Prepared for
Public Transport Authority
ABN: 61 850 109 576

AECOM

CPS 11153/1 - NVCP Amendment Supporting Document

30 April 2026

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CPS 11153/1 - NVCP Amendment Supporting Document

Client: Public Transport Authority

ABN: 61 850 109 576

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Executive Summary

Public Transport Authority of Western Australia (PTA) is proposing to clear / disturb an additional 0.005 hectares (ha) of native vegetation, adjacent to the Byford to Mundijong rail corridor, to install cabling between a future signalling equipment room and existing powerlines.

PTA were previously issued clearing permit CPS 11153/1 and are seeking an amendment to allow for the clearing of an additional 0.005 ha. This report was prepared to support the amendment application to CPS 11153/1.

To avoid and minimise clearing impacts, PTA has utilised existing cleared areas where possible, avoided vegetation in good or better condition and limited additional clearing to the necessary 0.005 ha. All clearing in Western Australia must be completed under an approved native vegetation clearing permit (NVCP), unless an exemption applies under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. As there are no NVCP exemptions that apply to this proposal, a NVCP is required.

An assessment against the ten clearing principles identified that proposed clearing is not or not likely to be at variance with nine clearing principles. Proposed clearing may be at variance with Principle (e) - native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been significantly cleared and Principle (d) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Glossary

Acronym	Definition
ACH	Aboriginal Cultural Heritage
ACHIS	Aboriginal Cultural Heritage Inquiry System
ASS	Acid sulfate soils
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
CCW	Conservation Category Wetland
Clearing regulations	*Environmental Protection (Clearing of Native Vegetation) Regulations 2004*
Cwlth	Commonwealth
DBCA	Department of Biodiversity, Conservation and Attractions
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority of Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
FVC	Focused Vision Consulting Pty Ltd
Ha	Hectares
IBRA	Interim Biogeographical Region of Australia
Km	Kilometres
M	Metres
MUW	Multiple Use Wetland
Natural Area	Natural Area Consulting Management
NVCP	Native Vegetation Clearing Permit
PD Act	*Planning and Development Act 2005*
PMST	Protected Matters Search Tool
PTA	Public Transport Authority of Western Australia
RSR	Radio Systems Replacement
TEC	Threatened Ecological Community
TEC/PEC	Threatened Ecological Community / Priority Ecological Community
TSER	Trackside Signalling Equipment Room

1.0 Introduction

1.1 Background

PTA is undertaking a Radio Systems Replacement (RSR) across the Perth rail network. This involves installing new radio masts or monopoles, ranging from 8 to 35 metres (m) in height, throughout the network.

As part of this upgrade, PTA has proposed a new radio mast for the Byford rail extension line (the Project). This will standardise the infrastructure extending into the Australind Line, which is a single line used by TransWA services between Perth and Bunbury.

A decision was made by Department of Water and Environmental Regulation (DWER) on 22 September 2025 to grant clearing permit CPS 11153/1 to PTA for facilitation of these works. The clearing permit authorised the clearing of no more than 0.21 ha. PTA is proposing to clear an additional 0.005 ha of native vegetation, adjacent to the Byford to Mundijong rail corridor (clearing area). This disturbance will enable the installation of cabling between a future signalling equipment room and existing powerlines. AECOM have been engaged by PTA to assist with preparing the amendment application and supporting documentation.

To date, clearing under CPS 11153/1 has occurred in the northern area of the permit. Clearing works are still ongoing. An inspection has been completed to confirm no clearing has occurred outside the permit area, that the clearing area has been demarcated, and that weeds and dieback controls have been implemented.

1.2 Purpose

This report has been prepared to support an application to amend clearing permit CPS 11153/1. PTA seeks approval to clear an additional 0.005 ha of native vegetation for the purpose of rail signalling upgrades.

1.3 Location

The Project area is located approximately 36 kilometres (km) south of Perth, in the Shire of Serpentine-Jarrahdale. Details of the additional clearing area are outlined in Table 1 and shown on Figure 1.

Table 1 Site details

Property	Description
Land description	Rail reserve – PIN 11525945 Shire of Serpentine-Jarrahdale – PIN 11609325
Property Area	**Entire parcel** PIN 11525945 – 49.0470 ha PIN 11609325 – 7.6542 ha **Addition 0.005 ha clearing area within parcels** PIN 11525945 – 0.002 ha PIN 11609325 – 0.003 ha
Clearing Permit Application Area	Previously approval clearing area: 0.21 ha Additional clearing area: 0.005 ha Total clearing area: 0.215 ha
Zoning	MRS railway reserve
Owner	Public Transport Authority (PIN 11525945) Shire of Serpentine-Jarrahdale (PIN 11609325)

1.4 Applicant

PTA is proposing to clear an additional 0.005 ha of native vegetation in the Shire of Serpentine-Jarrahdale. The contact for PTA is detailed in Table 2.

Table 2 Applicant details

Subject	Detail
Contact	[redacted]
Title	Environmental Officer
Company	Public Transport Authority
Address	Public Transport Centre, West Pde, Perth WA 6000
Postal address	PO Box 8125, Perth Business Centre WA 6849
Office phone	(08) 9326 5632
Email	[redacted]



Public Transport Authority

Byford to Mundijong Rail Signalling Infrastructure

Figure 1 - Survey Area Overview

LEGEND

- Proposed Clearing Area
- PTA Environmental and Heritage Surveys (FVC, 2022)



Date Printed: 17/04/2026
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Base Data: Nearmap 2022, Landgate 2022, Light Gray Base: Esri, TomTom, Garmin, FAO, NOAA, USGS, Landgate_Subscription_Imagery\WANow - LGATE320: , World Street Map: Esri, HERE, Garmin, NGA, USGS, Light Gray Reference: Esri, TomTom, Garmin, FAO, NOAA, USGS

2.0 Measures to avoid and minimise clearing

2.1 Environmental assessments

2.1.1 Focused Vision Consulting

PTA commissioned Focused Vision Consulting Pty Ltd (FVC) to undertake a flora and vegetation assessment for the Project in early September 2021 and late October 2021. The survey included the Byford Cable Route area, a 23.85 ha corridor extending along the existing South Western Railway adjacent to Soldiers Road, from Cardup Siding Road to Mundijong Junction (FVC, 2022). This survey area incorporates the proposed clearing area.

The assessment involved a comprehensive desktop review, a two-phase detailed survey, and targeted searches for significant flora and ecological communities. FVC confirmed the presence of the *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the Swan Coastal Plain, listed as Endangered under the *Biodiversity Conservation Act 2016* (BC Act). The vegetation assessment is presented in Appendix A

2.1.2 Natural Area Consulting Management Services

Natural Area Consulting Management Services (Natural Area) completed a 0.37 ha flora and vegetation survey in November 2024 between Soldiers Road and the South-Western Railway corridor. The assessment included a desktop review, detailed field survey, vegetation assessment and targeted searches, and recorded no significant flora or vegetation communities. This vegetation assessment survey area is located approximately 2 km to the north of the proposed clearing area. The vegetation assessment is presented in Appendix B.

In May 2024, Natural Area completed a 32.6 ha ecological assessment, including a basic fauna survey and black cockatoo habitat assessment, along Soldiers Road from Cardup Siding Road to Mundijong Junction. This encompasses the proposed clearing area. Approximately 16.7 ha was identified as high-quality foraging habitat for three threatened black cockatoo species, with foraging activity observed in Marri trees. The remaining area exhibited low ecological value. Natural Area (2024) also recorded 172 potential breeding trees, though only two contained suitable hollows, and none occurred within the proposed clearing footprint. These findings helped identify areas of lowest ecological value for site selection.

The fauna assessment is presented in Appendix C.

2.1.3 Applicability of Previous Surveys

Due to the recent surveys completed by FVC and Natural Area, no new surveys were completed for the purpose of supporting this NVCP amendment. The vegetation assessment completed by FVC and the fauna survey completed by Natural Area includes the clearing area for PIN 11525945 and the land directly adjacent to PIN 11609325, and the Natural Area vegetation assessment was approximately 2 km north of the clearing area. The combined assessments, in addition to site photos taken by PTA, have been used to infer the likely vegetation and fauna values that are applicable to the clearing area and have been used to make an assessment against the ten clearing principles in Section 5.

2.2 Project design

Between 2020 and 2024, PTA undertook an extensive program of environmental surveys along the 16 km Byford rail corridor, from Sherwood Station in Armadale to Mundijong Junction. These studies identified and mapped key environmental values, including TECs and habitats for threatened flora and fauna. During project design, PTA factored in these environmental values and prioritised existing cleared areas in the selection of infrastructure locations.

The proposed additional clearing area is located approximately 300 m north of the Trackside Signalling Equipment Room (TSER) clearing area previously approved under CPS 11153/1.

PTA proposes to clear an additional 0.005 ha of native vegetation adjacent to the Byford–Mundijong rail corridor to install cabling between a future TSER and existing powerlines. The clearing will be limited to understory disturbance, with no removal of established trees. The ground disturbance work will involve trenching for underground cables. Access to the site will be via the existing cleared track. No clearing to facilitate construction storage or access is required.

3.0 Existing environment

3.1 IBRA region

The largest regional vegetation classification scheme recognised by Environmental Protection Authority (EPA) is the Interim Biogeographical Region of Australia (IBRA). The IBRA regions provide the planning framework for the systematic development of a comprehensive, adequate and representative national reserve system. There are 89 recognised IBRA regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (IBRA7, 2012). The clearing area occurs in the Perth subregion of the Swan Coastal Plain IBRA region.

The Perth subregion is situated on a low lying coastal plain and consists of colluvial and aeolian sands, alluvial river flats, and coastal limestone. The region is mostly covered in woodlands, dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plain, and paperbark in swampy areas. In the eastern parts of the subregion, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. The region has a high degree of flora and fauna species diversity, notably on the eastern side of the coastal plain (CALM, 2003).

3.2 Geology and soils

The clearing area is situated on the Forrestfield system in the Pinjarra Zone. The Forrestfield system consists of undulating foot slopes of the Darling and Whicher Scarps. The system has duplex sandy gravels, pale deep sands and grey deep sandy duplexes. Woodland of *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *Eucalyptus wandoo* (Wandoo) and some *Banksia grandis*.

One soil system occurs within the clearing area, the Forrestfield F2a phase subsystem (213Fo). This soil type is characterised by well drained shallow to moderately deep, very gravelly acidic yellow duplex soils and common laterite (DPIRD, 2025).

3.2.1 Acid sulfate soils

Acid sulfate soils (ASS) risk within the clearing area has been mapped by the Department of Water and Environmental Regulation (DWER, 2025a). There is no risk of ASS occurring within the additional clearing area.

3.3 Water

3.3.1 Groundwater

The clearing area is located within the proclaimed Serpentine Groundwater Area. Under the *Rights in Water and Irrigation Act 1914,* it is illegal to take water within a proclaimed area without an abstraction licence. No water abstraction is currently anticipated for the completion of the proposed clearing. Should this be required, PTA will obtain the necessary licences under the RIWI Act.

3.3.2 Surface water

No Public Drinking Water Source Areas, Surface Water Allocation areas or proclaimed clearing control catchments intersect the clearing area.

3.3.3 Wetlands

No Conservation Category Wetlands (CCW), Ramsar or Wetlands of National Significance occur within the clearing area, or within 50 m of the clearing area.

The closest wetland to the clearing area is an unknown Multiple Use Wetland (MUW), approximately 250 m to the north. These wetlands may be seasonally waterlogged and are generally aligned with low lying areas or poorly draining sands, clays or duplex soils (DBCA, 2025a). The nearest CCW is an unknown Palusplain, approximately 360 metres to the south.

3.4 Vegetation, flora and fauna

3.4.1 Pre-European vegetation

Beard (1974) vegetation mapping for pre-European vegetation, shows one vegetation association (968) which intersects the clearing area. This vegetation association is described as medium woodland with *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), and *Eucalyptus wandoo* (Wandoo).

According to the Government of Western Australia (2019 and 2025) more than 30% of vegetation association 968 remains intact at the State level, but less than 10% remains intact in the IBRA subregion and local government area (Table 3 and Table 4).

Table 3 Vegetation representation – Statewide

Vegetation association	Pre-European extent (ha)	Current extent (ha)	Percentage remaining (%)			% Current extent in all DBCA managed land (proportion of current extent)
			Statewide	SWA02 bioregion	Shire of Serpentine-Jarrahdale	
968	296,877.84	95,048.82	32.02	6.62	4.60	57.64

(Government of Western Australia, 2019a)

Table 4 Vegetation representation – Swan Coastal Plain

Vegetation association	Pre-European extent (ha)	2024 extent (ha)	Percentage remaining (%) SWA02 bioregion	% Current extent in all DBCA managed land
968	136,117.32	8,570.43	6.30	1.52

(Government of Western Australia, 2025)

Heddle *et al.* (1980) conducted vegetation complex mapping for the Swan Coastal Plain at a scale of 1:250,000. One complex, the Forrestfield complex, intersects the clearing area, described as open forest of Marri, Wandoo and Jarrah to open forest of Jarrah, Marri, *Allocasuarina fraseriana* (Sheoak) and Banksia species. Fringing woodland of *Eucalyptus rudis* (Flooded Gum) occurs in the gullies that dissect this landform.

3.4.2 Vegetation

3.4.2.1 Vegetation survey results

FVC (2022) mapped one native vegetation unit within the survey area which is applicable to the clearing area, CcXpKa, described as *Corymbia calophylla* low open woodland over *Xanthorrhoea preissii* shrubland and *Kingia australis* tall sparse shrubland over *Laxmannia squarrosa* low forbland.

This vegetation unit covers 5.43 ha of the 23.85 ha survey area. FVC vegetation mapping did not cover the entire 0.005 ha additional clearing area. The unmapped vegetation is inferred to be in the same condition based on PTA's site inspections. The 0.005 ha of vegetation inside the additional clearing area is therefore assessed as being in a Degraded condition.

PTA conducted site inspections on 12 September 2025 and 5 March 2026, taking photographs of the clearing area. These photographs indicate that the vegetation is in a Degraded condition and can be found in Appendix D.

3.4.3 Threatened and priority ecological communities

3.4.3.1 TEC/PEC desktop assessment

The result of FVCs (2022) desktop assessment identified nine Threatened and/or Priority Ecological Communities (TEC/PECs) which have the potential to occur within the survey area. Of these nine communities, three intersect the clearing area (Table 5).

Table 5 TECs

Identifier	Community name	Commonwealth category	WA state category	Source
SCP 3b	*Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson *et al*, (1994))	-	Vulnerable	DBCA
SCP 20b	*Banksia attenuate* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson *et al*, (1994))	Endangered	Endangered	DBCA
Banksia WL SCP	Banksia dominated Woodlands of the Swan Coastal Plain IBRA Region	Endangered	Priority 3	PMST DBCA

3.4.3.2 TEC/PEC survey results

Based on FVCs (2022) field assessment, the additional clearing area was mapped vegetation unit CcXpKa and were determined to be representative of FCT SCP 3b (*Corymbia calophylla* – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain). Within the clearing area, this vegetation unit is in Degraded condition but has been assumed to be representative of the TEC as a precautionary approach.

3.4.4 Flora

3.4.4.1 Flora desktop assessment

Through a desktop assessment, FVC (2022) identified 33 conservation significant flora species with the potential to occur within 2 km of the survey area, which incorporates the proposed clearing area. This included 16 threatened species listed under the EPBC Act and BC Act; one Priority 1, three Priority 2, nine Priority 3 and four Priority 4 species.

Of the 33 species, one was considered likely to occur and two had previously been recorded within the survey area, listed in Table 6 below.

Table 6 Threatened and priority flora species with potential to occur (in surveyed areas)

Taxon	Listing	
Threatened species	**BC Act***	**EPBC Act****
Synaphea sp. Pinjarra Plain (previously recorded)	CR	CE
Synaphea sp. Serpentine (previously recorded)	CR	CE
Priority species	**DBCA***	**-**
Johnsonia pubescens subsp. Cygnorum (likely)	P2	

*BC Act: CR = Critically Endangered, DBCA: P = Priority

**EPBC Act: CE = Critically Endangered

One State-listed priority flora species, *Johnsonia pubescens subsp. cygnorum* was recorded within survey area, defined as vegetation unit CcXpKa. Therefore, vegetation unit CcXpKa was determined to be regionally significant.

Through the desktop assessment, Natural Area (2025) identified 54 conservation significant flora species with the potential to occur within 10 km of the survey area. This included 19 threatened species listed under the EPBC Act, 21 threatened species listed under the BC Act and 31 priority flora species.

Of the 54 species, 12 were considered likely to occur within the survey area, listed in Table 7 below.

Table 7 Threatened and priority flora species with potential to occur (in surveyed areas)

Taxon	Listing	
Threatened species	**BC Act***	**EPBC Act****
Caladenia huegelii	CR	E
Drakaea elastica	CR	E
Drosera oreopodion	CR	-
Eucalyptus x balanites	EN	E
Morelotia australiensis	VU	V
Synaphea sp. Fairbridge Farm	CR	CE
Synaphea sp. Pinjarra Plain	EN	CE
Synaphea sp. Serpentine	CR	CE
Priority species	**DBCA***	**-**
Drosera occidentalis	P4	
Jacksonia gracillima	P3	
Johnsonia pubescens subsp. cygnorum	P2	
Millotia tenuifolia var. laevis	P2	

*BC Act: EN = Endangered, VU = Vulnerable, CR = Critically Endangered, DBCA: P = Priority

**EPBC Act: E = Endangered, V = Vulnerable, CE = Critically Endangered

3.4.4.2 Flora survey results

FVC (2022) found no threatened flora listed under the EPBC Act or BC Act or priority flora during the survey.

Natural Area (2025) found no threatened flora listed under the EPBC Act or BC Act or priority flora were during the survey, and none were anticipated to occur post-survey.

Given the degraded condition of the clearing area, and the absence of significant flora species in past surveys, it is unlikely that any threatened or priority flora occur. Furthermore, the clearing area has been subject to historical and ongoing disturbance and therefore is not likely to be significant habitat for conservation significant flora.

One Declared Pest listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) was recorded within the survey area, the One-leaf Cape Tulip (*Moraea flaccida*). The species was recorded in low densities (less than 5%) throughout the survey area. Photographs taken by PTA during a 2026 site inspection did not show any Declared Pest species.

3.4.5 Fauna

3.4.5.1 Fauna desktop assessment

In May 2024, Natural Area conducted a fauna survey across a broader 32.6 ha area, which includes the proposed additional 0.005 ha clearing area. A desktop assessment identified 70 significant fauna species with the potential to occur within a 10 km radius of the survey area (Natural Area, 2024). Of these, 14 significant fauna species were assessed as having the potential to utilise the 32.6 ha surveyed area. This included nine threatened or migratory species listed under the EPBC Act, ten threatened, migratory or other specially protected species listed under the BC Act and four priority species, listed in Table 8.

Table 8 Significant fauna species with potential to use the survey area

Species	Listing	
Threatened and migratory species	**BC Act**	**EPBC Act**
Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo)	VU	V
Dasyurus geoffroii (Western Quoll, Chuditch)	VU	V
Falco peregrinus (Peregrine Falcon)	OS	
Myrmecobius fasciatus (Numbat)	EN	E
Pseudocheirus occidentalis (Western ringtail possum)	CR	CE
Tringa glareola (Wood sandpiper)	MI	Mi
Westralunio carteri (Carter's Freshwater Mussel)	VU	V
Zanda baudinii (Baudin's Cockatoo)	EN	E
Zanda latirostris (Carnaby's Cockatoo)	EN	E
Zanda sp. 'white-tailed black cockatoo'	EN	E
Priority species	**DBCA classification**	**-**
Hydromys chrysogaster (Rakali)	P4	
Isoodon fusciventer (Quenda)	P4	
Lerista lineata (Perth Slider)	P3	
Neelaps calonotos (Black-striped snake)	P3	

*BC Act: EN = Endangered, VU = Vulnerable, CR = Critically Endangered, OS = Other specially protected, MI = Migratory, DBCA: P = Priority

**EPBC Act: E = Endangered, V = Vulnerable, CE = Critically Endangered, Mi = Migratory

3.4.5.2 Fauna survey results

Within the 32.6 ha of survey area, five native fauna species were recorded through direct sighting or indirect evidence. One conservation significant species, the Forest Red Tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable) was found on site. The Common Brushtail Possum (*Trichosurus vulpecula*) was observed through the presence of fresh scat on site. All other recorded species were directly observed on site (Natural Area, 2024) and includes the Black-faced Cuckooshrike (*Coracina novaehollandiae*), the Red-capped Parrot (*Purpureicephalus spurius*), and the Australian Ringneck (*Barnardius zonarius*).

3.4.6 Black cockatoo assessment

The clearing area is within the known distribution range for all three threatened black cockatoo species, listed below:

- Carnaby's Cockatoo (*Zanda latirostris*);
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*); and
- Baudin's Cockatoo (*Zanda baudinii*).

Natural Area (2024) recorded 16.7 ha for moderate to high (8) quality foraging habitat for Baudin's and Carnaby's Cockatoos and 15.65 ha of high (10) quality foraging habitat for the Forest Red-tailed Black Cockatoo. This was represented by six different habitat types across the 32.6 ha survey area (Appendix C). One of these habitat types, CcXpKa (0.005 ha), is located within the additional clearing area.

The higher score for the Forest Red-tailed Black Cockatoo was due to observations of the species foraging in Marri trees during the survey (Natural Area, 2024). No evidence, either direct or indirect, of Baudin's or Carnaby's Cockatoos was found within the survey area.

Natural Area (2024) identified 172 potential breeding trees, two of which occur in the CPS 11153/1 clearing area. No potential breeding trees are within the additional clearing area.

3.5 Environmentally sensitive areas and conservation areas

Environmentally sensitive areas (ESAs) are classes or areas of native vegetation where the exemptions for clearing vegetation under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations) do not apply. ESA classes can include World Heritage Properties, Conservation Wetlands, Threatened flora, TECs and Bush Forever sites.

One mapped DWER ESA was found to intersect with the entire additional clearing area (0.005 ha), associated with the DBCA mapped TEC buffers and Bush Forever Site 350, known as the 'Byford to Serpentine Rail/Road Reserves and Adjacent Bushland'. The Bush Forever covers the entire clearing area.

Clearing native vegetation within a Bush Forever site requires approval under the EP Act and/or the *Planning and Development Act 2005* (PD Act). The nearest conservation reserve is the Cardup Nature Reserve (R2457), 1.5 km southwest of the clearing area (DBCA, 2025b).

3.6 Heritage

3.6.1 Aboriginal heritage

A search of the Department of Planning, Lands and Heritage (DPLH, 2026a) Aboriginal Cultural Heritage Inquiry System (ACHIS) indicated that there are no Registered or Lodged Aboriginal Cultural Heritage Places (ACH) within the clearing area. The nearest Registered ACH is Byford 16 (ACH-00016104), located approximately 2.5 km north-east of the clearing area. The site is registered for its historical value of artifacts / scatter found.

3.6.2 European heritage

There are no World Heritage Properties or National Heritage Places occurring within 10 km of the clearing area.

The nearest State Registered Place, Whitby Falls Hostel (8604), is located approximately 3.5 km south-east of the clearing area.

The nearest Local Heritage Place, Wellstrand Farm (27285), is located approximately 1 km south-west of the clearing area (DLPH, 2026b).

4.0 Proposed clearing

4.1 Schedule

The applicant intends to commence clearing in 2026. Construction of the project is expected to be completed by October 2027.

4.2 Clearing area

CPS 11153/1 approved a clearing area of 0.21 ha. This amendment application seeks approval to clear an additional 0.005 ha of native vegetation in a Degraded condition for purpose of installing cabling between a future signalling equipment room and existing powerlines. This would bring the total clearing area to 0.215 ha.

5.0 Assessment against the ten clearing principles

5.1 Principle (a) - Native vegetation should not be cleared if it comprises a high level of biological diversity

Table 9 Assessment against Principle (a)

Assessment results	Conclusion
PTA is proposing to clear 0.215 ha of native vegetation across three distinct areas, the Byford monopole (0.09 ha), TSER (0.12 ha), and the additional clearing area subject to this amendment application (0.005 ha). The clearing areas are located in a rail reserve, adjacent to Soldiers Road, in the Shire of Serpentine-Jarrahdale (Figure 1). **Flora and vegetation** <u>Byford monopole clearing area</u> Natural Area (2025) conducted a detailed vegetation and targeted flora assessment of the Byford Monopole clearing area in November 2024. Natural Area (2025) recorded one vegetation type within the Byford monopole clearing area, *Corymbia calophylla* open woodland, described as, *Corymbia calophylla* and *Eucalyptus marginata* low woodland over *Xanthorrhoea preissii* and occasional *Kingia australis* tall sparse shrubland over *Mesomelaena tetragona* sedgeland. Of the 0.09 ha recorded, 0.02 ha was in a Degraded condition and 0.07 ha was Completely Degraded. Natural Area (2025) recorded 21 native flora species and 38 weed species within their 0.37 ha survey area. No Marri trees occur within the clearing area. No significant flora species or vegetation communities were recorded within the Byford monopole clearing area or broader survey area, and none were considered likely to occur post-survey. One declared pest, the One-leaf Cape Tulip (*Moraea flaccida*), listed under the BAM Act was recorded throughout the Natural Area (2025) survey area. The clearing area will be appropriately managed to avoid further spread of this species. <u>TSER clearing area</u> FVC (2022) conducted a detailed flora and vegetation assessment of a 23.85 ha area along the rail corridor. The vegetation mapping was later refined to remove cleared areas and vegetation not representative of the *Corymbia calophylla - Kingia australis* woodlands on heavy soils TEC from the survey area (FVC 2024). PTA have used this fine-scale mapping to avoid areas of TEC and utilise cleared areas wherever possible. One vegetation type was recorded within the TSER clearing area, 0.12 ha of Wandoo woodland in Good condition. This vegetation is described as *Eucalyptus wandoo* and *Corymbia calophylla* low woodland over *Trymalium odoratissimum subsp. odoratissimum, Kingia australis* and *Xanthorrhoea preissii* shrubland *Mesomelaena tetragona* and *Laxmannia squarrosa* sedgeland. No threatened or priority ecological communities occur within this clearing area (FVC 2022; 2024). Two threatened flora (*Synaphea sp. Pinjarra Plain* and *Synaphea sp. Serpentine*) have known records within the FVC (2022) survey area. These records were not located during the survey, attributed to potential inaccuracy in location or species no longer being present, due to the age of the records. <u>Additional clearing area (subject of amendment application)</u> FVC completed a vegetation assessment, including a comprehensive desktop assessment, detailed flora and vegetation survey and targeted searches for significant flora and communities. The assessment is presented in Appendix A. Through a desktop assessment, FVC (2022) identified 33 conservation significant flora species with the potential to occur within 2 km of the survey area, which incorporates the proposed clearing area. This included 16 threatened species listed under the EPBC Act and BC Act; one Priority 1, three Priority 2, nine Priority 3 and four Priority 4 species.	Not at variance.

