Appendix G: MNES Assessment

WEDGETAIL
PROJECT CONSULTING

EPBC Act Controlled Action
Supplementary Assessment

Bobs Far Sand Quarry

3631 Nelson Bay Road, Bobs Farm, NSW 2316



Report prepared for:
Newcastle Sands

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11 May 2026

Bobs Far Sand Quarry

EPBC Act Supplementary Assessment

3631 Nelson Bay Road, Bobs Farm, NSW 2316

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1. INTRODUCTION

1.1 SCOPE

The proposed Bobs Farm Sand Quarry Project (SSD-99860959) (i.e. the "proposed action") was determined to be a "controlled action" under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 26 March 2026. The EPBC Act controlling provision for the proposed action is; *listed threatened species and communities* (section 18 and 18A). The proposed action will be assessed under the Bilateral Agreement between New South Wales and the Commonwealth. The supplementary NSW Planning Secretary's environmental assessment requirements (supplementary SEARs) in relation to the MNES identified in the Commonwealth Minister's controlled action decision.

The following terms are used throughout to describe geographical areas applicable to the assessment:

- **Project Area** - 3631 Nelson Bay Road, Bobs Farm, NSW 2316 (254/DP753204)
- **Disturbance Footprint** - Areas subject to direct and indirect impacts
- **Locality** – Area within 5km of the Project Area.

The following assessment has been completed in accordance with the supplementary SEARs, Commonwealth Minister's decision, and relevant EPBC assessment guidelines.

1.2 SUPPLEMENTARY SEARS

The supplementary SEARs in relation to the MNES identified in the Commonwealth's Minister's controlled action decision include the following:

1. *On 10 April 2026, a delegate of the Commonwealth Minister for the Environment and Water (Commonwealth Minister) determined that the Bobs Farm Sand Quarry Project (SSD-99860959) was a controlled action under section 75 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act controlling provision for the proposed action is:*

   a) *listed threatened species and communities (sections 18 and 18A).*

2. *The proposed action will be assessed in accordance with the bilateral assessment agreement between the Australian and NSW governments (Amending Agreement No.1, 2020). The assessment documentation must include:*

   a) *an assessment of all impacts that the action is likely to have on each matter protected by a provision of Part 3 of the EPBC Act;*

   b) *enough information about the proposal and its relevant impacts to allow the Commonwealth Minister to make an informed decision on whether or not to approve; and*

   c) *information addressing the matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations).*

3. *The Applicant must undertake an assessment of all protected matters that may be impacted by the development under the controlling provision identified in paragraph 1. The Australian*

Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) considers that there is likely to be a significant impact on the following:

a) *Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (Phascolarctos cinereus) – Endangered.*

- *The proposed action involves the removal of up to approximately 24.5 ha of habitat critical to the survival of the Koala.*

b) *Grey-headed Flying -fox (Pteropus poliocephalus) – Vulnerable.*

- *The proposed action involves the removal of up to approximately 24.5 ha of habitat critical to the survival of the Grey-headed Flying-fox.*

c) *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland – Endangered*

- *The proposed action is likely to adversely affect habitat critical to the survival of up to approximately 0.35 ha of Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland.*

4. *DCCEEW also considers that the proposed action may result in significant impacts to the following species:*

a) *Swift Parrot (Lathamus discolor) – Critically endangered;*

b) *Regent Honeyeater (Anthochaera phrygia) - Critically endangered;*

c) *Spotted -tailed Quoll (southeastern mainland population) (Dasyurus maculatus maculatus) – Endangered;*

d) *South -eastern Glossy Black Cockatoo (Calyptorhynchus lathami lathami) – Vulnerable;*

e) *Yellow -bellied Glider (south -eastern) (Petaurus australis australis) – Vulnerable; and*

f) *New Holland Mouse (Pseudomys novaehollandiae) – Vulnerable.*

These species require further assessment, surveys and analysis to determine whether they are likely to be significantly impacted.

5. *The Applicant must consider each of the protected matters under the triggered controlling provision that may be impacted by the action. Note that the above may not be a complete list and it is the responsibility of the Applicant to undertake an analysis of the significance of the relevant impacts and ensure that all protected matters that are likely to be significantly impacted are assessed for the commonwealth Minister's consideration.*

General requirements

Relevant Regulations

6. *The Environmental Impact Statement (EIS) must address the matters outlined in Schedule 4 of the EPBC Regulations and the matters outlined below in relation to the controlling provisions.*

Project Description

7. *The title of the action , the background of the action and current status .*

8. *The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on matters of national environment significance (MNES).*

9. *How the action relates to any other actions that have been or are being taken in the region affected by the action.*

10. *How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.*

Impacts

11. *The EIS must include an assessment of the relevant impacts 1 of the action on the matters protected by the controlling provisions, including:*

    a) *a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;*

    b) *a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;*

    c) *analysis of the significance of the relevant impacts; and*

    d) *any technical data and other information used or needed to make a detailed assessment of the relevant impacts.*

Avoidance, mitigation and offsetting

12. *For each of the relevant protected matters that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including:*

    a) *a description, and an assessment of the expected or predicted effectiveness of the mitigation measures;*

    b) *any statutory policy basis for the mitigation measures;*

    c) *the cost of the mitigation measures;*

    d) *an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing; and*

    e) *the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.*

13. *Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.*

14. *For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any:*

    a) *conservation advice or recovery plan for the species or community;*

    b) *relevant threat abatement plan for a process that threatens the species or community;*

c) *wildlife conservation plan for the species; and*

d) *any strategic assessment.*

[Note : the relevant guidelines and policy statements for each species and community are available from the Commonwealth DCCEEW Species Profiles and Threats Database: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl]

Specific risks

15. The key risk associated with the proposed action from the Commonwealth perspective include :

a) *Direct threats to listed species and ecological communities:*

i. *Habitat clearing*

ii. *Displacement from critical foraging, nesting and/or breeding habitat.*

b) *Indirect threats to listed species and ecological communities:*

i. *Fragmentation and degradation of habitat, including reduced habitat connectivity and edge effects*

ii. *Vehicle strike*

iii. *Invasive flora species and weed dispersal*

iv. *Fire regime changes*

v. *Reduced habitat quality due to noise, light spill, dust, fumes, smoke, mist or other particulate matter during construction and operation*

vi. *Hydrological regime changes, including ground disturbance, compaction, drainage modification, or changes to runoff patterns may reduce waterlogging or seasonal inundation essential to maintaining swamp sclerophyll forest structure and function.*

Assessment Requirements

16. The EIS must identify each EPBC Act listed threatened species and ecological community to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.

17. For each of the EPBC Act listed species predicted to occur in the project site, and each of the EPBC Act listed ecological communities likely to be significantly impacted, the EIS must provide:

a) *Survey results, including details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Commonwealth guidelines and policy statements. For ecological communities, this includes any condition thresholds provided in the listing advice or approved conservation advice.*

b) *A description and quantification of habitat in the study area (including suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including species and communities listing advice, conservation advice, recovery plans and threat abatement plans.*

c) *Maps displaying the above information (specific to EPBC matters) overlaid with the proposed action. It is acceptable, where possible, to use the mapping and assessment of Plant Community Types (PCTs) and the species surveys prescribed by the BAM as the bas is for identifying EPBC Act -listed species and communities. The EIS must clearly identify which PCTs are considered to align with habitat for the relevant EPBC Act -listed species or communities and provide individual maps for each species or community.*

d) *A description of the nature, geographic extent, magnitude, timing and duration of any likely direct, indirect and consequential impacts on any relevant EPBC Act -listed species and communities. It must clearly identify the location and quantify the extent of all impact areas to each relevant EPBC Act -listed species or community.*

e) *Information on proposed avoidance and mitigation measures to deal with the impacts of the action, and a description of the predicted effectiveness and outcomes that the avoidance and mitigation measures will achieve.*

f) *Quantification of the offset liability for each species and community significantly impacted, and information on the proposed offset strategy, including discussion of the conservation benefit for each species and community, how offsets will be secured, and the timing. It is a requirement that offsets directly contribute to the ongoing viability of the specific protected matter impacted by a proposed action i.e., 'like -for -like'.*

   i. *Like -for -like includes protection of native vegetation that is the same ecological community or habitat being impacted (preferably in the same region where the impact occurs), or funding to provide a direct benefit to the matter being impacted e.g., threat abatement, breeding and propagation programs or other relevant conservation measures.*

18. *Any significant residual impacts not addressed by the BAM may need to be addressed in accordance with the EPBC Act 1999 Environmental Offset Policy. https://www.dcceew.gov.au/environment/epbc/publications/epbc-act-environmental-offsets-policy.*

Other approvals and conditions

19. *Information in relation to any other approvals or conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations.*

Environmental record of person proposing to take the action

20. *Information in relation to the environmental record of a person proposing to take the action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations.*

Information sources

21. *For information given in a n EIS , the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested; and what uncertainties (if any) are in the information.*

Relevant References and guidelines

22. *The international conventions, management plans and principles that must be considered in relation to this proposal include:*

    a) *Listed threatened species or ecological community :*

i. *Australia's obligations under the:*

- *Convention on Biological Diversity (Biodiversity Convention);*
- *Convention on Conservation of Nature in the South Pacific (Apia Convention);*
- *the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); or*

ii. *a recovery plan or threat abatement plan.*

23. *The policies and plans that must be considered in relation to this proposal include:*

a) *Significant Impact Guidelines 1.1: Matters of National Environmental Significance (2012)*

b) *Relevant conservation advices and other relevant policies available on DCCEEW 's Species Profile and Threats (SPRAT) Database and EPBC Act publications and resources – DCCEEW webpage;*

c) *bioregional plans ; and*

d) *relevant strategic assessment reports .*

24. *Commonwealth listing advice, survey guidelines and referral guidelines contain information on threatened species and ecological communities which may provide further information for evaluating the significance of residual impacts on the action's controlling provisions. These documents may be found on the DCCEEW SPRAT Database .*

25. *Guidance on the biodiversity offset scheme for a major project where there are predicted to be impacts on matters on MNES can be found via the NSW Department of Planning, Housing and Infrastructure website below.*

Key Guidance – Biodiversity:

- *https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines/key-guidance/biodiversity*

Guidelines for matters of environmental significance:

- *https://www.planningportal.nsw.gov.au/sites/default/files/documents/2024/Guidance%20for%20Accredited%20Assessors%20-%20MNES%20form%20_0.pdf*

26. *Other references*

- *Environment Protection and Biodiversity Conservation Act 1999 - section 51 -55, section 96A(3)(a)(b), 101A(3)(a)(b), section 136, section 527E*
- *Environment Protection and Biodiversity Conservation Regulations 2000 Schedule 4*
- *Commonwealth and NSW Governments Bilateral Agreement (Amending Agreement No.1, 2020) - Item 2 (a)(i) of Schedule 1*

1.3 APPROACH

The requirements of the Supplementary SEARs (see **Section 1.2**), will be met through the following detailed assessment provided in the following subsections:

- Project Description (**Section 2**) including:
  - Description of action
  - Elements of the action that may impact MNES
  - How the action relates to other actions within the region
- Detailed Assessment of relevant MNES including (**Section 3**):
  - Surveys completed (**Section 3.2**),
  - Area of suitable habitat within the Project Area and Disturbance Footprint (**Section 3.3**)
  - Presence of Important Populations or Habitat Critical to the Survival of the MNES (**Section 3.4**)
- Detailed proposed measures to avoid, mitigate and manage impacts to MNES (**Section 4**)
- Detailed assessment of impacts to MNES (direct, indirect and cumulative) (**Section 0**)
- Residual significant impact assessment in-line with the Significant Impact Guidelines 1.1 (**Section 6**)
- Detailed measures to compensate for residual significant impacts on MNES in accordance with the EPBC Act Environmental Offsets Policy (2012) or endorsed offset framework (**Section 7**)

2. PROJECT DESCRIPTION

2.1 DESCRIPTION OF WORKS

The Proponent seeks to develop the site for an extractive industry as a sand quarry (**Figure 1** and **Figure 2**). Consent is sought for annual extraction of 530,000tpa for 10 years, equating to a total life-of-quarry of approximately 4.4 million tonnes. It is anticipated the proposal will average sales of 10,000 to 12,000 tonnes per week.

The site has an area of approximately 40.9ha with the proposal seeking to use the entirety of the subject site for extractive industry purposes with the exception of:

A minimum 15m buffer between the site boundary and any areas of extraction

The existing right-of-carriage way including a 3m buffer in the north-east of the site including the area east of this right-of-carriageway

The existing electricity easement including a 3m buffer at the southern end of the site and the vegetated area to the south of this easement

No dredging is proposed with only dry (surface) sand extraction being employed.

Preparation of the site and proposed sand quarry operations would broadly comprise:

- Construction of a new left-in left-out intersection
- Establishment of processing and sales area including installation of onsite office (Atco structure), installation of screening and wash facilities, designation of stockpiling areas, associated ancillary structures, and use of the existing dwelling at the site for a manager's residence
- Staged vegetation clearing and topsoil stripping in accordance with the approved staging plan with topsoil stored onsite to be used for future rehabilitation works.
- Dry extraction down to a maximum of 0.7m above the ground water table
- Ongoing rehabilitation

Day-to-day operations would require two (2) articulated haul trucks (Volvo A40G) loaded by a hydraulic excavator (Volvo EC350) to transport sand from the extraction area to the on-site processing facility being a full electric screen and wash plant. Equipment will include excavators, front-end loaders, haul trucks, conveyors and water carts. Operations will utilise modern, well-maintained equipment incorporating advanced noise attenuation and water saving measures as well as fuel efficiency technology to reduce operational impacts on the surrounding environment.

The site benefits from a Water Access Licence (WAL5960) for 40ML per annum which is proposed to be used for sand washing purposes. Approximately 85% of extracted sand will be washed requiring a total of approximately 32ML per annum which is within the current Water Access Licence.

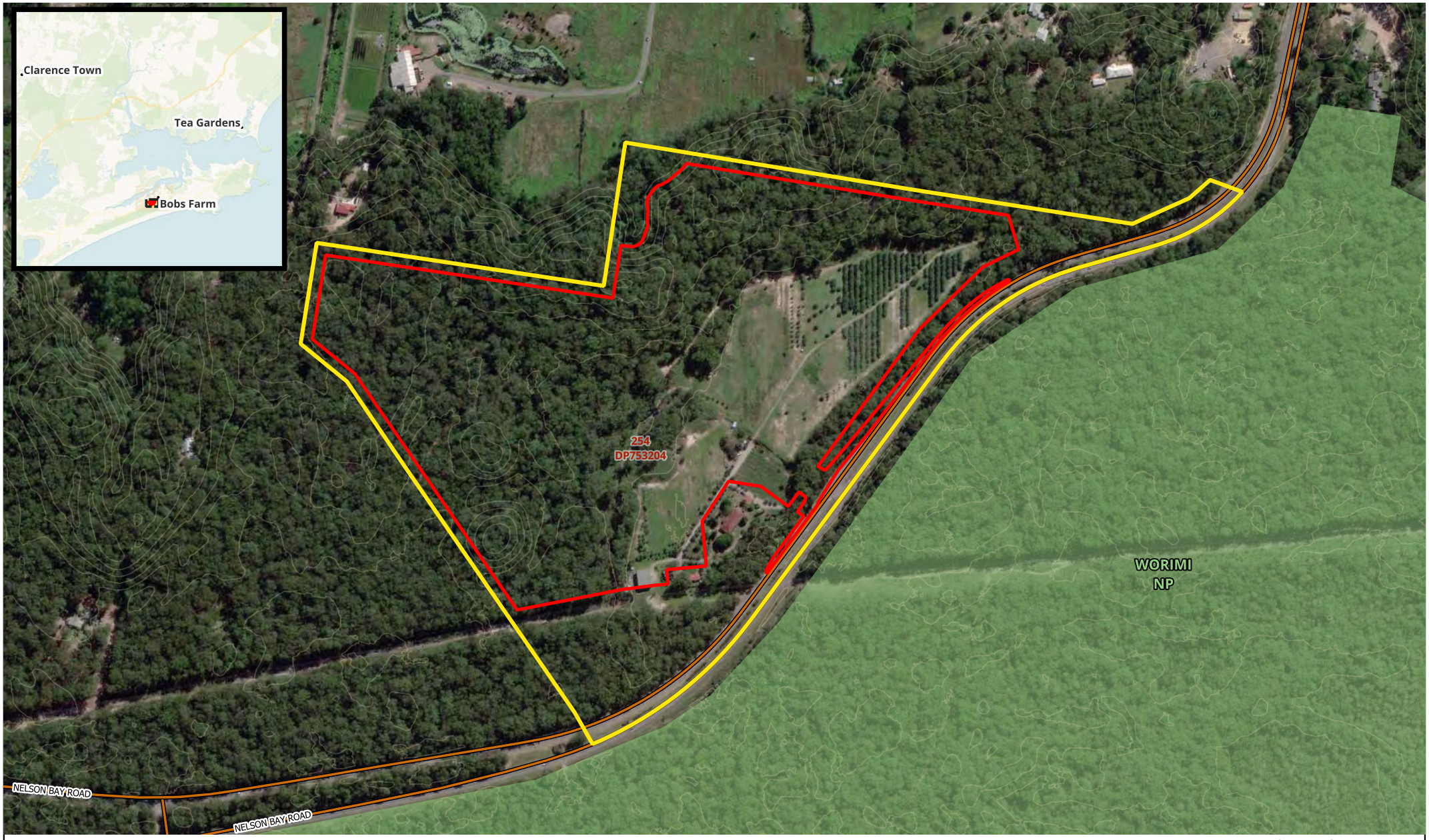
All essential services are available, or able to be made available, at the site including electricity, water tanks for potable water, pump-out system for sewage management, stormwater drainage and suitable vehicular access.

Sales would be by haulage truck at a maximum of ten (10) loaded trucks per hour equating to a maximum of 120 loaded trucks per day but with an average of 46 loaded trucks per day. All transport

trucks would travel east along Nelson Bay Road and complete a U-turn at the Port Stephens Drive roundabout. Haulage trucks will be prohibited from using Marsh Road.

The site will be accessed by way of a new left-in left-out intersection onto Nelson Bay Road. The existing access to the site at the electricity easement is proposed to be retained for light vehicle access for the quarry as well as for access to the manager's residence.

Progressive rehabilitation of exhausted areas will take place in accordance with the approved rehabilitation plan. The proposed post-quarry use of the site is to return the site to its current condition, being the same ratio of vegetated land and land used for the purpose of extensive agriculture.



Project area
Disturbance footprint
Surrounding lot
NPWSReserve
Contour (5m)

Figure 1: Project Area and Disturbance Footprint

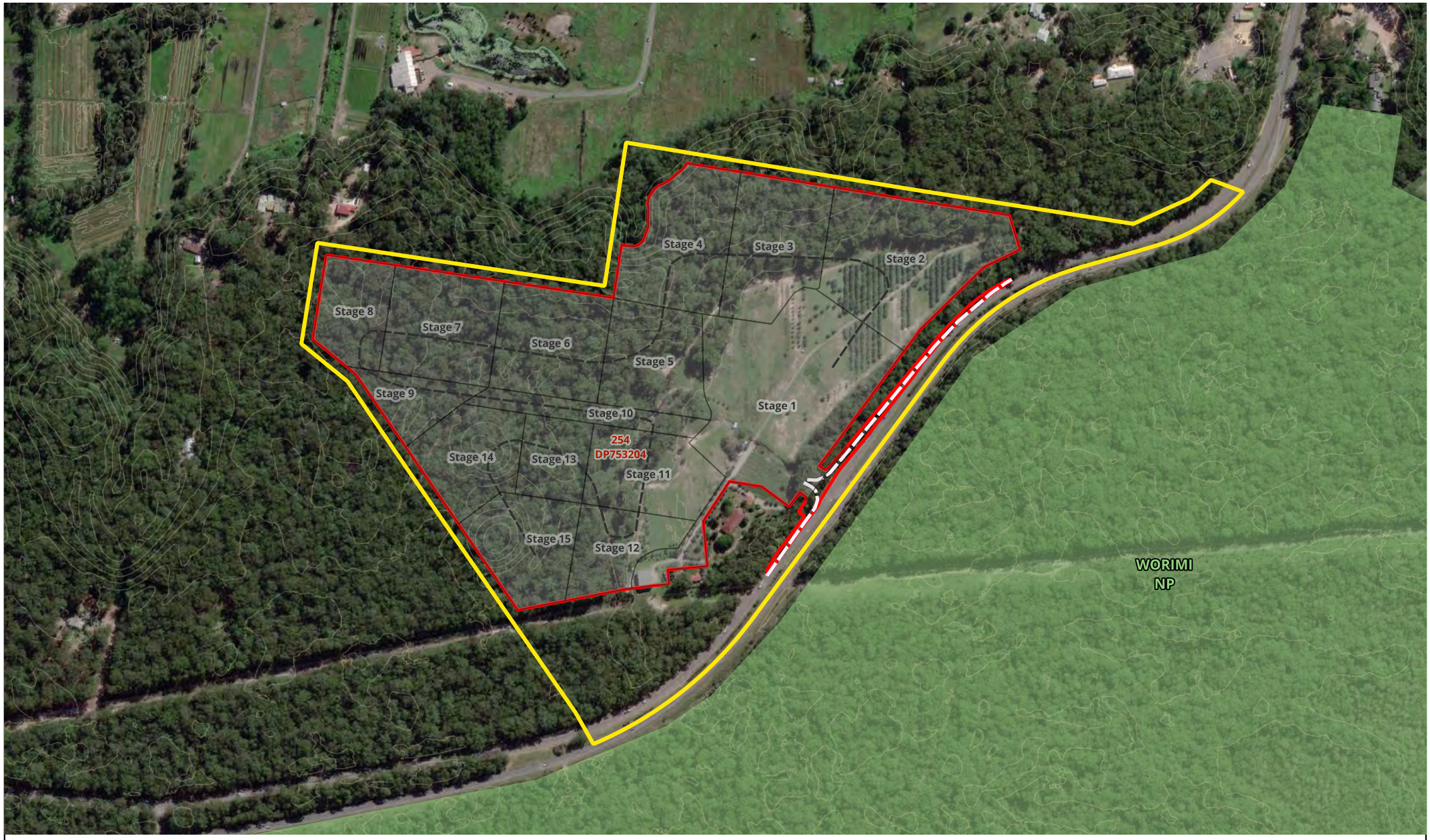
100 200 300 400 500 m

N

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Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area
Disturbance footprint
Stage boundary
NPWSReserve
Surrounding lot
Extraction Path
Proposed road access
Contour (5m)

Figure 2: Project Staging

100 200 300 400 500 m

N

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Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW

3. ASSESSMENT OF MNES

3.1 SCOPE

Following the determination that the Bobs Farm Sand Quarry Project (SSD-99860959) was a controlled action the Commonwealth Minister detailed the requirement that the applicant undertake an assessment of all protected matters that may be impacted by the proposed action.

DCCEEW considered that there is likely to be a significant impact on the following MNES:

- Koala *(Phascolarctos cinereus)* (combined populations of Qld, NSW and the ACT) – Endangered;
- Grey -headed Flying -fox *(Pteropus poliocephalus)* – Vulnerable
- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* – Endangered

DCCEEW also considers that the proposed action may result in significant impacts to the following:

- Swift Parrot *(Lathamus discolor)* – Critically endangered;
- Regent Honeyeater *(Anthochaera phrygia)* – Critically endangered;
- Spotted -tailed Quoll *(Dasyurus maculatus)* – Endangered;
- South -eastern Glossy Black Cockatoo *(Calyptorhynchus lathami lathami)* – Vulnerable
- Yellow -bellied Glider (south -eastern) *(Petaurus australis australis)* – Vulnerable; and
- New Holland Mouse *(Pseudomys novaehollandiae)* – Vulnerable.

3.2 SURVEYS COMPLETED

Targeted surveys were completed for listed MNES in accordance with the NSW Biodiversity Assessment Method (BAM 2020), Threatened Biodiversity Database Collection (TBDC), and relevant NSW and Commonwealth guidelines including:

- *Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method (DPIE 2020)*
- *Survey Guidelines for Australia's threatened bats* (DEWHA 2010a)
- *Survey Guidelines for Australia's threatened birds* (DEWHA 2010b)
- *Survey Guidelines for Australia's threatened frogs* (DEWHA 2010c)
- *Survey guidelines for Australia's threatened fish* (DSEWPC 2011a)
- *Survey guidelines for Australia's threatened mammals* (DSEWPC 2011b)
- *Survey guidelines for Australia's threatened reptiles* (DSEWPC 2011d).
- *NSW Survey Guide for Threatened Frogs* (DPIE 2020b).
- *'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method* (OEH 2018).

- *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Guide* (DPE 2022)

Surveys completed for each MNES is detailed below in **Table 1**.

Table 1: MNES Surveys Completed

MNES	Status	Survey requirements	Surveys Completed	Timing of surveys
Koala (combined populations of Qld, NSW and the ACT) *Phascolarctos cinereus*	Endangered	Habitat Assessment Direct Surveys Indirect Surveys	Habitat Assessment Spotlighting (12 nights), Remote Cameras (41), Detection Dogs	Habitat Assessment (Dec 2025, Feb 2026), Spotlighting (Jan-Feb 2026), Remote Cameras (Feb-March 2026)
Grey -headed Flying -fox *Pteropus poliocephalus*	Vulnerable	Habitat assessment Camp Search Spotlighting	Habitat Assessment and Camp Search Spotlighting (12 nights)	Habitat Assessment and Camp Search (Dec 2025, Feb 2026), Spotlighting (Jan-Feb 2026)
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered Ecological Community (EEC)	Mapping Plots Condition assessment	Mapping Plots Condition assessment	Mapping (2025-2026) Plots (Feb 2026)
Swift Parrot *Lathamus discolor*	Critically Endangered	Habitat Assessment Bird Surveys	Habitat Assessment Bird Surveys	Habitat Assessment (Dec 2025, Feb 2026) Bird Surveys (Jan 2026, May 2015 and July 2015)
Regent Honeyeater *Anthochaera phrygia*	Critically Endangered	Habitat Assessment Bird Surveys	Habitat Assessment Bird Surveys	Habitat Assessment (Dec 2025, Feb 2026) Bird Surveys (Jan 2026, May 2015 and July 2015)
Spotted -tailed Quoll *Dasyurus maculatus*	Endangered	Habitat Assessment (diurnal) Hair Funnels Remote Cameras	Remote Cameras Spotlighting	Habitat Assessment (Dec 2025, Feb 2026), Spotlighting (Jan-Feb 2026), Remote Cameras (Feb-March 2026)
South-eastern Glossy Black Cockatoo *Calyptorhynchus lathami lathami*	Vulnerable	Habitat Assessment Bird Surveys	Habitat Assessment Bird Surveys	Habitat Assessment (Dec 2025, Feb 2026) Bird Surveys (January 2026)
Yellow-bellied Glider (south-eastern) *Petaurus australis australis*	Vulnerable	Habitat Assessment Spotlighting Remote Cameas	Habitat Assessment Remote Cameras Spotlighting	Habitat Assessment (Dec 2025, Feb 2026), Spotlighting (Jan-Feb 2026), Remote Cameras (Feb-March 2026)
New Holland Mouse *Pseudomys novaehollandiae*	Vulnerable	Habitat Assessment Elliott Trapping Pitfall Traps	Habitat Assessment Elliott Trapping Pitfall Traps Remote Cameras	Habitat Assessment (Dec 2025, Feb 2026), Trapping (Feb 2026), Remote Cameras (Feb-March 2026)

3.2.1 Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT)

Recommended surveys for the Koala are detailed in a number of Commonwealth and NSW Guidelines, along with best practice survey methods including; *A review of koala habitat assessment criteria and methods* (ANU 2021), Koala (Phascolarctos cinereus), *Biodiversity Assessment Method Survey Guide* (DPE 2022), and Phillips & Callaghan (2011).

Commonwealth Guidelines support the completion of the following surveys:

- Direct observation techniques including; transect and point surveys, Spotlighting, Detection Dogs, Mark-resight or mark-recapture, Thermal Detection drones, Radio-tracking, and Camera traps
- Indirect survey techniques including; faecal pellet (scat) surveys (i.e. spot assessment technique [SAT] surveys), Call playback, Passive acoustics, and Landscape nutritional quality surveys

NSW Guidelines require the completion of a combination of habitat assessments along with at least one “scat detection method” and one “non-scat detection method” including the following:

- Habitat assessments – Suitable habitat for koala is any Plant Community Type (PCT) that is associated with koala in the TBDC and with a minimum of one (1) koala use tree present, for the relevant region.
- Scat detection method – including Spot Assessment Technique (SAT) or detection dogs
- Non-scat detection method – including Spotlighting, passive acoustic, or drones,

Other (best practice survey methodology) include SATs as described by Phillips & Callaghan (2011):

- SATs are completed in accordance with the protocol detailed in Phillips & Callaghan (2011). The SAT technique is a simplified version of the Koala Habitat Atlas method, assessing tree species preferences and koala activity by detecting faecal pellets. Smaller plots (20×20m) yield similar results, but for accuracy, at least 30 trees with a minimum 100mm diameter must be sampled.

Local survey guidelines for the species are detailed within the Port Stephens Comprehensive Koala Plan of Management (CKPoM). According to the Guidelines for Koala Habitat Assessments in the PSC CKPoM (2002), to satisfy requirements for a development assessed under Part 4 of the EP&A Act, a Koala Habitat Assessment (Appendix 6) must be carried out by a suitably qualified person (a brief CV should be included for each person involved in the assessment), and include the following for steps:

1. Preliminary Assessment
2. Vegetation Mapping
3. Koala Habitat Identification
4. Assessment of Proposal

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment - Vegetation Integrity Plots – 09, 10, and 13 February 2026
- Detection Dog Surveys - A total of eight (8) transects were surveyed using detection dogs in accordance with *Koala (Phascolarctos cinereus) Biodiversity Assessment Method survey Guide* (DPE 2022). Transects were spaced >100m apart and surveyed by a suitably qualified detection dog and handler who walked each transect twice, first in one direction and then the opposite. The detection dog was permitted to roam freely within the 25 m to the side of the transect. Whilst search times will vary with terrain, vegetation and individual dogs, the detection dog handler aimed to walk the transect at approximately 10 m/min. Detection dogs used to complete the surveys were trained ethically to detect koala scat, with prior field experience surveying for koalas, and the relevant approvals and permits. The detection dog and their handler were assessed as a competent team within the 12 months of the surveys in accordance with the guidelines
- Spotlighting surveys were conducted on 12 nights by two (2) experienced fauna ecologists (7/01, 13/01, 14/01, 15/01, 27/01, 28/01, 29/01, 5/02, 9/02, 10/02, 18/02, 19/02). Each spotlighting survey was conducted during suitable conditions, over a period of two (2) hours, using high-powered headtorches via a mix of transects and random meanders taking advantage of available access tracks located across the Subject Land
- Additional surveys (Remote Cameras) - A total of 41 remote cameras were installed at heights of 3 m, each being directed towards a single bait station (metal tea strainer). An additional ten (10) remote cameras were installed at a height of 1-1.5 m within known flowering Eastern Pygmy Possum tree and shrub species (e.g. *Banksia spp.*). These bait stations were baited with an oats, peanut butter, treacle, vanilla essence and truffle oil mixture. Bait stations were accompanied by a 30 cm wooden ruler for scale. During installation, each tree trunk was also sprayed with a diluted honey water mixture. Remote cameras were active for a total of four (4) weeks (28 nights), rebaited two (2) weeks after installation in accordance with relevant survey guidelines (2 February – 5 March 2026). Images captured during these surveys were analysed in-house by experienced fauna ecologists

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- Port Stephens Comprehensive Koala Plan of Management (CKPoM) Mapping
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.1**.

Assessment of Koala habitat in accordance with the Port Stephens CKPoM is provided in Appendix L of the BDAR.

3.2.2 Grey -headed Flying -fox (*Pteropus poliocephalus*)

Recommended surveys for the Grey-headed Flying-fox are detailed in the Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1 (DEWHA 2010) and include the following:

- Habitat Assessment (foraging habitat) – The primary native food plant species for flying fox species are well known (Hall and Richards 2000) and the presence of these plant species at a site should be used to assess the potential importance of the site to flying foxes (P. Eby, unpubl.).
- Habitat Assessment (camps) - The primary method for determining the presence of unrecorded day roosts is to conduct field surveys. Flying foxes are recognised easily from a distance while they roost or are in flight, and have distinctive audible calls that are heard most frequently in the early morning or under sunny conditions. Other signs include their distinctive odour and droppings. Both the ground and foliage should be examined for flying fox scats. Some project areas may require access by boat. Note that this species rarely vocalises during rain and some periods of the day. Roosts can also be located by surveying for animals exiting at dusk. For very large and/or inaccessible project areas, it may be necessary to conduct an aerial survey for camps from a light aircraft
- Spotlighting - Conduct walking transects (100 m apart) looking for feeding and flying bats. Smell can also provide a sign of their presence. Alternative methods may include night time audio recordings made at selected sites or fruiting food plants within the project area.

Habitat critical to the survival of the species is detailed in the *National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus* (DEW 2021) and described as:

- Vegetation communities containing winter and spring flowering species including; *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera*.
- Or vegetation communities not containing the above species, but which:
    - contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
    - contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
    - contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 09, 10, and 13 February 2026

- Habitat Assessment (camp search) – 17 December 2025
- Spotlighting surveys were conducted on 12 nights by two (2) experienced fauna ecologists (7/01, 13/01, 14/01, 15/01, 27/01, 28/01, 29/01, 5/02, 9/02, 10/02, 18/02, 19/02). Each spotlighting survey was conducted during suitable conditions, over a period of two (2) hours, using high-powered headtorches via a mix of transects and random meanders taking advantage of available access tracks located across the Subject Land

Desktop assessments completed for this species include:

- The Flying fox Foraging Habitat Mapping NSW (Eby et. al. 2019)
- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.2**.

