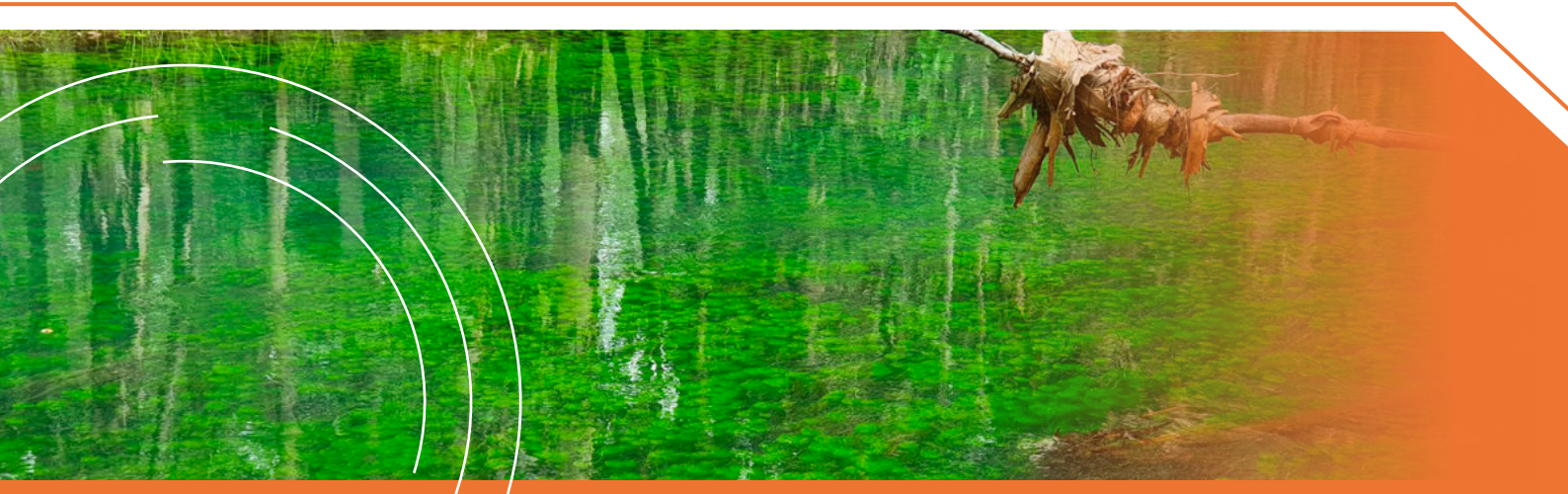




Offset Management Strategy



Aurukun Bauxite Project

Biodiversity offset strategy

Prepared for Glencore Bauxite Resources Pty Ltd

June 2023

Aurukun Bauxite Project

Biodiversity offset strategy

Glencore Bauxite Resources Pty Ltd

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Executive Summary

The Aurukun Bauxite Project involves the construction and operation of a bauxite mine and associated infrastructure on a greenfield site in western Cape York, Queensland (Figure 2.1). The proponent is the Aurukun Bauxite Project Joint Venture, an unincorporated joint venture between Glencore Bauxite Resources Pty Ltd and MDP Bauxite Pty Ltd, a wholly owned subsidiary of Mitsubishi Corporation.

The mine would produce up to 15 million tonnes per annum of Run of Mine bauxite ore, which equates to up to eight million dry tonnes per annum of product bauxite. Bauxite ore would be mined using open cut mining methods and the ore would be washed and screened in an on-site beneficiation plant. The product bauxite would then be transported by road train to a coastal loading facility located approximately 15 km to the west of the mine site. Transshipping arrangements would be used to load the product bauxite to ocean going vessels.

The total clearing footprint for the Project over its life of mine of more than 20 years is an area of 6,885.10 ha with the location of Project infrastructure and mining areas (the direct impact footprint) shown in Figure 2.2 and Figure 2.5. In addition, the total impact footprint for some threatened species includes areas of habitat that may be isolated as a result of clearing activities causing potential indirect impact on habitat functionality for that species.

The Project requires key approvals under Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland *Environmental Protection Act 1994* (EP Act), as well as an Environmental Impact Statement (EIS) that has been prepared. As part of the EIS, significant impact assessments (SIAs) have been completed for matters of national and state environmental significance based on results of extensive seasonal terrestrial and aquatic ecology surveys. Results of the SIAs found that the following prescribed values and associated impacts would require an offset under the relevant legislation.

Table ES1 Biodiversity offset requirements

Prescribed matter	MNES	MSES	Total impact being offset (ha)
Palm Cockatoo (Australian) (<i>Probosciger aterrimus macgillivrayi</i>)	✓	✓	8,531.8
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	✓	✓	8,781
Masked Owl (northern) (<i>Tyto novaehollandiae kimberli</i>)	✓	✓	8,781
Black-footed Tree Rat (north Qld) (<i>Mesembriomys gouldii rattoides</i>)	✓	✗	6,885.1
Watercourse vegetation	✗	✓	111.88
High Ecological Value (HEV) waters	✗	✓	10 km of stream order 3 watercourse

This Biodiversity Offset Strategy summarises the Project's offset requirements under State and Federal frameworks and identifies the preferred approach for offset delivery and how it will comply with applicable offset policies being EPBC Act Environmental Offsets Policy (DCCEE 2012) and Queensland Environmental Offset Policy (DES 2022). It is proposed that at least 90% of the total offset requirement will be delivered as land-based offsets.

The largest component of the Project's offset requirements is the offsetting of the impact on habitat of threatened species under EPBC Act. Within these habitats will be areas supporting MSES values, including watercourse vegetation and HEV waters.

The proposed location of the land-based offset will be in the Cape York bioregion in an area known to support the relevant threatened species and will contain suitable habitats for each species impacted (including the ecosystem and species function that was impacted). For example, if breeding habitat is being lost, then breeding habitat will be included in the offset.

This Biodiversity Offset Strategy also describes the management actions proposed that will provide for habitat quality improvements to be gained over time and threats reduced. Conservation outcomes anticipated to be achieved through land-based offsets and the associated management actions include:

- through implementation of an appropriate fire management regime (designed to prevent hot, late-season bushfires, and have cooler, mosaic burns that are not too frequent):
 - protection of existing hollows (of differing sizes) utilised by Palm Cockatoo, Masked Owl and Black-footed Tree Rat as well as supporting prey species for the Red Goshawk
 - protection of existing tall trees in proximity to water that could be used by Red Goshawk for nesting
 - protection of riparian vegetation communities and vine thickets which provide refuge and roosting habitat for a number of threatened species
 - increasing the number of large trees that have the potential to form hollows in the future and provide habitat for threatened species
 - increasing the availability of foraging resources for Palm Cockatoo and Black-footed Tree Rat
 - increasing ground cover, woody debris and species recruitment through changed fire management regimes
- through the implementation of weed and feral animal management programs:
 - increasing habitat quality through reduction of weeds and pest animals
 - increasing the number of small and medium sized mammals which are an important food resource for Masked Owl
 - reducing non-native plant cover improving feeding grounds for Red Goshawk (as well as reducing fuel loads that may contribute to hot bushfires)
- through implementation of targeted species monitoring programs, improving our understanding of these threatened species, their habitat utilisation and breeding requirements.

Two potential offset areas have been identified and preliminary EPBC Act offset calculators completed for each. Further details are provided in Section 6, Appendix C and Appendix D and are summarised below.

Table ES2 Offset Areas: Preliminary Calculation – MNES species

Species	Area of impact (ha)	Offset Area		Habitat quality			Risk of Loss without offset	NPV (adj ha)	% offset
		No.	Area	Start	Future (no offset)	Future (w/offset)			
Palm Cockatoo	8,531.8	#1	34,000	7	6	8	5%	6,010	100%
		#2	38,000	7	6	8	1%	6,018	100%
Red Goshawk	8,781	#1	42,500	7	6	8	5%	6,160	100%
		#2	38,000	6	5	8	1%	6,415	104%
Black-footed Tree-rat	6,885.1	#1	28,000	7	6	8	5%	4,950	102%
		#2	24,000	5	4	7	1%	4,923	102%
Masked Owl	8,781	#1	26,000	5	4	6	5%	4,397	100%
		#2	28,000	5	4	6	1%	4,391	100%

These preliminary calculations have found that an upper offset area extent is approximately 42,500 ha. The location of each offset area in proximity to the Project is shown in Figure 5.1.

The proponent intends to continue and progress landholder discussions as well as undertake rapid field assessments to confirm suitability of the offset areas for the threatened species required to be offset. A final offset area will then be chosen in consultation with regulators and refined based on targeted surveys and full habitat quality assessments completed.

It is then proposed that an Offset Area Management Plan (OAMP) will be prepared for regulatory approval prior to Project commencement.

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1 Introduction

This Biodiversity Offset Strategy (BOS) has been prepared as part of an Environmental Impact Statement (EIS) for the Aurukun Bauxite Project (the Project).

The Project's EIS has been prepared under the *Environmental Protection Act 1994* (EP Act) and will be used in support of applications for required approvals, including an Environmental Authority (EA), Mining Leases (MLs) and approval under the Federal *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Project has identified its potential to have significant impacts on matters of national environmental significance (MNES) and matters of state environmental significance (MSES). Accordingly, and under the Terms of Reference for the EIS (DES 2020) the proponent is required to propose offsets that are consistent with the requirements of the applicable State and/or Commonwealth legislation or policies, namely the following:

- Where a significant residual impact will occur on a prescribed environmental matter, as outlined in the *Environmental Offsets Regulation 2014*, the offset proposal(s) must be consistent with the requirements of Queensland's *Environmental Offsets Act 2014* and the latest version of the Queensland environmental offsets policy (DES 2022).
- Where the Commonwealth offset policy requires an offset for significant residual impacts on a MNES, the offset proposal(s) must be consistent with the requirements of the latest version of the EPBC Act environmental offsets policy (DSEWPC 2012) and relevant guidelines.

This BOS is the proponent's draft offset management strategy for the Project and incorporates the intended scope of an offset area management plan that would be developed for approval prior to Project commencement, as well as the next steps to finalising the biodiversity offsets and associated timing. No offset staging is proposed. The BOS includes:

- a summary of significant, residual impacts to prescribed matters that require offsetting
- identification of suitable preliminary offset sites for each prescribed matter (including maps showing offset extent and location of biodiversity values)
- description of how the proposed offset/s will meet requirements of the EPBC Act Environmental Offsets Policy and *Environmental Offsets Act 2014* (Qld) for each matter
- description of the conservation outcomes to be achieved including an indication of management and monitoring actions to be undertaken
- preliminary offset calculators for MNES to inform offset area requirements, and justify suitability of offset areas proposed
- details of how the environmental offset will provide connectivity with other habitats, populations and biodiversity corridors
- evidence that the relevant biodiversity values and/or their habitat can be present in the potential offset area/s
- options for legal security and addressing any tenure or resource tenements
- future steps to finalise offsets including preparation of an offset area management plan, and timeline in relation to approval and commencement of the Project.

2 Project background

2.1 Project description

The Project involves the construction and operation of a bauxite mine and associated infrastructure on a greenfield site in western Cape York, Queensland (Figure 2.1).

The mine would produce up to 15 million tonnes per annum of Run of Mine bauxite ore, which equates to up to eight million dry tonnes per annum of product bauxite. Bauxite ore would be mined using open cut mining methods. The ore would be washed and screened in an on-site beneficiation plant. The product bauxite would then be transported by road train to a coastal loading facility (CLF) located approximately 15 km to the west of the mine site. Transshipping arrangements would be used to load the product bauxite to ocean going vessels.

Fines material (produced from the washing and screening process) would be emplaced in a fines containment area for the first three years of operation and then (from year 4 onwards) emplaced within pits where mining has been completed. Once mining and any backfilling with fines has been completed, mined areas would be progressively rehabilitated with the final landform profiled to promote free drainage and prevent erosion before being revegetated using native species.

Infrastructure required as part of the Project includes infrastructure related to the mining, processing and transport of bauxite ore (including the CLF), an accommodation village, and a water supply dam on Tapplebang Creek. Infrastructure will all be built in the first two years of the Project.

The Project would have a mine life of approximately 22 years. The total clearing footprint for the Project over its life of mine of more than 20 years is an area of 6,885.10 ha with the location of Project infrastructure and mining areas (the direct impact footprint) shown in Figure 2.2 and Appendix E. The total area of remnant vegetation to be cleared is 6,885.10 ha.

Decommissioning would be undertaken from year 23 to year 25, with an active monitoring and maintenance phase commencing halfway through decommissioning and extending until year 27.

2.2 Project setting

The Project site (the area where the proposed Project would take place, and which would be subject to a mining tenure application) is in a remote location in western Cape York. The nearest city is Cairns, approximately 600 km to the south-east of the Project site and the nearest town is Aurukun township, approximately 23 km from the southern boundary of the Project site (Figure 2.1).

The Project site straddles the Aurukun Local Government Area and the Cook Local Government Area and covers an area of approximately 23,100 ha. The Project site includes:

- the mine site, located within mineral development licence 2001 (MDL 2001), where mining activity and the majority of Project infrastructure would be located
- the product bauxite transport corridor, which includes the coastal loading facility (CLF) and haul road, and extends to the coast (to the west of the mine site).

The Project site is located on a broad tertiary plateau of gently undulating plains with occasional shallow drainage depressions. The elevation within the Project site ranges from 9 m Australian Height Datum (AHD) near the coast to 91 m AHD in the eastern portion of the mine site.

The Project site is traversed by Tapplebang Creek and Coconut Creek (Figure 2.2), with waters flowing south-west to join the Ward River, ultimately flowing into the Gulf of Carpentaria near Aurukun township. All vegetation within the Project site is remnant vegetation, predominantly comprising eucalypt tall woodlands with scrubby woodland to open forest fringing the watercourses that drain the plateau.

A portion of the Project site extends westward to the Gulf of Carpentaria and includes the stretch of coastline in the vicinity of the CLF, comprising a low headland on the landward boundary of a sandy beach.

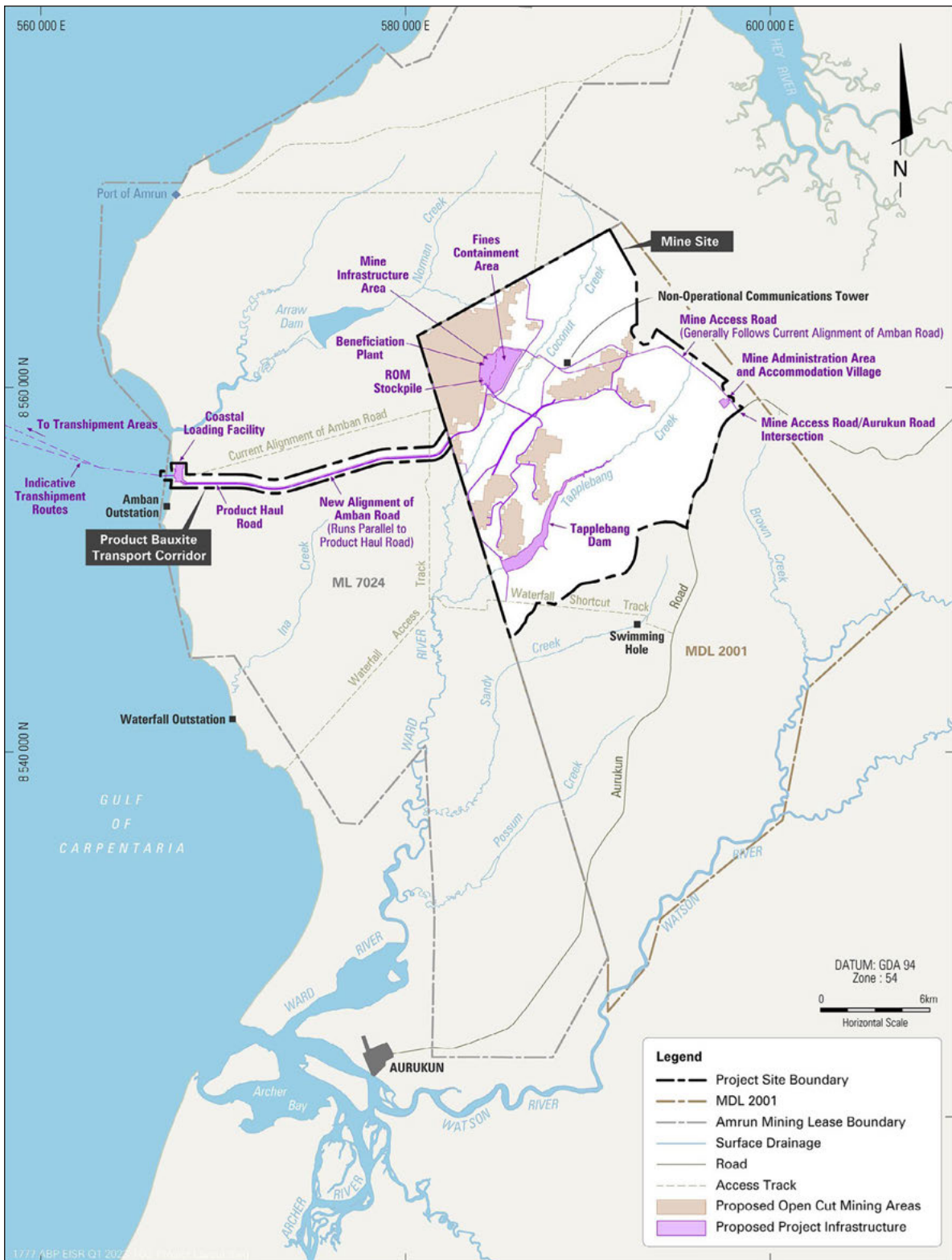
Figure 2.1 Project locality



AURUKUN BAUXITE PROJECT

Location Plan

Figure 2.2 Project area and impact footprint



AURUKUN BAUXITE PROJECT

Conceptual Project Layout

2.3 Regional setting

The Project is located on the western side of Cape York (western Cape York) in the Weipa plateau subregion of Cape York bioregion. Key townships in western Cape York include Weipa, Napranum and Aurukun (Figure 2.1). Weipa is the regional centre for western Cape York and a key residential location for people employed in the surrounding bauxite mining operations. Napranum and Aurukun are small Indigenous communities.

There are large areas of undisturbed land in western Cape York and vast tracts of remnant vegetation, with the Cape York bioregion being 99.4% remnant vegetation. Farming, largely grazing, is the most widespread land use in western Cape York. Bauxite mining is also prevalent. There are a number of large protected areas in Cape York, including some which are owned and managed by local Aboriginal Traditional Owners. The Cape York Peninsula Tenure Resolution Program returns ownership and management of identified lands on Cape York Peninsula to local Aboriginal Traditional Owners. This program ensures Cape York Peninsula's iconic natural assets are protected while nurturing the rich and diverse cultural values of First Nations groups across this vast and unique region (DES 2023).

Cape York has a tropical climate characterised by a distinct wet season (generally around November to April) and dry season (generally around May to October). Temperatures are relatively warm year-round, with slightly cooler temperatures over the dry season. The highest mean daily maximum temperature at the Weipa Aero weather station is 35.8°C, and the lowest mean daily minimum temperature at the weather station is 18.7°C.

The annual rainfall pattern illustrates the tropical climate of the Cape York region, with 97% of the annual rainfall occurring during November to April. Mean annual rainfall is 1,911.4 mm. Relative humidity is generally higher in the morning compared to the afternoon. The highest monthly average relative humidity is recorded in February for both morning and afternoon values (86% and 76% respectively). Winds are typically from the east to the south-east and are predominantly moderate in strength.

2.4 Land use and tenure

The Project site is used occasionally by both Traditional Owners and other residents of Aurukun township for various activities, including hunting. Land surrounding the Project site is used by Traditional Owners for a range of recreational activities, such as camping and fishing.

The mine site and adjacent land (to the south and east) is located within Lot 211 on SP241404. Ngan Aak-Kunch Aboriginal Corporation (NAK) is the holder, on behalf of the Wik and Wik Waya People, of Aboriginal freehold title for this land under the *Aboriginal Land Act 1991* (Qld) (AL Act) (Figure 2.3).

The land to the west of the mine site is subject to a lease of Crown land, held by RTA Weipa Pty Ltd (Rio Tinto) for mining and other purposes, as defined in the *Commonwealth Aluminium Corporation Pty Limited Agreement Act 1957* (Comalco Act). The Project's proposed Product Bauxite Transport Corridor would need to cross the Rio Tinto mining lease to access the proposed CLF.

The Wik and Wik Waya people hold the Native Title rights over the Project site, with the exception of a small parcel of land on which a non-operational communications tower is located. NAK is the nominated agent/representative and Prescribed Body Corporate in respect of the Native Title rights of the Wik and Wik Waya people.

To the east of the Project site (along Aurukun Road towards the Peninsula Developmental Road) are large parcels of pastoral land, including Sudley Station, Merluna Station, and Watson River Station (Figure 2.4).

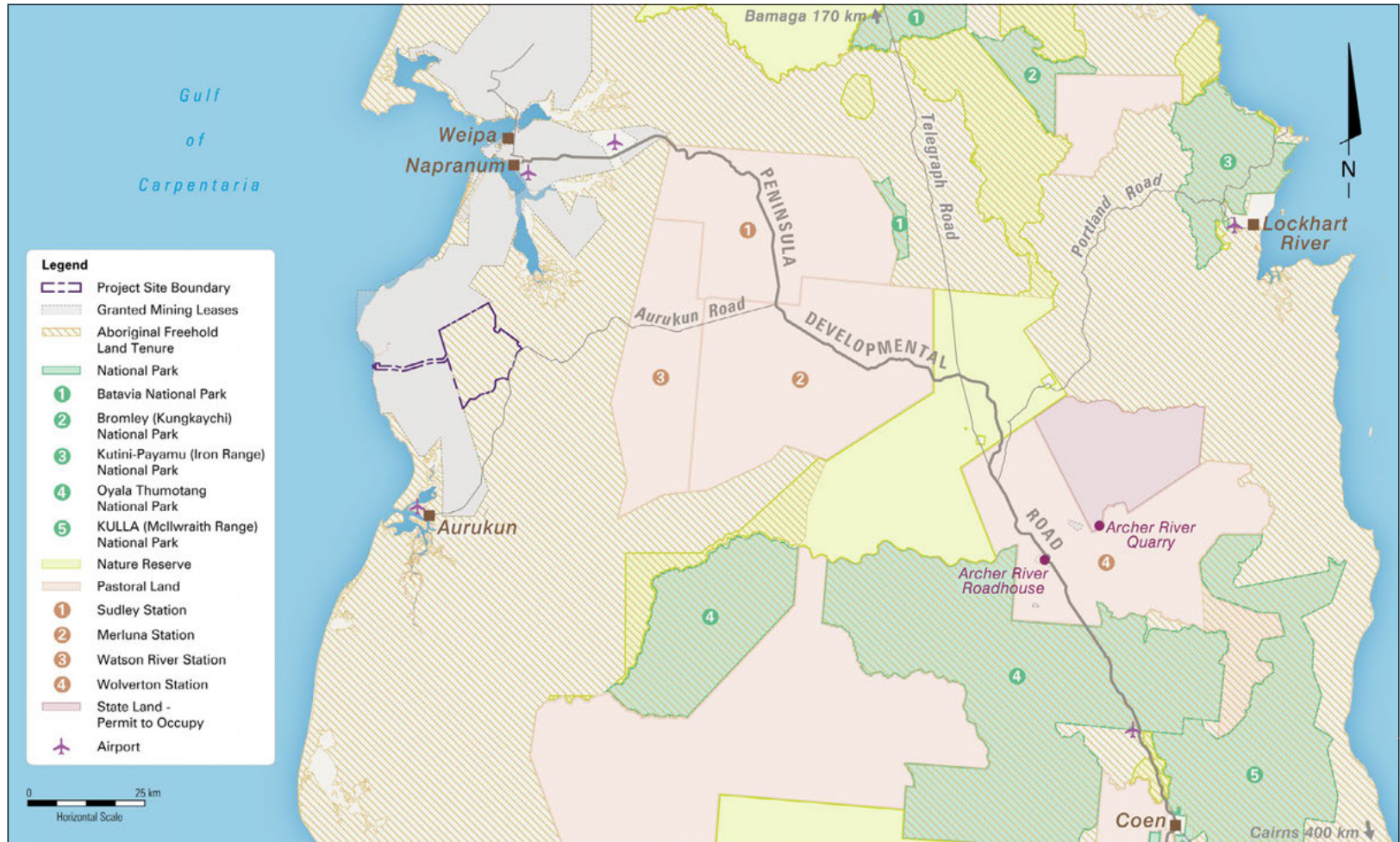
Figure 2.3 Land tenures



AURUKUN BAUXITE PROJECT

Land Ownership

Figure 2.4 Regional land use



AURUKUN BAUXITE PROJECT
Regional Setting (Other Land Tenure)

2.5 Ecological setting

2.5.1 Terrestrial ecology

The majority of the Project site comprises remnant vegetation with small sections containing cleared or non-remnant areas, including Amban Road, an abandoned airstrip along Amban Road, and non-remnant regrowth shrubland at the western end of the Product Bauxite Transport Corridor that was historically cleared and maintained as an airstrip. These cleared and disturbed areas comprise approximately 108.60 ha of the study area (Appendix E.1) (EcoSM 2023). Terrestrial ecology surveys were conducted over a larger 'study area' that was approximately 26,252 ha in area.

Darwin Stringybark (*Eucalyptus tetradonta*) +/- Cape Melville Bloodwood (*Corymbia nesophila*) woodland to tall woodland on tertiary plateaux (RE3.5.36b) dominates the Project site with over 25,000 ha present within the terrestrial ecology study area (approx. 96% of study area). It was found to be in moderate to good condition, although many areas are experiencing the effects of high intensity fires, exhibited by limited diversity of the shrub layer and sparse fallen timber (see Photograph 2.1 and Photograph 2.2). Canopy was variably composed of Darwin Stringybark, Long-fruited Bloodwood (*Corymbia novoguineensis*), Cape Melville Bloodwood (*Corymbia nesophila*), Gum-topped Bloodwood (*Corymbia stockeri* subsp. *peninsularis*), Broadleaved Carbeen (*Corymbia disjuncta*), Cooktown Ironwood (*Erythrophleum chlorostachys*), and Nonda (*Parinari nonda*).

Abundant hollow-bearing trees were observed in most areas of this habitat type, although the prevalence of mature trees was limited in areas that have been subjected to hot fires (EcoSM 2023).

A summary of the REs present across the study area based on field assessments are summarised in Table 2.1 and mapping of REs is provided in Appendix E.1. No threatened ecological communities (TECs) under EPBC Act or Endangered and Of Concern REs under *Vegetation Management Act 1999* (VM Act) are present in the study area.

Table 2.1 Regional ecosystems across project study area

Regional ecosystem (RE)	Broad vegetation group (BVG) 1M	Status (VM Act)	Description	Total within study area (ha)
3.2.2	3a	Least concern	Semi-deciduous vine thicket to vine forest on beach dunes and ridges	0.7
3.2.24	28d	Least concern	Mixed open tussock grassland and open forblands or shrublands on exposed foredunes and islands	0.7
3.3.9b	22b	Least concern	<i>Xanthostemon crenulatus</i> (penda), <i>Lophostemon suaveolens</i> (swamp mahogany), <i>Asteromyrtus brassii</i> woodland to open forest +/- <i>Dillenia alata</i> (red beech) +/- <i>Melaleuca saligna</i> (paperbark).	44.6
3.3.9a	22b	Least concern	Swamp Box (<i>Lophostemon suaveolens</i>) fringing forest	250.1
3.3.20a	9e	Least concern	<i>Corymbia clarksoniana</i> or <i>C. novoguineensis</i> woodland to open forest on alluvial plains. Occurs on a variety of alluvial plains derived from a range of geological substrates	3.5
3.3.20b	9e	Least concern	Long-fruited Bloodwood (<i>Corymbia novoguineensis</i>), Swamp Box +/- Paperbark (<i>Melaleuca</i> spp.) woodland on alluvium	337.1
3.3.49	21a	Least concern	Broad-leaved Tea Tree (<i>Melaleuca viridiflora</i>) low open woodland to low woodland on low-lying plains	12.2

Table 2.1 Regional ecosystems across project study area

Regional ecosystem (RE)	Broad vegetation group (BVG) 1M	Status (VM Act)	Description	Total within study area (ha)
3.3.50g	22a	Least concern	Broad-leaved Paperbark (<i>Melaleuca quinquenervia</i>) shrubland to closed heath on floodplain swamps	10.3
3.3.64	34c	Least concern	<i>Baloskion tetraphyllum</i> subsp. <i>meiostachyum</i> and/or <i>Leptocarpus</i> spp. and/or <i>Dapsilanthus spathaceus</i> open sedgeland in drainage swamps	0.4
3.5.36b	14a	Least concern	Darwin Stringybark (<i>Eucalyptus tetradonta</i>) +/- Cape Melville Bloodwood (<i>Corymbia nesophila</i>) woodland to tall woodland on tertiary plateaux	25,222.20
3.5.39	14b	Least concern	<i>Eucalyptus tetradonta</i> +/- <i>Corymbia clarksoniana</i> woodland on sand plains	0.3
3.7.3	13a	Least concern	<i>Eucalyptus cullenii</i> +/- <i>E. tetradonta</i> woodland on erosional escarpments and plains	0.7
3.7.4	14b	Least concern	Darwin Stringybark and Broad-leaved Carbeen (<i>Corymbia disjuncta</i>) woodland on ironstone knolls	260.1
Total				26,142.90



Photograph 2.1 Swamp Box riparian vegetation fringing Tapplebang Creek where large trees and tree hollows are abundant (RE3.3.9a)



Photograph 2.2 Darwin Stringybark woodland with lack of large trees (RE3.5.36b)

2.5.2 Aquatic ecology

The majority of the Project site is located within the local catchments of Coconut Creek and Tapplebang Creek. Coconut Creek and Tapplebang Creek traverse the site flowing to the south-west, and join downstream of the project site boundary, forming the Ward River. Ward River is part of the Watson River Catchment and discharges into Archer Bay. Coconut Creek and Tapplebang Creek are intermittent and although flows exist for an extended period after the wet season, only remnant pools remain by the late dry season.

The watercourses and wetlands within the Project site are deemed to be High Ecological Value (HEV) waters under the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* (Qld) because the biological integrity of the water is effectively unmodified or highly valued.

The aquatic habitats in the Project site are associated with Tapplebang Creek and Coconut Creek. Aquatic habitats are in good condition due to their generally undisturbed nature. However, Feral Pigs (*Sus scrofa*) are prevalent in the Project site and the effects of their wallowing and foraging are apparent along creeks and drainage features (Aurukun Bauxite Project EIS 2023).

2.6 Approval status of the Project

The proposed action of the Project has been assessed as a controlled action by the Australian Government (EPBC/2020/8624). The Project will require assessment and approved under the EPBC Act before it can proceed.

The Project's EIS (under the EP Act) will assess the potential impacts of the Project on the controlling provisions as an accredited assessment process under Part 8 of the EPBC Act.

3 Environmental impact assessments

3.1 Ecological studies

Extensive ecology surveys have been conducted over numerous years and seasons from Early Dry Season of 2018 to Early Dry Season of 2021, and then supplementary targeted surveys for threatened species have been completed in 2022. The surveys have included:

- vegetation community surveys (including mapping of regional ecosystems (REs))
- threatened flora and fauna surveys, including elliot traps, pitfall traps, camera traps, active searches, anabat, bird surveys and spotlighting
- electrofishing, baited traps and netting in aquatic settings.

Survey methods and effort were designed to comply with applicable survey guidelines for the identified target species with additional targeted surveys designed based on expert guidance and the most up to date literature such as for the Palm Cockatoo (Australian) (*Probosciger aterrimus macgillivrayi*). Survey efforts and timing are summarised in Chapter 8 -Terrestrial Ecology, Chapter 9 – Aquatic Ecology and Chapter 11 - MNES of the Project's EIS (Aurukun Bauxite Project EIS 2023).

A number of technical studies were undertaken as part of the EIS to assess the potential impacts of the Project on prescribed matters that may require offsets. These included:

- Terrestrial Ecology Assessment, undertaken by Ecological Survey and Management and documented in the EIS Terrestrial Ecology Assessment Report (Appendix L of the Aurukun Bauxite Project EIS 2023)
- Aquatic Ecology Assessment, undertaken by C&R Consulting and documented in the EIS Aquatic Ecology Assessment Report (Appendix M of the Aurukun Bauxite Project EIS 2023)
- Marine Assessment, undertaken by BMT Commercial Australia Pty Ltd and documented in the EIS Marine Assessment Report (Appendix O of the Aurukun Bauxite Project EIS 2023)
- Wildlife Lighting Impact Assessment, undertaken by Pendoley Environmental Pty Ltd and documented in the EIS Wildlife Lighting Impact Assessment Report (Appendix P of the Aurukun Bauxite Project EIS 2023)
- Acoustic surveys conducted for the Northern Masked Owl and Cape York Rufous Owl undertaken by Adaptive NRM Pty Ltd (Adaptive NRM 2023) (incorporated into Appendix L of the Aurukun Bauxite Project EIS 2023)
- Targeted surveys for Palm Cockatoo assessing habitat use including breeding and foraging areas, undertaken by Ecotone (Appendix L2 of the Aurukun Bauxite Project EIS 2023). These surveys included walking transect lines up to 1,500m from project watercourses at 100m spacings therefore were also good for identifying nests for Red Goshawk.

3.2 Survey results

Survey results from the above studies that are relevant to MNES and MSES are outlined below.

3.2.1 Terrestrial flora

A total of 486 flora species were recorded in the study area during the flora field surveys undertaken as part of the EIS Terrestrial Ecology Assessment. No threatened flora species under the NC Act or EPBC Act have been observed during seasonal ecology surveys, and the species identified through desktop searches are considered unlikely to occur. This determination was based on several factors including a lack of suitable habitat in (or in proximity to) the terrestrial ecology study area, the location, extent and timing of targeted threatened flora surveys undertaken and/or the lack of nearby records.

High risk trigger areas as defined and mapped under *Nature Conservation (Plants) Regulation 2020* for protected plants were extensively surveyed and it was noted essential habitat for the Cooktown Orchid (*Dendrobium bigibbum*) occurred just north of the study area. Flora surveys were conducted during the flowering period and did not record the Cooktown Orchid or other threatened flora species.

3.2.2 Terrestrial fauna

A total of 182 native fauna species were recorded during the fauna survey undertaken as part of the EIS Terrestrial Ecology Assessment, comprising 101 species of birds, 31 species of mammals, 34 species of reptiles, and 16 species of amphibians.

Desktop searches indicated that 15 fauna species listed as threatened under the EPBC Act potentially occur in the study area. Of these, three threatened fauna species listed under the EPBC Act have been observed in the study area which are:

- Palm cockatoo (Australian) (*Probosciger aterrimus macgillivrayi*)
- Red Goshawk (*Erythrotriorchis radiatus*)
- Black-footed Tree-rat (north Qld) (*Mesembriomys gouldii rattoides*).

Observations of threatened fauna species in the study area and associated habitats are shown in Appendix E.2. A likelihood of occurrence assessment was undertaken for the remaining species as part of the EIS Terrestrial Ecology Assessment. This assessment concluded that two additional threatened fauna species have not been recorded but are considered to have a moderate or high likelihood of occurring, those being:

- White-throated Needle-tail (*Hirundapus caudacutus*)
- Masked owl (northern) (*Tyto novaehollandiae kimberli*).

Assessments of significance have been undertaken for these species in accordance with the *Commonwealth Matters of National Environmental Significance significant impact guidelines 1.1* (Department of the Environment 2013). The significance assessment for the species found to be present or assessed to have a moderate or high likelihood of occurrence concluded that the project was unlikely to cause a significant impact to the White-throated Needle-tail but has the potential to result in a significant, residual impact on the remaining species. The habitats associated with these threatened species on-site are discussed below.

The Rufous Owl (*Ninox rufa meesi*) (Cape York subspecies) listed as Near Threatened under NC Act and Short-beaked Echidna (*Tachyglossus aculeatus*) listed as Special Least Concern under NC Act were also recorded. Offsets are not required for Near Threatened species, while an assessment of the significance of impacts to the Short-beaked Echidna concluded that the Project is unlikely to have a significant impact on the species.

3.2.3 Terrestrial migratory

Desktop searches indicated that 17 fauna species listed as migratory under the EPBC Act potentially occur within the terrestrial ecology study area. Of these, the following migratory species were recorded during the field surveys:

- Eastern Osprey (*Pandion haliaetus*)
- Oriental Cuckoo (*Coccyus optatus*)
- Satin Flycatcher (*Myiagra cyanoleuca*)
- Spectacled Monarch (*Symposiachrus trivirgatus*).

An additional four migratory species are considered to have a moderate or high likelihood of occurring being:

- Black-faced Monarch (*Monarcha trivirgatus*)
- Glossy Ibis (*Plegadis falcinellus*)
- Rufous Fantail (*Rhipidura rufifrons*)
- Fork-tailed Swift (*Apus pacificus*).

The Referral Guideline for 14 Migratory Species¹ has been used to assess the potential significance of impacts to 7 of the species listed above (excepting for the Glossy Ibis). These 7 bird species are specifically listed in this guideline.

This assessment concluded that there is a low risk of significant impacts to these species. In the case of the Glossy Ibis, it was noted that its habitat in the study area is restricted to the Paperbark wetlands and sedgelands areas in the south of the ecology study area which is not within the Project site and is located approximately 1.3 km to the south-west of the direct impact footprint.

3.2.4 Aquatic

The likelihood of any threatened or migratory species identified in database searches being present in the aquatic ecology study area was assessed based on the known habitat preferences of these species, the availability and condition of habitats within the aquatic ecology study area, the results of field surveys, and nearby records.

Two threatened aquatic species were recorded or assessed as having a moderate possibility of being present in the freshwater reaches of the aquatic ecology study area. The freshwater reaches of the aquatic ecology study area are most relevant to the assessment, given that the groundwater and surface water studies concluded that the Project is not predicted to impact the downstream, estuarine reaches of the Ward River.

The Estuarine Crocodile (*Crocodylus porosus*) (listed as Migratory and Marine under the EPBC Act and Vulnerable under the NC Act) was recorded on the Project site (in both Coconut Creek and Tapplebang Creek) as well as downstream of the Project site (in the Ward River).

¹ [Referral guideline for 14 birds listed as migratory species under the EPBC Act \(dcceew.gov.au\)](https://www.dcceew.gov.au)

The Largetooth Sawfish (*Pristis pristis*) (listed as Vulnerable and Migratory under the EPBC Act and Least Concern under the NC Act) was assessed as having a moderate possibility of being present in the freshwater reaches of the Ward River (downstream of the Project site). The Largetooth Sawfish utilises flowing freshwater systems to access large permanent water bodies (preferably open, off-channel wetlands/lagoons) during times of flow to use them as a nursery area, before migrating back downstream during subsequent flow events (Peeverell 2009). The EIS Aquatic Ecology Assessment Report considers it is unlikely that it would utilise the two watercourses within the project site because of the size of the watercourses, the types of habitats available and the quality of the water present. An assessment of significance was undertaken for each of these aquatic species, in accordance with the Significant Impact Guidelines 1.1: Matters of National Environmental Significance (Department of the Environment (DotE) 2013). The assessments (provided in Section 11 - Matters of National Environmental Significance) concluded that the project is not likely to have a significant, residual impact on either species.

No additional threatened aquatic species (listed solely under Queensland legislation) were returned from database searches.

In the EIS, Section 9 – Aquatic Ecology provides a summary of the MSES within the freshwater reaches of the aquatic ecology study area. It indicates that the relevant MSES are:

- WPA or HES wetlands
- a wetland or watercourse designated as HEV waters
- protected wildlife habitat and mapped essential habitat
- waterway providing for fish passage.

The potential impacts of the Project on these MSES were assessed using Queensland SRI Guideline, with the results concluding that the Project is predicted to give rise to a significant residual impact on a watercourse designated as HEV waters. This impact relates to the reach of Tapplebang Creek within the dam lake inundation area, which extends for 10 kilometres (km). This section of the watercourse will be artificially modified, which is considered a significant impact.

3.3 MNES threatened species and associated habitats

Further description of those threatened species on which a significant, residual impact may occur is set out below.