Assessment results	Conclusion
Of the 33 species, one was considered likely to occur and two had previously been recorded within the survey area. No threatened flora listed under the EPBC Act or BC Act or priority flora were recorded during the survey. One State-listed priority flora species, *Johnsonia pubescens subsp. cygnorum* was recorded within survey area, defined as vegetation unit CcXpKa. Therefore, vegetation unit CcXpKa was determined to be regionally significant. Based on FVCs field assessment, it was determined the vegetation within the clearing area is representative of the SCP 3b TEC, *Corymbia calophylla* – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain. Within the clearing area, this vegetation unit is in Degraded condition. **Fauna** Natural Area (2024) conducted a basic fauna survey in May 2024, which covered a 32.6 ha survey area. Natural Area (2024) identified 14 significant fauna species likely to use the survey area, of which one was recorded during the survey, the Forest Red Tailed Black Cockatoo (*Calyptorhynchus banksii naso*) listed as Vulnerable under the BC Act. All three clearing areas lay within the known distribution range of all three threatened black cockatoo species, each of which is considered likely to forage within the area. The Project will result in the clearing of a total of 0.215 ha of suitable foraging habitat, comprising moderate to high-quality habitat (score 8) for Carnaby's and Baudin's Cockatoos, and high quality habitat (score 10) for the Forest Red-tailed Black Cockatoo. Natural Area (2024) applied the DAWE (2022) foraging score tool, which applies one foraging score to an entire survey area. A review of site photos taken at the Byford monopole clearing area shows that the clearing area does not contain any primary foraging species (Marri trees). Additionally, the clearing areas are adjacent to several large patches of intact remnant native vegetation, including the Cardup Natura Reserve and Bush Forever Sites 354 and 361, which are more likely to provide suitable foraging habitat for black cockatoos. Natural area (2024) recorded 172 potential breeding trees containing two suitable hollows within their survey area. No breeding trees occur within the Byford monopole clearing area. Two potential breeding trees occur within the TSER clearing area, *Eucalyptus camaldulensis* and *E. rudis*. However, no hollows or evidence of use were detected. Additionally, the form of both trees is unlikely to develop suitable hollows for black cockatoos in the near future. The TSER clearing area contains suitable roosting habitat. However, clearing will not significantly reduce the potential roosting habitat within the local area. No indirect evidence of roosting (feathers) was observed during the survey. <u>Additional clearing area (subject of amendment application)</u> Through a desktop assessment, Natural Area (2024) identified 70 conservation significant fauna species to occur within 10 km of the survey area. NatureMap indicated 26 conservation significant species listed under the BC Act as potentially occurring within a 10 km radius of the site. The Protected Matters Search Tool (PMST) indicated 27 threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the site. A review of the DBCA threatened and priority fauna species database indicated the potential for 64 conservation significant fauna species to occur within a 20 km radius of the site. Natural Area (2024) recorded 172 potential breeding trees within their survey area. However, none occurred within the additional clearing area. No indirect evidence of roosting (feathers) was observed during the survey. **Summary** The Project requires clearing 0.215 ha of native vegetation in a Good to Completely Degraded condition. No significant flora species or vegetation communities occur within the clearing area. This vegetation is inferred as moderate-high to high-quality foraging habitat for the three	

Assessment results	Conclusion
threatened species of black cockatoos. However, the impact on foraging habitat is minimal, and will not significantly reduce the availability of foraging habitat within the local area. Additional clearing area (subject of amendment application) The native vegetation within the additional clearing (0.005 ha) area is in a Degraded condition. No significant flora species occur within the clearing area. This vegetation is classified as moderate-high to high-quality foraging habitat for the three threatened species of black cockatoos. No trees are proposed to be removed within the clearing area, with disturbance limited to understorey and shrubs. The surrounding Bush Forever site is likely to contain higher quality vegetation, with greater diversity values compared to the degraded rail reserve. The clearing area has been subject to historical and ongoing disturbance and therefore is not likely to be significant habitat for conservation significant flora. Given the small scale of impact, and the Degraded condition of the vegetation, the proposed additional clearing of 0.005 ha is not at variance with Principle A. Including this additional clearing, the total clearing of 0.215 ha for the Project is not at variance with Principle A.	
Sources: Focused Vision (2022), Natural Area (2024), Site photos (Appendix D)	

5.2 Principle (b) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia

Table 10 Assessment against Principle (b)

Assessment results	Conclusion
Natural Area (2024) conducted a basic fauna survey and black cockatoo assessment in May 2024. Natural Area (2024) identified 71 significant fauna species that potentially occur within 10 km of the survey area. Of these, it was determined that 14 species have the potential to utilise the survey area (32.6 ha). The PMST indicated 27 threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the site (DCCEEW, 2024). A review of the DBCA threatened and priority fauna species database indicated the potential for 64 conservation significant fauna species to occur within a 20 km radius of the site (DBCA, 2024). **Fauna observations** Five fauna species were recorded (directly or indirectly) during the survey, listed below: • Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) • Black- Faced Cuckooshrike (*Coracina novaehollandiae*) • Red- capped Parrot (*Purpureicephalus spurius*) • Australian Ringneck (*Barnardius zonarius*) • Common Brushtail Possum (*Trichosurus vulpecula*). Of these, one species, the Forest Red-tailed Black Cockatoo is listed as Vulnerable under the BC Act. This species was observed foraging in Jarrah and Marri trees. None of the fauna listed above were observed inside the three clearing areas. The clearing area is surrounded by larger patches of remnant native vegetation, namely Cardup Nature Reserve 1.3 km to the north-west, and the adjacent Bush Forever sites (315 and 361) to the west and east. Native fauna may be transient through the clearing area; however, are unlikely to use the vegetation as primary habitat (Natural Area, 2024). The vegetation immediately west of the Byford monopole clearing area and east of the TSER and additionally clearing area will remain intact, maintaining habitat connectivity. Clearing is not expected to have a significant	Not at variance.

Assessment results	Conclusion
increase on the existing habitat fragmentation from roads, rail line, access tracks and cleared paddocks. **Black cockatoos** The three clearing areas are within the known distribution range for the three threatened black cockatoo species. The Project will clear 0.095 ha of Marri Open Woodland (Degraded to Completely Degraded condition) and 0.12 ha of Wandoo Woodland (Good condition). These vegetation types were inferred as suitable foraging habitats for all three species, assessed as moderate to high quality (8) for Carnaby's and Baudin's Cockatoo and high quality (10) for the Forest Red-tailed Black Cockatoo. A review of site photos shows no primary foraging species (Marri trees) occur within the clearing areas (Appendix D). Additionally, given the surrounding larger patches of remnant native vegetation, the clearing areas are unlikely to provide critical foraging habitat to any of the black cockatoo species. Natural Area (2024) recorded four observation points for the Forest Red-Tailed Black Cockatoo, one record is located approximately 400 m north of the TSER clearing area, and the remaining are 700 m south. All records are 2-3 km south of the Byford monopole clearing area. These observations are consistent with the patches of remnant native vegetation that surround the clearing areas. Natural Area (2024) recorded 172 potential breeding trees within the survey area, of which two had suitable breeding hollows. No evidence of breeding was observed. Two potential breeding trees, *Eucalyptus camaldulensis* and *E. rudis*, occur within the TSER clearing area. However, no hollows or evidence of use were detected. A review of Google Street View from August 2024, indicates that due to the form of the two trees, it is unlikely they will develop suitable hollows in the near future. **Other threatened and priority species** The railway reserve has the potential to connect some small patches of remnant vegetation. At a local scale, the vegetation within the clearing area has some patch connectivity to other areas of habitat but is mostly surrounded by cleared agricultural land and residential land. While vegetation within the clearing area may provide opportunistic habitat for fauna species, impacts to ecological linkages are considered unlikely, given the minor scale of the clearing proposed, and presence of a significant amount of similar or better-quality habitat immediately adjacent to the east. It is highly likely that the remaining threatened and priority fauna species are present within the broader remnant vegetation and at a minimum utilise the area to move through the landscape. The vegetation within the clearing area also contributes to linkage values within the railway reserve for fauna species. Linkages will not be broken by the proposed clearing due to vegetation to the east being maintained. As such, clearing is not likely to impact on the ability of fauna to disperse through the landscape. **Summary** PTA is proposing to clear 0.215 ha of suitable foraging habitat and two potential breeding trees for black cockatoos. However, a review of vegetation within the Byford monopole clearing area (0.09 ha) shows that no primary foraging species (Marri trees) will be cleared. No foraging evidence (direct or indirect) was recorded within either clearing area, with records. The nearest foraging record (700 m north of the proposed TSER) is associated with a larger patch of remnant native vegetation, north of Norman Road. Further, clearing will not significantly alter the existing fragmentation that exists in the local area, with some vegetation along the rail corridor to be maintained. Given the above, the proposed clearing areas are unlikely to represent significant habitat for native fauna. This proposal is not at variance with Principle B. Including this additional clearing, the total clearing of 0.215 ha for the Project is not at variance with Principle B.	
Sources: Natural Area (2024), Site photos (Appendix D)	

5.3 Principle (c) - Native vegetation should not be cleared if it includes or is necessary for the continued existence of, rare flora

Table 11 Assessment against Principle (c)

Assessment results	Conclusion
Natural Area (2025) identified 54 conservation significant flora species with the potential to occur within the study area (10 km buffer). This included 19 threatened species listed under the EPBC Act, 21 threatened species listed under the BC Act and/or 31 priority flora species. Of the 54 species, 12 were considered likely to occur within the survey area. The FVC 2022 desktop assessment identified 33 conservation significant flora species with the potential to occur within 2 km of the survey area, which incorporates the proposed clearing area. This included 16 threatened species listed under the EPBC Act and BC Act; one Priority 1, three Priority 2, nine Priority 3 and four Priority 4 species. Of the 33 species, one was considered likely to occur and two had previously been recorded within the survey area. No threatened flora species were recorded in the three clearing areas or in either survey area. Flora specimens were collected at the previously recorded locations of *Synaphea sp. Pinjarra Plain* (A.S. George 17182) and *Synaphea sp. Serpentine* (G.R. Brand 103), however, none were representative of the Threatened taxa (FVC, 2022). The proposed clearing area has been subject to significant historical and ongoing disturbance due to being located within a road and rail reserve, adjacent to a cleared track, and therefore is not likely to be significant habitat for conservation significant flora, particularly the *Synaphea spp*. which have been noted to be sensitive to weeds. Based on the above assessment, the proposed clearing of 0.215 ha, including the additional 0.005 ha presented in this amendment, is not likely to result in significant impacts to conservation significant flora and is not at variance to Principle C.	Not at variance.
Sources: Focused Vision (2022), Natural Area (2025)	

5.4 Principle (d) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community

Table 12 Assessment against Principle (d)

Assessment results	Conclusion

Natural Area (2025) and FVC (2022) identified nine TECs with potential to occur within 10 km of the survey area, listed below:
• Critically Endangered:
  ○ Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)
  ○ *Corymbia calophylla -Kingia Australia* woodlands on heavy soils (FCT 3a)
  ○ *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (FCT3c)
• Endangered:
  ○ *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (FCT 20b)
  ○ Herb rich saline shrublands in clay pans (FCT 7)
  ○ Herb rich shrublands in clay pans (FCT 8)
  ○ Shrublands on dry clay flats (FCT 10a)
• Vulnerable:
  ○ *Corymbia calophylla- Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b)
	May be at variance.

<table>
<tr><th>Assessment results</th><th>Conclusion</th></tr>
<tr><td>
Dense shrublands on clay flats (FCT 9)
One TEC was identified within the FVC (2022) survey area, the Corymbia calophylla -Kingia Australia woodlands on heavy soils (FCT 3a). FVC (2024) undertook fine-scale vegetation mapping to remove cleared areas and vegetation not representative of the TEC, allowing PTA to avoid impacting TEC areas.
A desktop assessment identified the additional clearing area intersects with the buffer of three TECs as per the table below (FVC, 2022).
<table>
<tr><th>Identifier</th><th>Community name</th><th>Commonwealth category</th><th>WA state category</th></tr>
<tr><td>SCP 3b</td><td>Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as original described in Gibson et al, (1994))</td><td>-</td><td>Vulnerable</td></tr>
<tr><td>SCP 20b</td><td>Banksia attenuate and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as original described in Gibson et al, (1994))</td><td>Endangered</td><td>Endangered</td></tr>
<tr><td>Banksia WL SCP</td><td>Banksia dominated Woodlands of the Swan Coastal Plain IBRA Region</td><td>Endangered</td><td>Priority 3</td></tr>
</table>
FVC (2022) surveyed the surrounding area and CcXPka was mapped within the additional clearing area, and showed the greatest similarity to FCT SCP 3b. Interrogation of data indicated the presence of Corymbia calophylla, Xanthorrhoea preissii and Kingia australis as dominant species, all of which are considered typical of FCT SCP 3b. The clay soils within the clearing area are also characteristic of FCT SCP 3b. Therefore, based on the assessment of key dominant species and soils, it is possible that vegetation representative of FCT SCP 3b occurs within the additional clearing area, however the vegetation unit is in Degraded condition.
No TEC vegetation is present within the original approved clearing areas (0.21 ha) and none were anticipated to occur within the vegetation types (Marri Woodland in a Degraded to Completely Degraded Condition and Wandoo Woodland in Good condition) post-survey. However as a precautionary approach, the proposed additional clearing of 0.005 ha is considered to potentially impact vegetation containing part of a threatened ecological community and as such the clearing of 0.215 ha of vegetation may be at variance with this principal
Sources: Focused Vision (2022)
</td><td></td></tr>
</table>

5.5 Principle (e) - Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been significantly cleared

Table 13 Assessment against Principle (e)

Assessment results	Conclusion
The National Objectives and Targets for Biodiversity Conservation 2001-2005 (Commonwealth of Australia, 2001) recognises that if Australia's biodiversity is to be protected, the retention of 30% or more of each ecological community's pre-clearing extent is necessary. In constrained areas, such as the Swan Coastal Plain, this threshold is set at 10%.	May be at variance.

Assessment results	Conclusion

One Beard (1974) pre-European vegetation association intersects the clearing area, association 968, which is described as medium woodland with *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), and *Eucalyptus wandoo* (Wandoo).

At the state level, there is 32.02% of vegetation association 968 remains intact; however, at bioregion level, there is only 6.30% remaining. The clearing areas are located in a constrained area (Swan Coastal Plain); however, the extent remaining at the bioregion and local government scales are below the 10% threshold. A review of historical imagery shows the majority of the local area (~10 km of the clearing area) was cleared prior to 1953. These cleared areas are now zoned for residential, urban development and industrial use.

Vegetation representation - Statewide

Vegetation association	Pre-European extent (ha)	Current extent (ha)	Percentage remaining (%)			% Current extent in all DBCA managed land (proportion of current extent)
			Statewide	SWA02 bioregion	Shire of Serpentine-Jarrahdale	
968	296,877.84	95,048.82	32.02	6.62	4.60	57.64

(Government of Western Australia, 2019a)

Vegetation representation – Swan Coastal Plain

Vegetation association	Pre-European extent (ha)	2024 extent (ha)	Percentage remaining (%) SWA02 bioregion	% Current extent in all DBCA managed land
968	136,117.32	8,570.43	6.30	1.52

(Government of Western Australia, 2025)

The proposed clearing of 0.215 ha is within an area that has been extensively cleared. However, the proposed clearing is minor (0.215 ha) and will reduce the remaining extent of vegetation association 968 by less than 0.001% at the state, bioregion and local government levels. Due to the vegetation association 968 being below the 10% threshold, the proposed clearing constitutes a significant residual impact.

Heddle et al. (1980) conducted vegetation complex mapping for the Swan Coastal Plain at a scale of 1:250,000. One complex, the Forrestfield complex intersects the clearing areas, described as open forest of Marri, Wandoo and Jarrah to open forest of Jarrah, Marri, *Allocasuarina fraseriana* (Sheoak) and Banksia species. Fringing woodland of Eucalyptus rudis (Flooded Gum) occurs in the gullies that dissect this landform. There is 12.4% of this vegetation type remaining at the State level (Webb et al. 2016). The proposed clearing will reduce this complex by 0.007%, therefore keeping the total remaining extent above the 10% threshold.

The proposed clearing is within an area that has been extensively cleared. However, the proposed clearing is minor (0.215 ha of native vegetation in Completely Degraded to Good Condition) and is not likely to significantly reduce the remaining vegetation of the area.

The proposed clearing may be at variance to this principle.

Sources: Government of Western Australia (2019 and 2025).

5.6 Principle (f) - Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or a wetland

Table 14 Assessment against Principle (f)

<table>
<tr><th>Assessment results</th><th>Conclusion</th></tr>
<tr><td>
One CCW intersects 0.03 ha of the TSER clearing area, and another CCW is located approximately 10 m east. Both wetlands are unnamed palusplain wetlands, UFIs 15462 and 15463, respectively. One DBCA MUW, Armadale Palusplain (15383), is mapped over the Byford monopole clearing area. There are no Ramsar sites, or Nationally Important Wetlands within or within 50 meters of the three clearing areas.

A desktop assessment identified the additional clearing area does not intersect with any mapped wetlands. The following mapped wetlands are recorded within close proximity of the additional clearing area:
<table>
<tr><th>Wetland name</th><th>Wetland classification</th><th>Management category</th><th>Location</th></tr>
<tr><td>Unknown UFI 16,021</td><td>Palusplain</td><td>Multiple Use</td><td>Occurs approximately 350 m to the west of the clearing area.</td></tr>
<tr><td>Unknown UFI 15,015</td><td>Palusplain</td><td>Multiple Use</td><td>Occurs approximately 280 m to the north of the clearing area.</td></tr>
<tr><td>Unknown UFI 15,461</td><td>Palusplain</td><td>Multiple Use</td><td>Occurs approximately 360 m to the south of the clearing area.</td></tr>
<tr><td>Uknown UFI 15,463</td><td>Palusplain</td><td>Conservation</td><td>Occurs approximately 360 m to the south of the clearing area.</td></tr>
<tr><td>Uknown UFI 15,462</td><td>Palusplain</td><td>Conservation</td><td>Occurs approximately 360 m to the south of the clearing area.</td></tr>
</table>
No riparian vegetation or standing water was recorded during the surveys conducted by Natural Area (2025, 2024) or FVC (2022). The soil within the survey areas were also described as well-draining, brown sandy loam soils.

The Project is within a developed area (along the rail line) and is not likely to be representative of a watercourse or wetland. The clearing is also minor (0.215 ha) and is not expected to significantly impact any nearby wetlands or watercourses. The proposal is not likely to be at variance with this principle.
</td><td>Not likely to be at variance</td></tr>
<tr><td>Sources: Focused Vision (2022)</td><td></td></tr>
</table>

5.7 Principle (g) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation

Table 15 Assessment against Principle (g)

<table>
<tr><th>Assessment results</th><th>Conclusion</th></tr>
<tr><td>
No mapped ASS risk areas were identified within 50 m of the three clearing areas. The soil type is mapped as 213Fo_F2b and is described as well drained, moderately deep to deep, gravelly acidic yellow duplex soils and rare laterite.

A desktop assessment identified the additional clearing area is mapped as having a high risk of wind erosion.
<table>
<tr><th>Risk</th><th>Risk description</th><th>Risk level code</th></tr>
<tr><td>Wind erosion risk</td><td>>70% of map unit has a high to extreme wind erosion risk</td><td>H2</td></tr>
</table>
</td><td>Not likely to be at variance.</td></tr>
</table>

Assessment results			Conclusion
Water erosion risk	<3% of map unit has a high to extreme water erosion risk	L1	
Salinity risk	<3% of the map unit has a moderate to high salinity risk or is presently saline	L1	
Waterlogging risk	<3% of the map unit has a moderate to very high waterlogging risk	L1	
Flood risk	<3% of the map unit has a moderate to high flood risk	L1	
DPIRD (2025) Given the minor scale of the clearing and the existing vegetation surrounding it, the proposal is not likely to increase salinity, waterlogging, nutrient export or erosion. The clearing of vegetation is therefore not likely to cause appreciable land degradation or increase in wind erosion risk and is therefore not likely to be at variance with this principle.			
Sources: DPIRD (2025)			

5.8 Principle (h) - Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area

Table 16 Assessment against Principle (h)

Assessment results	Conclusion
No mapped conservation areas occur within the three clearing areas. The nearest conservation area is Cardup Nature Reserve (R2457), approximately 1.3 km north-west (DBCA, 2025b) of the additional clearing area. The separation distance between Cardup Nature Reserve and the clearing area is considered sufficient to prevent significant adverse impacts. The clearing areas are located within a cadastral boundary for Bush Forever Area, Site 350. The site extends approximately 15 km along the rail line, covering 125.7 ha (DPLH, 2019). Clearing impacts are minor (0.215 ha) and not likely to have a significant impact on the environmental values of the Bush Forever site. The proposed clearing of 0.215 ha of native vegetation along is not expected to diminish any ecological linkages or buffers around the Bush Forever site. No other mapped conservation areas, historic or Aboriginal heritage areas occur within, or within proximity to the clearing area. The entire application area occurs within Bush Forever site 350, known as the 'Byford to Serpentine Rail/Road Reserves and Adjacent Bushland'. The Bush Forever site is also within the 'Government Lands or Public Infrastructure' implementation category under SPP 2.8 (clause 5.1.2.3). Under this clause, proposals should be consistent with the overall purpose and intent of an existing reserve, can be reasonably justified with regard to wider environmental, social and economic considerations (in particular, future road (regional or local) and rail requirements), and reasonable alternatives have been considered to avoid or minimise impacts (WAPC 2022). The proposed clearing for the rail signalling upgrades is consistent with the policy document. Given the proposed clearing will only remove understory and shrubs, the vegetation to be cleared does not constitute high-value vegetation. The proposed is not at variance to this principle.	Not at variance.
Sources: DBCA (2025b), DPLH (2019)	

5.9 Principle (i) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

Table 17 Assessment against Principle (i)

Assessment results	Conclusion
The three clearing areas are not located within a Clearing Control Catchment under the *Country Areas Water Supply Act 1947*, Public Drinking Water Source Area or Surface Water Proclaimed Area under the *Rights to Water and Irrigation Act 1914*. The areas proposed for clearing consists of soils of well drained, moderately deep to deep, gravelly acidic yellow duplex soils. It is unlikely that proposed clearing would result in significant changes to surface water runoff of groundwater recharge. No soils prone to salinity or erosion are known to exist within the clearing area. There is also no known risk of ASS occurrence. No significant changes to the hydrological regime (including water quality) are expected to result from the proposed clearing. This proposal is therefore not likely to be at variance to this principle.	Not likely to be at variance.
Sources: DPIRD (2025), DWER (2025a)	

5.10 Principle (j) - Native vegetation should not be cleared if the clearing of the vegetation is likely to cause or exacerbate the incidence or intensity of flooding

Table 18 Assessment against Principle (j)

Assessment results	Conclusion
The clearing areas are not located within a mapped floodplain risk area (DWER 2025b). The clearing is minor (0.215 ha) and will not significantly reduce the local native vegetation. The clearing is within the existing rail corridor. Given the nature and scale of clearing proposed, it is unlikely the proposal would exacerbate the incidence or intensity of flooding in this area. The proposal is not at variance to this principle.	Not at variance.
Sources: DWER 2025b	

6.0 Offset proposal

PTA has provided a monetary offset ($43,750) for the previously approval clearing area of 0.21 ha.

Once the clearing permit amendment application has been submitted, DWER will advise PTA if the proposed clearing application will have a significant residual impact and therefore requires an offset. It is anticipated, based on the assessment against the ten clearing principles, that residual impacts of the proposed clearing remain significant, even after the application of avoidance and minimisation techniques. In line with clearing permit CPS11153/1, an offset is likely to be required to counterbalance the significant residual impacts of the proposed clearing including:

- approximately 0.005 ha of mapped native vegetation that provides suitable foraging habitat for three black cockatoo species (Carnaby's black cockatoo, Baudins black cockatoo, forest red-tailed black cockatoo), given the presence of *Corymbia calophylla* (marri), which is a preferred foraging species for black cockatoos; and
- approximately 0.005 ha of native vegetation representative of a TEC (FCT SCP 3b).

The size of the offset required was determined using the WA Environmental Offsets Guidelines (DWER, 2014) and associated DWER WA environmental offsets calculator (Appendix E). The offset calculator indicated that a maximum of 0.06 ha was required in order for the offset to be adequate (Appendix E).

In line with the previous offset proposal for CPS11153/1, to counterbalance the significant residual impacts of the proposal, PTA seeks to provide a monetary contribution to fund the purchase of 0.06 ha of native vegetation which comprises the following:

- at least 0.06 ha of high-quality foraging habitat for black cockatoos; and
- at least 0.06 ha of native vegetation representative of TEC FCT SCP 3b.

As a monetary offset is being sought, an offset proposal as per Appendix A of DWERs Clearing of native vegetation offsets procedure (2014) has not been provided.

The monetary contribution amount for DWERs consideration has been estimated based on the 'rate per hectare' value provided by DWERs offset calculations are provided in Appendix E. A parcel less than 20 ha in size has a market value of $35,000 per hectare. Therefore, a monetary contribution of $2,100 is proposed to fund the acquisition of 0.06 ha of vegetation.

7.0 Conclusions

PTA proposes to clear an additional 0.005 ha of native vegetation in a Degraded condition, to install cabling between a future signalling equipment room and existing powerlines. This is in addition to the approval clearing of 0.21 ha granted under CPS 11153/1, bringing the total clearing to 215 ha.

PTA has commissioned several biological surveys near the clearing area and selected the proposed location to avoid areas with high environmental values. The clearing will not affect any significant flora, or critical habitats for native fauna. Although the area is within the distribution range of the three threatened black cockatoos, the clearing will not impact any potential breeding trees. An assessment against the ten clearing principles has found that the proposed clearing is not likely to be at variance with six of these principles. However, it may be at variance with Principles relating to Black Cockatoo foraging habitat, TECs, remnant vegetation and a Bush Forever site.