3.2.3 Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland

Surveys to determine the presence, condition and extent of *Central Hunter Valley Eucalypt Forest and Woodland* TEC is detailed in the Conservation Advice (DEE 2016) including;

- Defining a patch – A patch is a discrete and mostly continuous area of the ecological community10, as defined by the key diagnostic characteristics, but can include small-scale (<30 m) variations, gaps, and disturbances within this area. The smallest patch size that can be identified is 0.25 ha.
- Sampling protocol – Plots of 0.04 ha (quadrats of 20 x 20 m) may be suitable (Tozer, 2003; Tozer et al., 2010).
- Timing of surveys – Whilst identifying the ecological community and its condition is possible at most times of the year, consideration must be given to the role that season, rainfall and disturbance history may play in an assessment.
- Area critical to the survival of the ecological community – Since hydrology governs the vegetation in wetland systems, the areas (including habitat) most critical to the survival of the ecological community are those where the hydrological regime remains reasonably intact such that the vegetative diagnostic features are maintained. Changes to natural hydrological regimes is a major factor contributing to the loss of wetland features, biological diversity and ecological function in Coastal Swamp Sclerophyll Forests. Categories A, B1, B2, and C1 (Table 2) represent those parts of the ecological community closest to its benchmark state, with more intact hydrology, other ecological function, and other critical habitat features, as demonstrated by the largest, most connected and/or most intact native vegetation and species diversity of the ecological community.

Surveys Completed

Surveys completed as part of this assessment include:

- Vegetation Mapping – 2025-2026

- Sampling Plots - Vegetation Integrity Plots – 09, 10, and 13 February 2026

Desktop assessments completed for this species include:

- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland ecological community Conservation Advice* (DAWE 2021)
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Species Profile and Threats Database [EPBC Act SPRAT Database];

Results of this assessment is provided in **Section 3.3** and **Section 3.4.3**.

3.2.4 Swift Parrot (*Lathamus discolor*)

Recommended surveys for the Swift Parrot (*Lathamus discolor*) are detailed in the *Survey Guidelines for Australia's threatened birds* (DEWHA 2010b). This includes:

- *Area searches or transect surveys of suitable habitat, preferably in the early morning and afternoon when birds are most active and vocal. Detection by sighting or call. Slow-moving vehicle transects also effective in expansive areas, detecting loud, distinctive 'clinking' call that can be heard over noise of engine. Targeted surveys of patches of heavily flowering eucalypts may be useful.*
- *Timing: surveys on the mainland should be conducted between March and July. Surveys in Tasmania should be conducted between August and February.*
- Survey effort: Area searches or Transect surveys (in areas of less than 50 ha) require 20hrs over 8 days. Targeted surveys (targeting areas of heavily flowering eucalypts) require 20hrs over 8 days.

Habitat for the species is defined as the following:

- *On mainland, inhabits dry sclerophyll eucalypt forests and woodlands, in particular, temperate box ironbark woodlands. Also in forests of Eucalyptus tereticornis, E. robusta, Corymbia maculata and C. gummifera in coastal New South Wales/Queensland. Occasionally occurs in wet sclerophyll forests (Higgins 1999; Brereton 2002). In Tasmania, nests in tree hollows and frequents forests dominated by blue gum Eucalyptus globulus and swamp gum E. ovata.*

National Recovery Plan for the Swift Parrot

When considering habitat loss, alteration or degradation to habitat in any part of the Swift Parrot's range, including in areas where the species 'may occur', surveys for occupancy at the appropriate times of the year and identifying preferred foraging species remain an important tool in refining understanding of the area's relative importance for Swift Parrots.

In addition, it is also important to note that Swift Parrots opportunistically use areas depending on the occurrence of eucalypt flowering. As a result, the absence of Swift Parrots from a given location at a given time cannot be taken as evidence that that location is unsuitable habitat. Rather, if there are potential food plants present (that include resources such as lerps, not just flowers) then that site may be utilised by Swift Parrots if conditions become favourable. This opportunistic habitat use means survey data and historical records need to be considered when assessing the relative importance of a local area or region for Swift Parrots, in addition to the knowledge that variation in

local conditions is a crucial predictor of Swift Parrot presence/absence and site utilisation (Webb et al. 2019).

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 09, 10, and 13 February 2026
- Targeted Bird Surveys (Wildthing) - 27/05/14 and 29/07/15

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- NSW Important Area Mapping (Swift Parrot)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.4**.

3.2.5 Regent Honeyeater (*Anthochaera phrygia*)

Recommended surveys for the Regent Honeyeater (*Anthochaera phrygia*) are detailed in the *Survey Guidelines for Australia's threatened birds* (DEWHA 2010b). This includes:

- Area searches in suitable habitat, preferably in the morning but other times may also be appropriate. Detection by call is possible when birds are most vocal (outside the breeding season). Otherwise, detection is by sighting. Targeted searches of woodland patches with heavily flowering trees is useful, especially around waterpoints such as dams and creeklines. Also check among flocks of other blossom nomads such as lorikeets and other honeyeaters. Broadcast surveys immediately before and during the breeding season may also be useful.
- Survey effort: Area searches or Transect surveys (in areas of less than 50 ha) require 20hrs over 10 days. Targeted surveys (targeting areas of heavily flowering trees and flocks of other blossom feeders) require 20hrs over 5 days.

Habitat for the species is defined as the following:

- *Mostly occurs in box-ironbark eucalypt associations. Prefers the wettest, most fertile sites within these associations such as along creek flats, broad river valleys and foothills. In New South Wales, riparian forests of river oak with needle-leaf mistletoe are also important for feeding and breeding. At times of food shortage, uses other woodland types and wet lowland coastal forest dominated by swamp mahogany E. robusta or spotted gum Corymbia maculata (Franklin et al. 1989; Webster & Menkhorst 1992; Geering & French 1998; Oliver et al. 1998).*

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 09, 10, and 13 February 2026

- Targeted visual and auditory bird surveys - A total of three (3) dawn bird surveys were completed within the Subject Land (20/01, 21/01, 22/01), with opportunistic bird surveys being completed during morning and afternoon trap checking, and prior to spotlighting surveys (dusk surveys). Observations were validated by experienced fauna ecologists visually, with the aid of binoculars or aurally from call identification.
- Targeted Bird Surveys (Wildthing) - 27/05/14 and 29/07/15

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- NSW Important Area Mapping (Regent Honeyeater)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.5**.

3.2.6 Spotted -tailed Quoll (*Dasyurus maculatus*)

Recommended surveys for the Spotted-tailed Quoll (*Dasyurus maculatus*) are detailed in the *Survey guidelines for Australia's threatened mammals* (DSEWPC 2011b), including the following:

- **Habitat Assessment (diurnal)** - *daytime searches for potentially suitable habitat resources, such as areas associated with a gully or a ridge and potential den sites (caves, hollow logs or even dense understorey vegetation such as Lantana species that provides suitable cover)*
- **Habitat Assessment (latrine search)** - *daytime searches for signs of activity, scats and latrines (description of the survey technique and recommended effort is outlined in Section 3.2 of the Guidelines). Latrine searches should be limited to areas where there are rocky habitats which can be targeted for searching. Where the spotted-tailed quoll occurs in sympatry with the eastern quoll, Dasyurus viverrinus in Tasmania, the species present may need to be identified through the application of direct detection survey techniques. Hair samples may be present in scats as a result of grooming, and species identification may be possible from an analysis of such hairs if they occur.*
    - **Section 3**.2 of the Guideline recommends a survey effort "*two hours search time for each one hectare survey site of a stratified sampling program undertaken in a subject site up to 5 hectares in size (that is, 50 000 square metres)*".
- **Hair funnels** - *hair sampling device (hair funnels) surveys, following the description of the technique and recommended effort provided in Section 3.3.7, placed 100 metres apart and using a mixture of sardines, tuna oil and flour for bait. Hair funnels should be set for a minimum of 14 consecutive nights. The spotted-tailed quoll is included among those known to be distinguishable from hair samples which will provide a high probability of detection (see Table 2, Section 3.3.7 of the Guideline). Forty widely spaced hair-tubes within a 100 hectare sampling unit has approximately 96% likelihood of detection on occupied sites (Nelson 2007)*
- **Remote cameras** - *recent surveys have found remote cameras to be the most cost-effective technique and allow concurrent data to be collected on other carnivores, particularly cats and*

foxes (Nelson 2008) (see Section 3.3.6 of the Guideline). Cameras should be left on site for a minimum of three weeks.

- **Section 3**.3.6 of the Guidelines recommends that remote cameras be "*deployed for at least 14 nights, and approximately 10 cameras should be deployed per hectare*"

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 09, 10, and 13 February 2026
- Habitat Assessment (latrine search) – 17 December 2025
- Remote Cameras - A total nine (9) remote cameras were installed at 0.5m targeting terrestrial marsupials. Bait stations (metal tea strainer) were installed within suitable habitat (e.g. at the base of trees, logs, or rocky outcrops) and baited with an oats, peanut butter, treacle, vanilla essence and truffle oil mixture. Bait stations were accompanied by a 30 cm wooden ruler for scale. During installation, each tree trunk was also sprayed with a diluted honey water mixture. Remote cameras were active for a total of four (4) weeks (28 nights), rebaited two (2) weeks after installation in accordance with relevant survey guidelines (2 February – 5 March 2026). Images captured during these surveys were analysed in-house by experienced fauna ecologists
- Spotlighting surveys were conducted on 12 nights by two (2) experienced fauna ecologists (7/01, 13/01, 14/01, 15/01, 27/01, 28/01, 29/01, 5/02, 9/02, 10/02, 18/02, 19/02). Each spotlighting survey was conducted during suitable conditions, over a period of two (2) hours, using high-powered headtorches via a mix of transects and random meanders taking advantage of available access tracks located across the Subject Land

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.6**.

3.2.7 South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*)

As there are no specific Commonwealth survey guidelines for the South-eastern Glossy Black Cockatoo, surveys were conducted in accordance with recommended surveys for the Glossy Black Cockatoo (Kangaroo Island population) which are detailed in the Survey Guidelines for Australia's threatened birds (DEWHA 2010b) and include the following:

- **Habitat Assessment (foraging signs)** - Presence most reliably detected through area searches or transects on foot through areas of drooping sheoak in search of sign of recent feeding, which consists of chewed cones that are either white (generated within previous 24 hours), cream (within a week) or orange (within about six weeks). Brown or grey chewed cones may be up to a year old. Minimum survey effort for an area of 50 ha or less includes 5hrs over one (1) day to watch for breeding birds and check for feeding signs.

- **Targeted Bird Surveys** - Birds found most readily during the first or last two hours of daylight when they are most active, usually by call. Feeding birds often detected by continual clicking of mandibles and sound of falling debris. Minimum survey effort for an area of 50 ha or less includes 20hrs over four (4) days to search for signs of feeding or nests.

Habitat for the species is known as:

- **Foraging Habitat -** South-eastern glossy black cockatoos rely on nine species of sheoaks (Allocasuarina spp. and Casuarina spp.) for feeding (Chapman 2007), with species used varying depending on the region. Birds often only feed on one or two species in one region (Higgins 1999). In south-east Queensland and north-east New South Wales, they show preference for black sheoak (A. littoralis) and forest sheoak (A. torulosa), although there are also records of them feeding on stringybark sheoak (A. inophloia; G Castley, D Guthrie & Roselli unpublished data), coastal sheoak (C. equisetifolia), and to a lesser extent river sheoak (C. cunninghamiana) and swamp sheoak (C. glauca) during limited times of the year (Glossy Black Conservancy 2010).
- **Breeding Habitat -** As a guide, potential nest hollows for the subspecies have the following traits (Cameron 2006b): 1) >8 m above ground; 2) Located in branches >30 cm in diameter; 3) Branch or stem no more than 45o from vertical; and 4) Minimum entrance diameter of >15 cm.

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 09, 10, and 13 February 2026
- Habitat Assessment (nest search) – 17 December 2025
- Targeted Bird Surveys - A total of three (3) dawn bird surveys were completed within the Subject Land (20/01, 21/01, 22/01), with opportunistic bird surveys being completed during morning and afternoon trap checking, and prior to spotlighting surveys (dusk surveys). Observations were validated by experienced fauna ecologists visually, with the aid of binoculars or aurally from call identification.

Desktop assessments completed for this species include:

- *Draft Hollow-dependent birds Biodiversity Assessment Method survey guide* (NSW DCCEEW 2025)
- *Survey Guidelines for Australia's threatened birds* (DEWHA 2010b)
- Conservation Advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo) (Comm. DCCEEW 2022)
- Bionet Threatened Species Records (NSW DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (Comm. DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.73.4.5**.

3.2.8 Yellow -bellied Glider (south -eastern) (*Petaurus australis australis*)

As there are no specific Commonwealth survey guidelines for the Yellow-bellied Glider (south-eastern), surveys were conducted in accordance with recommended surveys for the Yellow-bellied Glider (Wet Tropics) which are detailed in the Survey guidelines for Australia's threatened mammals (DSEWPC 2011b), and include the following in areas up to 5 hectares in size:

- *Investigation of the presence of key eucalypt species, E. resinifera and E. grandis through examining finescale vegetation mapping (where available), aerial photography and ground truthing*
- *Daytime searches for potential den sites in hollow-bearing trees, particularly E. grandis (description of the survey technique and recommended effort is outlined in Section 3.1* [of the guidelines]*);*
- *Daytime searches for signs of activity, in particular the characteristic V-shaped sap-feeding scars on E. resinifera trees, (description of the survey technique and recommended effort is outlined in Section 3.2.6* [of the guidelines]*)*
- *Stagwatching surveys at potential den sites (description of the survey technique and recommended effort is outlined in Section 3.3.4* [of the guidelines])
- *Call playback surveys (Note: for best results use pre-recorded calls of the fluffy glider rather than those of the south-eastern Australian subspecies) conducted according to the method outlined in Section 3.3.5* [of the guidelines]*, including playback of the rufous owl call, which has had better results in call-playback surveys than fluffy glider calls in some cases (M Schulz pers. comm.) It is recommended that care should be taken conducting call playback surveys during the species' breeding season (NSW Agriculture 1998) so if possible avoid or limit the use of this survey technique between June and August (consult appropriate Queensland government organisations for advice)*
- *Spotlight surveys (including listening for vocalisations) along transects, tracks or roads using the method described in Section 3.3.3.* [of the guidelines] *(Note: since this species is difficult to detect using spotlighting, listening for vocalisation is a primary technique for detection. It is therefore strongly recommended that spotlighting surveys are not conducted from a vehicle).*

Survey effort detailed within the guidelines include:

- Habitat Assessment (den sites) – Hollow-bearing tree assessment through the completion of 50-100m wide parallel transects
- Habitat Assessment (feeding signs) – Survey effort not detailed. Foraging species for Yellow-bellied Gliders (south-eastern) are detailed in Appendix A of the species' Conservation Advice.
- Stagwatching – station observer at potential den sites at least 30 minutes before dusk and continue until 60 minutes after sunset
- Call playback surveys – two (2) call playback locations per stratification unit (up to 200ha), surveyed twice on separate nights
- Spotlighting surveys – survey along transects approx. 100m apart, repeat on two (2) separate nights

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 09, 10, and 13 February 2026
- Habitat Assessment (Hollow-bearing tree and feeding search) – 17 December 2025, and 9 and 10 March 2026
- Spotlighting surveys were conducted on 12 nights by two (2) experienced fauna ecologists (7/01, 13/01, 14/01, 15/01, 27/01, 28/01, 29/01, 5/02, 9/02, 10/02, 18/02, 19/02). Each spotlighting survey was conducted during suitable conditions, over a period of two (2) hours, using high-powered headtorches via a mix of transects and random meanders taking advantage of available access tracks located across the Subject Land
- Call Playback surveys were completed at two (2) evenly distributed survey locations across the Subject Land on 10 nights by two (2) experienced fauna ecologists (7/01, 13/01, 14/01, 27/01, 28/01, 5/02, 9/02, 10/02, 18/02, 19/02). Each call playback survey was conducted during suitable conditions, allowed 10mins of listening time, broadcasted pre-recorded calls (for target species) for no more than 15 seconds followed by 30 seconds of listening time. This was repeated for 15mins for each target species, unless the target species is detected before 15mins expired. Following call playback surveyors completed 15mins of spotlighting

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.8, 3.4.5**.

3.2.9 New Holland Mouse (*Pseudomys novaehollandiae*)

There are no Commonwealth species-specific survey guidelines for this species, the *National Recovery Plan for the Pookila (New Holland Mouse) Pseudomys novaehollandiae* (Comm. DCCEEW 2026) notes that standardised survey guidelines are being developed. The guidelines refer to survey guidelines developed by the Tasmanian Department of Natural Resources and Environment *Management and survey guidelines for wild populations of New Holland Mouse, Pookila - Pseudomys novaehollandiae* (DNRE 2022). These guidelines recommend the completion of a mix of the following survey types including; Remote Cameras, Live trap and release (Elliot Traps), Pitfall traps, Hair tubes, Predator pellets or scats, Detector dogs, and Environmental DNA.

Elliott trapping guidelines detailed in the NSW Working Draft Threatened Species Survey and Assessment Guidelines (DECC 2004) include the following:

- Sampling effort per stratification unit must equate to at least 100 trap nights. The recommended approach involves 25 traps placed for four nights.
- Traps must be open for a minimum of three nights, and a maximum of four nights

- Trap lines should be established with a spacing of 20-50 metres
- Elliott traps need to be checked every morning to ensure that any animals caught are not left to dehydrate during the course of the day, and then reset in the evening. The trap should contain materials that allow the animal to keep warm during the course of the evening.

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment - Vegetation Integrity Plots – 09, 10, and 13 February 2026
- Elliott Trapping - A total of four (4) Elliot A trap lines were installed across the Project Area. Each trap line consisted of 20 traps installed in two (2) rows of ten (10) traps, each separated by 10 m. Each trap was baited with an oats, peanut butter, treacle, vanilla essence and truffle oil mixture. Leaf litter and small twigs was placed in the bottom of each bucket to provide shelter for trapped animals. Following installation traps were left in-situ across the Project Area for a total of four (4) nights and checked early in the morning and late afternoon each day (19-23 January 2026). All captured animals were identified and released by experienced fauna ecologists
- Pitfall Trapping - A total of 22 pitfall trap lines were installed. Each Pitfall trap line consisted of a 10 m of drift-fence with a 20 L or larger bucket with a lid at either end. The lid was elevated 2 to 3 cm (using sticks) above the lip of the bucket. Leaf litter and small twigs was placed in the bottom of each bucket to provide shelter for trapped animals. Following installation pitfall traps were left in-situ across the Project Area for a total of four (4) nights and checked early in the morning and late afternoon each day (19-23 January 2026). All captured animals were identified and released by experienced fauna ecologists
- Remote Cameras - A total nine (9) remote cameras were installed at 0.5m targeting terrestrial marsupials. Bait stations (metal tea strainer) were installed within suitable habitat (e.g. at the base of trees, logs, or rocky outcrops) and baited with an oats, peanut butter, treacle, vanilla essence and truffle oil mixture. Bait stations were accompanied by a 30 cm wooden ruler for scale. During installation, each tree trunk was also sprayed with a diluted honey water mixture. Remote cameras were active for a total of four (4) weeks (28 nights), rebaited two (2) weeks after installation in accordance with relevant survey guidelines (2 February – 5 March 2026). Images captured during these surveys were analysed in-house by experienced fauna ecologists

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

Results of this assessment is provided in **Section 3.3** and **Section 3.4.9**

3.3 AREA OF SUITABLE HABITAT FOR MNES

The following confirms the population/s present, species habitat and each habitat type and TECs (and each category) in both the project area (in hectares) and disturbance footprint (in hectares) for each identified MNES (see **Table 2**). Areas of habitat considered 'Important Habitat' or 'Habitat Critical to the Survival of the Species' are detailed in **Section 3.4**.

Table 2: MNES Area of Habitat

MNES	Status	Habitat Type	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Koala (combined populations of Qld, NSW and the ACT) *Phascolarctos cinereus*	Endangered	Marginal Foraging Habitat	22.99	31.31
Grey -headed Flying -fox *Pteropus poliocephalus*	Vulnerable	Supplementary Spring-Autumn Foraging Habitat	22.99	31.66
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered Ecological Community (EEC)	Occurrence	0	0.35
Swift Parrot *Lathamus discolor*	Critically Endangered	Potential Foraging Habitat	22.99	31.31
Regent Honeyeater *Anthochaera phrygia*	Critically Endangered	Marginal Habitat	-	-
Spotted -tailed Quoll *Dasyurus maculatus*	Endangered	Potential Foraging Habitat	22.99	31.66
South-eastern Glossy Black Cockatoo *Calyptorhynchus lathami lathami*	Vulnerable	Potential Foraging Habitat	22.99	31.66
Yellow-bellied Glider (south-eastern) *Petaurus australis australis*	Vulnerable	None	-	-
New Holland Mouse *Pseudomys novaehollandiae*	Vulnerable	Potential Foraging Habitat	22.99	31.66

3.4 IMPORTANT HABITAT OR HABITAT CRITICAL TO THE SURVIVAL OF THE MNES

Below details the presence/absence of important habitat or habitat critical to the survival of the species/community for each listed MNES:

I. *Identify whether an important population of relevant vulnerable listed threatened species is present in the project area and its vicinity as described in relevant EPBC Act statutory documents and/ or the Significant Impact Guidelines 1.1: Matters of National Environmental Significance (2012) (Significant Impact Guidelines 1.1);*

II. *Determine whether the suitable habitat and TEC category/ies form habitat critical to the survival of relevant listed threatened species and TECs as described in relevant EPBC Act statutory documents and/or the Significant Impact Guidelines 1.1;*

3.4.1 Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT)

In accordance with the National Recovery Plan for the Koala *habitat critical to the survival of a species* is the area that the species relies on to halt decline and promote the recovery of the species. Ideally this would be identified spatially; however, given the variety of factors that determine whether habitat is suitable for Koalas or not, it is more appropriate to define habitat based on the characteristics required to meet their needs, than by spatial delineation.

The functional ecology of the Koala is described in terms of the combined assemblage of habitat qualities (extent, arrangement, attributes) theoretically required to stop decline and promote recovery. Key questions to ask in evaluating habitat for Koalas are:

a) *whether the habitat is used during periods of stress (examples flood, drought or fire)*

b) *whether the habitat is used to meet essential life cycle requirements (e.g. foraging, breeding, social behaviour, dispersal)*

c) *the extent to which the habitat is used by important populations*

d) *whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development*

e) *whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements*

f) *whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation*

g) *any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community (EPBC Act).*

Assessment of the vegetation within the Project Area against the above criteria is provided below. Habitat for the Koala (Phascolarctos cinereus) is highly variable across the species' broad geographic range spanning coastal and inland areas from far-north Queensland to the south-east corner of South Australia. Koala habitat suitability is regionally variable and influenced by the availability and nutritional quality of food trees, presence of suitable resting trees and microclimates, age structure of habitat, management history, and barriers to dispersal (DAWE, 2022a). Measures of Koala habitat suitability and quality in the following subsections is based on the following measures

- Foraging Habitat Availability
- Habitat Suitability (Regional)
- Population Connectivity

Foraging Habitat

The koala is a specialist herbivore feeding almost entirely on the leaves of eucalypts, across a variety of vegetation types ranging from tropical forests to semi-arid woodlands throughout their geographic range. In New South Wales (NSW) alone, koalas have been recorded to use 66 eucalypt species and seven (7) non-eucalypts (DECC, 2008; Phillips and Callaghan, 2011). However, species selection is highly dependent on the region, with koalas in any one area feeding almost exclusively on a small number of preferred species (preferred food trees). Koalas are also known to use a number of tree and shrub species for purposes other than primary food species, including supplementary food species and shelter.

Multiple resources providing assignment, and ranking, of feed tree species for the koala are available across the species' broad range. We have used three (3) resources to assess koala foraging habitat value within the Project Area:

Commonwealth Guidelines

The Review of Koala Tree Use Across New South Wales (OEH 2018) provides a summary of koala use species including 'regional high use', 'local high use', 'significant use', 'irregular use', and 'low use' species, for each Koala Management Area.

State Koala Habitat Protections

At the time of the assessment the relevant State Environmental Planning Policy governing Koala habitat protection was SEPP 44. This policy has been replaced by Chapter 3 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021. This SEPP provides a list of Feed Tree Species (Schedule 1) used to assess Koala foraging habitat quality within the Project Area. These include; *Eucalyptus tereticornis* (Forest red gum), *Eucalyptus microcorys* (Tallowwood), *Eucalyptus punctata* (Grey Gum), *Eucalyptus viminalis* (Ribbon or manna gum), *Eucalyptus camaldulensis* (River red gum), *Eucalyptus haemastoma* (Broad leaved scribbly gum), *Eucalyptus signata* (Scribbly gum), *Eucalyptus albens* (White box), *Eucalyptus populnea* (Bimble box or poplar box), and *Eucalyptus robusta* (Swamp Mahogany).

Habitat Suitability

Koala habitat suitability is a product of several factors in addition to that of preferred feed tree occurrence with the core drivers of habitat suitability varying at different scales, including at the site level (e.g. food, shelter, breeding needs), to the broader landscape (e.g. climate, habitat connectivity). The Koala Habitat Information Base (DPIE 2019) provides a series of spatial datasets detailing koala habitat suitability and occupancy across New South Wales. The Koala Habitat Information Base datasets reviewed in relation to koala habitat within the Project Area include the following:

- The Koala Habitat Suitability Model (KHSM)
- The Koala Tree Index (KTI)
- Koala Likelihood Map (1999 – 2018)

- Areas of regional koala significance (ARKS)

The Koala Habitat Suitability Model

The KHSM provides a measure of koala habitat suitability at any location. The model predicts the likelihood of finding habitat that is ecologically similar to where koalas have been observed over the past 40 years. The model predicts the spatial distribution of potential koala habitat across NSW using a value between 0 and 1 (i.e. a higher value represents a higher probability that a specific location will contain habitat suitable for koalas).

The Koala Tree Index

The KTI provides a measure of the probability of finding a tree species that koalas are known to prefer for food or shelter.

Koala Likelihood Map (1999 – 2018)

The Koala Likelihood Map (KLM) provides the likelihood of koalas occurring across a 10-square-kilometre grid covering NSW, based on available arboreal mammal records from the past 20 years.

Areas of regional koala significance

This dataset provides mapping of regions that have high known koala occurrence using analysis of koala observation densities.

Population Connectivity (Dispersal)

The home range of the koala is estimated to be 80-90 ha. If the koala utilises the vegetation within the Project Area it is likely to be part of a much larger area of habitat extending into highly connected habitat surrounding the Project Area.

Assessment

The Project Area contains foraging habitat and potential movement corridors for the species. The extent, location and value of these habitats is outlined below.

Foraging Habitat

Foraging Habitat occurs within the Project Area, extent and value is summarised below:

Feed Tree Occurrence: Reviewing available resources detailing koala food tree species, the following applies to the Project Area:

- Commonwealth - The Project Area contains one (1) 'High Use' (*Eucalyptus pilularis*), two (2) trees recognised as 'Low Use' (*Angophora costata* and *Melaleuca quinquenervia*), and two (2) trees with no evidence of use (*Banksia serrata* and *Eucalyptus grandis*).
- State – No species listed as KFTs in Schedule 1 of the Biodiversity and Conservation SEPP 2021 (Chapter 3) occur within the Project Area
- Port Stephens LGA – No species listed as Koala food trees under the Port Stephens Council Comprehensive Koala Plan of Management (CKPoM)

Feed tree use: Koala was not detected during the completion of SAT tests within the Project Area

Koala presence: Signs of Koala (scats) were detected during the completion of detection dog surveys.

Associated PCTs

All two (2) PCTs within the Project Area are associated with the species in the NSW Bionet Threatened Biodiversity Database System (TBDC);

- *PCT 3544: Coastal Sands Apple-Blackbutt Forest*
- *PCT 4006: Northern Paperbark-Swamp Mahogany Saw-sedge Forest*

The total area of suitable foraging habitat for Koala within the Disturbance Footprint (22.99 ha) representing a small proportion of associated PCTs (i.e. available foraging habitat) within the locality (see **Figure 20**).

Key Questions for Koala Habitat

To determine whether habitat critical to the survival of the species the following questions were answered:

1. *whether the habitat is used during periods of stress (examples flood, drought or fire)*

   The vegetation does not represent important refugia in times of stress including flood, drought or fire because of the vegetation's exposed location and low quantity of suitable foraging species.

2. *whether the habitat is used to meet essential life cycle requirements (e.g. foraging, breeding, social behaviour, dispersal)*

   While the species was recorded within the Project Area the vegetation represents low quality/supplementary foraging habitat for the species due to the absence of regionally important foraging species. As such, the vegetation within the Project Are is unlikely to represent habitat essential for foraging, breeding, social behaviour or dispersal.

3. *the extent to which the habitat is used by important populations*

   The species was recorded within the Project Area during targeted surveys, however the vegetation is likely to represent only supplementary foraging habitat for the species.

4. *whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development*

   Considering the low quantity of important foraging habitat within the Project Area, the habitat within the Project Area is unlikely to be important for the maintenance of genetic diversity and long-term evolutionary development for the species.

5. *whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements*

   The vegetation within the Project Area may represent part of a local population's range and habitat. However, considering the large area of similar habitat surrounding the Project Area it is unlikely to represent an important corridor for the species. Avoidance measures including the retention of a 40-50m corridor in the northern boundary of the Project Area and the progressive rehabilitation of vegetation within the Project Area will maintain connectivity with vegetation in the locality.

6. *whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation*

   While the species was recorded within the Project Area, the vegetation is unlikely to be habitat necessary for the long-term survival of the species.

7. *any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community (EPBC Act).*

   Not applicable.

Considering the above the vegetation within the Project Area is considered Supplementary foraging habitat for the species but is not considered '*habitat critical to the survival of the species*'.

Table 3: Koala – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	Supplementary Foraging Habitat	22.99	No	22.99	31.31
Vegetation Zone 2 PCT 3544 Regen	None	-	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	Supplementary Foraging Habitat	10.24	No	0	0.35
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No		
			Total Area	**22.99**	**31.66**

3.4.2 Grey -headed Flying -fox (*Pteropus poliocephalus*)

Important Population - An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

Habitat Critical to the Survival of the Species - Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

In accordance with National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus (DEW 2021) habitat critical to the survival of the Grey-headed Flying-fox includes the following:

- Vegetation communities containing winter and spring flowering species including; *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or Syncarpia glomulifera*.
- Or vegetation communities not containing the above species, but which:
    - contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
    - contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
    - contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

Assessment

The Project Area contains a number of myrtaceous tree species which may provide foraging habitat for the species. However, no breeding habitat (camps) were identified within the Project Area, therefore it is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. The Project Area is also not located at the limit of this species' range. As such, it is unlikely the vegetation within the Project Area comprises an important population of the Grey-headed Flying-fox.

The Raymond Terrace Flying-fox Camp Management Plan (PSC 2017) highlights the importance of winter flowering species for the species. Table 5 of the Raymond Terrace Flying-fox Camp Management Plan (PSC 2017) identifies a total of six (6) species of tree that flower in winter that are preferential food sources for Flying-foxes, recommending that these species should be subject to protection to assist with Flying-fox survival in the region. These species are shown below for bi-monthly periods; December-January (D-J), February-March (F-M), April-May (A-M), June-July (J-J), August-September (A-S), and October-November (O-N). Flowering period of each listed local foraging species is marked with "X", each species found within the Project Area is bold and in green. Important winter-flowering species are those flowering in J-J and A-S.

A total of three (3) listed foraging species were recorded within the Project Area, of these none are listed important winter flowering foraging species. As such, the vegetation within the Project Area represents supplementary Spring-Autumn foraging habitat for the species, and is unlikely to represent important habitat or habitat critical to the survival of the species (see list of foraging species in **Table 4**). See areas of habitat critical to the survival of the species summarised in **Table 5**.

The Flying fox Foraging Habitat Mapping NSW (Eby et. al. 2019) maps the following within the Project Area:

- **Overall Rank** - The vegetation within the Project Area is mapped as having an overall conservation rank of the habitat of 1 (with 1 being the lowest, and 4 being the highest rank):
- **Seasonality of Habitat** - The vegetation within the Disturbance Footprint is mapped in regards to the foraging resource productivity seasonally. Within the Disturbance Footprint vegetation is mapped based on modelled vegetation communities and assigned a

productivity score in two-monthly periods from 0 (low productivity) to 1 (high productivity). The vegetation within the Project Area is largely mapped as a summer to autumn dominant foraging resource with average bimonthly results of:

- December/January: 0.38-0.91
- February/March: 0.35-0.91
- April/May: 0
- June/July: 0
- August/September: 0
- October/November: 0-0.17

See mapping in Appendix 1 (Figure 9, Figure 10, Figure 11, Figure 12, Figure 13, Figure 14, Figure 15, Figure 16, and Figure 17).