Table 3.1 Palm Cockatoo

EPBC Act status	Vulnerable (effective 31 October 2015)
NC Act status	Endangered (effective November 2022)
Approved Conservation Advice	Threatened Species Scientific Committee (2015). Conservation Advice <i>Probosciger aterrimus macgillivrayi</i> palm cockatoo (Australian). Canberra: Department of the Environment ² .
Adopted/Made Recovery Plans	There is no adopted or made Recovery Plan for this species
Adopted/Made Threat Abatement Plans	No Threat Abatement Plan has been identified as being relevant for this species

² [Conservation Advice Probosciger aterrimus macgillivrayi \(palm cockatoo \(Australian\)\) \(environment.gov.au\)](https://www.environment.gov.au/conservation/advice/conservation-advice-probosciger-aterrimus-macgillivrayi-palm-cockatoo-australian)

Table 3.1 Palm Cockatoo

Biology/Ecology	<p>Australian Palm Cockatoos inhabit rainforest, riparian forest along watercourses and adjoining areas of Eucalyptus and Melaleuca/Banksia woodland (Treby 2005, Murphy 2006) from north of Pormpuraaw on the west coast to Saltwater Creek, Princess Charlotte Bay on the east coast (Storch 1996, Higgins 1999).</p> <p>Palm Cockatoos forage as individuals or in small flocks, and feed on seeds of woodland, littoral and closed forest tree species, either from the canopy or on the ground (Wood 1988, Storch 1996). As obligate-hollow nesters, breeding sites are selected within hollow trees, particularly <i>Eucalyptus tetradonta</i>, with large hollows required to support the regular provisioning of offspring by an adult occurring inside the cavity.</p> <p>Observations for western Cape York made by Ecotone indicate birds typically nest in Darwin Stringybark open forest to woodland within 1,500 m of riparian or rainforest vegetation (Zdenek et al. 2022), moving more widely in open woodlands in early morning and late evening, whilst taking refuge and foraging in denser riparian or rainforest vegetation and associated ecotonal areas for much of the day (Ecotone 2023).</p> <p>Palm Cockatoos require large tree hollows (>20 cm opening diameter) for breeding (Heinsohn et al. 2003, Murphy et al. 2003, Igag et al. 2019, Zdenek et al. 2022). Most Palm Cockatoo nests within the Australian population are known from live trees, predominantly Darwin Stringybark (<i>Eucalyptus tetradonta</i>), but also from other Eucalyptus, Corymbia or Melaleuca species, or from <i>Lophostemon suaveolens</i> (Storch 1996, Murphy et al. 2003, Murphy 2005).</p> <p>Foraging habitat consists of vegetation communities that contain seeds fed on by Palm Cockatoos. Palm Cockatoos are considered specialised seed eaters, with Murphy (2005) noting they predominately feed upon seeds of the fruit of Scrub Turpentine (<i>Canarium australasicum</i>) and Nonda Plum (<i>Parinari nonda</i>) trees on Cape York. Other confirmed food trees for Palm Cockatoo on Cape York include Darwin Stringybark (<i>Eucalyptus tetradonta</i>), Cocky Apple (<i>Planchonia careya</i>), Arnhem Quandong (<i>Elaeocarpus arnhemicus</i>) (Storch 1996), Black Bean (<i>Castanospermum australe</i>) (Forshaw 1973), Bushman’s Clothes-peg (<i>Grevillea glauca</i>), Milky Plum (<i>Persoonia falcata</i>), and potentially other Elaeocarpus species (Igag 2002).</p>
Project context	<p>A targeted survey for this species was undertaken by Ecotone (Appendix L2 of the EIS) which comprised more than 500 km of transects in the Project site.</p> <p>Breeding habitat on western Cape York overwhelmingly occurs within 1,500 m of riparian and alluvial vegetation along watercourses (RE3.3.9a; RE3.3.20), rainforest (RE3.3.5) or other closed forest vegetation (RE3.5.4), and within the riparian/alluvial vegetation, rainforest, or other closed forest itself. The use of the breeding habitat within the 1,500 m distance from riparian or rainforest vegetation on western Cape York, appears to be noticeably gradational, where used hollows are found in much higher density closer to the boundary between riparian/woodland habitats (Ecotone 2023). Approximately 80% of hollows selected for display or breeding may be found within the first 550 m from the riparian vegetation boundary (Ecotone 2023).</p> <p>The study area provides a high abundance of potentially suitable hollow-bearing trees for nesting. The Palm Cockatoo Habitat Survey Report (Appendix L2) identifies 518 potential hollows suitable for Palm Cockatoo in the area surveyed at a density of one potential hollow per 10 ha. The density of potential hollows was found to be consistent with surveys undertaken elsewhere on western Cape York. Therefore, sufficiently large hollows may not be a limiting factor in habitat selection by Palm Cockatoos on Cape York Peninsula where extensive intact areas of homogenous tall Darwin Stringybark woodland is available. Rather, large hollows in relative proximity to riparian/alluvial corridors is more likely to be the key driver.</p> <p>Habitat mapping for this species on the Project site and species observations are provided in Appendix E.</p>

Table 3.1 **Palm Cockatoo**

Threats	<p>The Approved Conservation Advice for this species notes the following:</p> <ul style="list-style-type: none">• Inappropriate fire regimes are a significant threat to palm cockatoos (Murphy et al. 2003)• Fire affects the stability of the rainforest/woodland ecotone and is needed to maintain recruitment of large trees with frequent, high-intensity fires are destroying nest trees directly.• Land clearing near Weipa for bauxite mining has also reduced hollow availability, and has removed small patches of rainforest feeding habitat (Gould, cited in Garnett et al. 2011).• Palm cockatoos (Australian) also experience competition from sulphur-crested cockatoos (<i>Cacatua galerita</i>) that compete for nest-trees (Heinsohn et al., 2003) and have increased over the last 2 decades around Weipa (Gould, cited in Garnett et al. 2011).
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Table 3.2 Red Goshawk

EPBC Act status	Endangered (effective 31 March 2023)
NC Act status	Endangered (effective November 2022)
Approved Conservation Advice	Department of Climate Change, Energy, the Environment and Water (2023). Conservation Advice for <i>Erythrotriorchis radiatus</i> (red goshawk). Canberra: Department of Climate Change, Energy, the Environment and Water ³ .
Adopted/Made Recovery Plans	Department of Environment and Resource Management (2012). National recovery plan for the red goshawk <i>Erythrotriorchis radiatus</i> . Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra. Queensland Department of Environment and Resource Management, Brisbane ⁴ .
Adopted/Made Threat Abatement Plans	No Threat Abatement Plan has been identified as being relevant for this species
Biology/Ecology	<p>Red goshawks are currently known to breed from the Kimberley, east to Cape York Peninsula, and on the Tiwi Islands (MacColl et al. 2021).</p> <p>The species inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests (Marchant & Higgins 1993). Resident pairs of red goshawks prefer intact, extensive woodlands and forests with a mosaic of open vegetation types that are suitable for fast manoeuvring flight (Marchant & Higgins 1993). Favoured areas appear to contain permanent water, as they are relatively fertile and biologically rich, and support large populations of bird prey species and more likely to have nesting trees.</p> <p>Red goshawks hunt live prey with medium to large sized birds making up 95% of the species' diet, although they also take mammals, reptiles and insects (Czechura & Hobson 2000).</p> <p>Breeding pairs of red goshawks maintain the same territories (including nest sites) year after year (Hollands 1984; Aumann & Baker-Gabb 1991). Red goshawks typically breed in nests they build in tall trees >20 m (range 18.5–40.5 m) with an open limb and canopy structure (Aumann & Baker-Gabb 1991; Debus 2017). These trees commonly occur in proximity to, or along, a watercourse or wetland (Debus 2017). A basket-shaped nest of sticks (approximately 0.5–1.2 m across) is constructed by the male, in which the female lays 1–2 eggs (Aumann & Baker-Gabb 1991). The female incubates the eggs for 39–43 days (Debus et al. 2015).</p> <p>The previous Approved Conservation Advice (2015) described stick nests, in which 1–2 eggs are laid, as being restricted to trees that are taller than 20 m and within 1 km of a watercourse or wetland (Aumann & Baker-Gabb, 1991). The more recent Approved Conservation Advice (2023) describes breeding habitat as areas with large, tall trees (>14 m) within proximity to a watercourse (within 2.5 km), that occur within foraging habitat.</p> <p>Due to a small population size, all foraging and breeding habitat is considered critical to the survival of the species. Red goshawks naturally occur at low densities and require tracts of relatively intact and biodiverse land for hunting and nesting.</p>

³ [Conservation advice Erythrotriorchis radiatus \(red goshawk\) \(environment.gov.au\)](https://environment.gov.au)

⁴ [National recovery plan for the red goshawk \(Erythrotriorchis radiatus\) - DCCEEW](#)

Table 3.2 **Red Goshawk**

Project Context

Red goshawks are currently known to breed from the Kimberley, east to Cape York Peninsula, and on the Tiwi Islands (MacColl et al. 2021). The species therefore has wide distribution across Cape York including western Cape York where the Project is situated. The Gulf Plains bioregion, formerly viewed as a dispersal barrier, is now considered readily traversable (MacColl et al. 2021). The satellite-tracked adults and juveniles from Queensland and the Northern Territory also soared to higher than 1000 m, suggesting the Tiwi Islands population is unlikely to be isolated by the narrow water barrier to the mainland (~27 km) (MacColl et al. 2021).

This species was recorded as part of bird surveys and incidentally, at four locations in the ecology study area during seasonal and targeted surveys for Palm Cockatoo, in Eucalyptus and Corymbia woodland to tall woodland and Swamp Box fringing forest. It was recorded on a number of occasions at the Tapplebang Creek location. No Red Goshawk nests were identified in the ecology survey area during the surveys despite the extensive surveys undertaken between 2018 and 2022, including during Ecotone’s targeted traverse surveys (which involved walking transect lines up to 1500m from project watercourses at 100 m spacing (based on the distance from the centreline at which Palm Cockatoo hollows and the nests of other target species can be reliably seen (i.e. 50 m) (Ecotone Flora Fauna Consultants 2023)) and including all areas proposed to be cleared for permanent infrastructure.

This species was also recorded at two locations along the Ward River downstream of the terrestrial ecology study area.

All remnant habitats in the terrestrial ecology study area are considered to provide either potential breeding/nesting, hunting/foraging and/or dispersal habitat for this species (i.e. ‘coastal and sub-coastal tall open forests and woodlands’). Within the project site, this includes Eucalyptus and Corymbia woodland to tall woodland, Swamp Box fringing forest, Mixed foredune complex and Paperbark woodland and sedgeland due to the extensive remnant coverage of these structurally suitable communities, availability of tall trees and riparian forests.

However, communities within approximately 2.5 km of persistent water features within the terrestrial ecology study area, are likely to be preferred as breeding/nesting habitat.

Habitat mapping for this species on the Project site and species observations are provided in Appendix E.

Threats

The Approved Conservation Advice for this species notes the following:

- Habitat loss is the biggest threat to the species (ACF 2020; MacColl et al. 2021). Red goshawk foraging and breeding habitat have been impacted by the historic and ongoing clearing and fragmentation of native forests and woodlands for agriculture, forestry, mining and urbanisation.
- Native tree and shrub seedlings are highly susceptible to domestic livestock grazing. This can lead to a reduction or removal of understorey habitat which can reduce the abundance of red goshawk prey.
- Inappropriate fire regimes on mainland northern Australia may have changed habitat structure, impacting the availability of the red goshawk’s prey species (MacColl et al. 2021).
 - Reduced fire frequencies (for example, due to loss of cultural burning or inappropriate burning seasonality) has led to vegetation thickening across some parts of the savannahs of the species’ range mostly within Cape York Peninsula, which would likely impede the species’ ability to forage.
 - Conversely, too intense fires can also destroy nesting trees and/or reduce breeding success as nests can be abandoned or nestlings killed in the nest by fires that scorch the canopy.

Table 3.3 Black-footed tree rat (north Queensland)

EPBC Act status	Vulnerable (effective 26 June 2015)
NC Act status	Least concern (effective November 2022)
Approved Conservation Advice	Threatened Species Scientific Committee (2015). Conservation Advice <i>Mesembriomys gouldii rattoides</i> Black-footed tree-rat (north Queensland). Canberra: Department of the Environment.
Adopted/Made Recovery Plans	There is no adopted or made Recovery Plan for this species
Adopted/Made Threat Abatement Plans	No Threat Abatement Plan has been identified as being relevant for this species
Biology/Ecology	<p>This is a large, nocturnal, solitary rodent, known to occupy eucalypt forests and woodlands particularly where hollow abundance is high and, although it is known from margins of eucalypt and rainforests, it tends not to use rainforest habitats (TSSC 2015b). Typical habitat has been described as ‘lowland open forests and woodland dominated by Darwin Woollybutt (<i>Eucalyptus miniata</i>) and/or Darwin Stringybark, particularly where these forests have a relatively dense shrubby understory’ (Woinarski and Burbidge 2016). It shelters and dens predominantly in hollows and sometimes in the dense foliage of <i>Pandanus</i> species.</p> <p>Habitat critical to the survival of this species (in accordance with the Commonwealth Significant Impact Guidelines) is not defined by DCCEEW.</p> <p>It feeds from the ground and in trees, on fruit (particularly <i>Pandanus</i> spp.), seeds, insects, flowers and grass. The species’ home range is up to 60-70 ha (Woinarski and Burbidge 2016). Little is known about the breeding characteristics of the species, although, it is thought to breed throughout the year, peaking in August–September (TSSC 2015b).</p>
Project context	<p>The Black-footed Tree-rat was recorded at one location in the terrestrial ecology study area in Swamp Box fringing forest on Tapplebang Creek, by identifiable remains, as part of seasonal surveys for this project and another individual was also captured on infrared camera in <i>Eucalyptus</i> and <i>Corymbia</i> woodland to tall woodland.</p> <p>Suitable habitat for this species in the terrestrial ecology study area in the form of all remnant habitats (i.e. <i>Eucalyptus</i> and <i>Corymbia</i> woodland to tall woodland, Swamp Box fringing forest, Mixed foredune complex and Paperbark woodland and sedgeland), although the Swamp Box fringing forest may be preferred due to its structural diversity. General tree hollow transects (section 4.3.1.) indicate an average density of ~19 hollows per hectare of varying sizes across the ecological study area.</p> <p>Observations and habitat for this species on the Project site are displayed in Appendix E.2.</p>
Threats	<p>The Approved Conservation Advice for this species notes the following:</p> <ul style="list-style-type: none"> • There is little information available about the ecology of the black-footed tree rat (north Queensland). • Threat factors with ‘severe’ consequence rating are listed as inappropriate fire regimes, predation by feral cats and habitat loss/fragmentation. • Inappropriate fire regimes are likely causal factor in decline (Winter & Atherton 1985) • A moderate consequence of habitat change due to exotic invasive grasses which will change the ability of this species to forage effectively on the ground and result in fires that are more intense.

Table 3.4 Masked owl (northern)

EPBC Act status	Vulnerable (effective 16 July 2000)
NC Act status	Vulnerable (effective November 2022)
Approved Conservation Advice	Threatened Species Scientific Committee (2015). Conservation Advice <i>Tyto novaehollandiae kimberli</i> masked owl (northern). Canberra: Department of the Environment ⁵ .
Adopted/Made Recovery Plans	There is no adopted or made Recovery Plan for this species
Adopted/Made Threat Abatement Plans	Department of Sustainability, Environment, Water, Population and Communities (2012). Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses. Department of Sustainability, Environment, Water, Population and Communities ⁶ .
Biology/Ecology	<p>The species has been recorded in riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves and on the margins of sugar cane fields. The species hunts in open woodland and 'feeds on small to medium-sized terrestrial mammals' (DAWE 2020c). Habitat critical to the survival of this species (in accordance with the Commonwealth Significant Impact Guidelines) is not defined by DCCEEW.</p> <p>There is a lack of evidence of this species occupying the ecology study area despite using contemporary industry-accepted methods, i.e. the deployment of ARUs with a reasonable sample size across the ecology study area. However, potentially suitable habitat is present on western Cape York Peninsula and survey effort using appropriate contemporary techniques (ARUs) has been lacking on western Cape York Peninsula generally.</p> <p>The ecological study area comprises of 26,429 hectares of habitat for masked Owl (Figure x). Potentially suitable roosting habitat is mapped as Swamp Box fringing forest (317 hectares) and the remaining remnant Eucalyptus and Corymbia woodland to tall woodland, Mixed foredune complex and Paperbark woodlands and sedgelands, provide potentially suitable foraging, breeding/nesting and dispersal habitat (25,825.9 ha). These habitats within 2.5 km of roosting habitat are likely to be preferred by this species in the ecology study area and equate to 20,711.9 ha.</p> <p>The tree hollow transects undertaken in the ecology study area indicate hollow habitat availability (at densities of ~19/ha), of varying size, for potential Masked Owl nesting activities across the ecology study area, including densities of approximately 13.5 medium (10-20 cm diameter) and large hollows (>20 cm diameter) per hectare. The overall hollow density is probably comparable with other similar habitats on the western side of Cape York Peninsula.</p> <p>The Masked Owl nests in large hollows in large trees, usually Eucalypts, and usually within closed forest (DAWE 2020c). Breeding pairs are thought to occupy permanent home ranges but may concentrate use in smaller portions of these home ranges at different times. Reported home ranges vary in size from approximately 500 ha to more than 1,000 ha, and is thought to be influenced by location, prey availability, seasonal conditions, habitat, and disturbance, although birds or pairs may primarily stay within a smaller area of the home range (Higgins, 1999). Breeding is potentially at any time of year, although may not breed every year.</p>
Project context	Potentially suitable riparian and open forest habitat as described in the Commonwealth Government SPRAT profile for this species (DCCEEW 2023c), occurs throughout the ecology study area. It is noted that only one of the REs occurring within the ecology study area, RE 3.7.4, was identified as a primary RE associated with Masked Owl records on Cape York Peninsula by Jackett et. al. in a review of vegetation associated with records of the Masked Owl in north-eastern Queensland, although Clarkson's Bloodwood (<i>Corymbia clarksoniana</i>), Darwin

⁵ [Conservation Advice *Tyto novaehollandiae kimberli* \(environment.gov.au\)](https://www.environment.gov.au/conservation-advice/tyto-novaehollandiae-kimberli)

⁶ [Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses - DCCEEW](#)

Table 3.4 Masked owl (northern)

Stringybark (*Eucalyptus tetradonta*) and New Guinea Bloodwood (*Corymbia novoguineensis*) were regionally dominant in the Cape York Peninsula region where Masked Owls were present (Jackett et al. 2020). These vegetation species are also dominant or common within the ecology study area.

While all remnant communities are likely to provide suitable habitat for foraging and nesting, roosting or refuge habitat is likely to comprise denser vegetation assemblages that provide cover and milder microclimates during the day (Jackett pers. comm. March 2023). Within the ecology study area suitable roosting or refugial habitat would include Swamp Box fringing forest associated with Coconut and Tapplebang Creeks, the tributary of Norman Creek and the Ward River. It is also predicted that due to the importance of the riparian roosting habitats, night time foraging activities would likely occur within approximately 2.5 km of this roosting habitat, and nesting activities of this species likely to occur closer (Jackett pers. comm. March 2023).

It should be noted however, that this species was not recorded in the ecology study area despite an intensive targeted survey effort in habitats likely to provide the most suitable roosting opportunities for this species in the ecology study area. It is considered that any Masked Owl using the roosting habitat and foraging in adjacent habitats would have been detected while the ARUs were deployed, if the species had been present. This is because the majority of ARUs were closely spaced (i.e. ~800 m apart), operating for extended consecutive nights along the length of potential roosting habitats in the ecology study area. Potential detection distance for the AudioMoths deployed is not specifically known, however, similar devices have a conservative detection distance of upwards of 200 m, and up to 800 m in good ambient conditions. It is therefore reasonable to predict conservative detection distances of 200-250 m for the AudioMoths used in this study (Jackett pers. comm. March 2023). These results suggest that the Masked Owl is not using roosting habitats in the ecology study area at present.

Potential habitat for this species on the Project site is mapped in Appendix E.

Threats

The Approved Conservation Advice for this species notes the following:

- The reason for the decline and low density of masked owls in northern Australia is unclear.
- The subspecies has undoubtedly been affected by broad-scale changes to the environment of northern Australia caused by altered fire regimes, grazing by livestock and feral animals, and the invasion of native woodlands by exotic plants, particularly introduced pasture grasses (Woinarski 2004).
- The most likely cause of declines is a shortage of food, as small and medium-sized native mammals are becoming increasingly uncommon across much of northern Australia.
- The current regime of more intense, frequent and extensive fires may also reduce the availability of the large trees and hollows (Williams et al. 1999) required for nesting.

3.4 Impact Area description

The landscape within and surrounding the Project site is intact, providing regional connectivity with the surrounding landscape. Darwin Stringybark (*Eucalyptus tetradonta*) woodlands form a predominant community throughout the landscape, with greater diversity of vegetation assemblages observable around riverine, creek or coastal features. The riparian corridors along each of the waterways in the Project site are currently subject to frequent, and sometimes intense fires such as was observed during the 2022 late dry season, with the fringing vegetation often burnt to within the immediate edge of the creek bank. This burning regime effectively reduces the riparian vegetation to the minimum width possible in many instances.

Weed diversity and abundance is relatively low within the Project site. Weeds occur predominantly along Amban Road and the abandoned airstrip along Amban Road. Several feral animal species have been observed within the Project site, including Cane Toads (*Rhinella marina*), Feral Cats (*Felis catus*) and Feral Pigs (*Sus scrofa*) (see Photograph 3.1). Camera trap results indicate an abundance of Feral Cats in the terrestrial ecology study area, which would increase predation pressure on threatened species such as Black-footed tree rat and small mammals which are food source for Masked Owl (EcoSM 2023).

Fauna habitats throughout the terrestrial ecology study area were typically found to be in moderate to good condition. However, habitats were observed to be influenced by a frequent and intensive fire regime, and by Feral Pigs wallowing and rooting in drainage features and watercourses (Aurukun Bauxite EIS 2023).

Fires are frequent in the regional area and, based on fire scar mapping, the area has had a fire occur every year for at least the past five years, including a very hot and extensive fire in September 2022. Not all areas have burnt every year, but bushfires are a frequent occurrence and fires have occurred over more than 40% of the regional area every year from 2018 to 2022 (refer Figure 3.1). Fires are generally occurring in the late dry season between June and November (Northern Australia and Rangelands Fire Information 2023). Figure 3.2 shows the extensive areas burnt in 2022 and 2021.

As the dry season escalates, and vegetation cures prior to the onset of the Monsoon season, fire risk increases. At this time of year, anthropogenic causes of fire and frequency of cloud to ground lightning strikes can result in disastrous outcomes, impacting culture, livelihoods and ecosystem function. As the season dries out, thousands of square kilometres (anywhere up to three times the area impacted by the 2009 Victorian Bushfires) can burn, often extremely hot. Although it is well understood that the majority of fires in Northern Australia are grass fires, it is less understood that fires at the end of dry season have a huge impact on the canopy of vegetation, thereby having flow-on influences on the entire ecosystem (Cape York Natural Resource Management 2023).

In recent years, fires have been deliberately lit at the end of the dry season, resulting in extensive and hot bushfires covering large areas of bushland. In 2021 the Queensland Fire and Emergency Services (QFES) conducted an arson investigation in Cape York after fires burned through tens of thousands of hectares of grazing land and wildlife habitat. It was noted by the property manager of Piccaninny Plains Wildlife Reserve that these lit fires are burning trunks and branches, causing much more damage than managed grass burning. Wolverton Station and Piccaninny Plains Wildlife Reserve had about 45,000 ha burned by arson in November 2021. Piccaninny Plains is situated in the centre of Cape York Peninsula, extending from the foothills of the McIlwraith Range to the western plains of the Gulf of Carpentaria and provides habitat for threatened species included Red Goshawk.

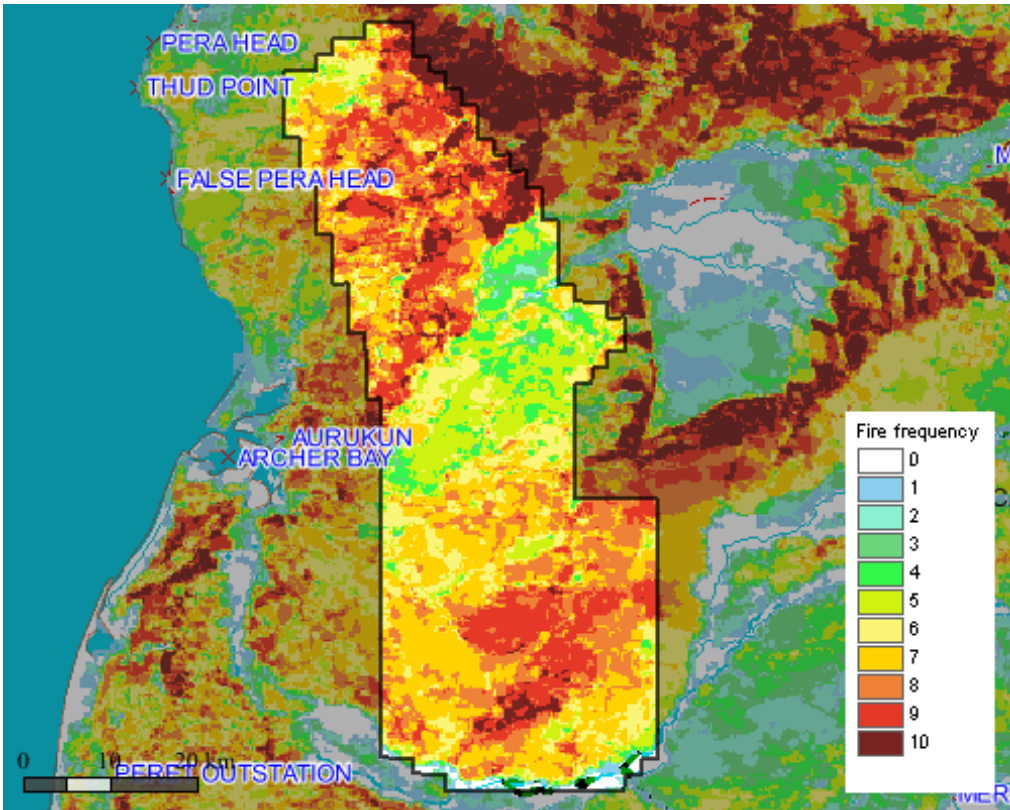


Figure 3.1 Fire Frequency (2013-2022): RA315 (Northern Australia Fire Institute)

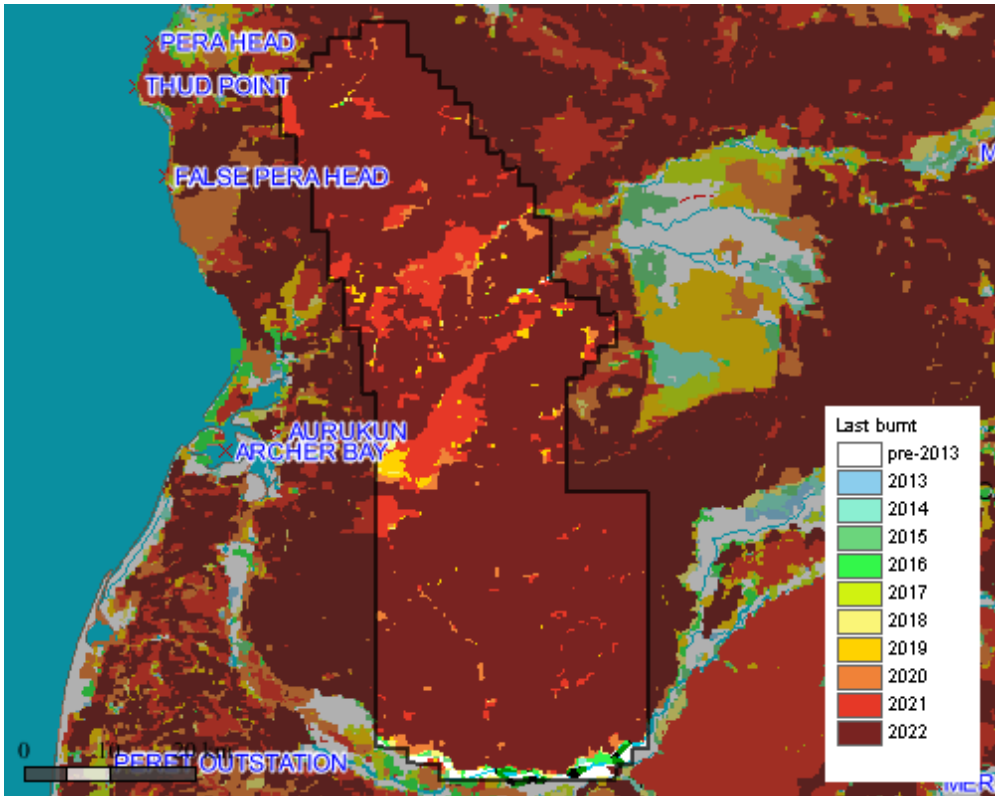


Figure 3.2 Year Last Burnt (2013-2022): RA315 (Northern Australia Fire Institute)

Given the prevalence of fire on the Project site, areas of riparian vegetation on the boundary of creeklines provide an important refuge, retaining more of their understorey layers, woody debris and large trees supporting hollows. However, what has been found on the Project site is that fires are coming up to the edge of riparian vegetation on boundary of creeklines (see Photograph 3.2). As the vegetation up to the riparian areas is being burnt more frequently this is also exposing the riparian vegetation to greater threat of being impacted by fire in future and opening them up to edge effects.

Effects of these burns are likely to be particularly detrimental to wetland, riparian and vine forest communities and the impacts of these fire events were regularly observed to the top of bank of the various watercourses and drainage features within the ecology study area (Aurukun Bauxite Project EIS 2023).

It is anticipated that over time that the continued prevalence of late season burns, which are hotter and more intense, will modify the vegetation communities in the region and are a threat to retention and abundance of hollow-bearing trees.



Photograph 3.1 Feral pigs on Project site (Glencore 2022)



Photograph 3.2 North bank of Tapplebang Creek showing burning to bank of creekline (Ecotone 2023)



Photograph 3.3 Woodland post fire in October 2022 (Glencore 2022)



Photograph 3.4 Example of woodland post fire where some large trees remain (Glencore 2022)

4 Biodiversity offset requirements

4.1 Impact on MNES

Significant impact assessments have been completed applying the *Commonwealth Matters of National Environmental Significance Significant Impact Guidelines 1.1* (Department of the Environment, 2013). For full details of MNES significant impact assessments refer to Section 11.8 of Chapter 11 of the Project EIS and Section 8.1 of Appendix L (Terrestrial Ecology Report) of the Project EIS.

These assessments concluded that the Project is likely to have a significant, residual impact on the following threatened species listed under the EPBC Act:

- Palm Cockatoo
- Red Goshawk
- Black-footed Tree-rat
- Masked Owl.

Where a proposed action is likely to have a significant, residual impact on a threatened species, the *Offset Assessment Guide* (Department of the Environment, 2012) is applied in order to assess the suitability of offset proposals prepared to meet the Commonwealth Government's EPBC Act *Environmental Offsets Policy* (Department of Environment, 2012).

A summary of impacts on MNES that require offset is set out in Table 4.1. The impact assessments have found that for three species there is potential for indirect impacts to occur as a result of clearing activities causing some habitat patches to become isolated and in turn potentially impact on habitat functionality for that species. The areas potentially indirectly impacted are shown in Appendix E.2.

Table 4.1 Summary of impacts on protected matters

Protected Matter	EPBC Act status	NC Act status	Habitat/Type	Habitat in the ecology study area (ha)	Direct impact (ha)	Indirect impact (ha)
Palm Cockatoo ⁷	V	E	Refuge and Foraging habitat		52.2	1.2
			Breeding and Foraging habitat	15,705	2,913	1,645.5
			Limited foraging	10,437	3,919	0
			<i>Total</i>	<i>26,143</i>	<i>6,885.1</i>	<i>1,646.7</i>
Red Goshawk	E	E	Breeding and Foraging	21,028.9	5,265.4	1,896
			Additional Foraging	5,114	1,619.7	0
Black-footed Tree-rat	V	-	Breeding and Foraging	26,142.9	6,885.1	0
Masked Owl	V	V	Preferred roosting	317	47.8	0
			Foraging / Breeding / Roosting (2.5 km from roosting)	20,711.9	5,217.7	1,896
			Additional Foraging / Breeding / Roosting	5,114	1,619.6	0

⁷ Refer to Appendix L2 of the Project's EIS for description of the habitat zones for this species.

4.2 Impact on MSES

Significant impact assessments have been completed applying the *Queensland Significant Residual Impact Guideline* (Department of Environment and Heritage Protection, 2014). For full details of MSES significant impact assessments, refer to Chapter 8 (Terrestrial Ecology) and Chapter 9 (Aquatic Ecology) of the Project's EIS.

The Queensland *Environmental Offsets Act* does not apply to impacts on MSES that are dual-listed and have been assessed under the EPBC Act. Accordingly, the MSES identified as likely to result in a significant residual impact from the Project, requiring offset under State framework, are the following:

- regulated watercourse vegetation (i.e. remnant REs that occur within certain distances of a relevant stream order)
- HEV waters.

A summary of all MSES and those found to have a significant, residual impact are set out in Table 4.2.

Under Queensland's environmental offsets framework, where a prescribed activity will have a significant residual impact on a prescribed environmental outcome (after the taking of all reasonable avoidance and mitigation measures), an environmental offset may be required where an offset is determined to be a suitable outcome.

Table 4.2 Project MSES offset requirements

MSES	Description	Status NC Act/VM Act	Status EPBC Act	Total impact (ha)
Regional ecosystems				
Endangered & Of Concern REs (VM Act status)	There are no Endangered or Of Concern REs impacted			-
Essential habitat				
Rufous Owl (Cape York subspecies)	Tapplebang Creek in the Project site is identified on Queensland government essential habitat mapping (Version 10.0) as supporting essential habitat for this species.	Near Threatened	-	Near threatened species are not required to be offset under EO Act.
Estuarine Crocodile	Vegetation within the Product Bauxite Transport Corridor is identified on Queensland government mapping as supporting essential habitat for the Estuarine Crocodile.	Vulnerable	Marine/Migratory	No significant impact was found to occur.
Eastern Curlew	Essential habitat for the species is mapped along coastline directly adjacent to the Product Bauxite Transport Corridor.	Endangered	Critically endangered Marine/Migratory	No significant impact was found to occur.
HEV Waters and Watercourse vegetation				
Remnant vegetation that intersects with mapped vegetation management wetland	No vegetation management wetlands occur in the Project study area.			-
Wetland Protection Area or High Ecological Significance (HES) wetland	No wetlands of HES occur in Project study area.			-
Wetland or watercourse in High Ecological Value waters (HEV waters)	The project is likely to have a significant impact on HEV waters in Tapplebang Creek. The impact relates to construction of Tapplebang Dam, which will artificially modify the types of aquatic habitat present in the dam lake area in the upstream reaches of Tapplebang Creek.	-	-	10 km of stream order 3
Watercourse vegetation	RE3.3.20b Stream Order 1	Least concern		0.32
	RE3.3.20b Stream Order 3	Least concern	-	1.13
	RE3.3.9a Stream Order 1	Least concern	-	0.41
	RE3.3.9a Stream Order 3	Least concern	-	39.44
	RE3.3.9b Stream Order 1	Least concern		0.07

Table 4.2 Project MSES offset requirements

MSES	Description	Status NC Act/VM Act	Status EPBC Act	Total impact (ha)
	RE3.3.9b Stream Order 3	Least concern		6.96
	RE3.5.36b Stream Order 1	Least concern		4.08
	RE3.5.36b Stream Order 3	Least concern		59.47
			Total	111.88
Strategic Environmental Area				
Strategic Environmental Area	No SEA present in Project study area			-
Protected wildlife habitat – Species habitat impacts are being offset as MNES				
Palm Cockatoo	Foraging and breeding habitat	Endange red	Vulnerable	8,531.8
Red Goshawk	Foraging and breeding habitat	Endange red	Vulnerable	8,781
Masked Owl (northern)	Foraging and breeding habitat	Vulnerab le	Vulnerable	8,781
Short-beaked Echidna	Foraging and breeding habitat	Special Least Concern	-	No significant impact was found to occur.
Fish passage				
Impacts to fish passage	A number of watercourses in Project site are mapped as providing for fish passage.	-	-	No significant impact was found to occur
Marine plants				
	No impacts to marine plants will occur as a result of project			-
Connectivity				
	DES’s Landscape Fragmentation and Connectivity Tool (LFC tool) was applied to the project clearing area. The LFC tool determined that the project would not result in a significant impact on connectivity areas.			-
Protected areas				
	There are no protected areas that will be impacted by the project.			-
High risk trigger mapping				
	Protected plant surveys were completed in high risk trigger mapping areas and more broadly. No threatened flora species were recorded.			-

Table 4.2 Project MSES offset requirements

MSES	Description	Status NC Act/VM Act	Status EPBC Act	Total impact (ha)
Legally secured offset area				
	No existing offsets occur within the Project study area			-

5 Offset delivery approach

5.1 Land based offsets

Upon assessment of the Project's MNES and MSES offset requirements, it is proposed that at least 90% of the total offset requirement will be delivered as land-based offsets. The largest component of the Project's offset requirements is the offsetting of the impact on habitat of threatened species under the EPBC Act. Within these habitats will be areas supporting MSES values including watercourse vegetation and HEV waters. This is consistent with EPBC Act Environmental Offsets Policy, *Environmental Offsets Act 2014*, and Queensland Environmental Offsets Policy (QEOP).

The land-based offsets will be located in the Cape York bioregion, in an area known to support the species and containing suitable habitats for each threatened species impacted, including the ecosystem and species function that was impacted. For example, if breeding habitat is being lost, then breeding habitat will be included in the offset. The offset will also provide for habitat quality improvements to be gained over time, and threats reduced.

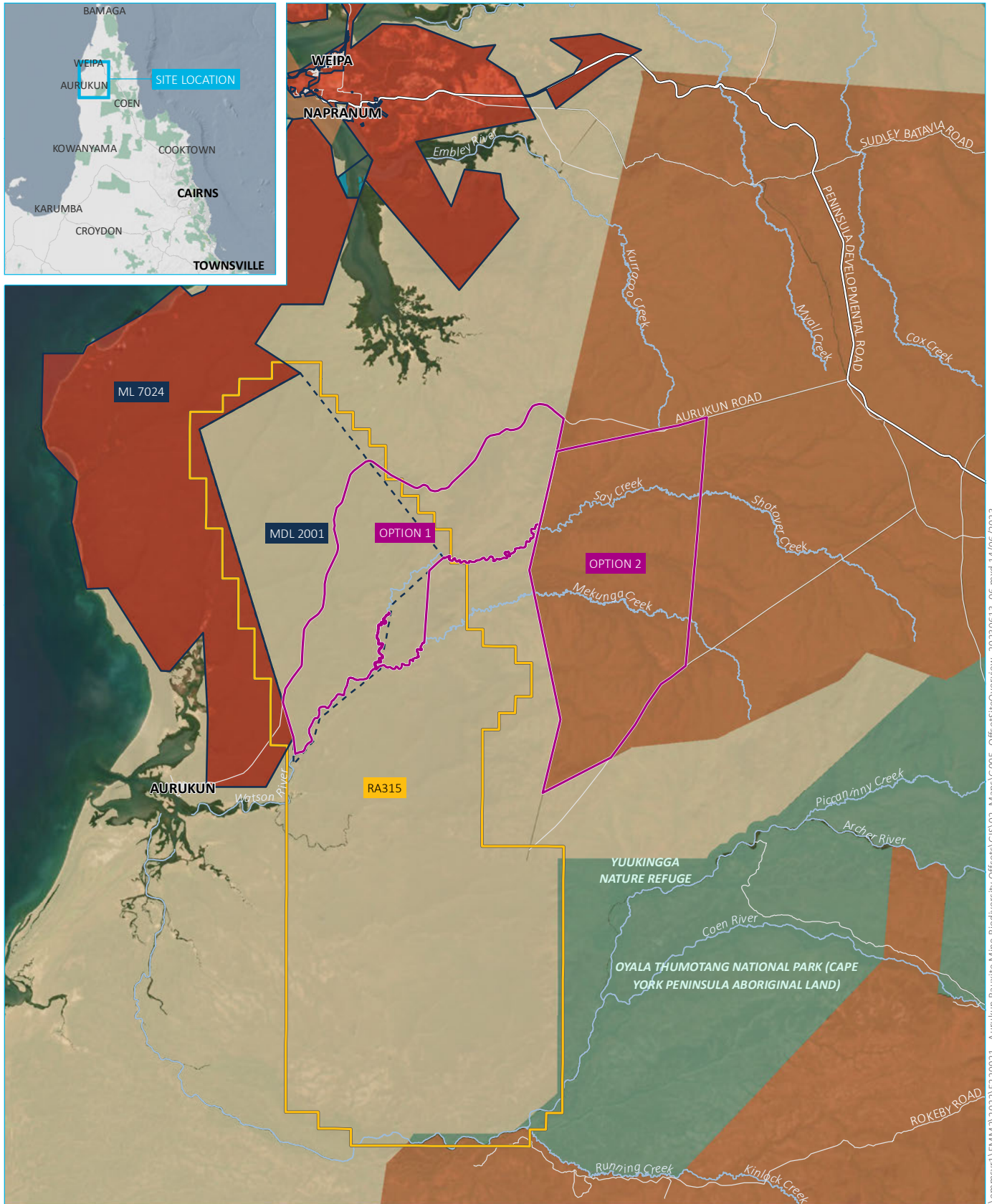
The offset land will be legally secured on title, be actively managed to improve its habitat quality, and reduce threatening processes. As Cape York is extensively covered by remnant vegetation, the offset will consist of remnant woodlands and a focus will be on habitat quality improvement and threat abatement. There is potential for the land-based offsets to be supplemented with other compensatory measures which would help in the long-term conservation of species. This is further discussed in Section 5.3.

The proponent has identified two potential offset properties (Option 1 and Option 2) for further investigation as illustrated in Figure 5.1. These lands were identified as they are:

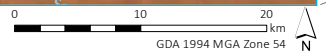
- located close to the impacted habitats of western Cape York and within known distribution of each MNES species
- based on current information, have high potential to support suitable habitat for the threatened species required to be offset and contain the MSES offset values
- subject to threatening processes (e.g. inappropriate fire regimes, feral animals, underlying resource tenements for Option 1, cattle grazing) that can be reduced
- have capacity to achieve habitat quality gains
- properties where landholders have expressed interest in providing a biodiversity offset on their land.

Further details regarding each potential offset property and the offset values they contain is summarised below. Offset calculator results for each MNES and each offset site is summarised in Section 5.2, calculators are provided in Appendix C, and calculator justifications in Appendix D. The calculator inputs are primarily based on desktop assessments. Further field assessments to support habitat quality scoring and undertake targeted surveys on the offset areas for the threatened species being offset, assessing habitat features and management actions will be completed post-project approval. Rapid assessments are proposed to be conducted during the assessment phase of the Project prior to approval, with selection of a preferred site in consultation with approval agencies.

No staging of offsets is proposed; therefore, the total extent of impacts will be offset up-front.