The PTA has undertaken substantial measures to avoid and minimise clearing of native vegetation in areas with high ecological values. Between 2020 and 2024, multiple biological surveys were conducted to inform project planning, enabling the design to avoid known areas of high quality vegetation in good or better condition, the project also makes use of previously cleared areas. The proposed clearing of 0.005 ha is the minimum area required for construction. A monetary offset of $2,100 will be proposed to DWER to offset the significant residual impacts of the vegetation clearing.

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Appendix A

Focused Vision Cable Route, Byford – Detailed Flora and Vegetation Assessment



FOCUSED VISION consulting

CABLE ROUTE, BYFORD

DETAILED FLORA AND VEGETATION ASSESSMENT

PUBLIC TRANSPORT AUTHORITY

AUGUST 2022

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EXECUTIVE SUMMARY

Focused Vision Consulting Pty Ltd (FVC) was commissioned by the Public Transport Authority of Western Australia (PTA) to undertake a flora and vegetation assessment of the Cable Route (survey area), to inform the impact assessment process.

A two-phase, detailed (formerly referred to as 'Level 2') flora and vegetation assessment with targeted flora and vegetation survey was carried out in accordance with the *Technical Guide Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a), by experienced botanists and ecologists, during early September and late October 2021.

The key findings and conclusions of the flora and vegetation assessment of the survey area are as follows:

- No Threatened flora species were recorded; however, one State-listed Priority species, *Johnsonia pubescens* subsp. *cygnorum* (P2) was recorded within vegetation type CcXpKa.
- Previously recorded Threatened flora species, *Synaphea* sp. Serpentine (G.R. Brand 103) and *Synaphea* sp. Pinjarra Plain (A.S. George 17182) were not observed within the survey area. The lack of records for previously recorded species is considered possibly due to degradation or the old age of some of the records, which may, in turn, be attributable to poor accuracy of recorded locations.
- The survey area has been subject to historic disturbances and a large proportion (29.98%) of the survey area has been cleared.
- No plants listed as a Declared Pest (DP) plant under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) were recorded.
- Seven vegetation units (four of which are remnant vegetation; BaXp, CcXp, CcXpKa and EwTo) were described and mapped within the survey area, consisting of six woodlands and one rehabilitated vegetation unit, with eleven units (five of which are also represented within the survey area) defined and mapped in the broader region (within a 500 m buffer of the survey area corridor).
- Eight Commonwealth or State-listed Threatened Ecological Communities (TECs) were identified through database searches as potentially occurring within the survey area. Of these, based on mapped occurrences with buffers applied, four TECs were considered most likely to occur, being floristic community types (FCTs) SCP 3a, 3b and 20b (the latter being part of Banksia woodlands TEC).
- The Marri/Xanthorrhoea woodland (CcXp) and the Marri/Xanthorrhoea/Kingia woodlands (CcXpKa) vegetation units have been inferred to be representative of Floristic Community Type (FCT) Swan Coastal Plain (SCP) 3b, the *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain, which is a State-listed (Vulnerable) TEC.
- None of the other vegetation units are considered to be representative of any Commonwealth-listed TECs or State-listed Priority Ecological Communities (PECs).
- The condition of the vegetation in the survey area ranges from 'Completely Degraded' to 'Excellent', with only 16.90% observed to be in 'Good' or better condition.
- The desktop assessment, field survey and floristic analysis determined that of the nine TECs or PECs potentially occurring in the survey area, only FCT SCP 3b is represented, which occurs within vegetation units CcXp and CcXpKa, together comprising 15.05 hectares (ha) (63.10% of the 23.85 ha survey area).

1. INTRODUCTION

Background

Focused Vision Consulting Pty Ltd (FVC) was commissioned by the Public Transport Authority of Western Australia (PTA) to undertake a flora and vegetation assessment of the Cable Route (survey area), to inform the impact assessment process.

1.1 LOCATION

The Cable Route survey area consists of a narrow corridor extending from Cardup Siding Road, along the existing South Western Railway adjacent to Soldiers Road, to Mundijong Junction within the Shire of Serpentine-Jarrahdale. It is situated approximately 35 km south-southeast of the Perth Central Business District (CBD) and has a total area of 23.85 ha, which is hereafter referred to as the survey area (**Figure 1**).

1.2 SCOPE OF WORK

A two-phase, detailed (formerly referred to as 'Level 2') flora and vegetation assessment with targeted flora and vegetation survey was carried out in accordance with the *Technical Guide Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a), with the key objectives to:

- define and map the vegetation present and its floral species composition
- determine the presence or absence of Threatened and Priority Ecological Communities
- determine the presence or absence of significant flora.

The field survey included, but was not limited to:

1. Detailed vegetation unit mapping of the survey area.
2. Detailed vegetation condition mapping of the survey area.
3. Determination of the presence of critical habitat for and/or if the survey area hosts Threatened flora.
4. Compilation of an inventory of all flora taxa recorded within the survey area, including introduced species.
5. Photographs of representative FCTs.
6. Track log records included in the report as a figure for the survey area.
7. Adequate quadrat sampling to allow analysis of the data to be undertaken (as per Department of Biodiversity Conservation and Attractions (DBCA) 2021a, Draft *Vegetation survey methods and analysis to determine floristic community types on the southern Swan Coastal Plain*).

FCT analysis of the data collected was required to determine which of the Gibson *et al.* (1994) sites are most similar to the surveyed vegetation and hence which FCTs have greatest affinity to the vegetation, as per DBCA (2021a).

A comprehensive report (this report) was required to be prepared, outlining the following:

1. the findings of the desktop review
2. the field survey method(s) used
3. the field survey results
4. figures and track logs
5. conclusions regarding potential environmental impacts to flora and vegetation values.

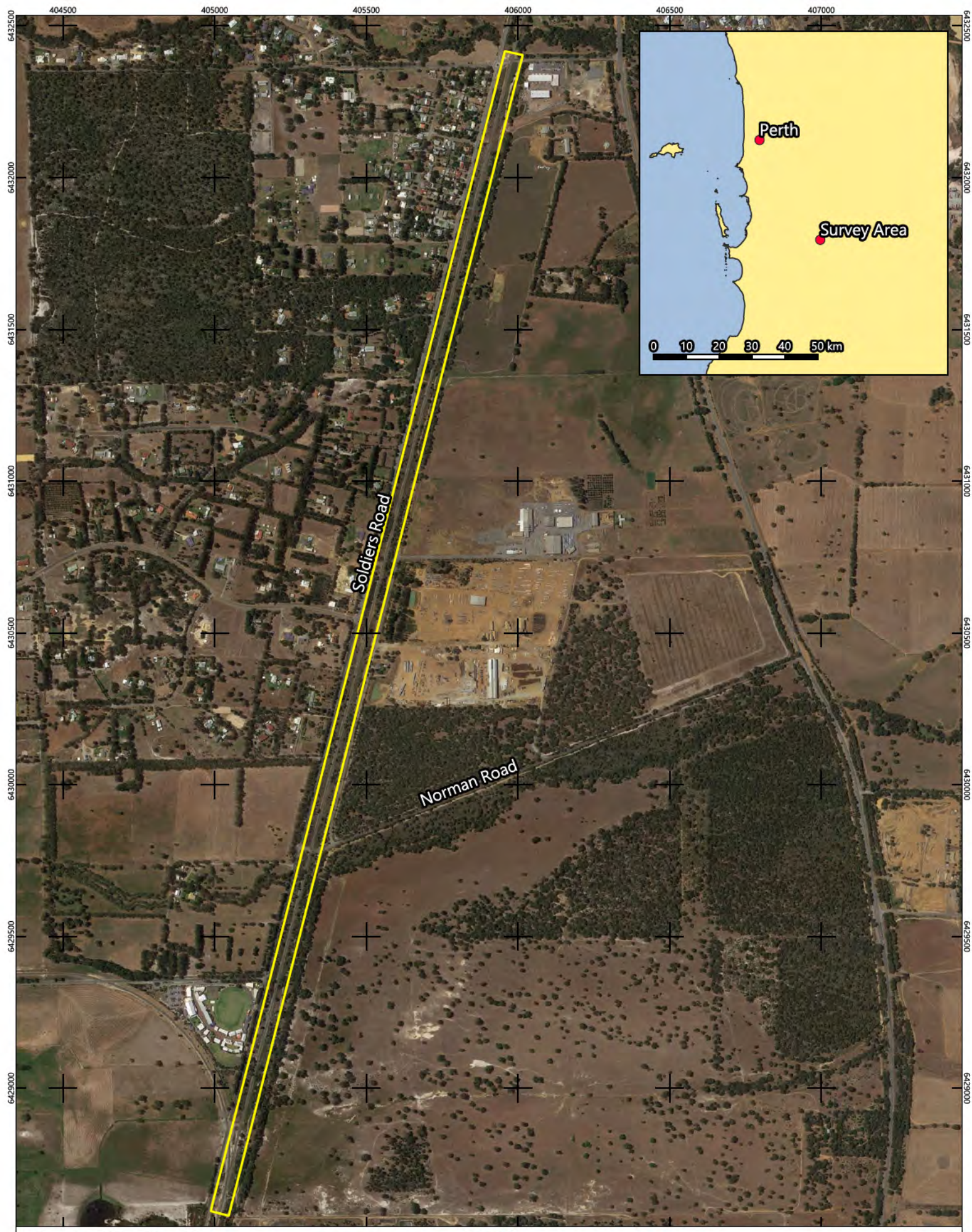


Figure 1 - Survey Area

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PTA21002g 09 May 2022

2. LEGISLATIVE CONTEXT

The flora and vegetation assessments were conducted in accordance with the following legislation:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Western Australian *Environmental Protection Act 1986* (EP Act)
- Western Australian *Biodiversity Conservation Act 2016* (BC Act).

The assessments complied with requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA (2008) *Guidance Statement No. 33: Environmental Guidance for Planning and Development*
- EPA (2016a) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*
- EPA (2016b) *Environmental Factor Guideline – Flora and Vegetation.*

2.1 THREATENED AND PRIORITY FLORA

The DBCA assigns conservation status to endemic plant species that are geographically restricted to few known populations or threatened by local processes. Allocating conservation status to plant species assists in protecting populations and conserving species from potential threats (DBCA 2018a).

The BC Act provides a statutory basis for the listing of threatened ecological communities (TECs), threatened and specially protected species, critical habitat and key threatening processes (DBCA 2021a). Whilst not awarded any statutory protection, the DBCA maintains the Priority flora list, for species of conservation concern. Therefore, both Threatened and Priority flora are important focuses of flora and vegetation surveys and their definitions are presented in **Table 1**.

Table 1 – Definitions of Threatened and Priority Flora Species (DBCA 2019)

Conservation Code	Category
T	**Threatened Species** Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the BC Act. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
P1	**Priority 1 – Poorly Known Species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority 2 – Poorly Known Species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority 3 – Poorly Known Species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority 4 – Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Species at risk of extinction are recognised as Threatened at a Commonwealth level and are categorised according to the EPBC Act as summarised in **Table 2**.

Table 2 - Categories of EPBC Act Threatened Flora Species (DBCA 2019)

Conservation Code	Category
EX	**Extinct** Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
EW	**Extinct in the Wild** Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
CR	**Critically Endangered** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	**Endangered** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
VU	**Vulnerable** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.

Any species listed in State and Commonwealth legislation as being of conservation significance is broadly considered to be a significant species. This incorporates species that are endangered, vulnerable and rare or covered by international conventions. Significance is not limited to species covered by State and Commonwealth legislation but also includes species of local significance and species showing significant range extensions or at the edge of their known range.

2.2 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat, which are subject to processes that threaten to destroy or significantly modify the assemblage across its range (DEC 2007).

The Minister for the Environment may list an ecological community as a TEC in one of the following categories: Presumed Totally Destroyed (PD), Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). A publicly available database listing TECs within Western Australia (WA) is maintained by DBCA.

TECs in WA are protected under the State BC Act and some are also protected under the Commonwealth EPBC Act. The TECs on the Commonwealth register are also listed on the Department of Agriculture, Water and Environment (DAWE) website, and in the Protected Matters Database (DAWE 2021b, 2021c).

Additional to TECs, ecological communities that are considered potentially of conservation significance (and potentially TECs) that do not currently meet survey criteria or that are not adequately defined, are rare but not threatened, have been recently removed from the TEC list or require regular monitoring, are considered to be PECs (DEC 2013) and are required to be taken into consideration during environmental impact assessments.

2.3 VEGETATION OF SIGNIFICANCE

Alongside and in addition to significance according to statutory listings, vegetation may be considered significant at a National, State, regional or local level.

2.3.1 Nationally Significant Vegetation

Vegetation communities may be considered to be of National significance where they support the following Commonwealth listed Matters of National Environmental Significance (MNES):

- populations of Threatened (EPBC listed) species
- TECs listed as nationally (EPBC) significant
- RAMSAR Wetlands of International Importance (DAWE 2021d).

2.3.2 State Significant Vegetation

Vegetation communities may be considered to be of State significance where they:

- support State listed Threatened flora, fauna and TECs afforded protection under the BC Act (EPA 2008, WALGA 2004a)
- occur within the State-managed conservation estate (areas protected under the *Conservation and Land Management Act 1984*) or areas that have been formally recommended by the DBCA for inclusion in the State conservation estate (EPA 2008).

2.3.3 Regionally Significant Vegetation

Vegetation communities may be considered to be of regional significance where they:

- support populations of Priority Flora or ecological communities (EPA 2016b, Government of Western Australia 2000a)
- are formally protected or recognised as Environmentally Sensitive Areas (ESAs), or under planning schemes for conservation, such as Bush Forever (EPA 2008, WALGA 2004a)
- support conservation category wetlands including associated vegetation (Government of Western Australia 2000a and 2000b)
- maintain important ecological processes or significant ecosystems (EPA 2016b)
- support high diversity of flora, fauna, communities, or community structure (Government of Western Australia 2000a)
- contain flora species of restricted distribution, species exhibiting range extensions and undescribed species (EPA 2016b)
- have a restricted regional distribution (EPA 2016b)
- are represented by less than 30% of their pre-European extent (Commonwealth of Australia 2001).

2.3.4 Locally Significant Vegetation

Vegetation communities may be considered to be locally significant where they:

- occur as small, isolated communities (Government of Western Australia 2000a, WALGA 2004a)
- have a restricted local extent (proportion) (EPA 2016b) and/or are locally restricted to only one or a few locations (WALGA 2004a).

2.4 VEGETATION CLEARING, EXTENT AND STATUS

Clearing of native vegetation is regulated in WA under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Any clearing of native vegetation is an offence, unless carried out under a clearing permit or if the clearing is for an exempt purpose (DWER 2018). A clearing permit may be required under Part V of the EP Act, whereby permit applications to clear native vegetation must be assessed against the '10 Clearing Principles' as outlined in the regulations (DER 2014).

Where clearing of native vegetation is proposed to occur, there are several key criteria applied to the assessment of clearing permit applications, in the interests of biodiversity conservation (DER 2014).

The objective of the EPA in relation to flora and vegetation is 'to protect flora and vegetation so that biological diversity and ecological integrity are maintained' (EPA 2016a). This objective is documented in the EPA Factor Guideline - Flora and Vegetation (EPA 2016a). The EPA considers it is important that ecological communities are maintained above the threshold level of 30% of the original pre-clearing extent of the community in unconstrained areas and 10% within 'constrained' areas (EPA 2008).

2.5 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally Sensitive Areas (ESAs) are areas that require special protection due to aspects such as landscape, fauna or historical value and are generally considered to be areas of high conservation value. ESAs are declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, which was gazetted on 8 April 2005 (Government of Western Australia 2005).

There are several types of ESAs relating to flora and vegetation, declared under Part V of the EP Act, which include:

- a defined wetland and the area within 50 m of that wetland
- the area covered by vegetation within 50 m of rare (Threatened) flora, to the extent where the vegetation is continuous with the vegetation in which the rare (Threatened) flora is located
- the area covered by a TEC
- Bush Forever sites.

2.6 INTRODUCED FLORA

Over 1,200 introduced (weed) species have been recognised to occur within Western Australia (EPA 2007). Weeds are plants that are not indigenous to an area and have been introduced either directly or indirectly through human activity. They establish in natural ecosystems and adversely modify natural processes, have the potential to dominate and simplify the ecosystems and thus decrease habitat value provided for native fauna. Weeds pose a threat to many native flora species due to their ability to rapidly grow and out-compete for available water, space, sunlight, and nutrients (EPA 2007).

2.6.1 Weeds of National Significance

Under the National Weed Strategy, there are currently 32 weed species listed as Weeds of National Significance (WoNS) (DAWE 2021e). Each weed listed was considered for inclusion based on the following criteria:

- invasive tendencies
- impacts
- potential for spread
- socioeconomic and environmental values.

2.6.2 Declared Pest Plants

The Western Australian Organism List (WAOL) details organisms listed as Declared Pests (DPs), including pest plants, under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (Department of Primary Industries and Regional Development (DPIRD) 2021). Under the BAM Act, DPs are listed under one of the following categories:

- **C1 (exclusion)**, that applies to pests not established in Western Australia; control measures are to be taken to prevent their entry and establishment
- **C2 (eradication)**, that applies to pests that are present in Western Australia but in low numbers or in limited areas where eradication is still a possibility
- **C3 (management)**, that applies to plants that should have some form of management applied that will alleviate the harmful impacts of the plant, reduce the numbers or distribution of the plant, or prevent or contain the spread of the plant (DPIRD 2017).

2.6.3 Environmental Weeds

Introduced flora species have also been ranked by a number of attributes, including invasiveness, distribution and environmental impacts in the various regions in the *Environmental Weed Strategy* (Department of Conservation and Land Management (CALM) 1999). To advance the above categorisation, the Invasive Plant Prioritisation Process for DBCA was developed in 2008 (Department of Parks and Wildlife (DPAW) 2013).

3. EXISTING ENVIRONMENT

3.1 CLIMATE

The survey area occurs on the Swan Coastal Plain, which has a warm Mediterranean climate, characterised by hot, dry summers and cool to mild wet winters (Mitchell *et al.* 2002). The Bureau of Meteorology (BoM) Jandakot Aero weather station (site 009172) is closest (approximately 19 km north-west) of the survey area and has been operating since 1972. The average annual long-term rainfall recorded at the station is 811.5 mm. The annual mean maximum temperature ranges from 19.1°C in winter to 31.5°C in summer (**Figure 2**). Rainfall data for the three months preceding the September field assessment indicates that July recorded well above average monthly rainfall, whilst June and August recorded below average monthly rainfall. Despite this, climatic conditions were considered optimal in the context of seasonal conditions for spring flora and vegetation assessments (**Figure 2**).

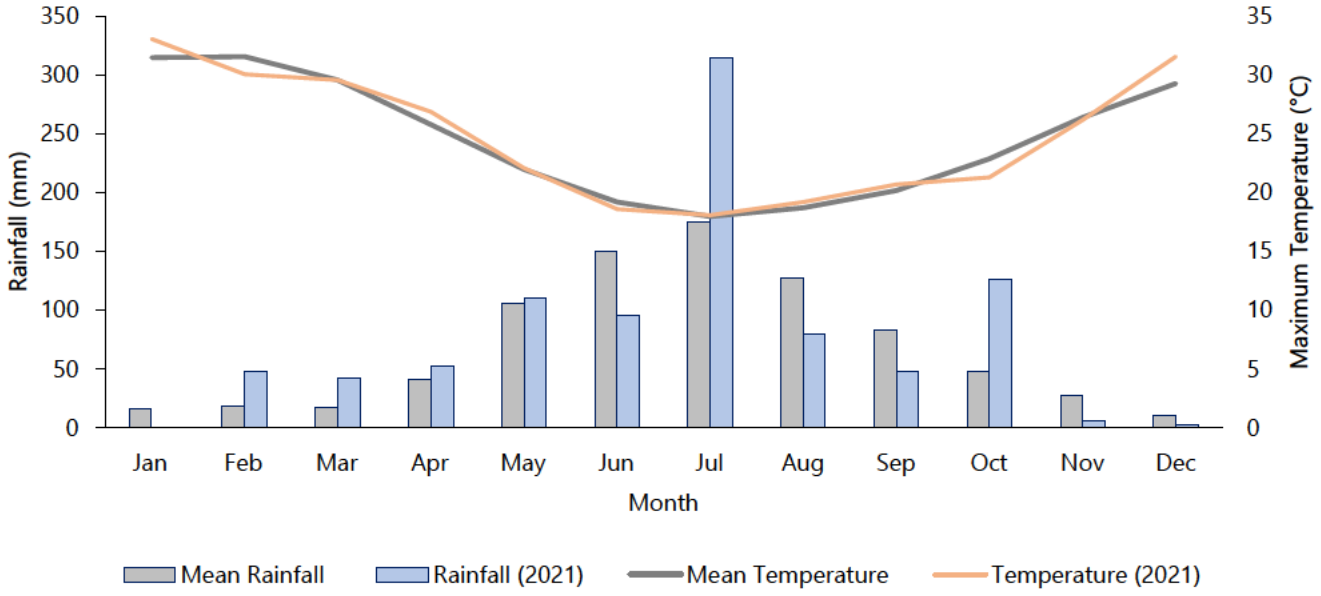


Figure 2 - Climate Data for Jandakot Aero Weather Station (Site 009172) (BoM 2021)

3.2 IBRA REGION

There are 89 recognised Interim Biogeographic Regionalisation for Australia (IBRA) regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (DAWE 2021f). The survey area lies within the Swan Coastal Plain IBRA region (SWA) and, at a finer scale, within the Perth subregion (Mitchell *et al.* 2002).

The Swan Coastal Plain bioregion is a low-lying coastal plain, mainly covered with *Banksia* and Tuart woodlands on sandy soils. Swampy areas are dominated by paperbark, and outwash plains by *Casuarina obesa*. *Melaleuca* shrublands and *C. obesa* - Marri woodlands are located extensively in the south, while Jarrah woodland dominates duricrusted Mesozoic sediments to the east.

The Perth subregion is comprised of colluvial and aeolian sands, alluvial river flats, coastal limestone and heath and/or Tuart woodlands on limestone, *Banksia* and Jarrah-*Banksia* woodlands on Quaternary marine dunes of varying ages, Marri on colluvial and alluvial soils, and seasonal wetlands (Mitchell *et al.* 2002).

3.3 GEOLOGY AND SOILS

The Swan Coastal Plain supports five major geomorphological systems (landforms) that lie parallel to the coast. From west to east these are; Quindalup Dunes, Spearwood Dunes, Bassendean Dunes, Pinjarra Plain and Ridge Hill Shelf (Churchward and McArthur 1980; Gibson *et al.* 1994). The survey area is situated on the Forrestfield System and Bassendean System which are summarised in **Table 3**. The spatial extent of each system is presented in **Figure 3**.

Table 3 – Soil Systems of the Survey Area (Schoknecht *et al.* 2004)

System	Soil Unit	Description
Bassendean System	212Bs	Swan Coastal Plain from Busselton to Jurien. Sand dunes and sandplains with pale deep sand, semi-wet and wet soil. Banksia-paperbark woodlands and mixed heaths.
Forrestfield System	213Fo	Undulating foot slopes of the Darling and Whicher Scarps. Duplex sandy gravels, pale deep sands and grey deep sandy duplexes. Woodland of *E. marginata* (Jarrah), *C. calophylla* (marri), wandoo and some *Banksia grandis.*



Figure 3 - Soils of the Survey Area

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3.4 VEGETATION

Vegetation of the Swan Coastal Plain has been broadly mapped by Beard (1990), and later re-assessed by Shepherd *et al.* (2002) into vegetation associations. Mapping depicted the native vegetation as it was presumed to be at the time of European settlement and is referred to as pre-European vegetation mapping.

There is one vegetation association, 968, that occurs within the survey area. The remaining extent of vegetation association 968 across a range of contexts is presented in **Table 4** and spatially in **Figure 4**.

Table 4 - Pre-European Vegetation of the Survey Area (Beard 1990, DBCA 2018b)

Extent Context	Veg. Association No.	Broad Vegetation Description	Pre–European Extent (ha)	Current Extent (ha)	% Pre-European Extent Remaining
Western Australia	968	Medium woodland; jarrah, marri & wandoo	296,877.84	95,048.82	32.02
Swan Coastal Plain IBRA Region	968	Medium woodland; jarrah, marri & wandoo	136,188.20	9,017.32	6.62
Perth IBRA Subregion	968	Medium woodland; jarrah, marri & wandoo	136,188.20	9,017.32	6.62
Shire of Serpentine-Jarrahdale	968	Medium woodland; jarrah, marri & wandoo	24,351.49	1,121.13	4.60

The vegetation of the Swan Coastal Plain has also been characterised by Heddle *et al.* (1980) based on vegetation in association with landforms and underlying geology. The survey area is situated on the Guildford complex and the Forrestfield complex (Heddle *et al.* 1980) (**Table 5, Figure 5**). The Guildford complex covers the majority (90.31%, 21.53 ha) of the survey area (**Figure 5**). The vegetation ranges from a mixture of open forest to tall open forest of *Corymbia calophylla* (Marri) – *Eucalyptus wandoo* (Wandoo) – *Eucalyptus marginata* (Jarrah) and woodland of *Eucalyptus wandoo* (Wandoo) (with rare occurrences *of Eucalyptus lane-poolei* (Salmon White Gum)). Minor components include *Eucalyptus rudis* (Flooded Gum) and *Melaleuca rhaphiophylla* (Swamp Paperbark) (Heddle *et al.* 1980).

The Forrestfield complex covers 9.69% (2.31 ha) of the lower southern region of the survey area (Heddle *et al.* 1980) (**Figure 5**). The vegetation ranges from open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) to open forest of *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) - *Allocasuarina fraseriana* (Sheoak) - *Banksia* species. There is also fringing woodland of *Eucalyptus rudis* (Flooded Gum) in the gullies that dissect this landform.