Table 4: Raymond Terrace Flying-Fox Camp Management Plan (PSC 2017) Foraging Species

Species	D-J	F-M	A-M	J-J	A-S	O-N
Angophora costata						X
Angophora floribunda	X					
Banksia integrifolia			X	X	X	
Corymbia eximia						X
Corymbia gummifera		X				
Corymbia maculata		X	X	X		
Eucalyptus acmenoides	X					X
Eucalyptus albens				X	X	
Eucalyptus amplifolia						X
Eucalyptus botryoides	X					
Eucalyptus camaldulensis	X					
Eucalyptus deanei	X	X				
Eucalyptus fibrosa	X					X
Eucalyptus longifolia			X			
Eucalyptus moluccana		X				
Eucalyptus paniculata	X					
Eucalyptus parramattensis	X					
Eucalyptus pilularis	X	X				
Eucalyptus piperita	X					
Eucalyptus punctata	X	X				
Eucalyptus resinifera	X	X				
Eucalyptus robusta			X	X		
Eucalyptus saligna	X	X				
Eucalyptus siderophloia	X					X
Eucalyptus tereticornis					X	X
Melaleuca quinquenervia		X	X			

Syncarpia glomulifera					X	X

Table 5: Grey-headed Flying Fox – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	Supplementary Spring-Autumn Foraging Habitat	22.99	No	22.99	31.31
Vegetation Zone 2 PCT 3544 Regen	None	-	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	Supplementary Spring-Autumn Foraging Habitat	10.24	No	0	0.35
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No		
			Total Area	**22.99**	**31.66**

3.4.3 Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland

Areas critical to the survival of the TEC are defined as:

"*Since hydrology governs the vegetation in wetland systems, the areas (including habitat) most critical to the survival of the ecological community are those where the hydrological regime remains reasonably intact such that the vegetative diagnostic features are maintained. Changes to natural hydrological regimes is a major factor contributing to the loss of wetland features, biological diversity and ecological function in Coastal Swamp Sclerophyll Forests. Categories A, B1, B2, and C1 (Table 2) represent those parts of the ecological community closest to its benchmark state, with more intact hydrology, other ecological function, and other critical habitat features, as demonstrated by the largest, most connected and/or most intact native vegetation and species diversity of the ecological community*".

And "*Patches that meet or are closest to high quality (Classes A, B and C1) for this ecological community or are otherwise critical to the survival of the ecological community*"

Assessment

The vegetation within the Project Area was assessed in accordance with the key diagnostic features of the TEC and condition thresholds as described in the Approved Conservation Advice. In summary:

- **Vegetation Zone 3** – Meets the key diagnostic features and minimum condition thresholds described below, therefore is commensurate with the TEC. The vegetation zone is consistent with Class B1 - High Quality Condition TEC, therefore meets the definition of "*areas critical to the survival*" of the TEC.

A summary of areas critical to the survival of this TEC within the Disturbance Footprint and the Project Area are outlined below in **Table 6**. The assessment results are detailed below in **Table 7**.

Table 6: Swamp Sclerophyll Forest – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area TEC (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	None	-	No	-	-
Vegetation Zone 2 PCT 3544 Regen	None	-	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	Occurrence	10.24	**Yes**	0	0.35
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No		
			Total Area	**0**	**0.35**

Table 7 Key Diagnostic Features of Coastal Swamp Sclerophyll Forest of New South Wales North Coast and South-east Queensland– EEC from Approved Conservation Advice (2008)

Decision Key Criteria	Answer	Justification
Occurs on the mainland and islands near to the coast (within 20 km) from South East Queensland to south-eastern NSW specifically within these IBRA Bioregions: South Eastern Queensland (SEQ); NSW North Coast (NNC); Sydney Basin (SYB) and the Bateman sub-region of the South East Corner (SEC).	Yes	The Project Area Is based within the NSW North Coast Basin IBRA Bioregion.
Occurs in coastal catchments typically below 20m ASL, but occasionally up to 220m ASL	Yes	The Vegetation within the Project Area occurred at an elevation of <20m ASL.
Occurs on hydric soils with inundation patterns ranging from intermittent to episodic.	Yes	The geology of the Project Area is characterised by Holocene (0.0117 million years ago – Present) marine deposited and aeolian-reworked coastal sand dunes (QH_bd Coastal). The following Soil Landscapes are mapped within the Project Area:
The vegetation structure varies from tall closed to open forest to woodland, to dense (closed) shrubland or scrub forest. Minimum crown cover (see footnote 5, p. 4) is at least 10%, but it is more typically in the range 50% to 70%.	Yes	Canopy cover is consistent with an open forest.
From South East Queensland to the Sydney Basin Bioregion, the canopy[9] is typically dominated or co-dominated by *Melaleuca quinquenervia* and/or *Eucalyptus robusta*. In some areas, the canopy may be locally dominated by other melaleuca species including *M. dealbata* (SEQ bioregion) (rarely); *M. biconvexa* (mid-NSW coast to south of Sydney); *M. decora* (north of Shoalhaven), frequently with *Parsonsia straminea* climbing on the trunks of	Yes	Canopy is dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark) and *Eucalyptus grandis* (Flooded Gum). A mix of ferns and graminoids including *Blechnum cartilagineum* (Gristle Fern), *Lobelia purpurascens* (Whiteroot), *Commelina cyanea* (Native Wandering Dew), *Gahnia clarkei* (Tall Saw-sedge), *Calochlaena dubia* (Rainbow Fern), and Cyclosorus interruptus

Decision Key Criteria	Answer	Justification
canopy species. In the SEC bioregion, *M. ericifolia* may occur as a dominant canopy or sub-canopy species.		
Other tree species may occur in the canopy (or sub-canopy) in some areas, but they are not dominant across a patch, including *Casuarina glauca*, *Banksia* spp., *Callistemon salignus*, *Corymbia intermedia* (Pink Bloodwood), *E. tereticornis*, (Forest Red Gum/Queensland Blue Gum), *E. longifolia* (Woollybutt), *E. botryoides* (Southern Mahogany/Bangalay), *E. ovata* (Swamp Gum), *Livistona australis* and/or *Lophostemon* spp.	Yes	*Eucalyptus grandis* and *Melaleuca quinquenervia*, with a high cover of *Livistona australis* and occasional *Eucalyptus pilularis* along the edges of the community (influence of adjacent dry sclerophyll forest)
The understorey typically includes a variable ground layer, depending on the canopy cover and inundation rate/period. Tall sedges (typically *Gahnia* spp.) and/or ferns often dominate the ground layer, mixed with graminoids and other herbs, especially *Imperata cylindrica* (Blady Grass).	Yes	The groundcover is dominated by *Gahnia clarkei* (Tall Saw-sedge), with drier areas containing increasing cover of *Lomandra longifolia* (Spiny-headed Mat-rush), *Entolasia stricta* (Wiry Panic) and *Imperata cylindrica* (Blady Grass).
While they can occur regularly in the ground layer, the ecological community is not present if halophytic species, more typically associated with estuarine/saltmarsh areas, dominate the ground layer of a patch, for example, *Appium prostratum*, *Atriplex cineria*, *Chenopodium glaucum*, *Rhagodia candolleaus* and *Samolus repens*.	N/A	Not Applicable
Note: Revegetated or replanted sites, or areas of vegetation regeneration (regrowth), are included in the nationally listed ecological community if they meet the key diagnostic characteristics. The inclusion of patches of natural and managed regeneration reflects the ecological community's ability to regenerate.	N/A	Not Applicable – This vegetation zone contains an intact native canopy, midstorey and groundcover.
Determination	This Vegetation Zone meets the definition of the Endangered Ecological Community *Coastal Swamp Sclerophyll Forest of New South Wales North Coast and South-east Queensland* as listed under the Commonwealth's Environment Protection Biodiversity Conservation Act 1999.	
Notes		

Decision Key Criteria	Answer	Justification
9 The uppermost layers of a vegetation type, formed by plant crowns. In a woodland or forest, the canopy is formed by the crowns of trees and sometimes large shrubs. The canopy can be further divided into upper, mid, and lower canopy layers. The tallest plants of a vegetation type form the upper canopy layer. *Identifying a patch* – A patch is a discrete and mostly continuous area of the ecological community[10], as defined by the key diagnostic characteristics, but can include small-scale (<30m) variations, gaps, and disturbances within this area. The smallest patch size that can be identified is 0.25 ha. Where a larger forest or woodland area has been classified as a different vegetation type (e.g. by state vegetation mapping), localised areas of the ecological community greater than 0.25 ha may be present within this larger area. 10 Note that NSW vegetation assessment tools/methodologies define a patch as including all intact native vegetation, which may include one or more ecological communities that have a gap of less than 100 m from the next area of moderate to good condition native vegetation. *Breaks in a patch* - When it comes to defining a patch of the ecological community, allowances are made for "breaks" up to 30 m between areas that meet the key diagnostics. Such breaks may be the result of watercourses, tracks, paths, roads, gaps made by exposed areas of soil, leaf litter or cryptogams, and areas of localised variation in vegetation that do not meet the key diagnostics. Such breaks do not significantly alter the overall functionality of the ecological community and thus form a part of the patch. Small breaks (< 30m across) should be included in the calculation of the size of the patch but be taken into account when determining the overall condition of the patch by excluding them from the calculation of patch condition. Where there is a break in the ecological community of 30 m or more (e.g. due to permanent artificial structures, wide roads or other barriers, water bodies or other types of vegetation) then the gap indicates that separate patches are present.		

Table 8 Condition Thresholds for EPBC Act Swamp Sclerophyll Forest TEC

Determination Criteria	Meets Criteria	Justification
Patch Size Thresholds		
Large Patch – The patch is at least 5 ha (it may or may not be contiguous with other native vegetation).	N/A	Not Applicable
Medium Patch – The patch is at least 2 ha and less than 5 ha (it may or may not be contiguous with other native vegetation).	Yes	The vegetation within the Project Area is only 0.35 ha, however it is likely connected to areas of similar vegetation outside the Project Area up to 5 ha and is connected to other native vegetation.
Small Contiguous Patch – The patch is at least 0.25 ha and less than 2 ha and is part of a larger area of native vegetation of at least 5 ha.	N/A	Not Applicable
Small Patch – The patch is at least 0.5 ha and less than 2 ha which is isolated or part of a small native vegetation remnant less than 5	N/A	Not Applicable
Biotic Thresholds		
High Condition – Non-native species comprise <20% of total ground layer vegetation cover*	Yes	The vegetation within this zone represents high condition vegetation with largely a low occurrence of non-native species.
Good Condition – Non-native species comprise 20% to 50% of total ground layer vegetation cover*	N/A	Not Applicable
Moderate Condition – Non-native species comprise 50% to 80% of total ground layer vegetation cover*	N/A	Not Applicable

Determination Criteria	Meets Criteria	Justification
Low Condition – Non-native species comprise more than 80% of total ground layer vegetation cover*	N/A	Not Applicable
Categories		
Class A - A large patch that meets key diagnostics AND has a predominantly native ground layer.	N/A	Not Applicable
Class B1 - A medium patch that meets key diagnostics AND has a predominantly native ground layer. OR **Class B1 -** A large patch that meets key diagnostics AND the ground layer is mostly native.	Yes	The vegetation within this zone largely meets the definition of Class B1 condition class, meeting the key diagnostics and having minimal non-native species cover.
Class B2 - A small patch that meets key diagnostics AND has a predominantly native ground layer AND is contiguous** with another large area of native vegetation.	N/A	Not Applicable
Class C1 - A large patch which meets key diagnostics AND the ground layer has at least 20% native vegetation cover. OR **Class C1 -** A medium patch that meets key diagnostics AND the ground layer is mostly native.	N/A	Not Applicable
Class C2 - A small patch that meets key diagnostics AND has a mostly native ground layer AND is contiguous** with another large area of native vegetation. OR **Class C2 -** A medium patch that meets key diagnostics AND the ground layer has at least 20% native vegetation cover. OR **Class C2 -** A large patch which meets key diagnostics, but the ground layer has low native vegetation cover	N/A	Not Applicable
Determination	The vegetation within Vegetation Zone 3 **does meet** the minimum condition thresholds for the Endangered Ecological Community *Coastal Swamp Sclerophyll Forest of New South Wales North Coast and South-east Queensland* as listed under the Commonwealth's Environment Protection Biodiversity Conservation Act 1999. As such, the vegetation within the Project Area does constitute the Commonwealth listed Endangered Ecological Community *Coastal Swamp Sclerophyll Forest of New South Wales North Coast and South-east Queensland*.	
*Refers to total perennial ground layer vegetation cover for the patch of the ecological community. Includes vascular plant species with a lifecycle of more than two growing seasons. It includes herbs (graminoids and forbs), grasses, shrubs, and juvenile plants of canopy species, but does not include annual plants, cryptogams, leaf litter or exposed soil. **Contiguous means the patch is connected or within 30 m of another area of native vegetation.		

3.4.4 Swift Parrot (*Lathamus discolor*)

Habitat critical to the survival of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act.

The Swift Parrot breeds mostly on the east and south-east coast of Tasmania during summer and migrates to mainland Australia in autumn. During winter the species disperses across forests and woodlands, foraging on nectar and lerps mainly in Victoria and New South Wales. Small numbers of Swift Parrots are also recorded in the Australian Capital Territory, south eastern South Australia and southern Queensland. Within these habitats, Swift Parrots preferentially forage in large, mature trees (Kennedy 2000; Kennedy and Overs 2001; Kennedy and Tzaros 2005) that provide more reliable foraging resources than younger trees (Wilson and Bennett 1999; Law et al. 2000). The migratory nature of the species means that they require a large network of resources both during and between annual cycles. Actions that directly and/or indirectly affect the species or their habitats could compromise recovery.

Noting the requirements of the species, habitat critical to the survival for the Swift Parrot includes:

Breeding and foraging habitat in Tasmania

- In different years the majority of the breeding population may be concentrated within a subset of the potential breeding range, according to spatially and temporally variable flowering patterns of preferred foraging species.
- Therefore, within areas where breeding is most likely to occur based on known breeding records, scientific literature and expert opinion, habitat critical to survival of Swift Parrots comprises both potential foraging habitat – which is native forest and woodland containing either Blue Gum (E. globulus) and/or Black Gum (E. ovata) as a dominant, subdominant or low density species, and potential nesting habitat – which is forests or woodlands containing hollow-bearing eucalypt trees within foraging range (~10 km) of potential foraging habitat that is old enough to flower.

Foraging habitat on the Australian mainland

- All preferred foraging species within known and likely foraging habitat on the mainland including Yellow Gum (*E. leucoxylon*); Red Ironbark (*E. tricarpa*); Mugga Ironbark (*E. sideroxylon*); Grey Box (*E. macrocarpa*); White Box (*E. albens*); Yellow Box (*E. melliodora*); Swamp Mahogany (*E. robusta*); Forest Red Gum (*E. tereticornis*); Blackbutt (*E. pilularis*); and Spotted Gum (*Corymbia maculata*).

Assessment

In accordance with the National Recovery Plan for the species "habitat critical for the survival of the species" is defined as important breeding or foraging habitat, assessed below:

- Breeding habitat – The species is known to only breed in Tasmania. Therefore, the Project Area does not contain breeding habitat for the species
- Foraging habitat – The Project Area contains one (1) foraging tree species; Blackbutt (*Eucalyptus pilularis*):
    - PCT 3544:
        - Veg Zone 1: contains Blackbutt (16%)
        - Veg Zone 2: contains no foraging species
    - PCT 4006: contains no foraging species
    - Exotic Vegetation: contains no foraging species
    - Exotic Grassland: contains no foraging species

Vegetation Zone 1 contains key foraging species and a high density of mature trees (approx. 150 mature trees a hectare – based on BAM plot data recording an average of 6 mature trees per 400m^2 plot). Therefore, Vegetation Zone 1 broadly meets the definition of "*habitat critical to the survival of the species*", however in accordance with the Recovery Plan for the species; "*survey data and historical records need to be considered when assessing the relative importance of a local area or region for Swift Parrots*". The nearest record of Swift Parrot is >5km to the north of the Project Area. As such, while the vegetation is potential foraging habitat for the species it is unlikely to represent important foraging habitat based on the lack of historical records for the species within the locality. Therefore, it is unlikely to represent "*habitat critical to the survival of the species*".

Table 9: Swift Parrot – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	Potential Foraging Habitat	22.99	Yes	22.99	31.31
Vegetation Zone 2 PCT 3544 Regen	None	-	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	None	-	No	-	-
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No		
			Total Area	**22.99**	**31.66**

3.4.5 Regent Honeyeater (*Anthochaera phrygia*)

Habitat Critical to the Survival of the Species - Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

Habitat critical to the survival of the regent honeyeater is defined under the National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) as:

- Any breeding or foraging habitat in areas where the species is likely to occur (based on commonwealth mapping); and
- Any newly discovered breeding or foraging locations.

Key areas include the Bundarra-Barraba, Pilliga Woodlands, Mudgee-Wollar and the Capertee Valley and Hunter Valley areas in New South Wales, and the Chiltern and Lurg-Benalla regions of north-east Victoria

Habitat - Most records of regent honeyeaters come from box-ironbark eucalypt associations, where the species seems to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes. Other forest types regularly utilised by regent honeyeaters include wet lowland coastal forest dominated by swamp mahogany (*Eucalyptus robusta*), spotted gum-ironbark associations and riverine woodlands (where it is known to feed on nectar from Amyema cambagei) (Menkhorst, 1997; Geering & French, 1998; Oliver et al., 1998; Oliver et al., 1999).

Key tree and mistletoe species for the regent honeyeater include:

- Mugga (or Red) Ironbark (*Eucalyptus sideroxylon*)
- Yellow Box (*E. melliodora*)
- White Box (*E. albens*)
- Yellow Gum (*E. leucoxylon*)
- Spotted Gum (*Corymbia maculata*)
- Swamp Mahogany (*E. robusta*)
- Needle-leaf Mistletoe (*Amyema cambagei*) on River Sheoak (*Casuarina cunninghamiana*)
- Box Mistletoe (*A. miquelii*)
- Long-flower Mistletoe (*Dendropthoe vitellina*)

Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events of regent honeyeaters. Flowering of associated species such as thin-leaved stringybark (*E. eugenioides*) and other stringybark species, and broad-leaved ironbark (*E. fibrosa*) can also contribute important nectar flows at times. Mature, large individual trees tend to be more important as they are more productive, particularly on highly fertile sites and in riparian areas (Webster & Menkhorst 1992; Oliver 2000). Trees in such areas tend to grow larger (Soderquist & MacNally 2000) and produce more flowers (Wilson & Bennett 1999).

Assessment

No mapped Important Bird Areas for the Species (i.e. Key breeding areas or other breeding areas) are mapped within the Project Area. The vegetation within the Project Area does not contain key foraging species for the Regent Honeyeater, as such the vegetation is unlikely to meet the definition of "*any foraging habitat in areas where the species is likely to occur*". Therefore, the vegetation within the Project Area does not meet the definition of "*Habitat critical to the survival of the species*".

Table 10: Regent Honeyeater – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	None	-	No	-	-
Vegetation Zone 2 PCT 3544 Regen	None	-	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	None	-	No	-	-
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No	-	-
			Total Area	-	-

3.4.6 Spotted -tailed Quoll (*Dasyurus maculatus*)

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long-term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

In accordance with the National Recovery Plan for the Spotted-tailed Quoll (DELWP 2016) *habitat critical to the survival of the Spotted-tailed Quoll includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey (Belcher 2000; Belcher & Darrant 2006b; Glen & Dickman 2006a, b). However, the threshold densities of these critical components required to support quoll populations are unknown. Consequently, it is currently not possible to define (or map) habitat critical to the survival of the Spotted-tailed Quoll. An action proposed in this Recovery Plan is to determine factors that influence habitat quality and to identify and map high quality habitat throughout the species' range (Action 1.3). Given the threatened status of the Spotted-tailed Quoll, all habitats within its current distribution that are known to be occupied*

are considered important. There is currently insufficient information to identify potential habitat that the species may recolonise or to which it could be reintroduced.

Habitat for the species is known to include:

- The southern subspecies, D. m. maculatus, has been recorded from a wide range of habitat types including rainforest, wet and dry sclerophyll forest, coastal heathland, scrub and dunes, woodland, heathy woodland, swamp forest, mangroves, on beaches and sometimes in grassland or pastoral areas adjacent to forested areas
- The Spotted-tailed Quoll occupies home ranges of several hundred to several thousand hectares in size.

Important populations for the species are listed in Table 1 of the Recovery Plan and include:

- Marylands National Park and adjacent freehold property 'Mowamba'
- Northern Tablelands (Tenterfield, Glen Innes, Armidale/Walcha, Dorrigo Plateau, Barrington)
- North Coast (Yuragir, Mariah, Limeburners Creek)
- Greater Blue Mountains (Wolgan, Goulburn River, Jenolan)
- South Coast (Barren Grounds / Budderoo, Escarpment forests from Morton National Park to Victorian border, Tallaganda / Badja)
- Kosciuszko National Park / Snowy Mountains, Byadbo

Assessment

The Disturbance Footprint and Project Area contains broadly suitable forging habitat for the Spotted-tailed Quoll. The Project Area does not occur within proximity of any listed Important Populations for the species, the species was not recorded within the Project Area during targeted surveys, and there is only five (5) records of the species within 5km of the Project Area. As such, it is unlikely the Disturbance Footprint comprises an important population of the Spotted-tailed Quoll or habitat critical to the survival of a species.

Table 11: Spotted-tailed Quoll – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	Broadly Suitable Habitat	22.99	No	22.99	31.31
Vegetation Zone 2 PCT 3544 Regen	Broadly Suitable Habitat	1.00	No	1.00	1.26
Vegetation Zone 3 PCT 4006 Mod-Good	Broadly Suitable Habitat	10.24	No	0	0.35
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No	-	-
			Total Area	**23.99**	**32.92**

3.4.7 South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*)

Important Population - An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

Habitat Critical to the Survival of the Species - Under the species' Conservation Advice *habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:*

- *for activities such as foraging, breeding, roosting, or dispersal;*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);*
- *to maintain genetic diversity and long-term evolutionary development; or*
- *for the reintroduction of populations or recovery of the species or ecological community.*

Foraging habitat - *South-eastern glossy black cockatoos rely on nine species of sheoaks (Allocasuarina spp. and Casuarina spp.) for feeding (Chapman 2007), with species used varying depending on the region. Birds often only feed on one or two species in one region (Higgins 1999). In south-east Queensland and north-east New South Wales, they show preference for black sheoak (A. littoralis) and forest sheoak (A. torulosa), although there are also records of them feeding on stringybark sheoak (A. inophloia; G Castley, D Guthrie & Roselli unpublished data), coastal sheoak (C. equisetifolia), and to a lesser extent river sheoak (C. cunninghamiana) and swamp sheoak (C. glauca) during limited times of the year (Glossy Black Conservancy 2010).*

Breeding habitat - *Cameron (2006b) found that in central New South Wales, the majority of the nesting hollows were in narrow-leaved ironbark (Eucalyptus crebra; 74%). Other species of trees used were the blue-leaved ironbark (E. nubila; 16%) and Blakely's red gum (E. blakelyi; 10%). As a guide, potential nest hollows for the subspecies have the following traits (Cameron 2006b):*

1) *>8 m above ground;*
2) *Located in branches >30 cm in diameter;*
3) *Branch or stem no more than 45o from vertical; and*
4) *Minimum entrance diameter of >15 cm.*

Assessment

The Disturbance Footprint contains minimal suitable forging habitat (*Allocasuaina* spp.) for the Glossy Black Cockatoo. Suitable breeding hollows (hollows >15cm diameter, 8m high) occur within the Disturbance Footprint, however the species has not been recorded within the Project Area during targeted surveys and only two (2) records of the species occur within 5 km of the Project Area (near Lemon Tree Passage and Tanilba Bay). Therefore, the Project Area is unlikely to represent key habitat for foraging, breeding, roosting or dispersal for the species. Due to the lack of suitable

foraging habitat and absence of records it is considered unlikely that the vegetation within the Project Area represents habitat that is key to maintaining genetic diversity or the long-term persistence of the species within the locality. As such, it is unlikely the Disturbance Footprint comprises an important population of the Glossy-black Cockatoo or habitat critical to the survival of a species.

Table 12: Glossy-black Cockatoo – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	Marginal Foraging Habitat	22.99	No	-	-
Vegetation Zone 2 PCT 3544 Regen	Marginal Foraging Habitat	1.00	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	Marginal Foraging Habitat	-	No	-	-
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No	-	-
			Total Area	-	-

3.4.8 Yellow -bellied Glider (south -eastern) (*Petaurus australis australis*)

In accordance with the species Conservation Advice key considerations in environmental impact assessments relevant to the yellow-bellied glider (south-eastern) should include the following factors about the subspecies:

- *Highly specialised diet and requirement of trees with unknown characteristics for sap feeding;*
- *Prefer to den in living hollow-bearing trees;*
- *Groups live in large, exclusive home ranges as foraging substrates are dispersed and variable through time and space; and*
- *Large areas of forest are required to maintain population viability.*

***Habitat critical to the survival** of the yellow-bellied glider (south-eastern) may be broadly defined as areas containing the following attributes (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis):*

- *large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees (see Appendix A);*
- *areas identified as refuges under future climate change scenarios;*
- *short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas;*

- *habitat corridors required to facilitate dispersal of the subspecies between fragmented habitat patches and/or that enable recolonization or movement away from threats. yellow-bellied gliders (south-eastern) have a glide ratio (horizontal distance/height dropped) of around 2.0, and corridors spanning gaps larger than the distance gliders are likely to be able to travel should be considered critical to the survival. There is not enough evidence to define the canopy and width characteristics of appropriate corridors. In the absence of such information, a precautionary approach should be taken to maximise dispersal by considering all habitat corridors in the species' range to be habitat critical to the survival; and*
- *areas in which some trees have evidence of use for sap extraction by yellow-bellied glider (south-eastern).*

Table 13: Yellow-bellied Glider – Foraging species as per Appendix A of Conservation Advice

Scientific Name*	Common Name/s	Used as a Sap tree
Acacia mabellae	Mabel's wattle	Yes
A. mearnsii	black wattle	Yes
Angophora subvelutina	broad-leaved apple	Yes
A. leiocarpa	rusty gum	Yes
Corymbia citriodora	spotted gum, lemon-scented gum	Yes
C. gummifera	red bloodwood	Yes
C. henryi	large-leaved spotted gum	Yes
C. intermedia	pink bloodwood	Yes
C. maculata	spotted gum	Yes
C. trachyphloia	brown bloodwood	Unknown
Eucalyptus acmenoides	white mahogany	Unknown
E. amplifolia	cabbage gum	Yes
E. andrewsii	New England blackbutt,	Yes
E. angophoroides	apple-topped box	Yes
E. bancroftii	orange gum, Bancroft's red gum	Yes
E. baxteri	brown stringybark	Unknown
E. biturbinata	grey gum	Yes
E. bosistoana	coast grey box	Yes
E. botryoides	Bangalay, southern mahogany	Yes
E. campanulata	New England blackbutt	Unknown
E. crebra	narrow-leaved ironbark	Unknown
E. cyclocarpa	monkey gum, mountain grey gum	Yes
E. dalrympleana	mountain gum	Yes
E. deanei	mountain blue gum, round-leaved gum	Yes
E. dunnii	white gum	Yes
E. elata	red peppermint	Unknown
E. eugenioides (includes E. nigra)	thin-leaved stringybark	Yes
E. fastigata	brown Barrel, cut-tail	Yes
E. fibrosa	broad-leaved ironbark	Unknown
E. fraxinoides	white ash	Unknown

E. grandis	flooded gum, rose gum	Yes
E. laevopinea	silvertop stringybark	Yes
E. longirostrata	grey gum	Yes
E. major	grey gum	Yes
E. melliodora	yellow box	Yes
E. microcorys	tallowwood	Unknown
E. moluccana	grey box	Yes
E. nobiliis	ribbon gum	Unknown
E. obliqua	messmate	Yes
E. ovata	swamp gum	Yes
E. pauciflora	snow gum	Unknown
E. pilularis	blackbutt	Yes
E. pilularis/C. maculata hybrid		Yes
E. piperita	Sydney peppermint	Yes
E. propinqua	grey gum	Yes
E. punctata	grey gum	Yes
E. racemosa	narrow-leaved scribbly Gum	Yes
E. radiata	narrow-leaved peppermint	Unknown
E. regnans	mountain ash	Unknown
E. resinifera	red mahogany	Yes
E. robusta	swamp mahogany	Unknown
E. saligna	Sydney blue gum	Yes
E. sclerophylla	hard-leaved scribbly gum	Yes
E. seeana	narrow-leaved red gum	Yes
E. sieberi	silvertop ash	Yes
E. siderophloia	grey ironbark	Unknown
E. sheraprocta	Blackdown stringybark	Yes
E. tereticornis	forest red gum	Yes
E. viminalis	ribbon gum, manna gum	Yes
Lophostemon confertus	brush box	Yes
Syncarpia glomulifera	turpentine	Yes

*Green species are recorded within the Project Area

Important Populations - *Populations important to the survival of the yellow-bellied glider (south-eastern) include stronghold populations, ecologically or genetically distinct populations (e.g., those at the limits of the subspecies' range, outlying populations), research populations, and other populations where recovery actions are being implemented. However, this list of important populations is not exhaustive. In the absence of such information, all known populations should be considered important. Known important populations include:*

- *Carnarvon Range (Inland population; Qld)*
- *Blackdown Tableland (Inland population; Qld)*
- *Bago Plateau (Endangered under NSW legislation; NSW)*

- *Richmond Range National Park (research population; NSW)*
- *Blacktown range (population near urban area; NSW)*
- *Shoalhaven populations (severely fire-affected, surveyed; NSW)*
- *Populations between Coffs Harbour, Dorrigo, Glen Innes and Grafton (affected by fire and timber harvesting, research populations; NSW)*
- *Populations between Nimmitabel and Cathcart (affected by fire and timber harvesting, research populations; NSW)*
- *Populations near Waratah Creek (affected by fire and timber harvesting, research populations; NSW)*
- *South Australian population (only SA population, potentially an ESU, six individuals, may be extinct; SA)*
- *Western Vic populations (outlying populations, potentially an ESU; Vic).*

Assessment

The Disturbance Footprint and Project Area contains broadly suitable forging habitat for the Yellow-bellied Glider, however the species was not recorded within the Project Area during targeted surveys and no records of the species occur within 5 km of the Project Area.

Habitat critical to the survival of the species was determined through the following key features described above:

- **Habitat** – A total of two (2) known foraging species occur within the Project Area; *Eucalyptus pilularis* (Blackbutt) and *Eucalyptus grandis* (Flooded Gum). However the species has not been recorded within the Project Area, no records occur within 5 km of the Project Area and no signs of foraging were recorded within the Project Area.
- **Future Climate Change Refuges** – The vegetation within the Project Area is not identified as future refuge under climate change
- **Short-term post-fire refuges** – The vegetation within the Project Area is unlikely to represent important post-fire refuge for the species within the locality owing to the site's exposure and absence of sheltered refugia.
- **Habitat corridors** – The vegetation likely represents a local movement corridor (north-east / south-west). Through an iterative process of avoidance
- **Evidence of feeding** – No evidence of Yellow-bellied glider foraging was detected within the Project Area

Important Populations – The Project Area is not associated with any of the listed important populations.

Table 14: Yellow-bellied Glider – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	None	-	No	-	-
Vegetation Zone 2 PCT 3544 Regen	None	-	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	None	-	No	-	-
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No	-	-
			Total Area	-	-

3.4.9 New Holland Mouse (*Pseudomys novaehollandiae*)

The National recovery Plan for the Pookila (New Holland mouse) *Pseudomys novaehollandiae* (DCCEEW 2026) outlines important habitat for the species and habitat critical to the survival of the species:

All potential habitat should be considered important to the Pookila's persistence and recovery, this includes any:

- *Areas within the species' modelled distribution;*
- *Areas where the species previously occurred but has since become locally extinct;*
- *Patches of suitable habitat that may not be currently occupied by the species but have the potential to be occupied by natural dispersal; and*
- *Areas that could be restored for reintroduction.*

All areas that contain habitat that serves one or more of the following ecological functions have the potential to be habitat critical to the survival of the Pookila:

- ***Foraging habitat:** vegetation with appropriate density and diversity to be able to support a population, such as native vegetation with seasonal abundance of edible flowering, fruiting, and seeding plants. Vegetation cover is important for the species to be able to forage without increased risk of predation. This habitat includes open heathland, tall open forest with a grassy understorey, open woodland with a grassy or heath understorey and vegetated sand dunes (Keith & Calaby 1968; Posamentier & Recher 1974; Fox & Fox 1978; Hocking 1980; Fox & McKay 1981; Pye 1991; Wilson 1991; Van Dyck & Lawrie 1997; Lock & Wilson 1999; Sparshott & Sparshott 2003; Wilson & Laidlaw 2003; Lazenby et al. 2007; Dixon 2014; DNRE Tas 2022).*
- ***Breeding habitat:** substrate for the species to be able to create burrows, or alternatively, 'surface nests' in low-lying vegetation that is suitable for successful reproduction and rearing*

of young. Soft sandy substrates, with deep topsoils are thought to be optimal (Abicair et al. 2020) but not exclusive. The Pookila mostly occupies coastal areas that provide this substrate. However, it also occupies sites 100–300 km from the coast and areas with higher elevation where soil composition varies. For example, the presence of sandy soils is highly likely in Goobang National Park (NSW NPWS 2001), whilst in the NSW ranges and Northern Tableland areas, soil may vary with a more dominant loamy or quartz soil base where the Pookila occurs or may be present (NSW OEH 2023. pers comm 22 November).

- ***Habitat for the long-term maintenance of the species:*** *including areas that are not subject to prolonged drought or at risk of extreme droughts in future (such as potential climate refugia), and habitat that is maintained through periodic small-scale burns to provide appropriate foraging habitat and connectivity for the species.*
- ***Habitat for the maintenance of genetic diversity:*** *includes all current habitats where the species is extant as they contain populations necessary to achieve maximum genetic diversity and increase resilience of the species against future threats. There are two recognised ESUs: the Southern ESU (Vic populations) and the Northern ESU (NSW and Qld populations). Tas may yet be identified as a third ESU or may cluster within the Southern ESU. Therefore, habitat across the species' range is necessary to maintain the national genetic diversity of the species.*
- ***Habitat for translocation:*** *can be identified using habitat modelling followed by ground-truthing at the local-scale and can include locations that have accounted for future changes due to climate change regimes as well as the exclusion of invasive predators.*

Refining what constitutes habitat critical to the survival of the Pookila is a priority action in this recovery plan. Until those key characteristics are further clarified, all areas that contain habitat that serves any of the above five ecological functions have the potential to be habitat critical to the survival of the Pookila. Habitat that supports multiple ecological functions and/or a higher number of the ecological attributes identified within the descriptions provided above, increases the likelihood that the habitat may be critical to the survival of the Pookila.