Source: EMM (2023); ABS (2021); DES (2022); DNRME (2022); ESRI (2022); GA (2011)



KEY

- Offset area
- Mining lease (ML 7024)
- Mineral development licence (MDL 2001)
- Restricted area (RA 315)
- Major road
- Minor road
- Major watercourse
- National park/nature reserve

- Tenure**
- Freehold
 - Lands lease
 - Mining
 - Reserve
 - Easement
 - State land

- INSET KEY**
- Major road
 - National park/nature reserve
 - State forest

**Offset area 1 and 2
in proximity to the Project**

Aurukun Bauxite Project
Biodiversity Offset Strategy
Figure 5.1



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5.1.1 Offset Area 1

The first potential offset area (Offset Area 1) is located on Lot 211 SP241404 which is held by Ngan Aak-Kunch Aboriginal Corporation, on behalf of the Wik and Wik Waya People, as Aboriginal freehold title under the AL Act. The property (i.e. Lot 211) extends across a large area between Weipa and south of Aurukun (refer Figure 5.5).

The lot is very large in size, consisting of 705,775 ha in total area and encompassing large tracts of *Eucalyptus tetradonta* woodlands, Melaleuca woodlands along creeklines, watercourses, wetlands, and lagoons. The property is known to support essential habitat for a number of threatened species, including Rufous Owl, Palm Cockatoo, Red Goshawk, Black-throated finch (white-rumped subspecies) and a number of migratory species. Biodiversity values of state significance for the property are summarised in Appendix B.

Offset Area 1 is a smaller portion of the larger property and is situated adjacent to the Project site, east of Aurukun Road and the mine site (Figure 5.1).

Current Status

Offset Area 1 is understood to be used occasionally by both Traditional Owner and other residents of Aurukun township for various activities, including hunting.

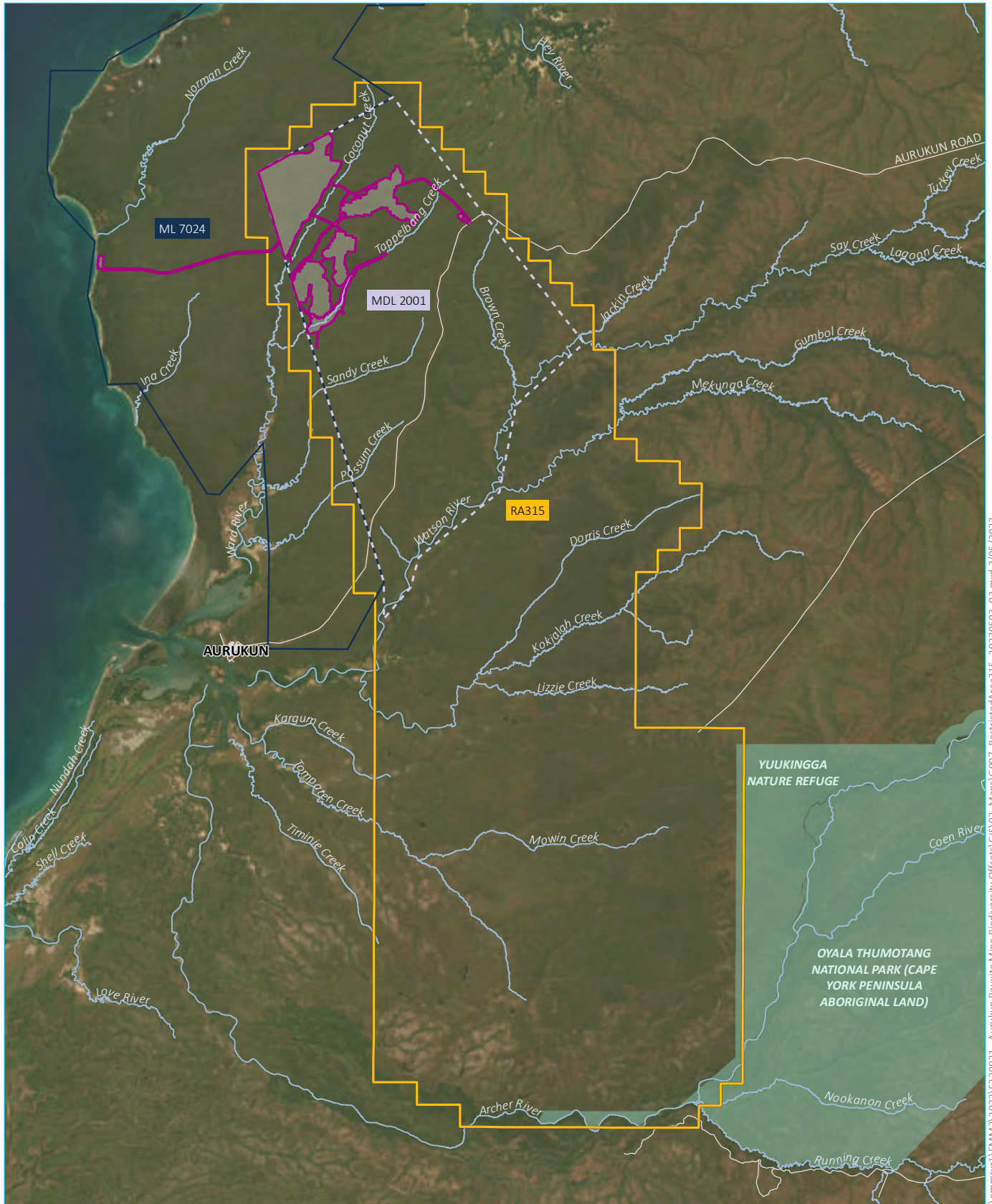
The proposed offset area is presently within MDL 2001 (a mineral development licence held by the proponent) and Restricted Area 315 (RA315) which is an area designated under the *Mineral Resources Regulation* for the protection of the Aurukun bauxite resource as shown on Figure 5.2.

Given its location on the bauxite plateau and within RA315, Offset Area 1 has a high potential for future development in connection with bauxite mining if it is not secured for conservation. There are no exploration tenements within the nominated offset area; however, there is an exploration permit for mining (EPM17836) to the north-east. EPM 17836 is held by McKay Brook Resources Pty Ltd.

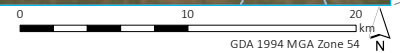
Land Management

The land owner has the ability to conduct land uses on this freehold property which are allowable under normal Queensland laws (including clearing for fencelines, firebreaks and understorey clearing). We are not presently aware of any land management practices occurring in this area (e.g. fire management, weed and feral animal control).

Fires on the property have been occurring annually and later in the dry season, making them more intense (Figure 5.3). The impact of a recent hot and extensive fire that burnt through the Project site and surrounding areas in September 2022 can be seen in Figure 5.4.



Source: EMM (2023); DES (2022); DNRME (2023); ESRI (2023)



KEY

- Impact footprint
- Mining lease (ML 7024)
- Mineral development licence (MDL 2001)
- Restricted area (RA 315)
- Minor road
- Named watercourse
- National park/nature reserve

Restricted Area 315

Aurukun Bauxite Project
Biodiversity Offset Strategy
Figure 5.2



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Figure 5.3 Fire Frequency – Late Burn (2013-2022) – Offset Area 1

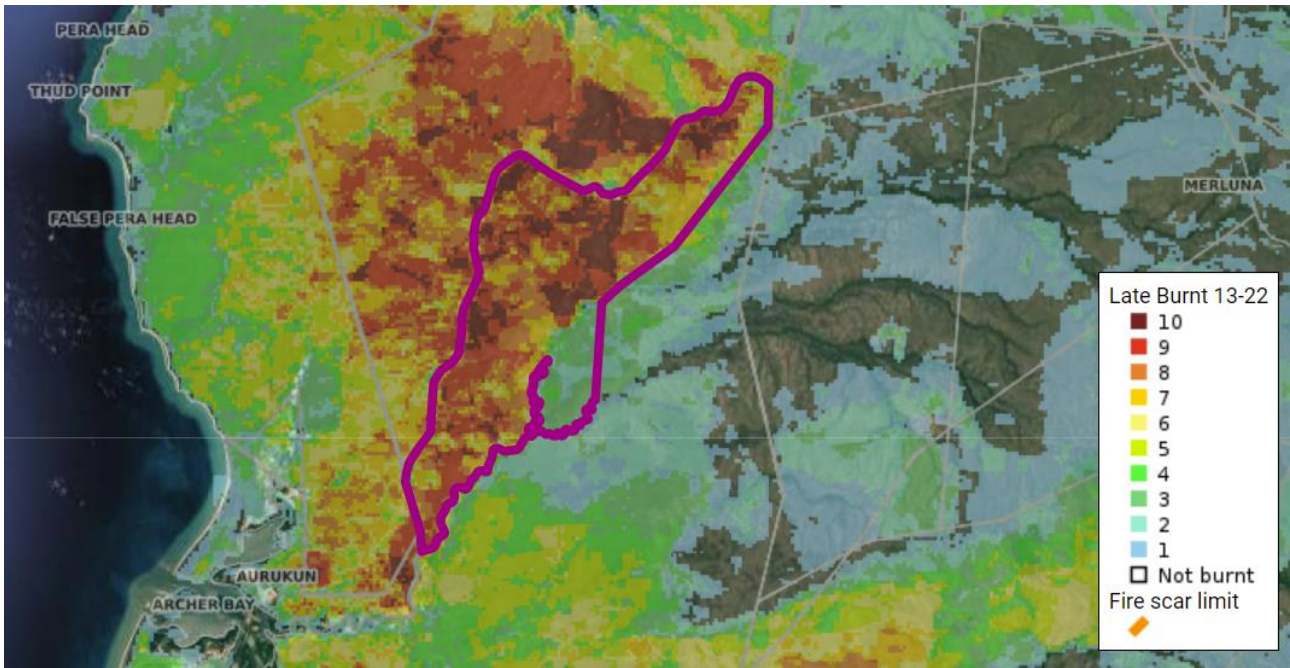


Figure 5.4 Fire Impact (September 2022) on Project site

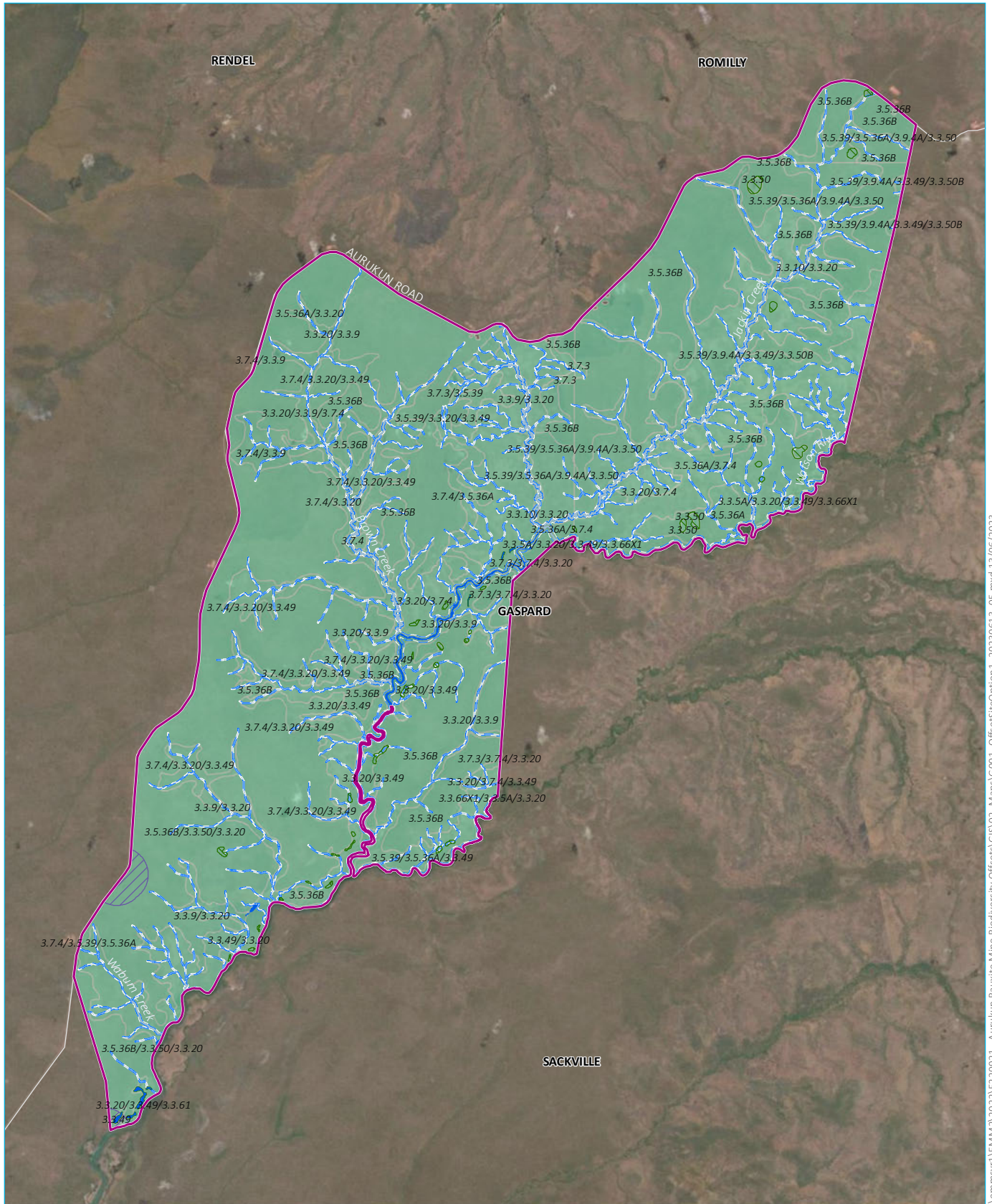


Environmental values

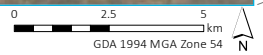
Offset Area 1 is approximately 42,500 ha and supports very similar vegetation communities, species habitats and ecological condition as the impact site. Based on regulated vegetation mapping, there is over 28,000 ha of *Eucalyptus tetradonta* and *Corymbia* woodlands, over 4,000 ha of *Corymbia* woodlands on alluvial plains, and over 8,000 ha of watercourse vegetation. Database searches for the property are provided in Appendix A.

Offset Area 1 includes a number of watercourses including Brown Creek, Wabum Creek and Watson River that support HEV waters and watercourse vegetation. It is also mapped as supporting an area of HES wetland and VM wetlands (refer Figure 5.5).

It is mapped as supporting essential habitat for Red Goshawk and Palm Cockatoo.



Source: EMM (2023); DES (2022); DNRME (2023); ESRI (2023)



KEY

- Offset area 1
- Minor road
- Watercourse
- Watercourse vegetation
- Essential habitat
- Vegetation management wetland
- High ecological significance wetland
- Regional ecosystems (VM status)
- Remnant - least concern

Offset area 1 environmental values

Aurukun Bauxite Project
Biodiversity Offset Strategy
Figure 5.



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A summary of the REs supported in Offset Area 1 and other mapped MSES values are summarised in Table 5.1 and mapped in Figure 5.5. Those highlighted in green are the same broad vegetation group as REs impacted in the Project site.

Table 5.1 Summary of values in Offset Area 1

Value	General RE description	VM Status	Area available (ha)	BVG
RE 3.3.5a	Evergreen to semi-deciduous <i>notophyll</i> vine forest.	LC	225.92	4b
RE 3.3.9	<i>Lophostemon suaveolens</i> woodlands on creeklines and swamps.	LC	280.01	22b
RE 3.3.10	<i>Melaleuca fluviatilis</i> and/or <i>Melaleuca argentea</i> woodland or <i>M. saligna</i> or <i>M. dealbata</i> woodland fringing watercourses.	LC	186.44	22c
RE 3.3.20	<i>Corymbia clarksoniana</i> or <i>C. novoguineensis</i> woodland on alluvial plains.	LC	4,251.76	9e
RE 3.3.49	<i>Melaleuca viridiflora</i> +/- <i>Corymbia clarksoniana</i> low open woodland on floodplains and alluvial plains.	LC	787.35	21a
RE 3.3.50	<i>Melaleuca</i> spp. woodland on swamps on floodplains and non-floodplain landforms.	LC	1032.76	21a
RE 3.3.61	Mixed tussock grassland and sedgeland on alluvial plains.	LC	6.57	32a
RE 3.3.65	Tussock grasslands in ephemeral lakes and lagoons	LC	0.29	34d
RE 3.3.66	Lakes and lagoons dominated by a variety of aquatic plants, frequently with fringing woodlands or sedgelands.	LC	322.6	16d
RE 3.5.36a	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland to open forest on undulating plains and remnant plateaus	LC	2,855.14	14a
RE 3.5.36b	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland to open forest on undulating plains and remnant plateaus	LC	21,756.33	14a
RE 3.5.39	<i>Eucalyptus tetradonta</i> +/- <i>Corymbia clarksoniana</i> woodland on sand plains.	LC	5,680.01	14a
RE 3.7.3	<i>Eucalyptus cullenii</i> +/- <i>E. tetradonta</i> woodland on erosional escarpments and plains.	LC	479.89	13a
RE 3.7.4	<i>Eucalyptus tetradonta</i> and <i>Corymbia stockeri</i> woodland on ironstone knolls and slopes.	LC	3,950.50	14b
Non-remnant			10.67	
HES wetland			139.12	
Vegetation management wetlands			94.67	
Essential habitat (Palm cockatoo and Red Goshawk)			202.84	
Watercourse vegetation	Stream orders ranging from stream order 1 to stream order 3 occur in the offset investigation area.		8,651.57	

5.1.2 Offset Area 2

The second potential offset area (Offset Area 2) is located on Lot 1 YK4 and is a total area of approximately 89,400 ha on crown land, held on a rolling term lease for pastoral purposes.

Current Status

Offset Area 2 is located on a property called the Watson River Station and is located to the east of the Project site, as shown in Figure 5.1. The primary land use on this property is cattle grazing, with a homestead located in the southern section of the property. The current owner of the property (Corporate Carbon) also utilises areas of the property to generate carbon credits, primarily through savanna fire management.

Various watercourses and drainage lines traverse the property, including the Watson River, Embley River, Lagoon Creek and Merkunga Creek and a number of wetlands are also present throughout the property. Several roads, including Aurukun Road, also traverse the property (refer Figure 5.3). The property is not covered by any production permits such as MLs or PLs; however, a small portion along western boundary is subject to EPM17836.

Offset Area 2 is south of Aurukun Road and is approximately 54,000 ha in area. This area was selected as it supports a number of watercourses and riparian woodlands, which are known to be an important breeding and refuge area for species being offset. The larger area provides greater flexibility as to where the final offset areas may be located, allowing future field survey results to be taken into consideration, and discussions with landowner to occur.

Land Management

The property was observed to have a more open canopy than the impact site. The property manager stated they actively manage fire and maintain firebreaks. Burns are generally timed to get cool burns or, occasionally, to be late in the season (just before the wet) if a hot fire to thin out the young regrowth vegetation is desired. Pig control is being carried out.

Environmental Values

The offset area supports similar vegetation communities and species habitats to the impact site and is mapped as supporting over 26,000 ha of *Eucalyptus tetradonta* and *Corymbia* woodlands. There is over 5,000 ha of watercourse vegetation mapped and habitat modelling by DES indicates a number of state listed species may be present (refer Appendix B).

The BVGs that are similar to the impact site are highlighted in green in Table 5.2.

In September 2022, an initial site inspection was carried out by ecologists from Eco Solutions and Management. Photos taken from the trip are shown in Photograph 5.1–Photograph 5.3. The property manager noted that Palm Cockatoos are regularly seen along the Watson River and the creeks. Evidence of Palm Cockatoos feeding along the Watson River were observed. Woodlands assessed were noted to have hollows and some of large enough size for Palm Cockatoo. As they are recorded on the property regularly, this may indicate they are breeding in the area as well.

A summary of the REs the offset area supports and other mapped MSES values are summarised in Table 5.2 and vegetation communities are illustrated in Figure 5.6.

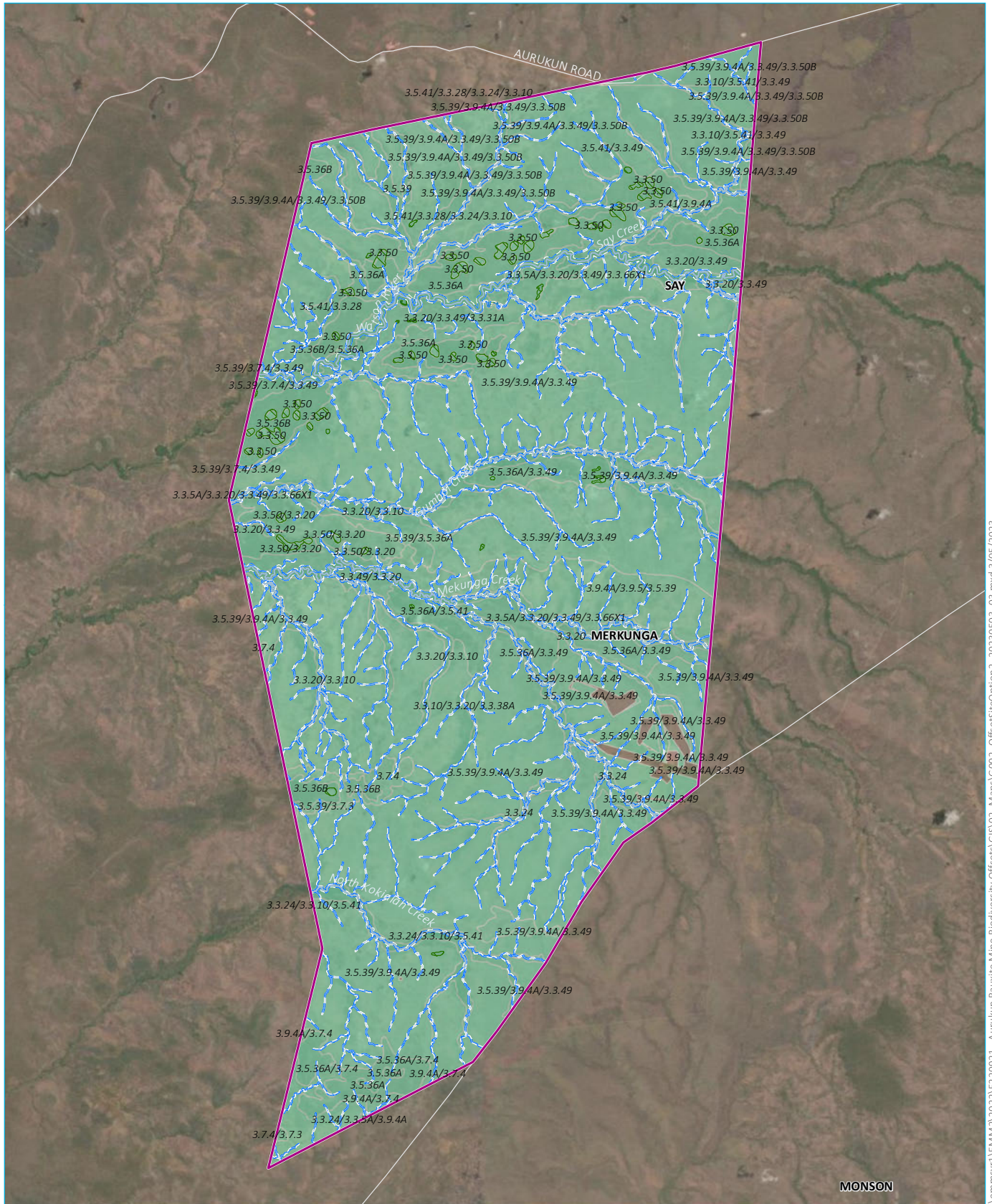
Those highlighted in green are the same broad vegetation group as REs impacted in the Project site.

Table 5.2 Summary of values in Offset Area 2

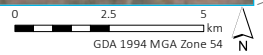
Value	General RE description	VM Status	Area available (ha)	BVG
RE 3.3.5a	Evergreen to semi-deciduous notophyll vine forest.	LC	806.72	4b
RE 3.3.10	<i>Melaleuca fluviatilis</i> and/or <i>Melaleuca argentea</i> woodland or <i>M. saligna</i> or <i>M. dealbata</i> woodland fringing watercourses.	LC	988.67	22c
RE 3.3.20	<i>Corymbia clarksoniana</i> or <i>C. novoguineensis</i> woodland on alluvial plains.	LC	3,305.39	9e
RE 3.3.24	<i>Eucalyptus leptophleba</i> +/- <i>Erythrophleum chlorostachys</i> woodland on riverine levees and alluvial plains.	LC	957.77	16b
RE 3.3.28	<i>Eucalyptus platyphylla</i> and <i>Corymbia clarksoniana</i> woodland on alluvial plains.	LC	289.2	9b
RE 3.3.31a	<i>Eucalyptus tetradonta</i> woodland +/- <i>Corymbia clarksoniana</i> +/- <i>Erythrophleum chlorostachys</i> .	LC	253.12	14b
RE 3.3.38a	Deciduous <i>notophyll</i> and/or microphyll vine thicket +/- <i>Lagerstroemia archeriana</i> on heavy clay alluvium.	LC	65.6	7b
RE 3.5.41	<i>Melaleuca viridiflora</i> +/- <i>Corymbia clarksoniana</i> woodland to low open woodland on plains.	LC	1,433.31	21a
RE 3.3.49	<i>Melaleuca viridiflora</i> +/- <i>Corymbia clarksoniana</i> low open woodland on floodplains and alluvial plains.	LC	5,090.15	21a
RE 3.3.50	<i>Melaleuca</i> spp. woodland on swamps on floodplains and non-floodplain landforms.	LC	397.35	21a
RE 3.3.50b	<i>Melaleuca</i> spp. woodland on swamps on floodplains and non-floodplain landforms	LC	348.03	21a
RE 3.3.66	Lakes and lagoons dominated by a variety of aquatic plants, frequently with fringing woodlands or sedgeland.	LC	178.87	16d
RE 3.5.36a	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland to open forest on undulating plains and remnant plateaus.	LC	3,797.64	14a
RE 3.5.36b	<i>Eucalyptus tetradonta</i> and <i>Corymbia nesophila</i> woodland to open forest on undulating plains and remnant plateaus.	LC	961.28	14a
RE 3.5.39	<i>Eucalyptus tetradonta</i> +/- <i>Corymbia clarksoniana</i> woodland on sand plains.	LC	21,519.27	14b
RE 3.7.3	<i>Eucalyptus cullenii</i> +/- <i>E. tetradonta</i> woodland on erosional escarpments and plains.	LC	83.14	13a
RE 3.7.4	<i>Eucalyptus tetradonta</i> and <i>Corymbia stockeri</i> woodland on ironstone knolls and slopes.	LC	653.02	14b
RE 3.9.4a	<i>Eucalyptus leptophleba</i> (Molloy red box) open woodland to woodland.	LC	12,448.34	18c
RE 3.9.5	<i>Corymbia papuana</i> open woodland on rolling plains.	LC	374.73	32b
Non-remnant			390.65	
HES wetland			8.96	
VM wetland			513.17	

Table 5.2 **Summary of values in Offset Area 2**

Value	General RE description	VM Status	Area available (ha)	BVG
Essential habitat			0	
Watercourse vegetation			5,253.53	



Source: EMM (2023); DES (2022); DNRME (2023); ESRI (2023)



KEY

- Offset area 2
- Minor road
- Watercourse
- Watercourse vegetation
- Vegetation management wetland
- High ecological significance wetland
- Regional ecosystems (VM status)
- Remnant - least concern

Offset area 2 environmental values

Aurukun Bauxite Project
Biodiversity Offset Strategy
Figure 5.



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Photograph 5.1 **Representative photo of woodlands**



Photograph 5.2 **Watson River where several fruits were found that Palm Cockatoo had been foraging on**



Photograph 5.3 Mekunga Creek

5.2 Legal security

The land on which an environmental offset will be delivered is required to be legally secured. Both the EPBC Act and QEOP require offset areas that are legally secured for at least the duration of the impact and once performance outcomes have been achieved.

Legal security is recognised when one of the following mechanisms are used:

- an environmental offset protection area under section 30 of the *Environmental Offsets Act 2014*
- an area declared as an area of high nature conservation value under section 19F of the *Vegetation Management Act 1999*, where it is secured for the purposes of an offset
- declared as a nature refuge under section 46 of the *Nature Conservation Act 1992*, where it is secured for the purposes of an offset
- declared as a protected area under section 29(1) of the *Nature Conservation Act 1992*, where it is secured for the purposes of an offset

- declared as a special wildlife reserve under section 43D of the *Nature Conservation Act 1992*, where it is secured for the purposes of an offset
- secured as a statutory covenant for environmental purposes under the *Land Act 1994* or *Land Title Act 1994*.

The proponent is assessing the most appropriate legal mechanism to be used. This may be dependent on the offset property chosen as a different legal instrument may be required on Aboriginal freehold land rather than a voluntary declaration or nature refuge that could be used on crown land under a rolling term lease.

5.3 Offset Area Management Plan

The MNES and MSES offset values will be co-located on one offset property. Watercourse vegetation and HEV waters for example will be a sub-set of the threatened species habitats. Both administering agencies (DCCEE and DES) will be required to sign off on the Offset Area Management Plan (OAMP) that is prepared.

It is proposed the final OAMP is approved post Project approval, and prior to Project commencement.

The intent of the OAMP will be to:

- Confirm the presence of each offset value, or high likelihood the species will be present, in the nominated offset area based on field ecology surveys
- describe and map the offset areas for each offset value including habitat function
- outline and justify starting habitat quality on the impact site and offset site for each offset value
- predict future habitat quality for each offset value based on 20 years of active management
- set out five yearly milestones for each offset value to demonstrate how final conservation outcomes can be achieved
- detail the management actions that will occur, and frequency, to result in habitat quality improvements
- outline risks and corrective actions to be implemented
- outline monitoring and reporting requirements.

A broad summary of the intended conservation outcomes for each MNES species and management actions is provided in Table 5.3.

5.3.1 Predicted conservation outcomes

Table 5.3 MNES conservation outcomes

Species	Proposed Management Actions	Desired Conservation Outcomes
Palm Cockatoo	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows suitable for Palm Cockatoo from inappropriate fire regimes including hot fires • Increasing number of large trees that will form hollows in the future • Protection of riparian vegetation communities and vine thickets which are refuge for Palm Cockatoo from hot bushfires • Improve availability of foraging resources for Palm Cockatoo from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration.
	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems
	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP
	Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of the active nest sites of Palm Cockatoo in the offset area so they can be better managed • Increase in Palm Cockatoo populations and breeding pairs utilising the offset area from year 1 to year 20 • Improved understanding of species habitat utilisation and dispersal
Red Goshawk	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Reduced likelihood Red Goshawk will abandon any existing nests by removing or reducing occurrence of hot bushfires • Protection of existing large trees that Red Goshawk may nest in from hot bushfires • Improving native species canopy cover and height through changed fire management regimes • Increasing ground cover, woody debris and species recruitment and maintaining suitable hunting grounds through changed fire management regimes • Increasing number of small and medium sized native mammals • Increase in number of large (20 m) trees from year 1 to year 20
	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Increase in number of small and medium sized native mammals • Improvement in habitat quality of ecosystems

Species	Proposed Management Actions	Desired Conservation Outcomes
	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing
	Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of any active nest sites of Red Goshawk in the offset area so they can be better managed • Improved understanding of species habitat utilisation and dispersal • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations
Black-footed Tree Rat	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration.
	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems
	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing
	Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of species habitat utilisation and dispersal • Increase in Black-footed Tree Rat populations utilising the offset area from year 1 to year 20

Species	Proposed Management Actions	Desired Conservation Outcomes
Masked Owl	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Increasing number of small and medium sized native mammals • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration.
	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems • Increasing number of small and medium sized native mammals
	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing
	Implement a species monitoring program	<ul style="list-style-type: none"> • Targeted surveys over 20 years to detect presence of species. • Confirm any active roost sites • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations

6 Offset calculators

To support an understanding of where suitable offsets can be found, and the quantum of offset area that may be needed, preliminary MNES offset calculators have been prepared for each MNES in connection with the Impact Area as well as both Offset Area 1 and Offset Area 2. These are summarised in sections below.

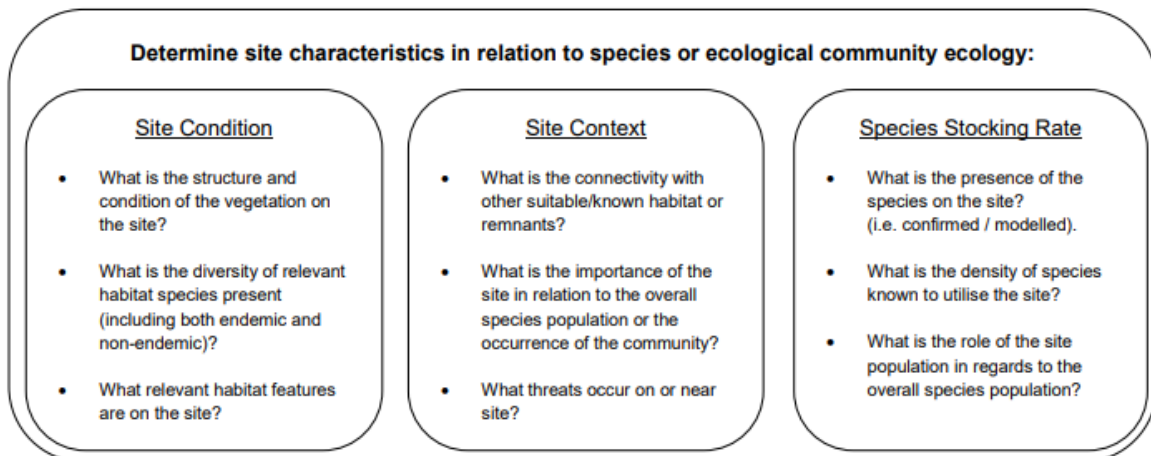
The preliminary calculators have been developed by reference to the EPBC Act *How to use the Offsets Assessment Guide* which is used to assist in determining the suitability of an offset proposal.

The quality score for an area of habitat is a measure of how well a particular site supports a particular threatened species and contributes to its ongoing viability. The habitat quality scoring system involves scores out of 10, whereby a maximum score of 10 represents a fully intact system, scores of 4, 5 and 6 may indicate good quality regrowth or medium value habitat, and a minimum score of 0 would indicate a totally cleared or uninhabitable area.

There are three components that contribute to the calculation of habitat quality:

- site condition,
- site context
- species stocking rates.

Key considerations for each component are shown in the figure below; however, the weighting given to each component is dependent on the ecological requirements of the impacted species or ecological community.



In all cases, habitat quality needs to be assessed consistently on both the impact and offset calculators of the guide. For the purposes of the preliminary calculations the following weighting was adopted:

- Site Condition (out of 4 points)
- Site Context (out of 3 points)
- Species Stocking Rates (out of 3 points).

Further habitat quality scoring is proposed to occur on the Impact Area and the selected Offset Area adopting the methodology for determining habitat quality as outlined in the *Guide to determining terrestrial habitat quality Methods for assessing habitat quality under the Queensland Environmental Offsets Policy* (DES 2020).

Targeted species surveys, habitat mapping and habitat quality scoring informed by BioCondition assessments will be completed across the proposed offset area to finalise calculators and the OAMP.

6.1 Impact Area

An assessment of habitat quality for each of the MNES species was undertaken for the Impact Area as summarised in Table 6.1 below.

Table 6.1 Impact Area: Habitat Quality – MNES species

Species	Area of habitat impacted (ha)	Habitat Quality Score				Quantum of impact
		Total Score	Site Condition	Site Context	Stocking Rate	
Palm Cockatoo	8,531.8	7/10	2/4	2/3	3/3	5,971
Red Goshawk	8,781	7/10	2/4	2/3	3/3	6,146
Black-footed Tree-rat	6,885.1	7/10	2/4	2/3	3/3	4,819
Masked Owl	8,781	5/10	2/4	2/3	1/3	4,390

A justification of each of the scores is set out for each species in Appendix D.1.

6.2 Offset Areas

An assessment of habitat quality for each of the MNES species was undertaken for each Offset Area. This assessment informs the estimation of offset area quantum required to meet the minimum percentage of impact offset.

Based on the offset calculator inputs, the required offset areas for each MNES species are summarised below, for both proposed offset areas. The full calculators for each offset area are included in Appendix C and justifications for scoring in Appendix D.2 and D.3.

Table 6.2 Offset Areas: Preliminary Calculation – MNES species

Species	Area of impact (ha)	Offset Area			Habitat quality		Risk of Loss	NPV (adj ha)	% offset
		No.	Area	Start	Future (no offset)	Future (w/offset)			
Palm Cockatoo	8,531.8	#1	34,000	7	6	8	5%	6,010	100%
		#2	38,000	7	6	8	1%	6,018	100%
Red Goshawk	8,781	#1	42,500	7	6	8	5%	7,109	101%
		#2	38,000	6	5	8	1%	6,415	104%
Black-footed Tree-rat	6,885.1	#1	28,000	7	6	8	5%	4,950	102%
		#2	24,000	5	4	7	1%	4,923	102%
Masked Owl	8,781	#1	26,000	5	4	6	5%	4,397	100%
		#2	28,000	5	4	6	1%	4,391	100%

6.3 Supplementary offset measures

The proponent is investigating the potential to utilise up to 10% of the offset package being a supplementary measure or mix of measures. This may be compensatory measures which are actions that do not directly offset the impacts on the protected matter but are anticipated to lead to benefits for the impacted protected matter.

Assessments and consultation with DCCEEW, DES, and other key stakeholders will be undertaken to identify if any of those threatened species being offset have a demonstrated lack of understanding on the species, or clear need for additional research. The action/s would be targeted to the species and attribute being impacted, be consistent with available literature and knowledge on the species, and would ensure that it would result in tangible benefits for the species. Information and learnings gained would be published and put in the public domain so others can gain from this information.

Potential areas for supplementary measures are outlined below.

6.3.1 Palm Cockatoo

Palm Cockatoo Conservation Advice Statement (TSSC 2015) identifies priority areas of research including the following:

- Identify appropriate fire management regimes for the species.
- Conduct genetic studies to understand population connectivity across Cape York.
- Identify what woodland habitat traits are required to support successful breeding.
- Develop techniques to characterise the age structure of the subspecies' populations.

There is potential for monitoring and research to be applied on the land-based offset to gain more information about the species, its habitat utilisation, threats, and effectiveness of management measures, including fire management. This could include monitoring impacts of fire on hollow-bearing trees and use of those hollows by Palm Cockatoo.

6.3.2 Red Goshawk

The Red Goshawk EPBC Act listing status was recently upgraded from Vulnerable to Endangered, as of March 2023. This was due to finding that the population is estimated to be low (1,340 mature individuals in the wild) with a declining trend (high reliability), and all individuals exist in one subpopulation spread over an extremely large area. There has also been a large contraction of the breeding range since 1980 (DCCEEW 2023).

The revised conservation advice (DCCEEW 2023) now identifies priority areas of research including the following:

- Characterise habitat critical to the survival of the Red Goshawk, particularly breeding habitat requirements.
- Develop a better understanding of how habitat changes (e.g. through clearing, fire regimes, restoration) and degradation (e.g. through grazing pressure) affect the prey populations (species composition, diversity, and abundance) needed to support Red Goshawks.
- Support Aboriginal communities to research, revive and document (where culturally appropriate) their connections, knowledge and land management practices and stories.

There is potential for research to be undertaken on the land-based offset and impact site to gain more information on the breeding habitat requirements of the species, as well as understanding the effects of habitat changes on prey populations from pressures such as fire and clearing. This could include monitoring of suitable nesting habitat and existing nests, as well as monitoring the population of prey before and after differing fire regimes.

6.3.3 Strategic fire management

All of the MNES species required to be offset have potential to be negatively impacted by inappropriate fire regimes. Hot bushfires and too frequent bushfires can destroy existing hollow bearing trees, can prevent tree growth and formation of hollows in future, can kill small mammals which are a food source for Masked Owl and Red Goshawk, and degrade riparian vegetation which is known to be an important refuge and breeding place for these species.

In northern Australia fire patterns are strongly influenced by the prevailing monsoonal climate – characterised by a dramatic high-rainfall ‘wet season’ (November–February), followed by a low-rainfall ‘dry season’ over the winter months. The wet season drives rapid growth in the grassy understorey, which subsequently dries, leading to high fuel loads heading into the dry season. The early dry season is therefore a critical time for managing fire in northern Australian savannah ecosystems (AWC 2023).

At the 2022 North Australia Savanna Fire Forum, there was discussion on threats that are occurring to biodiversity from bushfires, particularly those that are occurring in the late dry season. Thousands of hectares are being burnt each year and they are having negative impacts on Cape York’s biodiversity. Arson was raised as an issue and a call put out asking for regional collaboration and better responses to fire fighting. Regional collaboration was believed to be key to reducing the impacts of unplanned fires that threaten the Cape’s unique ecosystems, critical habitats and local wildlife

(<https://capeyorkweekly.com.au/collaboration-required-to-reduce-arson-attacks-in-cape-york/1021/>).

There is potential for Glencore as the proponent to work closely with Traditional Owners in their Project region, and other stakeholders to progress strategic planning, improve fire response, and implement best practice bushfire management to increase savanna burning, which is cooler fires in mosaics across the landscape in early dry season. Exploring ways to reduce arson and improve education may also be explored.

The Australian Wildlife Conservancy (AWC) carry out Australia’s largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York, which is confirmed to support Red Goshawk and Black-footed Tree Rat. This is an example of what could be achieved on the offset site for the Bauxite Mine project if active fire management and prescribed burning is implemented. In the early dry season, vegetation is green and retains a lot of moisture, so fires at this time tend to burn at relatively low intensity and tend not to cover vast areas. Burns are implemented in such a way to create a pattern of fire breaks, and to reduce the fuel load across the landscape. The effect is to limit the spread of destructive late dry season wildfires, and, crucially, to maintain patches of old-growth (or ‘long-unburned’) vegetation in the landscape, which provide shelter and food for wildlife (AWC 2023 -<https://www.australianwildlife.org/where-we-work/piccaninny-plains/>).