Table 5 - Remaining Extent of Forrestfield Complex and Guildford Complex (DBCA 2018c)

Location	Vegetation Complex	Pre–European Extent (ha)	Current Extent (ha)	% Remaining
Swan Coastal Plain	Guildford Complex	90,513.13	4,607.91	5.09
	Forrestfield Complex	22,812.92	2,803.36	12.29
Shire of Serpentine-Jarrahdale	Guildford Complex	12,986.67	552.25	4.25
	Forrestfield Complex	4,514.76	411.02	9.10

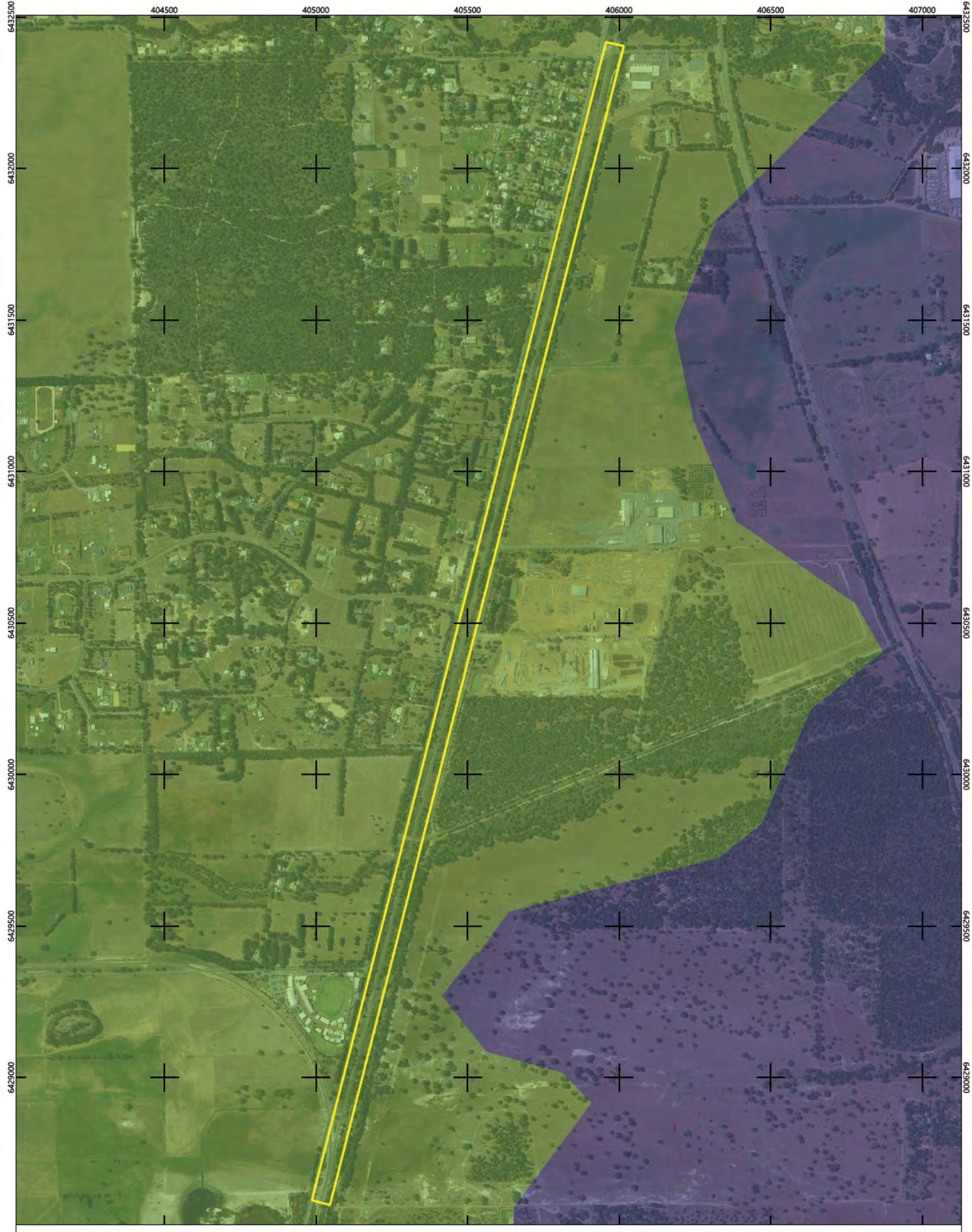


Figure 4 - Pre-European Vegetation

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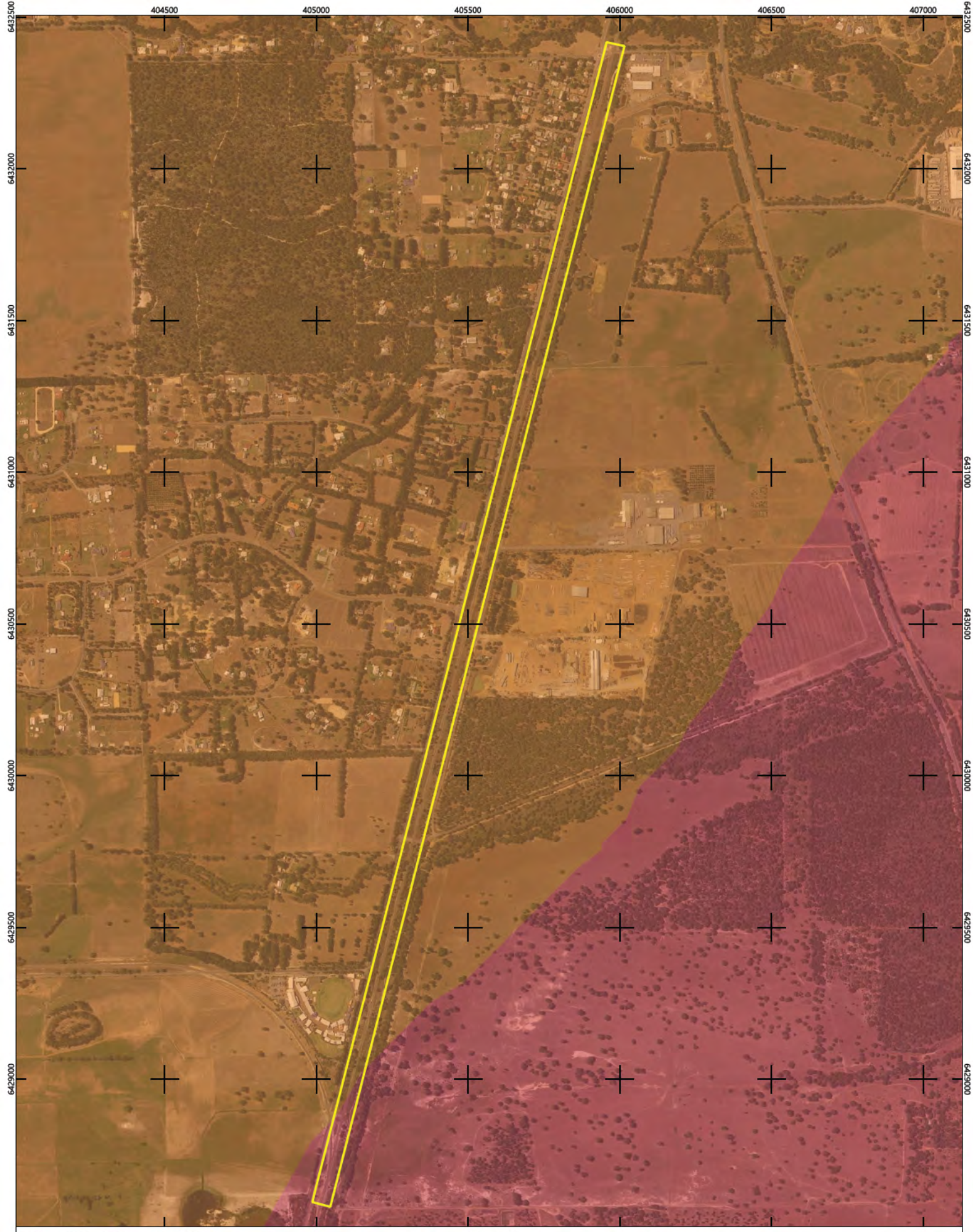


Figure 5 - Vegetation Complexes

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The objective of the Environmental Protection Authority (EPA) in relation to flora and vegetation is: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016b). The EPA considers it is important that vegetation associations are maintained above a threshold level of 30% of unconstrained areas and 10% for constrained areas, of the original pre-clearing extent of each association (EPA 2008). A level of 30% pre-clearing extent is considered to be the level below which species loss appears to accelerate exponentially at the ecosystem level (EPA 2008).

The following key criteria are applied to vegetation clearing from a biodiversity perspective, which justifies the retention targets (EPA 2000):

- the 'threshold level' below which species loss appears to accelerate exponentially within an ecosystem level, is regarded as being at a level of 30% (of the pre-European, i.e. pre-1750 extent of the vegetation unit)
- a level of 10% of the original extent of a vegetation community is regarded as being a level representing Endangered
- clearing which would increase the threat level to a vegetation community should be avoided.

The remaining extents of the Beard vegetation association 968 (**Table 4**) and Heddle vegetation Forrestfield complex and Guildford complex (**Table 5**) within the Shire of Serpentine-Jarrahdale both fall below the 10% threshold of extent remaining.

3.4.1 Floristic Community Types

Regional floristic assessments conducted by Gibson *et al.* (1994) sampled a total of 509 quadrats across the Swan Coastal Plain. This survey considered the patterning of plant distributions on the Plain and assessed the presence or absence of individual species to define floristic groupings based on shared species with the aid of multivariant analysis (Keighery 1997). These floristic groupings are commonly referred to as Floristic Community Types (FCTs).

Analysis of the 509 quadrats distinguished four super groups (Foothills/Pinjarra Plain, Seasonal Wetlands, Uplands centred on Bassendean Dunes and Uplands centred on Spearwood and Quindalup Dunes), and within these supergroups a further 43 FCTs were classified.

The assessment conducted by *Gibson et al.* (1994) is the point of reference for characterisation of FCTs on the Swan Coastal Plain, which also assists in the classification of vegetation as representative of a range of TECs and PECs.

3.5 GEOMORPHIC WETLANDS OF THE SWAN COASTAL PLAIN

The Geomorphic Wetlands of the Swan Coastal Plain dataset displays the location, boundary, geomorphic classification (wetland type) and management category of wetlands on the Swan Coastal Plain. Wetland management categories are based on their ecological, hydrological and geomorphological significance, and the degree of disturbance that has occurred. The three Wetland Management Categories on the Swan Coastal Plain can be summarised as follows:

- Conservation Category (CC) – wetlands that support a high level of ecological attributes and functions (generally having intact vegetation and natural hydrological processes), or that have a reasonable level of functionality and are representative of wetland types that are rare or poorly protected.
- Resource Enhancement (RE) – wetlands that have been modified (degraded) but still support substantial ecological attributes (wetland dependant vegetation covering more than 10%) and functions (hydrological properties that support wetland dependent vegetation and associated fauna) and have some potential to be restored to CC quality. Typically, such wetlands still support some elements of the original native vegetation, and hydrological function.

- Multiple Use (MU) – wetlands that are assessed as possessing few remaining ecological attributes and functions. While such wetlands can still play an important role in regional or landscape ecosystem management, including water management, they are considered to have low intrinsic ecological value. Typically, they have very little or no native vegetation remaining (less than 10%).

Nine Geomorphic wetlands of the Swan Coastal Plain occur within the survey area, including three Conservation Category Wetlands (CCW) and six Multiple Use Wetlands (MUW) (**Table 6**). The wetland locations are spatially presented in **Figure 6**.

Table 6 – Wetlands within the Survey Area

UFI	Wetland Name	Wetland Classification	Management Category	Location within the Survey Area
14505	Byford Rail Reserve	Palusplain	Conservation	Occurs 97 km south of Daisy Road to 50 m north of Robertson Road, excluding the area within UFI 15015 and 16021.
15462	Unknown	Palusplain	Conservation	Occurs 63 m south of Norman Road to 196 m north of Mundijong Junction
15463	Unknown	Palusplain	Conservation	Occurs 63 m south of Norman Road to 234 m north of Mundijong Junction
14543	Unknown	Palusplain	Multiple Use	Occurs 53 m north of Robertson Road Turnoff to 135 m south of Karbro Drive
15015	Unknown	Palusplain	Multiple Use	Occurs adjacent to Soldiers Road 225 m south of Bushlark Close to 215 m north of Robertson Road turnoff
15382	Unknown	Palusplain	Multiple Use	Occurs within NE corner of survey area from Cardup Siding Road to Cardup Train Station
15383	Armadale Palusplain	Palusplain	Multiple Use	Occurs from Cardup Train Station to 97 m south of Daisy Road
15461	Unknown	Palusplain	Multiple Use	Occurs 63 m south of Norman Road along Soldiers Road to 254 m north of Mundijong Junction
16021	Unknown	Palusplain	Multiple Use	Occurs in a small triangular area 211 m south of Bushlark Close and in a narrow corridor encompassing rail line 63 m south of Norman Road to Mundijong Junction

3.6 DRAINAGE AND GROUNDWATER

Two non-perennial minor unnamed tributaries occur within the survey area (**Figure 6**). Cardup Brook occurs approximately 30 m north (**Figure 6**) and Manjedal Brook approximately 360 m south of the survey area. The survey area occurs above the Serpentine proclaimed groundwater area. Under the *Rights in Water and Irrigation Act 1914* (WA), it is illegal to take water from a watercourse or groundwater aquifer in a proclaimed area without a licence.

Data contained in the Perth Groundwater Map (DWER 2020) indicates that there is no available groundwater depth data. Data available for the Swan Coastal Plain indicates that the groundwater at the location of the survey area contains 1000-1500 mg/L Total Dissolved Solids (TDS) to the north and 1500-3000 mg/L. TDS to the south (DWER 2020).

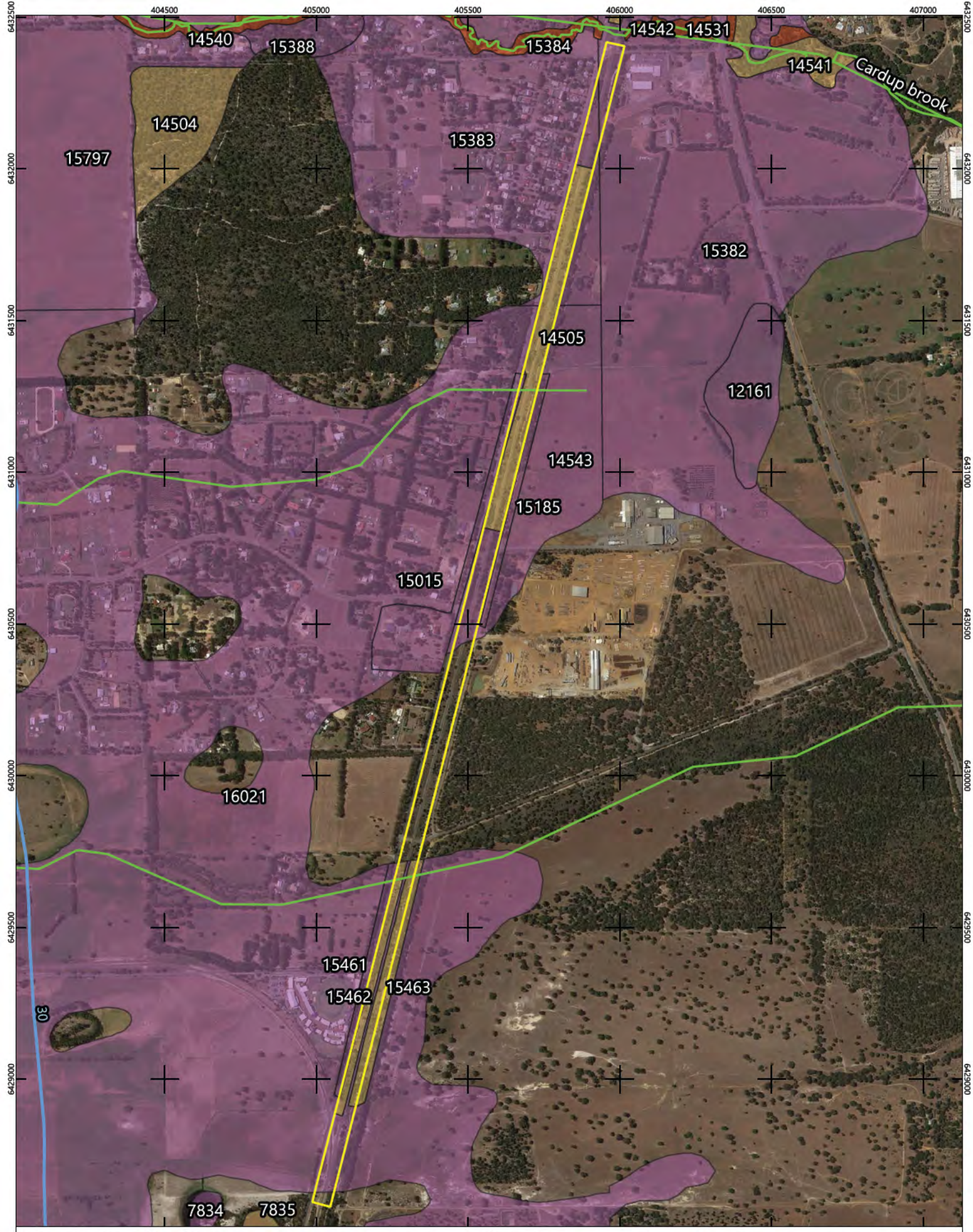


Figure 6 - Geomorphic Wetlands of the Swan Coastal Plain

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3.7 RESERVES, CONSERVATION AREAS AND ENVIRONMENTALLY SENSITIVE AREAS

Under the Bush Forever Plan, 51,200 ha of regionally significant bushland areas are protected in 287 Bush Forever Sites in Western Australia (Government of Western Australia 2000a and 2000b). Bush Forever sites are also classified as Environmentally Sensitive Areas (ESAs).

The survey area is listed as a Bush Forever site (site 350; Serpentine Rail/Road Reserves and Adjacent Bushland) and is therefore an ESA (**Figure 7** and **Table 7**). Cardup Nature Reserve (Bush Forever site 352) adjacent to the survey area has also been listed as a Class A Nature Reserve and has been documented to support Commonwealth and State listed TECs. Class A reserves are afforded the greatest degree of protection under the *Land Administration Act 1997* and the listing is used solely to protect areas of high conservation or community value (Landgate 2018).

Table 7 – Summary of Reserves and Conservation Areas

Name	Conservation Type	Proximity to the Survey Area
Byford to Serpentine Rail/Road Reserves and Adjacent Bushland	Bush Forever site 350 Environmentally Sensitive Area	Encompasses entire survey area
Cardup Nature Reserve	Bush Forever site 352 Class A Nature Reserve Environmentally Sensitive Area	Approximately 20 m west of survey area, adjacent to Soldiers Road
	Bush Forever site 271 Environmentally Sensitive Area	Approximately 339 m east of survey area, adjacent to South Western Highway
Norman Road Bushland	Bush Forever site 361 Environmentally Sensitive Area	Approximately 21 m east of survey area, adjacent to Robertson Road and Norman Road
	Bush Forever site 354 Environmentally Sensitive Area	Approximately 21 m east of survey area, adjacent to Norman Road

3.8 DISTURBANCE HISTORY

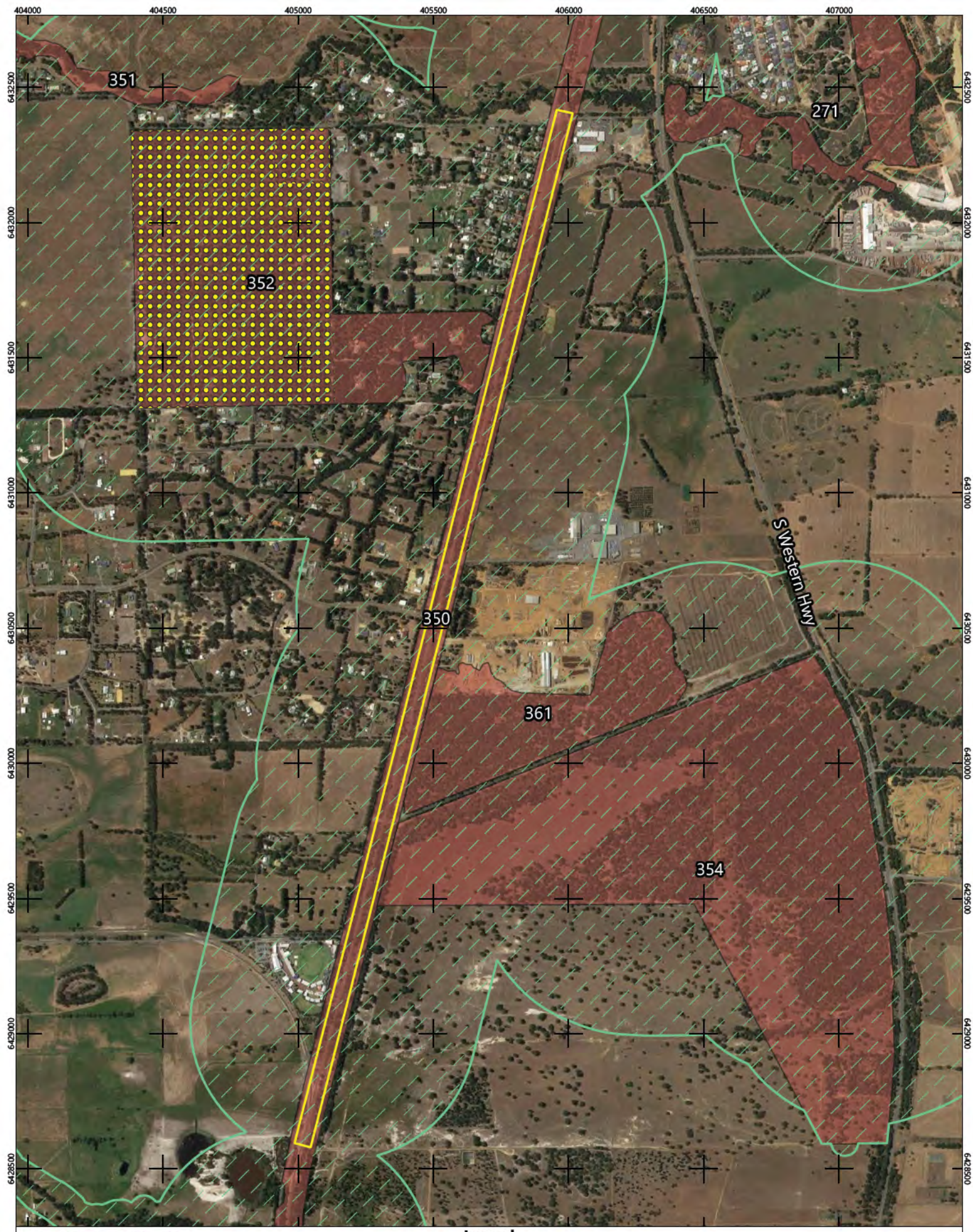
The survey area has a history of disturbance such as inappropriate fire regime (too frequent), weed invasion, potential clearing to upgrade the road or railway line, potential for altered surface drainage due to road grading and littering of rubbish (DEC 2012). The South Western Railway was constructed in 1893 from East Perth to Pinjarra later extended to Bunbury (Gunzburg and Austin 2008, Newland and Quinlan 2000). Open since 1894, the South Western Railway has been functional still to present day, where trains travel daily via this route.

Two gravel access roads have been constructed either side of the South Western Railway and run parallel to the railway tracks within the survey area. The long linear shape of the survey area coupled with frequent train movements, means it is vulnerable to weed invasion from adjacent agricultural paddocks and transport via vehicles (CALM 2003).

The survey site and adjacent Soldiers Road within the Byford to Serpentine Rail/Road Reserve are utilised for various recreational activities by bushwalkers, birdwatchers and picnickers and has subsequently been designated as a Flora Road by the Shire of Serpentine Jarrahdale (CALM 2003).

3.9 ECOLOGICAL CONNECTIVITY

The survey area forms part of the Perth Regional Ecological Linkages Network (WALGA 2004b). It is part of linkage 65 which runs in a north south direction and links the survey area with Bush Forever sites 321 (Brickwood Reserve), 350 and 365 (Byford to Serpentine Rail/Road Reserve and adjacent Bushland), 352 (Cardup Nature Reserve and adjacent Bushland), 361 (Norman Road Bushland) and 362 (Roman Road Bushland) (**Figure 7**). Linkage 65 also connects with linkage 64, 67, 68, 69, 70 and 71.



0 125 250 375 500 m

GDA 94 / MGA Zone 50

Legend

- Survey Area
- Nature Reserve
- Bush Forever Site
- Environmentally Sensitive Area

Figure 7 - Bush Forever, Reserves, Conservation Areas and ESAs

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4. METHODOLOGY

4.1 DESKTOP ASSESSMENT

The desktop assessment for significant flora and ecological communities considered a 2 km buffer around the survey area and incorporated a review of DBCA database search results (DBCA 2021b) for the survey area, as well as a NatureMap database search (DBCA 2021c), Atlas of Living Australia search and interrogation of the DAWE MNES search tool (DAWE 2021c). The database search results were compiled into a table that concluded the likelihood of occurrence of each of the significant species and communities based on habitat preferences of known recorded locations for each species. The likelihood of all significant flora occurring within the survey area was assessed based on known records and their age (currency), distance to the closest known DBCA record and the presence of suitable habitat within the survey area. Based on this assessment, each species was given a likelihood of occurrence category of 'likely to occur', 'may occur' or 'unlikely to occur' in the survey area. Where recent records and suitable species habitat occurs within or within less than 1 km of the survey area, these species were given a category of 'likely to occur'. For species occurring greater than 1 km from the survey area with limited suitable habitat, or for very old records, a category of 'unlikely to occur' or 'may occur' was applied, depending on record relevance.

Habitat preferences for all target species were determined during the desktop assessment and planning for the field assessment, to enable accurate targeted searching in the field.

The desktop assessment formed the foundation of the field surveys and ensured that the assessments were targeted to the areas potentially supporting conservation significant values.

4.2 FIELD PREPARATIONS

Field preparations included field safety planning, confirmation of site access permissions and the preparation of a detailed study plan, field guides for significant flora and ecological communities, field maps and equipment (including electronic devices for field data capture).

4.3 FIELD ASSESSMENT

4.3.1 Flora and Vegetation

A two-phase, detailed flora and vegetation field assessment was carried out within the survey area during spring 2021 by experienced botanists and ecologists as presented in **Section 8**. The phase 1 field survey was conducted on 15 and 16 September 2021 and phase 2 was conducted on 22 October 2021.

Flora and vegetation data were collected in the field at sampling points where vegetation was noted to be of differing floristic composition. Pegged quadrats were installed where native vegetation was found to be in 'Good' or better condition, in accordance with the requirements for flora and vegetation assessments as documented in EPA (2016a). Detailed data collection points (relevés) were recorded where vegetation was not in 'Good' or better condition.

During phase 1, a total of five quadrats were established in areas of 'Good' or better condition and two relevés were established in an area of poorer quality vegetation, as per the Technical Guidance (EPA 2016a). The locations of these are presented in **Figure 8**. Each sampled quadrat from the first phase was rescored as part of the second phase survey.