Assessment

No New Holland mice were recorded during the completion of targeted surveys within the Project Area. A total of four (4) records of the species occur within 5 km of the Project Area, as such a habitat assessment was completed with reference to the ecological functions referenced in the National Recovery Plan for the specie. Important habitat includes:

- ***Areas within the species' modelled distribution*** – The Project Area occurs within the modelled distribution of the species.
- ***Areas where the species previously occurred but has since become locally extinct*** – The species has not been recorded within the Project Area historically or as part of this assessment. A total of four (4) records of this species occurs within 5 km of the Project Area.
- ***Patches of suitable habitat that may not be currently occupied by the species but have the potential to be occupied by natural dispersal*** – While the species has not been recorded within the Project Area suitable habitat occurs within the Project Area and records of the species occur within the locality. As such, it is likely that while the Project Area is unoccupied by the species the habitat within the Project Area has the potential to be occupied by the species through natural dispersal.

- ***Areas that could be restored for reintroduction*** – the proposed sand quarry includes progressive rehabilitation of the site following extraction. The National Recovery Plan for the species highlights that the species is "identified as preferring early successional habitat, at some sites with peak abundance approximately 3-7 years post-fire and 7-9 years post-sand mine rehabilitation.

Considering the above, the vegetation is likely to represent habitat important to the species.

Areas that contain one or more of the following ecological functions have the potential to be habitat critical to the survival of the species:

- **Foraging habitat** – The vegetation within the Project Area is consistent with "*vegetated sand dunes*" with high floristic diversity with leguminous perennials. As such, the vegetation is likely to represent broadly suitable foraging habitat for the species.
- **Breeding habitat** – The Project Area is characterised by sandy soils suitable for burrowing. As such, the vegetation within the Project Area is likely representative of suitable breeding habitat for the species.
- **Habitat for the long-term maintenance of the species** – The vegetation within the Project Area is unlikely to represent potential climate refugia for the species.
- **Habitat for the maintenance of genetic diversity** – As the species has not been recorded within the Project Area the site is unlikely to represent habitat for a population necessary to achieve maximum genetic diversity and increase resilience of the species against future threats.
- **Habitat for translocation** – The vegetation within the Project Area is likely suitable habitat for translocation considering the presence of broadly suitable foraging habitat, and potential breeding habitat. The species is likely to also utilise rehabilitated areas following extraction (known to have peak abundance 7-9 years post-rehabilitation)

The vegetation within Vegetation Zone 1 meets more than one of the listed ecological functions above, therefore the habitat is likely to "*have the potential to be habitat critical to the survival*" of the species.

Table 15: New Holland Mouse – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 PCT 3544 Mod-Good	Broadly Suitable Habitat	22.99	Yes	22.99	31.31
Vegetation Zone 2 PCT 3544 Regen	Broadly Suitable Habitat	1.00	No	-	-
Vegetation Zone 3 PCT 4006 Mod-Good	None	-	No	-	-
Vegetation Zone 4 Exotic Vegetation	None	-	No	-	-
Vegetation Zone 5 Exotic Grassland	None	-	No	-	-
			Total Area	-	-

4. AVOID, MITIGATE AND MANAGE IMPACTS TO MNES

The proposed layout of the sand quarry and associated infrastructure has undergone a design process, taking into consideration engineering, surface water, traffic and transport and biodiversity values. Avoidance of impacts on native vegetation, fauna habitats and other biodiversity values have been taken into consideration in the design.

For the purpose of this assessment the following terms are defined in accordance with the BAM 2020 below:

- **Avoid -** *measures taken by a proponent such as careful site selection, or actions taken through the design, planning, construction and operational phases of the development to completely prevent impacts on biodiversity values, or certain areas of biodiversity.*
- **Minimise –** *a process applied throughout the development planning and design life cycle that seeks to reduce the residual impacts of development on biodiversity values.*

A total of 32.49 ha will be impacted by the proposed Disturbance Footprint, including 0.26 ha of existing infrastructure, 2.10 ha of exotic vegetation, and 6.14 ha of exotic grassland. Direct and indirect impacts to native vegetation have been avoided and minimised through the implementation of the following:

- The proposed action has been located to minimise impacts to higher condition vegetation (Vegetation Zone 1) and areas of TEC (Vegetation Zone 3), prioritising impacts within lower condition vegetation where possible as a resource project:
    - A total of 24.50 ha of Vegetation Zone 1 (PCT 3544: Moderate – Good Condition) will be impacted by the proposed action. Retained areas of this PCT include the southern corner of the Project Area, and vegetation within the road reserve and a 15 m boundary buffer. The proposed action will impact 78% of Vegetation Zone 1, retaining 22% within the Project Area.
    - A total of 0.35 ha of Vegetation Zone 3 (PCT 4006: Moderate Condition) (EEC) occurs within the Project Area. All of this Vegetation Zone and Commonwealth listed Swamp Sclerophyll Forest EEC occurring within the Project Area will be retained under the proposed action.
- The proposed action will impact areas mapped on the NSW Biodiversity Values Map, including land identified as “Old Growth Forest”.
- The proposed action will impact a total of 793 Hollow-bearing Trees (HBTs) representing a total of 73% of HBTs within the Project Area. The remaining 27% are retained within the southern corner of the Project Area, the road reserve, retained vegetation in the north-east of the Project Area, and vegetated buffer areas (15m boundary buffer, 3m powerline easement buffer, and 3m right of carriageway buffer).
- The proposed action avoids impacts to a wetland area associated with PCT 4006 in the north-western corner of the Project Area.
- The proposed action avoids impacts to the north-eastern corner of the Project Area, east of the right-of-carriageway.

- The proposed action will minimise impacts to threatened species recorded within the Project Area, including the following EPBC Act listed species:
    - *Diuris praecox (Newcastle Doubletail)* – was not recorded within the Project Area, however broadly suitable habitat occurs within the powerline easement. No additional impacts (beyond existing uses) to the powerline easement are proposed under the proposed action.
    - Koala (*Phascolarctos cinereus*) – while this species was recorded within the Project Area, and the vegetation within the Project Area broadly represents foraging habitat for the species.
    - Grey-headed Flying-fox (*Pteropus poliocephalus*) – the vegetation within the Project Area is considered foraging habitat for the species.
- The proposed action will minimise impacts to suitable habitat for the following EPBC Act listed threatened species (not recorded within the Project Area, only suitable habitat):
    - Spotted-tailed Quoll (*Dasyurus maculatus*) - the vegetation within the Project Area is considered possible habitat for the species. Moderate likelihood of occurrence.
    - New Holland Mouse (*Pseudomys novaehollandiae*) – the vegetation within the Project Area is considered potential habitat for the species, however the species has not been recorded within the Project Area during targeted surveys. Moderate likelihood of occurrence.
- Dust suppression using water carts will minimise indirect impacts caused by excessive dust
- The proposed action will be staged along with progressive revegetation over the life of the sand quarry. This allows for the maintenance of connectivity east-west across the Subject Land. This revegetation is based on successful revegetation undertaken within the Cabbage Tree Road Sand Quarry
- Rehabilitation and management of retained areas will be detailed within a site-specific Biodiversity Management Plan.

Mitigation Measures

The measures outlined below in **Table 16** are proposed to further manage and mitigate impacts associated with the proposed development.

Table 16 Additional Impact Mitigation Measures

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
Clearing of native vegetation	Avoid and minimise clearing impacts to native vegetation where possible. Clearly delineate the boundaries of the project footprint to prevent any unnecessary clearing beyond its extent. This includes the installation of appropriate fencing or demarcation. This demarcation should clearly show the extent of permitted disturbance area, with signage to restrict entry into the retained vegetation.	Prior to and during vegetation clearing and operation of the sand quarry	Quarry manager

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
	Appropriate signage such as 'no go zone' or 'environmental protection area' should be installed surrounding the area of retained native vegetation and wetlands. Clearly identify and communicate the location of any 'no go zones' in site inductions. Excavation along the boundary of the excavation area will have regard to Tree protection measures and consider allowances for Tree Protection Zones in accordance with AS4970 (Standards Australia, 2009) where feasible. A suitably licenced and trained fauna handler will be present during clearing (where clearing is vegetation above 3m in height).		
Removal of hollow-bearing trees / habitat trees, resulting in fauna injury and mortality	Pre-clearance surveys will be undertaken to determine presence of fauna habitat features (i.e. nests or hollows) are present. A suitably licenced and trained fauna handler will be present during clearing hollow-bearing tree clearing to rescue and relocate displaced fauna. A suitable hollow offset program will be detailed within the Biodiversity Management Plan and will include: Provision of 793 replacement hollows (being reclaimed hollows from site and/or nest boxes). Replacement of a suitable range of hollow types representative of the expected carrying capacity of rehabilitated landscape. Erection of suitable posts (reclaimed trees or otherwise) within the rehabilitation area to support nest box installation, (treated pine should not be used for posts). Installation of a range of nest boxes within the retained vegetation. Maintenance and replacement of these hollows as needed for a minimum 15 year period (i.e. quarrying life plus five years). In Year 10 of quarrying, compile a Replacement Hollow Report that documents details of the Hollow Offset Program including the use and maintenance costs of hollows and associated influences on these outcomes. The report should be made available on a suitable website for future public access (e.g. Council library).	During vegetation clearing and operation	Quarry manager
Impacts to surface and groundwater quality and quantity due to sediment run-off and/or contaminant runoff into adjacent watercourses	Erosion and sediment controls employed as needed (noting no water courses onsite and limited risk of runoff due to sandy soils). Employ appropriate hydrocarbon controls onsite for containment of spills. Excavation limited to 0.7m above groundwater, with exception to installation of poles, piers etc required for construction. Rehabilitation to 1.0m above groundwater table. Site-based vehicles will carry spill kits.	During operation	Quarry manager

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
	Limit the use of pesticides in the project footprint where possible to avoid contamination of nearby wetland areas.		
Vehicle collision with fauna	Speed limits within the Subject Land should be limited to 40 km/hr. This limit should be clearly signed at all entry points to site. All staff and haulage contractors must be suitably inducted to the site including awareness of speed limits and fauna presence.	During operation	Quarry manager
Transfer of weeds and pathogens to and from site	The fungal pathogens *Phytophora cinnamomi* and Myrtle Rust (*Puccinia psidii*) are known to occur in the Port Stephens LGA, however, it is unknown if they occur within the Subject Land. These pathogens can have devastating impacts on native plant communities and inhabiting fauna if not properly managed. All vehicles working outside the established hardstand areas of the site must arrive to site in a clean condition. Ensure soil and seed material is not transferred in accordance with measures outlined in the Biodiversity Management Plan. Weed infestations within the Subject Land are to be identified and mapped within the Biodiversity Management Plan. The Biodiversity Management Plan must detail requirements for the control of weeds within areas of retained vegetation.	During vegetation clearing and operation	Quarry manager
Noise, vibration, lighting, waste and air pollution impacts to adjacent sensitive habitat areas	Increased human activity (from workers and traffic levels) directly adjacent to sensitive habitat areas may cause disturbance to flora and fauna species in adjoining habitat. Impacts from operational activities, such as disturbance to an animal's normal behaviour patterns due to noise, vibration, lighting or dust may cause areas of previously suitable habitat to become sub-optimal and may cause fauna species to vacate areas of previously suitable habitat. Measures to mitigate impacts on flora and fauna from noise, vibration, waste, light and air pollution such as: Enforce 'carry-in, carry-out' policy regarding rubbish and waste materials generated on-site during operation to avoid waste materials entering adjacent vegetation. Restriction of public access and associated impacts from domestic pets, waste dumping and damage to adjoining vegetation must be enforced pre, during and post construction. Fence sensitive areas to delineate 'no go' zones. The sand quarry will only be in operation during daylight hours Levels of lighting associated with the sand quarry will be reduced to a minimal level and directed away from retained vegetation areas to reduce any adverse effects upon the essential behavioural patterns of light-sensitive fauna. Lighting design and utilisation during construction and operational phases of the development should be based on principles detailed in Appendix A of the National Light Pollution Guidelines for Wildlife (DEE 2020). This includes	During operation	Quarry manager

Action	Outcome (Describe the outcome of implementing the measure, with reference to specific entities identified in Sections 4 and 5)	Timing	Responsibility
	consideration of adaptive controls, and measures to reduce light intensity and inappropriate light spill into retained vegetation and fauna habitat. Lighting should also comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting. Noise minimisation practices in accordance with the Noise Management Plan. Dust control measures such as covering loads where required; amending operations under excessive wind conditions including ceasing operations if required; use of water tankers as required, to control dust; and rehabilitation of native vegetation. Induction of all personnel on measures to minimise noise, dust and vibration on the adjoining environment and community.		

5. ASSESSMENT OF IMPACTS TO MNES

In accordance with the Supplementary SEARs the following has been provided:

11. The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including:

a) a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;

b) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

c) analysis of the significance of the relevant impacts; and

d) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

5.1 DIRECT IMPACTS

Direct impacts associated with the proposed action are the result of direct clearing of native vegetation and habitat. The extent of direct impacts is detailed in **Table 17**.

Table 17: Summary of direct impacts - total

Direct impact	BC Act status	EPBC Act status	Habitat Type	Extent (ha, number of individuals)
Koala (combined populations of Qld, NSW and the ACT) (*Phascolarctos cinereus*)	E	E	Foraging Habitat, Habitat Critical to the Survival of the Species	22.99 ha
Grey -headed Flying -fox (*Pteropus poliocephalus*)	V	V	Foraging Habitat, Habitat Critical to the Survival of the Species	22.99 ha

Direct impact	BC Act status	EPBC Act status	Habitat Type	Extent (ha, number of individuals)
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	EEC	EEC	Class B1 TEC, Area Critical to the Survival of the TEC	0 ha
Swift Parrot (*Lathamus discolor*)	CE	CE	Potential Foraging Habitat, Habitat Critical to the Survival of the Species	22.99 ha
Regent Honeyeater (*Anthochaera phrygia*)	CE	CE	None	0 ha
Spotted -tailed Quoll (*Dasyurus maculatus*)	E	E	Broadly Suitable Habitat, Habitat Critical to the Survival of the Species	23.99 ha
South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*)	V	V	Marginal Foraging Habitat	23.99 ha
Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*)	V	V	None	0 ha
New Holland Mouse (*Pseudomys novaehollandiae*)	V	-	Broadly Suitable Habitat, Habitat Critical to the Survival of the Species	22.99 ha

5.2 INDIRECT IMPACTS

Indirect impacts associated with the proposed action are detailed in **Table 17**.

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Accidental clearing outside of Disturbance Footprint, inadvertent impacting adjacent habitat or vegetation	Native vegetation and associated general fauna habitats	5–10 m from disturbance edge	Unlikely during construction or operation. Greater potential for accidental incursions during construction.	Long-term	Construction and operation	Likelihood: Low provided exclusion fencing and other mitigation measures in place. Consequence: Disturbance and damage to adjacent vegetation and disturbance to resident fauna; reduction in quality of adjacent vegetation and habitats
General edge effects (clearing, light, noise, weeds)	Native vegetation and associated general	5–10 m from disturbance edge	Daily for the duration of construction and operation, reducing in intensity and	Long-term	Construction and operation	Likelihood: High Consequence: could impact condition of avoided vegetation and habitats

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
	fauna habitats		location as the quarry project becomes established.			
Noise, dust or light spill	Native vegetation and associated general fauna habitats	5–10 m from disturbance edge	Daily for the duration of construction and operation.	Long-term	Construction and operation	Likelihood: high. Consequence: could reduce quality of habitats for foraging and breeding activities of local or resident fauna. Powerful Owl may be disturbed by construction and operational noise but large area of surrounding habitat will allow for dispersal. Note: no night works are proposed, so light spill is not a relevant impact on adjacent habitats within the quarry.
Movement of weeds and pathogens from the site to adjacent vegetation	Native vegetation and associated general fauna habitats	Vegetation adjoining haul roads and operation areas	Daily for the duration of construction and operation.	Long-term	Construction and operation	Likelihood: moderate Consequence: potential reduction in native flora diversity and increase in cover and diversity of weeds (including high threat weeds, HTWs), and function of the avoided vegetation. High prevalence of *Lantana camara* (Lantana) and *Chrysanthemoides monilifera* (Bitou Bush) within the Subject Land. Controls include management of residual avoided lands to minimise weeds.

6. SIGNIFICANT IMPACT ASSESSMENT

The following species and Ecological Communities have been assessed under the EPBC Act Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment [DotE], 2013) (Significant Impact Guidelines):

Critically Endangered Species:

- Swift Parrot *(Lathamus discolor)*;
- Regent Honeyeater *(Anthochaera phrygia)*;

Endangered Species and Ecological Communities:

- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*
- Koala *(Phascolarctos cinereus)* (combined populations of Qld, NSW and the ACT);
- Spotted -tailed Quoll *(Dasyurus maculatus)*;

Vulnerable Species:

- Grey -headed Flying -fox *(Pteropus poliocephalus)*
- South -eastern Glossy Black Cockatoo *(Calyptorhynchus lathami lathami)*
- Yellow -bellied Glider (south -eastern) *(Petaurus australis australis)*
- New Holland Mouse *(Pseudomys novaehollandiae)*

The assessments are provided in **Appendix 2**, the results summarised in **Table 18**.

Table 18: MNES Assessment of Significance

Direct impact	BC Act status	EPBC Act status	Habitat Type	Extent (ha, number of individuals)	Significant Impact
Koala (combined populations of Qld, NSW and the ACT) (*Phascolarctos cinereus*)	E	E	Foraging Habitat, Habitat Critical to the Survival of the Species	22.99 ha	No
Grey -headed Flying -fox (*Pteropus poliocephalus*)	V	V	Foraging Habitat, Habitat Critical to the Survival of the Species	22.99 ha	No
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	EEC	EEC	Class B1 TEC, Area Critical to the Survival of the TEC	0 ha	No
Swift Parrot (*Lathamus discolor*)	CE	CE	Potential Foraging Habitat, Habitat Critical to the Survival of the Species	22.99 ha	No
Regent Honeyeater (*Anthochaera phrygia*)	CE	CE	None	0 ha	No
Spotted -tailed Quoll (*Dasyurus maculatus*)	E	E	Broadly Suitable Habitat, Habitat Critical	23.99 ha	No

Direct impact	BC Act status	EPBC Act status	Habitat Type	Extent (ha, number of individuals)	Significant Impact
			to the Survival of the Species		
South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*)	V	V	Marginal Foraging Habitat	23.99 ha	No
Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*)	V	V	None	0 ha	No
New Holland Mouse (*Pseudomys novaehollandiae*)	V	-	Broadly Suitable Habitat, Habitat Critical to the Survival of the Species	22.99 ha	No

7. OFFSETTING

Requirements of the SEARs include:

Item 17(f) - Quantification of the offset liability for each species and community significantly impacted, and information on the proposed offset strategy, including discussion of the conservation benefit for each species and community, how offsets will be secured, and the timing. It is a requirement that offsets directly contribute to the ongoing viability of the specific protected matter impacted by a proposed action i.e., 'like -for -like'.

Item 17 (f)(i) - Like -for -like includes protection of native vegetation that is the same ecological community or habitat being impacted (preferably in the same region where the impact occurs), or funding to provide a direct benefit to the matter being impacted e.g., threat abatement, breeding and propagation programs or other relevant conservation measures.

The proposed action will be assessed under the NSW Bilateral Agreement, as such offsetting will be achieved through the NSW Biodiversity Offset Scheme (BOS). In accordance with the NSW BOS residual impacts are offset through the retirement of two (2) types of biodiversity credits, including;

- **Ecosystem Credits:** a measurement of the value of threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur with a PCT, and PCTs generally.
- **Species Credits:** the class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection (TBDC).

For the proposed action offset obligations for residual impacts to MNES are to be met through the retirement of both Ecosystem and Species Credits. For the proposed action retirement of 552 Ecosystem Credits for Coastal Dune Dry Sclerophyll Forests - < 50% meets the project's offset obligation for the following MNES entities recognised as "*Ecosystem Credit*" entities under the BOS:

- Grey -headed Flying -fox (*Pteropus poliocephalus*)
- Swift Parrot (*Lathamus discolor*)

- Regent Honeyeater (*Anthochaera phrygia*)
- Spotted -tailed Quoll (*Dasyurus maculatus*)
- South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*)
- Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*)
- New Holland Mouse (*Pseudomys novaehollandiae*)

Impacts to MNES species recognised as "*Species Credit Species*" under the BOS, relevant to the proposed action, are offset through the retirement of Species Credits, these include:

- Koala (combined populations of Qld, NSW and the ACT) (*Phascolarctos cinereus*)

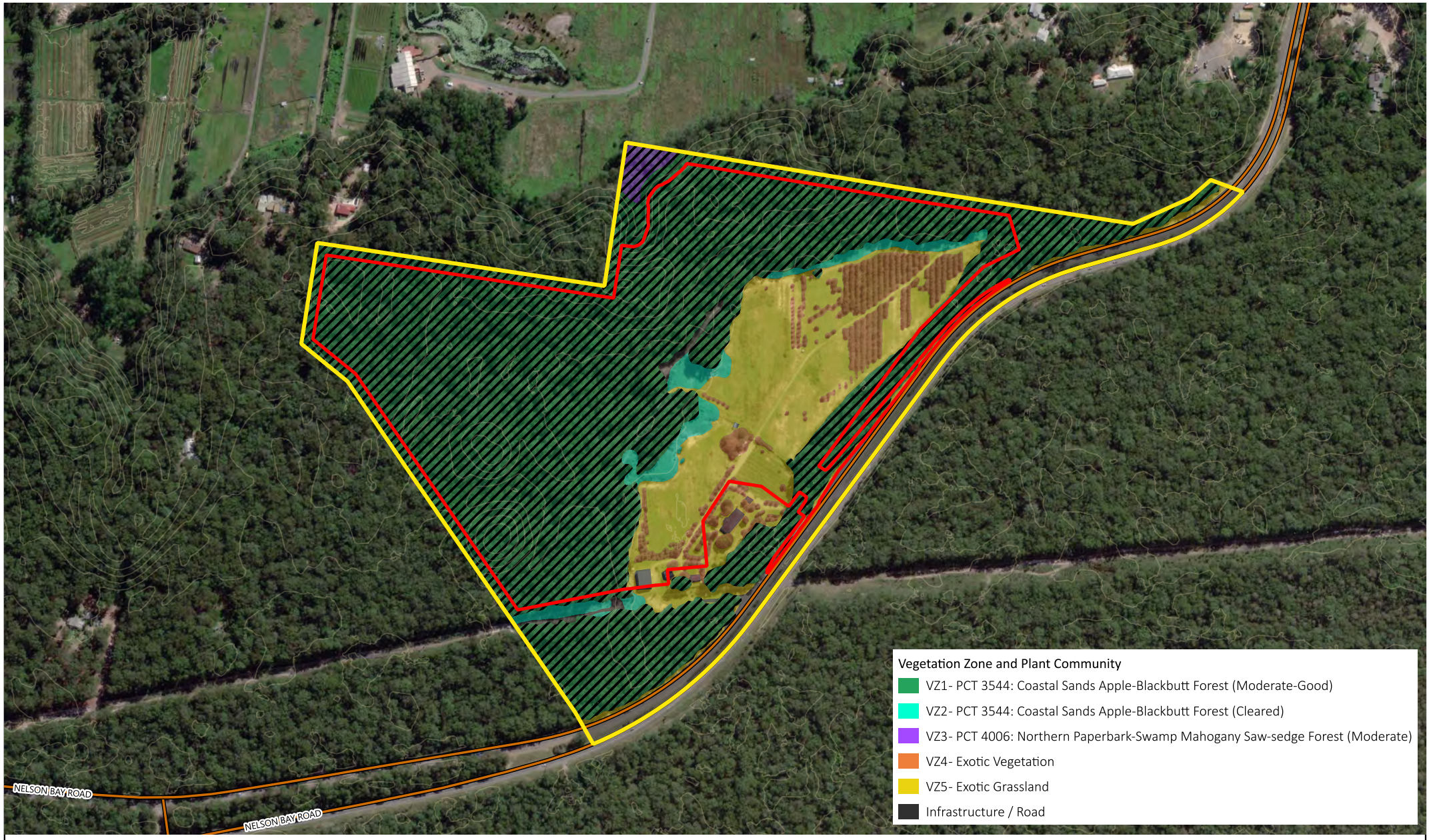
A summary of offsetting under the BOS is provided in **Table 19**.

Table 19: Summary of offsetting - total

Direct impact	BC Act status	EPBC Act status	Habitat Type	Offset Type	Credits
Koala (combined populations of Qld, NSW and the ACT) (*Phascolarctos cinereus*)	E	E	Foraging Habitat, Habitat Critical to the Survival of the Species	Species	737
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	EEC	EEC	Class B1 TEC, Area Critical to the Survival of the TEC	Ecosystem	0
Grey -headed Flying -fox (*Pteropus poliocephalus*)	V	V	Foraging Habitat, Habitat Critical to the Survival of the Species	Ecosystem	552*
Swift Parrot (*Lathamus discolor*)	CE	CE	Potential Foraging Habitat, Habitat Critical to the Survival of the Species	Ecosystem	
Regent Honeyeater (*Anthochaera phrygia*)	CE	CE	None	Ecosystem	
Spotted -tailed Quoll (*Dasyurus maculatus*)	E	E	Broadly Suitable Habitat, Habitat Critical to the Survival of the Species	Ecosystem	
South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*)	V	V	Marginal Foraging Habitat	Ecosystem	
Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*)	V	V	None	Ecosystem	
New Holland Mouse (*Pseudomys novaehollandiae*)	V	-	Broadly Suitable Habitat, Habitat Critical to the Survival of the Species	Ecosystem	

*MNES offset using Ecosystem Credits (Coastal Dune Dry Sclerophyll Forests - < 50% credits)

APPENDIX 1. FIGURES



Project area

Disturbance footprint

Koala (*Phascolarctos cinereus*) foraging habitat

Arterial Road

Contour (5m)

Figure 3: Koala (*Phascolarctos cinereus*) - Habitat

100 200 300 400 500 m

N

WEDGETAIL PROJECT CONSULTING PTY LTD

Date: 28/05/2026
By: Natalia Laws
GDA2020 / MGA zone 56
Source:© Microsoft Bing

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Figure 4: Koala (*Phascolarctos cinereus*) – Regional context

WEDGETAIL PROJECT CONSULTING PTY LTD

Date: 05/05/2026
By: Natalia Laws
GDA2020 / MGA zone 56
Source:© Google

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area
Disturbance footprint
Supplementary Koala Habitat
Arterial Road
Contour (5m)

Figure 5: Koala (*Phascolarctos cinereus*) – Port Stephens CKPoM Koala Habitat Mapping (Existing)

100 200 300 400 500 m

N

WEDGETAIL PROJECT CONSULTING PTY LTD

Date: 01/05/2026
By: Natalia Laws
GDA2020 / MGA zone 56
Source:© Microsoft Bing

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area
Disturbance footprint
Supplementary habitat
Mainly cleared
Infrastructure / Road
Arterial Road
Contour (5m)

Figure 6: Koala (*Phascolarctos cinereus*) - Port Stephens CKPoM Koala Habitat Mapping (Verified)

100 200 300 400 500 m

N

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW

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Date: 01/05/2026
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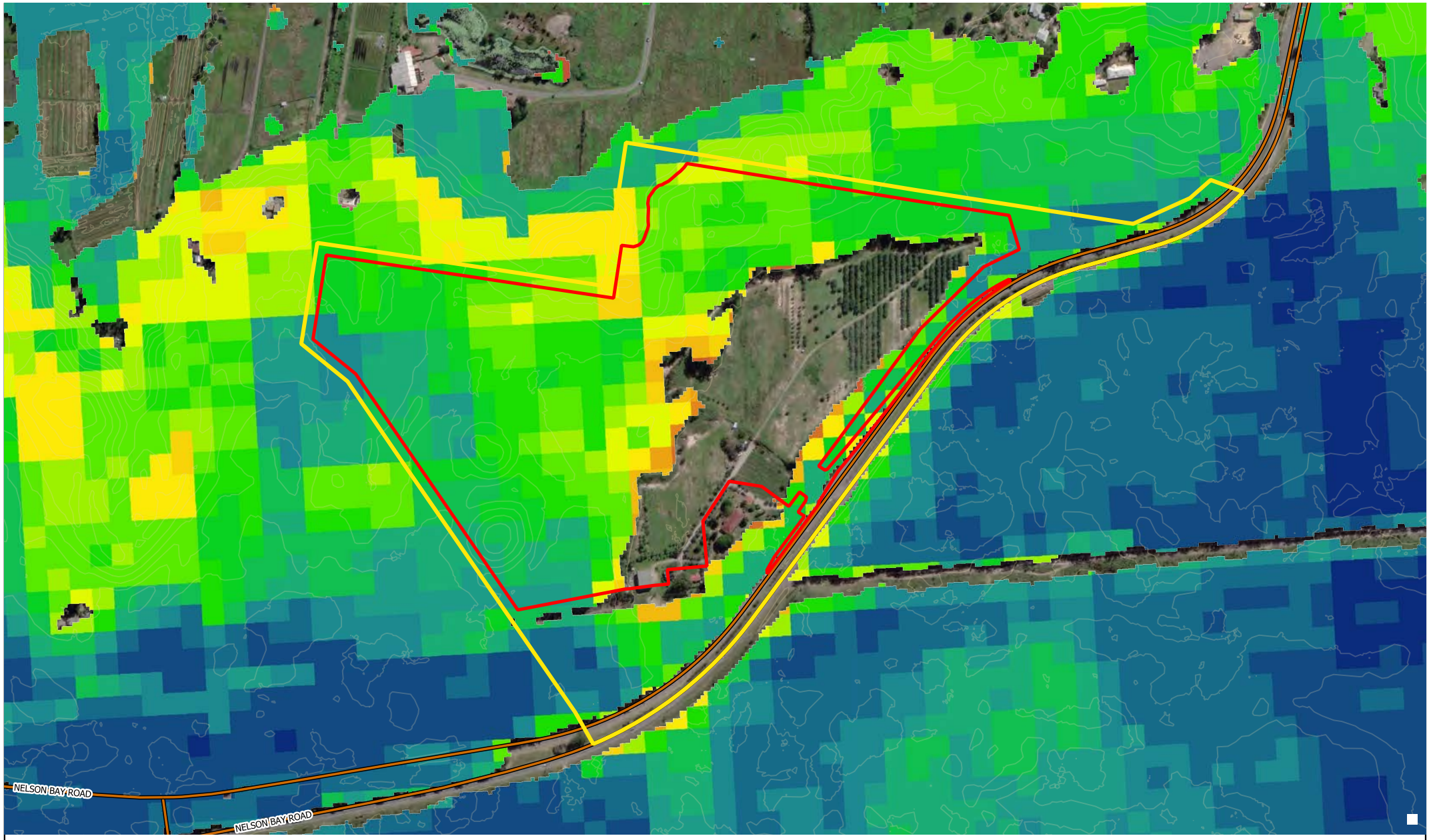
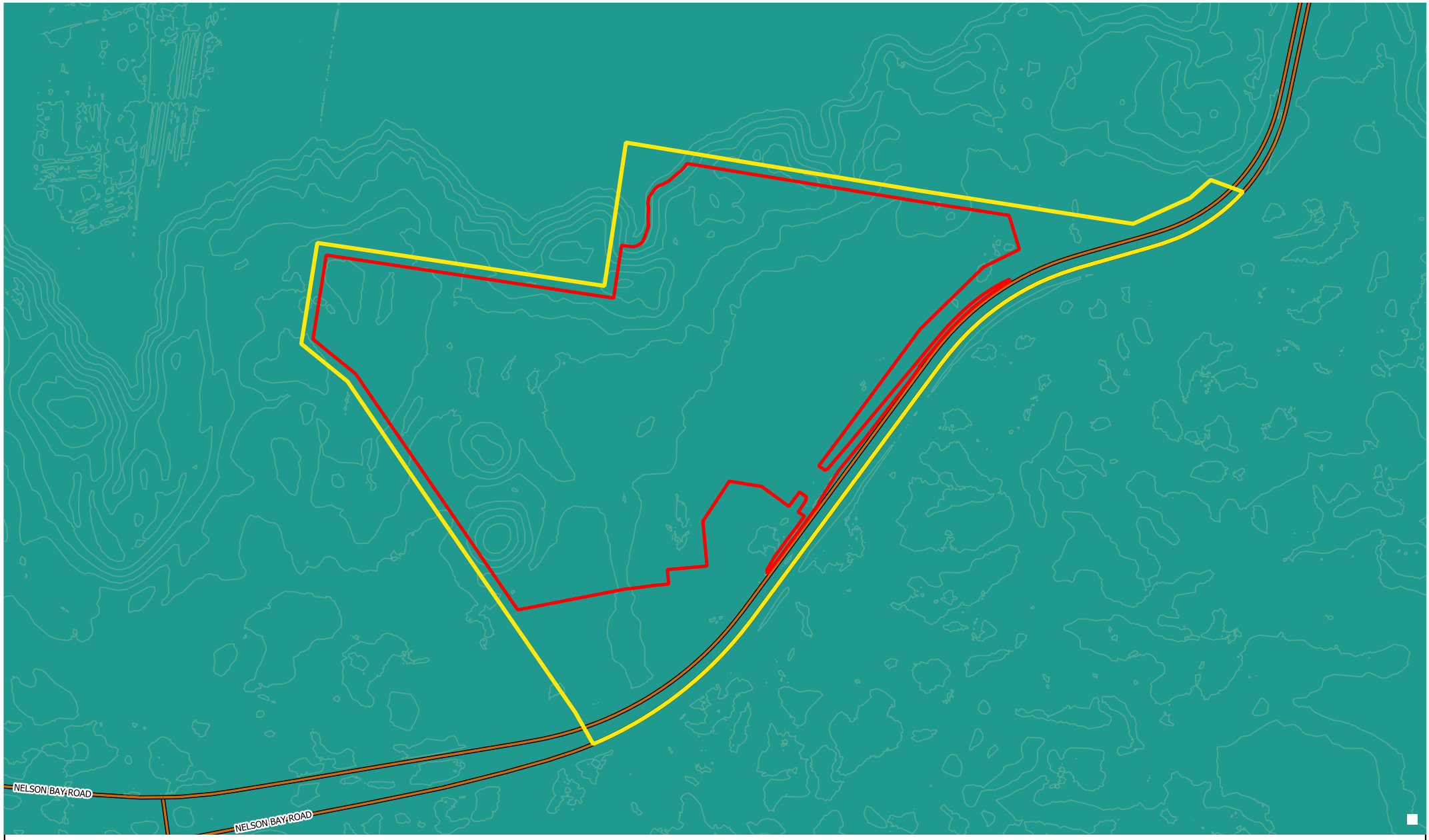


