written report:</p> <ul style="list-style-type: none"> i. providing accurate and complete details of compliance, incidents, and non-compliance with the conditions and the plans ii. consistent with the Department's <i>Annual Compliance Report Guidelines (2014)</i> iii. include a shapefile of any clearance of any protected matters, or their habitat, undertaken within the relevant 12 month period iv. annexing a schedule of all plans prepared and in existence in relation to the conditions during the relevant 12 month period. 	Approval Holder	DCCEEW	12 months
EPBC 2020/8803 Independent Audit	Audit of approval conditions, conducted by an independent and suitably qualified person as detailed in the <i>Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines (2019)</i> .	Approval Holder	DCCEEW	36 months

14 Review

This Plan will be reviewed by the Project Environmental Representative and the Approval Holder:

- following a significant incident or non-compliance; or
- if an audit specified in Section 13 determines that the effectiveness of the Plan or aspects of the Plan could be improved.

Reviews will take into account monitoring records, corrective actions and audits findings. If the review determines that amendments to the Plan are required, then the reason for those changes must be documented.

Any amendments to this Plan will be submitted to the Australian Government Agency responsible for administering the EPBC Act for approval by the Minister administering the EPBC Act. Revised management measures cannot commence until the new revision of the Plan has been approved by the Minister administering the EPBC Act.

15 References

- ARUP 2020, Beerburrum to Nambour Rail Upgrade Project Commonwealth Matters Ecological Report for the Department of Transport and Main Roads to support referral to the Department of Agriculture, Water, and the Environment (DAWE) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- DCCEEW 2015, Referral guideline for management actions in grey-headed and spectacled Flying-fox camps, [Referral guideline for management actions in grey-headed and spectacled Flying-fox camps \(dcceew.gov.au\)](https://www.dcceew.gov.au)
- DAWE 2021, National Recovery Plan for the Grey-headed Flying-fox '*Pteropus poliocephalus*', Department of Agriculture, Water and the Environment, [National Recovery Plan for the Grey-headed Flying-fox \(agriculture.gov.au\)](https://www.agriculture.gov.au)
- DCCEEW 2023, National Light Pollution Guidelines for Wildlife, Department of Climate Change, Energy, the Environment and Water, [National Light Pollution Guidelines for Wildlife \(dcceew.gov.au\)](https://www.dcceew.gov.au)
- DES 2021a, Code of Practice - Ecologically sustainable management of Flying-fox roosts, Department of Environment and Science, Queensland, <http://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/roost-management.html>
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Appendix A Independent Endorsement



[REDACTED]
John Holland Seymour Whyte Joint Venture
1 Church St
Beerburrum
QLD 4517

03 July 2024

Dear [REDACTED]

The Department of Transport and Main Roads (the approval holder), as part of the Beerburrum to Nambour Rail Upgrade project (B2N project), is required to meet conditions of approval (EPBC 2020/8803) to avoid impacts to the grey-headed flying-fox (*Pteropus poliocephalus*).

Condition 3 specifically states that:

For the ongoing protection of Grey-headed Flying-fox populations, the approval holder must:

- (a) Submit an Environmental Management Plan (EMP) for the Minister's approval that, to the satisfaction of the Minister, details avoidance and mitigation measures to manage the impacts from clearing and construction on Grey-headed Flying-fox roosts.*
- (b) Prepare the EMP in accordance with the Environmental Management Plan Guidelines.*
- (c) Not commence clearing or construction in the areas represented in Attachment A by the zones enclosed by the lines designated 'EPBC Stage 1 Main Works Boundary' and 'EPBC Stage 2 Boundary' identified by the aqua and green boundaries respectively, unless the Minister has approved the EMP in writing.*
- (d) Implement the approved EMP until the completion of the Action.*

In line with Condition 3, a draft Grey-headed Flying-fox Management Plan (the Plan) has been prepared.

Endorsement of the draft Plan by a suitably qualified and experienced person has been sought for further assurance that the document satisfies requirements of Condition 3 of EPBC approval 2020/8803.

I have been involved in flying-fox conservation, monitoring, management and impact avoidance/mitigation for over 13 years. During this time I have guided work to avoid impacting flying-foxes at more than 170 roosts, acted as an expert witness during a flying-fox Parliamentary enquiry, convened the annual national Flying-fox Forum for eight years, and advised on flying-fox policy for all levels of government. Please find my curriculum vitae attached.