Sampled quadrats were demarcated with a peg (galvanised fence-dropper) at each corner and the north-west corner co-ordinates were recorded using GPS. During sampling, quadrats were marked by measuring tapes. Quadrat dimensions were 10 m x 10 m in accordance with the Technical Guidance (EPA 2016a) and in alignment with the Gibson *et al.* (1994) survey, and the data collected were used to characterise all of the intact native vegetation communities (vegetation in 'Good' or better condition).

The following information was collected at each quadrat and relevé:

- observer
- date
- GPS location (GDA 94)
- representative photograph
- soil type and colour
- topography
- vegetation condition/degradation/disturbances (e.g. grazing, weed invasion, fire)
- flora species observed, including average height and projected foliage cover of dominant species within each stratum
- vegetation community, described in accordance with the National Vegetation Information System (NVIS) (DEH 2003)
- vegetation condition, assessed against the currently accepted scale; an adaptation of the Keighery (1994) condition scale.

Observations and opportunistic data collection were also carried out during foot traverses within and throughout the survey area and track logs of all personnel were captured using GPS-enabled devices to demonstrate survey effort. These combined track logs for the survey area from the first phase of sampling are presented in the **Figure 9** series.

The first phase field assessment also included targeted searches for conservation significant flora potentially occurring in the survey area. Selective targeted searching was also carried out during the second phase survey whilst traversing between quadrats and in limited additional areas as appropriate, depending on flowering times and preferred habitats of target species. Any observed flora suspected to be Threatened or Priority was marked using GPS-enabled devices to enable inclusion in the report maps and spatial data layers. Suspected Threatened and Priority flora were collected for further taxonomic identification by FVC taxonomists and specialists at the Western Australian Herbarium.

Two sampling events within the optimal flowering period (spring) during September and October enabled the capturing of species in the second phase that may not have been present during the first phase, particularly annuals and other late spring flowering species.

The flora and vegetation data collected during the two-phase field assessment, from the combination of quadrats and continuous opportunistic observations, contributed to the flora inventory for the survey area. The vegetation units of the survey area have been defined by data collected within quadrats and opportunistically between, and how they relate to other environmental features such as soil type and landform. A map of the vegetation units was then developed using GIS. As per EPA (2016a) Guidelines, vegetation within a 500 m buffer of the linear survey area centreline was extrapolated and mapped utilising aerial imagery and ground truthing of adjacent vegetation units.

Vegetation condition was assessed using the current bushland condition scale, which is an adaptation of Keighery (1994) scale, as described in EPA (2016a). The spatial extent of the varying vegetation condition was mapped using GIS.

All field data was recorded using electronic tablets equipped with the mobile mapping software, Mappt™ and customised data collection forms, tailored to the electronic collection of quadrat and relevé data as well as targeted flora surveys. Draft vegetation unit and condition mapping were also prepared in shapefiles directly into Mappt™ whilst in the field, and this formed the basis of the mapping presented in this report.



0 125 250 375 500 m

GDA 94 / MGA Zone 50

Figure 8 - Quadrat Locations

Legend

- Survey Area
- Quadrat
- Releve

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Figure 9a - Search Traverses

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Figure 9b - Search Traverses

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4.4 DATA PROCESSING AND ANALYSIS

4.4.1 Flora Identification

Flora identifications were undertaken by FVC's specialist taxonomists, [redacted] and [redacted] and verified by taxonomic specialist and Consulting Botanist, [redacted]. Specimens were collected and dried in accordance with WA Herbarium protocols (DBCA 2020a). Specific plant group specialist taxonomists and group authorities were consulted for challenging identifications, where required. Taxonomy and nomenclature follow current protocols of the WA Herbarium. The data processing task allowed for the preparation of species lists, including those for collected flora specimens, once identified.

4.4.2 Floristic Analysis

The Gibson *et al.* (1994) and Keighery *et al.* (2012) studies were carried across the entire Swan Coastal Plain south from Gingin (Southern Swan Coastal Plain). Due to the large extent of that survey area, in order to determine more robust assignment of quadrats to a Floristic Community Type (FCT) a local subset of these sites was selected for inclusion in floristic analysis. These sites were selected based on proximity to the survey area and taking into account the geology and pre-European vegetation associations as analogous to the survey area, in order to produce the resulting dendrograms and statistical analysis.

Recorded quadrat data was analysed in accordance with the *Draft Vegetation survey methods and analysis to determine floristic community types on the southern Swan Coastal Plain* (DBCA 2021a). This methodology analysed data utilising PATN™ software (Belbin 2013), via multivariate cluster analysis of species presence/absence, in order to group sites of floristically similar composition within the survey area. In order to assign FCTs, quadrat data were analysed against the Gibson *et al.* (1994) and the Keighery *et al.* (2012) datasets, which were updated to the current species nomenclature as per the Western Australian Herbarium. Floristic analysis via single site insertion (SSI) (into the Gibson *et al.* (1994) and Keighery *et al.* (2012) datasets) was carried out for all quadrats within the survey area against a local subset of the entire suite of sites from the Gibson *et al.* (1994) survey.

All quadrat data was processed with singletons and annuals included, for comparison with Gibson *et al.* (1994) and Keighery *et al.* (2012) data (as per advice from Val English, pers. comm., DBCA). An inferred FCT was assigned to each quadrat based on the resulting dendrogram.

Quadrats were also analysed in PATN™ in comparison to the Gibson *et al.* (1994) and the Keighery *et al.* (2012) datasets utilising the Bray-Curtis Dissimilarity Index. Results range from 0 to 1, where 0 would indicate that the quadrats are identical (i.e. have zero dissimilarity) (Belbin 2013) and 1 indicating no shared species (Hao *et al.* 2019). The closer the value to 0, the greater the similarity. A dissimilarity index value of greater than 0.6 is considered to be high (Maguire *et al.* 2016) and tends to indicate little similarity.

Conclusions regarding relevant FCTs that would be assigned to each sampled quadrat were based on 'nearest neighbour' in the dendrograms, and where appropriate, were also further critically analysed by determining similarities to Gibson *et al.* (1994) sites based on some or all of the following characteristics: key dominant flora species, vegetation structure, habitat, geographical location, soils/landforms, vegetation complexes and site hydrological status. The collective results of the FCT analysis concluded with settling on an inferred FCT for each quadrat, with justifications provided.

Other analysis in reference to relevant conservation advice and available information for significant ecological communities was also carried out in order to determine whether TECs or PECs are supported by the survey area.

4.5 SURVEY LIMITATIONS

The current biological assessment was assessed against limitations outlined in the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a) (**Table 8**).

Table 8 – Potential Survey Limitations and Constraints

Aspect	Constraint	Commentary
Availability of regional data, previously available information	No	Regional and local data for the Perth region is abundantly available, as evident in FloraBase records. The Gibson *et al.* (1994) survey results provide a reference for the FCTs of the Swan Coastal Plain. The survey area is classified as a Bush Forever Site (site 350) and as a result, is well documented (Government of Western Australia 2000a and 2000b). The presence of Commonwealth and State listed TECs (FCT 3a and 3b) within the survey area has been documented. Numerous documents such as Approved Conservation Advice (DEE 2017a) and Recovery Plans (DEC 2011b, DPaW 2011, DBCA 2020b) are publicly available for both FCTs to assist in defining them.
Scope (detail)	Minor	A two-phase, detailed flora and vegetation assessment was carried out in accordance with EPA (2016a). Seven vegetation units were defined within the survey area. Five quadrats were sampled within vegetation in 'Good' or better condition and two relevés were sampled in an area of 'Degraded' vegetation. Due to the high level of disturbance throughout the survey area and the insufficient area of 'Good' quality vegetation, none of the defined vegetation units contained three or more quadrats. Two quadrats were established within vegetation unit CcXp (Marri/*Xanthorrhoea* Woodland), whilst all of the remaining vegetation units were sampled from a single quadrat, relevé or visual observation. The data collected was considered adequate to define and map the two vegetation units in the relatively small area.
Competency/ Experience of personnel	No	The botanical field surveys were led by botanists who have a minimum of 18 years' experience. All personnel undertaking the field assessments, flora identifications, data analysis, vegetation mapping and reporting are experienced botanists, with specialist skills in their respective fields.
Survey effort/detail/ intensity	No	The two-phase, detailed flora and vegetation assessment was considered adequate to determine the floristic values within the survey area. Five quadrats were established in vegetation considered to be in 'Good' or better condition and two relevés was sampled in 'Degraded' vegetation, where some loss of structure and weed infestations has occurred. All quadrats were sampled during September 2021 and rescored in October 2021. The density of quadrats sampled is considered to be high, within a relatively small survey area and in small areas of each vegetation unit present.
Seasonal timing and climatic conditions	No	The flora and vegetation field assessments were conducted during spring (two days in September, one day in October), during the optimal spring season for biological surveys on the Swan Coastal Plain. Supplementary surveys for the South-West are typically undertaken after autumn rain in order to supplement data collected during the primary survey (EPA 2016a), although draft advice from DBCA (2021f) recommends an early spring and a late spring phase of survey for determination of FCTs on the Swan Coastal Plain. Cumulative rainfall in the three months preceding the September field assessment (June, July and August) was above average and near optimal (**Figure 2**). A total of 315 mm of rain was recorded during July 2021, well above the long-term mean (174.7 mm). The above average winter 2021 rainfall during the growth stage, would have promoted the production of new leaves and increase the number (and quality) of flowers and fruit (Chen *et al.* 2019).
Access	No	The majority of the survey area was easily accessible on foot and was traversed during September. Some of the survey areas were not traversed in detail due to the ability to good visibility which enabled easy verification of the vegetation by visual observations and the fact that these areas largely comprise of vegetation in 'Degraded-Good' or poorer condition. Visual observations were made throughout these areas, which enabled appropriate mapping of these locations and this approach is not considered to be a limitation of the survey.
Mapping reliability	No	Mapping has been prepared at a scale based on ground-truthed areas, with limited extrapolation given the good accessibility of the survey area. Therefore, mapping reliability is considered high.
Disturbances	Minor limitation	The survey area has a history of disturbance such as inappropriate fire regime (too frequent), weed invasion, potential clearing to upgrade the road or railway line, potential for altered surface drainage due to road grading and littering of rubbish (DEC 2012). Two gravel access roads have been constructed either side of the South Western Railway and run parallel to the railway tracks. As much

Aspect	Constraint	Commentary
		of the study area is quite degraded, this limited the areas within which quadrats could be sampled. As a result, some vegetation units that are only represented in poorer than 'Good' condition, or in small extents, or both, were only sampled by one relevé or fewer than three quadrats, as is required by the Guidance (EPA 2016).
Survey completeness	No	The survey area is classified as a Bush Forever Site (site 350) and as a result, is well documented (Government of Western Australia 2000a and 2000b). The majority of the survey area was easily accessible and data and other information for the region is abundant. Some of the survey areas were not traversed in detail due to the ability to easily verify the vegetation from visual observations and the fact that these areas largely comprised of vegetation in 'Degraded-Good' or poorer condition. Despite this, it is considered that the field assessments for the current survey were completed in sufficient detail for the entire survey area. Although not all vegetation units were sampled by at least three quadrats, given the small size of the survey area, the small area of the vegetation units, the degraded condition of much of the vegetation and the abundance of data available for the area, the survey is considered to have been adequate for defining the flora and vegetation values present.

5. RESULTS

5.1 DESKTOP ASSESSMENT

5.1.1 Threatened and Priority Flora

The DBCA database (DBCA 2021b), NatureMap (DBCA 2021c) and DAWE Protected Matters Search Tool (DAWE 2021c) identified 33 conservation significant flora species that have the potential to occur within the desktop assessment area (the survey area plus a 2 km buffer applied to the DBCA database search (**Appendix B**). The list of conservation significant taxa comprised 16 that are Threatened flora pursuant to the Commonwealth EPBC Act and State BC Act; one Priority 1, three Priority 2, nine Priority 3 and four Priority 4 species (**Table 9**, **Figure 10**). Based on known distribution, current records, preferred habitats and the habitats present in the survey area, 18 taxa were considered 'unlikely' to occur, 12 'may' occur, one was considered 'likely' to occur and two had previously been recorded within the survey area.

Table 9 – Threatened and Priority Flora Potentially Occurring within the Survey Area

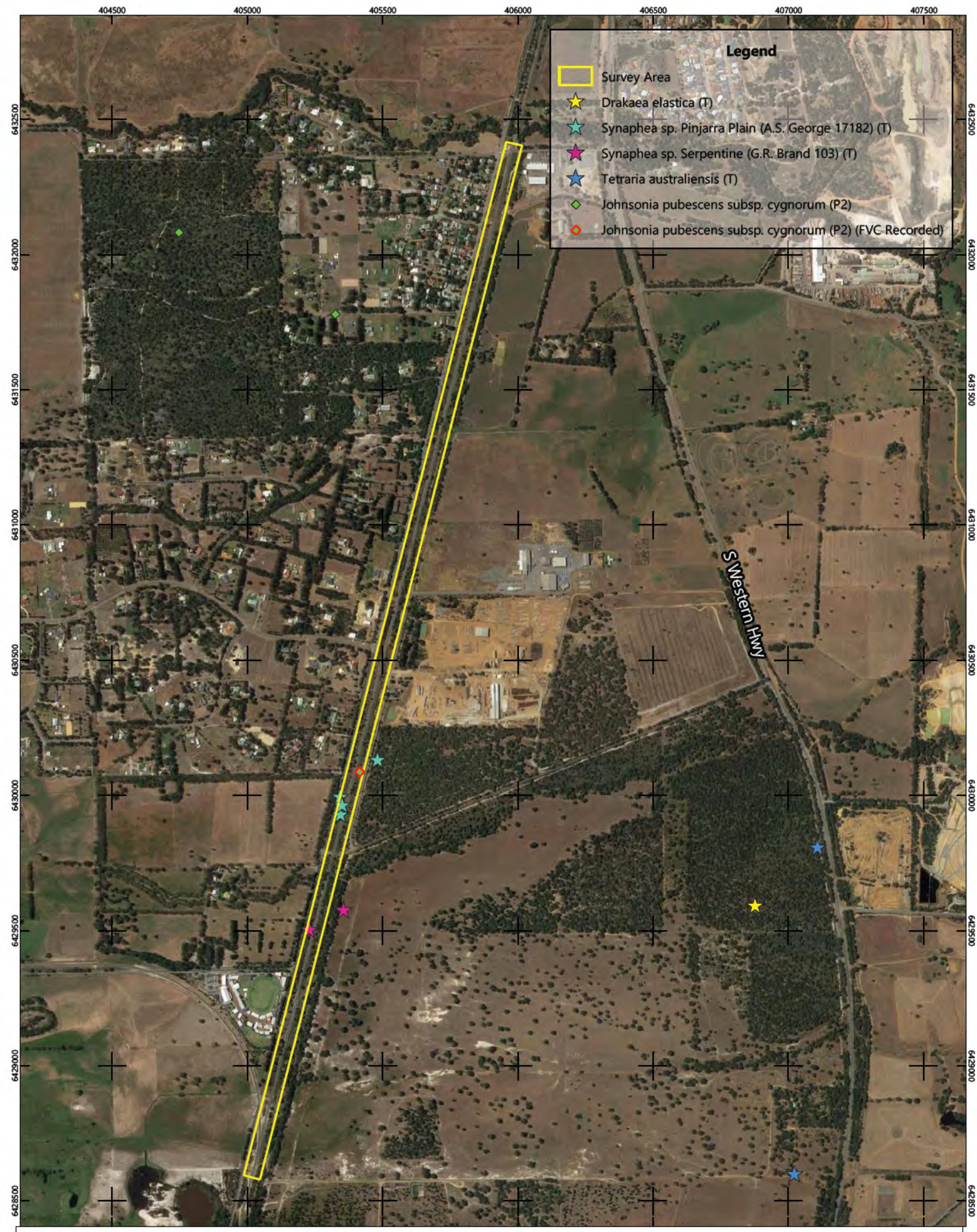
Species	EPBC Act Conservation Status	BC Act/DBCA Conservation Status	Description	Preferred Habitat	Likelihood of Occurrence	Source of Record
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	Critically Endangered	Critically Endangered	Dense, clumped shrub growing to 0.3-0.6 m high and 0.4-0.8 m wide. Produces yellow flowers on erect spikes 0.07-0.24 m long from September to October.	Grey clayey sand soil with lateritic pebbles. Near winter-wet flats, low woodlands with weedy grasses.	May occur - specimen found 10.2 km from survey area.	PMST
Synaphea sp. Pinjarra Plain (A.S. George 17182)	Critically Endangered	Critically Endangered	Erect, clumping shrub growing to 0.8 m high. Produces yellow flowers from September to November.	Sand, loam and clay soils sometimes with laterite. Winter wet depressions and flats.	Previously recorded within survey area.	PMST, DBCA, NatureMap
Synaphea sp. Serpentine (G.R. Brand 103)	Critically Endangered	Critically Endangered	Erect, compact shrub to 0.3 m high. Produces yellow flowers from September to October.	Grey, yellow or brown sandy clay-loam soils. Edge of wetlands, slopes and flats.	Previously recorded within survey area.	PMST, DBCA, NatureMap
Drakaea elastica	Endangered	Critically Endangered	Tuberous, perennial herb growing to 0.1-0.3 m high with a single bright green, glossy, prostrate heart-shaped leaf. Produces distinctive flower with red and green-yellow parts from October to November.	Bare patches of white or grey sandy soils. Low-lying situations adjoining winter-wet swamps.	May occur - suitable habitat may occur. Specimen found 1.5 km from survey area.	PMST, NatureMap
Eucalyptus x balanites	Endangered	Critically Endangered	Mallee with rough flaky grey bark growing to 5-8 m high and 15 m wide. Produces white flowers from October to December or from January to February.	White-grey sand, brown sandy loam soils with lateritic gravel. Slopes.	May occur - suitable habitat may occur. Specimen found 6.7 km from survey area.	PMST, NatureMap
Lasiopetalum pterocarpum	Endangered	Critically Endangered	Low, open shrub growing to 1.5 m high with spreading branches. Produces pale pink or white, pendulous flowers from August to December. Distinct six-winged membranous fruit. Distinguished from *L. floribundum* by having discolorous and strongly lobed leaves.	Dark red-brown loam or clayey sand over granite. On sloping banks near creek lines.	Unlikely to occur - specimen found 10.1 km from survey area. No granite present within the survey area.	PMST
Diuris purdiei	Endangered	Endangered	Tuberous, perennial orchid growing to 0.15-0.45 m high. Produces distinct flattened yellow flowers with brown blotches on their underside from September to October.	Grey-black sand, sandy clay moist soils. Winter-wet swamps.	May occur – suitable habitat may occur. Specimen found 2.4 km from survey area.	PMST, NatureMap

Species	EPBC Act Conservation Status	BC Act/DBCA Conservation Status	Description	Preferred Habitat	Likelihood of Occurrence	Source of Record
Grevillea curviloba susbp. *incurva*	Endangered	Endangered	Variable, prostrate shrub with broad dark green leaves or tall erect shrub growing to 2 m high with greyish green leaves. Produces creamy-white flowers on short stalks in leaf axils from September to October.	Grey sand, sandy loam. Winter-wet heath.	Unlikely to occur - Specimen found approximately 55 km from survey area. Habitat of the survey area is not typically sandy.	PMST
Lepidosperma rostratum	Endangered	Endangered	Rhizomatous, tufted perennial grass-like sedge growing to 0.5 m high. Produces brown flowers in narrow, spike-like inflorescence and fruits in June to August.	Peaty sand, clay.	Unlikely to occur - suitable habitat unlikely to occur. Specimen found 3.6 km from survey area.	NatureMap, PMST
Thelymitra stellata	Endangered	Endangered	Tuberous perennial herb growing to 0.25 m high with a single lily-like leaf to 0.9 m long. Produces up to 6 golden-brown or yellow with orange striped flowers from September to November.	Sandy loam soils with lateritic gravel. Ridges, slopes and gullies in wandoo and jarrah woodland.	Unlikely to occur - suitable habitat unlikely to occur. Specimen found 7.2 km from survey area.	NatureMap, PMST
Andersonia gracilis	Endangered	Vulnerable	Slender, erect or open straggly shrub growing to 0.1-0.5 m high. Produces pink to pale mauve flowers in ovoid oblong groups of 4-14 on terminal heads from September to November.	White-grey sand, sandy clay, gravelly loam soils. Winter wet areas, near swamps.	Unlikely to occur - suitable habitat unlikely to occur Closest occurrence approximately 30 km north-west.	PMST
Drakaea micrantha	Vulnerable	Endangered	Tuberous, perennial herb growing to 0.15-0.3 m high with a single silvery-grey, prostrate heart-shaped leaf. Produces distinct flower with red and yellow parts from September to October.	Bare patches of white-grey sandy soils. Winter wet swamps, disturbed areas.	May occur - suitable habitat may occur. Closest occurrence near Forrestdale.	PMST
Anthocercis gracilis	Vulnerable	Vulnerable	Erect, spindly, almost leafless shrub growing to 0.6 m high. Produces yellowish-white or yellowish-green flowers from September to October and in April.	Sandy or loamy soils. Granite outcrops, gullies and slopes with granite on the Darling Scarp.	Unlikely to occur – suitable habitat unlikely to occur. Closest occurrence approx. 20 km south-east.	PMST

Species	EPBC Act Conservation Status	BC Act/DBCA Conservation Status	Description	Preferred Habitat	Likelihood of Occurrence	Source of Record
Diuris micrantha	Vulnerable	Vulnerable	Tuberous, perennial orchid growing to 0.3-0.6 m high with a basal tuft of narrow, linear leaves. Produces up to 7 yellow flowers with red-brown markings from August to October.	Brown/black sandy clay-loam and clayey soils. Winter-wet depressions and swamps, in shallow water.	Unlikely to occur – suitable habitat unlikely, closest occurrence approximately 14 km from survey area.	PMST
Eleocharis keigheryi	Vulnerable	Vulnerable	Tufted, clumping grass like sedge growing to 0.2-0.4 m high and 0.4 m wide with smooth, erect stems and leaves reduced to straw-coloured sheaths. Produces pale green flowers in a narrow, cylindrical flower spike from August to November (December in favourable conditions).	Clay, sandy loam soils. Emergent in freshwater creeks, claypans and wetlands.	Unlikely to occur - suitable habitat unlikely to occur.	PMST
Morelotia australiensis (formerly *Tetraria australiensis*)	Vulnerable	Vulnerable	Tufted perennial grass-like sedge growing to 1 m high with cylindrical stems. Produces brown flowers following fire.	Grey sand over clay soil. Winter wet depressions, swamps, drainage lines and swamp margins.	May occur – suitable habitat may occur. Known to occur within 2 km of the survey area.	PMST, NatureMap, DBCA
Acacia lasiocarpa var. *bracteolata*		Priority 1	Spinescent shrub growing between 0.4-1.5 m high. Produces yellow flowers in globular heads from May or August.	Grey or black sand over clay soils. Swampy areas, winter wet lowlands.	May occur – suitable habitat may occur. Specimen found 2.4 km from survey area.	NatureMap
Johnsonia pubescens subsp. *cygnorum*		Priority 2	Tufted, perennial, grass like herb (lily) growing to 0.25 m high. Produces greenish cream flowers from September to October.	Grey or yellow sand, sandy clayey soils. Gentle slopes and flats.	Likely to occur – suitable habitat may occur. Closest occurrence 470 m from survey area.	DBCA, NatureMap
Levenhookia pulcherrima		Priority 2	Annual ephemeral herb growing between 0.03-0.7 m high. Produces pink-red flowers from October to November.	Sand.	Unlikely to occur – closest occurrence approximately 90 km from survey area.	NatureMap
Millotia tenuifolia var. *laevis*		Priority 2	Erect to ascending annual herb growing to 0.1 m high. Produces yellow flowers from September to October.	Sandy soil. Slopes and flats sometimes with gravel.	May occur - suitable habitat may occur. Specimen found 4.2 km from survey area.	NatureMap
Angianthus drummondii		Priority 3	Erect annual herb growing to 0.1 m high. Produces yellow flowers in compound, hemispherical heads from October to December.	Grey or brown clay soils, ironstone. Seasonally wet flats.	Unlikely to occur – suitable habitat unlikely to occur. Specimen found 4.5 km from survey area.	NatureMap

Species	EPBC Act Conservation Status	BC Act/DBCA Conservation Status	Description	Preferred Habitat	Likelihood of Occurrence	Source of Record
Babingtonia urbana		Priority 3	Erect to sprawling shrub growing to 0.5 m high. Produces pink flowers from October to March.	Brown clay loam, sandy soils. Flats and winter wet depressions.	May occur – suitable habitat may occur. Specimen found 1.1 km from survey area.	NatureMap
Banksia kippistiana var. *paenepeccata*		Priority 3	Erect, prickly, lignotuberous shrub growing between 0.3-1.2 m high. Produces yellow-cream flowers from October to November.	Lateritic gravelly soils.	Unlikely to occur - suitable habitat unlikely to occur. Specimen found 6.4 km from survey area.	NatureMap
Jacksonia gracillima		Priority 3	Prostrate, spreading or scrambling spindly shrub growing to 0.5-1 m high and 1 m wide. Produces flowers with yellow, red and orange parts from October and November.	Grey sand. Seasonally wet poorly drained flat.	May occur – suitable habitat may occur. Specimen found 4.1 km from survey area.	NatureMap
Pithocarpa corymbulosa		Priority 3	Erect to scrambling, perennial herb growing between 0.5-1 m high. Produces white flowers from January to April.	Amongst granite outcrop ridges and slopes. Sandy loam, loamy clay soils with lateritic gravel.	Unlikely to occur - suitable habitat unlikely to occur.	NatureMap
Schoenus capillifolius		Priority 3	Semi-aquatic, tufted annual sedge growing to 0.05 m high. Produces green flowers from October to November.	Brown sand, clay. Claypans and seasonally wet depressions.	Unlikely to occur – suitable habitat unlikely to occur.	NatureMap
Schoenus pennisetis		Priority 3	Tufted annual sedge growing to 0.1-0.4 m high. Produces purple-black flowers from August to October.	Grey or brown peaty sand, sandy clay soils. Swamps, winter-wet depressions and flats.	Unlikely to occur - suitable habitat unlikely to occur.	NatureMap
Schoenus sp. *Waroona*		Priority 3	Tufted, annual grass-like herb growing to 0.06 m high. Produces brown flowers from October to November.	Clay, sandy clayey soils. Winter wet flats.	Unlikely occur - suitable habitat unlikely to occur. Specimen found 4.4 km from survey area.	NatureMap
Stylidium aceratum		Priority 3	Fibrous rooted annual herb growing to 0.1 m high with spathulate leaves. Produces pink-white flowers from October to November.	Black-grey sand and clayey soils. Swamp heathland and low lying depressions.	Unlikely to occur - suitable habitat unlikely to occur. Specimen found 4.6 km from survey area.	NatureMap
Acacia oncinophylla subsp. *patulifolia*		Priority 4	Shrub growing between 0.5-2.5 m high with 'minni-ritchi' bark and phyllodes 4-9 cm long, 3-6 mm wide. Produces yellow flowers in cylindrical heads from August to December.	Granitic soils, occasionally on laterite.	Unlikely to occur – suitable habitat unlikely to occur. Specimen found 6.4 km from survey area.	NatureMap

Species	EPBC Act Conservation Status	BC Act/DBCA Conservation Status	Description	Preferred Habitat	Likelihood of Occurrence	Source of Record
Drosera occidentalis		Priority 4	Fibrous-rooted, small red rosetted perennial herb growing to 0.02 m high. Produces white flowers from October to December.	Low lying flat. Grey sandy clay. Disturbed.	May occur - suitable habitat may occur. Specimen found 1.1 km from survey area.	NatureMap
Parsonsia diaphanophleba		Priority 4	Woody climber (vine). Produces cream-pale pink flowers from September to June.	Alluvial soils. Along rivers.	Unlikely to occur – suitable habitat unlikely to occur. Specimen found 6.4 km from survey area.	NatureMap
Verticordia lindleyi subsp. *lindleyi*		Priority 4	Erect shrub growing to 0.2 to 0.75 m high. Produces pink flowers with white fringes from November to January (also known from May).	Sand, sandy clay soils. Winter-wet depressions.	May occur - suitable habitat may occur. Specimen found 4.4 km from survey area.	NatureMap



0 125 250 375 500 m

GDA 94 / MGA Zone 50

Figure 10 - Threatened and Priority Flora

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5.1.2 Threatened and Priority Ecological Communities

A review of DBCA Threatened and Priority Ecological Communities (TEC and PEC) database (DBCA 2021e) and the EPBC PMST (DAWE 2021c) identified the potential for nine TECs or PECs to occur in the survey area, including eight Commonwealth listed TECs (**Table 10**). Of these TECs and PECs, four occur (or their buffers do) within the survey area and surrounding region (desktop assessment area) as presented spatially in **Figure 11**.