Figure 7: Koala (*Phascolarctos cinereus*) – Habitat Suitability Map (KHSM)

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PROJECT CONSULTING PTY LTD

Date: 01/05/2026
By: Natalia Laws
GDA2020 / MGA zone 56
Source:© Microsoft Bing

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area
Disturbance footprint

Koala likehood (v2.0) Map
No Koala Records
0.00- 0.25
0.26- 0.50
0.51- 0.75
0.76- 1.00

Arterial Road
Contour (5m)

Figure 8: Koala (*Phascolarctos cinereus*) – Koala Likelihood Map (KLM)

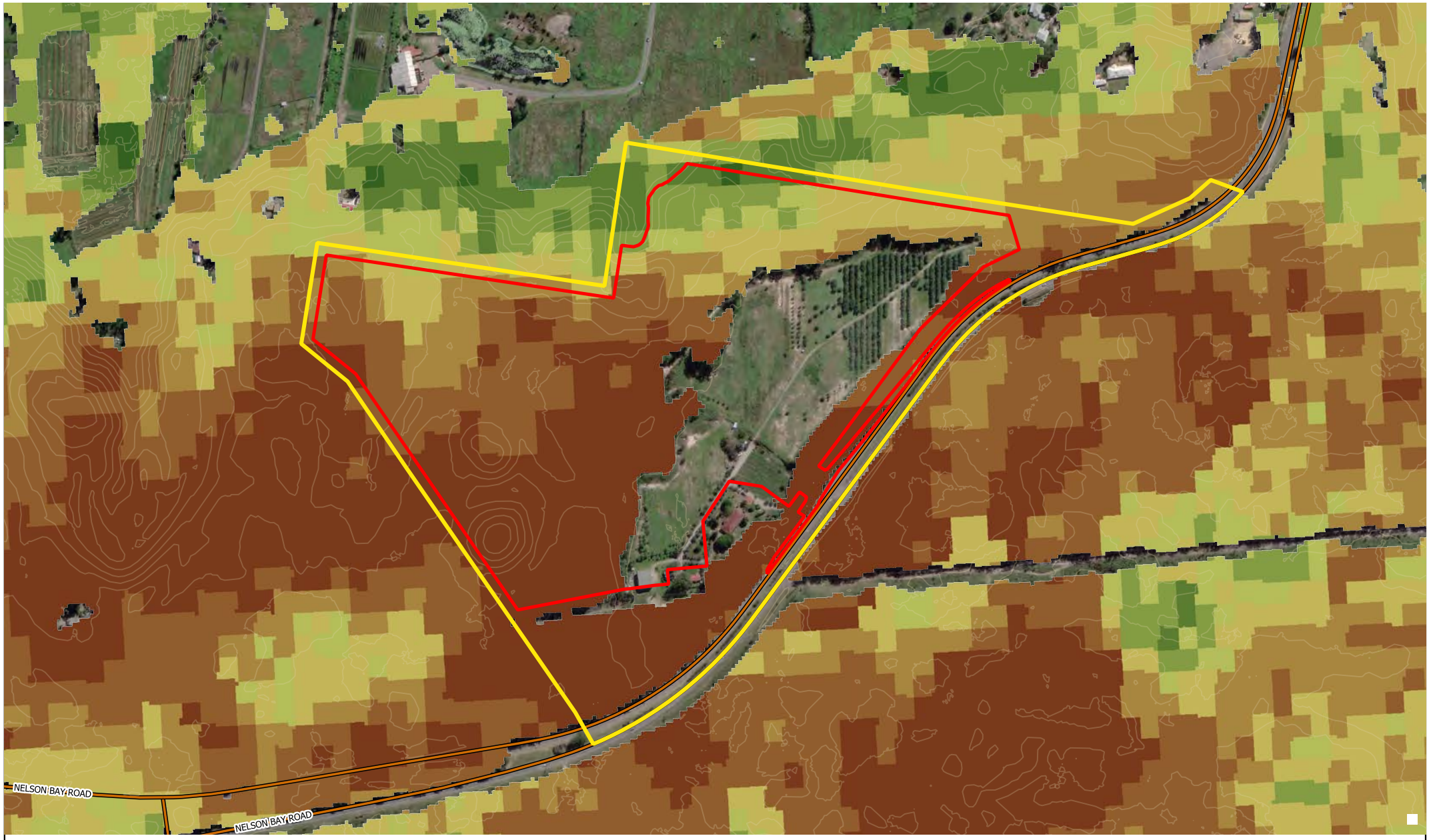
100 200 300 400 500 m

N

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Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area

Disturbance footprint

Koala tree index - Central Coast

less than 0.1000

0.1000- 0.2000

0.2000- 0.3000

0.3000- 0.4000

0.4000- 0.5000

0.5000- 0.6000

0.6000- 0.7000

0.7000- 0.8000

0.8000- 0.9000

0.9000- 1.0000

Arterial Road

Contour (5m)

Figure 9: Koala (*Phascolarctos cinereus*) Tree Index Map

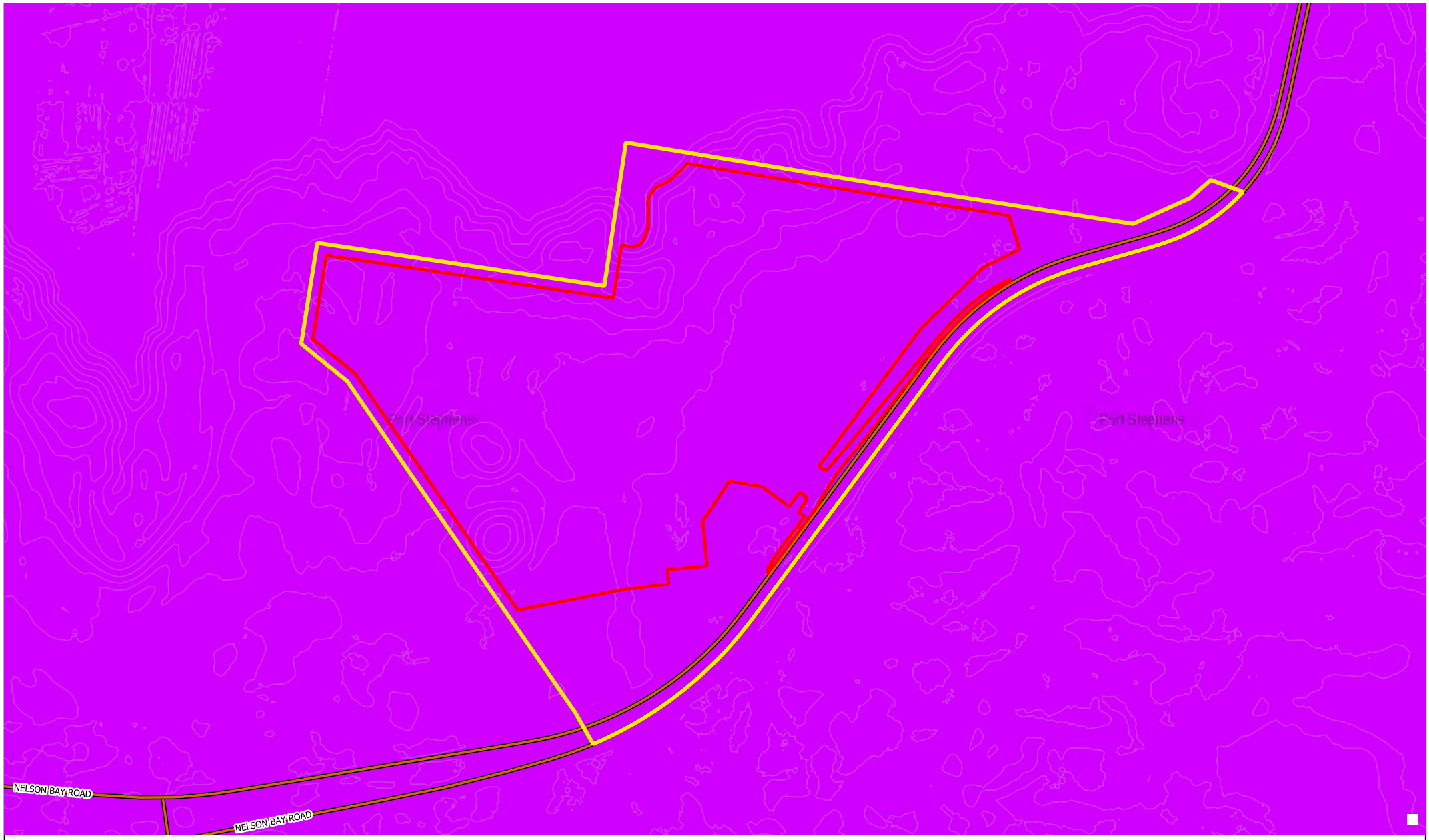
100 200 300 400 500 m

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Project area

Disturbance footprint

Koala Habitat Information Base-Areas of Regional Koala Significance (ARKS)

Arterial Road

Contour (5m)

Figure 10: Koala (*Phascolarctos cinereus*) – Koala ARK Map

100 200 300 400 500 m

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W:\Arbus\25-079 - Bobs Farm Quarry BOAR\GIS\25-079_BobsFarmQuarry_EPBC_20260501.qgz
25-079_Bobs_Farm_EPBC_F10_koala_ARK_map



Project area
Disturbance footprint
Impacted Koala foraging habitat
Not impacted Koala foraging habitat
Arterial Road
Contour (5m)

Figure 11: Koala (*Phascolarctos cinereus*) - Impact

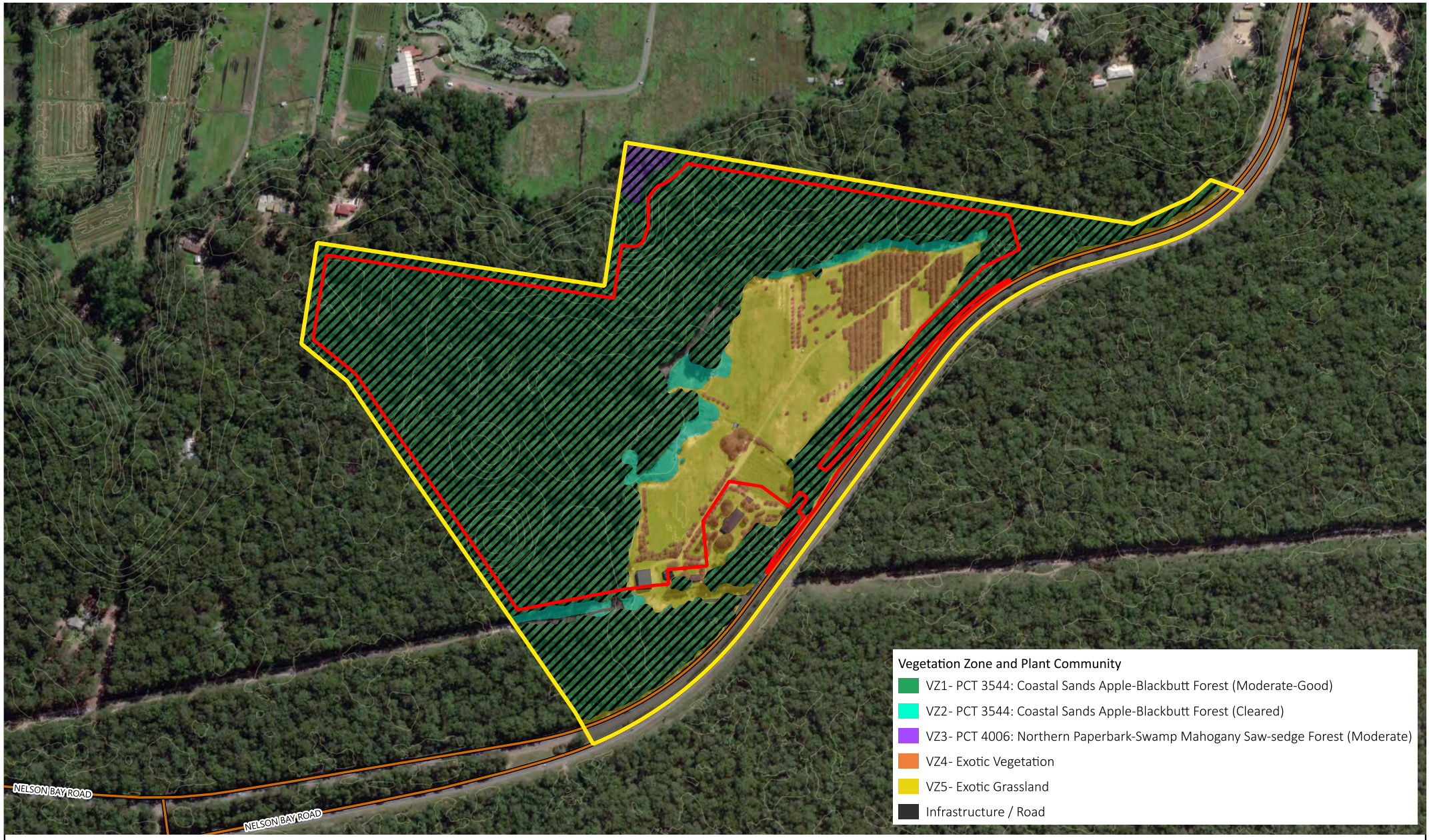
100 200 300 400 500 m

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Arterial Road

Contour (5m)

Figure 12: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Habitat

100 200 300 400 500 m

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Figure 13: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Regional context

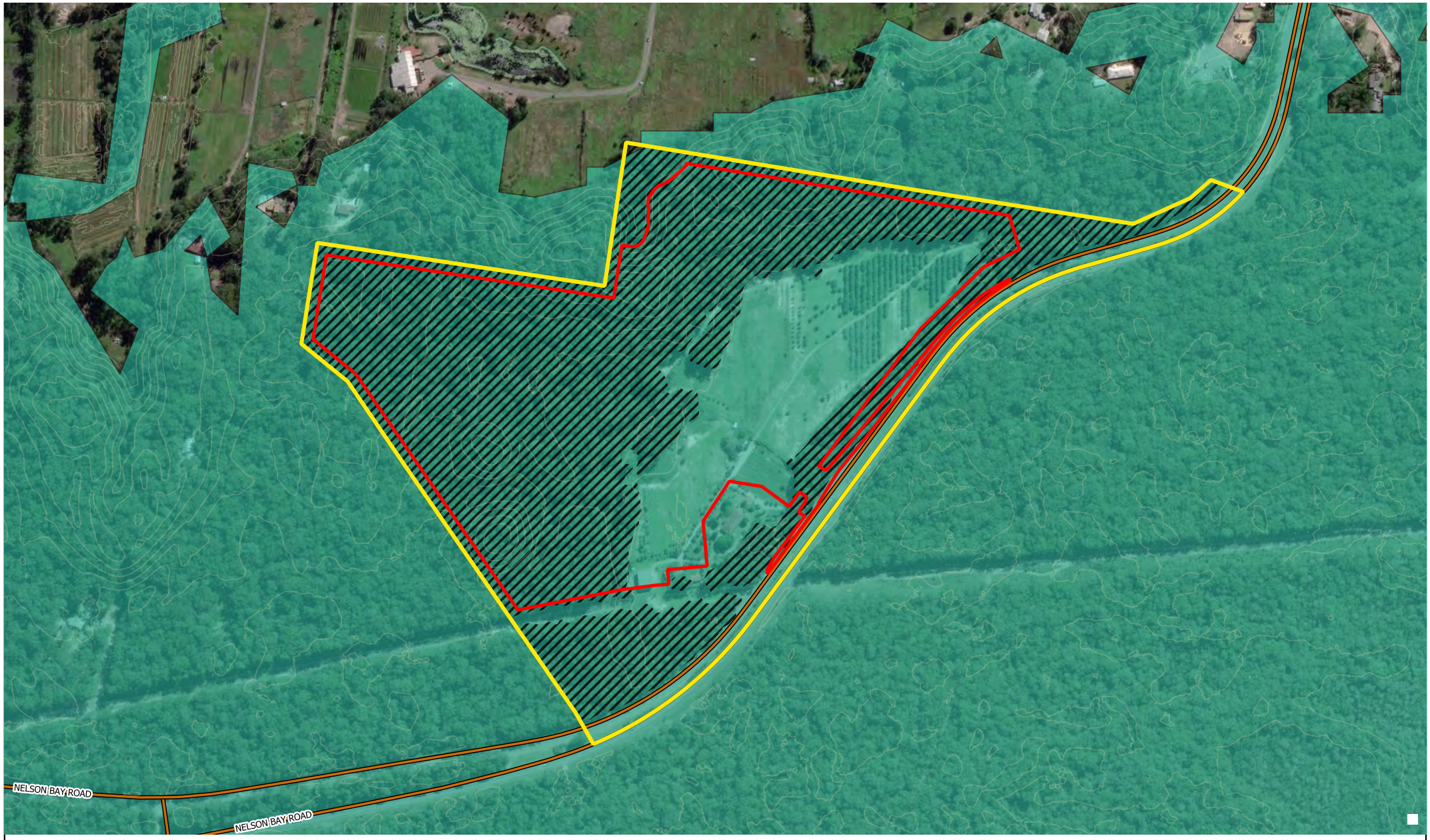
1 2 3 4 5 km

N

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Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox habitat Rank

1

Arterial Road

Contour (5m)

Figure 14: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Habitat Rank

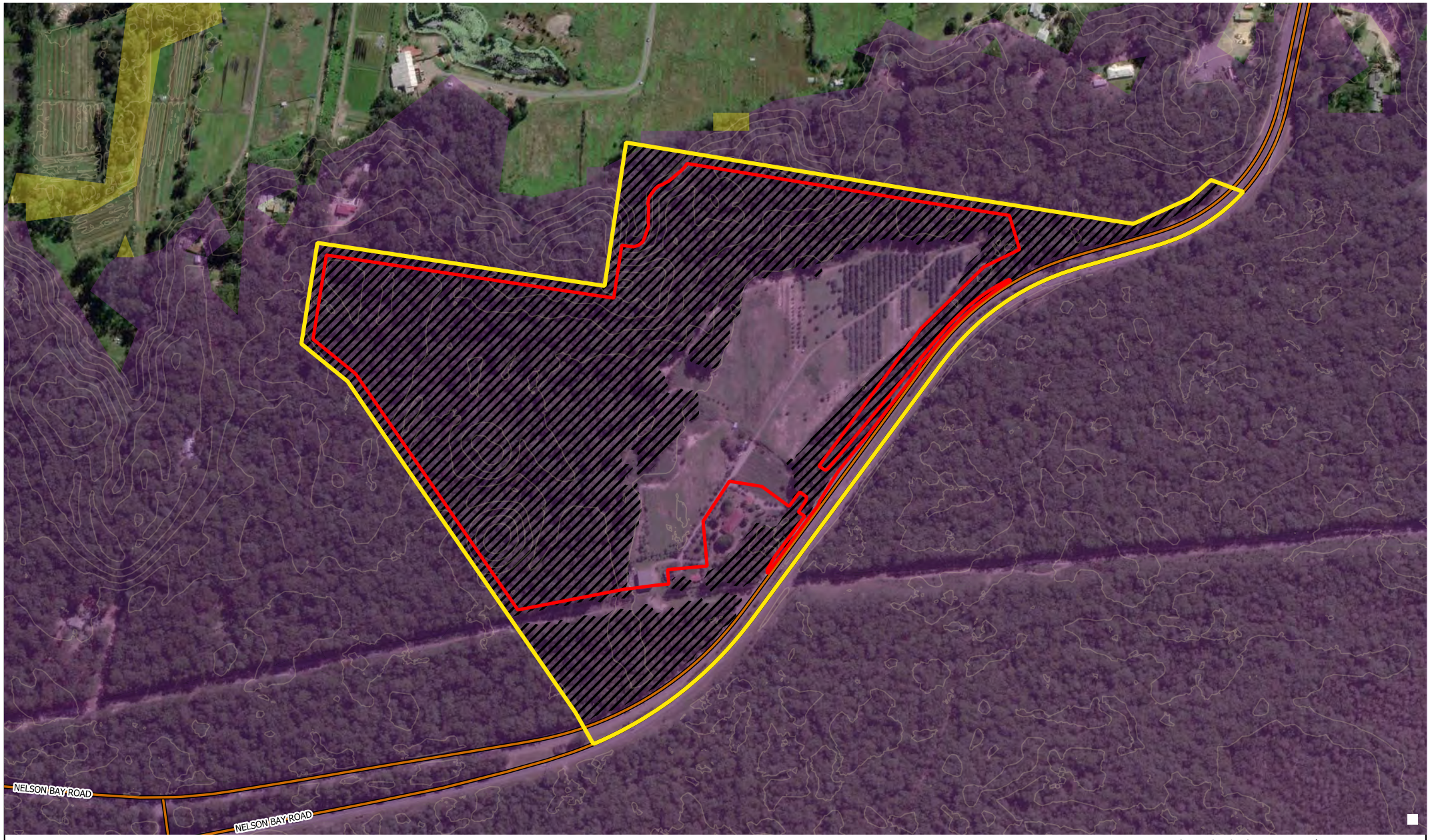
100 200 300 400 500 m

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox foraging productivity

0- 0

0.38- 0.91

Arterial Road

Contour (5m)

Figure 15: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Productivity (Dec-Jan)

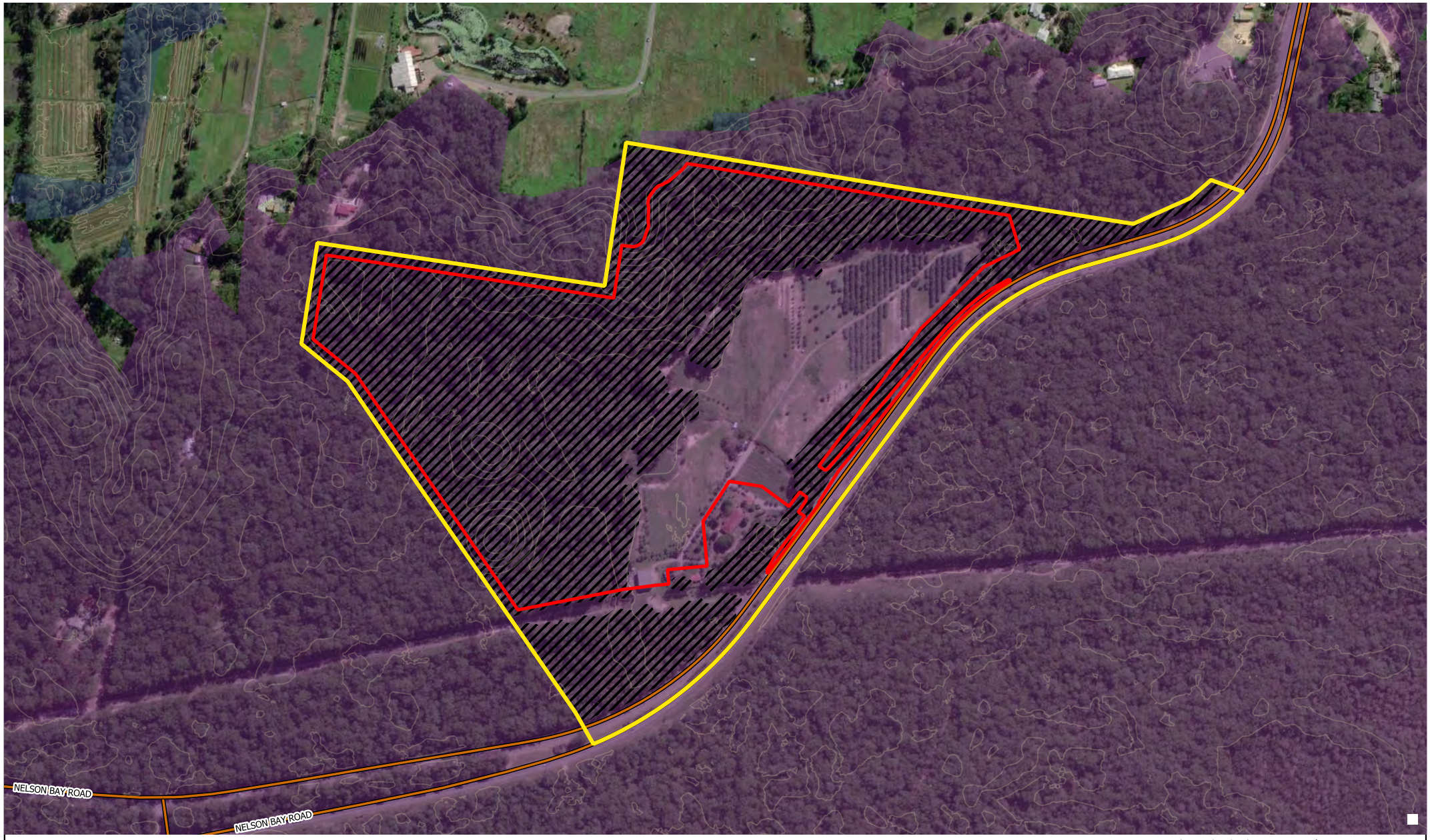
100 200 300 400 500 m

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox foraging productivity

0.19- 0.35

0.35- 0.91

Arterial Road

Contour (5m)

Figure 16: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Productivity (Feb-Mar)

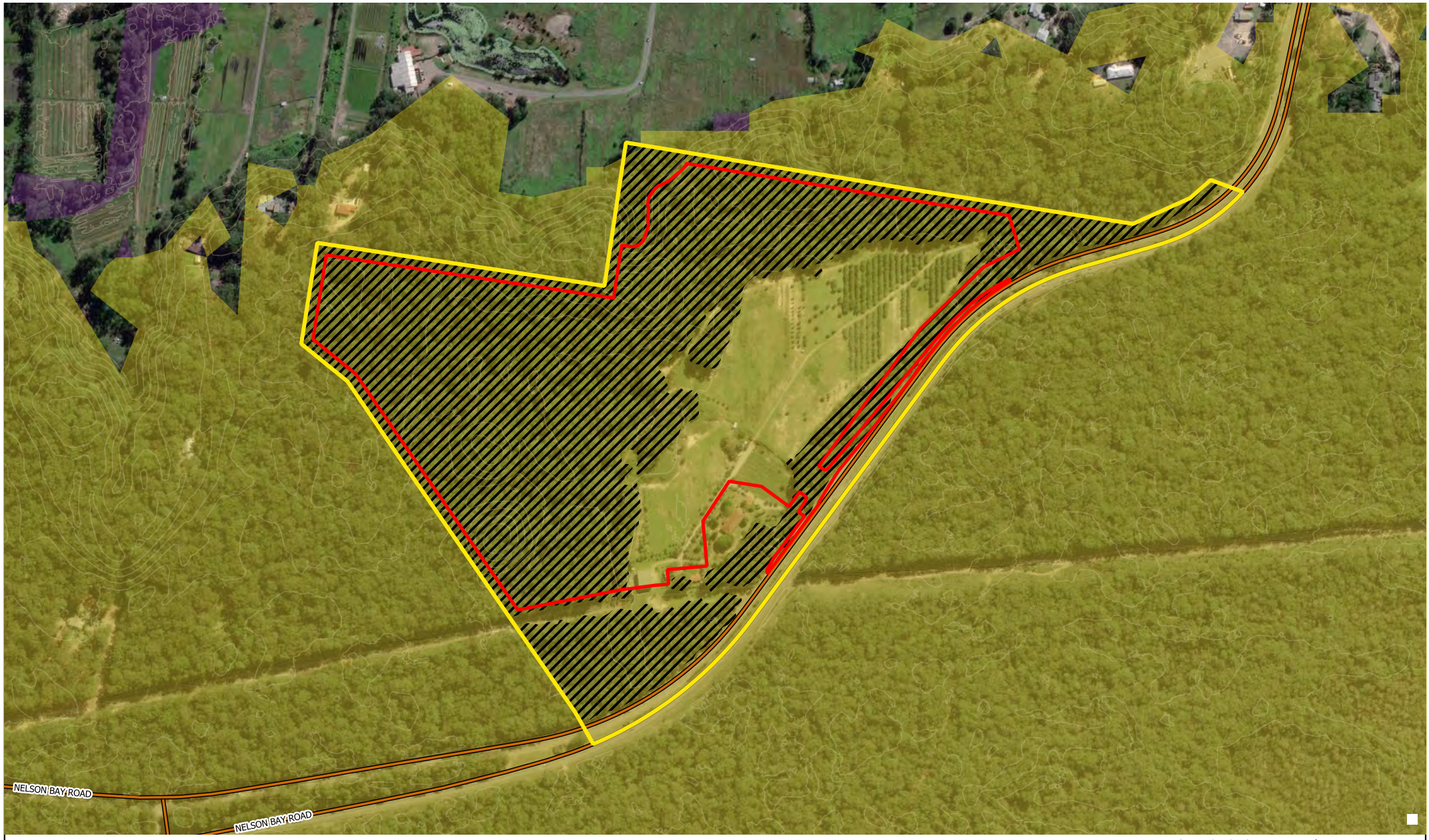
100 200 300 400 500 m

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox foraging productivity

0- 0

0- 1

Arterial Road

Contour (5m)

Figure 17: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Productivity (Apr-May)

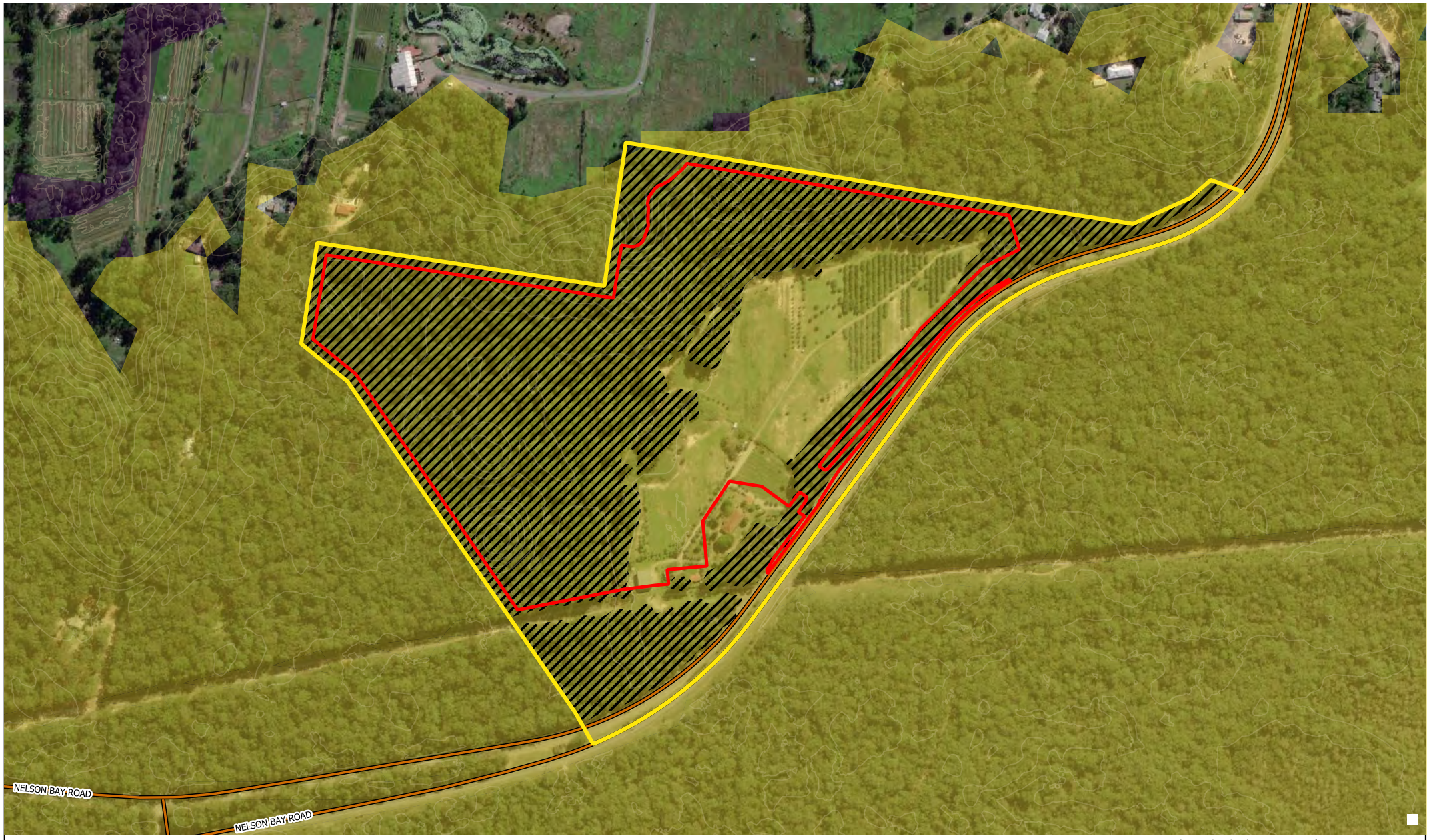
100 200 300 400 500 m

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox foraging productivity

0- 0

0- 1

Arterial Road

Contour (5m)

Figure 18: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Productivity (Jun-Jul)