Based on my experience, I suggest a 300 m buffer between occupied roosts and construction in this scenario is sufficient to avoid impacts. This is specifically based on:

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Bowen Hills QLD 4006
PO Box 675
Fortitude Valley QLD 4006

Telephone 07 3606 1030

ABN 631 0606 7976
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- monitoring flying-fox roosts for numerous construction projects of similar scale and scope where impacts have been effectively avoided using mitigation measures consistent with the draft Plan
- data collected and collated for *A review of noise, light and dust impacts on grey-headed flying fox camps* (dcceew.gov.au) (Ecosure 2021), where no roost is known to have abandoned due to construction of similar projects where a 300 m buffer from all works was applied
- assessment of the three roosts (not nationally important) within 1 km of the B2N footprint, all of which are in an urban setting and would likely have moderate-high tolerance to noise and light (noting dust may not be otherwise encountered but with dust avoidance measures and monitoring considered sufficient to ensure dust is not an impact at this distance).

It is recommended the following monitoring measures are included in the Plan:

1. Monitoring the three roosts within 1 km of the alignment before, during (at least every two months) and after construction to evaluate the Plan and inform future management. Data should be collected at three comparative control camps in the local area away from the alignment to assess if potential roost changes during construction are likely to be attributed to natural environmental variation (e.g. flying-fox food availability) or could be linked with construction. These data, along with noise, dust and light monitoring data collected during construction, should be shared with the Department of Climate Change, Energy, the Environment and Water (DCCEWW) to inform future project assessment and conditions.
2. Pre-clear assessments to include a 300 m radius search for roosting flying-foxes to allow early identification of potential new roosts and timely management in accordance with the Plan. It is acknowledged that some land in the surrounds will not be accessible (e.g. private property), in which case the Suitably Qualified Ecologist (as defined in the Plan) will survey as far as practicable from surrounding public land. Surveys should consider the use of thermal drones and fly-out searches.

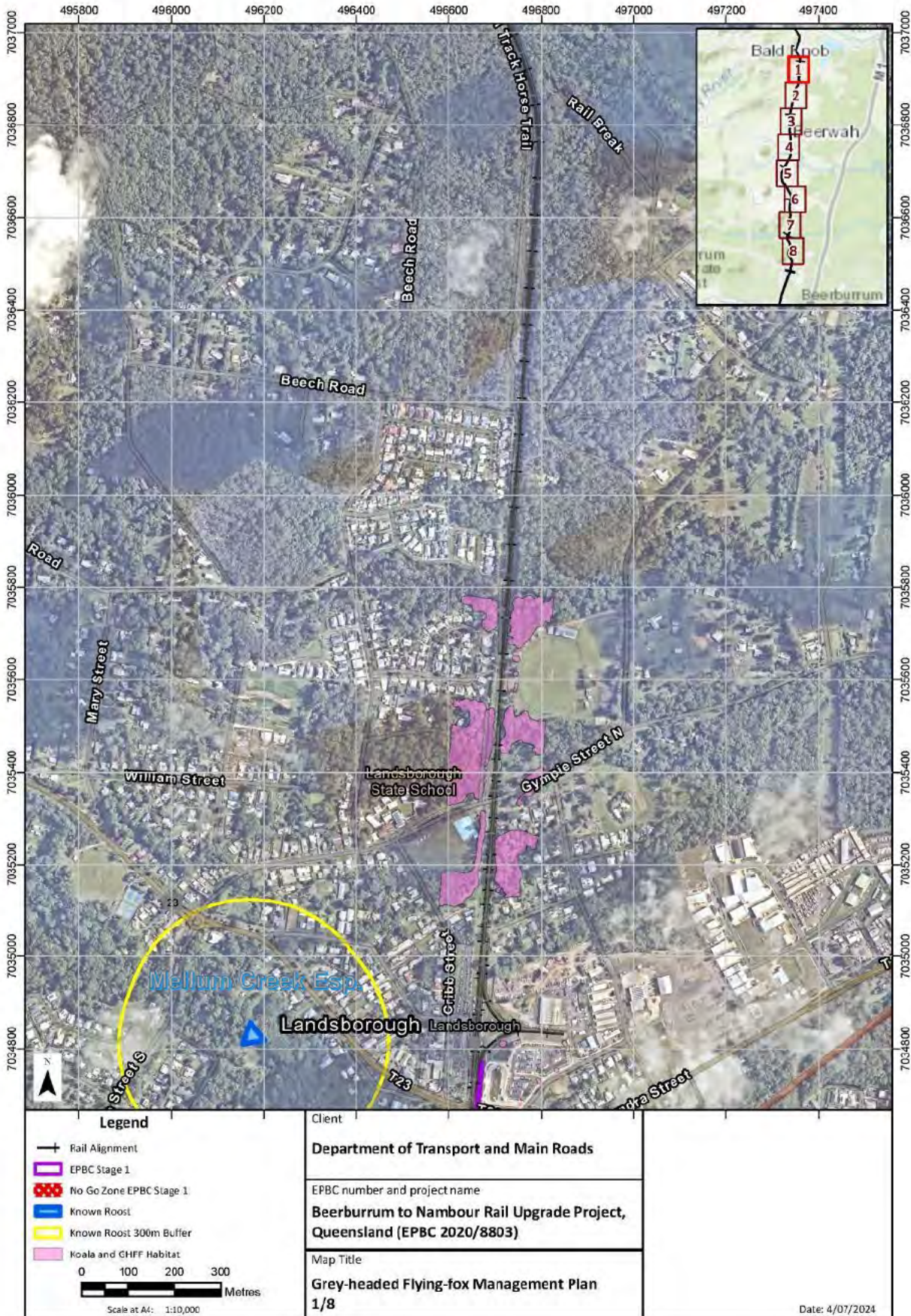
Having reviewed the draft Plan (version dated 28 June 2024), it is my professional opinion Condition 3 has been met, and with the above additions I am happy to provide my endorsement.