Table 10 – Threatened and Priority Ecological Communities Potentially Occurring within the Survey Area (DBCA 2021e)

Abbreviated Identifier	Community Name	Commonwealth Category	State Category	Source
Clay Pans of the Swan Coastal Pain	Clay Pans of the Swan Coastal Pain	Critically Endangered	-	PMST
SCP 09	Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson *et* al (1994))	Critically Endangered	Vulnerable	DBCA
Tuart Woodlands and Forests	Tuart (*Eucalyptus gomphocephala)* Woodlands and Forests of the Swan Coastal Plain	Critically Endangered	Priority 3	PMST
Mound Springs SCP	Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	Endangered	Critically Endangered	DBCA
SCP 3a	*Corymbia calophylla – Kingia australis* woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in Gibson *et al.* (1994))	Endangered	Critically Endangered	PMST DBCA
SCP 3c	*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in Gibson *et al.* (1994))	Endangered	Critically Endangered	PMST DBCA
SCP 3b	*Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson *et al.* (1994))	-	Vulnerable	DBCA
SCP 20b	*Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson *et al.* (1994))	(part) Endangered	Endangered (part Priority 3)	DBCA
Banksia WL SCP	Banksia dominated Woodlands of the Swan Coastal Plain IBRA Region	Endangered	Priority 3	PMST DBCA

5.1.2.1 Clay Pans of the Swan Coastal Plain

The Commonwealth listed 'Clay pans of the Swan Coastal Plain' TEC, comprises the four State listed TECs and one State listed PEC:

- SCP 07 – Herb rich saline shrublands in clay pans (Vulnerable)
- SCP 08 – Herb rich shrublands in clay pans (Vulnerable)
- SCP 09 – Dense shrublands on clay flats (Vulnerable)
- SCP 10a – Shrublands on dry clay flats (Endangered)
- Clay pans with mid dense shrublands of *Melaleuca lateritia* over herbs (Priority 1).

The species-diverse clay pan communities of the SCP occur where clay substrates are low in the landscape and form an impermeable layer close to the surface (DBCA 2019b). There are no specific suites of flora that characterise all the clay pans, but they share general characteristics of substrate, landform, hydrology and vegetation structure (DBCA 2019b).

5.1.2.2 SCP09 – Dense Shrublands on Clay Flats, Swan Coastal Plain, (TEC)

This community type consists of shrublands or low open woodlands on clay flats that are inundated for long periods because it usually occurs very low in the landscape. Sedges are more apparent in this ecological community and include *Chorizandra enodis* (black bristlerush), *Cyathochaeta avenacea*, *Lepidosperma longitudinale* (pithy sword-sedge) and *Leptocarpus coangustatus* (formerly *Meeboldina coangustata*). Shrubs include *Hakea varia* (variable-leaved hakea), *Melaleuca viminea* and occasionally *Xanthorrhoea preissii, X. drummondii* (grass trees) and *Kingia australis*. This vegetation community has a lower species richness and weed frequency than in the other clay pan community types, presumably because of the longer inundation times (DBCA 2019b).

5.1.2.3 Tuart *(Eucalyptus gomphocephala)* Woodlands and Forests of the Swan Coastal Plain

The *Tuart* (*Eucalyptus gomphocephala*) *Woodlands and Forests of the Swan Coastal Plain Ecological Community* (Tuart woodlands and forests TEC) occurs as woodland, forest or other structural forms associated with soils of the Swan Coastal Plain with a prominent tree layer of *Eucalyptus gomphocephala* (Tuart) as the defining feature (DEE 2019).

The Tuart woodlands and forests TEC occurs within the Swan Coastal Plain IBRA region within the Perth subregion, from Jurien, 200 km north of Perth, to Sabina River near Busselton, 225 km south of Perth (DEE 2019). The distribution of the ecological community is limited by the distribution of Tuart, although Tuart trees do also occur as a component of other vegetation communities, including the nationally listed Banksia woodlands TEC (DEE 2019).

5.1.2.4 Mound Springs SCP - Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)

The Mound Springs TEC is characterised by a continuous discharge of groundwater in raised areas of peat. Flora species recorded in this community include *Banksia littoralis, Melaleuca preissiana* and *Eucalyptus rudis* with *Agonis linearifolia, Pteridium esculetum, Astartea fascicularis* and *Cyclosorus interruptus*. Several non-vascular plants are also associated with this community (CALM 2006). This TEC has not been previously identified to occur within the survey area, however, a buffer for this TEC occurs 80 m north-west of the survey area boundary.

5.1.2.5 SCP 3a - *Corymbia calophylla – Kingia australis* woodlands on heavy soils, Swan Coastal Plain (TEC)

The *Corymbia calophylla – Kingia australis* woodlands on heavy soils of the Swan Coastal Plain ecological community is a woodland community located on heavy soils of the eastern side of the Swan Coastal Plain between Ruabon and Guildford (DEE 2017a). This TEC occurs on wetter sites than FCT SCP 3b or 3c and is associated with the median species richness, and lowest level of weed invasion and disturbance (DPaW 2011).

This TEC is typically dominated by; *Corymbia calophylla* (Marri); *Banksia dallanneyi, Philotheca spicata, Kingia australis* and *Xanthorrhoea preissii;* over herbs, rushes and sedges of *Cyathochaeta avenacea, Dampiera linearis, Haemodorum laxum, Desmocladus fasciculatus, Mesomelaena tetragona* and *Tetraria* (now *Morelotia*) *octandra* (DEE 2017a).

5.1.2.6 SCP 3b - *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (TEC)

The *Corymbia calophylla - Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain ecological community (SCP 3b) is characterised by an overstorey of dominated by both *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) (DBCA 2020b). Other typical species include: *Bossiaea eriocarpa*, *Conostylis juncea, Hibbertia hypericoides, Tetraria* (now *Morelotia*) *octandra, Chamaescilla corymbosa, Desmocladus fasciculatus, Banksia dallanneyi, Mesomelaena tetragona, Babingtonia camphorosmae, Lepidosperma squamatum, Neurachne alopecuroidea, Philotheca spicata, Burchardia congesta, Caesia micrantha, Kingia australis, Drosera erythrorhiza, Lomandra hermaphrodita* and *Caladenia flava* (DBCA 2020b). This community is distributed between Wattle Grove and Harvey.

5.1.2.7 SCP 3c - *Corymbia calophylla – Xanthorrhoea preissii* woodlands and Swan Coastal Plain (TEC)

The SCP 3c community is found on heavy soils on the eastern side of the Swan Coastal Plain between Bullsbrook and Stratham. It is dominated by *Corymbia calophylla* and *Xanthorrhoea preissii* occasionally with *Eucalyptus wandoo*. The most common shrub species are *Gompholobium marginatum, Hypocalymma angustifolium* and *Banksia dallanneyi* (DBCA 2021d).

5.1.2.8 SCP 20b – *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (part of Banksia woodlands TEC)

This community occurs on sands at the base of the Darling Scarp primarily on Pinjarra Plain and Ridge Hill Shelf soils. The community comprises woodlands of *Banksia attenuata* often with *Eucalyptus marginata*. The presence of *Hakea stenocarpa, Conostylis setosa* and *Johnsonia pubescens* subsp. *cygnorum* is considered an indicator of this community (DEC 2012).

5.1.2.9 Banksia Woodlands TEC

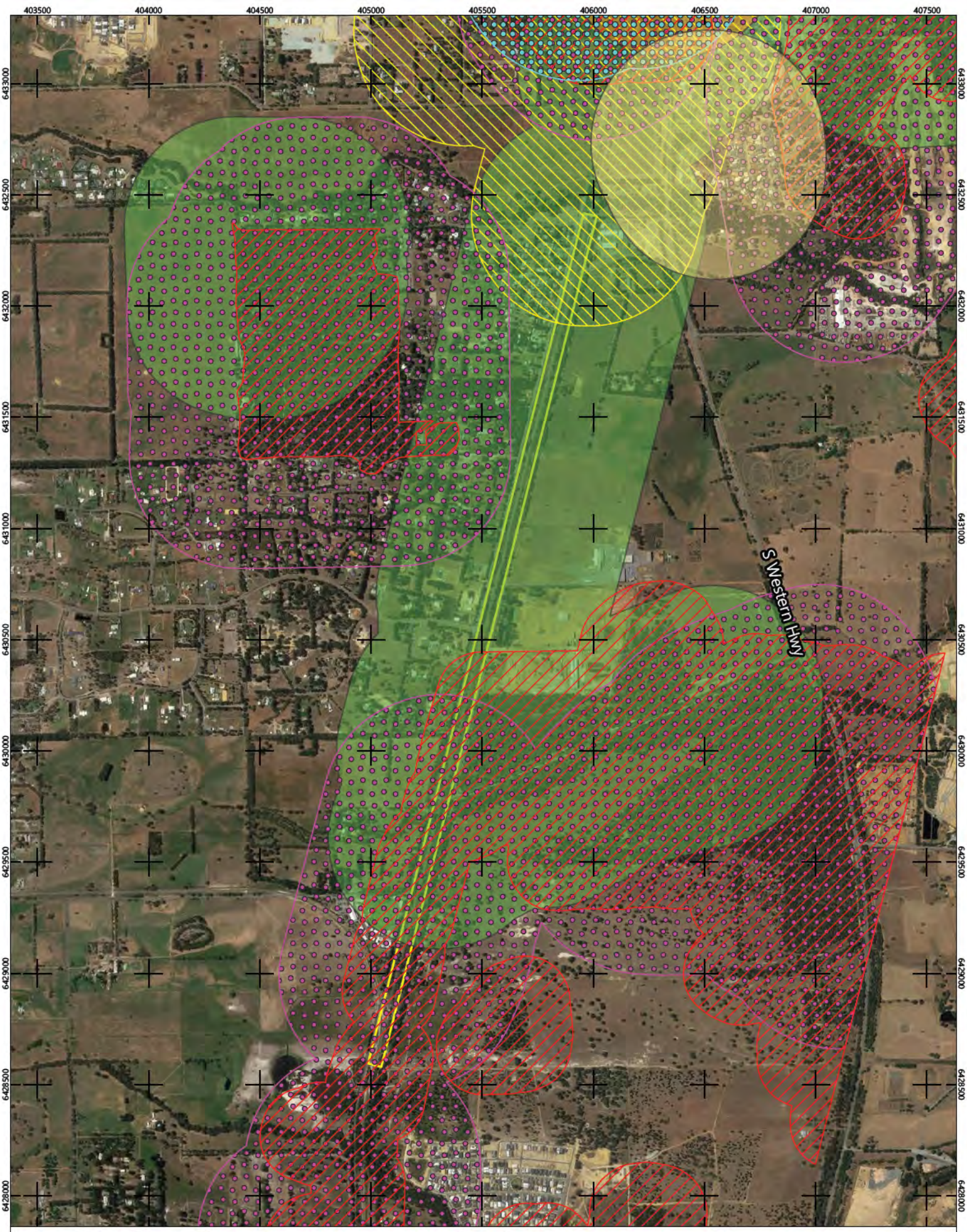
The *Banksia Woodlands of the Swan Coastal Plain Ecological Community* (Banksia woodlands TEC) was approved for inclusion as an Endangered TEC under the EPBC Act on 16 September 2016. This ecological community is woodland associated with some soils of the Swan Coastal Plain with a prominent tree layer of Banksia with scattered Eucalypts and other tree species among or emerging above the canopy. The understorey is comprised of a species rich mix of sclerophyllous shrubs, graminoids and forbs (TSSC 2016).

The Banksia woodlands TEC is largely restricted to the Swan Coastal Plain IBRA bioregion, within the Perth (SWA02) and Dandaragan (SWA01) sub-regions. It extends into the adjacent Jarrah Forrest IBRA region (JA01 and JA02 sub-regions) and areas of the Whicher and Darling escarpments where pockets of Banksia woodland may occur. This TEC mainly occurs on deep Bassendean and Spearwood sands or occasionally on Quindalup sands at the eastern edge (TSSC 2016).

Twenty-one Floristic Community Types (FCTs) described by Gibson *et al.* (1994) in Bush Forever (Government of Western Australia 2000), Keighery *et al.* (2012), and Urban Bushland Council (2011) best correspond to the Banksia woodlands TEC (TSSC 2016) which are summarised in **Table 11**.

Table 11 – Floristic Community Types Corresponding to the Banksia Woodlands TEC (TSSC 2016)

FCT	FCT Name	WA TEC/PEC	EPBC TEC
Supergroup 3 – Uplands centered on Bassendean Dunes and Dandaragan Plateau			
20a	*Banksia attenuata* woodlands over species rich dense shrublands	Endangered	
20b	Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands	Endangered	
20c	Eastern shrublands and woodlands	Critically Endangered	Endangered
21a	Central *Banksia attenuata - Eucalyptus marginata* woodlands		
21b	Southern *Banksia attenuata* woodlands	P3	
21c	Low lying *Banksia attenuata* woodlands or shrublands	P3	
22	*Banksia ilicifolia* woodlands	P3	
23a	Central *Banksia attenuata - Banksia menziesii* woodlands		
23b	Northern *Banksia attenuata - Banksia menziesii* woodlands	P3	
23c	North-eastern *Banksia attenuata - Banksia menziesii* woodlands		
S09	*Banksia attenuata* woodlands over dense low shrublands		
Supergroup 4 – Uplands centered on Spearwood and Quindalup Dunes			
24	Northern Spearwood shrublands and woodlands	P3	
25	Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands	P3	
28	Spearwood *Banksia attenuata* or *Banksia attenuata – Eucalyptus* woodlands		
Whicher Scarp FCTs (Keighery *et al.* 2012)			
A1	Central Whicher Scarp Mountain Marri Woodland WHSFCT_A1	P1	
A2	North Whicher Scarp Jarrah and Woody Pear woodland WHSFCT_A2		
A3	North Whicher Scarp *Banksia* and Woody Pear woodland WHSFCT_A3		
A4	Whicher Scarp *Banksia grandis*, Jarrah and Marri woodland WHSFCT_A4		
B1	Swan Coastal Plain / North Whicher Scarp *Banksia attenuata* woodland WHSFCT_B1		
B2	West Whicher Scarp *Banksia attenuata* woodland WHSFCT_B2	P1	
C2	Whicher Scarp Jarrah woodland on deep coloured sands WHSFCT_C2	P1	



0 0.25 0.5 0.75 1 km

GDA 94 / MGA Zone 50

Legend

- Survey Area
- Banksia WL SCP
- Mound Springs SCP
- SCP09
- SCP20b
- SCP3a
- SCP3b
- SCP3c

Figure 11 - Threatened and Priority Ecological Communities

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5.2 FIELD ASSESSMENT

5.2.1 Flora

A total of 96 flora species, from 69 genera and 29 families were recorded during the field survey. The dominant families were found to be Fabaceae (12 taxa), Myrtaceae (10 taxa) and Asparagaceae (eight taxa). The total is comprised of 83 (86.5%) native species and 13 (13.5%) introduced (weed) species. The full list of vascular flora species recorded within each vegetation unit (which includes opportunistic species records, additional to flora species recorded within quadrats and relevés) is presented in **Appendix C** and individual quadrat and relevé data is presented in **Appendix D**.

No species listed as Threatened flora under the BC Act or under the EPBC Act were recorded. One Priority flora species listed by DBCA, *Johnsonia pubescens* subsp. *cygnorum* (P2) was recorded in quadrat CR02 (**Figure 10**).

Two vascular flora species of conservation significance, *Synaphea* sp. Serpentine (G.R Brand 103) and *Synaphea* sp. Pinjarra Plain (A.S. George 17182) both listed as Critically Endangered under the EPBC Act and BC Act have been previously recorded from within the survey area (**Figure 10**). *Synaphea* sp. Serpentine (G.R Brand 103) was recorded from one location in 2011 and *Synaphea* sp. Pinjarra Plain (A.S. George 17182) was recorded from three locations in 2003, 2011 and 2012. None of the collected specimens from the survey area, including *Synaphea* spp., were confirmed to be representative of the Threatened taxa.

None of the flora recorded are exhibiting extensions of their currently known range as documented by the WA Herbarium (WAH 1998-).

Due to the limited number of quadrats sampled within the survey area, species accumulation curves were not able to be produced to assess the adequacy of sampling.

5.2.2 Vegetation

Seven vegetation units were defined and mapped within the survey area. This comprised of six Woodlands and one Planted Rehabilitation unit. Each vegetation unit is described in **Table 12** and their spatial extents within the survey area are presented in the **Figure 12** series.

Table 12 – Summary of Recorded Vegetation Units

Vegetation Unit	Vegetation Description	Representative Photo	Site Number	Area (ha)	% of Survey Area
BsXp Banksia/ Xanthorrhoea Woodland	*Corymbia calophylla* Low Open Woodland over *Banksia* sessilis Tall Shrubland over *Xanthorrhoea preissii* Shrubland		CR04	0.25	1.05
CcXp Marri/ Xanthorrhoea Woodland	*Corymbia calophylla* and *Eucalyptus marginata* Low Woodland over *Xanthorrhoea preissii* and occasional *Kingia australis* Tall Sparse Shrubland over *Mesomelaena tetragona* Sedgeland		CR01 CR03	9.62	40.33
CcXpKa Marri/ Xanthorrhoea/ Kingia Woodland	*Corymbia calophylla* Low Open Woodland over *Xanthorrhoea preissii* and *Kingia australis* Tall Sparse Shrubland over *Laxmannia squarrosa* Low Forbland		CR02	5.43	22.77
EwTo Wandoo Woodland	*Eucalyptus wandoo* and *Corymbia calophylla* Low Woodland over *Trymalium odoratissimum* subsp. *odoratissimum, Kingia australis* and *Xanthorrhoea preissii* Shrubland *Mesomelaena tetragona* and *Laxmannia squarrosa* Sedgeland		CR07	0.56	2.35
Cc(P) Marri over weeds	*Corymbia calophylla* Open Woodland over grasses and weeds	No representative photo	NA	0.04	0.17
Er(P) *Eucalyptus rudis* over weeds	*Eucalyptus rudis* Open Woodland over *Trymalium odoratissimum* subsp. *odoratissimum* Shrubland over grassess and weeds		CR06r	0.03	0.12
Rehab	Rehabilitation with planted endemic and non endemic species		CR05r	0.77	3.23
			Cleared	7.15	29.98
			TOTAL	**23.85**	**100**



Figure 12a - Vegetation Units of the Survey Area

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Figure 12b - Vegetation Units

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Vegetation within a 500 m buffer of the survey area centreline was extrapolated, as per the requirements of EPA (2016). It was determined that the survey area plus the surrounding area supports eleven broad vegetation units, five of which (CcXp, CcXpKa, EwTo, Cc(P) and Rehab) are represented within the survey area, as summarised in **Table 13** and presented in the **Figure 13** series.

Table 13 – Summary of Recorded Vegetation Units Surrounding the Survey Area

Vegetation Unit	Vegetation Description
CcXp Marri/ Xanthorrhoea Woodland*	*Corymbia calophylla* and *Eucalyptus marginata* Low Woodland over *Xanthorrhoea preissii* and occasional *Kingia australis* Tall Sparse Shrubland over *Mesomelaena tetragona* Sedgeland
CcXpKa Marri/ Xanthorrhoea/ Kingia Woodland*	*Corymbia calophylla* Low Open Woodland over *Xanthorrhoea preissii* and *Kingia australis* Tall Sparse Shrubland over *Laxmannia squarrosa* Low Forbland
EwTo Wandoo Woodland*	*Eucalyptus wandoo* and *Corymbia calophylla* Low Woodland over *Trymalium odoratissimum* subsp. *odoratissimum, Kingia australis* and *Xanthorrhoea preissii* Shrubland *Mesomelaena tetragona* and *Laxmannia squarrosa* Sedgeland
BsXp Banksia /Xanthorrhoea Woodland*	*Corymbia calophylla* Low Open Woodland over *Banksia* sessilis Tall Shrubland over *Xanthorrhoea preissii* Shrubland
ErCc *Eucalyptus rudis* and *Corymbia calophylla* over weeds	*Eucalyptus rudis* and *Corymbia calophylla* Open Woodland *over grasses and weeds*
Cc(P) Marri over weeds*	*Corymbia calophylla* Open Woodland over grasses and weeds
KS *Kunzea* Shrubland	*Kunzea* spp. Shrubland over grasses and weeds
MS *Melaleuca* Shrubland	*Melaleuca* spp. Shrubland over grasses and weeds
Parkland	Isolated remnant trees or shrubs over grasses and other weeds
Planted	Planted endemic, non-endemic or garden species
Rehab*	Rehabilitation with planted endemic and non-endemic species
Water	Indundated areas devoid of vegetation