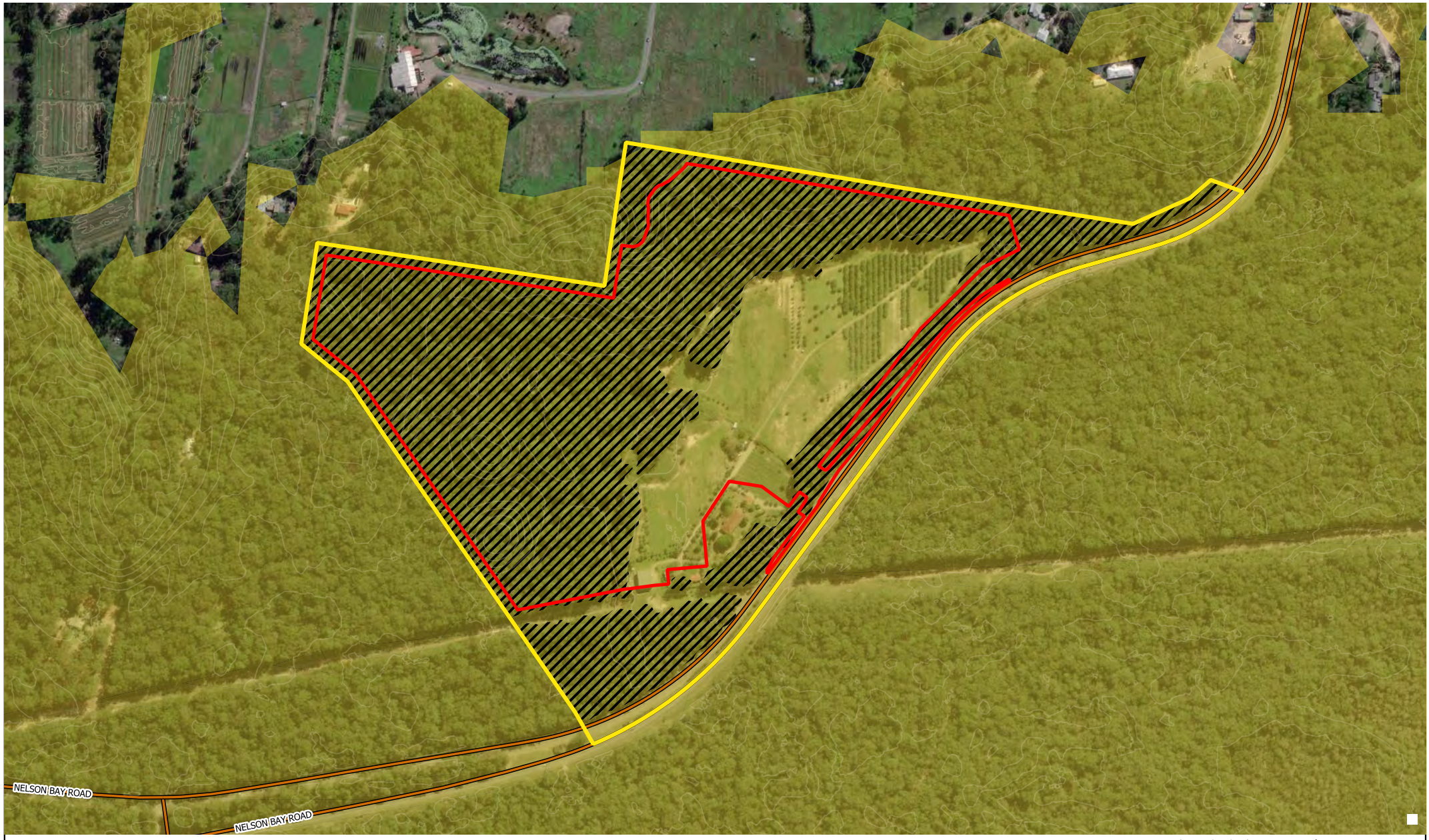
100 200 300 400 500 m

N

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox foraging productivity

0- 0

Arterial Road

Contour (5m)

Figure 19: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Productivity (Aug-Sep)

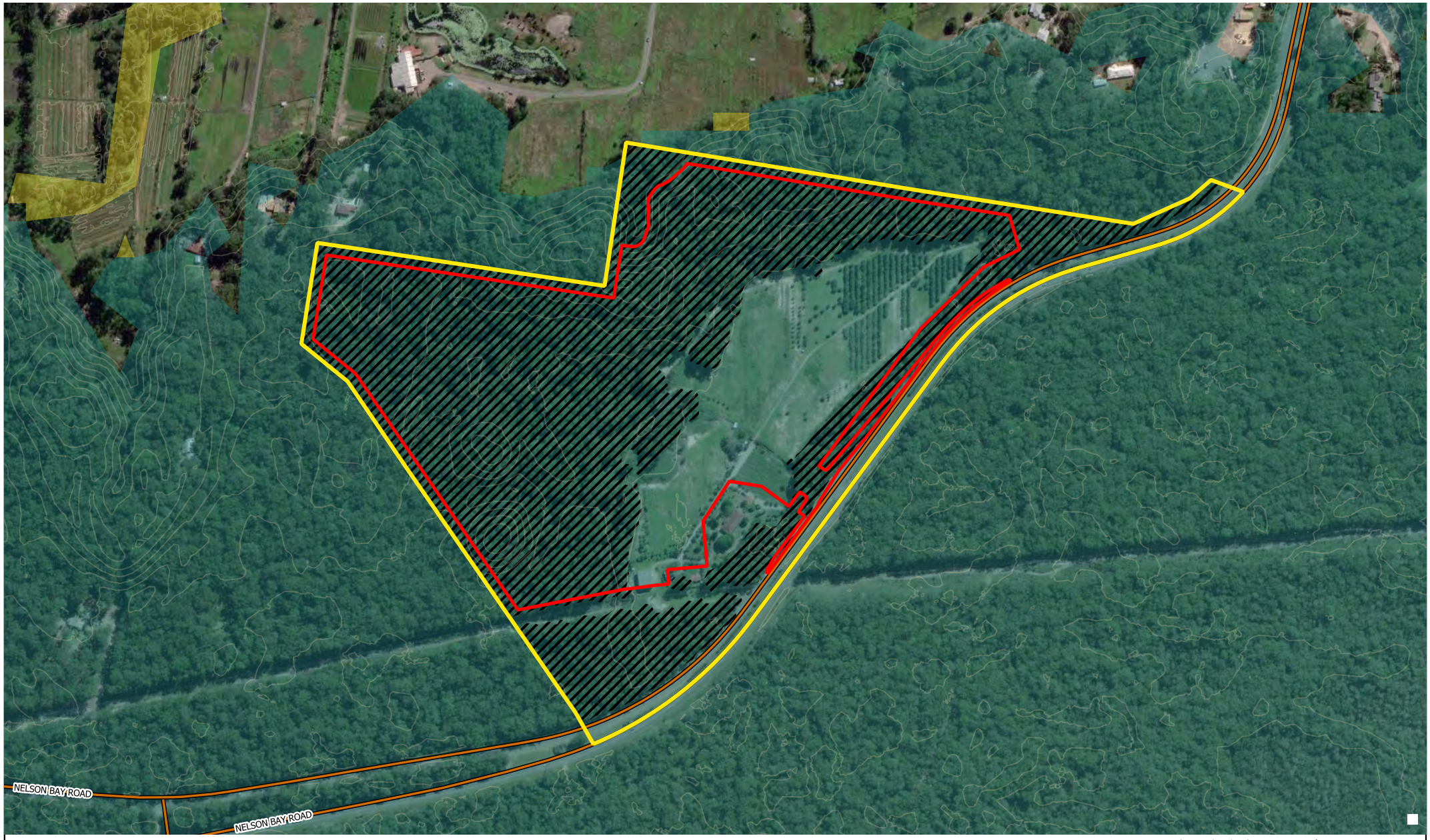
100 200 300 400 500 m

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Project area

Disturbance footprint

Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat

Grey-headed Flying Fox foraging productivity

0- 0

0- 0.17

Arterial Road

Contour (5m)

Figure 20: Grey-headed Flying Fox (*Pteropus poliocephalus*) – Foraging Productivity (Oct-Nov)

100 200 300 400 500 m

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Project area

Disturbance footprint

Impacted Grey-headed Flying Fox foraging habitat

Not impacted Grey-headed Flying Fox foraging habitat

Arterial Road

Contour (5m)

Figure 21: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Impact

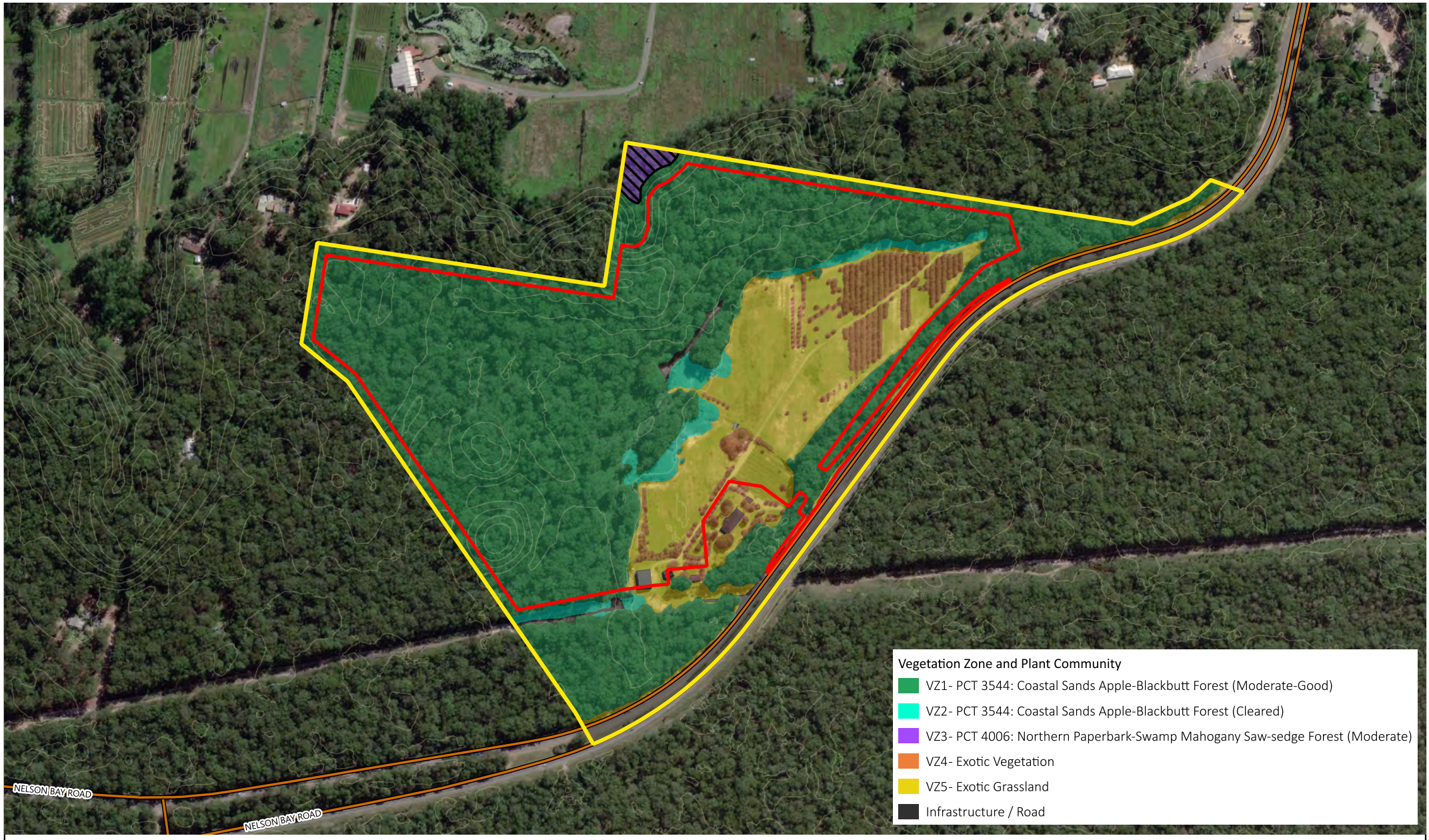
100 200 300 400 500 m

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Project area

Disturbance footprint

Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland Endangered Ecological Community (EEC)(EPBC Act)

Arterial Road

Contour (5m)

Figure 22: Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland - Habitat

100 200 300 400 500 m

N

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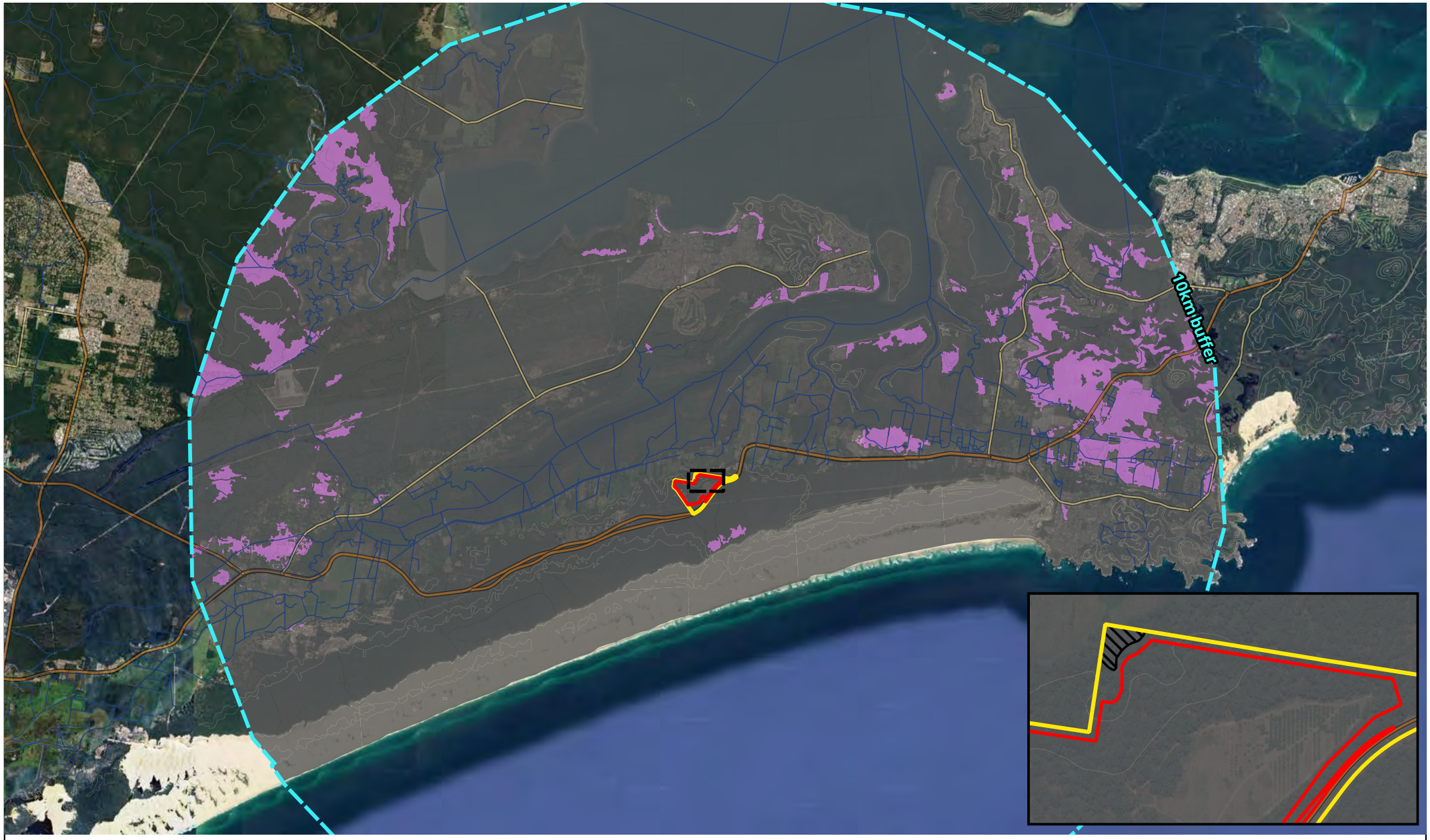
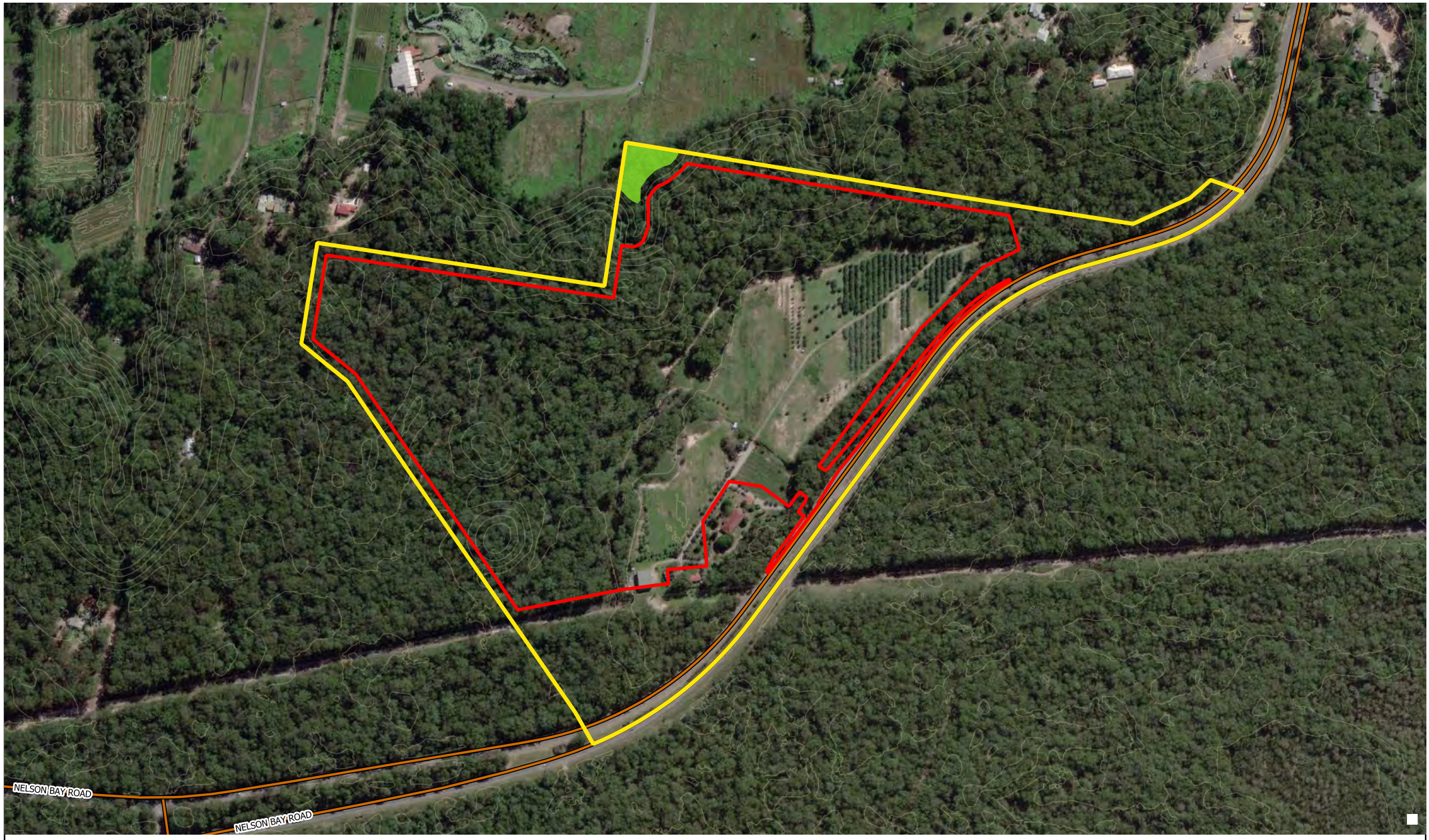


Figure 23: Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland – Regional context

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Project area

Disturbance footprint

Not impacted Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland Endangered Ecological Community (EEC)(EPBC Act)

Arterial Road

Contour (5m)

Figure 24: Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland - Impact

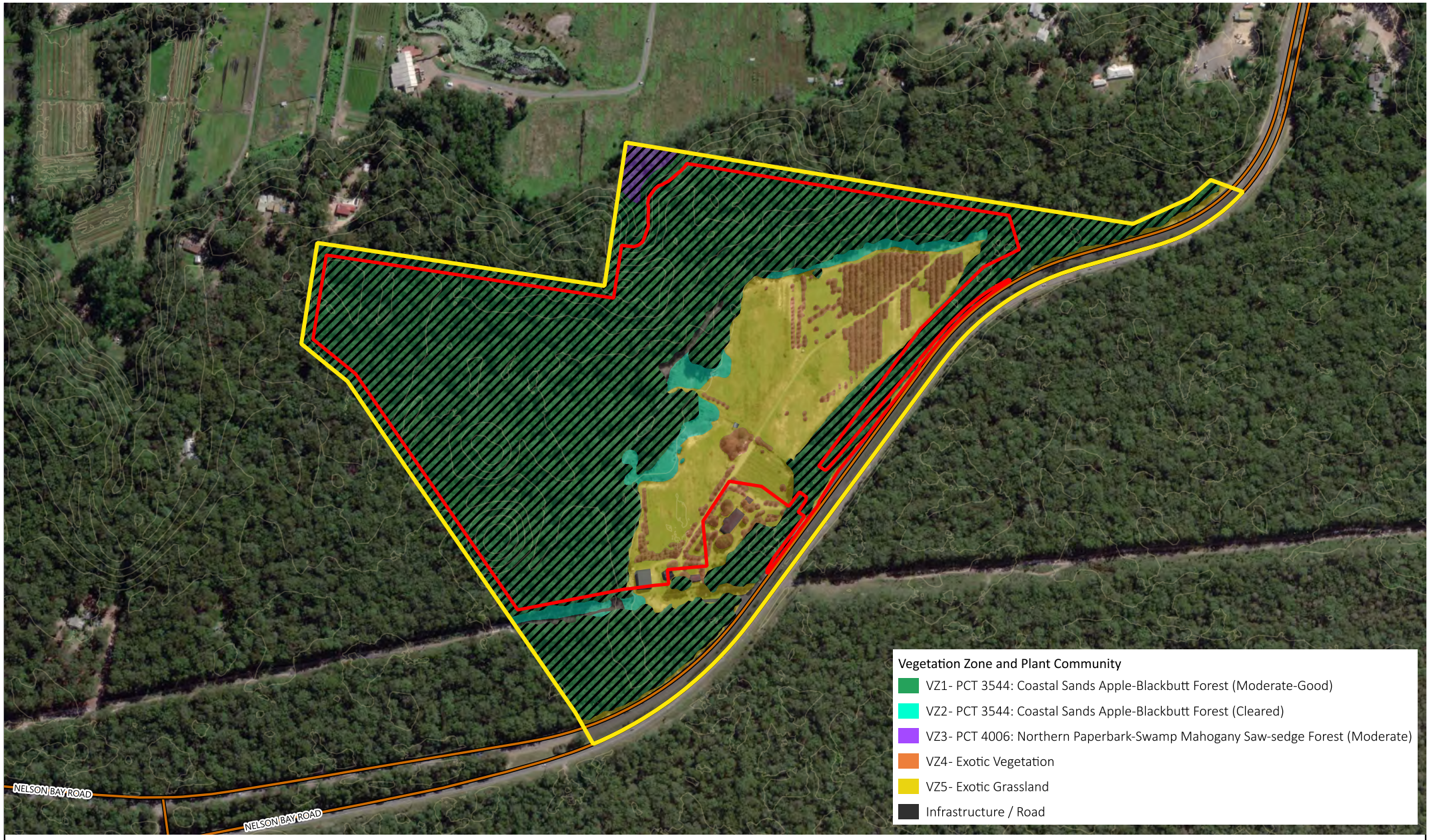
100 200 300 400 500 m

N

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Project area

Disturbance footprint

Swift Parrot (*Lathamus discolor*) foraging habitat

Arterial Road

Contour (5m)

Figure 25: Swift Parrot (*Lathamus discolor*) - Habitat

100 200 300 400 500 m

N

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Figure 26: Swift Parrot (*Lathamus discolor*) – Regional context

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Project area
Disturbance footprint
Impacted Swift Parrot foraging habitat
Not impacted Swift Parrot foraging habitat
Arterial Road
Contour (5m)

Figure 27: Swift Parrot (*Lathamus discolor*) - Impact

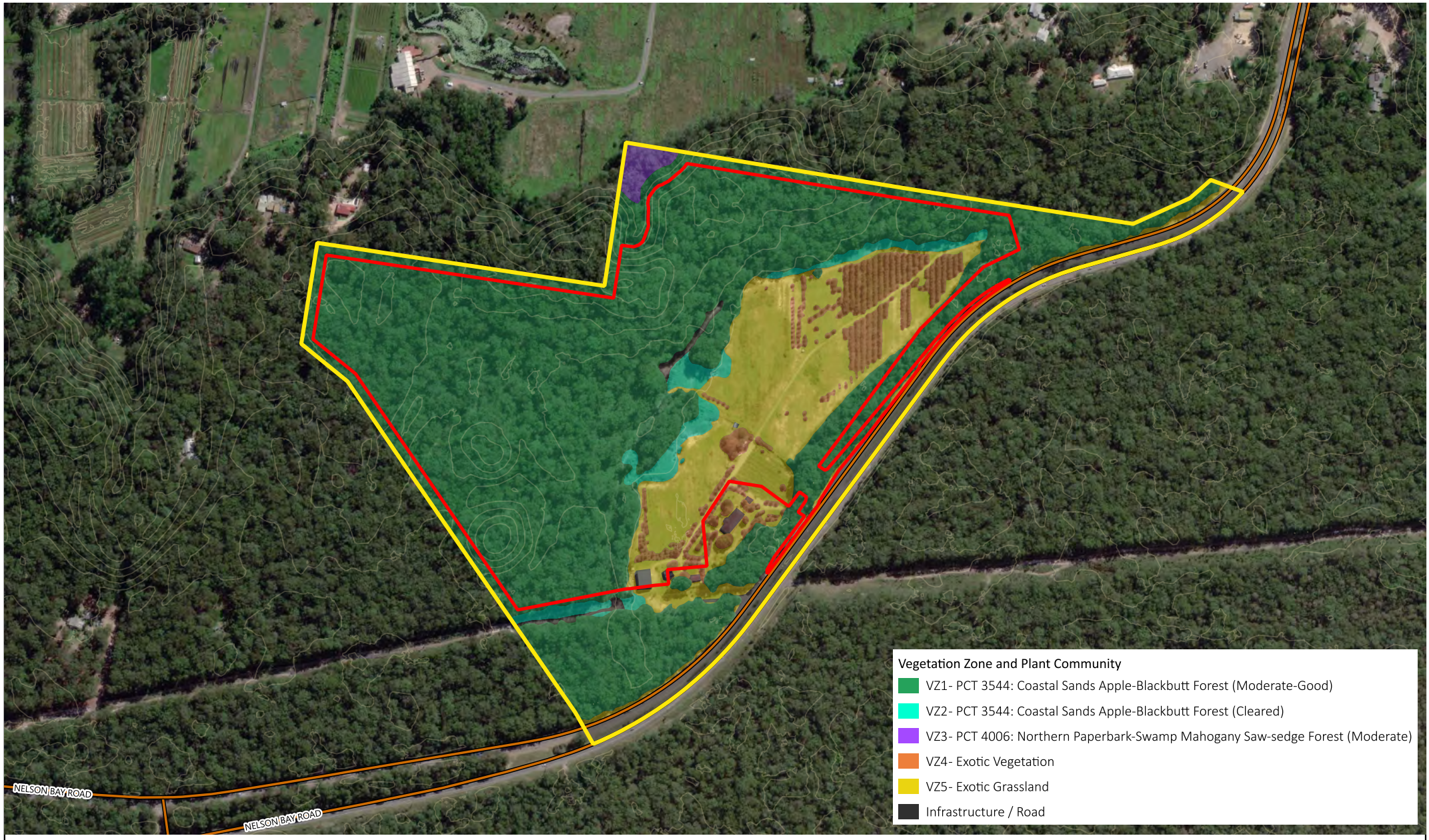
100 200 300 400 500 m

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Project area

Disturbance footprint

Regent Honeyeater (*Anthochaera phrygia*) foraging habitat

Arterial Road

Contour (5m)

Figure 28: Regent Honeyeater (*Anthochaera phrygia*) - Habitat

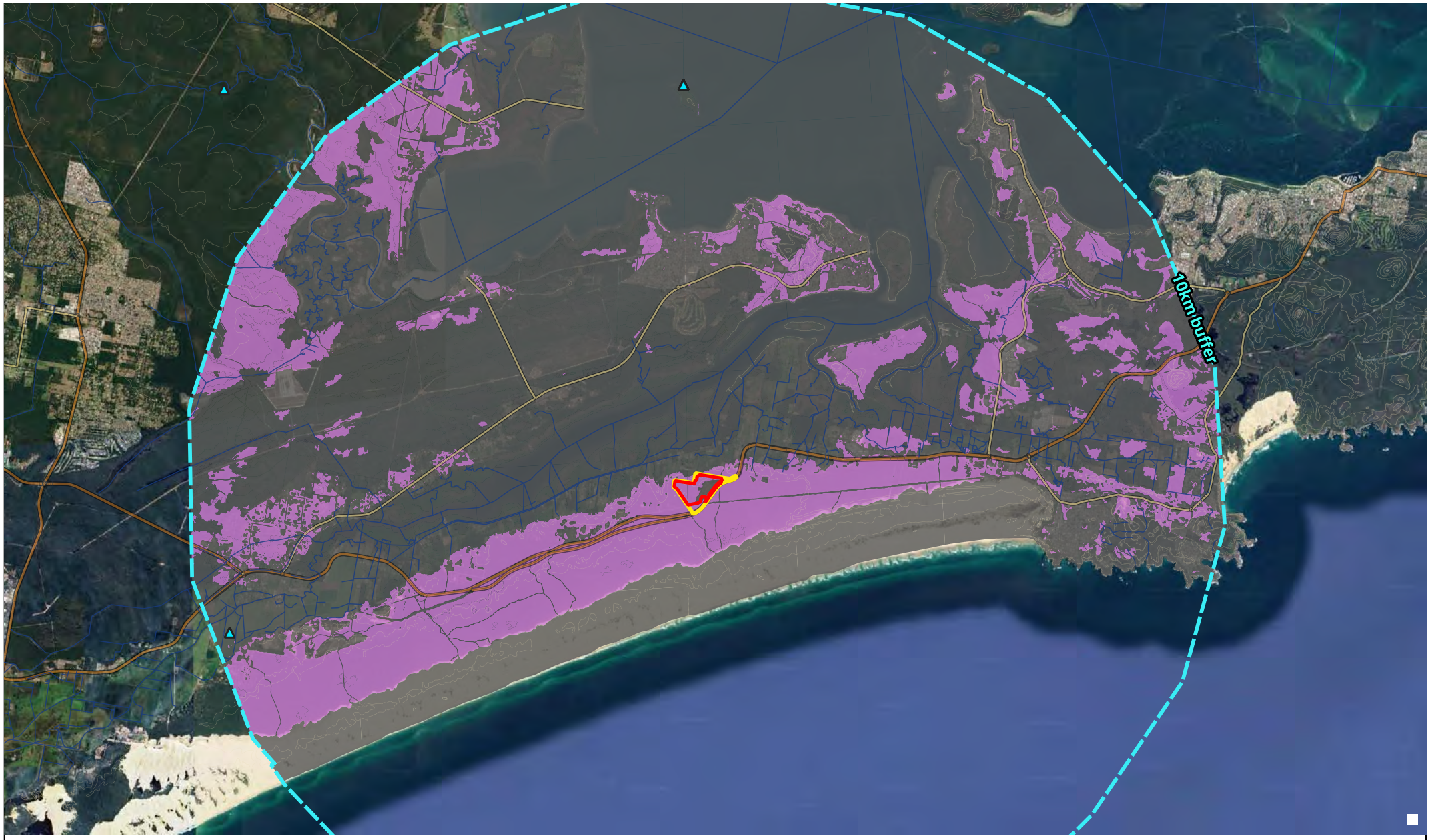
100 200 300 400 500 m

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Project area
Disturbance footprint
Buffer (10km)

Regent Honeyeater (Habitat)
Associated PCTs (Habitat)
Not associated PCTs (Not Habitat)

Regent Honeyeater (ATLAS)
Arterial Road
Sub-Arterial Road

Watercourse
Contour (20m)