Please do not hesitate to contact me to discuss or if you further information is required.

Yours sincerely,

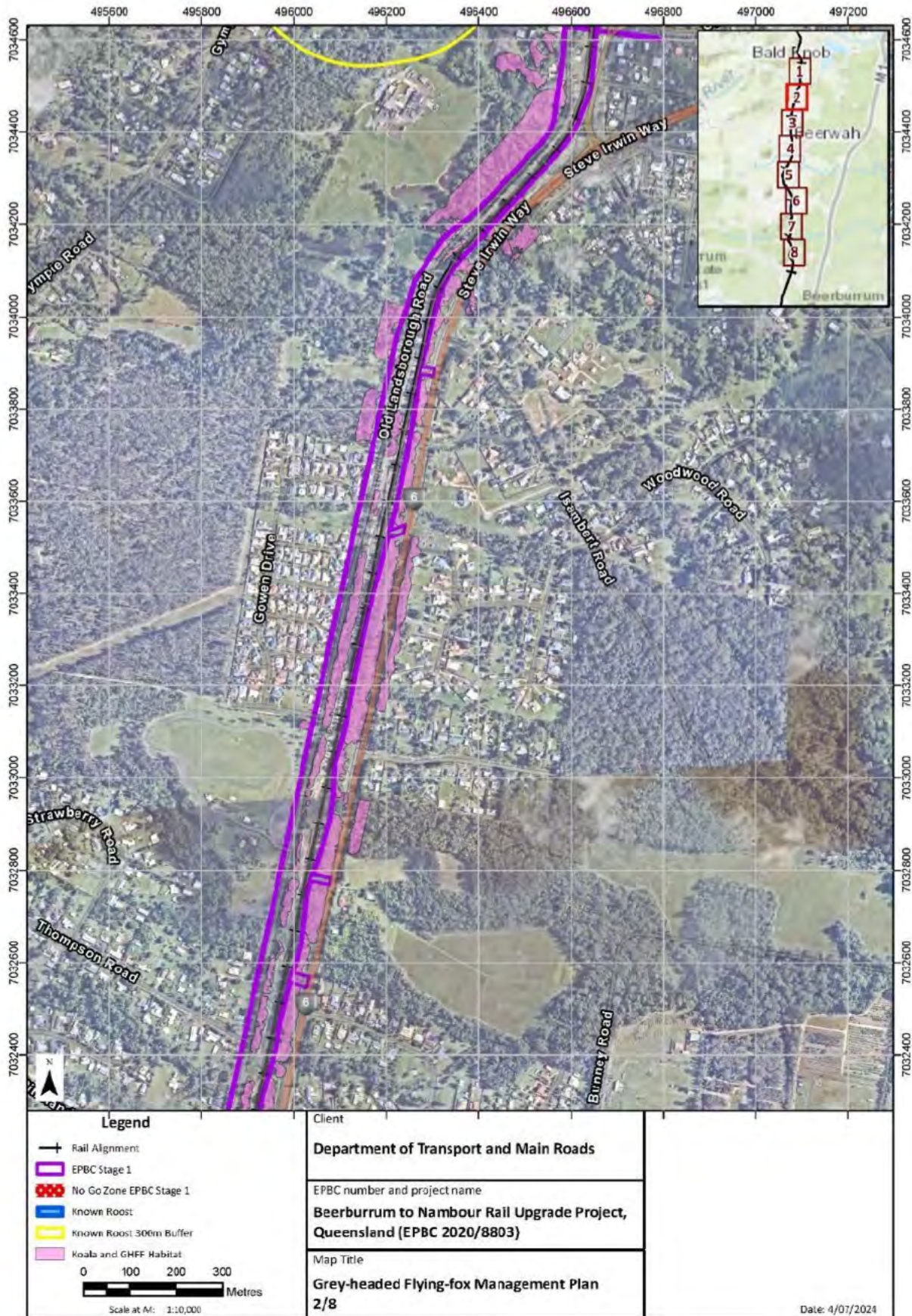
Principal Wildlife Biologist

Appendix B Habitat and known roost site maps



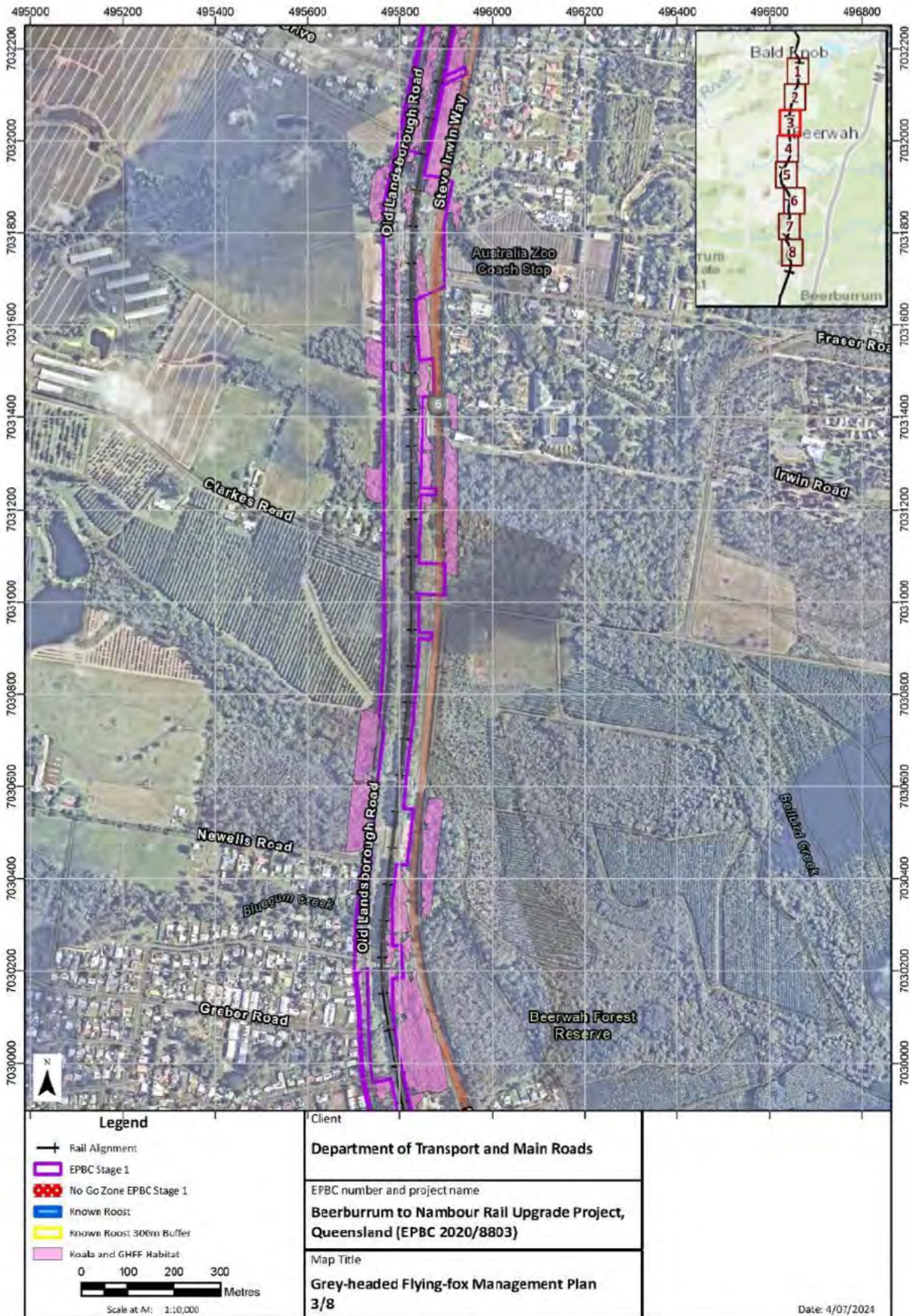