*also within the Cable Route survey area

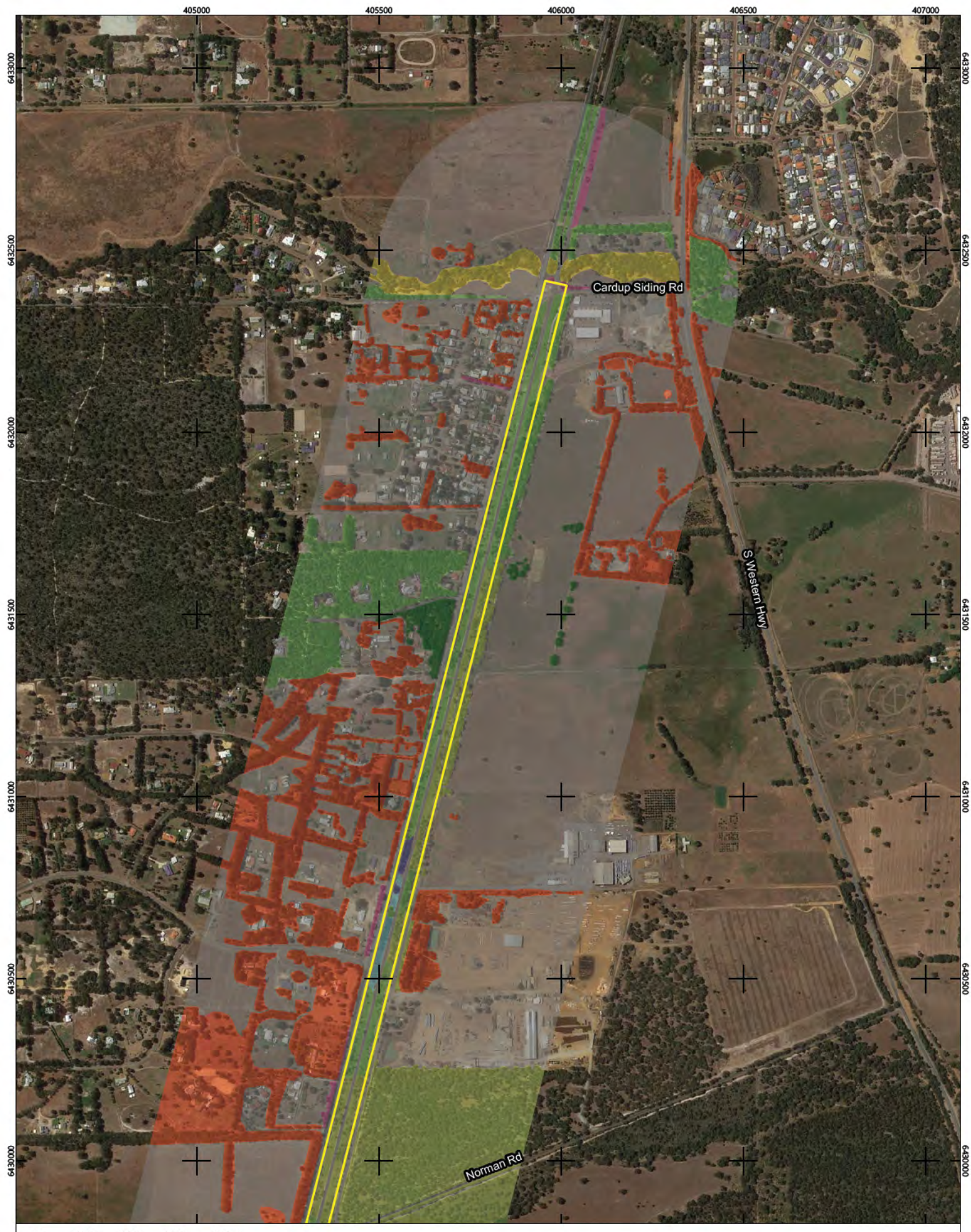
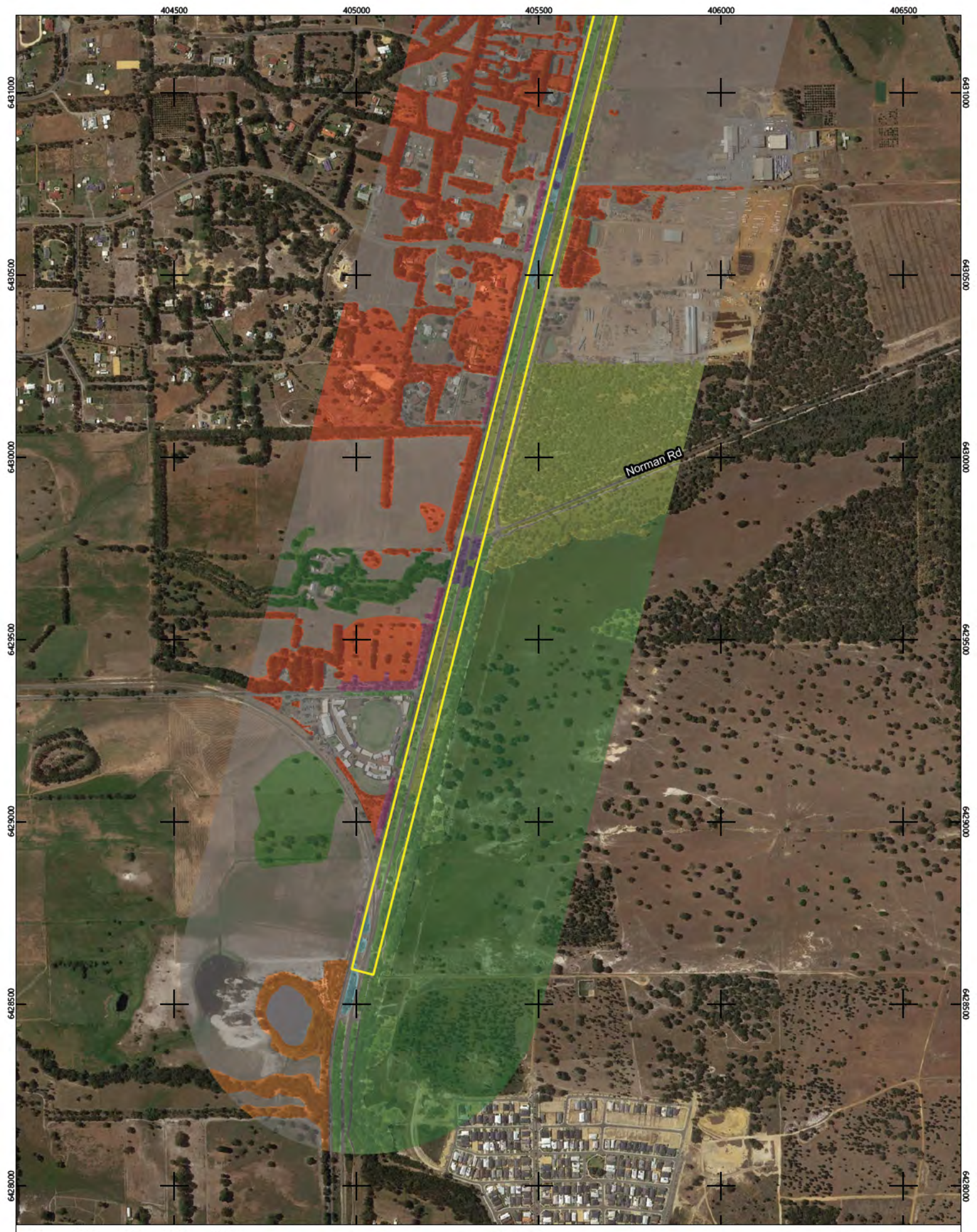


Figure 13a - Vegetation Units Surrounding the Survey Area

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0 125 250 375 500 m

GDA 94 / MGA Zone 50

Legend

- Survey Area
- BsXp
- CcXp
- CcXpKa
- Cleared
- Er(P)
- EwTo
- Rehab
- Parkland
- MS
- KS
- Planted
- Water

Figure 13b - Vegetation Units Surrounding the Survey Area

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5.2.2.1 Vegetation Condition

The condition of the vegetation within the survey area was found to range from 'Completely Degraded' to 'Very Good - Excellent', with only 16.9% observed to be in 'Good' or better condition. The areas of the varying vegetation condition are summarised in **Table 14** and the spatial extent of this is presented in the **Figure 14** series.

Table 14 – Summary of Vegetation Condition

Vegetation Condition Rating	Vegetation Unit	Area (ha)	Total Area (ha)	% of Survey Area
Excellent	CcXpKa	0.20	0.20	0.84
Very Good - Excellent	CcXp	0.12	0.12	0.50
Very Good	CcXpKa	0.78	0.82	3.44
	EwTo	0.04		
Good-Very Good	CcXp	0.74	1.37	5.74
	CcXpKa	0.51		
	EwTo	0.12		
Good	BsXp	0.05	1.52	6.38
	CcXp	0.88		
	CcXpKa	0.25		
	EwTo	0.34		
Degraded-Good	BsXp	0.15	3.26	13.67
	CcXp	1.04		
	CcXpKa	1.73		
	Rehab	0.34		
Degraded	BsXp	0.04	6.48	27.17
	CcXp	4.55		
	CcXpKa	1.86		
	EwTo	0.03		
Completely Degraded-Degraded	Cc(P)	0.04	2.71	11.36
	CcXp	2.14		
	CcXpKa	0.12		
	Er(P)	0.04		
	EwTo	0.02		
	Rehab	0.35		
Completely Degraded	CcXp	0.14	0.22	0.92
	Rehab	0.08		
		Cleared	7.15	29.98
		TOTAL	**23.85**	**100**



Figure 14a - Vegetation Condition

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Figure 14b - Vegetation Condition

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5.2.2.2 Assessment of Floristic Community Types

Analysis of all quadrats recorded within the survey area was first conducted using the full suite of FVC sampled quadrats (batch analysis) and then via single site insertion (SSI) into a local subset of Gibson *et al.* (1994) and Keighery *et al.* (2012) quadrats. Multivariate cluster analysis of species presence/absence in PATN™ was conducted in order to assign Gibson *et al.* (1994) or Keighery *et al.* (2012) FCTs that are most likely represented within each quadrat.

The dendrograms resulting from the SSI analysis are presented in **Appendix E** and the results of the analysis, including analysis of dissimilarity are presented in **Table 15**.

Interrogation of the results of the data analysis (**Table 15**) indicates that all quadrats sampled, excluding CR04, are considered to be representative of FCT SCP 3b which is a State-listed TEC. Based these results, the vegetation units described and mapped for the survey area which most closely align with the FCT SCP 3b TEC (*Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain) are:

- CcXp (Marri/Xanthorrhoea Woodland)
- CcXpKa (Marri/Xanthorrhoea/Kingia Woodland).

Table 15 – Summary of Single Site Insertion PATN™ Analysis Results

Vegetation Unit	Quadrat	Vegetation condition	SSI Dendrogram Result*	Dissimilarity values	SCP Quadrat	FCT	Dissimilarity values	SCP Quadrat	FCT	Dissimilarity values	SCP Quadrat	FCT	Inferred FCT	Reasoning
BsXp Banksia/ Xanthorrhoea Woodland	CR04	Good	3c, 3a, 3b	0.6768	CARD13	3b	0.7105	DUCK-2	3c	0.7263	HARRY-2	28	Inconclusive	Greatest similarity to FCT SCP 3b; however, CR04 has a mid-stratum dominated by *Banksia sessilis* (60%). Although often a disturbance opportunist, this species is not considered typical within FCT SCP 3a, 3b or 3c and often occurs on lateritic gravel. Based on the distribution of defined sites and the lack of characteristic Banksia species, it is considered unlikely for CR04 to be representative of FCT SCP 28
CcXp Marri/ Xanthorrhoea Woodland	CR01	Good	6, 3b, 3c, 3a	0.7200	CARD4	6	0.7381	Norm04	3b	0.7556	CARD13	3b	3b	Greatest overall similarity to FCT SCP 3b. FCT SCP 6 (CARD4), a weed dominated wetland on heavy soils, does not support the dominant species occurring within CR01. Dominant species of CR01 occur within FCT SCP 3a, 3b and 3c. Based on dissimilarity values and dendrogram results CR01 is representative of FCT SCP 3b.
	CR03	Very Good-Excellent	3b	0.6216	serp03	3b	0.6543	serp04	3b	06667	serp01	3b	3b	Consistently greatest similarity to FCT SCP 3b. Gibson *et. al* (1994) sites serp03, serp04 and serp01 occur near Serpentine approx. 10 km south of the survey area.
CcXpKa Marri/ Xanthor-rhoea/ Kingia Woodland	CR02	Good-Very Good	6, 3b, 3c, 3a	0.6667	CARD13	3b	0.6852	LAMB2	3a	0.6854	BRICK7	3a	3b	Greatest overall similarity to FCT SCP 3b. Dominant species of the quadrat occur within FCT SCP 3b. CARD13 (FCT SCP 3b) occurs within Cardup Nature Reserve approximately 1 km west of the survey area.
EwTo Wandoo Woodland	CR07	Good	3c, 3a, 3b	0.6346	CARD13	3b	0.6543	DUCK-2	3c	0.6545	LAMB2	3a	Inconclusive	Greatest similarity to FCT SCP 3b. The key dominant species of CR07 (*Eucalyptus wandoo*) has not been recorded within any of the SCP FCTs, besides 3c.. The dendrogram indicates clustering with FCT SCP 3c quadrats, however FCT SCP 3c has not been previously documented to occur within the desktop assessment area, whilst FCT SCP 3a and 3b quadrats and confirmed DBCA TEC locations do. A dominant understorey species within CR07, *Trymalium odroratissimum* subsp. *ordoratissimum* has not been previously recorded in FCTs SCP 3a, 3b or 3c. Vegetation of CR07 is not typical of the Swan Coastal Plain and not represented in Gibson *et al.* (1994) or Keighery *et al.* (2012).

*listed in order of nearest neighbour

5.2.3 Threatened and Priority Ecological Communities

The desktop assessment identified the following nine TECs and/or PECs that are known to occur within or in close proximity to the survey area:

- Clay Pans of the Swan Coastal Plain (Critically Endangered: EPBC Act)
- FCT SCP 09 – Dense Shrublands on Clay Flats, Swan Coastal Plain (Critically Endangered; EBPC Act, Vulnerable; BC Act)
- Tuart Woodlands and Forests (Critically Endangered: EPBC Act, Priority 3: DBCA)
- Mound Springs SCP – Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain) (Endangered; EBPC Act, Critically Endangered; BC Act)
- FCT SCP 3a - *Corymbia calophylla – Kingia australis* woodlands on heavy soils, Swan Coastal Plain (Endangered: EPBC Act, Critically Endangered BC Act)
- FCT SCP 3b - *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (Vulnerable BC Act)
- FCT SCP 3c - *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (Endangered: EPBCA Act, Critically Endangered: BC Act)
- FCT SCP 20b - *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (Endangered BC Act)
- Banksia dominated Woodlands of the Swan Coastal Plain IBRA Region (Endangered: EPBC Act, Priority 3 DBCA).

5.2.3.1 Clay Pans of the Swan Coastal Plain

The EPBC PMST identified that the Clay Pans of the Swan Coastal Plain TEC is likely to occur within the defined search area (**Appendix B**). The DBCA Threatened and Priority Ecological Community database did not specifically identify the presence of the Commonwealth listed TEC, however it did identify State listed TECs; FCT SCP 09 – Dense shrublands on clay flats, which form part of the Commonwealth-listed Clay pans of the Swan Coastal Plain TEC, within or within 2 km of the survey area. As the Commonwealth-listed TEC is comprised of five State-listed TECs, including FCT SCP 09, then the Commonwealth listed TEC also occurs. The presence of State-listed FCT SCP 09 is reported in **Section 5.1.2.1**.

5.2.3.2 SCP09 – Dense Shrublands on Clay Flats, Swan Coastal Plain

The desktop assessment identified that FCT SCP 09 and its buffer, does not occur within the survey area; however, is located 600 m north of the survey area (**Figure 11**). PATN™ analyses carried out as part of this assessment did not infer that any of the defined vegetation units showed similarity to FCT SCP 09; therefore, are not representative of this FCT.

5.2.3.3 Tuart *(Eucalyptus gomphocephala)* Woodlands and Forests of the Swan Coastal Plain

The desktop assessment indicates that the Commonwealth-listed (Critically Endangered) Tuart woodlands TEC, also listed as a Priority 3 PEC by DBCA has the potential to occur within the survey area; however, the closest recorded occurrence is approximately 14 km from the survey area. The key species defining this TEC, *Eucalyptus gomphocephala* was not recorded within the survey area; therefore, none of the defined vegetation units are considered representative of this TEC.

5.2.3.4 Mound Springs - Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain

The Mound Springs TEC is characterised by a continuous discharge of groundwater in raised areas of peat. The maintenance of hydrological processes for quality and quantity of water to the mounds is essential to sustain the tumulus springs assemblages (DBCA 2013). The Mound Springs TEC distributed at isolated locations between Muchea and Oldbury.

DBCA Threatened Ecological Community database search indicates that the Mound Springs TEC and its buffer does not occur within the survey area; however, one known occurrence is located less 100 m north-east of the survey area (**Figure 11**). None of the defined vegetation units are considered to be representative of this TEC.

5.2.3.5 SCP 3a – *Corymbia calophylla – Kingia australis* woodlands on heavy soils

This FCT occurs on heavy soils on the eastern side of the Swan Coastal Plain. DBCA spatial data identified that this TEC and its buffer encompasses a small area in the northern portion of the survey area (**Figure 11**). PATN™ analyses carried out as part of this assessment did not infer that any of the defined vegetation units show the greatest similarity to FCT SCP 3a or are representative of this FCT.

5.2.3.6 SCP 3b – *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain

The desktop assessment identified that FCT SCP 3b encompasses a large proportion of the survey area and thus, DBCA data confirms the presence of this FCT within the survey area (**Figure 11**). Floristic analysis results indicate that quadrats CR01 and CR03 within CcXp (Marri/Xanthorrhoea Woodland) and quadrat CR02 within CcXPka (Marii/Xanthorrhoea/Kingia Woodland) show the greatest similarity to FCT SCP 3b. Interrogation of data from these quadrats indicates the presence of *Corymbia calophylla, Xanthorrhoea preissii* and *Kingia australis* as dominant species, all of which are considered typical of FCT SCP 3b. At quadrat CR01, the clay soils characteristic of FCT SCP 3b were observed. Therefore, based on PATN™ analysis results and the assessment of key dominant species and soils, it is considered that vegetation representative of FCT SCP 3b occurs within the survey area.

5.2.3.7 SCP 3c - Corymbia calophylla – Xanthorrhoea preissii woodlands and Swan Coastal Plain

DBCA data indicated that FCT SCP 3c does not occur within the survey area; however, two occurrences of this FCT (or a buffer of its occurrence) occur approximately 0.8 km north and 1.7 km south of the survey area (**Figure 11**). Based on PATN™ analysis results and the assessment of key dominant species and soils, it is considered that none of the vegetation is considered representative of FCT SCP 3c.

5.2.3.8 SCP 20b – *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain

DBCA data indicates that the *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain TEC (or a buffer of its occurrence) encompasses the southern portion of survey area (**Figure 11**). Floristic analysis of all quadrats indicates that none of the vegetation units in the survey area are representative of FCT SCP 20b and therefore, none of the defined vegetation units are considered to be representative of the FCT. Furthermore, characteristic species of FCT SCP 20b such as *Banksia attenuata* and *Xylomelum occidentale* were not recorded within the survey area.

5.2.3.9 Banksia Dominated Woodlands of the Swan Coastal Plain

DBCA TEC and PEC database results indicated that the Commonwealth-listed (Endangered) Banksia woodlands TEC, also listed as a Priority 3 PEC by DBCA (or a buffer of its occurrence), encompasses the southern portion of the survey area.

Floristic analysis of all quadrats inferred that none of the vegetation units in the survey area are representative of FCT SCP 20b and therefore none of the defined vegetation units are considered to be representative of the FCT. It is also considered that none of the defined vegetation units are representative of the Banksia woodlands TEC, due to a lack of characteristic species such as *Banksia attenuata*.

5.3 VEGETATION OF SIGNIFICANCE

5.3.1 Nationally Significant Vegetation

The National significance of the vegetation units was assessed based on presence of:

- populations of Threatened (EPBC listed) species
- TECs listed as nationally (EPBC) significant
- Ramsar Wetlands of International Importance (DAWE 2020a).

5.3.1.1 Threatened Flora

No EPBC-listed Threatened flora were recorded within the survey area and therefore, none of the recorded vegetation units are of National significance due to this factor.

5.3.1.2 Threatened Ecological Communities

None of the defined vegetation units, were considered to be representative of, or form part of an EPBC-listed TEC. Therefore, none of the vegetation units are considered to be of National significance due to this factor.

5.3.1.3 Ramsar Wetlands

No Ramsar wetlands occur within the survey area and therefore, none of the recorded vegetation units are of National significance due to this factor.

5.3.2 State Significant Vegetation

The State significance of the vegetation units was assessed based on presence of:

- State listed Threatened flora or TECs
- land within (or areas recommended by DBCA for inclusion) the State-managed conservation estate.

5.3.2.1 Threatened Flora

No State-listed Threatened flora were recorded within the survey area and therefore, none of the recorded vegetation units are of State significance due to this factor.

5.3.2.2 TECs

Two of the defined vegetation units, CcXp and CcXpKa, are considered to be representative of a State-listed TEC (SCP 3b). Therefore, these vegetation units are considered to be of State significance due to this factor.

5.3.2.3 Conservation Estate

No DBCA Conservation Reserves or Estate occur within survey area. Therefore, none of the defined vegetation units are considered to be of State significance due to this factor.

5.3.3 Regionally Significant Vegetation

The regional significance of the vegetation units was assessed based on:

- the presence of populations of Priority flora or ecological communities
- the presence of ESAs or areas relevant to a conservation scheme
- the presence of conservation category wetlands
- the presence of high diversity of flora, fauna, communities, or community structure
- the presence of flora species exhibiting range extensions or undescribed species
- having a restricted regional distribution
- being represented by less than 30% of the pre-European extent.

5.3.3.1 Priority Flora

No Priority flora were recorded and therefore, none of the recorded vegetation units are of regional significance due to this factor.

One State-listed priority flora species, *Johnsonia pubescens subsp. cygnorum* was recorded within quadrat CR02 defined as vegetation unit CcXpKa. Therefore, only vegetation unit CcXpKa is considered Regionally significant due to this factor.

5.3.3.2 Priority Ecological Communities

None of the vegetation units are considered to be representative of any PEC and therefore, none of the recorded vegetation units are of regional significance due to this factor.

5.3.3.3 ESAs or Conservation Areas

The survey area is a Bush Forever site (site 350), which is also therefore, an ESA. Therefore, all of the recorded vegetation units, (BsXp, CcXp, CcXpKa, EwTo, Er(P) and Cc(P)) which occupy the Bush Forever site and ESA are considered to be of regional significance due to this factor.

5.3.3.4 Conservation Category Wetlands

Three conservation category wetlands occur within the survey area and therefore, vegetation that intersects with the mapped wetland (BsXp, CcXp, CcXpKa EwTo and Er(P)) are considered to be of regional significance due to this factor.

5.3.3.5 High Diversity

A large proportion of the survey area (29.98%) has been cleared, therefore within the survey area, the species richness across the remaining remnant vegetation (average 5.67 species per hectare) is considered to be low and the diversity of the vegetation is not considered to be high given the size of the survey area. The floral composition and vegetation structure of the vegetation units are considered typical of the vegetation of the Swan Coastal Plain. None of the recorded vegetation units are considered to exhibit complex or diverse structure and are therefore not considered to be of regional significance due to this factor.

5.3.3.6 Range Extending/Undescribed Flora

None of the recorded flora are occurring beyond their known range and none are undescribed flora, therefore, none of the recorded vegetation units are considered to be of regional significance due to this factor.

5.3.3.7 Restricted Regional Representation and Distribution

The most important aspect in the consideration of regional significance of vegetation is the representation of that vegetation in the region. Within each IBRA Region, some regionally defined vegetation associations (Shepherd *et al.* 2002) comprise a very small proportion of the vegetation associations within that region. Vegetation units are considered significant if they are poorly represented regionally. The vegetation association

represented in the survey area (968) is not restricted in its representation or distribution, and therefore, none of the recorded vegetation units are considered to be of regional significance due to this factor.

5.3.3.8 Extent Remaining

The vegetation association (Beard 1990) represented within the survey area (968) falls below both the unconstrained (30%) and constrained (10%) area thresholds for retention in comparison to their pre-European extent for the Swan Coastal Plain. Therefore, all remnant vegetation units occurring within the survey area are considered to be of regional significance due to this factor.

The Guildford complex is represented by less than 10% of its original vegetation extent. Therefore, vegetation units occurring within the defined extent of the Guildford complex (BsXp, Cc(P), CcXp, CcXpKa, EwTo) are considered to be of regional significance due to this factor.

5.3.4 Locally Significant Vegetation

The local significance of the vegetation units was assessed based on:

- representing small, isolated communities
- their local extent (proportion) and distribution.

5.3.4.1 Small, Isolated Communities

Two of the recorded vegetation units BsXp (1.05%) and EwTo (2.35%) each occupy less than 3% of the survey area and occur as isolated occurrences. The combination of flora taxa occurring within these vegetation units are considered to be widespread across the Swan Coastal Plain and nearby regions and therefore, these units are not unique or of conservation significance, nor of local significance due to being limited in their extent and distribution. However, due to being represented within small, isolated occurrences within the survey area and in the context of the surrounding area (**Figure 13**), vegetation units BsXp and EwTo are considered be of local significance.

5.3.4.2 Limited Extent and Distribution

Despite vegetation units BsXp and EwTo being represented by small extents within the survey area, the combination of flora taxa occurring within these vegetation units are considered to be widespread across the Swan Coastal Plain and nearby regions. Based on literature, including the Gibson *et al.* (1994) distribution of sites and other anecdotal information, the recorded vegetation units are considered to be widely distributed and well-represented within the local area (Shire of Serpentine-Jarrahdale) and across the Swan Coastal Plain and surrounding regions. Therefore, none of the recorded vegetation units are considered to be of local significance due to this factor.

6. DISCUSSION

6.1 FLORA

The survey area occurs at the base of the Darling Scarp, on the eastern side of the Swan Coastal Plain where the level of historic clearing is very high, and the original populations of flora species have been greatly reduced in size and connectivity (Malcom Trudgen, pers. comm.). The survey area is a linear corridor, running parallel with the South Western Railway corridor. The corridor and areas surrounding it have been highly disturbed. Vegetation remains within the survey area, whilst there has been significant clearing in the surrounding areas. This has resulted in the survey area emerging as an ecological linkage, with retained vegetation joining reserves in the north, to larger vegetation remnants in the south. Consequently, the survey area may have high conservation value for native flora, whether or not the individual taxa recorded in the survey area are of particular conservation significance (Malcolm Trudgen pers. comm.).

A total of 96 flora species, from 69 genera and 29 families were recorded during the field survey. The dominant families were found to be Fabaceae (12 taxa), Myrtaceae (10 taxa) and Asparagaceae (eight taxa). The total is comprised of 85 (86.5%) native species and 13 (13.5%) introduced (weed) species, none of which are Declared Pest plants.

The species diversity within the survey area is considered low (5.67 species/ha) which is considered likely due to the linear alignment of the survey area, providing a larger edge to area ratio and therefore vulnerability to edge effects such as weed invasion, and a large proportion of the survey area being cleared. The survey area's disturbed and partially cleared nature, was a minor limitation of the study.

The presence of invasive weeds within the survey area can be attributed to the close proximity to existing infrastructure such as roads, railways and cleared pasture. Introduced species can out-compete native species, particularly adjacent to these high traffic areas. Poorer vegetation condition and higher weed abundance occurs adjacent to road and rail infrastructure where the edge effects from these activities are more pronounced.

6.1.1 Significant Flora

No species listed as Threatened flora under the BC Act or under the EPBC Act were recorded.

Two Threatened vascular flora species have been previously recorded from within the survey area: *Synaphea* sp. Serpentine (G.R Brand 103); and *Synaphea* sp. Pinjarra Plain (A.S. George 17182). Both species are listed as Critically Endangered under the EPBC and BC Acts.

Synaphea sp. Serpentine (G.R Brand 103) was recorded from one location in 2011 and *Synaphea* sp. Pinjarra Plain (A.S. George 17182) was recorded from three locations in 2003, 2011 and 2012 within the railway corridor adjacent to Soldiers Road. *Synaphea* sp. Serpentine (G.R Brand 103) is known from 38 FloraBase records, predominantly between Byford in the north to Serpentine in the south, with isolated locations at Yalgoo and Capel. *Synaphea* sp. Pinjarra Plain (A.S. George 17182) is known from 63 FloraBase records and is predominantly distributed from Byford to Pinjarra. *Synaphea* sp. Pinjarra Plain (A. S. George 17182) typically occurs within Open Woodland of *Corymbia calophylla, Xanthorrhoea preissii* over Open Shrubland of *Pericalymma ellipticum, Kunzea micrantha, Hakea varia, Adenanthos meisneri, Stirlingia latifolia Synaphea petiolaris* and *Synaphea gracillima* over Sedgelands of *Mesomelaena tetragona* and *Tetraria octandra* (DBCA 2016). Both species grow in a variety of habitats but commonly occur within *Corymbia calophylla* Woodlands and/or *Kunzea* or *Melaleuca* thickets and shrublands.

While suitable habitat for these two species occurs within survey area, neither of these species were recorded during the field assessment. This may be attributed to the length of time since these species were originally recorded (which may suggest poor accuracy of the recorded locations), or the 'Degraded' condition of the vegetation in which these species were previously recorded.

6.2 VEGETATION

Overall, only 16.9% of the vegetation within the survey area was recorded to be in 'Good' or better condition. This poorer quality of vegetation condition was expected due to the close proximity of the survey area to existing infrastructure and the largely cleared context in which it occurs. A large proportion of survey area has been subject to weed infestation, resulting in poorer quality vegetation.