Figure 29: Regent Honeyeater (*Anthochaera phrygia*) – Regional context

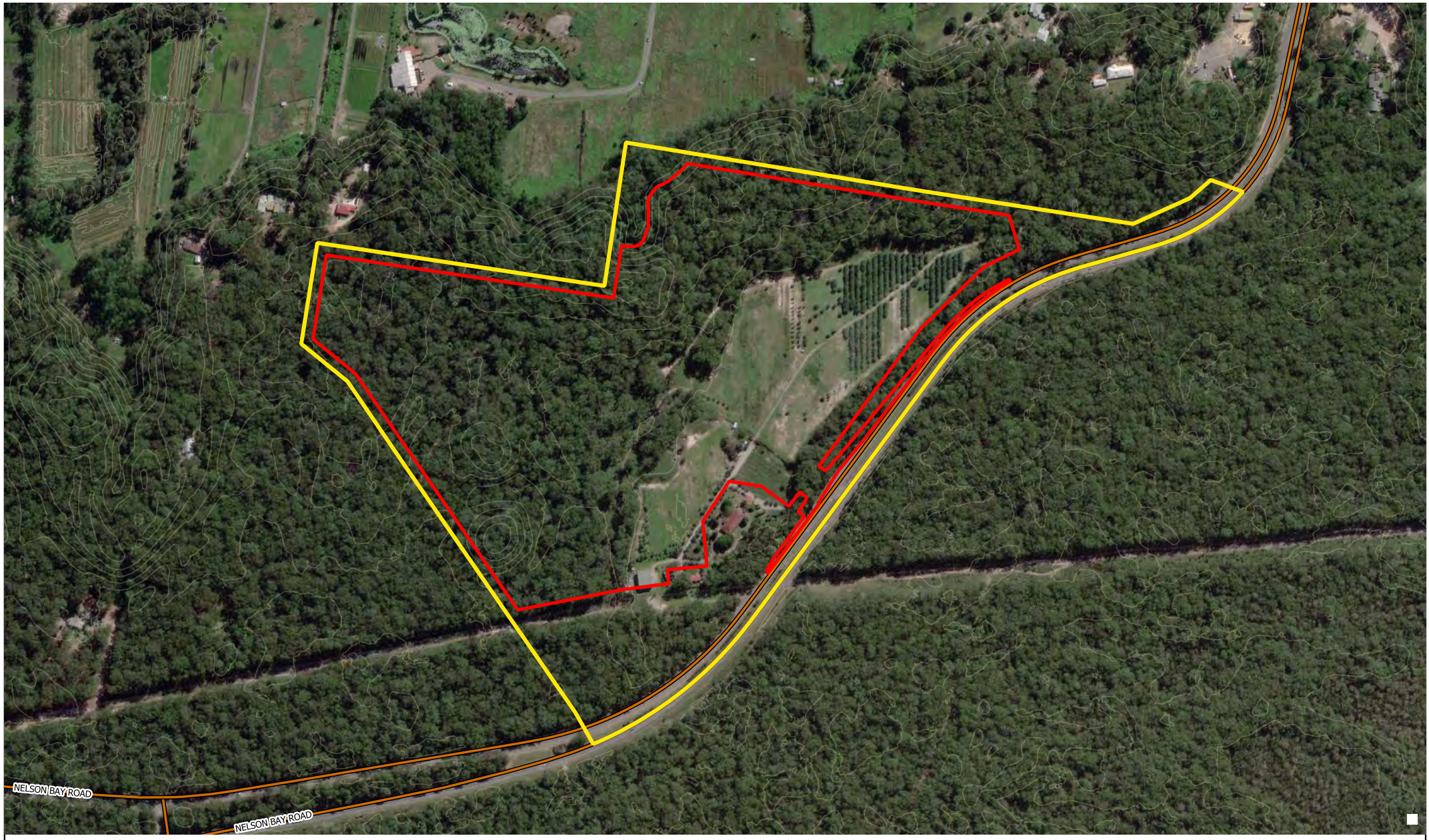
1 2 3 4 5 km

N

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Project area
Disturbance footprint
Impacted Regent Honeyeater foraging habitat
Not impacted Regent Honeyeater foraging habitat
Arterial Road
Contour (5m)

Figure 30: Regent Honeyeater (*Anthochaera phrygia*) - Impact

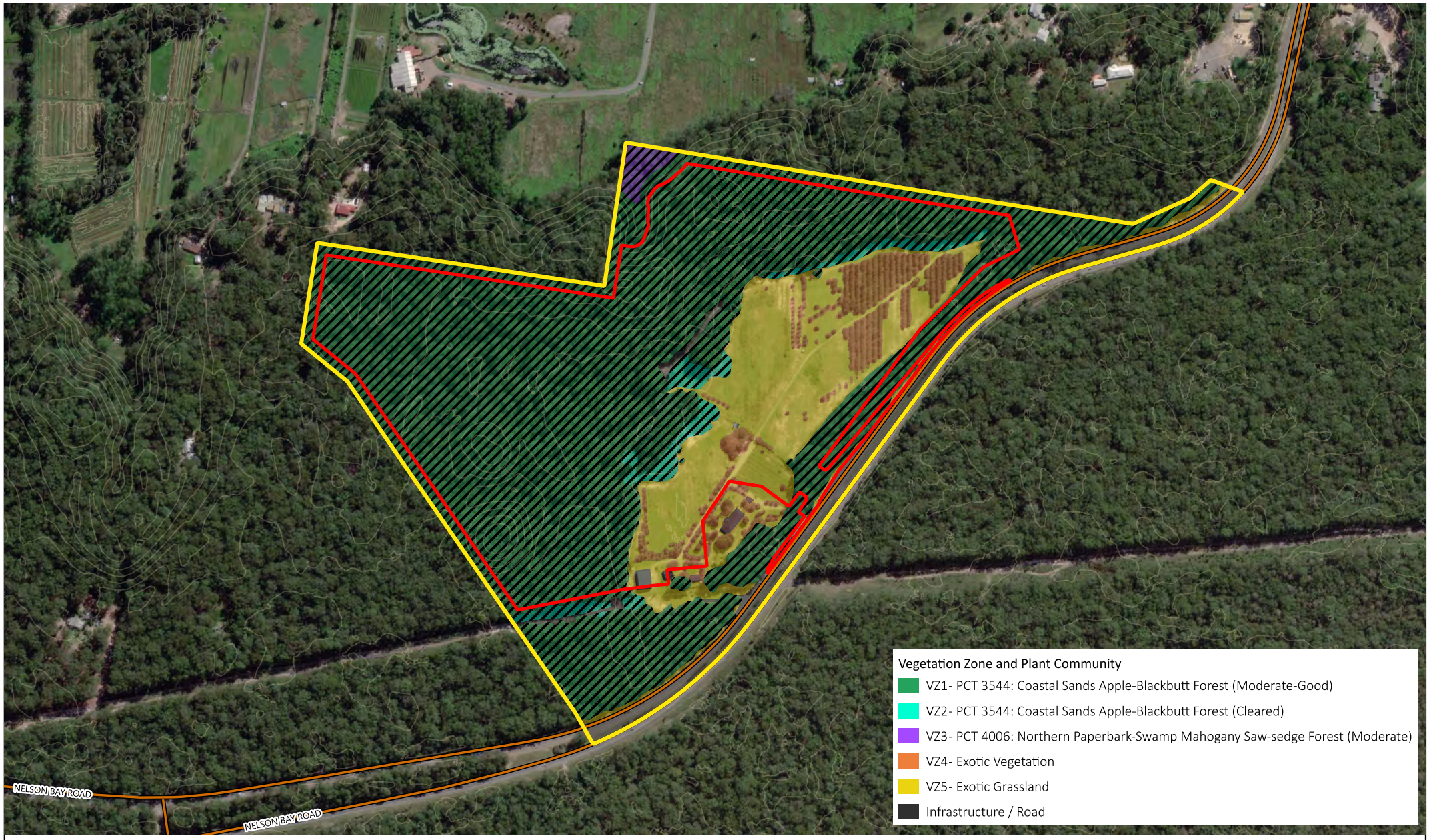
100 200 300 400 500 m

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Project area

Disturbance footprint

Spotted-tailed Quoll (*Dasyurus maculatus*) suitable habitat

Arterial Road

Contour (5m)

Figure 31: Spotted-tailed Quoll (*Dasyurus maculatus*) - Habitat

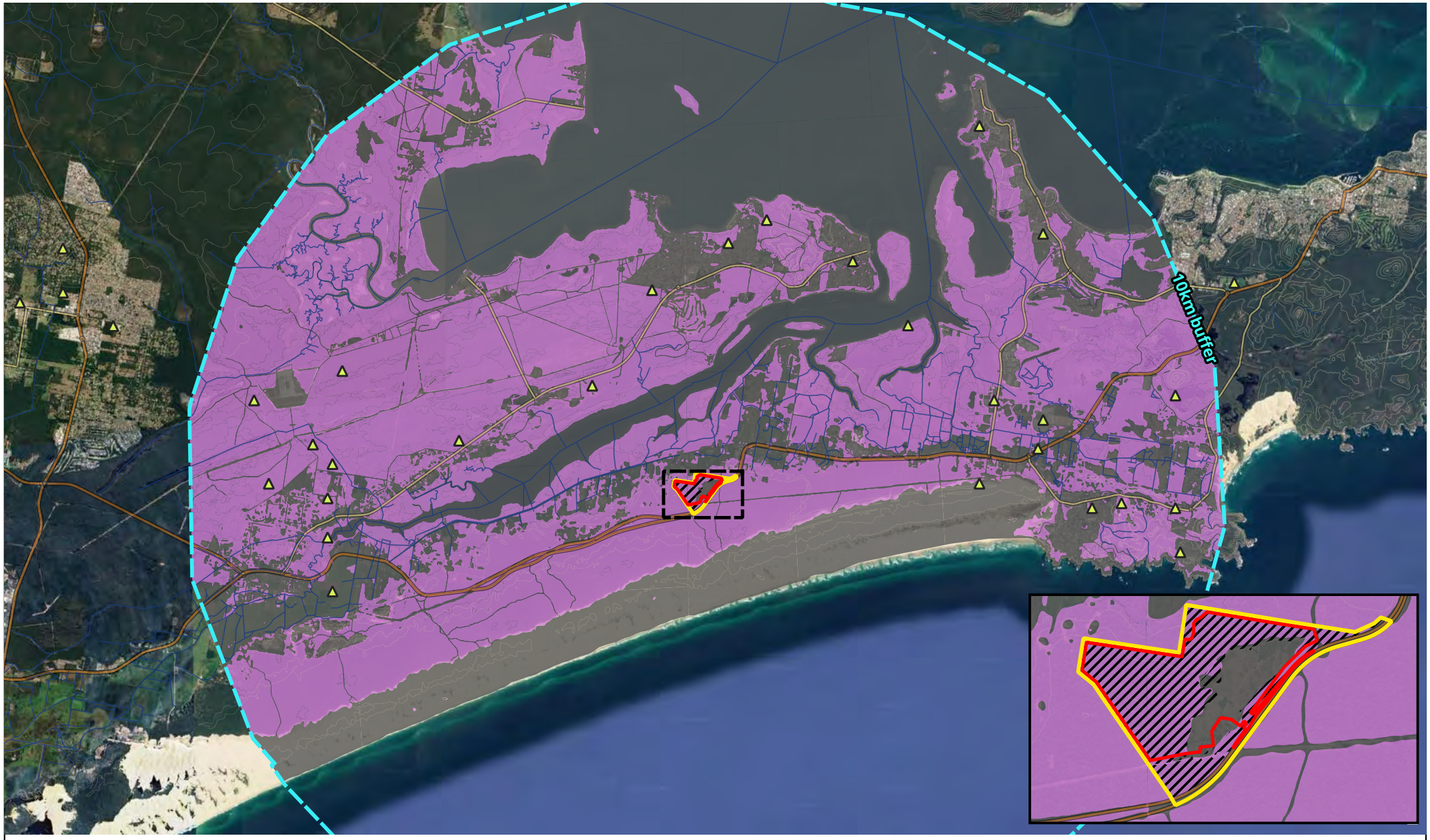
100 200 300 400 500 m

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Project area
Disturbance footprint
Buffer (10km)

Spotted-tailed Quoll (*Dasyurus maculatus*) suitable habitat

Spotted-tailed Quoll (Habitat)
Associated PCTs (Habitat)
Not associated PCTs (Not Habitat)

Spotted-tailed Quoll (ATLAS)
Arterial Road
Sub-Arterial Road

Contour (20m)

Figure 32: Spotted-tailed Quoll (*Dasyurus maculatus*) – Regional context

1 2 3 4 5 km

N

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Project area
Disturbance footprint
Impacted Spotted-tailed Quoll
Not impacted Spotted-tailed Quoll
Arterial Road
Contour (5m)

Figure 33: Spotted-tailed Quoll (*Dasyurus maculatus*) - Impact

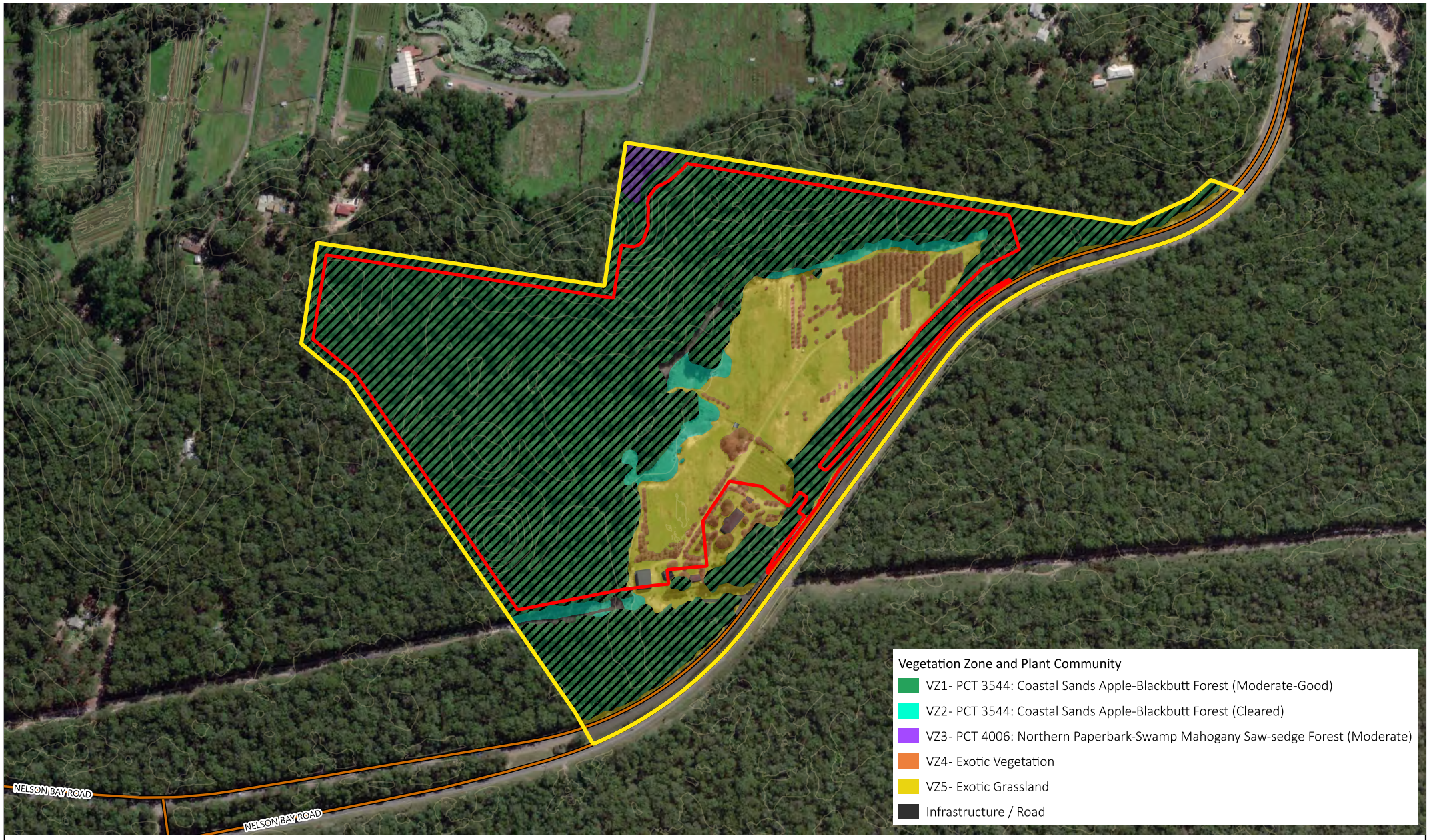
100 200 300 400 500 m

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Project area

Disturbance footprint

South-eatern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami)* suitable habitat

Arterial Road

Contour (5m)

Figure 34: South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*) - Habitat

100 200 300 400 500 m

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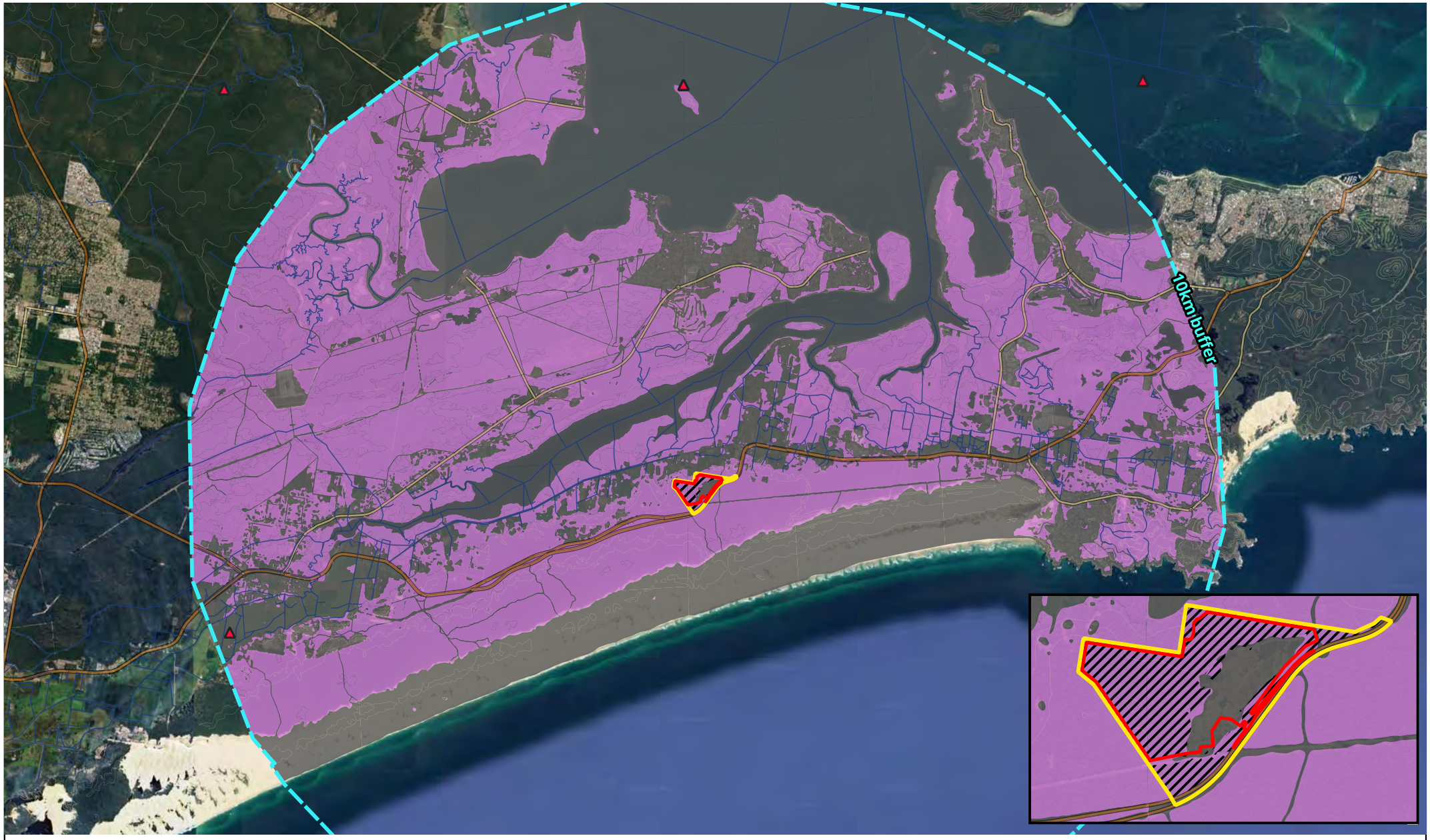


Figure 35: South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*) – Regional context

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Project area

Disturbance footprint

Impacted South-eastern Glossy Black Cockatoo suitable habitat

Not impacted South-eastern Glossy Black Cockatoo suitable habitat

Arterial Road

Contour (5m)

Figure 36: South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*) - Impact

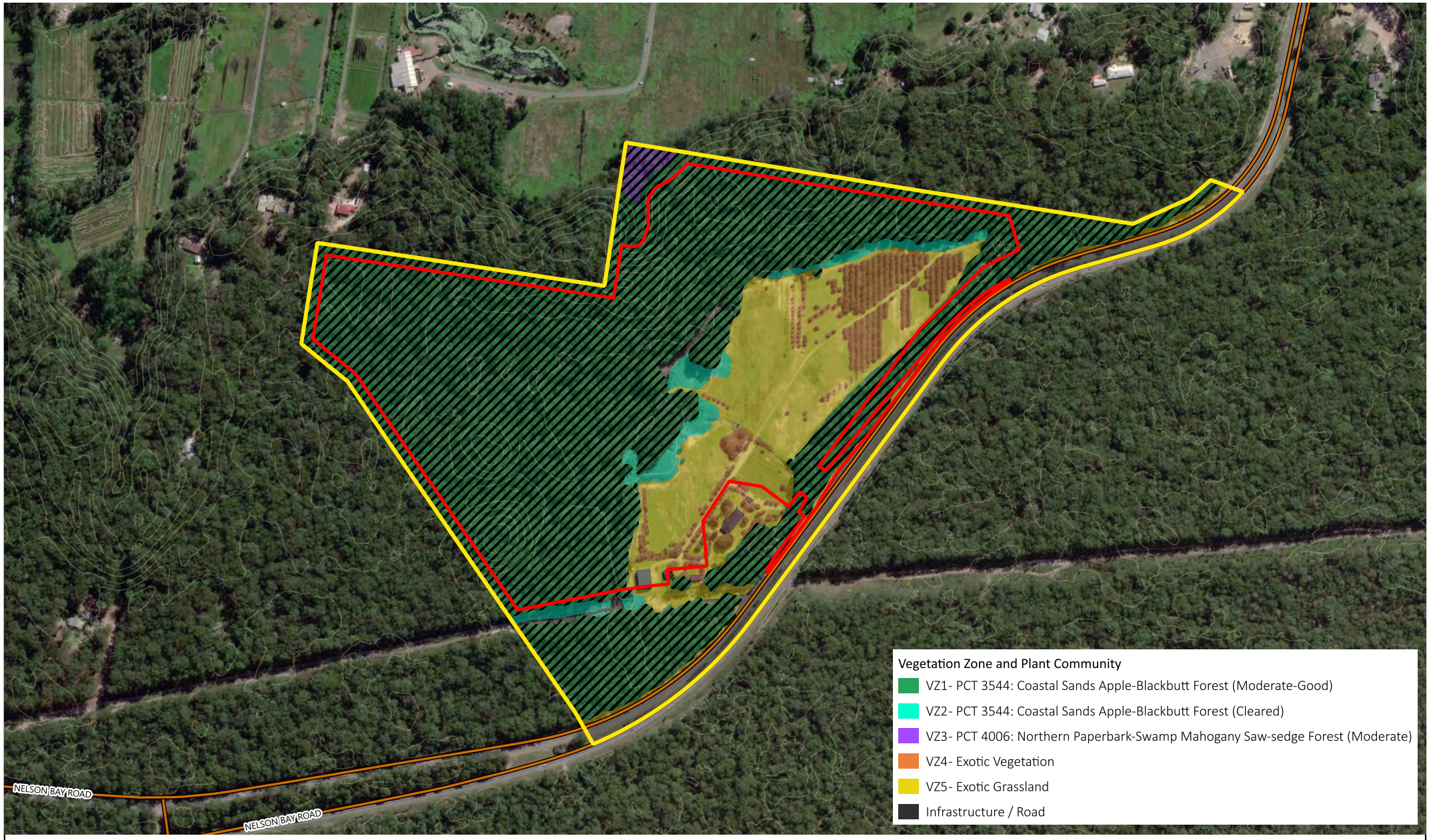
100 200 300 400 500 m

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Project area

Disturbance footprint

Yellow-bellied Glider (*Petaurus australis*) suitable habitat

Arterial Road

Contour (5m)

Figure 37: Yellow-bellied Glider (*Petaurus australis*) - Habitat

100 200 300 400 500 m

N

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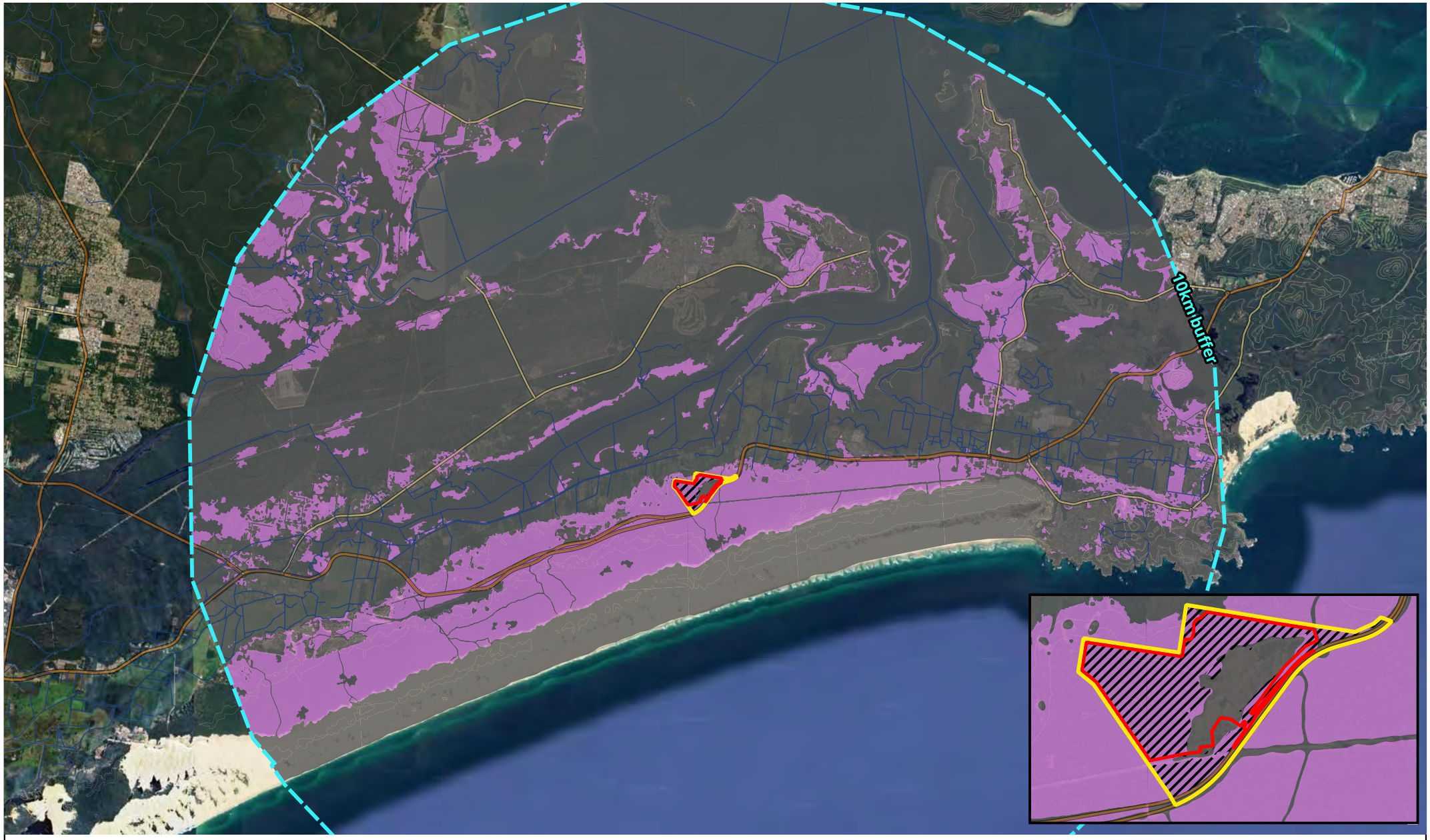


Figure 37: Yellow-bellied Glider (*Petaurus australis*) - Habitat

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Project area
Disturbance footprint
Impacted Yellow-bellied Glider suitable habitat
Not impacted Yellow-bellied Glider suitable habitat
Arterial Road
Contour (5m)

Figure 39: Yellow-bellied Glider (*Petaurus australis*) - Impact

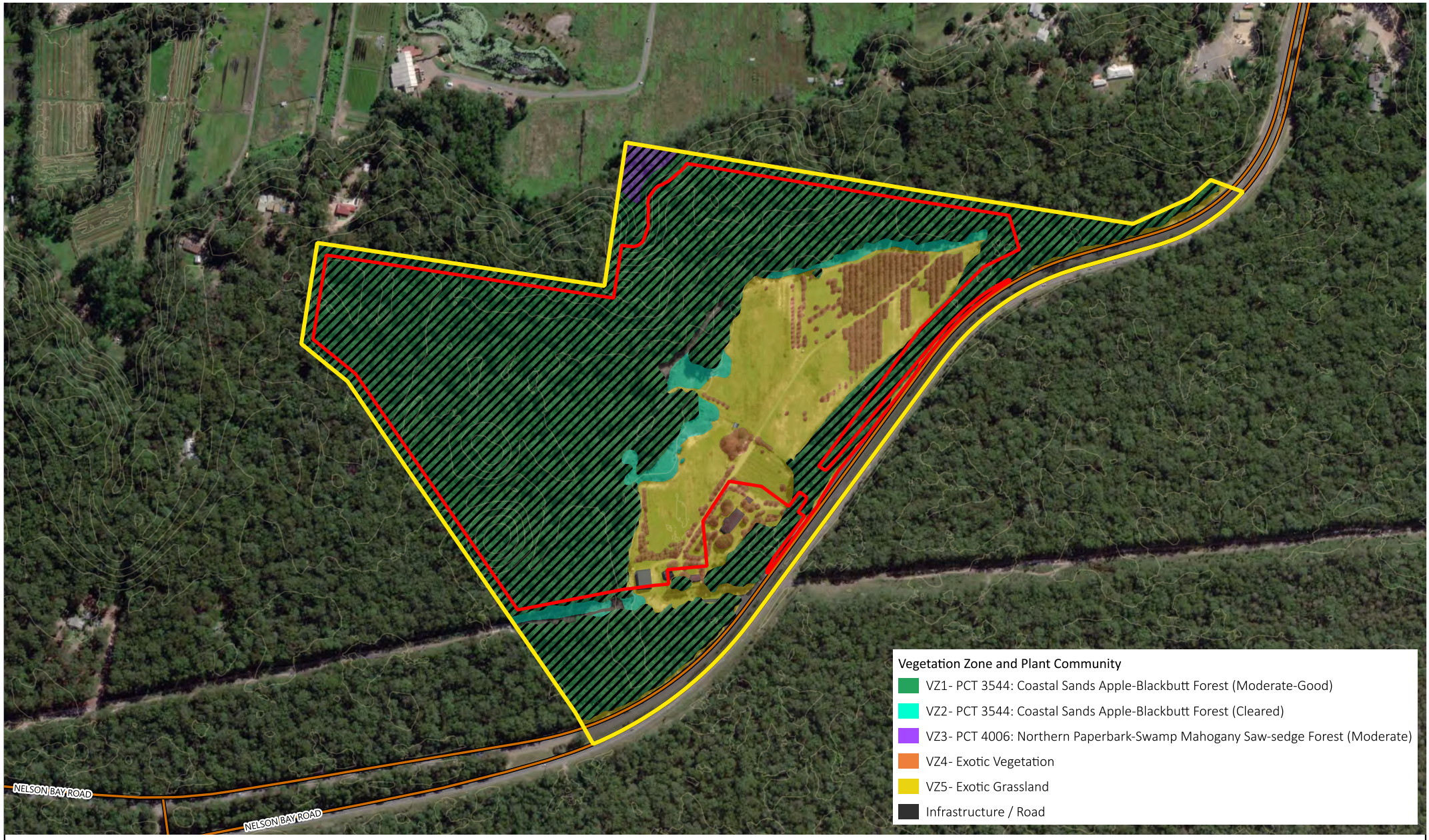
100 200 300 400 500 m

N

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Date: 04/05/2026
By: Natalia Laws
GDA2020 / MGA zone 56
Source:© Microsoft Bing

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area

Disturbance footprint

New Holland Mouse (*Pseudomys novaehollandiae*) suitable habitat

Arterial Road

Contour (5m)

Figure 40: New Holland Mouse (*Pseudomys novaehollandiae*) - Habitat

100 200 300 400 500 m

N

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Date: 28/05/2026
By: Natalia Laws
GDA2020 / MGA zone 56
Source:© Microsoft Bing

Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW

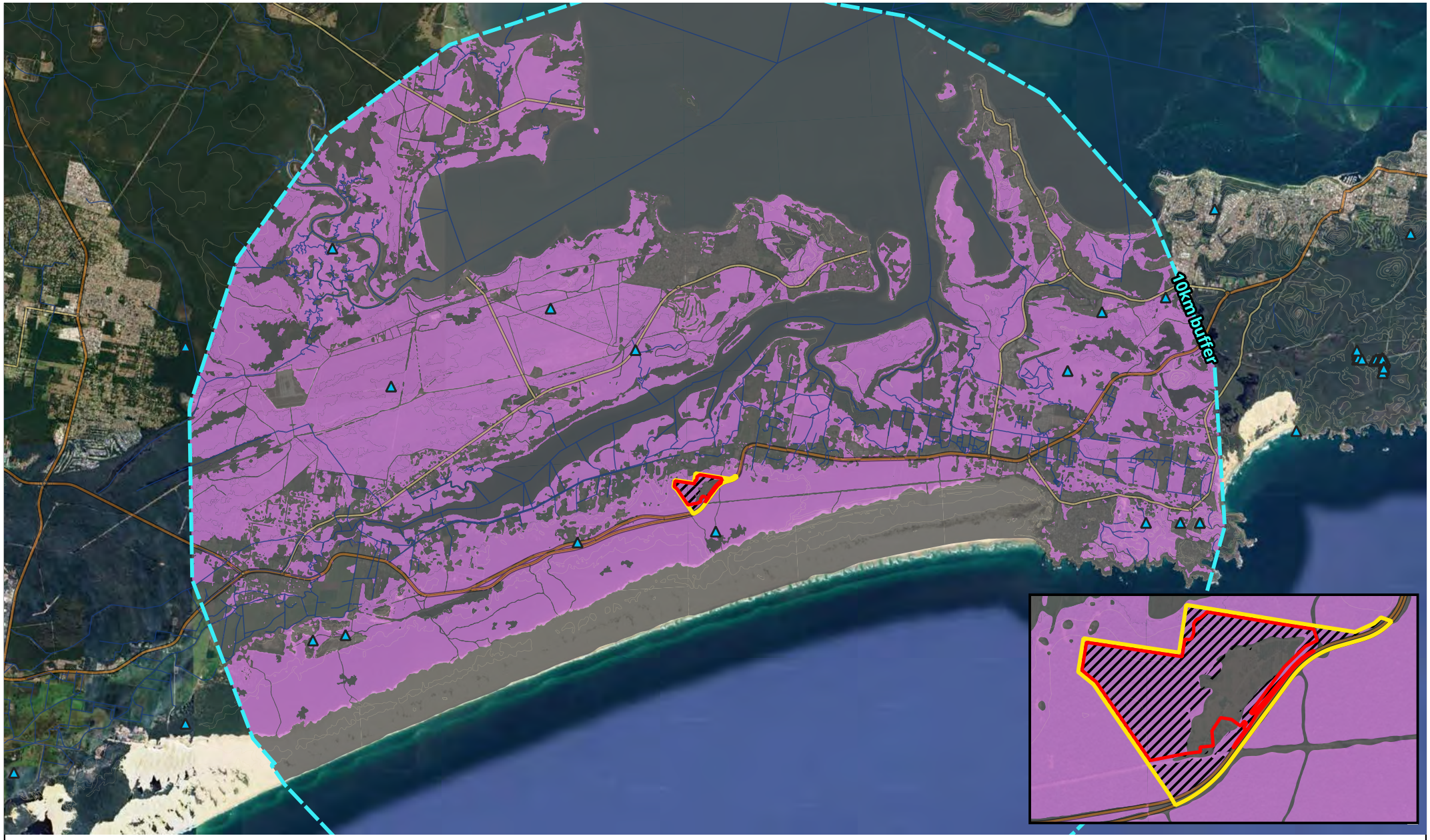


Figure 41: New Holland Mouse (*Pseudomys novaehollandiae*) – Regional context

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Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW



Project area
Disturbance footprint
Impacted New Holland Mouse suitable habitat
Not impacted New Holland Mouse suitable habitat
Arterial Road
Contour (5m)

Figure 42: New Holland Mouse (*Pseudomys novaehollandiae*) - Impact

100 200 300 400 500 m

N

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Arbus, *25-079 Bobs Farm Sand Quarry EPBC*, Nelson Bay Road BOBS FARM NSW

APPENDIX 2. SIGNIFICANT IMPACT ASSESSMENTS

Species Assessed under the EPBC Act Significant Impact Guidelines

The following pertains to Assessments of Significance for direct or indirect impacts to EBPC Act listed threatened species, populations and communities.