7 Timing of next actions

The following Table 7.1 provides a summary of remaining actions to finalise the required biodiversity offsets, and timing of those actions in relation to Project approvals and commencement.

Table 7.1 Schedule to finalise project offsets

Biodiversity offset action	Description	Timing
Landholder and stakeholder engagement	Progress landholder discussions on the two preferred offset areas regarding the provision of offset areas and commercial arrangements. This may include discussion on land management, legal security and compensation.	Prior to Project approval
Rapid assessments	Carry out an initial survey on each of the preferred offset properties to gain more information on their suitability for each MNES species. Surveys will collect information on: <ul style="list-style-type: none"> • habitat attributes present • regional ecosystems • presence of suitable hollows • fire history • assess for threats such as weeds and feral animals • some targeted fauna surveys may be conducted • land management practices such as grazing and fire. Some initial BioCondition transects may also be completed. These surveys are scheduled to occur in early dry season of 2023.	Prior to Project approval
Select preferred offset site	Based on landholder discussions, regulator consultation and results of rapid assessments select a final offset site.	Prior to Project approval
Targeted field surveys on selected offset site	Comprehensive fauna surveys will be undertaken for each MNES required to be offset. This will include: <ul style="list-style-type: none"> • targeted surveys to determine their presence/absence or likely presence/absence • Targeted surveys to identify any active nesting sites • BioCondition surveys on impact and offset areas • Hollow-bearing tree surveys • Weed baseline surveys • Assess management requirements Survey results will confirm habitat areas for each species and inform habitat quality (HQ) scoring.	Commence prior to Project approval and will continue post approval
Habitat Quality Assessments	Complete HQ assessments across the impact areas and proposed offset areas applying the Queensland Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy. Seek to undertake BioCondition transects at similar seasonal times on impact site and offset site to improve comparison. Post wet is required as it has highest likelihood for improved condition such as ground cover and species diversity. However, conditions can change quite a lot between wet and dry seasons or post fire. Seek feedback from DCCEEW on scoring before finalisation and Qld Herbarium on setting suitable benchmarks for REs. Benchmarks will need to be obtained by the proponent for some REs.	Post approval

Table 7.1 **Schedule to finalise project offsets**

Biodiversity offset action	Description	Timing
Finalise offset calculators and offset package	Based on HQ scores finalise calculators for each MNES and MSES to confirm offset area needed. The proponent would also determine at this time if any supplementary measures were to be included in the offset package and further details as to what that was.	Post approval
Finalise Offset Area Management Plan (OAMP)	Finalise an Offset Area Management Plan that details the specific management and monitoring measures to be carried out over life of the Project. OAMP will meet conditions of approval. Further field assessments of the offset will be conducted to inform the management plan to finalise management actions and performance outcomes. OAMP must be approved prior to Project commencement.	Post Project approval DCCEEW approval of OAMP prior to Project commencement
Prepare Offset Delivery Plan	Prepare Offset Delivery Plan for MSES values. Offset Delivery Plan must be approved prior to Project commencement.	Post Project approval and prior to commencement
Legally secure offset	Prepare documentation to legally secure offset area/s and have registered	12 months from Project commencement
Active management and monitoring of offset	Commence the identified management measures in the approved OAMP. Management will occur for specified duration in the OAMP. It will be for a minimum of 20 years and likely for duration of Project if >20 years.	Post approval of OAMP

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Appendix A

Database searches for Offset Area 1



Vegetation management report

For Lot: 211 Plan: SP241404

08/03/2023

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Recent changes

Updated mapping

Updated vegetation mapping was released on 8 September 2022 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

The Department of Environment and Science have also updated their protected plant and koala protection mapping to align with the Queensland Herbarium scientific updates.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:

- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

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1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 211 Plan: SP241404, are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
211	SP241404	Freehold	7,064,000,000.0
BR	SP331541	Easement	186

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does this property have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 211 Plan: SP241404, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Aurukun Shire

Bioregion(s)	Subregion(s)
Cape York Peninsula	Northern Holroyd Plain
Cape York Peninsula	Coastal Plains
Cape York Peninsula	Weipa Plateau

Catchment(s)
Holroyd
Archer
Watson
Embley
Arafura Sea

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the *Vegetation Management Regulation 2012*, the *Planning Act 2016* and the *Planning Regulation 2017*, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the *Vegetation Management Regulation 2012*; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions>.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes>

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at

<https://apps.dnrm.qld.gov.au/vegetation/>

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans>

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval.

Information on how to apply for a development approval is available at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development>

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

Phone 135VEG (135 834)

Email vegetation@resources.qld.gov.au

Visit <https://www.resources.qld.gov.au/?contact=vegetation> to submit an online enquiry.

3. Vegetation management framework for Lot: 211 Plan: SP241404

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 706210.79ha

Vegetation category	Area (ha)
Category B	705775.4
Category Water	349.7
Category X	85.7

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/>

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
3.1.1	Least concern	B	2,079.16	Rhizophora stylosa and/or Bruguiera spp. closed forest	Dense
3.1.2	Least concern	B	1,567.81	Avicennia marina low open forest	Mid-dense
3.1.3	Least concern	B	2,010.55	Ceriops tagal and/or C. australis +/- Avicennia marina low open forest	Mid-dense
3.1.4	Of concern	B	35.39	Excoecaria agallocha +/- Aegiceras corniculatum low open forest	Mid-dense
3.1.5	Least concern	B	5,371.46	Sporobolus virginicus closed tussock grassland on coastal plains	Grassland Sch 4
3.1.6	Least concern	B	9,337.27	Sparse herbland or bare salt pans on salt plains and saline flats	None
3.1.7	Of concern	B	1,447.58	Intermittent dry season saltflats and wet season freshwater swamps.	Grassland Sch 5
3.10.6	Least concern	B	3.63	Eucalyptus tetrodonta +/- Corymbia stockeri subsp. stockeri woodland on sandstone plateaus	Sparse
3.12.4	Of concern	B	1.62	Notophyll vine forest of Welchiodendron longivalve and Acacia polystachya on low hills and rises on igneous hills	Dense
3.2.10	Least concern	B	619.85	Eucalyptus tetrodonta and Corymbia clarksoniana +/- E. brassiana or Erythrophleum chlorostachys woodland on stabilised dunes	Sparse
3.2.2	Least concern	B	12,344.20	Semi-deciduous vine thicket to vine forest on beach dunes and ridges	Dense
3.2.24	Least concern	B	1,602.73	Mixed open tussock grassland and open forblands or shrublands on exposed foredunes and islands	Sparse
3.2.27	Least concern	B	9,218.63	Sedgelands fringing perennial lakes in coastal dunefields	Other
3.2.3	Least concern	B	10,556.70	Melaleuca dealbata or Lophostemon suaveolens open forest in dune swales	Mid-dense
3.2.4	Of concern	B	738.23	Melaleuca spp. open forest in dune swales and swampy areas	Mid-dense
3.2.5	Least concern	B	3,082.46	Acacia crassicaarpa on coastal dunes and beach ridges, woodland to open forest	Sparse
3.2.6	Of concern	B	308.92	Casuarina equisetifolia woodland to open forest on foredunes on mainland and islands	Sparse
3.2.7	Least concern	B	1,892.65	Corymbia novoguineensis and/or C. clarksoniana woodland in coastal areas	Sparse

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
3.3.10	Least concern	B	3,635.40	Melaleuca fluviatilis and/or Melaleuca argentea woodland or M. saligna or M. dealbata woodland fringing watercourses	Mid-dense
3.3.16	Least concern	B	758.62	Eucalyptus chlorophylla +/- Corymbia clarksoniana woodland on alluvial plains	Sparse
3.3.20	Least concern	B	56,324.67	Corymbia clarksoniana or C. novoguineensis woodland on alluvial plains	Sparse
3.3.24	Least concern	B	1,547.67	Eucalyptus leptophleba +/- Erythrophleum chlorostachys woodland on riverine levees and alluvial plains	Sparse
3.3.31	Least concern	B	5.06	Eucalyptus tetrodonta +/- Corymbia spp. woodland on coastal plains	Sparse
3.3.34	Of concern	B	69.06	Corypha utan open woodland on alluvial plains	Very sparse
3.3.37	Least concern	B	2,486.16	Eucalyptus microtheca +/- Corymbia papuana open woodland on floodplains	Very sparse
3.3.38	Least concern	B	1,010.88	Deciduous notophyll and/or microphyll vine thicket +/- Lagerstroemia archeriana on heavy clay alluvium	Dense
3.3.47	Least concern	B	72.00	Melaleuca citrolens +/- M. foliolosa low open woodland along drainage lines	Very sparse
3.3.49	Least concern	B	35,261.85	Melaleuca viridiflora +/- Corymbia clarksoniana low open woodland on floodplains and alluvial plains	Very sparse
3.3.5	Least concern	B	1,929.16	Evergreen to semi-deciduous notophyll vine forest on alluvia on major watercourses	Dense
3.3.50	Least concern	B	26,224.41	Melaleuca spp. woodland on swamps on floodplains and non-floodplain landforms	Sparse
3.3.51	Of concern	B	759.02	Melaleuca acacioides +/- Hakea pedunculata tall shrubland on coastal plains	Sparse
3.3.56	Least concern	B	8,066.16	Aristida spp. and/or Eriachne spp. tussock grassland in drainage depressions	Grassland Sch 4
3.3.58	Least concern	B	8,580.91	Oryza spp. closed tussock grassland +/- Eleocharis spp. +/- Echinochloa spp. in seasonally inundated depressions on coastal plains	Grassland Sch 4
3.3.6	Of concern	B	8.85	Evergreen notophyll vine forest with Melaleuca leucadendra on swamps	Dense
3.3.61	Least concern	B	27,404.53	Mixed tussock grassland and sedgeland on alluvial plains	Grassland Sch 4
3.3.63	Least concern	B	2,731.92	Eleocharis spp. open sedgeland swamps	Other
3.3.64	Least concern	B	415.93	Baloskion tetraphyllum subsp. meiotachyum and/or Leptocarpus spp. and/or Dapsilanthus spathaceus open sedgeland in drainage swamps	Other
3.3.65	Least concern	B	6,114.69	Tussock grasslands in ephemeral lakes and lagoons	Grassland Sch 4
3.3.66	Least concern	B	2,137.54	Lakes and lagoons dominated by a variety of aquatic plants, frequently with fringing woodlands or sedgelands	Other

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
3.3.9	Least concern	B	17,091.94	Lophostemon suaveolens woodlands on creeklines and swamps	Mid-dense
3.5.36	Least concern	B	271,164.92	Eucalyptus tetradonta and Corymbia nesophila woodland to open forest on undulating plains and remnant plateaus	Sparse
3.5.37	Least concern	B	15,563.63	Eucalyptus tetradonta +/- Corymbia stockeri woodland to tall open forest on erosional plains and remnant plateaus	Sparse
3.5.39	Least concern	B	88,120.67	Eucalyptus tetradonta +/- Corymbia clarksoniana woodland on sand plains	Sparse
3.5.4	Least concern	B	110.49	Semi-deciduous notophyll vine forest in small patches on northern plateaus	Dense
3.5.40	Least concern	B	517.28	Melaleuca stenostachya +/- Eucalyptus chlorophylla woodland +/- M. viridiflora shrub layer on outwash plains	Sparse
3.5.41	Least concern	B	9,713.44	Melaleuca viridiflora +/- Corymbia clarksoniana woodland to low open woodland on plains	Sparse
3.5.6	Least concern	B	0.25	Eucalyptus phoenicea woodland on sandy outwash plains	Sparse
3.5.9	Least concern	B	24,750.51	Eucalyptus tetradonta, Corymbia stockeri +/- C. setosa woodland on sand plains	Sparse
3.7.3	Least concern	B	7,332.51	Eucalyptus cullenii +/- E. tetradonta woodland on erosional escarpments and plains	Sparse
3.7.4	Least concern	B	12,617.63	Eucalyptus tetradonta and Corymbia stockeri woodland on ironstone knolls and slopes	Sparse
3.7.6	Least concern	B	271.03	Melaleuca stenostachya +/- Acacia leptostachya woodland on lateritic erosional slopes	Sparse
3.9.4	Least concern	B	10,757.79	Eucalyptus leptophleba +/- Corymbia dallachiana or Eucalyptus platyphylla open woodland on rolling plains	Very sparse
non-rem	None	X	85.72	None	None
water	None	Water	349.68	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

Vegetation management wetlands are present on this property and are shown on the vegetation management supporting map in section 4.2 of this report.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

- 1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
- 2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
29	Natator depressus	flatback turtle	V	Turbid, shallow tropical inshore waters (coast & bays) over soft-bottomed habitats away from reefs; no records beyond continental shelf. Nests dug in sandy area well up beach (on or behind dune, on dune slope), occasionally to tree line.	Sea level to 50m.	Sandy substrates.	Beach.
39	Eretmochelys imbricata	hawksbill turtle	E	Tropical and warm temperate seas, at certain size recruit to tidal and sub-tidal coral and rocky reef habitats; especially outer edges with complex vertical surfaces rather than flat areas. Nests in sandy beach above high tide, often in vegetated area (under trees).	Sea level to 50m.	Sandy substrates.	Beach.
41	Lepidochelys olivacea	olive ridley turtle	E	Tropical seas in relatively deep, protected waters (80-100m) over soft-bottomed (e.g. mud near mangroves) habitats, also coral reefs. Nests dug above high tidemark.	Sea level to 50m.	Sandy substrates.	Beach.

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
584	<i>Crocodylus porosus</i>	estuarine crocodile	V	Estuaries and major rivers, billabongs and swamps in dry season; freshwater swamps in wet season, occasionally found in open sea; also in dune swale swamps and dams; mostly within 40-50km of coastline (some breeding populations up to 100km from sea). Nest sites vegetated areas (preference for Melaleuca swamp forest with <i>Thoracostachyum</i> or <i>Scleria</i> sedgeswamp &/or <i>Stenoclaena</i> fern) near permanent freshwater (<100-200m), often on north-west banks, prime areas associated with productive deepwater estuaries; will also use marginal sites, e.g. grassy areas (<i>Imperata</i> , <i>Ischaemum</i> , <i>Themeda</i> , <i>Sorghum</i>) near forest edge or with sparse eucalypt, riverbank/fringe forest (<i>Melaleuca</i> , <i>Corypha</i> , <i>Acacia</i>), mangrove fringe, salt meadow behind mangrove, and sparse short (<40cm) sedgeland/swamp.	Sea level to 100m.	None	Near and in waterbodies.
1104	<i>Ninox rufa meesi</i>	rufous owl (Cape York subspecies)	NT	Lowland rainforest (e.g. semi-deciduous mesophyll vine forest; gallery vine forest), dense swamp (including <i>Melaleuca leucadendron</i>), and along edge of mangroves; most hunting in rainforest and adjoining open sclerophyll (eucalypt) woodland.	Sea level to 500m.	None	None
1175	<i>Probosciger aterrimus macgillivrayi</i>	palm cockatoo	E	Rainforest, gallery forest and adjacent open grassy forest/woodland (eucalypt) and swamp woodland (melaleuca or palm) (up to at least 1km), especially when enriched with <i>Pandanus</i> and <i>Nonda</i> plums <i>Parinari</i> with shrubby acacia understorey over grass; preference for ecotone but will retreat into rainforest during hottest part of day. Nest in vertical hollow 15-60cm diameter, 0.5-1.5m deep and 0.5-45m (mostly 4-12m) above ground; most nests in open forest eucalypts (<i>Eucalyptus tetradonta</i> , <i>Corymbia</i> sp.), also use <i>Melaleuca</i> , <i>Alstonia</i> , <i>Lophostemon</i> & <i>Ficus</i> spp. (mean DBH = 60cm), near rainforest (40-60m away) and rarely in rainforest.	Sea level to 200m.	None	None
1365	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)	E	Grassy open woodland dominated by <i>Eucalyptus</i> , <i>Acacia</i> and <i>Melaleuca</i> spp. (e.g. <i>E. platyphylla</i> , <i>E. erythrophloia</i> , <i>E. melanophloia</i> , <i>E. brownii</i> , <i>E. whitei</i> , <i>E. similis</i> , <i>E. camaldulensis</i> , <i>Corymbia plena</i> , <i>C. dallachiana</i> , <i>C. setosa</i> , <i>M. viridiflora</i> , <i>M. leucodendra</i>) with high diversity ground cover of perennial grasses (e.g. <i>Heteropogon</i> , <i>Themeda</i> , <i>Bothriochloa</i> , <i>Eulalia</i> , <i>Enneapogon</i> , <i>Triodia</i> , <i>Triopogon</i> , <i>Chrysopogon</i> , <i>Aristida</i>) and shrub layer usually sparse or absent. Nest in topmost twiggy branches of eucalypt, occasionally in tree hollow or termite mound, up to 12m above ground.	50-350m.	None	None
1370	<i>Neochmia phaeton evangelinae</i>	crimson finch (white-bellied subspecies)	E	Riparian vegetation, especially eucalypt/melaleuca woodland with dense long grasses and <i>pandanus</i> near watercourses, dune swales and swamps; will use vine forest as fire refuge. Nest in bulky domed nest built between fronds of trees with palm-like leaves (e.g. <i>Pandanus</i> & <i>Corypha</i> spp.) 2-16m above ground, often over water and occasionally in hollows or buildings.	Sea level to 250m.	None	None

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
1728	<i>Erythrorichis radiatus</i>	red goshawk	E	Tall open forest to open forest (<i>Eucalyptus saligna</i> , <i>E. pitularis</i> , <i>Corymbia citriodora</i>), edge of rainforest/vine thicket (especially Araucarian notophyll vine forest), tall woodland (including savannah/semi-open woodland, e.g. <i>E. alba</i> , and open riparian <i>E. camaldulensis</i> in dry areas), and along forested rivers (including Melaleuca swamp forest and riparian <i>Casuarina</i> sp.) and near wetlands; preference for a mosaic of tall vegetation types (forest/woodland) with permanent water, high bird (prey) density; often in remote terrain (gorge/escarpment country). Nest in tall eucalypt or melaleuca (7-40m above ground) in undisturbed forest/woodland; restricted to trees >20m tall within 1km of permanent watercourse or wetland.	Sea level to 550m.	None	None
1843	<i>Numerius madagascariensis</i>	eastern curlew	E	Foraging on soft, intertidal mudflat, with a preference for broad flats, often in sheltered areas near mangroves and estuaries/creeks, also on sandflats and occasionally ocean beaches, rock platforms and coral reefs. Roost on saltflat, saltmarsh, mangroves, reef flat, sandy spits and grassland near water.	Sea level to 100m.	Sand, sandy mud and mud substrates.	Associated with coastlines and wetlands.
1856	<i>Calidris tenuirostris</i>	great knot	CE	Foraging on intertidal mudflat/sandflat in sheltered coastal areas, exposed reef, rock platform, mangrove, near coastal swamp/lagoon and salt lake. Roost on sandy beach, mudflat and coastal claypan.	Sea level to 100m.	Mud and sand substrates.	Associated with coastlines and wetlands.
1936	<i>Charadrius mongolus</i>	lesser sand plover	E	Foraging on sandy beach, intertidal mudflat/sandflat and mangrove mudflat of coastal bays and estuaries. Also inland at lakes and soaks. Roost on beach, banks, sand/shell spits, rocky spits and exposed reef.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and coastal and inland wetlands.
1948	<i>Charadrius leschenaultii</i>	greater sand plover	V	Foraging on intertidal mudflats, sandbank, sandy/shelly/muddy beaches, rock platforms, coral reefs and tidal lagoons. Roost on sandspit, beach, lagoons edge, rocky points, coastal saltmarsh and claypan.	Sea level to 100m.	Sand and mud substrates.	Associated with coastlines and wetlands.
13977	<i>Dendrobium bigibbum</i>	Cooktown orchid	V	low closed shrubland/heathland; vine thicket; semi-deciduous notophyll vine forest; woodland with <i>Eucalyptus drepanophylla</i> / <i>E. crebra</i> ; woodland with <i>Eucalyptus tereticornis</i> , <i>Corymbia tessellaris</i> and <i>Erythrophleum chlorostachys</i>	0 to 1000 m	no soil information, lithophyte or epiphyte (grows on trees and boulders)	rocky creek bank, steep talus slope, ridge line, hill slope, sand ridge and swale of consolidated beach dune, coastal sandy plain, beach ridge
29734	<i>Emydura subglobosa worrelli</i>	diamond head turtle	NT	Large tropical rivers, permanent lakes and lagoons; and shallow temporary areas.	Sea level to 350m.	None	In and near watercourses.
33787	<i>Crudia abbreviata</i>	None	NT	gallery/riparian rainforest	0 to 100 m	alluvium: sand, sandy red earth, silty loam	watercourse

Label	Regional Ecosystem (mandatory unless otherwise specified)
29	All regional ecosystems adjacent to beach.
39	All regional ecosystems adjacent to beach.
41	All regional ecosystems adjacent to beach.
584	All regional ecosystems within the stream/wetland buffer as determined by VMA code.

Label	Regional Ecosystem (mandatory unless otherwise specified)
1104	3.1.1, 3.1.3, 3.2.1, 3.2.2, 3.2.11, 3.2.12, 3.2.13, 3.2.17, 3.2.21, 3.2.28, 3.2.29, 3.2.30, 3.3.1, 3.3.2, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.38, 3.3.39, 3.3.40, 3.3.54, 3.3.68, 3.5.3, 3.5.4, 3.5.19, 3.5.20, 3.5.33, 3.5.42, 3.7.1, 3.8.1, 3.8.2, 3.8.5, 3.10.1, 3.10.2, 3.10.3, 3.10.5, 3.10.13, 3.11.1, 3.11.2, 3.11.3, 3.12.1, 3.12.2, 3.12.3, 3.12.4, 3.12.5, 3.12.6, 3.12.20, 3.12.21, 3.12.22, 3.12.23, 3.12.35
1175	3.1.1, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.11, 3.2.12, 3.2.13, 3.2.21, 3.2.28, 3.3.1, 3.3.2, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.3.13, 3.3.17, 3.3.39, 3.3.68, 3.3.70, 3.5.3, 3.5.4, 3.5.20, 3.5.21, 3.5.32, 3.5.33, 3.7.1, 3.7.2, 3.7.6, 3.8.1, 3.8.2, 3.8.3, 3.8.5, 3.10.1, 3.10.2, 3.10.3, 3.10.5, 3.10.13, 3.11.1, 3.11.2, 3.11.3, 3.11.4, 3.11.6, 3.12.1, 3.12.3, 3.12.4, 3.12.5, 3.12.6, 3.12.7, 3.12.8, 3.12.9, 3.12.20, 3.12.21, 3.12.22, 3.12.23, 3.12.35, 3.12.36, 3.12.44
1365	9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.9, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.18, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.23, 9.4.1, 9.4.2, 9.4.3, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.14, 9.5.16, 9.7.1, 9.7.2, 9.7.3, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.4, 9.8.5, 9.8.6, 9.8.9, 9.8.10, 9.8.11, 9.10.1, 9.10.3, 9.10.6, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.11, 9.11.12, 9.11.13, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.23, 9.11.24, 9.11.26, 9.11.28, 9.11.29, 9.11.31, 9.11.32, 9.12.1, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.33, 9.12.35, 9.12.37, 9.12.39, 10.3.1, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.16, 10.3.17, 10.3.19, 10.3.20, 10.3.21, 10.3.22, 10.3.23, 10.3.25, 10.3.27, 10.3.28, 10.3.30, 10.3.31, 10.4.1, 10.4.2, 10.4.3, 10.4.4, 10.4.5, 10.4.6, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.6, 10.7.7, 10.7.8, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.1, 10.9.2, 10.9.3, 10.9.5, 10.9.6, 10.9.8, 10.10.1, 10.10.2, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.8, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.20, 11.3.23, 11.3.25, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.39, 11.4.2, 11.4.3, 11.4.5, 11.4.8, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.9, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.2, 11.9.3, 11.9.7, 11.9.9, 11.9.14, 11.10.1, 11.10.4, 11.10.6, 11.10.7, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.11, 11.12.12, 11.12.13, 11.12.14, 11.12.17, 11.12.20
1370	2.2.1, 2.2.7, 2.3.1, 2.3.5, 2.3.6, 2.3.7, 2.3.8, 2.3.9, 2.3.10, 2.3.11, 2.3.12, 2.3.13, 2.3.15, 2.3.17, 2.3.18, 2.3.19, 2.3.20, 2.3.21, 2.3.22, 2.3.23, 2.3.24, 2.3.25, 2.3.26, 2.3.27, 2.3.28, 2.3.29, 2.3.30, 2.3.31, 2.3.33, 2.3.34, 2.3.35, 2.3.36, 2.3.37, 2.3.39, 2.3.40, 2.3.41, 2.3.42, 2.3.43, 2.3.44, 2.3.45, 2.3.46, 2.3.47, 2.3.49, 2.3.50, 2.3.51, 2.3.52, 2.3.53, 2.3.54, 2.3.55, 2.3.56, 2.3.57, 2.3.58, 2.3.59, 2.3.60, 2.3.61, 2.3.62, 2.3.63, 2.3.64, 2.3.65, 2.3.66, 2.3.68, 2.3.69, 2.3.70, 2.3.71, 2.3.72, 2.4.3, 2.4.4, 2.4.5, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 2.5.5, 2.5.6, 2.5.7, 2.5.9, 2.5.10, 2.5.11, 2.5.12, 2.5.13, 2.5.14, 2.5.15, 2.5.17, 2.5.18, 2.5.19, 2.5.20, 2.5.21, 2.5.22, 2.5.23, 2.5.24, 2.5.25, 2.5.26, 2.5.27, 2.5.28, 2.5.29, 2.5.30, 2.5.31, 2.5.32, 2.5.33, 2.5.34, 2.5.35, 2.5.36, 2.5.37, 2.5.38, 2.5.39, 2.5.40, 2.5.41, 2.7.1, 2.7.2, 2.7.3, 2.7.4, 2.7.5, 2.7.6, 2.7.7, 2.8.1, 2.9.1, 2.9.2, 2.9.3, 2.9.4, 2.9.5, 2.9.6, 2.9.7, 2.10.1, 2.10.2, 2.10.4, 2.10.5, 2.10.6, 2.10.7, 2.11.1, 2.12.1

Label	Regional Ecosystem (mandatory unless otherwise specified)
1728	2.2.7, 2.3.5, 2.3.6, 2.3.7, 2.3.10, 2.3.11, 2.3.12, 2.3.15, 2.3.17, 2.3.19, 2.3.20, 2.3.21, 2.3.22, 2.3.23, 2.3.24, 2.3.25, 2.3.26, 2.3.27, 2.3.28, 2.3.29, 2.3.30, 2.3.33, 2.3.34, 2.3.35, 2.3.37, 2.3.39, 2.3.40, 2.3.42, 2.3.43, 2.3.44, 2.3.45, 2.3.47, 2.3.49, 2.3.50, 2.3.51, 2.3.52, 2.3.53, 2.3.54, 2.3.55, 2.3.56, 2.3.57, 2.3.58, 2.3.59, 2.3.60, 2.3.61, 2.3.62, 2.3.63, 2.3.64, 2.3.65, 2.3.66, 2.3.68, 2.3.69, 2.3.70, 2.3.71, 2.3.72, 2.4.4, 2.5.3, 2.5.4, 2.5.5, 2.5.6, 2.5.7, 2.5.8, 2.5.9, 2.5.10, 2.5.11, 2.5.13, 2.5.14, 2.5.15, 2.5.17, 2.5.18, 2.5.19, 2.5.20, 2.5.21, 2.5.23, 2.5.24, 2.5.25, 2.5.26, 2.5.27, 2.5.28, 2.5.29, 2.5.30, 2.5.33, 2.5.36, 2.5.37, 2.5.38, 2.5.41, 2.7.1, 2.7.2, 2.7.3, 2.7.4, 2.7.5, 2.7.6, 2.7.7, 2.8.1, 2.9.3, 2.9.6, 2.9.7, 2.10.1, 2.10.2, 2.10.3, 2.10.5, 2.10.7, 2.11.1, 2.12.1, 3.2.3, 3.2.4, 3.2.5, 3.2.6, 3.2.7, 3.2.8, 3.2.9, 3.2.10, 3.2.15, 3.2.17, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.3.13, 3.3.14, 3.3.15, 3.3.16, 3.3.17, 3.3.18, 3.3.19, 3.3.20, 3.3.21, 3.3.22, 3.3.23, 3.3.24, 3.3.25, 3.3.26, 3.3.27, 3.3.28, 3.3.29, 3.3.30, 3.3.31, 3.3.32, 3.3.33, 3.3.34, 3.3.35, 3.3.36, 3.3.37, 3.3.40, 3.3.69, 3.3.70, 3.5.1, 3.5.2, 3.5.5, 3.5.6, 3.5.7, 3.5.8, 3.5.9, 3.5.10, 3.5.11, 3.5.12, 3.5.13, 3.5.21, 3.5.22, 3.5.23, 3.5.24, 3.5.25, 3.5.26, 3.5.31, 3.5.34, 3.5.35, 3.5.36, 3.5.37, 3.5.38, 3.5.39, 3.5.41, 3.5.42, 3.7.2, 3.7.3, 3.7.4, 3.7.5, 3.7.6, 3.8.3, 3.9.2, 3.9.4, 3.9.5, 3.9.6, 3.10.6, 3.10.7, 3.10.8, 3.10.9, 3.10.10, 3.10.11, 3.10.15, 3.10.21, 3.11.4, 3.11.6, 3.11.7, 3.11.8, 3.11.9, 3.11.10, 3.11.11, 3.11.12, 3.11.13, 3.11.14, 3.11.15, 3.11.17, 3.11.18, 3.11.20, 3.11.21, 3.12.7, 3.12.8, 3.12.9, 3.12.10, 3.12.11, 3.12.12, 3.12.13, 3.12.14, 3.12.15, 3.12.16, 3.12.17, 3.12.18, 3.12.19, 3.12.26, 3.12.40, 3.12.41, 3.12.42, 3.12.44, 3.12.45, 3.12.46, 3.12.47, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.6, 6.3.9, 6.3.16, 6.3.17, 6.3.18, 6.3.24, 6.3.25, 6.4.2, 6.4.3, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.17, 6.5.19, 6.7.2, 6.7.5, 6.7.6, 7.2.3, 7.2.4, 7.2.7, 7.2.8, 7.2.9, 7.2.10, 7.2.11, 7.3.5, 7.3.6, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.34, 7.3.35, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.46, 7.3.47, 7.3.48, 7.3.49, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.8, 7.11.10, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.26, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.38, 7.11.40, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.9, 7.12.12, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.37, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.2.1, 8.2.3, 8.2.4, 8.2.6, 8.2.7, 8.2.8, 8.2.12, 8.2.13, 8.2.14, 8.3.2, 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1843	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 7.1.1, 7.1.2, 7.1.3, 8.1.1, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 11.1.4, 12.1.2, 12.1.3
1856	2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 7.1.1, 7.1.3, 8.1.2, 11.1.2, 11.1.4, 12.1.3
1936	2.1.1, 2.1.2, 2.1.3, 2.1.5, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 7.1.1, 7.1.3, 8.1.2, 11.1.2, 11.1.4, 12.1.3
1948	2.1.1, 2.1.4, 2.1.5, 3.1.6, 7.1.2, 7.1.3, 8.1.2, 8.1.3, 8.1.4, 11.1.1, 11.1.2, 11.1.3, 12.1.2, 12.1.3
13977	3.2.2, 3.2.5, 3.2.12, 3.2.13, 3.2.17, 3.2.18, 3.2.21, 3.2.22, 3.2.26, 3.3.5, 3.3.10, 3.3.38, 3.3.39, 3.3.49, 3.3.50, 3.3.53, 3.3.67, 3.5.4, 3.5.5, 3.5.19, 3.5.33, 3.5.42, 3.10.1, 3.10.5, 3.11.7, 3.11.20, 3.12.4, 3.12.10, 3.12.21, 3.12.28, 3.12.34, 7.3.40, 7.11.20, 7.12.7, 7.12.6, 7.12.38, 7.12.61, 7.12.55, 7.12.69, 9.8.7, 9.11.8
29734	All regional ecosystems within the stream/wetland buffer as determined by VMA code.
33787	3.3.5, 3.3.38, 3.3.50, 3.3.65

3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Non Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

Class A (with urban areas masked as per SPP): 16159.03ha

Class B (with urban areas masked as per SPP): 285672.2ha

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 211 Plan: SP241404.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:

<https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form>

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new [property maps of assessable vegetation \(PMAV\)](#).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

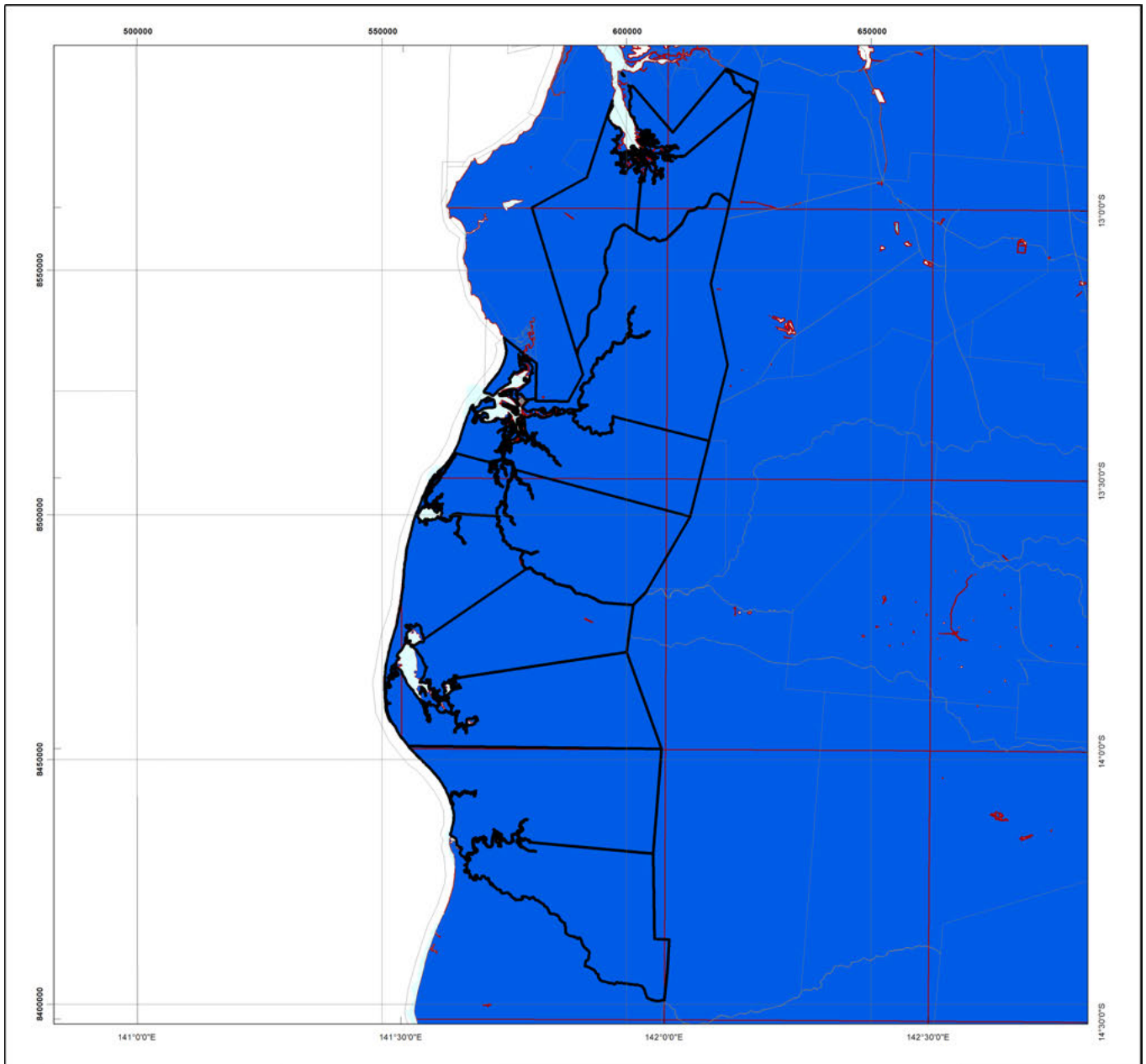
Coastal/non-coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture









The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

4.1 Regulated vegetation management map



Regulated Vegetation Management Map

Legend

-  Selected Lot and Plan
-  Category A area (Vegetation offsets/compliance notices/VDecs)
-  Category B area (Remnant vegetation)
-  Category C area (High-value regrowth vegetation)
-  Category R area (Reef regrowth watercourse vegetation)
-  Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
-  Water
-  Other land parcel boundaries



This product is projected into:
GDA 1994 MGA Zone 54

Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

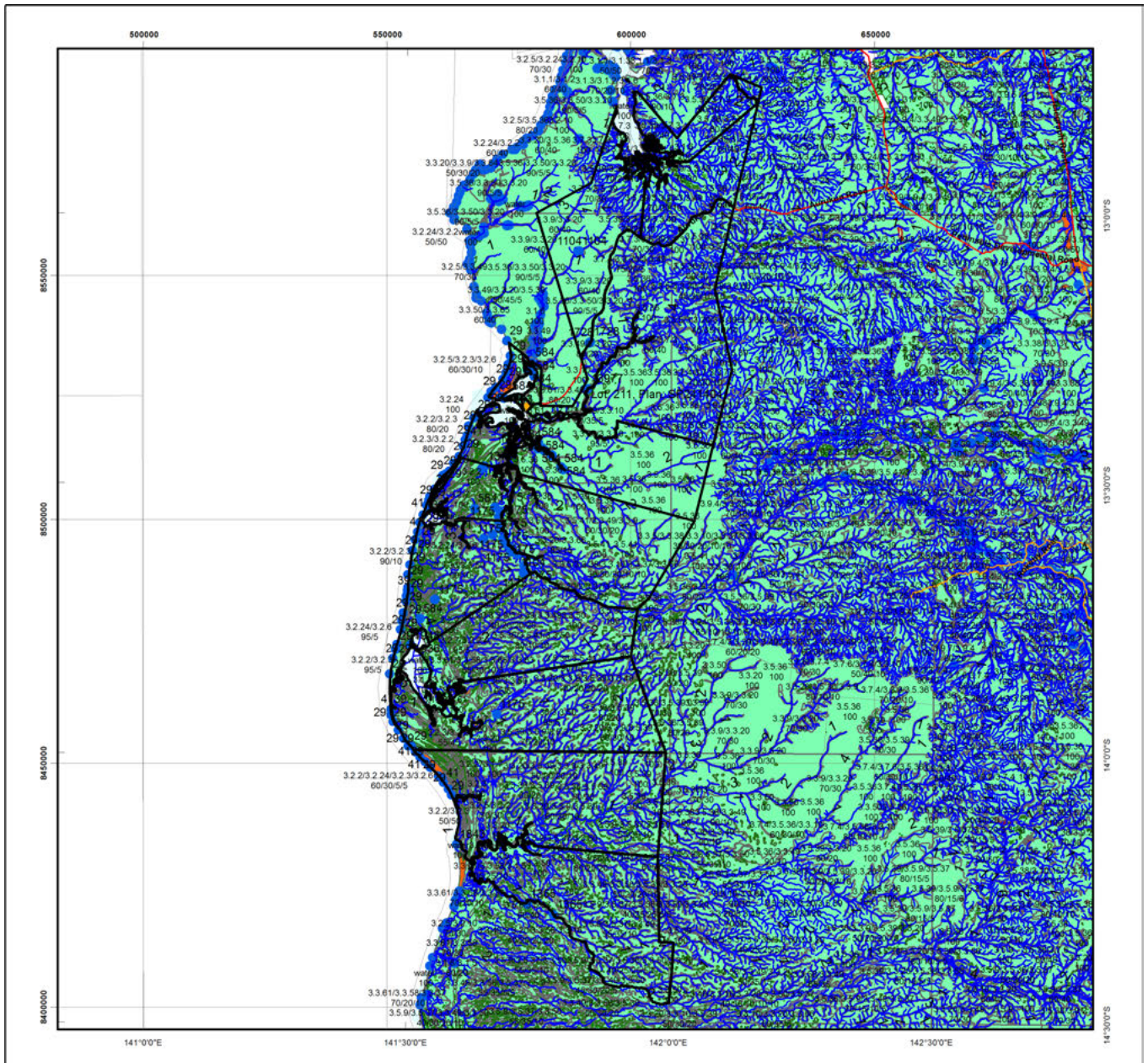
Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.





