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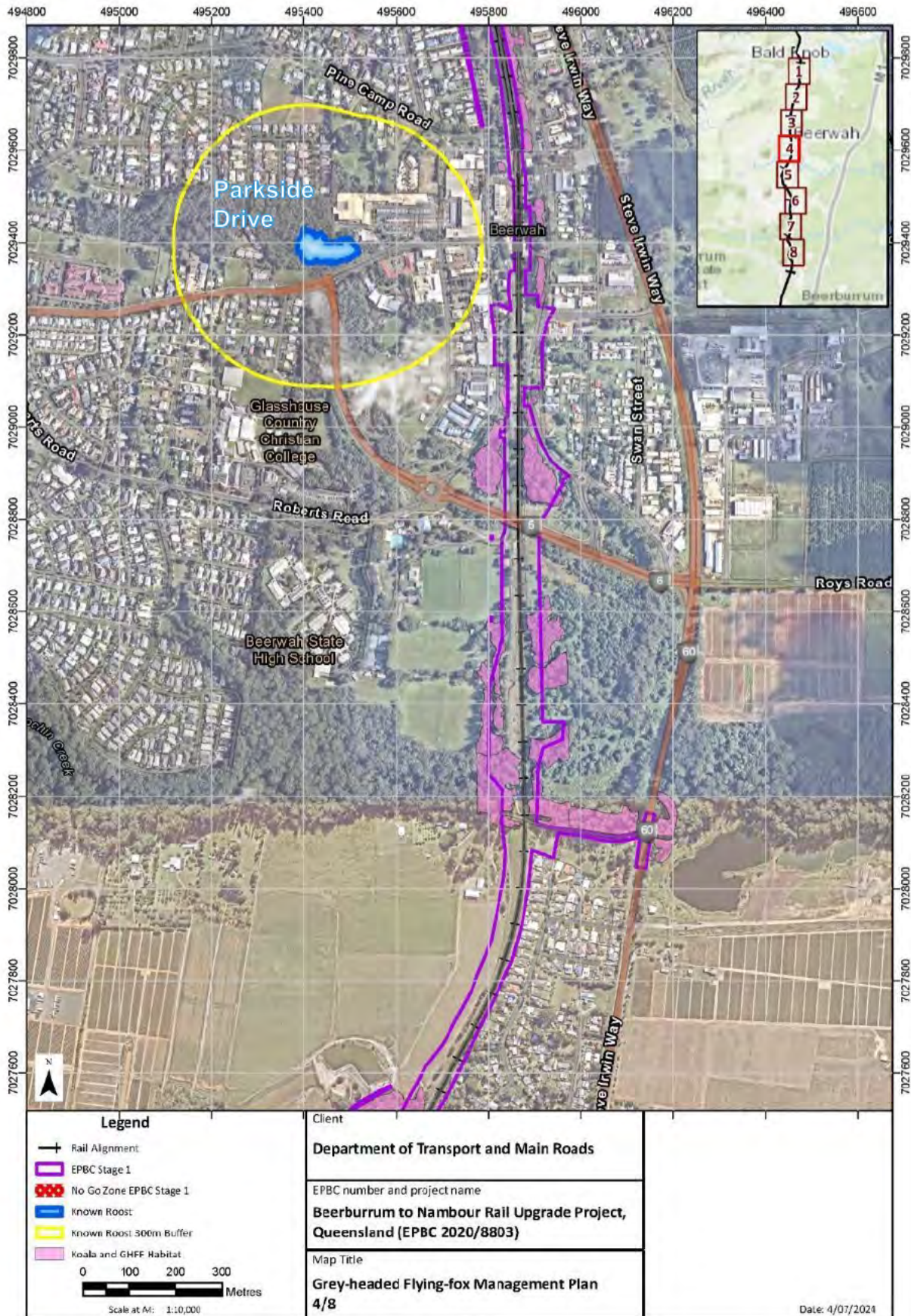
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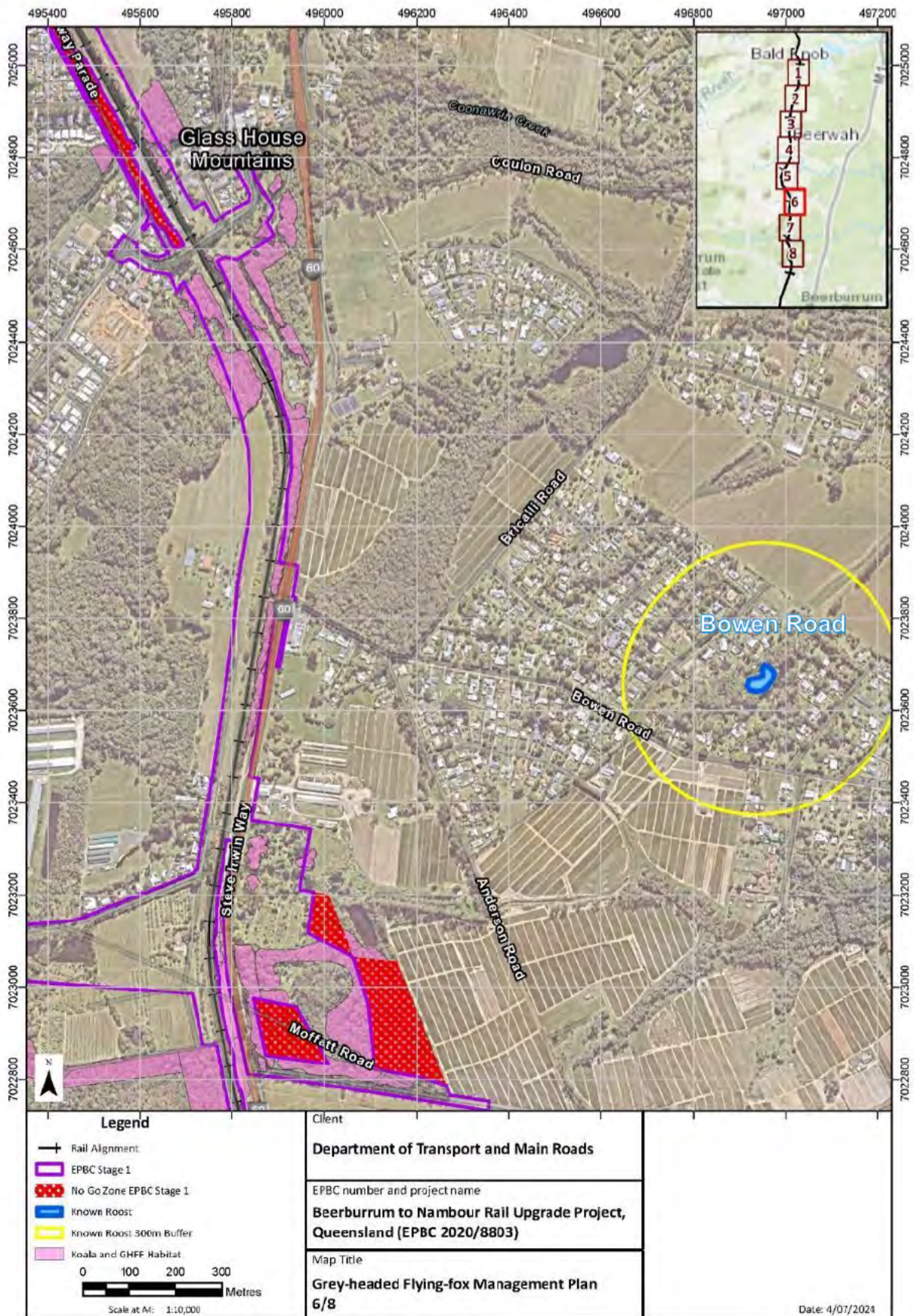
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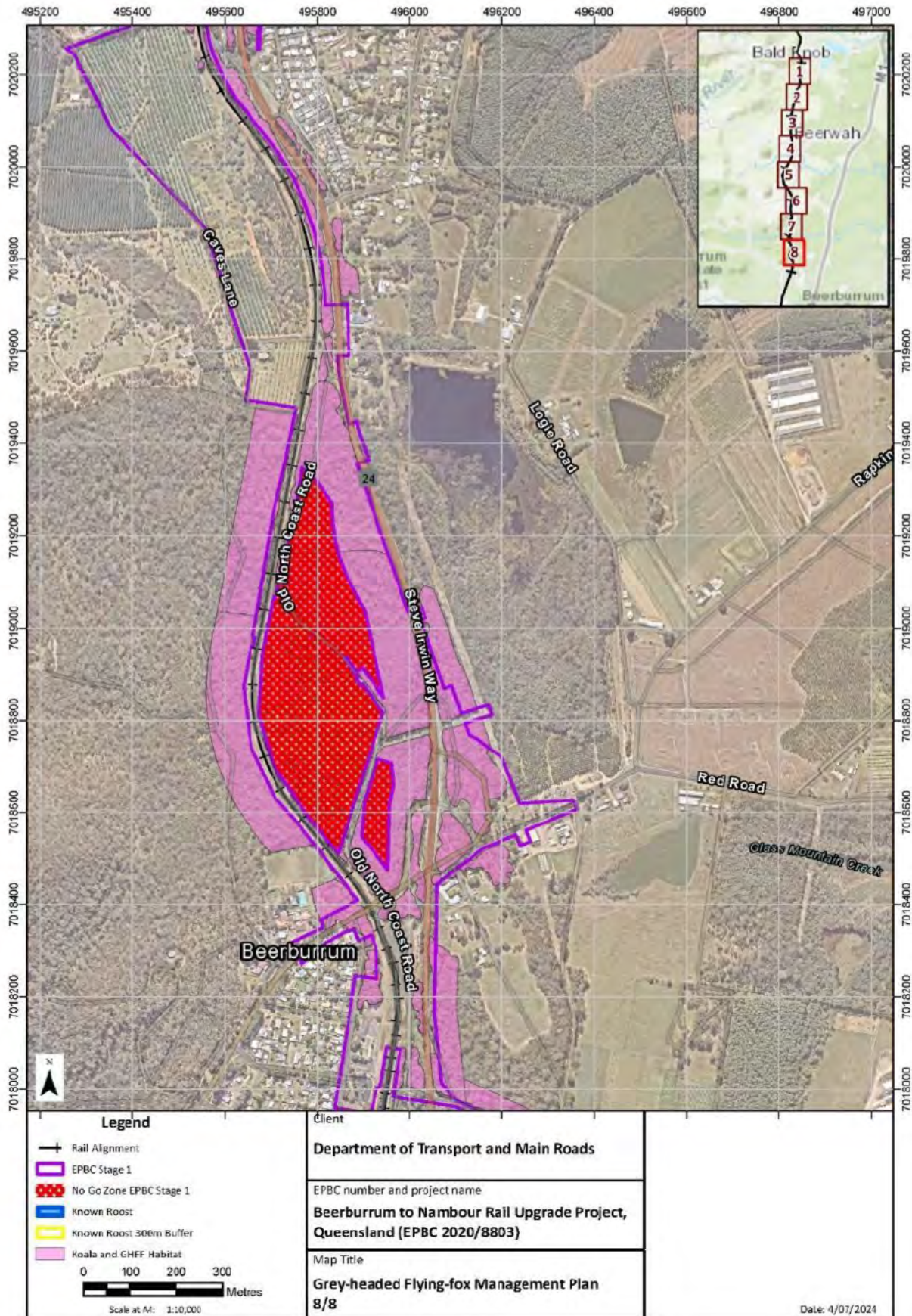
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Appendix C Risk Rating Matrix

Risk Rating

		Consequence				
		Minor	Moderate	High	Major	Critical
Likelihood	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Likelihood and Consequence

Qualitative measure of likelihood (how likely is it that this event or circumstances will occur after management actions have been put in place or are being implemented)	
Highly Likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence or result if the issue does occur)	
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage
Major	Major loss of environmental amenity and real danger of continuing
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive effort
Minor	Minor incident of environmental damage that can be reversed