The following species and Ecological Communities have been assessed under the EPBC Act Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment [DotE], 2013) (Significant Impact Guidelines):

Critically Endangered Species:

- Swift Parrot *(Lathamus discolor)*;
- Regent Honeyeater *(Anthochaera phrygia)*;

Endangered Species and Ecological Communities:

- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland*
- Koala *(Phascolarctos cinereus)* (combined populations of Qld, NSW and the ACT);
- Spotted -tailed Quoll *(Dasyurus maculatus)*;

Vulnerable Species:

- Grey -headed Flying -fox *(Pteropus poliocephalus)*
- South -eastern Glossy Black Cockatoo *(Calyptorhynchus lathami lathami)*
- Yellow -bellied Glider (south -eastern) *(Petaurus australis australis)*
- New Holland Mouse *(Pseudomys novaehollandiae)*

Critically Endangered and Endangered Species and Ecological Communities

Swift Parrot (*Lathamus discolor*) – Critically Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area during targeted surveys, and there are no records of the species within 5km of the Project Area. No mapped Important Bird Areas for the Species (i.e. Key breeding areas or other breeding areas) are mapped within the Project Area, however the vegetation is mapped by the Commonwealth broadly as an area where the species is likely to occur. The vegetation within the Project Area contains one (1) foraging tree species; Blackbutt (*Eucalyptus pilularis*), therefore the vegetation is considered to be broadly suitable foraging habitat for the species. As such, the vegetation meets the definition of "*any foraging habitat in areas where the species is likely to occur*". Therefore, the vegetation within the Project Area broadly meets the definition of "*Habitat critical to the survival of the species*". However, it is important to note that the majority of vegetation communities within the locality is likely to meet the same definition.

While broadly suitable habitat will be impacted by the proposed action, the species was not recorded within the Project Area, there are no records of the species within the locality, and broadly suitable foraging habitat occurs throughout the locality. As such, the proposed action is unlikely to lead to a long-term decrease in the size of the local population of the species.

1. Will the action reduce the area of occupancy of a population of the species?

The proposed action will result in a reduction in the occupancy of the species with the removal of 22.99 ha of broadly suitable foraging habitat for the species. However, as the Area of Occupancy (AOO) is 4,000 km^2 (400,000 ha) the proposed action is expected to impact 0.006 % of foraging habitat within the species' AOO.

2. Will the action fragment an existing population into two or more populations?

The proposed action will directly impact 22.99 ha of broadly suitable foraging habitat for the species. However, considering the high mobility of the species and availability of similar foraging habitat (and higher quality foraging habitat) surrounding the Project Area, the proposed action is unlikely to result in further fragmentation of an existing population of the species.

3. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species includes areas of breeding and foraging habitat in Tasmania, and foraging habitat on the Australian mainland.

While the species was not recorded within the Project Area, the vegetation within the Project Area does contain one (1) foraging tree species; Blackbutt (*Eucalyptus pilularis*). As such, despite no records of use, the vegetation meets the definition of "*any foraging habitat in areas where the species is likely to occur*". Therefore, the vegetation within the Project Area broadly meets the definition of "*Habitat critical to the survival of the species*". However, it is important to note that the majority of vegetation communities within the locality is likely to meet the same definition, and the species is known to only breed in Tasmania. Considering the lack of records and the high availability of foraging habitat throughout the locality, the proposed action is unlikely to affect habitat critical to the survival of the species to the extent that the species will be significantly impacted.

4. Will the action disrupt the breeding cycle of a population?

The species only breeds in Tasmania. As such, the proposed action will not disrupt the breeding cycle of a population.

5. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will result in a reduction in the occupancy of the species with the removal of 22.99 ha of broadly suitable foraging habitat for the species. However, as the Area of Occupancy (AOO) is 4,000 km^2 (400,000 ha) the proposed action is expected to impact 0.006 % of foraging habitat within the species' AOO. However, considering the high mobility of the species and availability of similar foraging habitat (and higher quality foraging habitat) surrounding the Project Area the proposed action is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

6. Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

7. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

8. Will the action interfere substantially with the recovery of the species?

Whilst the proposed action will impact a total of 22.99 ha of broadly suitable foraging habitat for the species. However, considering the high mobility of the species, low diversity of feed tree species, and the availability of similar foraging habitat (and higher quality foraging habitat) surrounding the Project Area the proposed action is unlikely to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 22.99 ha of broadly suitable foraging habitat for the species which meets the definition of habitat critical to the survival of the species. However, considering the mobility of the species, low diversity of feed tree species within the Project Area, the absence of records of the species within the Project Area and locality (5km), and the availability of foraging habitat surrounding the Project Area the proposed action is unlikely have a significant impact on the species.

Regent Honeyeater (*Anthochaera phrygia*) – Critically Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area and there are no records of the species within 5 km of the Project Area. While the Project Area is mapped under the Commonwealth's area of occurrence map for the species, there is no NSW mapped Important Bird Areas for the Species (i.e. Key breeding areas or other breeding areas) within the Project Area. The vegetation within the Project Area does not contain key foraging species for the Regent Honeyeater, as such it is unlikely to constitute "*habitat critical to the survival of the species*".

As the species was not recorded within the Project Area, and the vegetation is considered broadly suitable foraging habitat consistent with the vegetation throughout the locality, the proposed action is unlikely to lead to a long-term decrease in the size of the local population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

The proposed action will result in a reduction in the occupancy of the species with the removal of 22.99 ha of marginal foraging habitat for the species. However, as the Area of Occupancy (AOO) is 300 km^2 (30,000 ha) the proposed action is expected to impact 0.08 % of foraging habitat within the species' AOO.

3. Will the action fragment an existing population into two or more populations?

The proposed action will directly impact 22.99 ha of marginal foraging habitat for the species. As the proposed action will retain vegetation surrounding the proposed quarry, and considering the large area of similarly suitable habitat occurring throughout the locality in reserves including Worimi National Park, the proposed action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

Habitat critical to the survival of the regent honeyeater is defined under the National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) as: any breeding or foraging habitat in areas where the species is likely to occur (based on commonwealth mapping); and any newly discovered breeding or foraging locations.

The vegetation within the Project Area does not contain key foraging species for the Regent Honeyeater, as such the vegetation is unlikely to meet the definition of "*any foraging habitat in areas where the species is likely to occur*". Therefore, the vegetation within the Project Area does not meet the definition of "*Habitat critical to the survival of the species*".

As such, considering the lack of records within the locality, the lack of key foraging species for the species, and the availability of similar habitat throughout the locality, the proposed action is unlikely to affect habitat critical to the survival of the species to the extent that the species will be significantly impacted.

5. Will the action disrupt the breeding cycle of a population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the vegetation is considered lower value foraging habitat.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will result in a reduction in the occupancy of the species with the removal of 22.99 ha of marginal foraging habitat for the species. However, as the Area of Occupancy (AOO) is 300 km^2 (30,000 ha) the proposed action is expected to impact 0.08 % of foraging habitat within the species' AOO.

7. Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

Whilst the proposed action will impact a total of 22.99 ha of marginal habitat for the species, this vegetation did not contain any key foraging species and is not considered habitat critical to the survival of the species. As such, the proposed action is unlikely to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 22.99 ha of marginal habitat for the species. As such, the proposed action is unlikely to be significant.

Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (EEC)

Assessment of Significance

Coastal swamp sclerophyll forests of south-eastern Australia is listed as Endangered under the EPBC Act. In accordance with the EPBC Act Matters of National Environmental Significance Significant impact guidelines 1.1:

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

1. ***Reduce the extent of an ecological community***

The proposed action will not result in a decrease in the extent of the EEC.

2. ***Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines***

Impacts associated with the proposed action will not reduce the extent of the EEC. While vegetation adjacent to the EEC will be cleared, measures including the establishment of a 15m buffer from the boundary and staging of extraction will minimise fragmentation or isolation of the EEC within the locality.

3. ***Adversely affect habitat critical to the survival of an ecological community***

All impacts to the EEC are likely to constitute impacts to "*habitat critical to the survival of the ecological community*", however the proposed action is avoiding all areas of the EEC within the Project Area.

4. ***Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.***

A total of 0.35ha of the EEC occurs within the Project Area, none will be removed. As the proposed action will not impact the water table, no substantial alterations of surface water drainage patterns are expected, as such it is unlikely the proposed action will modify or destroy abiotic factors necessary for the EEC's survival.

5. ***Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting***

The proposed action will result in the removal of 0 ha of the EEC. Indirect impacts associated with clearing adjacent vegetation may exacerbate weed invasion within this community and threatened its longevity. Therefore adherence to control and mitigation measures presented in the BDAR and the establishment of a management plan will reduce the potential for changes in species composition following indirect impacts.

6. ***Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:***

   i. *assisting invasive species, that are harmful to the listed ecological community, to become established, or*

ii. causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or

The proposed action is unlikely to cause a substantial reduction of the quality or integrity of retained areas of the EEC within the Project Area as long as specific measures presented in the BDAR are followed. These measures include the requirement for sediment controls bordering vegetation commensurate with the EEC to reduce exotic seed dispersal; and careful stockpiling of topsoil with high weed load. Furthermore, specific mitigation measures for pollutants and contaminants, such as spill kits, designated re-fuelling areas, and sediment controls, will greatly reduce the chance of harmful contaminants entering areas of the retained the EEC.

7. Interfere with the recovery of an ecological community.

The recovery potential of the vegetation within the Project Area will not be interfered by the proposed action.

Conclusion

The proposed action will not result in the removal of the EEC, with a total of 0.35 ha of the EEC within the Project Area to be retained (100%). Indirect impacts on retained areas of the EEC, such as weed incursion and pollutants will be managed throughout the operation of the sand quarry. Given the level of direct impact on the EEC the proposed action is unlikely to constitute a significant impact on the community.

Koala (*Phascolarctos cinereus*) - Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

Koala was not recorded within the Project Area, however the vegetation is considered suitable habitat for the species. Canopy species within the Project Area were assessed against koala use class ranks in The Review of Koala Tree Use Across New South Wales to determine foraging habitat suitability for the species, including dominant tree species; Eucalyptus pilularis (Blackbutt) [High Use], and Angophora costata (Smooth-barked Apple) [Low Use], and Eucalyptus grandis (Flooded Gum) [No Evidence of Use]. The mix of species is not considered highly suitable foraging habitat for the species, and this is reflected with the low the Koala Tree Index (KTI) mapping as part of the statewide Koala Habitat Information Base (KHIB). Areas of higher quality koala foraging habitat in the north-western corner of the Project Area will be retained (Vegetation Zone 3).

As the species was not recorded within the Project Area, and the vegetation is considered lower value foraging habitat, the proposed action is unlikely to lead to a long-term decrease in the size of the local population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

The proposed action will result in a reduction in the occupancy of the species with the removal of 24.50 ha of suitable habitat for the species (Vegetation Zone 1). However, as the Area of Occupancy (AOO) is 19,428 km2 (1,942,800 ha) the proposed action is expected to impact <0.001 % of the species' AOO.

3. Will the action fragment an existing important population into two or more populations?

The proposed action will directly impact 24.50 ha of suitable habitat for the species. As the proposed action will be staged and retain a 15 m wide buffer along the Project Area boundary, it is unlikely to fragment two areas of suitable habitat within or outside of the Project Area, the proposed action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

As the species was not recorded within the Project Area, and the vegetation is considered lower value foraging habitat, the proposed action is unlikely to affect habitat critical to the survival of the species.

5. Will the action disrupt the breeding cycle of an important population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the vegetation is considered lower value foraging habitat.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will result in a reduction in the occupancy of the species with the removal of 24.50 ha of suitable habitat for the species (Vegetation Zone 1). However, as the Area of Occupancy (AOO) is 19,428 km2 (1,942,800 ha) the proposed action is expected to impact <0.001 % of the

species' AOO. Higher value foraging habitat for the species will be retained within the north-western corner of the Project Area.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the Critically Endangered species' habitat?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

Whilst the proposed action will impact a total of 24.50 ha of suitable habitat for the species, this vegetation is considered lower value foraging habitat. As such, the proposed action is unlikely to lead to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 24.50 ha of suitable habitat for the species, this vegetation is considered lower value foraging habitat. As such, the proposed action is unlikely to be significant.

Spotted-tailed Quoll (*Dasyurus maculatus*) - Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area, however the vegetation within the Project Area is considered broadly suitable habitat for the species. A total of five (5) records of the species are recorded within 5 km of the Project Area. The proposed action will result in impacts to 23.99 ha of suitable habitat for the species. The estimated Area of Occupancy (AOO) is 2,512 km2 (251,200ha). The proposed impacts will lead to a decrease in the area of occupancy of the species by <0.001 % of the AOO. However, considering that the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

This species has a large geographical distribution with an area of occupancy estimated to be that of 2,512 km2 (251,200ha). The proposed action will result in a reduction in the occupancy of the species by 23.99 ha (<0.001 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

3. Will the action fragment an existing important population into two or more populations?

The proposed action will directly impact 23.99 ha of broadly suitable habitat for the species. However, considering the staging of the proposed action, the avoidance of impacts within a 15m buffer from the boundary, and progressive rehabilitation of the site, the action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

As the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to adversely affect habitat critical to the survival of the species.

5. Will the action disrupt the breeding cycle of an important population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the avoidance of impacts within a 15m buffer from the boundary, and progressive rehabilitation of the site will maintain connectivity for the species within the locality.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

This species has a large geographical distribution with an area of occupancy estimated to be that of 2,512 km2 (251,200ha). The proposed action will result in a reduction in the occupancy of the species by 23.99 ha (<0.001 % of the species' geographic distribution). However, considering that the

species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to impact or isolate quality habitat for the species so as to result in a decline of the species.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the Critically Endangered species' habitat?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

As the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 23.99 ha of potential habitat for the species. Considering that the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to result in a significant impact to the species

Vulnerable Species

Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of an important population of a species?

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The Project Area contains foraging habitat for the species. No breeding habitat (camps) were identified within the Project Area. Therefore, the Project Area is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. The Project Area is also connected to large areas of similarly suitable foraging habitat.

As such, it is unlikely the Project Area comprises an important population of Grey-headed Flying-fox.

2. Will the action reduce the area of occupancy of an important population of the species?

The area of occupancy of the Grey-headed Flying-fox is not known but the species exists as one interconnected population along the eastern Australian coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. The area occupied by this species would remain the same after the action. No decrease in the area of occupancy for this species is expected as a result of the proposed action.

3. Will the action fragment an existing important population into two or more populations?

Highly mobile species such as bats are expected to be less impacted by fragmentation. The Grey-headed Flying-fox is particularly well adapted to accessing widely spaced habitat resources given its mobility and preference for seasonal fruits and blossom in differing parts of the landscape. The proposed action is not expected to fragment an important population of the Grey-headed Flying-fox. Individuals would still be able to disperse between roosts along the east Australian coast. Genetic exchange within the population and dispersal would not be disrupted by the proposed action.

Therefore, the proposed action is unlikely to result in the fragmentation an existing important population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

This species typically exhibits very large home range and Grey-headed Flying-fox is known to travel distances of at least 50 km from roost sites to access seasonal foraging resources. There are no known roost camps within the Project Area and the site does not provide critical roosting habitat.

The recovery plan for the Grey-headed Flying-fox identifies critical foraging habitat for this species as:

- Winter and spring flowering native vegetation, including; *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or Syncarpia glomulifera*
- native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
- native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
- native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

A total of three (3) listed foraging species were recorded within the Project Area, of these none are listed important winter flowering foraging species. As such, the vegetation within the Project Area represents supplementary Spring-Autumn foraging habitat for the species, and is unlikely to represent important habitat or habitat critical to the survival of the species.

Given the distance of known camps, the absence of important winter and spring foraging species, the proposed action is likely to affect foraging habitat for the species. However, considering the high availability of such habitat within the locality the impacts are unlikely to be significant.

5. Will the action disrupt the breeding cycle of an important population?

No breeding habitat for this species was identified within the Project Area, although breeding colonies occur approximately 5.5 km west of the Project Area. The proposed action will impact vegetation that is unlikely to significantly disrupt the breeding cycle of this species or significantly impact the continued survival of the species. The proposal would not directly impact on a known camp / breeding or maternity site. Alternative foraging resources are available in the locality that would provide suitable resources during the maternity season. The proposed action will not impact an important population of this vulnerable species.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will remove 23.99 ha of potential foraging habitat. No camps occur within the Project Area. This impact is not expected to lead to a decline in the species in the region given the availability of high-quality foraging habitat available to local animals in the surrounding area.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

The Project Area currently contains a number of invasive species. The proposal is not expected to increase the prevalence of these species. The action is unlikely to result in an invasive species harmful to the Grey-headed Flying-fox becoming established in the habitat.

8. Will the action introduce disease that may cause the species to decline?

There are no known disease issues affecting this species in relation to the action. The action would be unlikely to increase the potential for significant disease vectors to affect local populations.

9. Will the action interfere substantially with the recovery of the species?

No, the proposed action will not interfere substantially with the recovery of the species due to low level of impact.

Conclusion

Based on the above assessment it is considered unlikely that this species will be significantly impacted by the proposed action

South-eastern Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*) - Vulnerable

1. ***Is the action likely to lead to a long-term decrease in the size of an important population of a species?***

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The Project Area contains minimal suitable forging habitat (*Allocasuaina* spp.) for the Glossy Black Cockatoo. Suitable breeding hollows (hollows >15cm diameter, 8m high) occur within the Disturbance Footprint, however the species has not been recorded within the Project Area during targeted surveys and only two (2) records of the species occur within 5 km of the Project Area (near Lemon Tree Passage and Tanilba Bay). Therefore, the Project Area is unlikely to represent key habitat for foraging, breeding, roosting or dispersal for the species, as such it is unlikely to contain an important population of the species.

2. ***Will the action reduce the area of occupancy of an important population of the species?***

The proposed action will not impact an important population of this species.

3. ***Will the action fragment an existing important population into two or more populations?***

The proposed action will not impact an important population of this species.

4. ***Will the action adversely affect habitat critical to the survival of a species?***

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

Under the Conservation Advice for the species *habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:*

- *for activities such as foraging, breeding, roosting, or dispersal;*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);*
- *to maintain genetic diversity and long-term evolutionary development; or*
- *for the reintroduction of populations or recovery of the species or ecological community.*

Due to the lack of suitable foraging habitat and absence of records it is considered unlikely that the vegetation within the Project Area represents habitat that is key to maintaining genetic diversity or the long-term persistence of the species within the locality. As such, it is unlikely the Disturbance Footprint comprises an important population of the Glossy-black Cockatoo or habitat critical to the survival of a species.

5. ***Will the action disrupt the breeding cycle of an important population?***

The proposed action will not impact an important population of these species.

6. ***Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?***

The proposal will remove 23.99 ha of vegetation providing potential habitat for this species, albeit no high foraging value. The vegetation within the Project Area is connected to large areas of similar habitat to the north, east and south. As such, the proposal is unlikely to decrease the availability or quality of habitat such that the species is likely to decline.

7. ***Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?***

Invasive species are not likely to be harmful to this species. Mitigation measures will prevent construction activities from introducing or spreading new or existing invasive species into the Project Area.

8. ***Will the action introduce disease that may cause the species to decline?***

There are no known disease issues affecting this species in relation to the action. The action would be unlikely to increase the potential for significant disease vectors to affect local populations.

9. ***Will the action interfere substantially with the recovery of the species?***

As the proposal will impact on potential habitat only, it is unlikely to impact on the recovery of this species.

Conclusion

Based on the above assessment it is considered unlikely that the species will be significantly impacted by the proposed action.

Yellow -bellied Glider (south -eastern) (*Petaurus australis australis*) - Vulnerable

1. ***Is the action likely to lead to a long-term decrease in the size of an important population of a species?***

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

In accordance with the species' Conservation Advice; *Populations important to the survival of the yellow-bellied glider (south-eastern) include stronghold populations, ecologically or genetically distinct populations (e.g., those at the limits of the subspecies' range, outlying populations), research populations, and other populations where recovery actions are being implemented. However, this list of important populations is not exhaustive. In the absence of such information, all known populations should be considered important. Known important populations include:*

- *Carnarvon Range (Inland population; Qld)*
- *Blackdown Tableland (Inland population; Qld)*
- *Bago Plateau (Endangered under NSW legislation; NSW)*
- *Richmond Range National Park (research population; NSW)*
- *Blacktown range (population near urban area; NSW)*
- *Shoalhaven populations (severely fire-affected, surveyed; NSW)*
- *Populations between Coffs Harbour, Dorrigo, Glen Innes and Grafton (affected by fire and timber harvesting, research populations; NSW)*
- *Populations between Nimmitabel and Cathcart (affected by fire and timber harvesting, research populations; NSW)*
- *Populations near Waratah Creek (affected by fire and timber harvesting, research populations; NSW)*
- *South Australian population (only SA population, potentially an ESU, six individuals, may be extinct; SA)*
- *Western Vic populations (outlying populations, potentially an ESU; Vic).*

The Project Area is not associated with any of the listed important populations. As such, no important population of the species occurs within the Project Area.

2. ***Will the action reduce the area of occupancy of an important population of the species?***

The proposed action will not impact an important population of this species.

3. ***Will the action fragment an existing important population into two or more populations?***

The proposed action will not impact an important population of this species.

4. Will the action adversely affect habitat critical to the survival of a species?

Habitat critical to the survival *of the yellow-bellied glider (south-eastern) may be broadly defined as areas containing the following attributes (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis):*

- *large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees (see Appendix A);*
- *areas identified as refuges under future climate change scenarios;*
- *short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas;*
- *habitat corridors required to facilitate dispersal of the subspecies between fragmented habitat patches and/or that enable recolonization or movement away from threats. yellow-bellied gliders (south-eastern) have a glide ratio (horizontal distance/height dropped) of around 2.0, and corridors spanning gaps larger than the distance gliders are likely to be able to travel should be considered critical to the survival. There is not enough evidence to define the canopy and width characteristics of appropriate corridors. In the absence of such information, a precautionary approach should be taken to maximise dispersal by considering all habitat corridors in the species' range to be habitat critical to the survival; and*
- *areas in which some trees have evidence of use for sap extraction by yellow-bellied glider (south-eastern).*

The vegetation within the Project Area was determined not be habitat critical to the survival of the species based on the following:

- **Habitat** – A total of two (2) known foraging species occur within the Project Area; *Eucalyptus pilularis* (Blackbutt) and *Eucalyptus grandis* (Flooded Gum). However the species has not been recorded within the Project Area, no records occur within 5 km of the Project Area and no signs of foraging were recorded within the Project Area.
- **Future Climate Change Refuges** – The vegetation within the Project Area is not identified as future refuge under climate change
- **Short-term post-fire refuges** – The vegetation within the Project Area is unlikely to represent important post-fire refuge for the species within the locality owing to the site's exposure and absence of sheltered refugia.
- **Habitat corridors** – The vegetation likely represents a local movement corridor (north-east / south-west). Through an iterative process of avoidance
- **Evidence of feeding** – No evidence of Yellow-bellied glider foraging was detected within the Project Area

5. Will the action disrupt the breeding cycle of an important population?

The proposed action will not impact an important population of these species.

6. ***Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?***

The proposal will remove 23.99 ha of vegetation providing potential habitat for this species, albeit no signs of use, and no records of the species occupying habitat within the locality. The vegetation within the Project Area is connected to large areas of similar habitat to the north, east and south. As such, the proposal is unlikely to decrease the availability or quality of habitat such that the species is likely to decline.

7. ***Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?***

The proposal is not expected to increase the prevalence of exotic species. The action is unlikely to result in an invasive species harmful to the Yellow-bellied Glider becoming established in the habitat.

8. ***Will the action introduce disease that may cause the species to decline?***

The proposed action will unlikely result in the increase of potentially significant disease vectors that may affect the Yellow-bellied Glider.

9. ***Will the action interfere substantially with the recovery of the species?***

No, the proposed action will not interfere substantially with the recovery of the species.

Conclusion

Based on the above assessment it is considered unlikely that this Commonwealth-listed species will be significantly impacted by the proposal

New Holland Mouse (*Pseudomys novaehollandiae*) - Vulnerable

1. ***Is the action likely to lead to a long-term decrease in the size of an important population of a species?***

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The National recovery Plan for the Pookila (New Holland mouse) *Pseudomys novaehollandiae* (DCCEEW 2026) outlines important habitat for the species and habitat critical to the survival of the species:

All potential habitat should be considered important to the Pookila's persistence and recovery, this includes any:

- *Areas within the species' modelled distribution;*
- *Areas where the species previously occurred but has since become locally extinct;*
- *Patches of suitable habitat that may not be currently occupied by the species but have the potential to be occupied by natural dispersal; and*
- *Areas that could be restored for reintroduction.*

No New Holland mice were recorded during the completion of targeted surveys within the Project Area. A total of four (4) records of the species occur within 5 km of the Project Area, as such a habitat assessment was completed with reference to the ecological functions referenced in the National Recovery Plan for the specie. Important habitat includes:

- ***Areas within the species' modelled distribution*** – The Project Area occurs within the modelled distribution of the species.
- ***Areas where the species previously occurred but has since become locally extinct*** – The species has not been recorded within the Project Area historically or as part of this assessment. A total of four (4) records of this species occurs within 5 km of the Project Area.
- ***Patches of suitable habitat that may not be currently occupied by the species but have the potential to be occupied by natural dispersal*** – While the species has not been recorded within the Project Area suitable habitat occurs within the Project Area and records of the species occur within the locality. As such, it is likely that while the Project Area is unoccupied by the species the habitat within the Project Area has the potential to be occupied by the species through natural dispersal.
- ***Areas that could be restored for reintroduction*** – the proposed sand quarry includes progressive rehabilitation of the site following extraction. The National Recovery Plan for the species highlights that the species is "identified as preferring early successional habitat, at some sites with peak abundance approximately 3-7 years post-fire and 7-9 years post-sand mine rehabilitation.

Considering the above, the vegetation is likely to represent habitat important to the species.

2. ***Will the action reduce the area of occupancy of an important population of the species?***

The proposed action will not impact an important population of this species.

3. ***Will the action fragment an existing important population into two or more populations?***

The proposed action will not impact an important population of this species.

4. ***Will the action adversely affect habitat critical to the survival of a species?***

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long-term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

All areas that contain habitat that serves one or more of the following ecological functions have the potential to be habitat critical to the survival of the Pookila:

- ***Foraging habitat:*** *vegetation with appropriate density and diversity to be able to support a population, such as native vegetation with seasonal abundance of edible flowering, fruiting, and seeding plants. Vegetation cover is important for the species to be able to forage without increased risk of predation. This habitat includes open heathland, tall open forest with a grassy understorey, open woodland with a grassy or heath understorey and vegetated sand dunes (Keith & Calaby 1968; Posamentier & Recher 1974; Fox & Fox 1978; Hocking 1980; Fox & McKay 1981; Pye 1991; Wilson 1991; Van Dyck & Lawrie 1997; Lock & Wilson 1999; Sparshott & Sparshott 2003; Wilson & Laidlaw 2003; Lazenby et al. 2007; Dixon 2014; DNRE Tas 2022).*
- ***Breeding habitat:*** *substrate for the species to be able to create burrows, or alternatively, 'surface nests' in low-lying vegetation that is suitable for successful reproduction and rearing of young. Soft sandy substrates, with deep topsoils are thought to be optimal (Abicair et al. 2020) but not exclusive. The Pookila mostly occupies coastal areas that provide this substrate. However, it also occupies sites 100–300 km from the coast and areas with higher elevation where soil composition varies. For example, the presence of sandy soils is highly likely in Goobang National Park (NSW NPWS 2001), whilst in the NSW ranges and Northern Tableland areas, soil may vary with a more dominant loamy or quartz soil base where the Pookila occurs or may be present (NSW OEH 2023. pers comm 22 November).*
- ***Habitat for the long-term maintenance of the species:*** *including areas that are not subject to prolonged drought or at risk of extreme droughts in future (such as potential climate refugia), and habitat that is maintained through periodic small-scale burns to provide appropriate foraging habitat and connectivity for the species.*

- ***Habitat for the maintenance of genetic diversity:*** *includes all current habitats where the species is extant as they contain populations necessary to achieve maximum genetic diversity and increase resilience of the species against future threats. There are two recognised ESUs: the Southern ESU (Vic populations) and the Northern ESU (NSW and Qld populations). Tas may yet be identified as a third ESU or may cluster within the Southern ESU. Therefore, habitat across the species' range is necessary to maintain the national genetic diversity of the species.*
- ***Habitat for translocation:*** *can be identified using habitat modelling followed by ground-truthing at the local-scale and can include locations that have accounted for future changes due to climate change regimes as well as the exclusion of invasive predators.*

Refining what constitutes habitat critical to the survival of the Pookila is a priority action in this recovery plan. Until those key characteristics are further clarified, all areas that contain habitat that serves any of the above five ecological functions have the potential to be habitat critical to the survival of the Pookila. Habitat that supports multiple ecological functions and/or a higher number of the ecological attributes identified within the descriptions provided above, increases the likelihood that the habitat may be critical to the survival of the Pookila

Areas that contain one or more of the following ecological functions have the potential to be habitat critical to the survival of the species:

- **Foraging habitat** – The vegetation within the Project Area is consistent with "*vegetated sand dunes*" with high floristic diversity with leguminous perennials. As such, the vegetation is likely to represent broadly suitable foraging habitat for the species.
- **Breeding habitat** – The Project Area is characterised by sandy soils suitable for burrowing. As such, the vegetation within the Project Area is likely representative of suitable breeding habitat for the species.
- **Habitat for the long-term maintenance of the species** – The vegetation within the Project Area is unlikely to represent potential climate refugia for the species.
- **Habitat for the maintenance of genetic diversity** – As the species has not been recorded within the Project Area the site is unlikely to represent habitat for a population necessary to achieve maximum genetic diversity and increase resilience of the species against future threats.
- **Habitat for translocation** – The vegetation within the Project Area is likely suitable habitat for translocation considering the presence of broadly suitable foraging habitat, and potential breeding habitat. The species is likely to also utilise rehabilitated areas following extraction (known to have peak abundance 7-9 years post-rehabilitation)

The vegetation within Vegetation Zone 1 meets more than one of the listed ecological functions above, therefore the habitat is likely to "*have the potential to be habitat critical to the survival*" of the species. However, the proposed action is unlikely to result in impacts to habitat critical to the survival of the species to the extent that it would significantly impact the species within the locality.

5. ***Will the action disrupt the breeding cycle of an important population?***

The proposed action will not impact an important population of this species.

6. ***Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?***

The proposal will remove 23.99 ha of broadly suitable habitat for the species. The proposed action will result in a reduction in the occupancy of the species (AOO: 694 km^2 or 69,400 ha) of 23.99 ha which represents 0.03 % of the species' AOO. However, considering that the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation which the species is known to inhabit after 7-9 years), the proposed action is unlikely to impact or isolate quality habitat for the species so as to result in a decline of the species.

7. ***Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?***

The proposal is not expected to increase the prevalence of exotic species that would have an adverse effect on the species.

8. ***Will the action introduce disease that may cause the species to decline?***

The proposed action will unlikely result in the increase of potentially significant disease vectors that may affect the New Holland Mouse.

9. ***Will the action interfere substantially with the recovery of the species?***

No, the proposed action will not interfere substantially with the recovery of the species.

Conclusion

Based on the above assessment it is considered unlikely that this Commonwealth-listed species will be significantly impacted by the proposal