Queensland Government

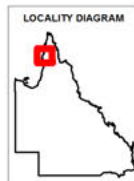
4.2 Vegetation management supporting map



Vegetation Management Supporting Map

Legend

-  Selected Lot and Plan
-  Category A or B area containing endangered regional ecosystems
-  Category A or B area containing of concern regional ecosystems
-  Category A or B area that is a least concern regional ecosystem
-  Category C or R area containing endangered regional ecosystems
-  Category C or R area containing of concern regional ecosystems
-  Category C or R area that is a least concern regional ecosystem
-  Category X area
-  Water
-  Wetland on the vegetation management wetlands map
-  Essential habitat on the essential habitat map
-  Essential habitat species record
-  Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
-  Highway
-  Connector
-  Street/Local Road
-  National Parks, State Forest and other reserves
-  Other land parcel boundaries



0 8,100 16,200 24,300 32,400 40,500 m

This product is projected into:
GDA 1994 MGA Zone 54

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:

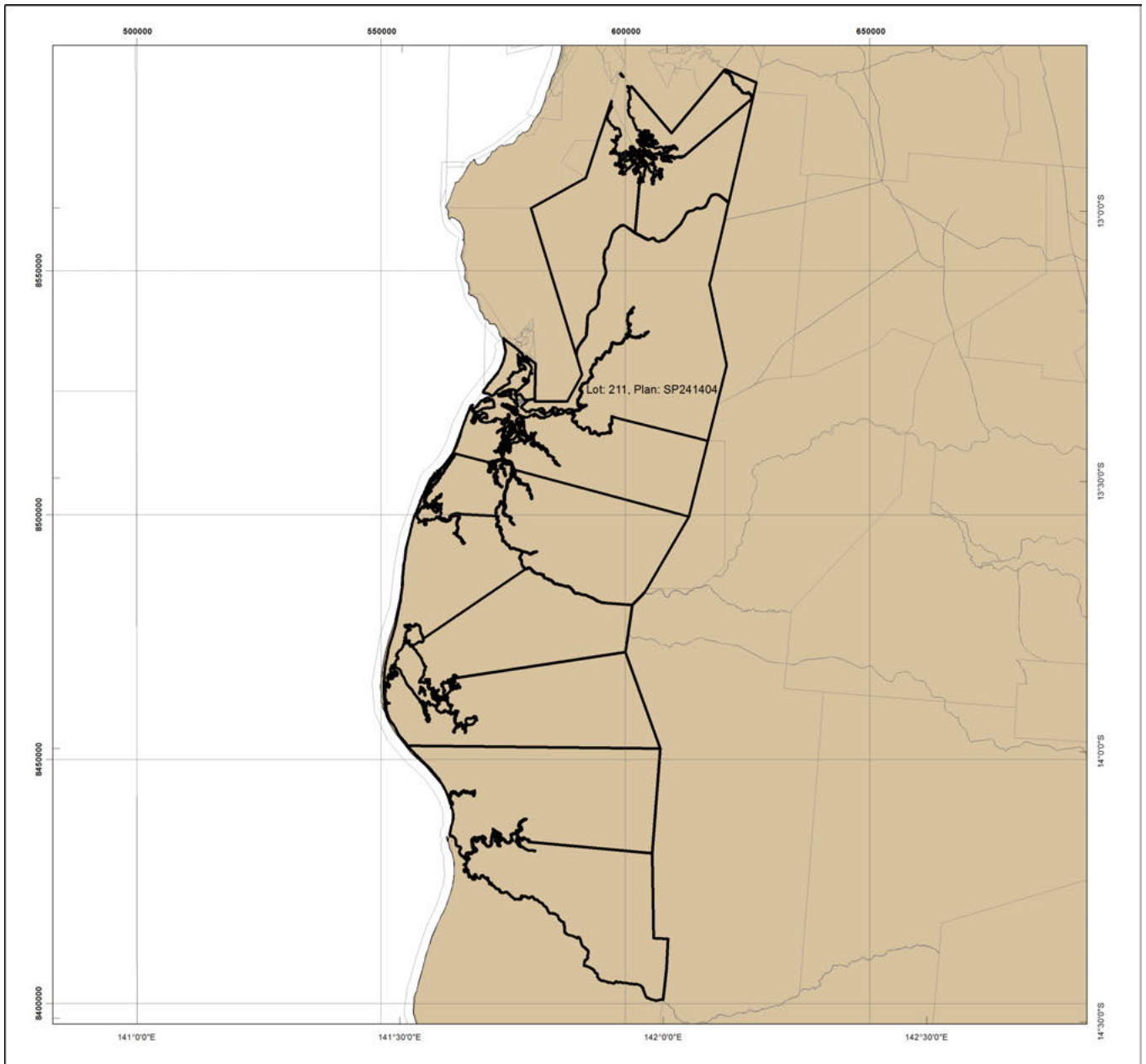
While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>





Land parcel boundaries are provided as locational aid only.

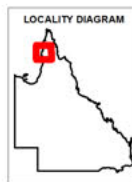
4.3 Coastal/non-coastal map



Coastal/Non Coastal Map

Legend

-  Selected Lot and Plan
-  Coastal
-  Non Coastal
-  Other land parcel boundaries



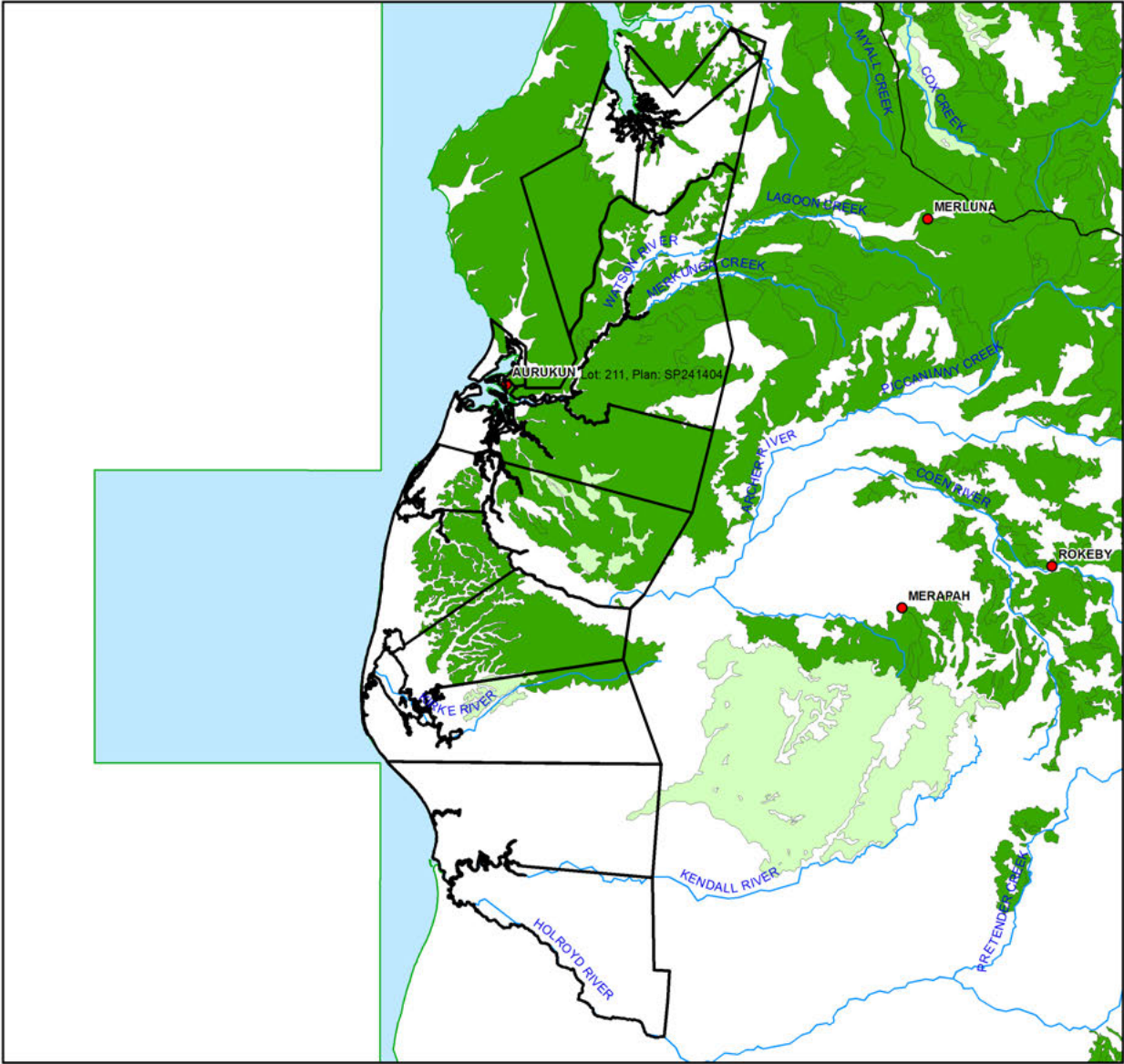
This product is projected into:
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Land parcel boundaries shown are provided as a locational aid only.



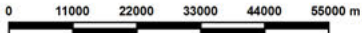
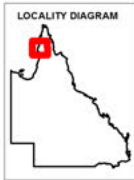
4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

Legend

- Selected Lot and Plan
- Towns
- Rivers and creeks
- Freeways / motorways; Highways
- Secondary roads; Streets
- Agricultural land class A or B**
- A
- B
- Not class A or B



This product is projected into GDA 1994 MGA Zone 54

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5. Protected plants framework (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the [Nature Conservation Act 1992](#) (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see [Operational policy: When a protected plant in Queensland is considered to be 'in the wild'](#)) that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the [Flora survey guidelines](#). The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of a threatened or near threatened plant can be avoided, the clearing activity is exempt from a permit. An [exempt clearing notification form](#) must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the [clearing permit application form](#).

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DES

For further information on the protected plants framework:

Phone 1300 130 372 (and select option four)

Email palm@des.qld.gov.au

Visit <https://www.qld.gov.au/environment/plants-animals/plants/protected-plants>

5.5 Protected plants flora survey trigger map

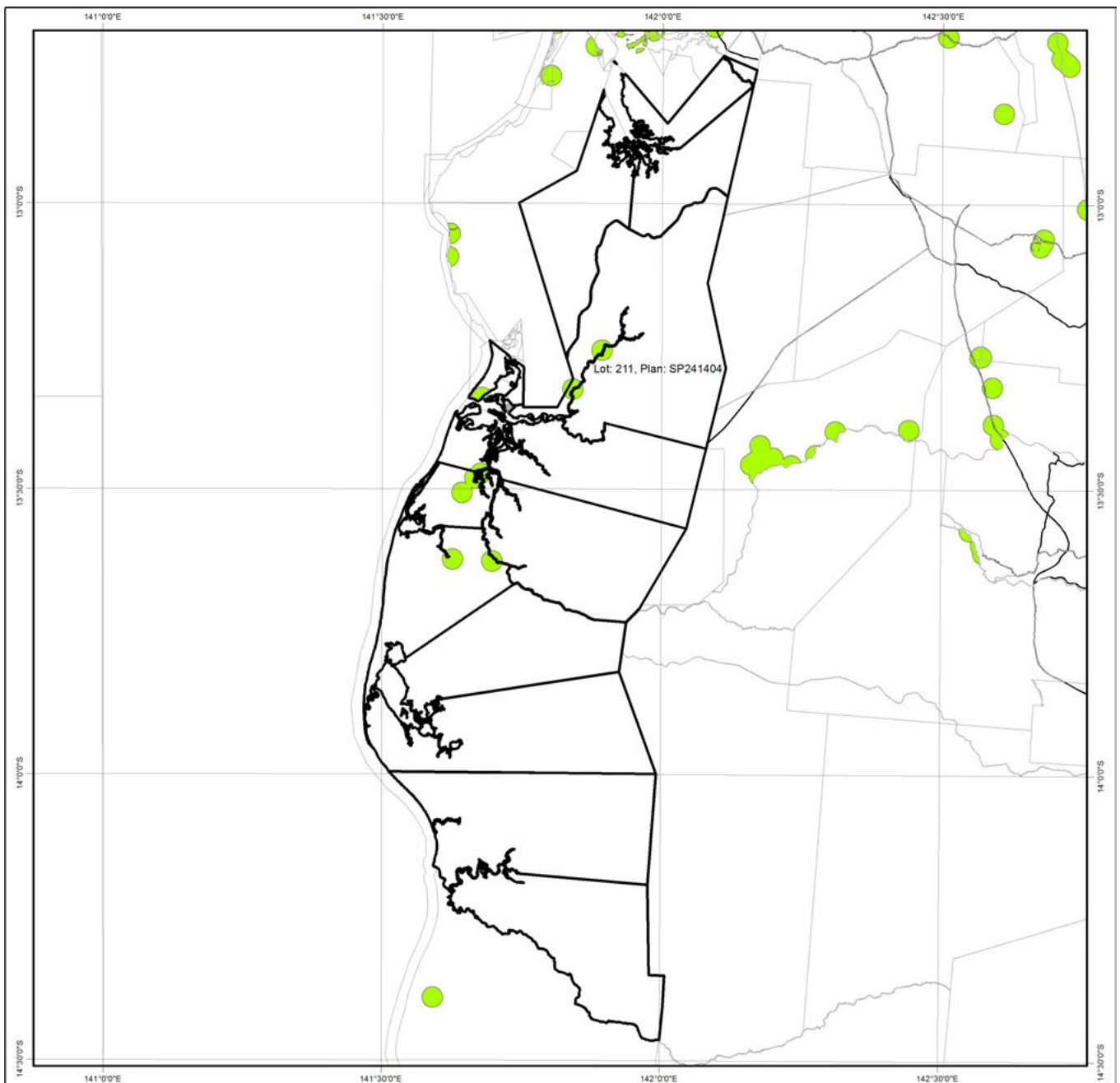
This map included may also be requested individually at: <https://apps.des.qld.gov.au/map-request/flora-survey-trigger/>.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.






Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.



Protected Plants Flora Survey Trigger Map

Legend

-  Selected Lot and Plan
-  High risk area
-  Other land parcel boundaries
-  Freeways / motorways / highways
-  Secondary roads / streets



0 7,500 15,000 22,500 30,000 37,500 m

This product is projected into:
GDA 1994 MGA Zone 54

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

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6. Koala protection framework (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document [Spatial modelling in South East Queensland](#).

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document [Guideline - Requests to make, amend or revoke a koala habitat area determination](#).

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps>. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley,

Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

- 1) Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
- 2) Does not include destroying standing vegetation by stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the [Planning Regulation 2017](#). More information on exempted development can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:
 - the local government planning scheme makes the development assessable;
 - the premises includes an area that is both a koala priority area and a koala habitat area; and
 - the development does not involve interfering with koala habitat (defined above); and
- development in identified koala broad-hectare areas.

The [Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks](#) outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the [Nature Conservation \(Koala\) Conservation Plan 2017](#) prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DES

For further information on the koala protection framework:

Phone 13 QGOV (13 74 68)

Email koala.assessment@des.qld.gov.au

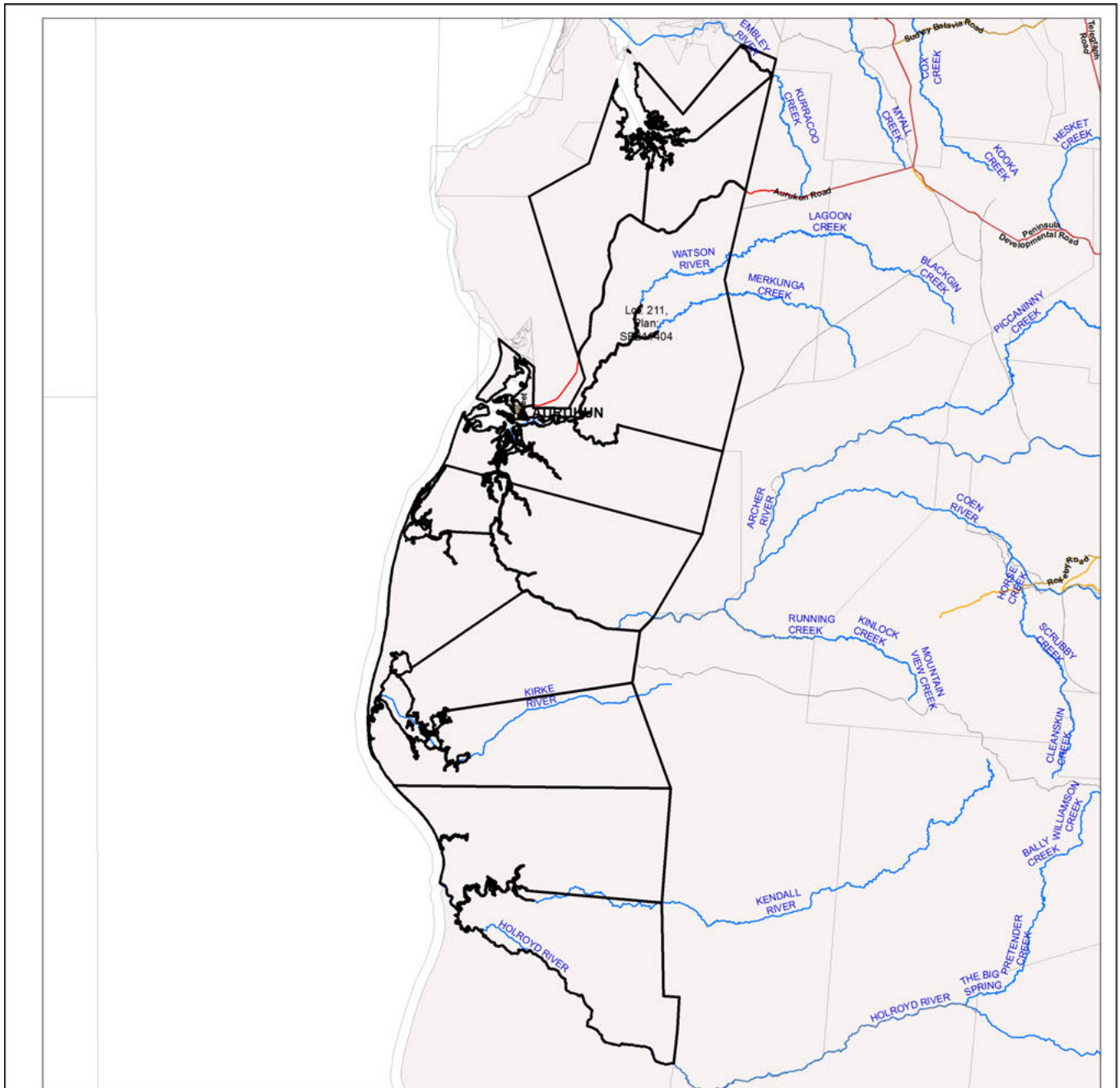
Visit <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

7. Koala protection framework details for Lot: 211 Plan: SP241404

7.1 Koala districts

(no results)

7.2 Koala priority area, koala habitat area and identified koala broad-hectare area map



Koala priority area, koala habitat area and identified koala broad-hectare area map

Legend

- Selected Lot and Plan
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Koala priority area
- Identified koala broad-hectare area
- Cadastral Boundaries
- Towns
- Highway
- Connector
- Street/Local Road
- Major rivers/creeks
- Queensland

The koala habitat mapping within South East Queensland uses regional ecosystem line work compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



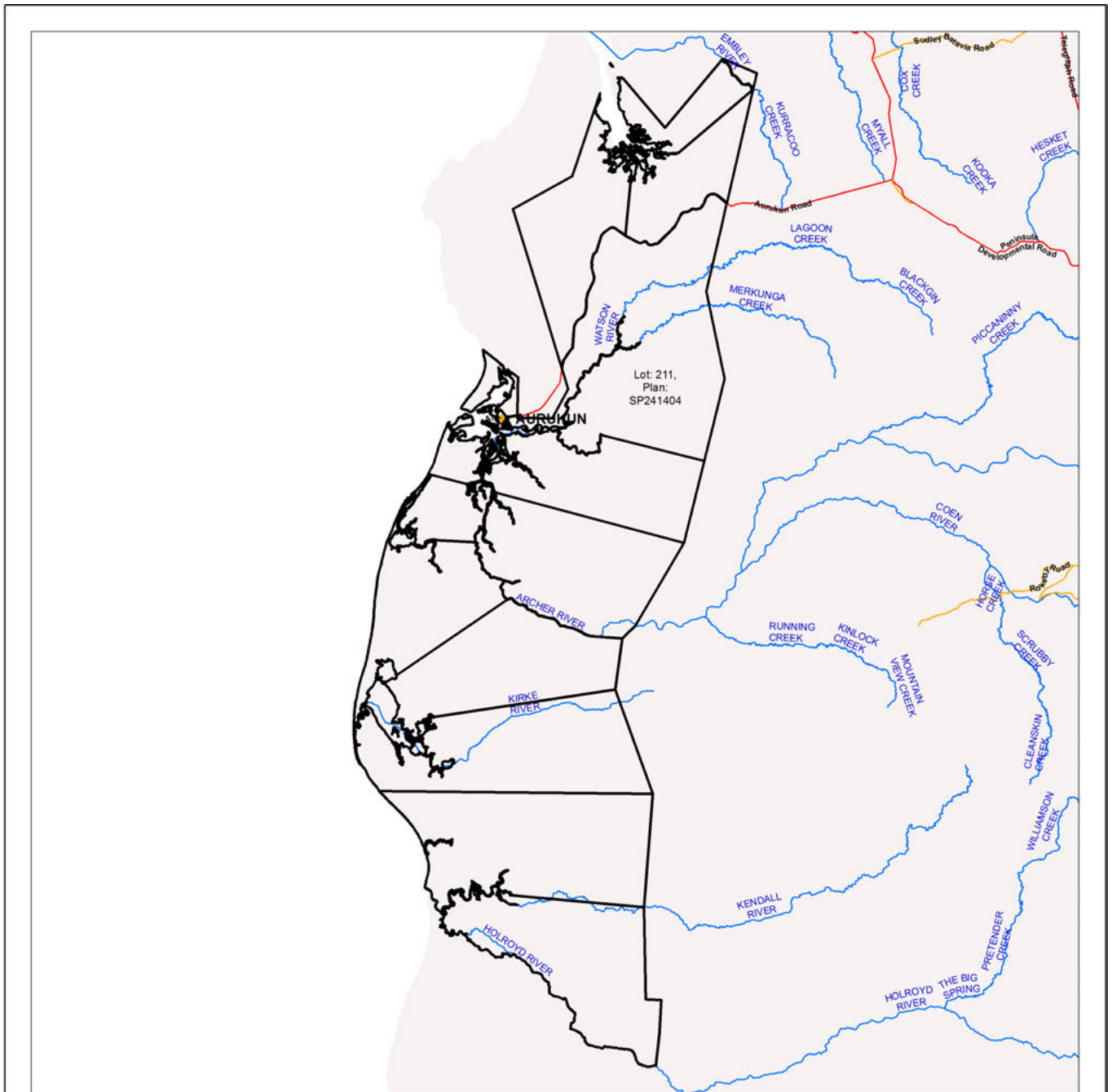
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The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.









In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at:
<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/>.
 The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

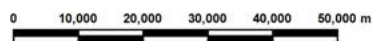
7.3 Koala habitat regional ecosystems for core koala habitat areas



Koala habitat regional ecosystems for core koala habitat areas

Legend

-  Selected Lot and Plan
-  Koala habitat area (core)
-  Towns
-  Highway
-  Connector
-  Street/Local Road
-  Major rivers/creeks
-  Queensland



The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
<ul style="list-style-type: none"> • Interference with overland flow • Earthworks, significant disturbance 	<i>Water Act 2000</i> <i>Soil Conservation Act 1986</i>	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au www.resources.qld.gov.au
<ul style="list-style-type: none"> • Indigenous Cultural Heritage 	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
<ul style="list-style-type: none"> • Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues 	<i>Environmental Protection Act 1994</i> <i>Coastal Protection and Management Act 1995</i> <i>Queensland Heritage Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
<ul style="list-style-type: none"> • Protected plants and protected areas 	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
<ul style="list-style-type: none"> • Koala mapping and regulations 	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
<ul style="list-style-type: none"> • Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures 	<i>Fisheries Act 1994</i> <i>Forestry Act 1959</i>	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
<ul style="list-style-type: none"> • Matters of National Environmental Significance including listed threatened species and ecological communities 	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
<ul style="list-style-type: none"> • Development and planning processes 	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
<ul style="list-style-type: none"> • Local government requirements 	<i>Local Government Act 2009</i> <i>Planning Act 2016</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
<ul style="list-style-type: none"> • Harvesting timber in the Wet Tropics of Qld World Heritage area 	<i>Wet Tropics World Heritage Protection and Management Act 1993</i>	Wet Tropics Management Authority	Ph: (07) 4241 0500 www.wettropics.gov.au

Appendix B

Database searches for Offset Area 2



Vegetation management report

For Lot: 1 Plan: YK4

14/03/2023

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Recent changes

Updated mapping

Updated vegetation mapping was released on 8 September 2022 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

The Department of Environment and Science have also updated their protected plant and koala protection mapping to align with the Queensland Herbarium scientific updates.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:

- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

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1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 1 Plan: YK4, are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
1	YK4	Lands Lease	890,000,000

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does this property have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 1 Plan: YK4, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Cook Shire

Bioregion(s)	Subregion(s)
Cape York Peninsula	Weipa Plateau

Catchment(s)
Archer
Watson
Embley

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the *Vegetation Management Regulation 2012*, the *Planning Act 2016* and the *Planning Regulation 2017*, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the *Vegetation Management Regulation 2012*; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions>.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes>

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at

<https://apps.dnrm.qld.gov.au/vegetation/>

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans>

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval.

Information on how to apply for a development approval is available at

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development>

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

Phone 135VEG (135 834)

Email vegetation@resources.qld.gov.au

Visit <https://www.resources.qld.gov.au/?contact=vegetation> to submit an online enquiry.

3. Vegetation management framework for Lot: 1 Plan: YK4

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 89401.78ha

Vegetation category	Area (ha)
Category A	113.8
Category B	88857.9
Category X	430.1

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

The following Property Map of Assessable Vegetation (PMAVs) may be present on this property:

Reference number

2009/009594

2010/004960

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/>

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
3.3.10	Least concern	B	1,949.70	Melaleuca fluviatilis and/or Melaleuca argentea woodland or M. saligna or M. dealbata woodland fringing watercourses	Mid-dense
3.3.20	Least concern	B	4,605.21	Corymbia clarksoniana or C. novoguineensis woodland on alluvial plains	Sparse
3.3.24	Least concern	B	2,081.88	Eucalyptus leptophleba +/- Erythrophleum chlorostachys woodland on riverine levees and alluvial plains	Sparse
3.3.28	Least concern	B	318.41	Eucalyptus platyphylla and Corymbia clarksoniana woodland on alluvial plains	Sparse
3.3.31	Least concern	B	253.22	Eucalyptus tetrodonta +/- Corymbia spp. woodland on coastal plains	Sparse
3.3.38	Least concern	B	65.63	Deciduous notophyll and/or microphyll vine thicket +/- Lagerstroemia archeriana on heavy clay alluvium	Dense
3.3.49	Least concern	A	11.38	Melaleuca viridiflora +/- Corymbia clarksoniana low open woodland on floodplains and alluvial plains	Very sparse
3.3.49	Least concern	B	8,178.33	Melaleuca viridiflora +/- Corymbia clarksoniana low open woodland on floodplains and alluvial plains	Very sparse
3.3.49	Least concern	X	less than 0.01	Melaleuca viridiflora +/- Corymbia clarksoniana low open woodland on floodplains and alluvial plains	Very sparse
3.3.5	Least concern	B	807.05	Evergreen to semi-deciduous notophyll vine forest on alluvia on major watercourses	Dense
3.3.50	Least concern	B	2,104.51	Melaleuca spp. woodland on swamps on floodplains and non-floodplain landforms	Sparse
3.3.66	Least concern	B	249.61	Lakes and lagoons dominated by a variety of aquatic plants, frequently with fringing woodlands or sedgelands	Other
3.5.36	Least concern	B	5,580.54	Eucalyptus tetrodonta and Corymbia nesophila woodland to open forest on undulating plains and remnant plateaus	Sparse
3.5.39	Least concern	A	68.27	Eucalyptus tetrodonta +/- Corymbia clarksoniana woodland on sand plains	Sparse
3.5.39	Least concern	B	38,483.70	Eucalyptus tetrodonta +/- Corymbia clarksoniana woodland on sand plains	Sparse
3.5.39	Least concern	X	less than 0.01	Eucalyptus tetrodonta +/- Corymbia clarksoniana woodland on sand plains	Sparse
3.5.41	Least concern	B	1,517.55	Melaleuca viridiflora +/- Corymbia clarksoniana woodland to low open woodland on plains	Sparse

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
3.7.3	Least concern	B	161.18	Eucalyptus cullenii +/- E. tetradonta woodland on erosional escarpments and plains	Sparse
3.7.4	Least concern	B	653.26	Eucalyptus tetradonta and Corymbia stockeri woodland on ironstone knolls and slopes	Sparse
3.9.4	Least concern	A	34.13	Eucalyptus leptophleba +/- Corymbia dallachiana or Eucalyptus platyphylla open woodland on rolling plains	Very sparse
3.9.4	Least concern	B	21,474.22	Eucalyptus leptophleba +/- Corymbia dallachiana or Eucalyptus platyphylla open woodland on rolling plains	Very sparse
3.9.4	Least concern	X	less than 0.01	Eucalyptus leptophleba +/- Corymbia dallachiana or Eucalyptus platyphylla open woodland on rolling plains	Very sparse
3.9.5	Least concern	B	374.87	Corymbia papuana open woodland on rolling plains	Very sparse
non-rem	None	X	430.15	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

Vegetation management wetlands are present on this property and are shown on the vegetation management supporting map in section 4.2 of this report.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential

habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

- 1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
- 2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

No records

3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Non Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

No Class A

Class B (with urban areas masked as per SPP): 64371.72ha

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 1 Plan: YK4.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:

<https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form>

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new [property maps of assessable vegetation \(PMAV\)](#).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

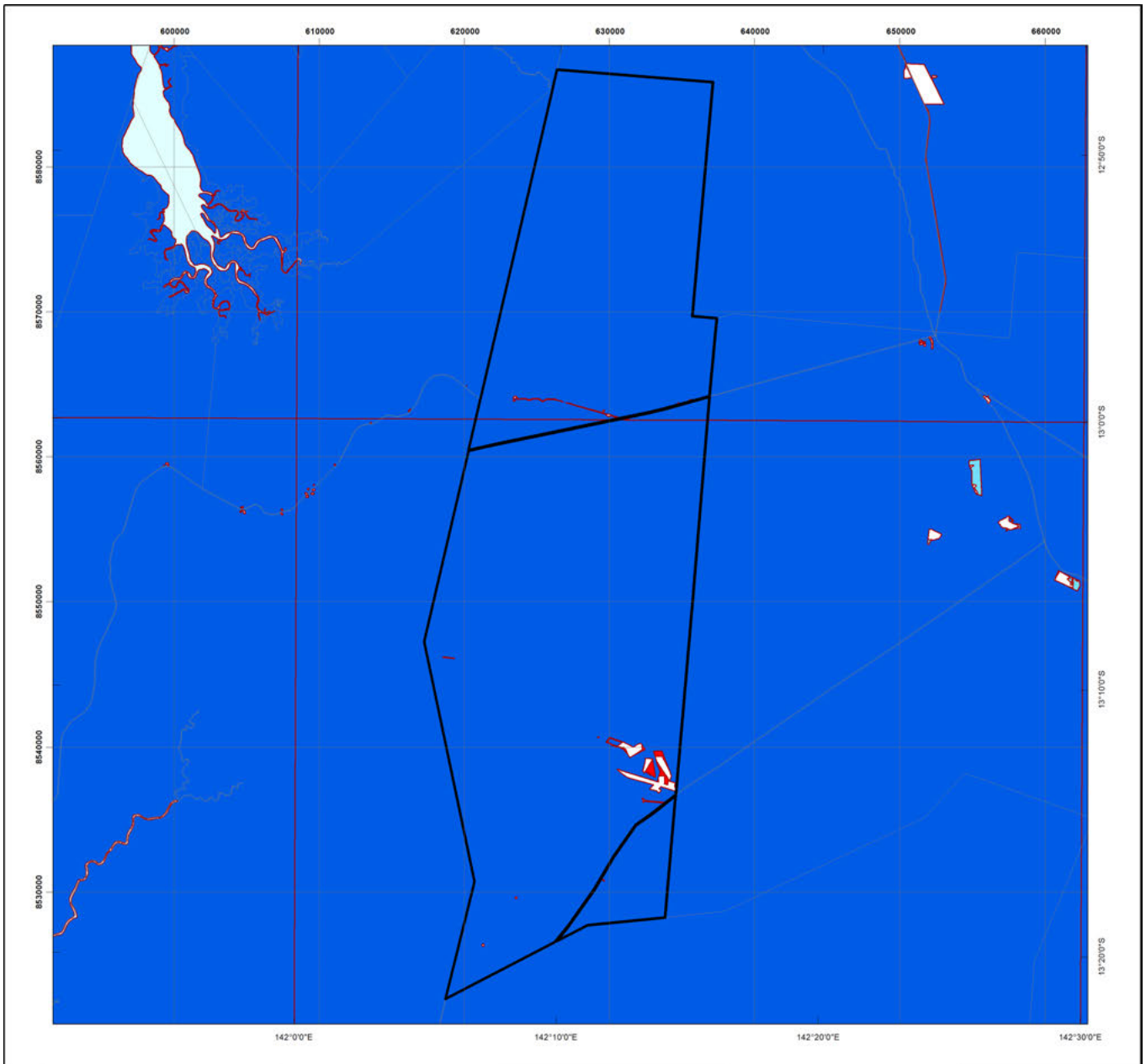
Coastal/non-coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

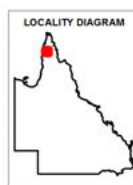
4.1 Regulated vegetation management map



Regulated Vegetation Management Map

Legend

- Selected Lot and Plan
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Other land parcel boundaries



This product is projected into:
GDA 1994 MGA Zone 54

Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries are provided as locational aid only.

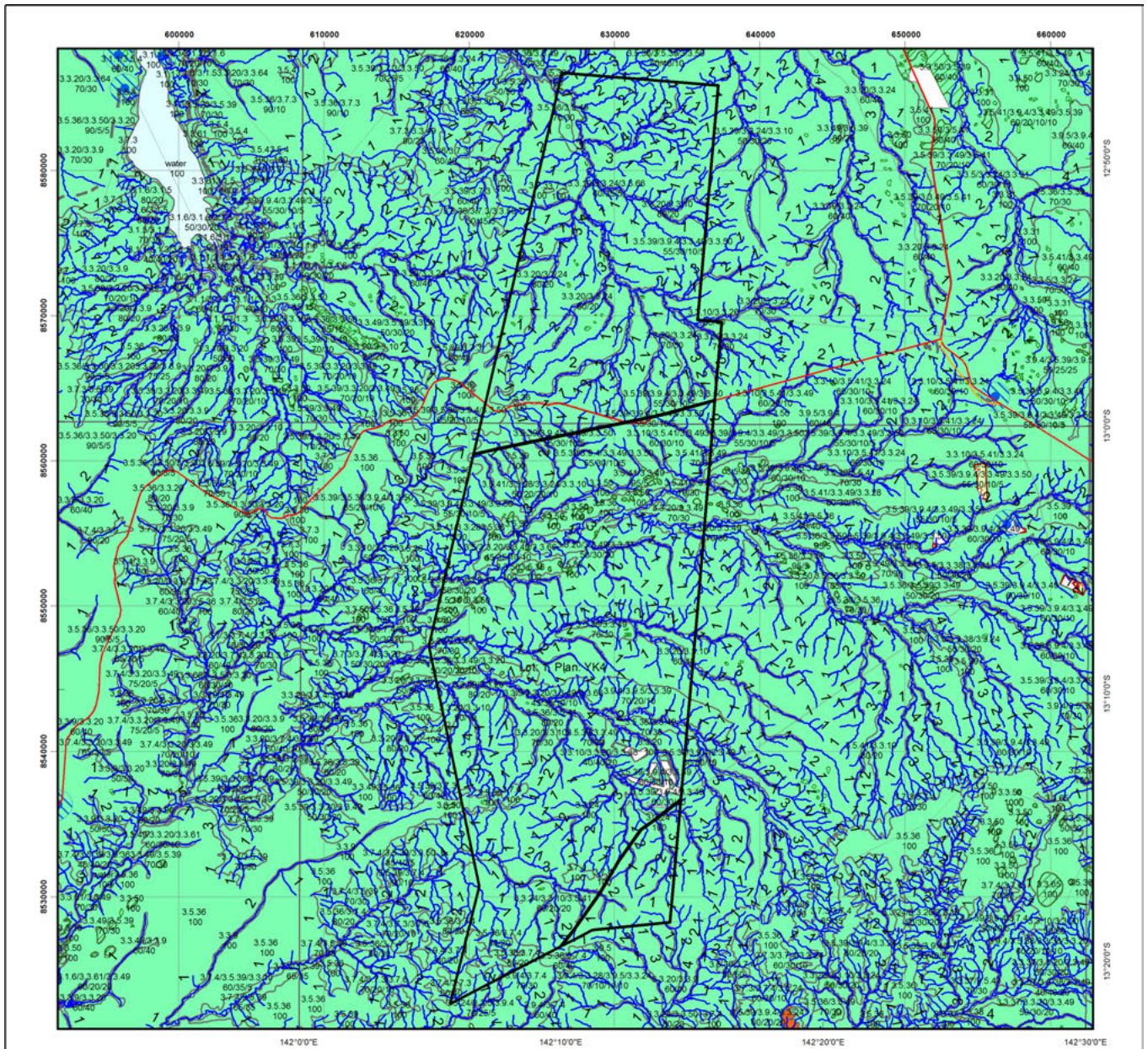
This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.



Queensland Government

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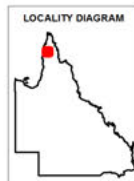
4.2 Vegetation management supporting map



Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries



0 2,700 5,400 8,100 10,800 13,500 m

This product is projected into:
GDA 1994 MGA Zone 54

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

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Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>





Land parcel boundaries are provided as locational aid only.

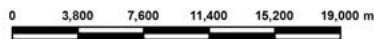
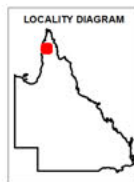
4.3 Coastal/non-coastal map



Coastal/Non Coastal Map

Legend

-  Selected Lot and Plan
-  Coastal
-  Non Coastal
-  Other land parcel boundaries



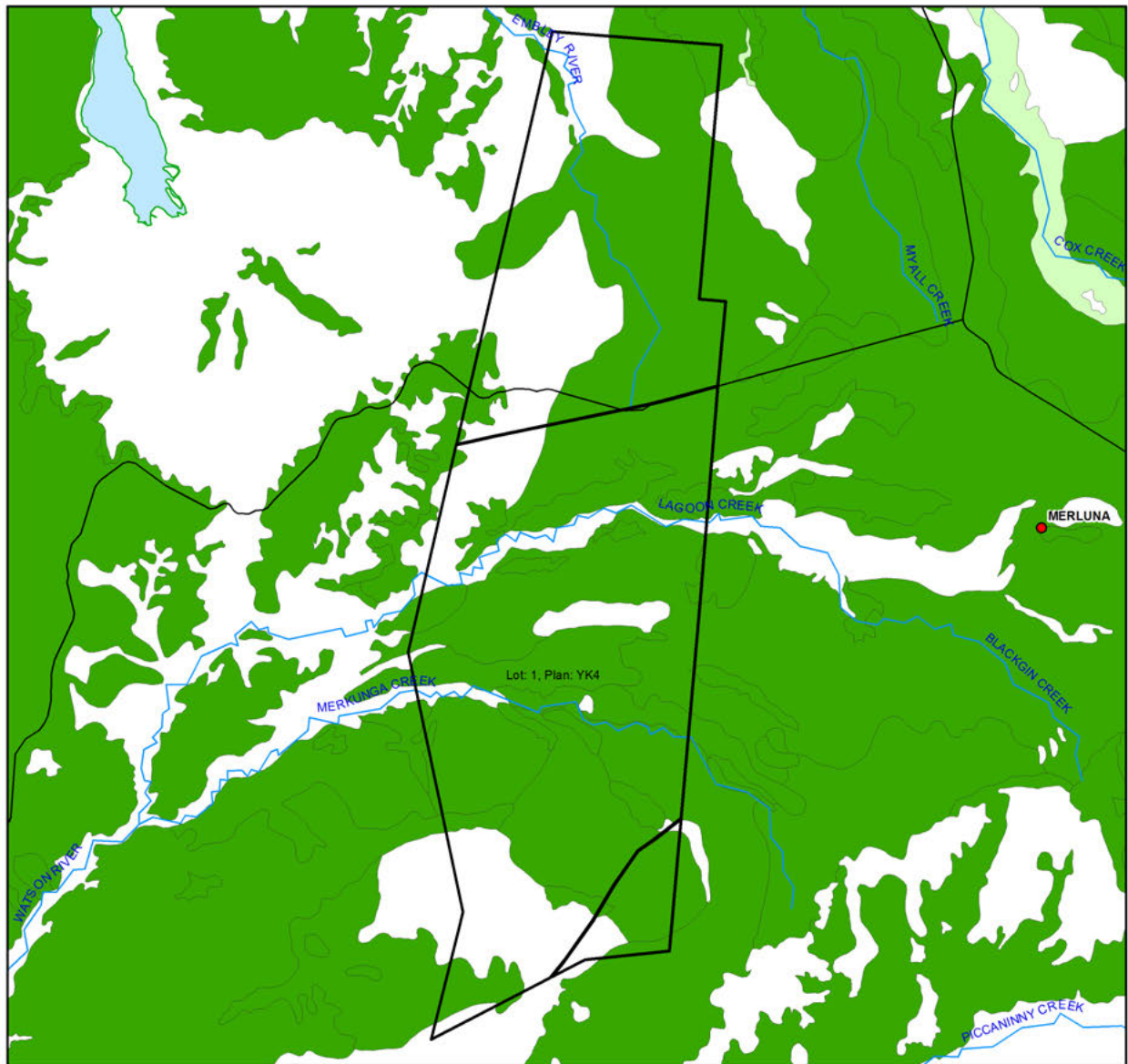
This product is projected into:
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Land parcel boundaries shown are provided as a locational aid only.



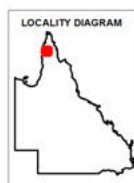
4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

Legend

- Selected Lot and Plan
- Towns
- Rivers and creeks
- Freeways / motorways; Highways
- Secondary roads; Streets
- Agricultural land class A or B
 - A
 - B
 - Not class A or B



0 3800 7600 11400 15200 19000 m

This product is projected into GDA 1994 MGA Zone 54

Disclaimer

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5. Protected plants framework (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the [Nature Conservation Act 1992](#) (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see [Operational policy: When a protected plant in Queensland is considered to be 'in the wild'](#)) that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the [Flora survey guidelines](#). The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of a threatened or near threatened plant can be avoided, the clearing activity is exempt from a permit. An [exempt clearing notification form](#) must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the [clearing permit application form](#).

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DES

For further information on the protected plants framework:

Phone 1300 130 372 (and select option four)

Email palm@des.qld.gov.au

Visit <https://www.qld.gov.au/environment/plants-animals/plants/protected-plants>

5.5 Protected plants flora survey trigger map

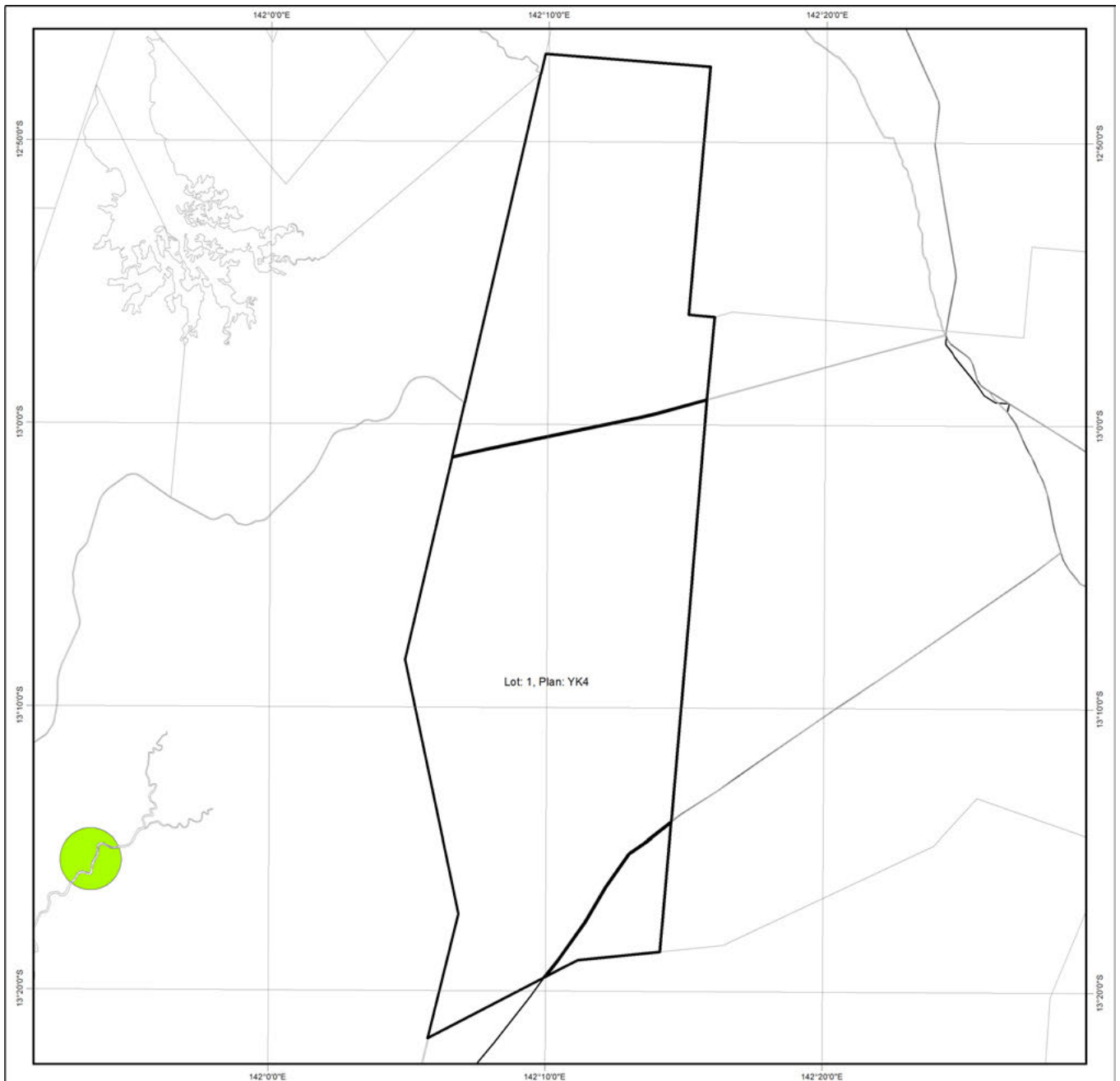
This map included may also be requested individually at: <https://apps.des.qld.gov.au/map-request/flora-survey-trigger/>.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

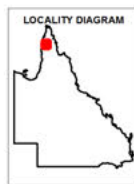
Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.



Protected Plants Flora Survey Trigger Map

Legend

- Selected Lot and Plan
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:
GDA 1994 MGA Zone 54

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

6. Koala protection framework (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document [Spatial modelling in South East Queensland](#).

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document [Guideline - Requests to make, amend or revoke a koala habitat area determination](#).

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps>. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley,

Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

- 1) Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
- 2) Does not include destroying standing vegetation by stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the [Planning Regulation 2017](#). More information on exempted development can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:
 - the local government planning scheme makes the development assessable;
 - the premises includes an area that is both a koala priority area and a koala habitat area; and
 - the development does not involve interfering with koala habitat (defined above); and
- development in identified koala broad-hectare areas.

The [Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks](#) outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the [Nature Conservation \(Koala\) Conservation Plan 2017](#) prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DES

For further information on the koala protection framework:

Phone 13 QGOV (13 74 68)

Email koala.assessment@des.qld.gov.au

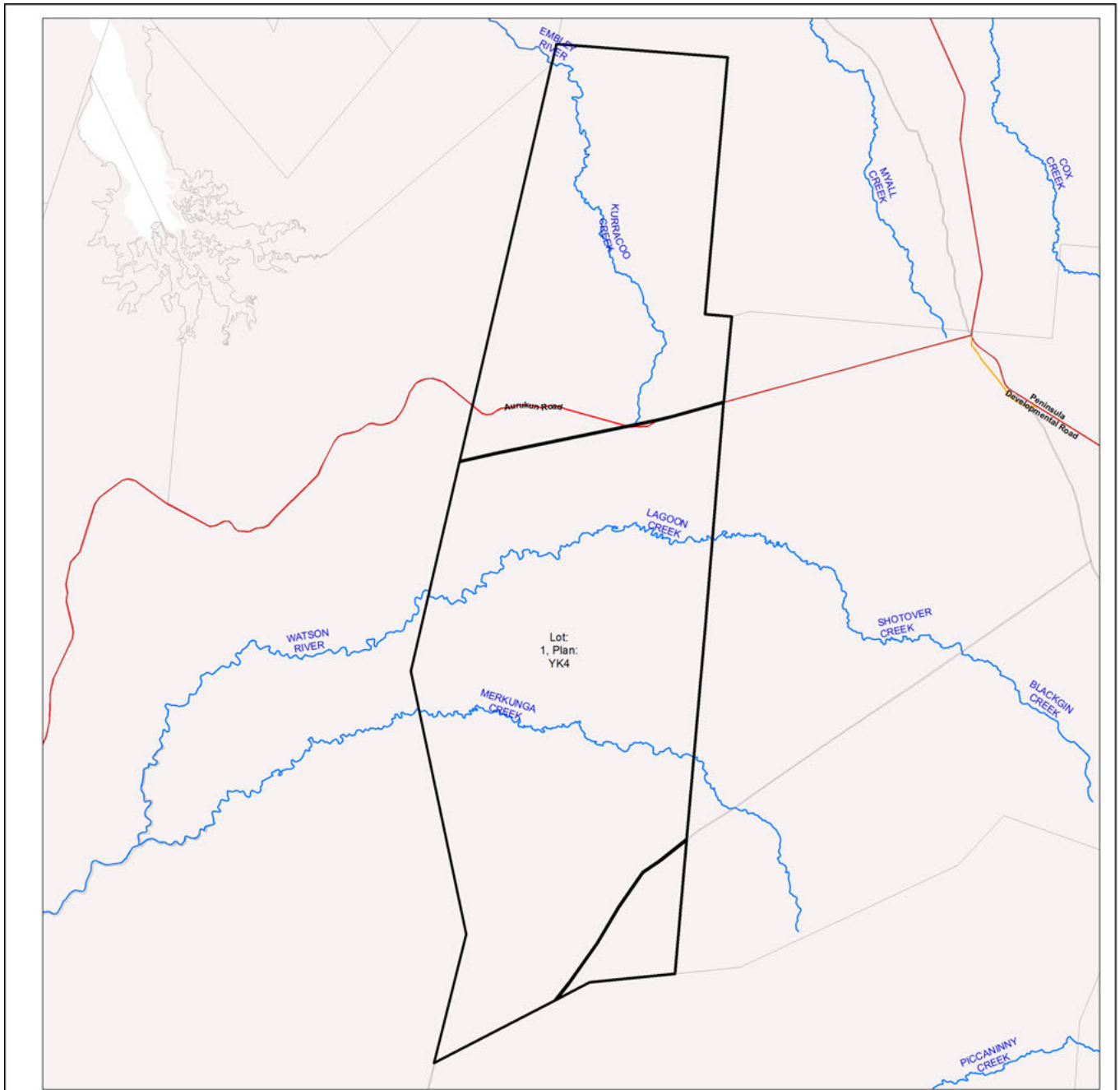
Visit <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

7. Koala protection framework details for Lot: 1 Plan: YK4

7.1 Koala districts













(no results)

7.2 Koala priority area, koala habitat area and identified koala broad-hectare area map

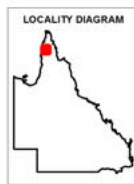


Koala priority area, koala habitat area and identified koala broad-hectare area map

Legend

-  Selected Lot and Plan
-  Koala habitat area (core)
-  Koala habitat area (locally refined)
-  Koala priority area
-  Identified koala broad-hectare area
-  Cadastral Boundaries
-  Towns
-  Highway
-  Connector
-  Street/Local Road
-  Major rivers/creeks
-  Queensland

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



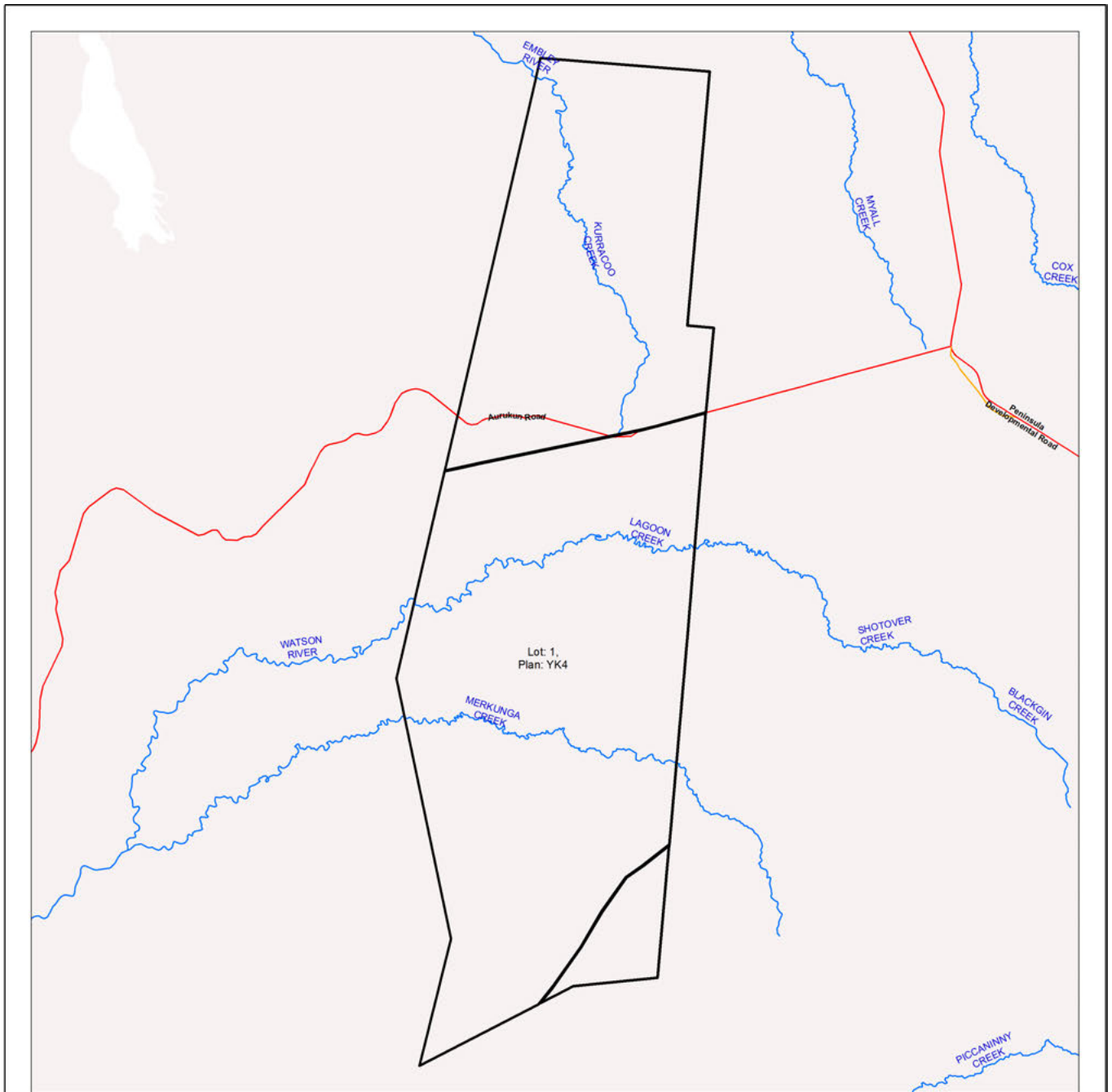
Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Environment and Science acting on behalf of the State of Queensland makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason. Due to varying sources of data, spatial locations may not coincide when overlaid.

The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at:
<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/>.
 The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

7.3 Koala habitat regional ecosystems for core koala habitat areas



Koala habitat regional ecosystems for core koala habitat areas

Legend

-  Selected Lot and Plan
-  Koala habitat area (core)
-  Towns
-  Highway
-  Connector
-  Street/Local Road
-  Major rivers/creeks
-  Queensland



DISCLAIMER:

While every care is taken to ensure the accuracy of this product, the Department of Environment and Science acting on behalf of the State of Queensland makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason. Due to varying sources of data, spatial locations may not coincide when overlaid.

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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This product is projected into GDA 1994 MGA Zone 54

8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
<ul style="list-style-type: none"> • Interference with overland flow • Earthworks, significant disturbance 	<i>Water Act 2000</i> <i>Soil Conservation Act 1986</i>	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au www.resources.qld.gov.au
<ul style="list-style-type: none"> • Indigenous Cultural Heritage 	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
<ul style="list-style-type: none"> • Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues 	<i>Environmental Protection Act 1994</i> <i>Coastal Protection and Management Act 1995</i> <i>Queensland Heritage Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
<ul style="list-style-type: none"> • Protected plants and protected areas 	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
<ul style="list-style-type: none"> • Koala mapping and regulations 	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
<ul style="list-style-type: none"> • Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures 	<i>Fisheries Act 1994</i> <i>Forestry Act 1959</i>	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
<ul style="list-style-type: none"> • Matters of National Environmental Significance including listed threatened species and ecological communities 	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
<ul style="list-style-type: none"> • Development and planning processes 	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
<ul style="list-style-type: none"> • Local government requirements 	<i>Local Government Act 2009</i> <i>Planning Act 2016</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
<ul style="list-style-type: none"> • Harvesting timber in the Wet Tropics of Qld World Heritage area 	<i>Wet Tropics World Heritage Protection and Management Act 1993</i>	Wet Tropics Management Authority	Ph: (07) 4241 0500 www.wettropics.gov.au

Appendix C

EPBC Act Offset calculators

C.1 Option Area 1

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Palm Cockatoo
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	8531	Hectares	
			Quality	7	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																											
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source											
<i>Ecological Communities</i>																											
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset)		Risk of loss (% with offset)																		
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0																			
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)																		
<i>Threatened species habitat</i>																											
Area of habitat	Yes	5971.70	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	38000	Risk of loss (% without offset)	1%	Risk of loss (% with offset)	0%	Raw gain	380.00	Confidence in result (%)	80%	Adjusted gain	304.00	Net present value	292.09	% of impact offset	6017.09	100.76%	Yes			
					Future area without offset (adjusted hectares)	37620.0	Future area with offset (adjusted hectares)	38000.0																			
					Time until ecological benefit	20	Start quality (scale of 0-10)	7	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	8	Raw gain	2.00	Confidence in result (%)	80%	Adjusted gain	1.60	Net present value	1.54							
<i>Threatened species</i>																											
Birth rate e.g. Change in nest success	No																										
Mortality rate e.g. Change in number of road kills per year	No																										
Number of individuals e.g. Individual plants/animals	No																										

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	5971.7	6017.09	100.76%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

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

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	8,781	Hectares	
			Quality	7	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate <small>e.g. Change in nest success</small>	No					
Mortality rate <small>e.g. Change in number of road kills per year</small>	No					
Number of individuals <small>e.g. Individual plants/animals</small>	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
<i>Ecological Communities</i>																				
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset)		Risk of loss (% with offset)		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source		
							Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0										
							Time until ecological benefit		Start quality (scale of 0-10)										Future quality without offset (scale of 0-10)	
<i>Threatened species habitat</i>																				
Area of habitat	Yes	6146.70	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	42500	Risk of loss (% without offset)	5%	Risk of loss (% with offset)	0%	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
									Future area without offset (adjusted hectares)	40375.0	Future area with offset (adjusted hectares)	42500.0								
									Time until ecological benefit	20	Start quality (scale of 0-10)	7								
<i>Threatened species</i>																				
Birth rate <small>e.g. Change in nest success</small>	No																			
Mortality rate <small>e.g. Change in number of road kills per year</small>	No																			
Number of individuals <small>e.g. Individual plants/animals</small>	No																			

Summary								
	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Summary	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	6146.7	6160.22	100.22%	Yes	\$0.00	N/A	\$0.00
	Area of community	0				\$0.00		\$0.00
						\$0.00	\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Masked Owl
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	8781	Hectares	
			Quality	5	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source				
<i>Ecological Communities</i>																				
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset) Future area without offset (adjusted hectares)	0.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0.0										
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)												
					<i>Threatened species habitat</i>															
Area of habitat	Yes	4390.50	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	26000	Risk of loss (% without offset) Future area without offset (adjusted hectares)	5% 24700.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0% 26000.0	1300.00	80%	1040.00	999.26	4396.75	100.14%	Yes	
					Time until ecological benefit	20	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	6	2.00	80%	1.60	1.54				
					<i>Threatened species</i>															
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value	Future value without offset	Future value with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source				
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g. Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	4390.5	4396.75	100.14%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Black-Footed Tree-Rat
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	6885	Hectares	
			Quality	7	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																														
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source														
<i>Ecological Communities</i>																														
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset)		Risk of loss (% with offset)																					
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0																						
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)																					
<i>Threatened species habitat</i>																														
Area of habitat	Yes	4819.57	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	28000	Risk of loss (% without offset)	5%	Risk of loss (% with offset)	0%	Raw gain	1400.00	Confidence in result (%)	80%	Adjusted gain	1120.00	Net present value (adjusted hectares)	1076.13	% of impact offset	4950.18	102.71%	Minimum (90%) direct offset requirement met?	Yes	Cost (\$ total)		Information source		
					Future area without offset (adjusted hectares)	26600.0	Future area with offset (adjusted hectares)	28000.0																						
					Time until ecological benefit	20	Start quality (scale of 0-10)	7	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	8	Raw gain	2.00	Confidence in result (%)	80%	Adjusted gain	1.60	Net present value (adjusted hectares)	1.54										
<i>Threatened species</i>																														
Birth rate e.g. Change in nest success	No																													
Mortality rate e.g. Change in number of road kills per year	No																													
Number of individuals e.g. Individual plants/animals	No																													

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	4819.57	4950.18	102.71%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

C.2 Option Area 2

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Black-footed Tree-Rat
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	6885	Hectares	
			Quality	7	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																			
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source			
<i>Ecological Communities</i>																			
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset) Future area without offset (adjusted hectares)	0.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0.0									
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)											
					<i>Threatened species habitat</i>														
Area of habitat	Yes	4819.57	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	24000	Risk of loss (% without offset) Future area without offset (adjusted hectares)	1% 23760.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0% 24000.0	240.00	80%	192.00	184.48			
					Time until ecological benefit	20	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	7	3.00	70%	2.10	2.02	4923.28	102.15%	Yes
					<i>Threatened species</i>														
<i>Threatened species</i>																			
Birth rate e.g. Change in nest success	No																		
Mortality rate e.g. Change in number of road kills per year	No																		
Number of individuals e.g. Individual plants/animals	No																		

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	4819.57	4923.28	102.15%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Palm Cockatoo
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	8531	Hectares	
			Quality	7	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																											
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source											
<i>Ecological Communities</i>																											
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset)		Risk of loss (% with offset)																		
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0																			
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)																		
<i>Threatened species habitat</i>																											
Area of habitat	Yes	5971.70	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	38000	Risk of loss (% without offset)	1%	Risk of loss (% with offset)	0%	Raw gain	380.00	Confidence in result (%)	80%	Adjusted gain	304.00	Net present value	292.09	% of impact offset	6017.09	100.76%	Yes			
					Future area without offset (adjusted hectares)	37620.0	Future area with offset (adjusted hectares)	38000.0																			
					Time until ecological benefit	20	Start quality (scale of 0-10)	7	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	8	Raw gain	2.00	Confidence in result (%)	80%	Adjusted gain	1.60	Net present value	1.54							
<i>Threatened species</i>																											
Birth rate e.g. Change in nest success	No																										
Mortality rate e.g. Change in number of road kills per year	No																										
Number of individuals e.g. Individual plants/animals	No																										

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	5971.7	6017.09	100.76%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

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

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	8781	Hectares	
			Quality	7	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source				
<i>Ecological Communities</i>																				
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset) Future area without offset (adjusted hectares)	0.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0.0										
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)												
					<i>Threatened species habitat</i>															
Area of habitat	Yes	6146.70	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	38000	Risk of loss (% without offset) Future area without offset (adjusted hectares)	1% 37620.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0% 38000.0	380.00	80%	304.00	239.48	6414.98	104.36%	Yes	
					Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	8	3.00	70%	2.10	1.65				
					<i>Threatened species</i>															
<i>Threatened species</i>																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g. Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	6146.7	6414.98	104.36%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Masked Owl
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	8781	Hectares	
			Quality	5	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source				
<i>Ecological Communities</i>																				
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset) Future area without offset (adjusted hectares)	0.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0.0										
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	Future quality with offset (scale of 0-10)												
					<i>Threatened species habitat</i>															
Area of habitat	Yes	4390.50	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	28000	Risk of loss (% without offset) Future area without offset (adjusted hectares)	1% 27720.0	Risk of loss (% with offset) Future area with offset (adjusted hectares)	0% 28000.0	280.00	80%	224.00	215.23	4390.60	100.00%	Yes	
					Time until ecological benefit	20	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	6	2.00	80%	1.60	1.54				
					<i>Threatened species</i>															
<i>Threatened species</i>																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g. Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	4390.5	4390.60	100.00%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

Appendix D

EPBC Act Offset calculators: input justification

D.1 Input Justification: Impact Area

The following tables provide the input justification for that part of the EPBC Act Offset Calculators related to the Impact Area.

Table D.1 Impact Area: EPBC offset assessment guide input justification – Palm Cockatoo

Aspect	Score	Justification
Area of habitat (ha)	8,531.8	The total area of Palm Cockatoo habitat being impacted is 8,531.8.
Habitat quality score (1-10)	7/10	The quality of Palm Cockatoo habitat in the impact site is assessed as being a 7 out of 10 , comprising: <ul style="list-style-type: none"> • 2 out of 4 for site condition • 2 out of 3 for site context • 3 out of 3 for stocking rate.
Site Condition	2/4	<p>The species breeding and foraging habitat areas are remnant vegetation.</p> <p>The species inhabits closed forest and riparian systems as well as open woodland adjacent to these habitats. All remnant forests within the impact area provided potential habitat for the species. Breeding habitat on western Cape York overwhelmingly occurs within 1,500 m of riparian and alluvial vegetation along watercourses (RE3.3.9a; RE3.3.20), rainforest (RE3.3.5) or other closed forest vegetation (RE3.5.4), and within the riparian/alluvial vegetation, rainforest, or other closed forest itself. The use of the breeding habitat within the 1,500 m distance from riparian or rainforest vegetation on western Cape York, appears to be noticeably gradational, where used hollows are found in much higher density closer to the boundary between riparian/woodland habitats (Ecotone 2023). Approximately 80% of hollows selected for display or breeding may be found within the first 550 m from the riparian vegetation boundary (Ecotone 2023).</p> <p>Degrading factors to vegetation condition are inappropriate fire regimes. Frequent and intensive bushfires have been occurring in project site and more broadly. There was an extensive and hot bushfire in late 2022. These fires are modifying the understorey across large areas in the project site. Frequent fires have removed a lot of ground cover, shrubs and woody debris. They are also limiting growth of trees with areas supporting a lower abundance of large trees.</p> <p>The vegetation closely fringing creeks is relatively intact, in part due to an absence of fire. Overall, the habitat for this species throughout the project site is in moderate to good condition. Within the project site, a number of threats were evident to the Palm Cockatoo populations and associated habitat condition including:</p> <ul style="list-style-type: none"> • bushfire – too frequent and intense fires resulting in: <ul style="list-style-type: none"> – loss of existing hollow-bearing trees – lack of fallen woody debris – lack of understorey species and reduced recruitment – loss of foraging resources • feral cats and pigs • weeds.

Table D.1 **Impact Area: EPBC offset assessment guide input justification – Palm Cockatoo**

Aspect	Score	Justification
Site Context	2/3	<p>The Palm Cockatoo in Australia has a relatively restricted range, being found only on Cape York Peninsula. Individuals recorded in the terrestrial ecology study area are not at the limit of the species range within Australia, which extends throughout the Cape from approximately 200 km south of the terrestrial ecology study area near Pormpuraaw on the west coast and Princess Charlotte Bay on the east coast of the Cape to the northern tip of the Cape.</p> <p>The project site is well connected to other large tracts of remnant vegetation and habitat for the species. To the west, there are existing developments including bauxite mines and townships of Aurukun and Weipa. However, this clearing is minor compared to extent of remnant vegetation remaining in Cape York across species distribution.</p> <p>The project site and surrounds are known to support populations of Palm Cockatoo.</p>
Stocking Rate	3/3	<p>Palm Cockatoo were observed through direct observation and from calls at seven locations in the terrestrial ecology study area, as part of seasonal surveys for this project. This was primarily along Coconut and Tapplebang creeks in Swamp Box fringing forest, but also in adjacent Eucalyptus and Corymbia woodland to tall woodland. The species assessment in EIS has concluded that this population is considered likely to be an important population.</p> <p>Given the restricted distribution to Cape York and low breeding success of this species, all individuals of Palm Cockatoo are likely to form part of one key source population for breeding and dispersal.</p>

Table D.2 Impact Area: EPBC offset assessment guide input justification – Red Goshawk

Aspect	Score	Justification
Area of habitat (ha)	8,781	The total area of Red Goshawk habitat being impacted is 8,781 ha.
Habitat quality score (1-10)	7/10	<p>The quality of Red Goshawk habitat in the impact site are assessed as being an 8 out of 10, comprising:</p> <ul style="list-style-type: none"> • 2 out of 4 for site condition • 2 out of 3 for site context • 3 out of 3 for stocking rate.
Site Condition	2/4	<p>Red Goshawk habitat is described as ‘coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests, usually on fertile soils’ (TSSC 2015a). The species is known to avoid very dense and very open habitats that don’t provide enough coverage for ambush of prey or inhibit fast flight and manoeuvring when hunting.</p> <p>The more recent Approved Conservation Advice (2023) describes breeding habitat as areas with large, tall trees (>14 m) within proximity to a watercourse (within 2.5 km), that occur within foraging habitat.</p> <p>All potential breeding and foraging habitat in the project site is remnant vegetation.</p> <p>All remnant habitats in the terrestrial ecology study area are considered to provide either potential breeding/nesting, hunting/foraging and/or dispersal habitat for this species (i.e. ‘coastal and sub-coastal tall open forests and woodlands’). Within the project site, this includes Eucalyptus and Corymbia woodland to tall woodland, Swamp Box fringing forest, Mixed foredune complex and Paperbark woodland and sedgelands due to the extensive remnant coverage of these structurally suitable communities, availability of tall trees and riparian forests. The impact area supports suitable vegetation communities within approximately 2.5 km of persistent water features, which are likely to be preferred as breeding/nesting habitat.</p> <p>Degrading factors to vegetation condition are inappropriate fire regimes. Frequent and intensive bushfires have been occurring in project site and more broadly. There was an extensive and hot bushfire in late 2022. These fires are modifying the understorey across large areas in the project site. Frequent fires have removed a lot of ground cover, shrubs and woody debris. They are also limiting growth of trees with areas supporting a lower abundance of large trees.</p> <p>The vegetation closely fringing creeks is relatively intact, in part due to an absence of fire. Overall, the habitat for this species throughout the project site is in moderate to good condition. Within the project site a number of threats were evident to the Red Goshawk and associated habitat condition including:</p> <ul style="list-style-type: none"> • bushfire – too frequent and intense fires resulting in: <ul style="list-style-type: none"> – loss of large trees they nest in – lack of fallen woody debris – lack of understorey species and reduced recruitment – creating more open woodlands making them less suitable for hunting – direct loss of prey being small and medium sized mammals • feral cats and pigs • weeds.

Table D.2 **Impact Area: EPBC offset assessment guide input justification – Red Goshawk**

Aspect	Score	Justification
Site Context	2/3	<p>Red goshawks are currently known to breed from the Kimberley, east to Cape York Peninsula, and on the Tiwi Islands (MacColl et al. 2021). They may still breed at very low densities in the Wet Tropics and Einasleigh Uplands though record data are scarce (MacColl et al. 2021). Birds recorded from far outside the breeding range in central Australia (Aumann 2001) and the Pilbara (L Trotter pers. comm. cited in MacColl et al. 2021) likely include both dispersive juveniles (Aumann 2001) and seasonal migrants from further north. The breeding range of red goshawks has significantly contracted since 1980. The species gradually declined to extinction in New South Wales over the 1980s and 1990s (Cooper et al. 2014) and populations in south-east Queensland largely disappeared before 2010 (Seaton 2014). Apart from the satellite-tracked birds, records south of Cape York Peninsula over the last decade are increasingly scant, although some places where the species has been recorded historically have not been surveyed recently (MacColl et al. 2021).</p> <p>The Project area within Cape York is an important breeding, foraging and refugia area for Red Goshawk. The vast areas of habitat provide important connectivity for the species within the site and the greater region. To the west, there are existing developments including bauxite mines and townships of Aurukun and Weipa. However, this clearing is minor compared to extent of remnant vegetation remaining in Cape York across species distribution. Two of the major threats in the project area are from habitat loss due to mining and bushfire.</p> <p>Due to recent uplisting of the species and known Red Goshawk populations in the project area, site context is considered high.</p>
Stocking Rate	3/3	<p>This species was recorded as part of bird surveys and, incidentally, at three locations in the terrestrial ecology study area during seasonal surveys for this project, in Eucalyptus and Corymbia woodland to tall woodland and Swamp Box fringing forest. It was recorded on a number of occasions at the Tapplebang Creek location. This species was also recorded at two locations along the Ward River downstream of the terrestrial ecology study area.</p> <p>Due to a small population size, all foraging and breeding habitat is considered critical to the survival of the species. Red goshawks naturally occur at low densities and require tracts of relatively intact and biodiverse land for hunting and nesting.</p>

Table D.3 Impact Area: EPBC offset assessment guide input justification – Black-footed Tree-Rat

Aspect	Score	Justification
Area of habitat (ha)	6,885.1	The total area of Black-footed Tree-Rat habitat being impacted is 6,885.1 ha.
Habitat quality score (1-10)	7/10	<p>The quality of Black-footed Tree-rat habitat in the impact site is assessed as being a 7 out of 10, comprising</p> <ul style="list-style-type: none"> • 2 out of 4 for site condition • 2 out of 3 for site context • 3 out of 3 for stocking rate.
Site condition	2/4	<p>The species inhabits Eucalypt forests and woodlands particularly in forests where suitable large hollows are plentiful. The species has also been known to den in large rainforest trees containing suitable hollows. All remnant habitats within the impact area provided potential habitat for the species (i.e. Eucalyptus and Corymbia woodland to tall woodland, Swamp Box fringing forest, Mixed foredune complex and Paperbark/ woodland and sedgeland). The impact area supports an abundance of potentially suitable hollow-bearing trees required for denning.</p> <p>Degrading factors to vegetation condition are inappropriate fire regimes. Frequent and intensive bushfires have been occurring in project site and more broadly. There was an extensive and hot bushfire in late 2022. These fires are modifying the understorey across large areas in the project site. Frequent fires have removed a lot of ground cover, shrubs and woody debris. They are also limiting growth of trees with areas supporting a lower abundance of large trees.</p> <p>The vegetation closely fringing creeks is relatively intact, in part due to an absence of fire. Overall the habitat for this species throughout the terrestrial ecology study area is in moderate to good condition. Within the project site a number of threats were evident to the Black-footed Tree-Rat populations and associated habitat including:</p> <ul style="list-style-type: none"> • bushfire – too frequent and intense fires resulting in: <ul style="list-style-type: none"> – loss of hollow-bearing trees – lack of fallen woody debris – lack of understorey species and reduced recruitment – direct loss of foraging resources • feral cats and pigs • weeds.
Site context	2/3	<p>The distribution of the Black-footed Tree-Rat in Australia is poorly known. It has been recorded mostly from eucalypt forests and woodlands (but not rainforests) around Mareeba, but there are records sparsely across Cape York Peninsula (TSSC 2015). The individual found within the project site falls within the species distribution range. The project site is well connected to other large tracts of remnant vegetation and habitat for the species. To the west, there are existing developments including bauxite mines and townships of Aurukun and Weipa. However, this clearing is minor compared to extent of remnant vegetation remaining in Cape York across species distribution. Three of the major threats in the project area are from mining, bushfire, and pest animals.</p>
Species stocking rate	3/3	<p>A single Black-footed Tree-Rat was recorded through direct observation of identifiable remains in Swamp Box fringing forest on Tapplebang Creek, and another individual was recorded on a camera trap in Eucalyptus and Corymbia woodland to tall woodland as part of seasonal surveys for this project.</p> <p>The species assessment in EIS has concluded that this population is considered likely to be an important population. Given the lack of knowledge on the species ecology, as well as the declining population size, the population of Black-footed Tree-Rat on the site are likely to form part of an important population for breeding and dispersal.</p>

Table D.4 Impact Area: EPBC offset assessment guide input justification – Masked Owl

Aspect	Score	Justification
Area of habitat (ha)	8,781	The total area of Masked Owl habitat being impacted is 8,781 ha.
Habitat quality score (1-10)	5/10	<p>The quality of Masked Owl habitat in the impact site are assessed as being a 5 out of 10 comprising</p> <ul style="list-style-type: none"> • 2 out of 4 for site condition • 2 out of 3 for site context • 1 out of 3 for stocking rate.
Site Condition	2/4	<p>The Masked Owl nests in large hollows in large trees, usually Eucalypts, and usually within closed forest (DAWE 2020c). Remnant habitats, including Eucalyptus and Corymbia woodland to tall woodland, Swamp Box fringing forest, Mixed foredune complex and Paperbark woodland and sedgeland, provide potentially suitable foraging, breeding/nesting and dispersal habitat within the impact areas.</p> <p>The impact area supports an abundance of potentially suitable hollow-bearing trees for nesting, therefore habitat in the study area is likely to provide foraging, breeding/nesting and dispersal habitat. All habitat for the Masked Owl is remnant vegetation.</p> <p>Degrading factors to vegetation condition are inappropriate fire regimes. Frequent and intensive bushfires have been occurring in project site and more broadly. There was an extensive and hot bushfire in late 2022. These fires are modifying the understorey across large areas in the project site. Frequent fires have removed a lot of ground cover, shrubs and woody debris. They are also limiting growth of trees with areas supporting a lower abundance of large trees.</p> <p>The vegetation closely fringing creeks is relatively intact, in part due to an absence of fire. Overall, the habitat for this species throughout the terrestrial ecology study area is in moderate to good condition. Within the project site, a number of threats were evident to the Masked Owl populations and associated habitat including:</p> <ul style="list-style-type: none"> • bushfire – too frequent and intense fires resulting in: <ul style="list-style-type: none"> – loss of hollow-bearing trees – lack of fallen woody debris – lack of understorey species and reduced recruitment – direct loss of foraging resources being small and medium size mammals • feral cats and pigs • weeds.
Site Context	2/3	<p>The population of Masked Owl in Cape York Peninsula is considered to be one of three subpopulations, the other two occurring in the Kimberley and Northern Territory. The Queensland subpopulation occurs in Cape York Peninsula and extends south along the southern rim of the Gulf of Carpentaria to Normanton in the west and down to the Atherton Tablelands in the east (DAWE 2020c). There is a relatively recent record approximately 60 km to the east of the terrestrial ecology study area (CSIRO 2020). Connectivity of habitat for the species is high.</p> <p>To the west there are existing developments including bauxite mines and townships of Aurukun and Weipa. However, this clearing is minor compared to extent of remnant vegetation remaining in Cape York across species distribution. Three of the major threats in the project area are from mining, bushfire and pest animals.</p> <p>The species has not been recorded in project site.</p>
Stocking Rate	1/3	<p>This species was not recorded in the terrestrial ecology study area during seasonal field surveys for the project. There are very few records of the species, and its distribution is poorly known. In Queensland, there are historical records from the Normanton region, and from Pascoe, Archer, Chester and Watson Rivers on Cape York Peninsula (Higgins 1999; Mees 1964; Storr 1984).</p> <p>This species is considered to have a moderate likelihood of occurrence in the study area, given nearby records and the presence of potentially suitable habitat.</p>

D.2 Input Justification: Option Area 1

The following tables summarise the inputs for each MNES offset calculator for Offset Area 1.

Table D.5 Offset Area 1: EPBC offset assessment guide input justification – Palm Cockatoo

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	7/10	<p>The impact site and offset site are similar in nature as they are located adjacent to each other, support similar vegetation communities, both on similar geologies, support watercourses of similar nature including riparian vegetation, and under similar climatic conditions including fire regimes. Therefore the same justification for each sub-element of habitat quality is the same.</p> <p>The starting quality of Palm Cockatoo habitat in the offset site has been assessed as per the impact site – 7 out of 10.</p>
Time until ecological benefit	20 years	<p>This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing hollows from hot bushfires, increase number of large trees and canopy cover, native species ground cover, increase recruitment and species diversity as well as woody debris.</p> <p>Feral animal populations will also be reduced.</p> <p>To achieve the performance outcomes 20 years is proposed.</p>
Risk of loss (%) without offset	5%	<p>This is a risk that Palm Cockatoo habitat on the offset site will be completely lost or experience significant loss of ecological function if the offset was not put into effect. The greatest risk may come from future bauxite mining as it is located in an existing MDL granted to the proponent and does contain bauxite resource as evident by its inclusion in Restricted Area 315. Endorsement from State Gov't would be required to place this area under an environmental offset and it would be removed from MDL and any future ML.</p> <p>If the area doesn't go to an offset there is a high chance future bauxite mining may be pursued.</p> <p>The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing for fencelines and native forestry. They may also choose to run livestock which could have a detrimental impact on habitat quality.</p> <p>The risk of loss without the offset has been set at 5%.</p>
Future quality without offset (1-10)	6/10	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place.</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p> <ul style="list-style-type: none"> • Inappropriate fire regimes which are showing to have a number of detrimental impacts on Palm Cockatoo such as: <ul style="list-style-type: none"> – Reduction in recruitment and growth of large trees that will form hollows in future – Potential loss of existing hollow-bearing trees from hot fires – Threat to their refugia in more dense riparian woodlands – Removing foraging material for Palm Cockatoo • Predation from feral cats • Habitat degradation from feral pigs • Changes in land use that could further degrade habitat such as grazing.

Table D.5 Offset Area 1: EPBC offset assessment guide input justification – Palm Cockatoo

		Without the offset being legally secured on title and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 6 out of 10 .										
Risk of loss (%) with offset	0%	With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low.										
Future quality with offset (1-10)	8/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Palm Cockatoo the habitat quality score is estimated to increase by one point to 8 out of 10 within 20 years due to the implementation of management measures.</p> <p>The largest change proposed is to the fire regime. Inappropriate fire regimes are a significant threat to palm cockatoos (Murphy et al., 2003). In some areas frequent, high-intensity fires are destroying nest trees directly, and may also indirectly reduce the number of breeding hollows available to palm cockatoos through the negative impacts on the abundance and diversity of termites (Abenspergtraun and Milewski 1995), which play a significant role in the creation of new hollows (Perry et al., 1985).</p> <p>The following actions will be implemented to improve habitat quality.</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</td> <td> <ul style="list-style-type: none"> • Protection of existing hollows suitable for Palm Cockatoo from inappropriate fire regimes including hot fires • Increasing number of large trees that will form hollows in the future • Protection of riparian vegetation communities and vine thickets which are refuge for Palm Cockatoo from hot bushfires • Improve availability of foraging resources for Palm Cockatoo from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. </td> </tr> <tr> <td>Implement a feral animal management program</td> <td> <ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Implement a weed management program</td> <td> <ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Manage land use</td> <td> <ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP </td> </tr> </tbody> </table>	Management action	Conservation outcome	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows suitable for Palm Cockatoo from inappropriate fire regimes including hot fires • Increasing number of large trees that will form hollows in the future • Protection of riparian vegetation communities and vine thickets which are refuge for Palm Cockatoo from hot bushfires • Improve availability of foraging resources for Palm Cockatoo from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems 	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems 	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP
Management action	Conservation outcome											
Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows suitable for Palm Cockatoo from inappropriate fire regimes including hot fires • Increasing number of large trees that will form hollows in the future • Protection of riparian vegetation communities and vine thickets which are refuge for Palm Cockatoo from hot bushfires • Improve availability of foraging resources for Palm Cockatoo from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 											
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Table D.5 Offset Area 1: EPBC offset assessment guide input justification – Palm Cockatoo

		Management action	• Conservation outcome
		Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of the active nest sites of Palm Cockatoo in the offset area so they can be better managed • Increase in Palm Cockatoo populations and breeding pairs utilising the offset area from year 1 to year 20 • Improved understanding of species habitat utilisation and dispersal
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires. The Australian Wildlife Conservancy (AWC) carry out Australia’s largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York which is confirmed to support Red Goshawk and Black-footed Tree Rat.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>	
Area of offset required	34,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 8,531 ha of remnant vegetation within the impact footprint.	
% of impact offset	104.69%	Based on inputs of 34,000 ha of habitat the calculator states 100.66% is delivered.	

Table D.6 Offset Area 1: EPBC offset assessment guide input justification – Red Goshawk

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	7/10	The impact site and offset site are similar in nature as they are located adjacent to each other, support similar vegetation communities, both on similar geologies, support watercourses and under similar climatic conditions including fire regimes. The starting quality of Red Goshawk habitat in the offset site has been assessed as per the impact site – 8 out of 10 .
Time until ecological benefit	20 years	This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing large trees suitable for nesting from hot bushfires, increase the number of large trees and canopy cover, increase native species ground cover, increase recruitment and species diversity as well as woody debris. To achieve the performance outcomes 20 years is proposed.
Risk of loss (%) without offset	5%	This is a risk that Red Goshawk habitat on the offset site will be completely lost or experience significant loss of ecological function if the offset was not put into effect. The greatest risk may come from future bauxite mining as it is located in an existing MDL granted to the proponent and does contain bauxite resource as evident by its inclusion in Restricted Area 315. Endorsement from State Gov't would be required to place this area under an environmental offset and it would be removed from MDL and any future ML. If the area doesn't go to an offset there is a high chance future bauxite mining may be pursued. The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing for fencelines and native forestry. They may also choose to run livestock which could have a detrimental impact on habitat quality. The risk of loss without the offset has been set at 5% .
Future quality without offset (1-10)	6/10	A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place. It has been assessed that habitat quality will go down at least one point over a 20 year period due to: <ul style="list-style-type: none"> • regular and hot bushfires occurring which are showing to have a number of detrimental impacts on Red Goshawk such as: <ul style="list-style-type: none"> – changing the composition of forest and woodland habitat to unsuitable hunting habitat (vegetation thickening) – preventing trees growing to suitable nesting height – loss of existing tall trees required for nesting – reduction in prey being small to medium sized mammals due to too frequent or too hot fires or feral cats • changes in land use. Possible grazing by livestock may alter the groundcover composition and in turn increase fire occurrence or intensity. Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 7 out of 10 .
Risk of loss (%) with offset	0%	With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low. The risk of loss with the offset has been set at 0% .

Table D.6 Offset Area 1: EPBC offset assessment guide input justification – Red Goshawk

Aspect	Score	Justification												
Future quality with offset (1-10)	8/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Red Goshawk the habitat quality score is estimated to increase by one point to 9 out of 10 within 20 years due to the implementation of management measures.</p> <p>The largest change proposed is to the fire regime. Inappropriate fire regimes are a significant threat to Red Goshawk.</p> <p>The following actions will be implemented to improve habitat quality</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</td> <td> <ul style="list-style-type: none"> Reduced likelihood Red Goshawk will abandon any existing nests by removing or reducing occurrence of hot bushfires Protection of existing large trees that Red Goshawk may nest in from hot bushfires Improving native species canopy cover and height through changed fire management regimes Increasing ground cover, woody debris and species recruitment and maintaining suitable hunting grounds through changed fire management regimes Increasing number of small and medium sized native mammals Increase in number of large (20 m) trees from year 1 to year 20 </td> </tr> <tr> <td>Implement a feral animal management program</td> <td> <ul style="list-style-type: none"> Reduction of feral pig populations Reduction of feral cat populations Increase in number of small and medium sized native mammals Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Implement a weed management program</td> <td> <ul style="list-style-type: none"> Reduction of non-native plant cover Reduction in fuel load and likelihood of hot bushfires occurring Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Manage land use</td> <td> <ul style="list-style-type: none"> Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use Restricted access Reduced likelihood of unplanned fires occurring No vegetation clearing unless authorised under OAMP No or restricted grazing </td> </tr> <tr> <td>Implement a species monitoring program</td> <td> <ul style="list-style-type: none"> Improved understanding of any active nest sites of Red Goshawk in the offset area so they can be better managed Improved understanding of species habitat utilisation and dispersal Demonstrated increase in small and medium sized mammals Improved understanding of relationship between fire regimes and small and medium sized mammal populations </td> </tr> </tbody> </table>	Management action	Conservation outcome	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> Reduced likelihood Red Goshawk will abandon any existing nests by removing or reducing occurrence of hot bushfires Protection of existing large trees that Red Goshawk may nest in from hot bushfires Improving native species canopy cover and height through changed fire management regimes Increasing ground cover, woody debris and species recruitment and maintaining suitable hunting grounds through changed fire management regimes Increasing number of small and medium sized native mammals Increase in number of large (20 m) trees from year 1 to year 20 	Implement a feral animal management program	<ul style="list-style-type: none"> Reduction of feral pig populations Reduction of feral cat populations Increase in number of small and medium sized native mammals Improvement in habitat quality of ecosystems 	Implement a weed management program	<ul style="list-style-type: none"> Reduction of non-native plant cover Reduction in fuel load and likelihood of hot bushfires occurring Improvement in habitat quality of ecosystems 	Manage land use	<ul style="list-style-type: none"> Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use Restricted access Reduced likelihood of unplanned fires occurring No vegetation clearing unless authorised under OAMP No or restricted grazing 	Implement a species monitoring program	<ul style="list-style-type: none"> Improved understanding of any active nest sites of Red Goshawk in the offset area so they can be better managed Improved understanding of species habitat utilisation and dispersal Demonstrated increase in small and medium sized mammals Improved understanding of relationship between fire regimes and small and medium sized mammal populations
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Implement a species monitoring program	<ul style="list-style-type: none"> Improved understanding of any active nest sites of Red Goshawk in the offset area so they can be better managed Improved understanding of species habitat utilisation and dispersal Demonstrated increase in small and medium sized mammals Improved understanding of relationship between fire regimes and small and medium sized mammal populations 													

Table D.6 **Offset Area 1: EPBC offset assessment guide input justification – Red Goshawk**

Aspect	Score	Justification
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	42,500	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 8,781 ha of remnant vegetation within the impact footprint.
% of impact offset	101.19%	Based on inputs of 42,500 ha of habitat the calculator states 101.19% is delivered.

Table D.7 Offset Area 1: EPBC offset assessment guide input justification – Black-footed Tree-Rat

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	7/10	<p>The impact site and offset site are similar in nature as they are located adjacent to each other, support similar vegetation communities, are both on similar geologies, support large hollow bearing tree habitat and are under similar climatic conditions including fire regimes.</p> <p>The starting quality of Black-footed Tree-Rat habitat in the offset site has been assessed as per the impact site – 7 out of 10.</p>
Time until ecological benefit	20 years	This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing hollows from hot bushfires, increase number of large trees and canopy cover, native species ground cover, increase recruitment and species diversity as well as woody debris. Feral animal and weed populations will also be reduced. To achieve the performance outcomes 20 years is proposed.
Risk of loss (%) without offset	5%	<p>This is a risk that Black-footed Tree-Rat habitat on the offset site will be completely lost or experience significant loss of ecological function if the offset was not put into effect. The greatest risk may come from future bauxite mining as it is located in an existing MDL granted to the proponent and does contain some bauxite resource.</p> <p>The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing for fencelines and native forestry. They may also choose to run livestock which is a known threat to Black-footed Tree-Rat habitat.</p> <p>The risk of loss without the offset has been set at 5%.</p>
Future quality without offset (1-10)	6/10	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place.</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p> <ul style="list-style-type: none"> • inappropriate fire regimes which are known to have a number of detrimental impacts on Black-footed Tree-Rat such as: <ul style="list-style-type: none"> – creating more open canopy woodlands with lack of understorey – preventing trees growing and forming new hollows – loss of existing hollow-bearing trees used for denning – direct loss of individuals from hot fires – loss of food resources • predation from feral cats (<i>Felis catus</i>) • habitat degradation due to livestock which could be commenced as a land use. <p>Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 6 out of 10.</p>
Risk of loss (%) with offset	0%	<p>With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low.</p> <p>The risk of loss with the offset has been set at 0%.</p>

Table D.7 Offset Area 1: EPBC offset assessment guide input justification – Black-footed Tree-Rat

Aspect	Score	Justification												
Future quality with offset (1-10)	8/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Black-footed Tree-Rat the habitat quality score is estimated to increase by one point to 8 out of 10 within 20 years due to the implementation of management measures. The largest change proposed is to the fire regime. Inappropriate fire regimes are a significant threat to Black-footed Tree-Rat as they destroy and are a likely causal factor in the population decline (Winter & Atherton, 1985). Frequent, high-intensity fires may destroy denning trees directly, reduce available foraging resources and result in mortality of individuals.</p> <p>Management actions to be implemented to increase habitat quality are summarised below.</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</td> <td> <ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. </td> </tr> <tr> <td>Implement a feral animal management program</td> <td> <ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Implement a weed management program</td> <td> <ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Manage land use</td> <td> <ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing </td> </tr> <tr> <td>Implement a species monitoring program</td> <td> <ul style="list-style-type: none"> • Improved understanding of species habitat utilisation and dispersal • Increase in Black-footed Tree Rat populations utilising the offset area from year 1 to year 20 </td> </tr> </tbody> </table>	Management action	Conservation outcome	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems 	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems 	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing 	Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of species habitat utilisation and dispersal • Increase in Black-footed Tree Rat populations utilising the offset area from year 1 to year 20
Management action	Conservation outcome													
Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 													
Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems 													
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Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of species habitat utilisation and dispersal • Increase in Black-footed Tree Rat populations utilising the offset area from year 1 to year 20 													
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p>												

Table D.7 **Offset Area 1: EPBC offset assessment guide input justification – Black-footed Tree-Rat**

Aspect	Score	Justification
		<p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires. The Australian Wildlife Conservancy (AWC) carry out Australia’s largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York which is confirmed to support Red Goshawk and Black-footed Tree Rat.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	28,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 6,885 ha of remnant vegetation within the impact footprint.
% of impact offset	102.71%	Based on inputs of 28,000 ha of habitat the calculator states 102.71% is delivered.

Table D.8 Offset Area 1: EPBC offset assessment guide input justification – Masked Owl

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	5/10	The impact site and offset site are similar in nature as they are located adjacent to each other, support similar vegetation communities, both on similar geologies, support watercourses and riparian vegetation, and under similar climatic conditions including fire regimes. The starting quality of Masked Owl habitat in the offset site has been assessed as per the impact site – 5 out of 10 .
Time until ecological benefit	20 years	This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing hollows from hot bushfires, increase number of large trees and canopy cover, improve abundance of small and medium sized mammals which Masked Owl feed on. Feral animal populations will also be reduced. To achieve the performance outcomes 20 years is proposed.
Risk of loss (%) without offset	5%	This is a risk that Masked Owl habitat on the offset site will be completely lost or experience significant loss of ecological function if the offset was not put into effect. The greatest risk may come from future bauxite mining as it is located in an existing MDL granted to the proponent and does contain bauxite resource as evident by its inclusion in Restricted Area 315. Endorsement from State Gov't would be required to place this area under an environmental offset and it would be removed from MDL and any future ML. If the area doesn't go to an offset there is a high chance future bauxite mining may be pursued. The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing for fencelines and native forestry. They may also choose to run livestock which could have a detrimental impact on habitat quality. The risk of loss without the offset has been set at 5% .
Future quality without offset (1-10)	4/10	A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place. It has been assessed that habitat quality will go down at least one point over a 20 year period due to: <ul style="list-style-type: none"> • regular and hot bushfires occurring which are showing to have a number of detrimental impacts on Masked Owl such as: <ul style="list-style-type: none"> – creating more open canopy woodlands with lack of understorey – preventing trees growing and forming new hollows – loss of existing hollow-bearing trees used for breeding – reduction in prey being small to medium sized mammals due to too frequent or too hot fires or feral cats • changes in land use. Grazing by livestock is a recognised threat to the species. Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 4 out of 10 .
Risk of loss (%) with offset	0%	With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low. The risk of loss with the offset has been set at 0% .

Table D.8 **Offset Area 1: EPBC offset assessment guide input justification – Masked Owl**

Aspect	Score	Justification												
Future quality with offset (1-10)	6/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Masked Owl the habitat quality score is estimated to increase by one point to 6 out of 10 within 20 years due to the implementation of management measures.</p> <p>The largest change proposed is to the fire regime. Inappropriate fire regimes are a significant threat to Masked Owl (Woinarski, 2004). Fires can have a detrimental impact on number of small and medium sized mammals in an area. The reduction of Masked Owl prey is one of the most likely causes of their decline.</p> <p>Management actions to be implemented to increase habitat quality are summarised below.</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</td> <td> <ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Increasing number of small and medium sized native mammals • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. </td> </tr> <tr> <td>Implement a feral animal management program</td> <td> <ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems • Increasing number of small and medium sized native mammals </td> </tr> <tr> <td>Implement a weed management program</td> <td> <ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems </td> </tr> <tr> <td>Manage land use</td> <td> <ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing </td> </tr> <tr> <td>Implement a species monitoring program</td> <td> <ul style="list-style-type: none"> • Targeted surveys over 20 years to detect presence of species. • Confirm any active roost sites • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations </td> </tr> </tbody> </table>	Management action	Conservation outcome	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Increasing number of small and medium sized native mammals • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems • Increasing number of small and medium sized native mammals 	Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems 	Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing 	Implement a species monitoring program	<ul style="list-style-type: none"> • Targeted surveys over 20 years to detect presence of species. • Confirm any active roost sites • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations
Management action	Conservation outcome													
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Implement a species monitoring program	<ul style="list-style-type: none"> • Targeted surveys over 20 years to detect presence of species. • Confirm any active roost sites • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations 													

Table D.8 **Offset Area 1: EPBC offset assessment guide input justification – Masked Owl**

Aspect	Score	Justification
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires. The Australian Wildlife Conservancy (AWC) carry out Australia’s largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York which is confirmed to support Red Goshawk and Black-footed Tree Rat.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	26,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 8,781 ha of remnant vegetation within the impact footprint.
% of impact offset	100.14%	Based on inputs of 26,000 ha of habitat the calculator states 100.14% is delivered.

D.3 Input Justification: Option Area 2

The following tables summarise the inputs for each MNES offset calculator for Offset Area 2. The full calculator is included in Appendix C.

Table D.9 Offset Area 2: EPBC offset assessment guide input justification – Palm Cockatoo

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	7/10	<p>The quality of Palm Cockatoo habitat in the offset site is assessed as follows using the Offsets Assessment Guide.</p> <p>Watson River Station supports a diversity of remnant REs that provide suitable habitat for the Palm Cockatoo, and the species has been observed on the property. Based on a rapid assessment of parts of the site in 2022 and desktop information the following has been identified for habitat quality.</p> <p>The quality of Palm Cockatoo habitat in the offset site is assessed as being a 7 out of 10.</p>
Site condition	2/4	<p>The species inhabits closed forest and riparian systems as well as open woodland adjacent to these habitats. Eucalypt woodlands within the offset area provide potential breeding and foraging habitat for the species. The offset area is mapped as containing over 25,000 ha of <i>Eucalyptus tetradonta</i> and <i>Corymbia</i> woodland to open forest (BVG 14a and 14b), and over 5,000 ha of watercourse vegetation including <i>Corymbia clarksoniana</i> or <i>C. novoguineensis</i> woodland on alluvial plains.</p> <p>Woodlands were observed to support hollow-bearing trees. From initial assessments these communities appear to be in moderate condition with a more open canopy than the impact site. Cattle grazing occurs on the property and there was a lack of understorey noted. Threats to vegetation condition and function on the offset area would include feral pigs, weeds, grazing and bushfire.</p> <p>High number of streams occur on the offset area including larger watercourses being Watson River and Merkunga Creek which provide good refuge and likely breeding habitat for the species. Evidence of Palm Cockatoo feeding was found near the Watson River.</p>
Site context	2/3	The Palm Cockatoo in Australia has a relatively restricted range, being found only on Cape York Peninsula. However, Palm Cockatoo do extend throughout the Cape from approximately 200 km south of the impact site near Pormpuraaw on the west coast and Princess Charlotte Bay on the east coast of the Cape to the northern tip of the Cape. There are a number of Palm Cockatoo records in proximity of Watson River Station and they have been observed on site. The potential offset area is well connected to other large tracts of remnant vegetation and habitat for the species. Three of the major threats in the offset area are from inappropriate fire regimes, grazing and pest animals.
Species stocking rate	3/3	Palm Cockatoo has been observed on Watson River Station by the station managers and evidence of them foraging was seen near Watson River by ecologists during a rapid assessment. The number of Palm Cockatoos likely to use the offset area and breeding pairs is currently unknown. Based on suitable habitat including hollows and riparian woodlands and larger watercourses the offset area is considered likely to support an important population. Given the restricted distribution to Cape York and low breeding success of this species, all individuals of Palm Cockatoo are likely to form part of one key source population for breeding and dispersal.

Table D.9 **Offset Area 2: EPBC offset assessment guide input justification – Palm Cockatoo**

Aspect	Score	Justification
Time until ecological benefit	20 years	<p>This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing hollows from hot bushfires, increase number of large trees and canopy cover, exclude or manage grazing regime to improve native species ground cover, increase recruitment and species diversity as well as woody debris. Feral animal populations will also be reduced.</p> <p>To achieve the performance outcomes 20 years is proposed.</p>
Risk of loss (%) without offset	1%	<p>It is acknowledged the risk that Palm Cockatoo habitat on the offset area would be completely lost from future development is low. The property is not within a mining area on bauxite plateau. However, it is an active cattle station. The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing around buildings and cattle yards, clearing for fencelines and native forestry. Grazing by livestock also has potential to have a detrimental impact on habitat quality.</p> <p>The risk of loss without the offset has been set at 1%.</p>
Future quality without offset (1-10)	6/10	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place.</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p> <ul style="list-style-type: none"> • inappropriate fire regimes occurring which are showing to have a number of detrimental impacts on Palm Cockatoo such as: <ul style="list-style-type: none"> – creating more open canopy woodlands with lack of understorey – threat to their refugia in more dense riparian woodlands – preventing trees growing and forming new hollows – loss of existing hollow-bearing trees used for breeding – removing foraging material for Palm Cockatoo • predation from feral cats (<i>Felis catus</i>) • land use primarily grazing of cattle. <p>Fire regime on Watson River Station has been fewer hot fires as fuel load is reduced from grazing and burns are generally occurring earlier in dry season. However, fire regimes are dependent on landholders and it is possible the fire regime could change in the future.</p> <p>Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 6 out of 10.</p>
Risk of loss (%) with offset	0%	<p>With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low.</p> <p>The risk of loss with the offset has been set at 0%.</p>

Future quality with offset (1-10)

8/10

This is the habitat quality score estimated for the offset within the time until ecological benefit. For Palm Cockatoo, the habitat quality score is estimated to increase by one point to **8 out of 10** within 20 years due to the implementation of management measures.

The largest change proposed is to the fire regime and grazing. Inappropriate fire regimes are a significant threat to palm cockatoos (Murphy et al. 2003). In some areas frequent, high-intensity fires are destroying nest trees directly, and may also indirectly reduce the number of breeding hollows available to palm cockatoos through the negative impacts on the abundance and diversity of termites (Abenspergtraun and Milewski 1995), which play a significant role in the creation of new hollows (Perry et al. 1985).

The following actions will be implemented to improve habitat quality.

Management action	Conservation outcome
Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows suitable for Palm Cockatoo from inappropriate fire regimes including hot fires • Increasing number of large trees that will form hollows in the future • Protection of riparian vegetation communities and vine thickets which are refuge for Palm Cockatoo from hot bushfires • Improve availability of foraging resources for Palm Cockatoo from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration.
Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems
Implement a weed management program	<ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
Manage land use	<ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP
Implement a species monitoring program	<ul style="list-style-type: none"> • Improved understanding of the active nest sites of Palm Cockatoo in the offset area so they can be better managed • Increase in Palm Cockatoo populations and breeding pairs utilising the offset area from year 1 to year 20 • Improved understanding of species habitat utilisation and dispersal

Table D.9 **Offset Area 2: EPBC offset assessment guide input justification – Palm Cockatoo**

Aspect	Score	Justification
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed are believed to be shown as effective and performance outcomes set for Palm Cockatoo would be achievable in the timeframe provided for. Also regular monitoring will occur to ensure effectiveness of management actions.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires. The Australian Wildlife Conservancy (AWC) carry out Australia’s largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York which is confirmed to support Red Goshawk and Black-footed Tree Rat.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	38,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 8,531 ha of remnant vegetation within the impact footprint.
% of impact offset	100.8%	Based on inputs of 38,000 ha of habitat the calculator states 100.8% is delivered.

Table D.10 **Offset Area 2: EPBC offset assessment guide input justification – Masked Owl**

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	5/10	The starting quality of Masked Owl habitat in the offset site has been assessed as per the impact site – 5 out of 10.
Site condition	2/4	<p>The Masked Owl nests in large hollows in large trees, usually Eucalypts, and usually within closed forest (DAWE 2020c). Remnant habitats, including Eucalyptus and Corymbia woodland to tall woodland and Paperbark woodland and sedgeland, provide potentially suitable foraging, breeding/nesting and dispersal habitat within the offset areas.</p> <p>Woodlands on the offset area were observed to support hollow-bearing trees. From initial assessments these communities appear to be in moderate condition with a more open canopy than the impact site. Cattle grazing occurs on the property and there was a lack of understorey noted. Threats to vegetation condition and function on the offset area would include feral pigs, weeds, grazing and bushfire.</p>
Site context	2/3	<p>The population of Masked Owl in Cape York Peninsula is considered to be one of three subpopulations, the other two occurring in the Kimberley and Northern Territory. The Queensland subpopulation occurs in Cape York Peninsula and extends south along the southern rim of the Gulf of Carpentaria to Normanton in the west and down to the Atherton Tablelands in the east (DAWE 2020c). There is a relatively recent record approximately 60 km to the east of the terrestrial ecology study area (CSIRO 2020). Connectivity of habitat for the species is high.</p> <p>The offset area is well connected to other large tracts of remnant vegetation and potential habitat for the species.</p>
Species stocking rate –	1/3	There have not been any recent records from near Broome, Cape York Peninsula or some historical sites in the NT (Barrett et al. 2003; Higgins 1999). The closest records of species are near Aurukun to north-west of the offset area. Similar to the impact site, the offset area is considered to have a moderate likelihood of occurrence due to the presence of potentially suitable habitat and being in an area of likely distribution.
Time until ecological benefit	20 years	<p>This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing hollows from hot bushfires, increase number of large trees and canopy cover, exclude or manage grazing regime to improve native species ground cover, increase recruitment and species diversity as well as woody debris. Feral animal populations will also be reduced.</p> <p>To achieve the performance outcomes 20 years is proposed.</p>
Risk of loss (%) without offset	1%	<p>It is acknowledged the risk that Masked Owl habitat on the offset area would be completely lost from future development is low. The property is not within a mining area on bauxite plateau. However, it is an active cattle station. The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing around buildings, clearing for fencelines and native forestry. Grazing by livestock also has potential to have a detrimental impact on habitat quality.</p> <p>The risk of loss without the offset has been set at 1%.</p>
Future quality without offset (1-10)	4/10	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place.</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p>

Table D.10 **Offset Area 2: EPBC offset assessment guide input justification – Masked Owl**

Aspect	Score	Justification								
		<ul style="list-style-type: none"> regular and hot bushfires occurring which are showing to have a number of detrimental impacts on Masked Owl such as: <ul style="list-style-type: none"> creating more open canopy woodlands with lack of understorey preventing trees growing and forming new hollows loss of existing hollow-bearing trees used for breeding reduction in prey being small to medium sized mammals due to too frequent or too hot fires or feral cats changes in land use. Grazing by livestock is a recognised threat to the species. <p>Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 4 out of 10.</p>								
Risk of loss (%) with offset	0%	<p>With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low.</p> <p>The risk of loss with the offset has been set at 0%.</p>								
Future quality with offset (1-10)	6/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Masked Owl the habitat quality score is estimated to increase by one point to 6 out of 10 within 20 years due to the implementation of management measures.</p> <p>The largest change proposed is to the fire regime. Inappropriate fire regimes are a significant threat to Masked Owl (Woinarski, 2004). Fires can have a detrimental impact on number of small and medium sized mammals in an area. The reduction of Masked Owl prey is one of the most likely causes of their decline.</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</td> <td> <ul style="list-style-type: none"> Protection of existing hollows from hot bushfires Increasing number of large trees that will form hollows in the future Increasing number of small and medium sized native mammals Increase in ground cover, woody debris and species recruitment through changed fire management regimes Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth Increasing time between burns of habitat patches to allow more regeneration. </td> </tr> <tr> <td>Implement a feral animal management program</td> <td> <ul style="list-style-type: none"> Reduction of feral pig populations Reduction of feral cat populations Improvement in habitat quality of ecosystems Increasing number of small and medium sized native mammals </td> </tr> <tr> <td>Implement a weed management program</td> <td> <ul style="list-style-type: none"> Reduction of non-native plant cover Reduction in fuel load and likelihood of hot bushfires occurring Improvement in habitat quality of ecosystems </td> </tr> </tbody> </table>	Management action	Conservation outcome	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> Protection of existing hollows from hot bushfires Increasing number of large trees that will form hollows in the future Increasing number of small and medium sized native mammals Increase in ground cover, woody debris and species recruitment through changed fire management regimes Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth Increasing time between burns of habitat patches to allow more regeneration. 	Implement a feral animal management program	<ul style="list-style-type: none"> Reduction of feral pig populations Reduction of feral cat populations Improvement in habitat quality of ecosystems Increasing number of small and medium sized native mammals 	Implement a weed management program	<ul style="list-style-type: none"> Reduction of non-native plant cover Reduction in fuel load and likelihood of hot bushfires occurring Improvement in habitat quality of ecosystems
Management action	Conservation outcome									
Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> Protection of existing hollows from hot bushfires Increasing number of large trees that will form hollows in the future Increasing number of small and medium sized native mammals Increase in ground cover, woody debris and species recruitment through changed fire management regimes Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth Increasing time between burns of habitat patches to allow more regeneration. 									
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Implement a weed management program	<ul style="list-style-type: none"> Reduction of non-native plant cover Reduction in fuel load and likelihood of hot bushfires occurring Improvement in habitat quality of ecosystems 									

Table D.10 **Offset Area 2: EPBC offset assessment guide input justification – Masked Owl**

Aspect	Score	Justification
		<p>Manage land use</p> <ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No grazing or restricted grazing to ensure groundcover is maintained, regeneration of flora species can occur, and small and medium size mammal populations aren't impacted by grazing <hr/> <p>Implement a species monitoring program</p> <ul style="list-style-type: none"> • Targeted surveys over 20 years to detect presence of species. • Confirm any active roost sites • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 80%. To achieve a one point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed are believed to be shown as effective and performance outcomes set for Masked Owl would be achievable in the timeframe provided for. Also regular monitoring will occur to ensure effectiveness of management actions.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto's land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires. The Australian Wildlife Conservancy (AWC) carry out Australia's largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York which is confirmed to support Red Goshawk and Black-footed Tree Rat. For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	28,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 8,781 ha of remnant vegetation within the impact footprint.
% of impact offset	100%	Based on inputs of 28,000 ha of habitat the calculator states 100% is delivered.

Table D.11 **Offset Area 2: EPBC offset assessment guide input justification – Black-footed Tree-Rat**

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	5/10	The quality of Black-footed Tree-Rat habitat in the impact site is assessed as follows using the <i>Offsets Assessment Guide</i> . The quality of Black-footed Tree-Rat habitat in the impact site is assessed as being a 5 out of 10.
Site condition	2/4	<p>The species inhabits Eucalypt forests and woodlands particularly in forests where suitable large hollows are plentiful. The species has also been known to den in large rainforest trees containing suitable hollows. Watson River Station supports a diversity of remnant REs that provide suitable habitat for the Black-footed Tree-Rat and all remnant habitats within the offset area should be assumed to potentially provide habitat for the species. The offset area was observed to support potentially suitable hollow-bearing trees required for denning.</p> <p>From initial assessments these communities appear to be in moderate condition with a more open canopy than the impact site. Cattle grazing occurs on the property and there was a lack of understorey noted. Threats to vegetation condition and function on the offset area would include feral pigs, weeds, grazing and bushfire.</p>
Site context	2/3	The distribution of the Black-footed Tree-Rat in Australia is poorly known. It has been recorded mostly from eucalypt forests and woodlands (but not rainforests) around Mareeba, but there are records sparsely across Cape York Peninsula (TSSC 2015). The project site is well connected to other large tracts of remnant vegetation and habitat for the species.
Species stocking rate	1/3	No Black-footed Tree-rats have been observed on the offset area however Atlas of Living Australia records exist in the region and are known from the area, with the closest ALA record being 35 kms away.
Time until ecological benefit	20 years	<p>This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing hollows from hot bushfires, increase number of large trees and canopy cover, exclude or manage grazing regime to improve native species ground cover, increase recruitment and species diversity as well as woody debris. Feral animal populations will also be reduced.</p> <p>To achieve the performance outcomes 20 years is proposed.</p>
Risk of loss (%) without offset	1%	<p>It is acknowledged the risk that Black-footed Tree-rat habitat on the offset area would be completely lost from future development is low. The property is not within a mining area on bauxite plateau. However it is an active cattle station. The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing around buildings, clearing for fencelines and native forestry. Grazing by livestock also has potential to have a detrimental impact on habitat quality.</p> <p>The risk of loss without the offset has been set at 1%.</p>

Table D.11 **Offset Area 2: EPBC offset assessment guide input justification – Black-footed Tree-Rat**

Aspect	Score	Justification						
Future quality without offset (1-10)	4/10	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place.</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p> <ul style="list-style-type: none"> • inappropriate fire regimes which are known to have a number of detrimental impacts on Black-footed Tree-Rat such as: <ul style="list-style-type: none"> – creating more open canopy woodlands with lack of understorey – preventing trees growing and forming new hollows – loss of existing hollow-bearing trees used for denning – direct loss of individuals from hot fires – loss of food resources • Predation from feral cats (<i>Felis catus</i>) • Land use primarily grazing of cattle. <p>Fire regime on Watson River Station has been fewer hot fires as fuel load is reduced from grazing and burns are generally occurring earlier in dry season. However, fire regimes are dependent on landholders and it is possible the fire regime could change in the future.</p> <p>Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 4 out of 10.</p>						
Risk of loss (%) with offset	0%	<p>With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring the risk of loss is very low.</p> <p>The risk of loss with the offset has been set at 0%.</p>						
Future quality with offset (1-10)	7/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Black-footed Tree-rat the habitat quality score is estimated to increase by one point to 7 out of 10 within 20 years due to the implementation of management measures.</p> <p>The largest change proposed is to the fire regime and grazing. Inappropriate fire regimes are a significant threat to Black-footed Tree-rats and is likely to be a causal factor in the species decline (Winter & Atherton, 1985). In some areas frequent, high-intensity fires are destroying denning trees directly and also prohibiting other trees from growing and creating hollows.</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</td> <td> <ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. </td> </tr> <tr> <td>Implement a feral animal management program</td> <td> <ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems </td> </tr> </tbody> </table>	Management action	Conservation outcome	Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 	Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems
Management action	Conservation outcome							
Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.	<ul style="list-style-type: none"> • Protection of existing hollows from hot bushfires • Increasing number of large trees that will form hollows in the future • Improve availability of foraging resources for Black-footed Tree Rat from implementation of cooler mosaic burns • Increase in ground cover, woody debris and species recruitment through changed fire management regimes • Areas significantly impacted by 2022 fires will not be burnt for a number of following years to allow recovery including regeneration and tree growth • Increasing time between burns of habitat patches to allow more regeneration. 							
Implement a feral animal management program	<ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Improvement in habitat quality of ecosystems 							

Table D.11 Offset Area 2: EPBC offset assessment guide input justification – Black-footed Tree-Rat

Aspect	Score	Justification
		<p>Implement a weed management program</p> <ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
		<p>Manage land use</p> <ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • No or restricted grazing
		<p>Implement a species monitoring program</p> <ul style="list-style-type: none"> • Improved understanding of species habitat utilisation and dispersal • Increase in Black-footed Tree Rat populations utilising the offset area from year 1 to year 20
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 70%. To achieve a two point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p> <p>Management actions proposed are believed to be shown as effective and performance outcomes set for Black-footed Tree-rat would be achievable in the timeframe provided for. Also regular monitoring will occur to ensure effectiveness of management actions.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires. The Australian Wildlife Conservancy (AWC) carry out Australia’s largest non-government prescribed burning program which has reduced destructive wildfire by 50% across their northern sanctuaries. The extent of wildfire has been reduced by 64% on Piccaninny Plains Wildlife Sanctuary in Cape York which is confirmed to support Red Goshawk and Black-footed Tree Rat.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	24,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 6,996 ha of remnant vegetation within the impact footprint.
% of impact offset	102.15%	Based on inputs of 24,000 ha of habitat the calculator states 102.15% is delivered.

Table D.12 Offset Area 2: EPBC offset assessment guide input justification – Red Goshawk

Aspect	Score	Justification
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1-10)	6	The quality of Red Goshawk habitat in the offset site is assessed as follows using the <i>Offsets Assessment Guide</i> : The quality of Red Goshawk in the offset site is assessed as being a 6 out of 10 .
Site Condition	2	<p>Red Goshawk inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests, usually on fertile soils (TSSC 2015a). The species is known to avoid very dense and very open habitats that don't provide enough coverage for ambush of prey or inhibit fast flight and manoeuvring when hunting. This species' nests are restricted to trees taller than 20 m and within 2.5 km of a watercourse or wetland.</p> <p>The offset site supports a high number of streams including larger watercourses being Watson River and Merkunga Creek which provide good refuge and likely breeding habitat for the species. The surrounding remnant vegetation within approximately 2.5 km of these persistent water features are likely to be preferred as breeding/nesting habitat. All other remnant habitats within offset site are considered to provide either potential breeding/nesting, hunting/foraging and/or dispersal habitat for this species (i.e. 'coastal and sub-coastal tall open forests and woodlands').</p> <p>From initial assessments, these communities appear to be in moderate condition with a more open canopy than the impact site. Cattle grazing occurs on the property and there was a lack of understorey noted. Threats to vegetation condition and function on the offset area would include feral pigs, weeds, grazing and bushfire.</p>
Site Context	3	<p>Red goshawks are currently known to breed from the Kimberley, east to Cape York Peninsula, and on the Tiwi Islands (MacColl et al. 2021). They may still breed at very low densities in the Wet Tropics and Einasleigh Uplands though record data are scarce (MacColl et al. 2021). Birds recorded from far outside the breeding range in central Australia (Aumann 2001) and the Pilbara (L Trotter pers. comm. cited in MacColl et al. 2021) likely include both dispersive juveniles (Aumann 2001) and seasonal migrants from further north.</p> <p>The breeding range of red goshawks has significantly contracted since 1980. The species gradually declined to extinction in New South Wales over the 1980s and 1990s (Cooper et al. 2014) and populations in south-east Queensland largely disappeared before 2010 (Seaton 2014). Apart from the satellite-tracked birds, records south of Cape York Peninsula over the last decade are increasingly scant, although some places where the species has been recorded historically have not been surveyed recently (MacColl et al. 2021).</p> <p>The offset area within Cape York is an important breeding, foraging and refugia area for Red Goshawk. The vast areas of habitat provide important connectivity for the species within the site and the greater region. Three of the major threats in the offset area are from inappropriate fire regimes, grazing and pest animals.</p> <p>Due to recent uplisting of the species and known Red Goshawk populations in the project area, site context is considered high.</p>
Species Stocking Rate	1	No Red Goshawks have been recorded on site however Atlas of Living Australia shows records nearby (within 30 km). A score of 1 out of 3 is given for offset site.
Time until ecological benefit	20 years	This is the estimated time it will take the habitat to improve for the offset to be realised. It is estimated that it will take up to 20 years for the quality of the remnant vegetation in the offset site to be raised one point. Management actions will seek to protect existing remnant, tall vegetation from hot bushfires, increase number of large trees and canopy cover, exclude or manage grazing regime to improve native species ground cover, increase recruitment and species diversity as well as woody debris. Feral animal populations will also be reduced.

Table D.12 Offset Area 2: EPBC offset assessment guide input justification – Red Goshawk

Aspect	Score	Justification				
		To achieve the performance outcomes 20 years is proposed.				
Risk of loss (%) without offset	1%	<p>It is acknowledged the risk that Red Goshawk habitat on the offset area would be completely lost from future development is low. The property is not within a mining area on bauxite plateau. However, it is an active cattle station. The landholder may undertake some clearing under current lawful exemptions such as track maintenance, clearing around buildings, clearing for fencelines and native forestry. Grazing by livestock also has potential to have a detrimental impact on habitat quality.</p> <p>The risk of loss without the offset has been set at 1%.</p>				
Future quality without offset (1-10)	5/10	<p>A habitat quality score was allocated based on the start quality of the habitat and the existing threatening processes that would continue to impact the offset site habitat and species without the offset being in place.</p> <p>It has been assessed that habitat quality will go down at least one point over a 20 year period due to:</p> <ul style="list-style-type: none"> regular and hot bushfires occurring which are showing to have a number of detrimental impacts on Red Goshawk such as: <ul style="list-style-type: none"> changing the composition of forest and woodland habitat to unsuitable hunting habitat (vegetation thickening) preventing trees growing to suitable nesting height loss of existing tall trees required for nesting reduction in prey being small to medium sized mammals due to too frequent or too hot fires or feral cats changes in land use. Possible grazing by livestock can impact on populations of small and medium size mammal populations. <p>Fire regime on Watson River Station has been fewer hot fires as fuel load is reduced from grazing and burns are generally occurring earlier in dry season. However, fire regimes are dependent on landholders and it is possible the fire regime could change in the future.</p> <p>Without the offset and associated management activities, degradation of the offset site from these threats are assessed as reducing the future habitat quality score to a 5 out of 10.</p>				
Risk of loss (%) with offset	0%	<p>With the offset in place, which includes legal security on title, preventing future clearing, and implementing an approved offset management plan that will include regular ecological monitoring, the risk of loss is very low.</p> <p>The risk of loss with the offset has been set at 0%.</p>				
Future quality with offset (1-10)	8/10	<p>This is the habitat quality score estimated for the offset within the time until ecological benefit. For Red Goshawk the habitat quality score is estimated to increase by two points to 8 out of 10 within 20 years due to the implementation of management measures.</p> <p>The largest change proposed is to the fire regime. Inappropriate fire regimes are a significant threat to Red Goshawk. Fires can have a detrimental impact on number of small and medium sized mammals in an area. The reduction of Red Goshawk suitable nesting trees and hunting habitat is one of the most likely causes of their decline.</p> <p>The following actions will be implemented to improve habitat quality:</p> <table border="1"> <thead> <tr> <th>Management action</th> <th>Conservation outcome</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Management action	Conservation outcome		
Management action	Conservation outcome					

Table D.12 **Offset Area 2: EPBC offset assessment guide input justification – Red Goshawk**

Aspect	Score	Justification
		<p>Implement a fire management regime in the offset area that is designed to prevent hot bushfires coming through every year and moving to cooler, mosaic burns earlier in the dry season.</p> <ul style="list-style-type: none"> • Reduced likelihood Red Goshawk will abandon any existing nests by removing or reducing occurrence of hot bushfires • Protection of existing large trees that Red Goshawk may nest in from hot bushfires • Improving native species canopy cover and height through changed fire management regimes • Increasing ground cover, woody debris and species recruitment and maintaining suitable hunting grounds through changed fire management regimes • Increasing number of small and medium sized native mammals • Increase in number of large (20 m) trees from year 1 to year 20
		<p>Implement a feral animal management program</p> <ul style="list-style-type: none"> • Reduction of feral pig populations • Reduction of feral cat populations • Increase in number of small and medium sized native mammals • Improvement in habitat quality of ecosystems
		<p>Implement a weed management program</p> <ul style="list-style-type: none"> • Reduction of non-native plant cover • Reduction in fuel load and likelihood of hot bushfires occurring • Improvement in habitat quality of ecosystems
		<p>Manage land use</p> <ul style="list-style-type: none"> • Manage land use to ensure no damage occurs to creeks, wetlands and open woodlands such as from vehicle use • Restricted access • Reduced likelihood of unplanned fires occurring • No vegetation clearing unless authorised under OAMP • Managing or restricted grazing
		<p>Implement a species monitoring program</p> <ul style="list-style-type: none"> • Improved understanding of any active nest sites of Red Goshawk in the offset area so they can be better managed • Improved understanding of species habitat utilisation and dispersal • Demonstrated increase in small and medium sized mammals • Improved understanding of relationship between fire regimes and small and medium sized mammal populations
Confidence in result (%)	80%	<p>This describes the confidence in managing the risk of loss with introduction of the proposed offset and the confidence in the evaluated change in quality of the offset site. The level of confidence that risk of loss is averted by the offset is 80%.</p> <p>The level of confidence that habitat quality gains will be achieved is assessed at 70%. To achieve a two point increase in habitat quality over 20 years is reasonable and achievable through the management actions proposed.</p>

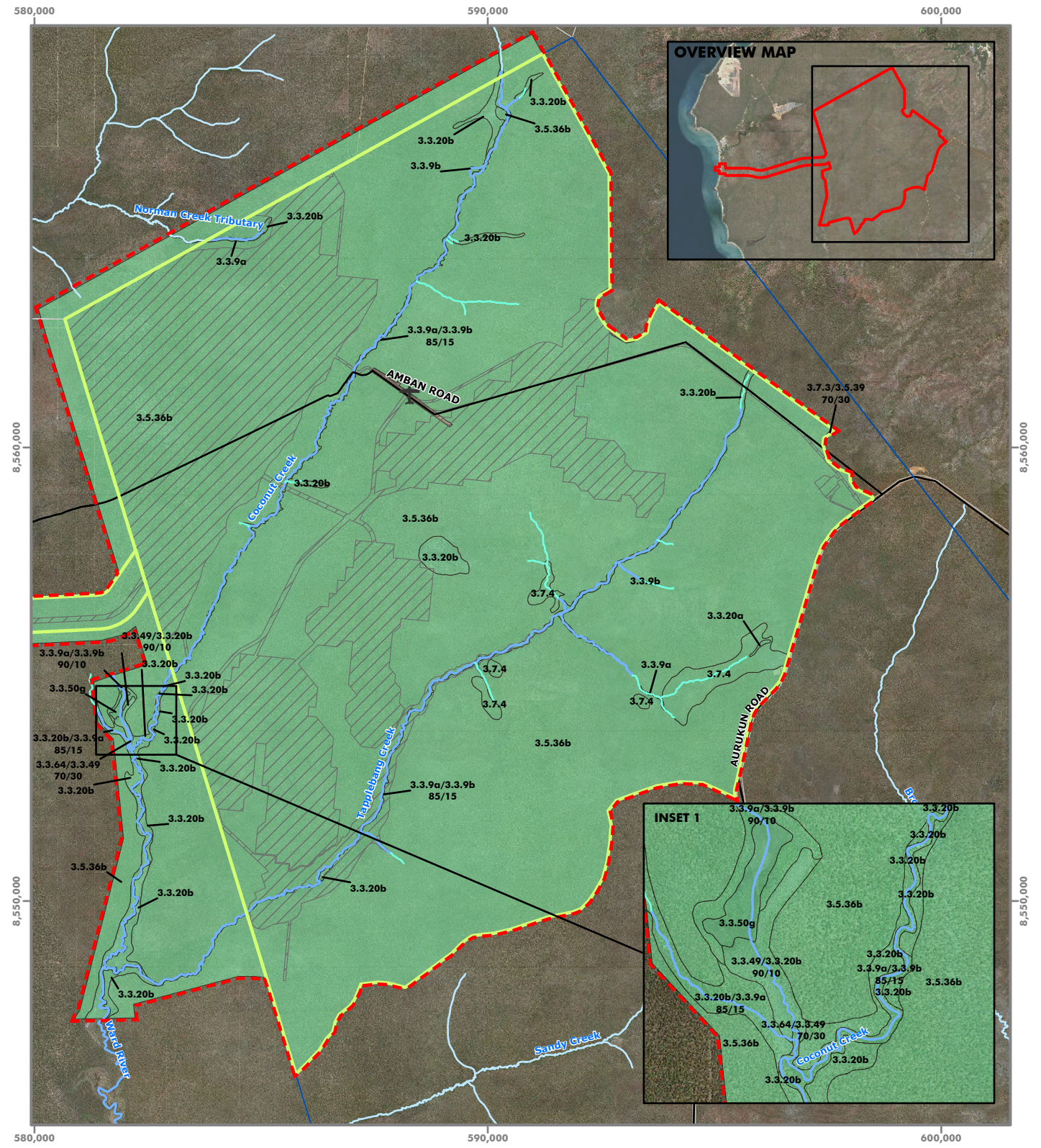
Table D.12 **Offset Area 2: EPBC offset assessment guide input justification – Red Goshawk**

Aspect	Score	Justification
		<p>Management actions proposed are believed to be shown as effective and performance outcomes set for Red Goshawk would be achievable in the timeframe provided for. Also regular monitoring will occur to ensure effectiveness of management actions.</p> <p>Management actions proposed including moving to cooler, mosaic burns early in dry season to actively discourage intense and extensive bushfires has shown effective in other large properties in Cape York including Rio Tinto’s land and conservation reserves such Piccaninny Plains. This fire regime is demonstrated to have multiple benefits and a number of regulators and stakeholder groups are working together to reduce late season, hot wildfires.</p> <p>For the Amrun project also on western Cape York in one year (2021) they humanely destroyed 709 pigs as part of their feral pig control program. Highest levels of pig activity were found along creeks and aerial shooting was the most effective. The feral animal control program in 2021 also removed 12 feral cats and 11 feral dogs (Rio Tinto 2022).</p>
Area of offset required	38,000	The calculator was prepared to calculate the amount of habitat required to satisfy the offset liability for the loss of 8,781 ha of remnant vegetation within the impact footprint.
% of impact offset	104.36%	Based on inputs of 38,000 ha of habitat the calculator states 104.36% is delivered.

Appendix E

Habitat mapping and threatened species records in
Project area

E.1 Ground-truthed regional ecosystem mapping



Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- Abandoned air strip
- Road
- Watercourse - ground-truthed
- Drainage feature - ground-truthed
- Watercourse or drainage feature (Water Act 2000)
- Cadastral boundary

Queensland Herbarium certified regional ecosystem mapping - 2022

(Vegetation Management Act status)

- Least concern

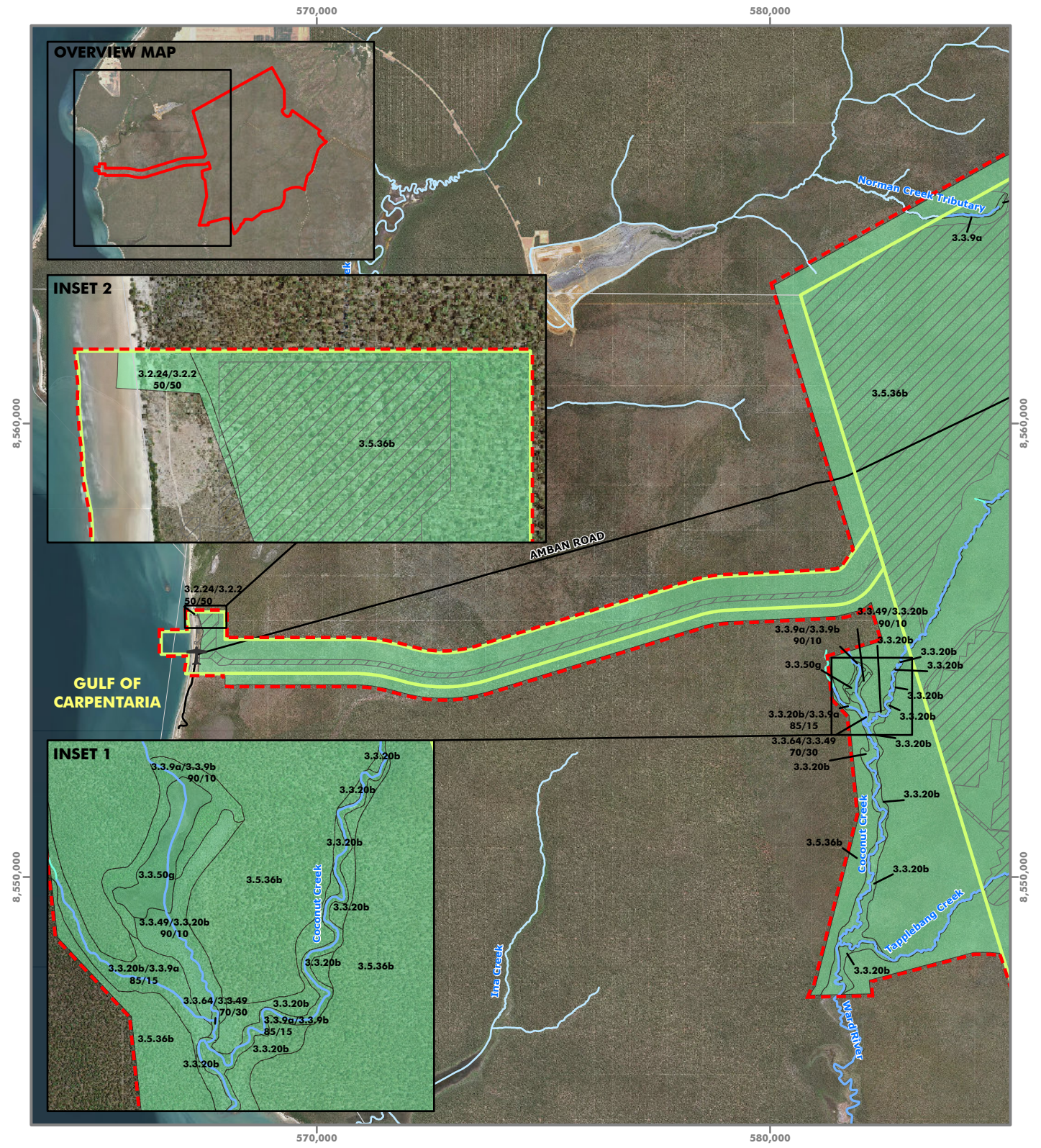
Figure 12a : Queensland Herbarium certified regional ecosystem mapping for the ecology study area

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_12A_E
Date: 04 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023

0 1 2 3 4 5
Kilometres





Legend

- Ecology study area
- Project site
- Mineral development licence 2001
- Abandoned air strip
- Road
- Watercourse - ground-truthed
- Drainage feature - ground-truthed
- Watercourse or drainage feature (Water Act 2000)
- Cadastral boundary
- Disturbance footprint

Queensland Herbarium certified regional ecosystem mapping - 2022

(Vegetation Management Act status)

- Least concern

Figure 12b : Queensland Herbarium certified regional ecosystem mapping for the ecology study area

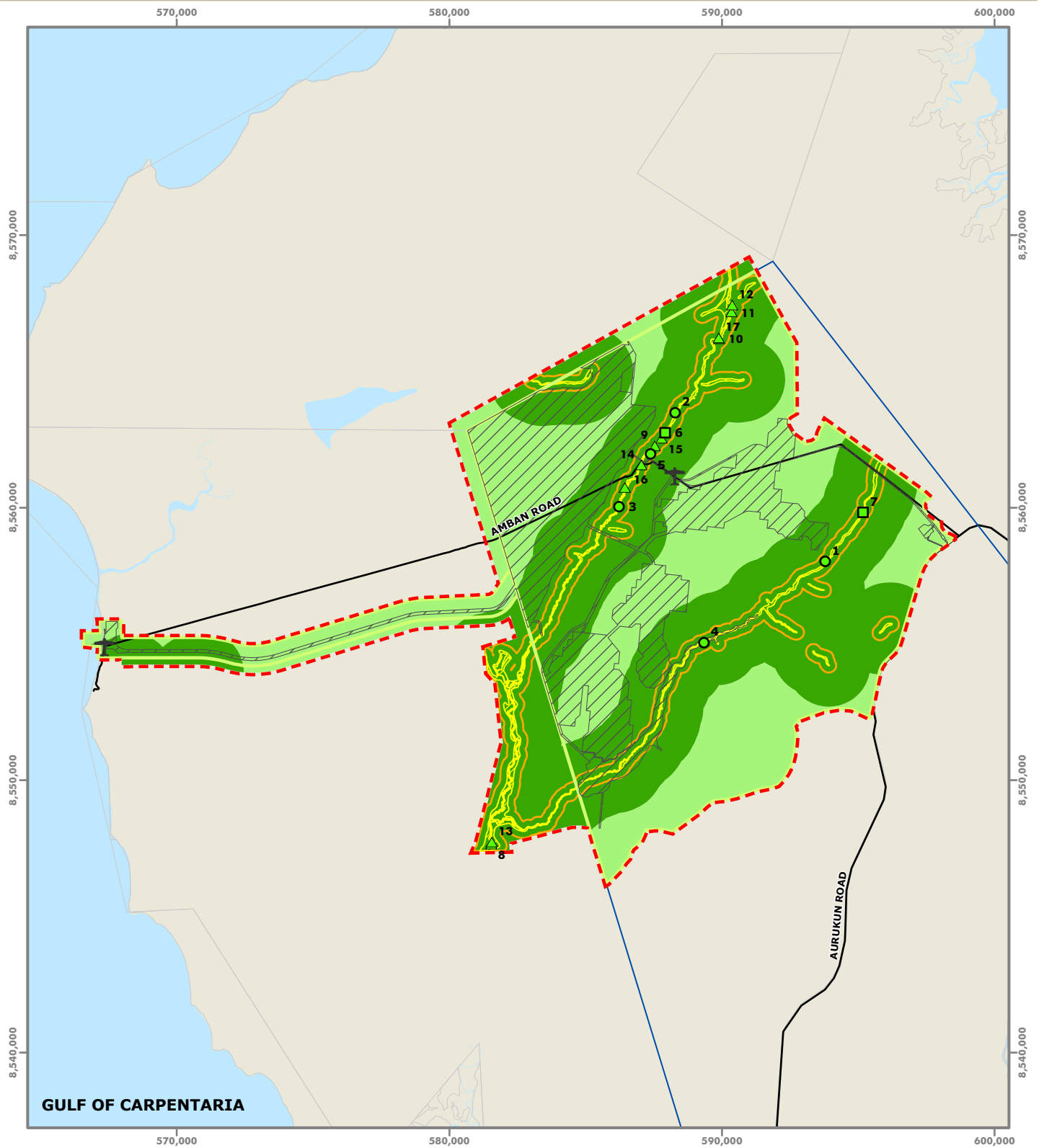
Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_12B_E
Date: 04 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023

0 1 2 3 4 5
Kilometres



E.2 Habitat mapping and threatened species records in Project area



Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- Abandoned air strip
- Road
- Cadastral boundary

Habitat mapping

- Potential breeding and foraging habitat (Breeding Zones 1 - 6 and feeding zones 1 - 3)
- Highest potential breeding habitat (Breeding zone 1)
- Primary habitat for foraging/feeding and daytime refuge (Riparian vegetation)
- Limited Use foraging and feeding habitat

Palm Cockatoo (*Probosciger aterrimus macgillivrayi*) - Vulnerable (EPBC Act), Endangered (NC Act)

Recorded locations (Source & year of record)

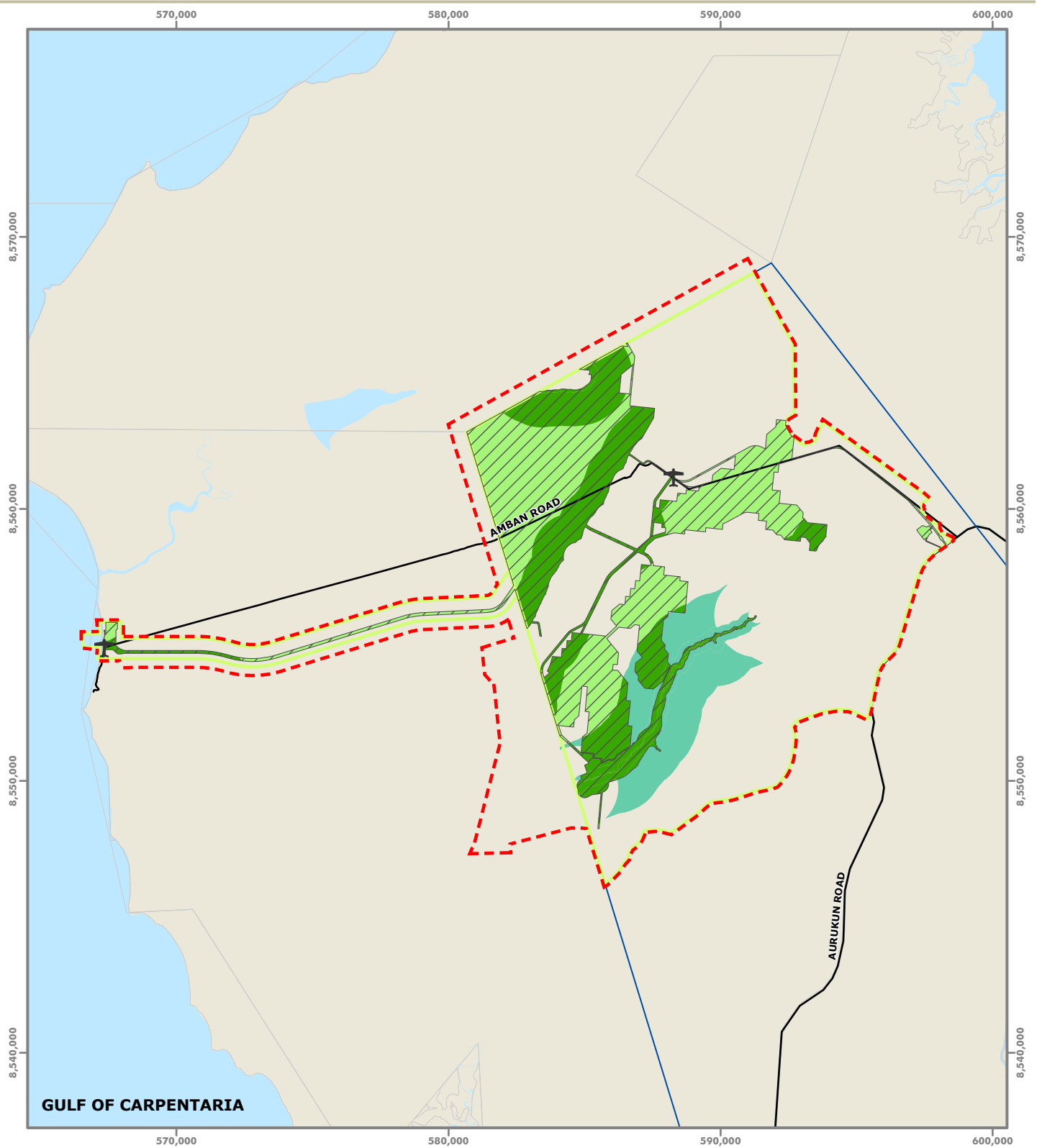
- EcoSM 2018
- EcoSM 2019
- ▲ Ecotone 2022

Figure 15a : Palm Cockatoo habitat for the ecology study area

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_15A_L
Date: 07 June 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023





Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- + Abandoned air strip
- Road
- Cadastral boundary

Clearing impacts

- Potential breeding and foraging habitat (Breeding Zones 1 - 6 and feeding zones 1 - 3)
- Limited Use foraging and feeding habitat

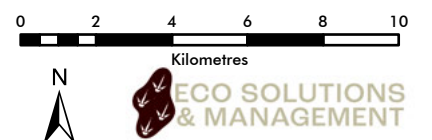
Indirect impacts

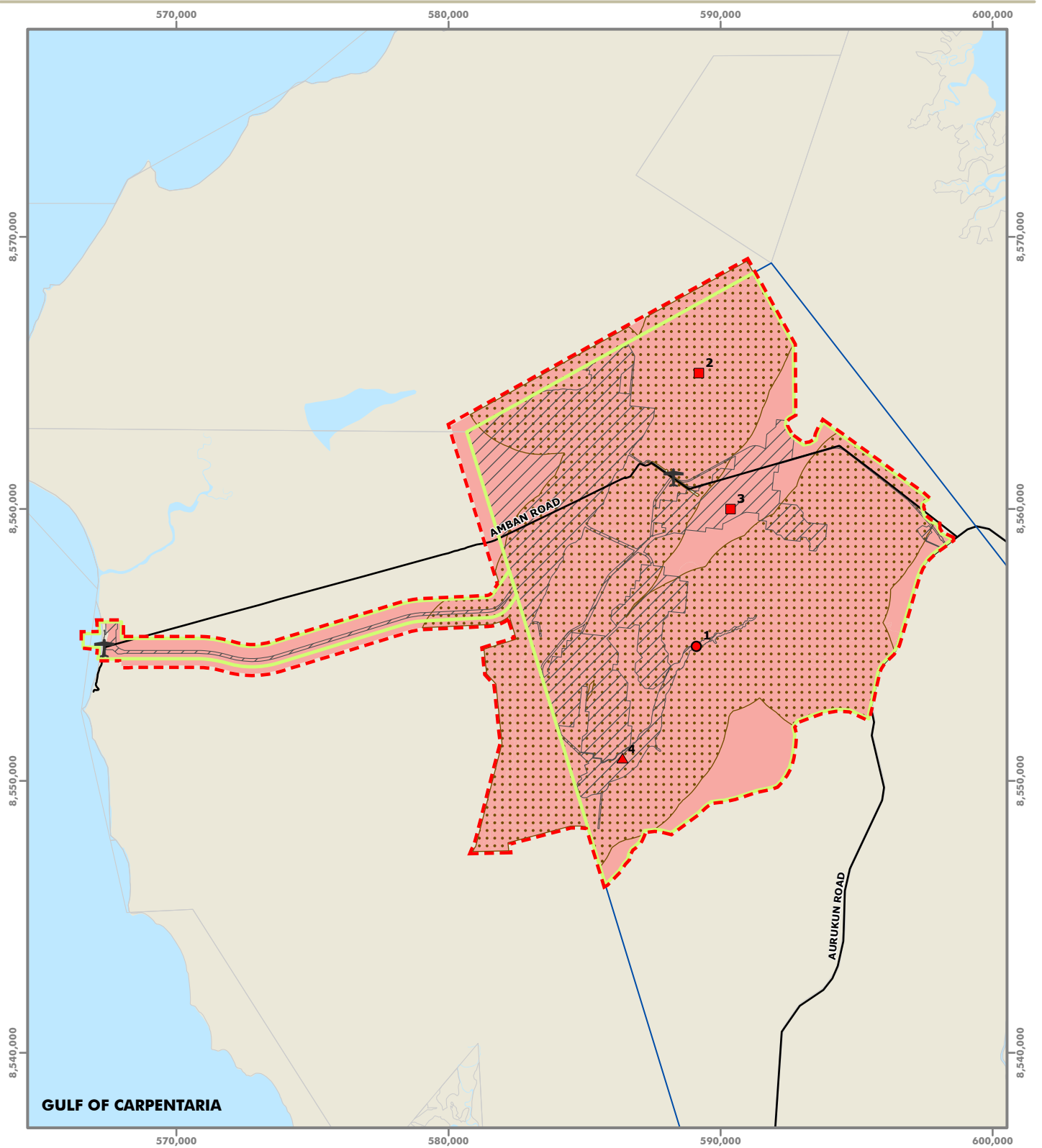
- Potential breeding and foraging habitat (Breeding Zones 1 - 6 and feeding zones 1 - 3)

Figure 15b : Palm Cockatoo habitat clearing and indirect impacts

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_15B_F
Date: 31 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023





Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- Abandoned air strip
- Road
- Cadastral boundary

Red Goshawk (*Erythrotriorchis radiatus*) – Endangered (EPBC Act), Endangered (NC Act)

Recorded locations (Source & year of record)

- EcoSM 2018
- EcoSM 2019
- Ecotone 2022

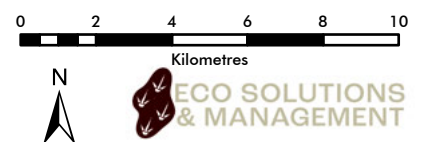
Habitat mapping

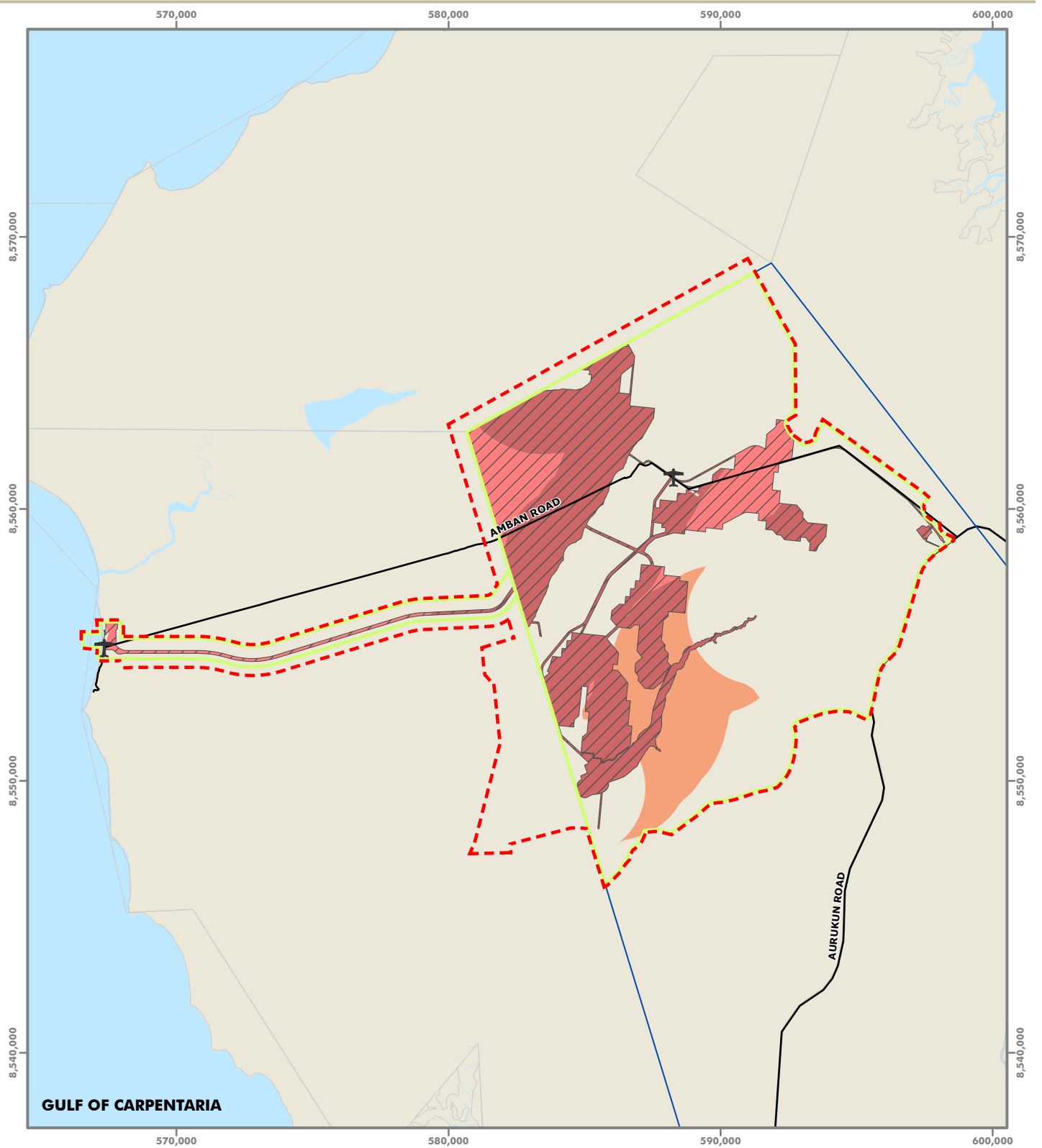
- Foraging/hunting and dispersal
- Breeding/nesting habitat

Figure 16a : Red Goshawk habitat mapping and records for the ecology study area

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_16A_I
Date: 01 June 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023





Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- Abandoned air strip
- Road
- Cadastral boundary

Clearing impacts

- Breeding/nesting habitat
- Foraging/hunting and dispersal habitat

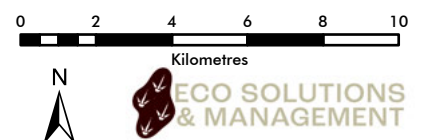
Indirect impacts

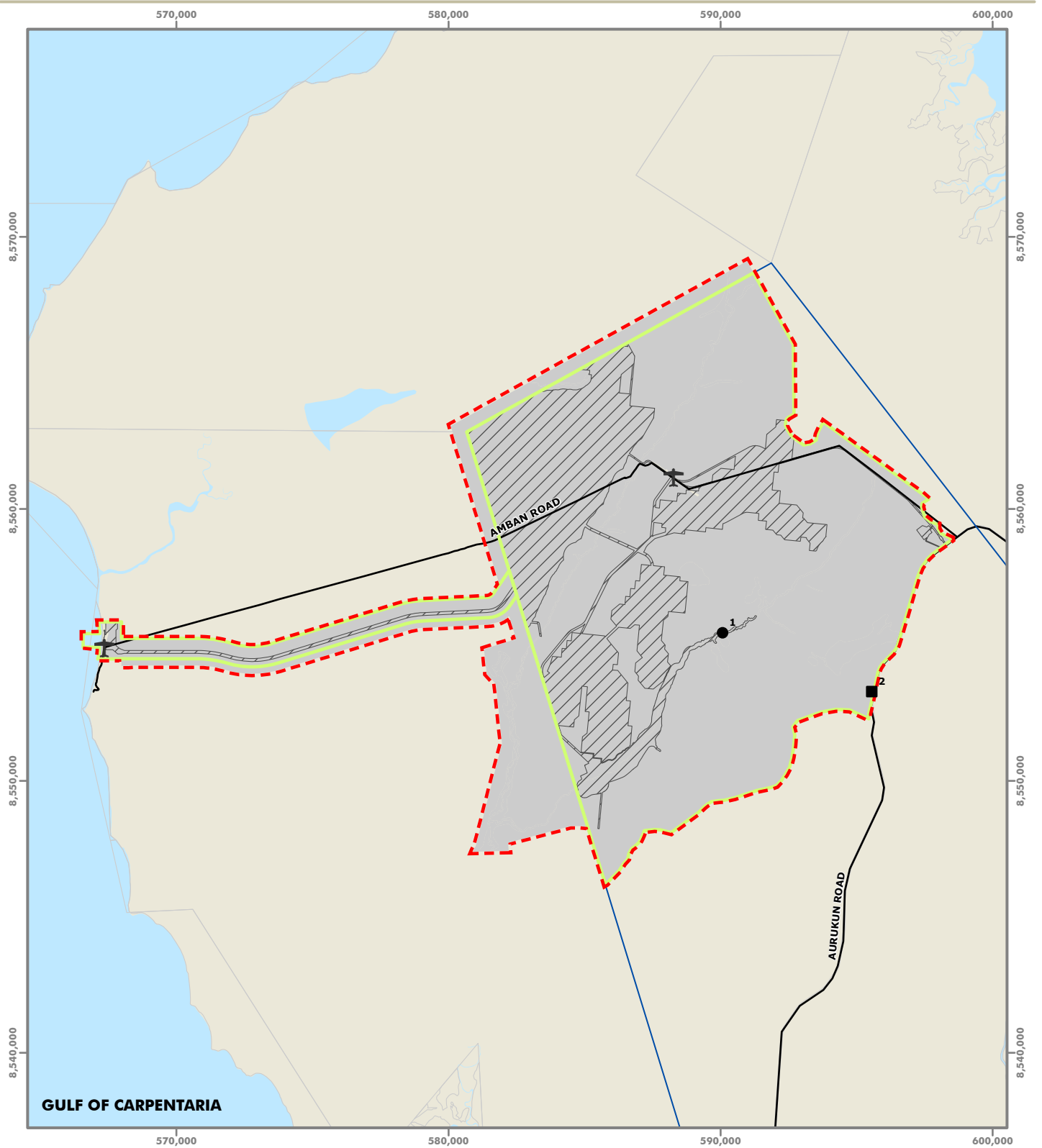
- Breeding/nesting habitat

Figure 16b : Red Goshawk habitat mapping clearing and indirect impacts

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_168_B
Date: 31 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023





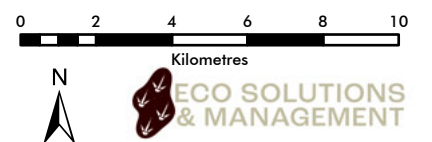
Legend

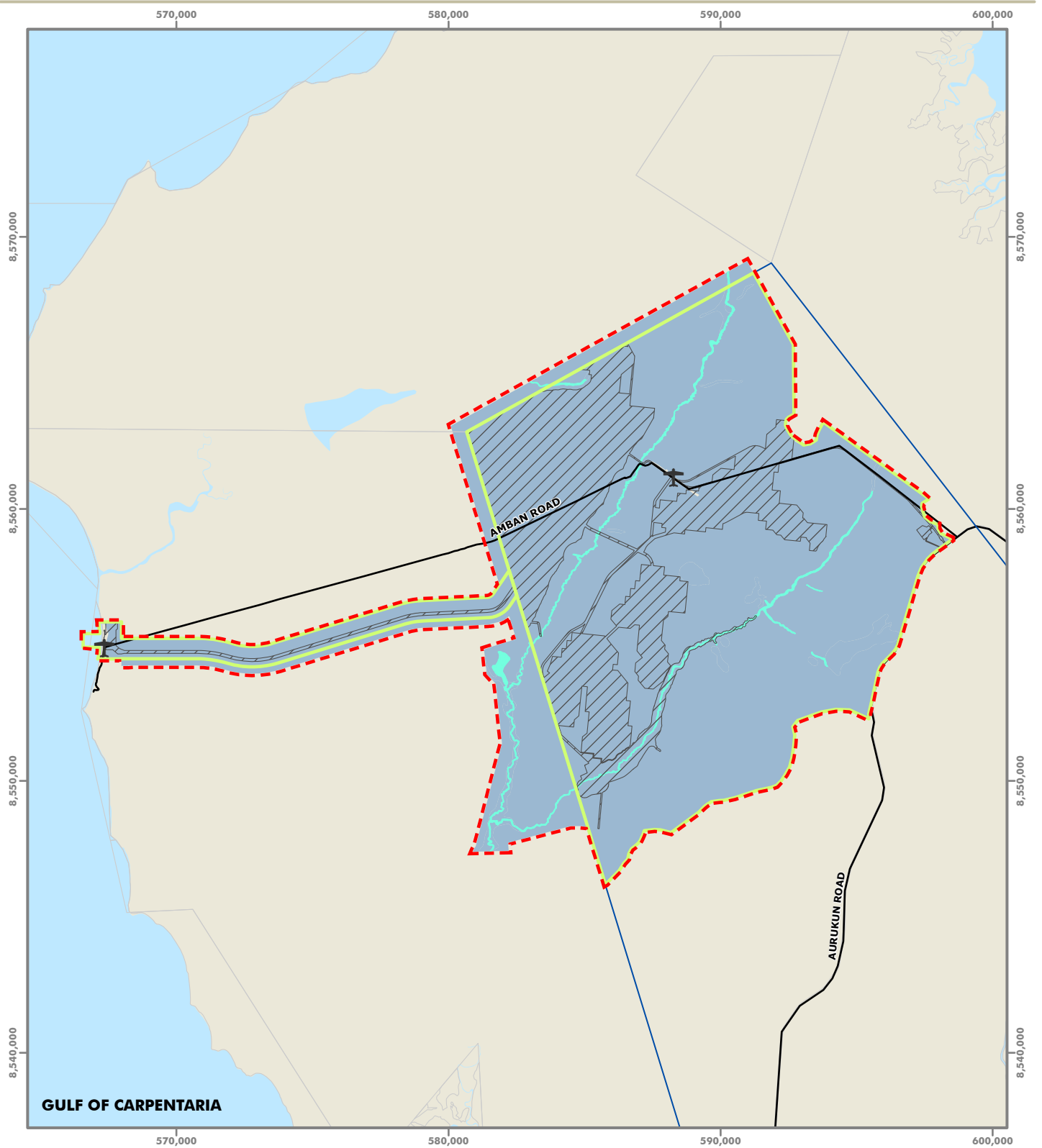
- Ecology study area
 - Project site
 - Disturbance footprint
 - Mineral development licence 2001
 - Abandoned air strip
 - Road
 - Cadastral boundary
- Black-footed Tree-rat (*Mesembriomys gouldii rattoides*) – Vulnerable (EPBC Act), Least concern (NC Act)**
- Recorded locations (Source & year of record)**
- EcoSM 2018
 - EcoSM 2019
- Habitat mapping**
- Foraging, breeding and dispersal habitat

Figure 17 : Black-footed Tree-rat habitat mapping and records for the ecology study area

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_17_E
Date: 31 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023





Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- Abandoned air strip
- Road
- Cadastral boundary

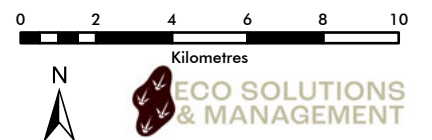
Masked Owl (*Tyto novaehollandiae kimberli*) - Vulnerable (EPBC Act and NC Act)

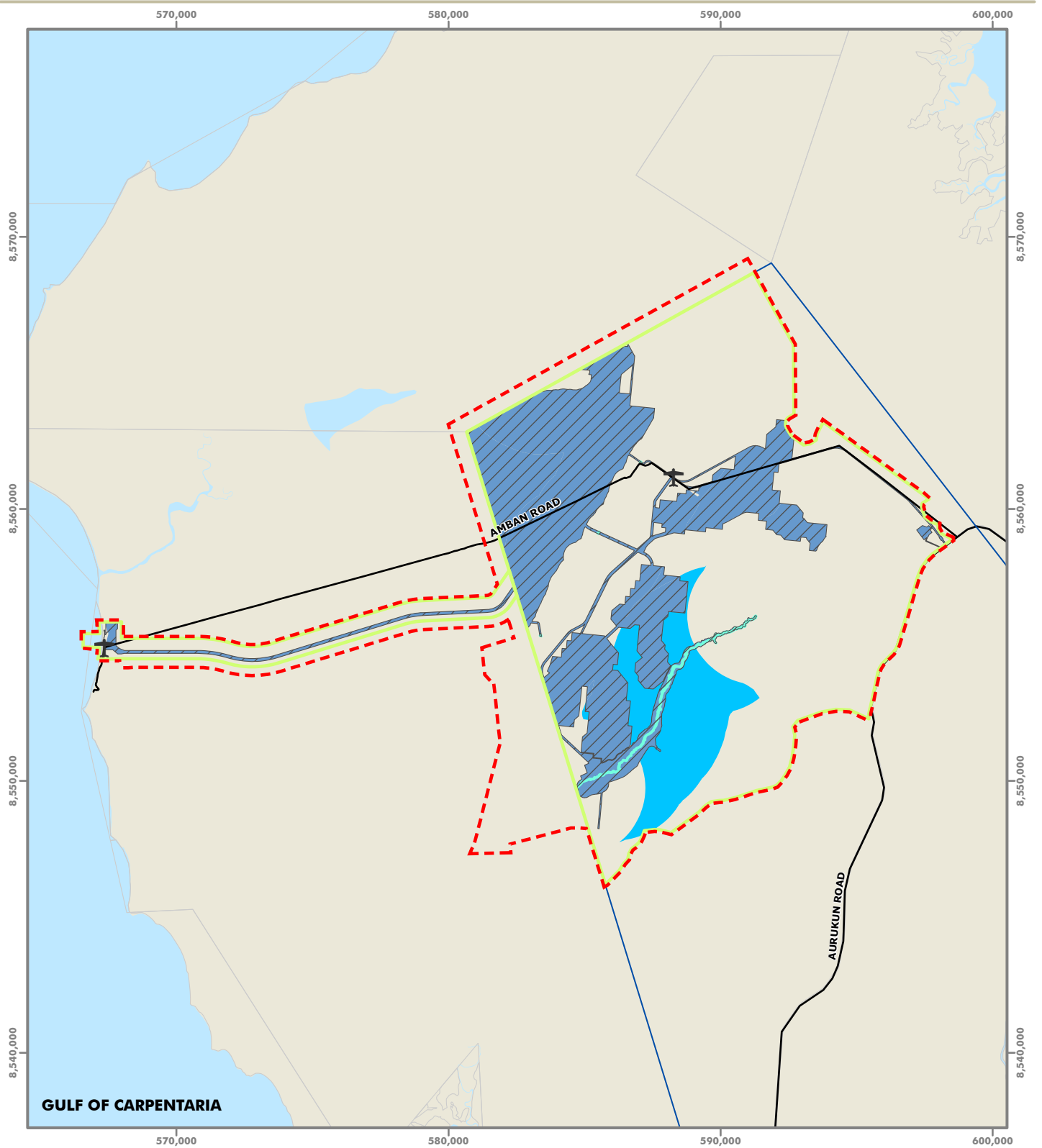
- Preferred roosting habitat
- Foraging, roosting, nesting/ breeding and dispersal habitat mapping

Figure 18 : Masked Owl habitat mapping for the ecology study area

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_18_C
Date: 02 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023





Legend

- Ecology study area
- Project site
- Disturbance footprint
- Mineral development licence 2001
- Abandoned air strip
- Road
- Cadastral boundary

Clearing impacts

- Preferred roosting habitat
- Foraging, roosting, nesting/breeding and dispersal habitat

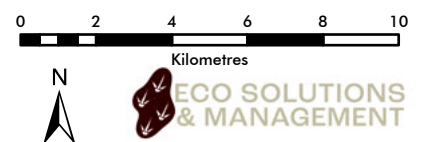
Indirect impacts

- Foraging, roosting, nesting/breeding and dispersal habitat

Figure 18b : Masked Owl habitat mapping clearing and indirect impacts

Terrestrial Ecology Assessment
Aurukun Bauxite Project

Map Number: 22036_TEA_188_B
Date: 31 May 2023
Map Projection: GDA 1994 MGA Zone 54
Imagery: November 2018
Data: Roads, DCDB - (c)DNRM 2023



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