6.2.1 Connectivity

While much of survey area is adjacent to cleared areas, the survey area acts as an ecological linkage between areas of native vegetation (**Section 3.10**). These linkages are important, as they connect continuous areas of native vegetation, and in effect, create a larger area of native vegetation when combined. The size of an area of native vegetation is directly related to the number of flora species that can survive there (Freudenberger *et al.* 1997), so these connections (by maintaining the larger size of the overall remnant) assist in maintaining flora species abundance and diversity in the survey area and the local region.

6.2.2 Floristic Community Types

The DBCA database search results suggested that TECs are likely to be present in the survey area. PATN^{TM} analysis indicated that two of the vegetation units (CcXp and CcXpKa) that were defined and mapped within the survey areas are representative of FCT SCP 3b (*Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain), which is listed as a Vulnerable TEC at a State level. All other vegetation units in the survey area produced inconclusive results or were not aligned with an FCT due to their degraded nature.

Vegetation units CcXp (Marri/*Xanthorrhoea* woodland) and CcXpKa (Marri/*Xanthorrhoea/Kingia* woodland) showed the greatest similarity to FCT SCP 3b (**Table 14**) and the FCT SCP 3b quadrats recorded by Gibson *et al.* (1994) from Cardup Nature Reserve. Statistical analysis of quadrat data and interrogation of species composition from vegetation units BsXp (*Banksia/Xanthorrhoea* Woodland) and EwTo (*Wandoo* Woodland) provided inconclusive results.

More specifically, quadrats sampled within vegetation units CcXp (CR03) and CcXpKa (CR02) showed the greatest similarity to Gibson *et al.* (1990) quadrat CARD13 (FCT SCP 3b), which is located within the Cardup Nature Reserve. Statististical analysis indicated that quadrat CR01 showed the greatest similarity (with a dissimilarity value of 0.7255) to FCT SCP 06 (Weed dominated wetlands on heavy soils). Despite analysis indicating the greatest affinity of CR01 with FCT SCP 06, examination of species composition of FCT SCP 06 concluded that quadrat CR01 is unlikely to be representative of this FCT, due to the lack of dominant species in common. The alignment to this FCT from floristic analysis may be due to the presence of a similar suite of weed species. Clay soils were recorded at quadrat CR01, and whilst such soils are characteristic of FCT SCP 06, they are also characteristic of FCT SCP 3b. Overall, it was therefore concluded that CR01 also shows the greatest similarity to FCT SCP 3b.

Sampled quadrats within vegetation unit CcXp (Marri/Xanthorrhoea woodland) also showed affinity to FCTs defined as Banksia woodland communities (FCT SCP 20b and 21a). None of the charateristic Banksia species (predominantly *Banksia attenuata*) of both FCT SCP 20b and 21a occur within quadrats CR01 or CR03 and therefore, this vegetation unit is not considered to be representative of either of these Banksia woodland communities.

A representative image of vegetation unit CcXp from within the survey area, where FCT SCP 3b is considered to be represented, is provided in **Plate 1**.



Plate 1 – FCT SCP 3b, *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain

6.2.3 Threatened and Priority Ecological Communities

Interrogation of the DBCA TEC and PEC database search indicates that four TECs (FCTs SCP 3a, 3b, FCT 20b and therefore, the Commonwealth listed Banksia woodlands TEC) have been previously reported to occur within (or their buffers do) the survey area.

FCT SCP 3a and its associated buffer encompasses a portion of the northern section of the survey area, according to the DBCA database. The buffer extends beyond the bounds of the survey area and encompasses large areas of cleared paddock and areas devoid of remnant vegetation that could be representative of FCT SCP 3a. None of the vegetation units defined within the survey area are considered to be representative of this TEC.

FCT SCP3b was documented by DBCA to encompass the majority of the survey area. Vegetation units CcXp and CcXpKa within the survey areas are considered representative of FCT SCP 3b (*Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain).

Two DBCA verified locations of FCT SCP 20b and associated buffers occur within the survey area. Observations made during the field survey and statistical analysis of recorded flora identified that none of the vegetation units are representative of this TEC. In addition, no vegetation units considered to be representative of the Commonwealth listed Banksia woodlands TEC were recorded.

6.2.4 Summary of Vegetation Significance

The significance of the vegetation units of the survey area, along with the aspects determining their significance, is summarised in **Table 16**. The level of significance for each vegetation unit is broadly summarised in **Table 17**.

Table 16 – Summary of the Significance of the Recorded Vegetation Units

Scale	Significance Aspect	Vegetation Units
National Significance	Populations of Threatened (EPBC listed) species	-
	Presence of EPBC listed TECs	-
	Presence of Ramsar wetlands	-
State Significance	Presence of State-listed Threatened flora	-
	Presence of State-listed TECs	CcXp, CcXpKa
	Land within the Conservation Estate	-
Regional Significance	Presence of Priority flora	CcXpKa
	Presence of PECs	-
	Presence of ESAs or areas relevant to a conservation scheme	BsXp, CcXp, CcXpKa, EwTo, Cc(P), Er(P)
	Presence of conservation category wetlands	BsXp, CcXp, CcXpKa, EwTo, Er(P)
	High diversity of flora, fauna, communities, or community structure	-
	Presence of flora species exhibiting a range extension	-
	Presence of undescribed flora	-
	Having a restricted regional representation and distribution	-
	Represented by less than 30% of the pre-European extent	BsXp, CcXp, CcXpKa, EwTo, Cc(P), Er(P)
Local Significance	Small, isolated communities	BsXp and EwTo
	Having a limited local extent	-
	Having a limited distribution	-

Table 17 – Summary of Level of Potential Significance of Vegetation Units in the Survey Area

Vegetation Unit	Vegetation Description	Area (ha)	% of Survey Area
BsXp Banksia /Xanthorrhoea Woodland	Regional significance – within an ESA Regional significance – within a conservation category wetland Regional significance – Represented by <30% of pre-European extent Local significance – Small isolated communities	0.25	1.05
CcXp Marri/ Xanthorrhoea Woodland	State significance – presence of State-listed TEC Regional significance – within an ESA Regional significance – within a conservation category wetland Regional significance – Represented by <30% of pre-European extent	9.62	40.33
CcXpKa Marri/ Xanthorrhoea/ Kingia Woodland	State significance – presence of State-listed TEC Regional significance – presence of Priority flora Regional significance – within an ESA Regional significance – within a conservation category wetland Regional significance – Represented by <30% of pre-European extent	5.43	22.77
EwTo Wandoo Woodland	Regional significance – within an ESA Regional significance – within a conservation category wetland Regional significance – Represented by <30% of pre-European extent Local significance – Small isolated communities	0.56	2.35
Cc(P) Marri over weeds	Regional significance – within an ESA Regional significance – Represented by <30% of pre-European extent	0.04	0.17
Er(P) *Eucalyptus rudis* over weeds	Regional significance – within an ESA Regional significance – within a conservation category wetland Regional significance – Represented by <30% of pre-European extent	0.03	0.12
	TOTAL	**15.93**	**66.79**

7. CONCLUSIONS

The key findings and conclusions of the flora and vegetation assessment of the survey area are as follows:

- No Threatened flora species were recorded; however, one State-listed Priority species, *Johnsonia pubescens* subsp. *cygnorum* (P2) was recorded within vegetation type CcXpKa.
- Previously recorded Threatened species, *Synaphea* sp. Serpentine (G.R. Brand 103) and *Synaphea* sp. Pinjarra Plain (A.S. George 17182) were not observed within the survey area.. The lack of records for previously recorded species is considered possibly due to degradation or the old age of some of the records, which may, in turn, be attributable to poor accuracy of recorded locations.
- The survey area has been subject to historic disturbances and a large proportion (29.98%) of the survey area has been cleared.
- No plants listed as a DP plant under the BAM Act were recorded.
- Seven vegetation units (four of which are remnant vegetation, BaXp, CcXp, CcXpKa and EwTo) were described and mapped within the survey area, consisting of six woodlands and one rehabilitated vegetation unit, with eleven units (five of which are also represented within the survey area) defined and mapped in the broader region (within a 500 m buffer of the survey area corridor).
- Eight Commonwealth or State-listed TECs were identified through database searches as potentially occurring within the survey area. Of these, based on mapped occurrences with buffers applied, four TECs were considered most likely to occur, being FCTs SCP 3a, 3b and 20b (the latter being part of Banksia woodlands TEC).
- The Marri/Xanthorrhoea woodland (CcXp) and the Marri/Xanthorrhoea/Kingia woodlands (CcXpKa) vegetation units have been inferred to be representative of FCT SCP 3b, the *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain, which is a State-listed (Vulnerable) TEC.
- None of the other vegetation units are considered to be representative of any Commonwealth-listed TECs or State-listed PECs.
- The condition of the vegetation in the survey area ranges from 'Completely Degraded' to 'Excellent', with only 16.90% observed to be in 'Good' or better condition.
- The desktop assessment, field survey and floristic analysis determined that of the nine TECs or PECs potentially occurring in the survey area, only FCT SCP 3b is represented, which occurs within vegetation units CcXp and CcXpKa, together comprising 15.05 ha (63.10% of the 23.85 ha survey area).

8. LIST OF PARTICIPANTS

The personnel who contributed to the project are summarised in **Table 18**.

Table 18 – Project Team

Name	Qualification	Years of Relevant Experience	Role
Kellie Bauer–Simpson Principal Ecologist	BSc. (Biological Science)	23	Project manager, field assessment, GIS mapping, technical and authorisation review
Lisa Chappell Senior Botanist/Environmental Scientist	BEnvSc. (Hons) (Environmental Science)	18	Data management, floristic analysis, GIS mapping, report preparation
Kylie Del Fante Principal Botanist	BSc. (Biological Science)	24	Field assessment
Kristen Bleby Senior Ecologist	B.Sc. (Hons) Natural Resource Management PhD (Ecology)	10	Report technical review
Yasmin Skinner Graduate Ecologist	BSc. (Zoology and Conservation Biology)	1	Report preparation
Kelly Hopkinson Graduate Ecologist	BSc. (Biological Science and Conservation Biology)	1	Report preparation
Shibi Chandran Botanical Taxonomist	BSc. (Zoology) MSc. (Fisheries and Aquaculture)	11	Flora identifications
Kathya Tippur Botanist / Taxonomist	BSc. (Chemistry, Botany, Zoology) MSc. (Botany)	9	Flora identifications
Will Bauer–Simpson Technician/Advisor	Cert IV (Health and Safety)	10	Field assistance, field safety and logistics planning, GIS mapping, spatial analysis, spatial data management
Megan Meadowcroft Administration		5	Data entry, editorial support

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APPENDIX A - DBCA NATUREMAP SEARCH REPORT

NatureMap
Mapping Western Australia's biodiversity

Cable Route 10km Buffer Report

Created By Guest user on 22/03/2022

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 59' 50" E,32° 15' 24" S
Buffer 10km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	1322	20412
Other specially protected fauna	3	24
Presumed extinct	2	6
Priority 1	1	2
Priority 2	3	9
Priority 3	19	65
Priority 4	10	71
Protected under international agreement	3	7
Rare or likely to become extinct	22	973
TOTAL	**1385**	**21569**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
2.	1213	*Calectasia cyanea (Blue Tinsel Lily)*		T	
3.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
4.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
5.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
6.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
7.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
8.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
9.	1637	*Diuris purdiei (Purdie's Donkey Orchid)*		T	
10.	1639	*Drakaea elastica (Glossy-leaved Hammer Orchid)*		T	
11.	13090	*Eucalyptus x balanites (Cadda Road Mallee)*		T	
12.	24557	*Leipoa ocellata (Malleefowl)*		T	
13.	942	*Lepidosperma rostratum*		T	
14.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
15.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
16.	24145	*Setonix brachyurus (Quokka)*		T	
17.	30751	*Synaphea sp. Pinjarra Plain (A.S. George 17182)*		T	
18.	28354	*Synaphea sp. Serpentine (G.R. Brand 103)*		T	
19.	1033	*Tetraria australiensis*		T	
20.	10862	*Thelymitra stellata (Star Orchid)*		T	
21.	24157	*Trichosurus vulpecula subsp. arnhemensis (northern brushtail possum (Kimberley))*		T	
22.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Presumed extinct					
23.	24155	*Perameles eremiana (Desert Bandicoot, walilya)*		X	
24.	24164	*Potorous platyops (Broad-faced Potoroo)*		X	
Protected under international agreement					
25.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
26.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
27.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Other specially protected fauna					
28.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
29.	25508	*Phascogale tapoatafa (Brush-tailed Phascogale)*		S	
30.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	
Priority 1					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
31.	14932	*Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)*		P1	
Priority 2					
32.	19272	*Johnsonia pubescens subsp. cygnorum*		P2	
33.	7675	*Levenhookia pulcherrima (Beautiful Stylewort)*		P2	
34.	14337	*Millotia tenuifolia var. laevis*		P2	
Priority 3					
35.	25242	*Acanthophis antarcticus (Southern Death Adder)*		P3	
36.	18195	*Amanita carneiphylla*		P3	
37.	43543	*Amanita fibrillopes*		P3	
38.	46334	*Amanita kalamundae (Kalamunda Lepidella)*		P3	
39.	43542	*Amanita wadjukiorum*		P3	
40.	7829	*Angianthus drummondii*		P3	
41.	45402	*Babingtonia urbana (Coastal Plain Babingtonia)*		P3	
42.	32216	*Banksia kippistiana var. paenepeccata*		P3	
43.	48579	*Euoplos inornatus (inornate trapdoor spider (northern Jarrah Forest))*		P3	
44.	34114	*Glacidorbis occidentalis (Jarrah forest freshwater snail, freshwater snail)*		P3	
45.	48935	*Idiosoma sigillatum (Swan Coastal Plain shield-backed trapdoor spider)*		P3	
46.	20462	*Jacksonia gracillima*		P3	
47.	25147	*Lerista lineata (Perth Slider, Lined Skink)*		P3	
48.	24165	*Petropseudes dahli (Rock Ringtail Possum, Wogoit)*		P3	
49.	8163	*Pithocarpa corymbulosa (Corymbose Pithocarpa)*		P3	
50.	980	*Schoenus capillifolius*		P3	
51.	1008	*Schoenus pennisetis*		P3	
52.	17731	*Schoenus sp. Waroona (G.J. Keighery 12235)*		P3	
53.	18564	*Stylidium aceratum*		P3	
Priority 4					
54.	14131	*Acacia oncinophylla subsp. patulifolia*		P4	
55.	25035	*Ctenotus delli (Dell's skink, Darling Range southwest Ctenotus)*		P4	
56.	3115	*Drosera occidentalis (Western Sundew)*		P4	
57.	24189	*Falsistrellus mackenziei (Western False Pipistrelle, Western Falsistrelle)*		P4	
58.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
59.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
60.	48024	*Notamacropus eugenii subsp. derbianus (Tammar Wallaby, Tammar)*		P4	
61.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
62.	6573	*Parsonsia diaphanophleba*		P4	
63.	14714	*Verticordia lindleyi subsp. lindleyi*		P4	
Non-conservation taxon					
64.		*?Hypolaena exsulca*			Y
65.		*?Persoonia saccata*			Y
66.	15429	*Acacia alata var. alata*			
67.	15466	*Acacia applanata*			
68.	3233	*Acacia barbinervis*			
69.	15469	*Acacia barbinervis subsp. barbinervis*			
70.	3294	*Acacia dentifera*			
71.	3307	*Acacia divergens*			
72.	3310	*Acacia drewiana*			
73.	11926	*Acacia drewiana subsp. drewiana*			
74.	3374	*Acacia huegelii*			
75.	3409	*Acacia lasiocarpa (Panjang)*			
76.	11519	*Acacia lasiocarpa var. bracteolata*			
77.	3410	*Acacia lateriticola*			
78.	3442	*Acacia microbotrya (Manna Wattle, Kalyang)*			
79.	3454	*Acacia nervosa (Rib Wattle)*			
80.	17860	*Acacia podalyriifolia*	Y		
81.	3502	*Acacia pulchella (Prickly Moses)*			
82.	15481	*Acacia pulchella var. glaberrima*			
83.	15483	*Acacia pulchella var. pulchella*			
84.	15480	*Acacia pulchella var. reflexa*			
85.	30032	*Acacia saligna subsp. saligna*			
86.	3541	*Acacia sessilis*			
87.		*Acacia sp.*			
88.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			
89.	3574	*Acacia teretifolia*			
90.	3591	*Acacia urophylla*			
91.	3602	*Acacia willdenowiana (Grass Wattle)*			
92.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
93.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
94.	24262	*Acanthiza inornata (Western Thornbill)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
95.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
96.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
97.		*Acariformes sp.*			
98.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
99.	25536	*Accipiter fasciatus (Brown Goshawk)*			
100.	24282	*Accipiter fasciatus subsp. fasciatus (Brown Goshawk)*			
101.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
102.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
103.	6205	*Actinotus leucocephalus (Flannel Flower)*			
104.	14970	*Adenanthos barbiger*			
105.	1775	*Adenanthos cygnorum (Common Woollybush)*			
106.	1790	*Adenanthos meisneri*			
107.	1791	*Adenanthos obovatus (Basket Flower)*			
108.	25	*Adiantum aethiopicum (Common Maidenhair)*			
109.		*Adoxotoma chionopogon*			
110.		*Adoxotoma embolica*			Y
111.		*Adoxotoma nitida*			Y
112.		*Aeshnidae sp.*			
113.	23474	*Agrostocrinum hirsutum*			
114.	1261	*Agrostocrinum scabrum (Blue Grass Lily)*			
115.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
116.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
117.	186	*Aira elegantissima*	Y		
118.	187	*Aira praecox (Early Hairgrass)*	Y		
119.	48513	*Aizoon pubescens*	Y		
120.		*Akamptogonus novarae*			
121.		*Aleurina ferruginea*			
122.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
123.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
124.	1734	*Allocasuarina microstachya*			
125.	1739	*Allocasuarina thuyoides (Horned Sheoak)*			
126.	48786	*Amanita hiltonii*			
127.	38755	*Amanita ochroterrea*			
128.		*Ambicodamus marae*			
129.		*Amblyomma triguttatum*			
130.	13380	*Amphibromus nervosus*			
131.	197	*Amphipogon debilis*			
132.	198	*Amphipogon laguroides*			
133.	199	*Amphipogon strictus (Greybeard Grass)*			
134.	200	*Amphipogon turbinatus*			
135.	13267	*Amyema linophylla subsp. linophylla*			
136.	2380	*Amyema miquelii (Stalked Mistletoe)*			
137.		*Aname mainae*			
138.		*Aname tepperi*			
139.	1058	*Anarthria gracilis*			
140.	1059	*Anarthria humilis*			
141.	1060	*Anarthria laevis*			
142.	24312	*Anas gracilis (Grey Teal)*			
143.	24315	*Anas rhynchotis (Australasian Shoveler)*			
144.	24316	*Anas superciliosa (Pacific Black Duck)*			
145.		*Ancylidae sp.*			
146.	6300	*Andersonia aristata (Rice Flower)*			
147.	6314	*Andersonia lehmanniana*			
148.	1409	*Anigozanthos humilis (Catspaw)*			
149.	1411	*Anigozanthos manglesii (Mangles Kangaroo Paw, Kurulbrang)*			
150.	11261	*Anigozanthos manglesii subsp. manglesii*			
151.	29487	*Anigozanthos manglesii var. x angustifolius*			
152.	1416	*Anigozanthos viridis (Green Kangaroo Paw, Kurulbardang)*			
153.	11566	*Anigozanthos viridis subsp. viridis*			
154.	25449	*Antechinus flavipes (Yellow-footed Antechinus)*			
155.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
156.	24561	*Anthochaera carunculata (Red Wattlebird)*			
157.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
158.	7411	*Anthotium humile (Dwarf Anthotium)*			
159.	12724	*Anthotium junciforme*			
160.	25670	*Anthus australis (Australian Pipit)*			
161.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
162.	3686	*Aotus cordifolia*			
163.	3688	*Aotus gracillima*			
164.	3692	*Aotus procumbens*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
165.	1117	*Aphelia cyperoides*			
166.	1119	*Aphelia nutans*			
167.	17845	*Apodasmia ceramophila*			
168.	24990	*Aprasia pulchella (Granite Worm-lizard)*			
169.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
170.	24285	*Aquila audax (Wedge-tailed Eagle)*			
171.		*Arachnura higginsi*			
172.		*Araneus amblycyphus*			Y
173.		*Araneus cyphoxis*			
174.		*Araneus eburneiventris*			
175.		*Araneus senicaudatus*			
176.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
177.	24337	*Ardea garzetta subsp. nigripes (Little Egret)*			
178.	24340	*Ardea novaehollandiae (White-faced Heron)*			
179.	24341	*Ardea pacifica (White-necked Heron)*			
180.	24610	*Ardeotis australis (Australian Bustard)*			
181.		*Argiope trifasciata*			
182.	207	*Aristida contorta (Bunched Kerosene Grass)*			
183.	210	*Aristida holathera*			
184.		*Aristida sp.*			
185.	1264	*Arnocrinum preissii*			
186.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
187.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
188.		*Artoria flavimana*			
189.		*Artoria linnaei*			
190.		*Artoria schizocoides*			
191.		*Asadipus kunderang*			
192.	6580	*Asclepias curassavica (Redhead Cottonbush)*	Y		
193.	8779	*Asparagus asparagoides (Bridal Creeper)*	Y		
194.		*Astartea aff. fascicularis sthcst*			
195.	20350	*Astartea affinis (West-coast Astartea)*			
196.	20283	*Astartea scoparia (Common Astartea)*			
197.		*Asteraceae sp.*			
198.	6334	*Astroloma pallidum (Kick Bush)*			
199.	6337	*Astroloma stomarrhena (Red Swamp Cranberry)*			
200.		*Austracantha minax*			
201.		*Australomimetus auriculatus*			
202.		*Australomimetus dunlopi*			
203.		*Austrochthonius muchmorei*			
204.	17233	*Austrostipa campylachne*			
205.	17234	*Austrostipa compressa*			
206.	17237	*Austrostipa elegantissima*			
207.	17253	*Austrostipa semibarbata*			
208.		*Austrostipa semibarbata/campylachne*			Y
209.	17257	*Austrostipa variabilis*			
210.	231	*Avellinia michelii*	Y		
211.	233	*Avena barbata (Bearded Oat)*	Y		
212.	235	*Avena sativa (Common Oat)*	Y		
213.	24318	*Aythya australis (Hardhead)*			
214.	18279	*Babiana angustifolia*	Y		
215.	18280	*Babiana nana*	Y		
216.	36441	*Babingtonia camphorosmae (Camphor Myrtle)*			
217.		*Backobourkia brounii*			
218.		*Backobourkia heroine*			
219.		*Baetidae sp.*			
220.		*Baiami volucripes*			
221.		*Ballarra longipalpus*			
222.	32682	*Banksia armata var. armata*			
223.	1800	*Banksia attenuata (Slender Banksia, Piara)*			
224.	32678	*Banksia bipinnatifida subsp. bipinnatifida*			
225.	32576	*Banksia dallanneyi (Couch Honeypot)*			
226.	32580	*Banksia dallanneyi subsp. dallanneyi var. dallanneyi*			
227.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
228.	1822	*Banksia ilicifolia (Holly-leaved Banksia)*			
229.	32214	*Banksia kippistiana*			
230.	1834	*Banksia menziesii (Firewood Banksia)*			
231.	32202	*Banksia nivea (Honeypot Dryandra, Pudjarn)*			
232.	32053	*Banksia undata (Urchin Dryandra)*			
233.		*Barnardius zonarius*			
234.	739	*Baumea acuta (Pale Twig-rush)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
235.	740	*Baumea arthrophylla*			
236.	743	*Baumea juncea (Bare Twigrush)*			
237.	5387	*Beaufortia macrostemon (Darling Range Beaufortia)*			
238.	7046	*Bellardia trixago (Bellardia)*	Y		
239.	48868	*Bellardia viscosa*	Y		
240.	25788	*Billardiera fraseri (Elegant Pronaya)*			
241.	25798	*Billardiera fusiformis (Australian Bluebell)*			
242.	3165	*Billardiera variifolia*			
243.	24319	*Biziura lobata (Musk Duck)*			
244.		*Boletellus obscurecoccineus*			
245.		*Boletus sp.*			
246.	11503	*Boronia crenulata subsp. crenulata var. crenulata*			
247.	4420	*Boronia fastigiata (Bushy Boronia)*			
248.	4429	*Boronia molloyae (Tall Boronia)*			
249.	1272	*Borya scirpoidea*			
250.	1273	*Borya sphaerocephala (Pincushions)*			
251.	48782	*Bossiaea angustifolia*			
252.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
253.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			
254.	10915	*Brachychiton populneus (Kurrajong)*	Y		
255.	8661	*Brachypodium distachyon (False Brome)*	Y		
256.	7867	*Brachyscome bellidioides*			
257.	7883	*Brachyscome pusilla*			
258.	244	*Briza maxima (Blowfly Grass)*	Y		
259.	245	*Briza minor (Shivery Grass)*	Y		
260.	249	*Bromus diandrus (Great Brome)*	Y		
261.	1366	*Bulbine semibarbata (Leek Lily)*			
262.	1383	*Burchardia bairdiae*			
263.	12770	*Burchardia congesta*			
264.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
265.	25714	*Cacatua pastinator (Western Long-billed Corella)*			
266.	25715	*Cacatua roseicapilla (Galah)*			
267.	25716	*Cacatua sanguinea (Little Corella)*			
268.	24729	*Cacatua tenuirostris (Eastern Long-billed Corella)*	Y		
269.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
270.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
271.		*Caenidae sp.*			
272.	1276	*Caesia micrantha (Pale Grass Lily)*			
273.	1277	*Caesia occidentalis*			
274.		*Caesia sp.*			
275.	1586	*Caladenia discoidea (Dancing Orchid)*			
276.	1592	*Caladenia flava (Cowslip Orchid)*			
277.	15348	*Caladenia flava subsp. flava*			
278.	1602	*Caladenia longicauda (Common White Spider Orchid)*			
279.	15365	*Caladenia longicauda subsp. longicauda*			
280.	1605	*Caladenia marginata (White Fairy Orchid)*			
281.	1613	*Caladenia reptans (Little Pink Fairy Orchid)*			
282.	15379	*Caladenia serotina*			
283.	2854	*Calandrinia granulifera (Pygmy Purslane)*			
284.	1214	*Calectasia grandiflora (Blue Tinsel Lily)*			
285.	19309	*Calectasia narragara*			
286.	4717	*Callitriche stagnalis (Common Starwort)*	Y		
287.	36600	*Callitris pyramidalis (Swamp Cypress)*			
288.	5411	*Calothamnus hirsutus*			
289.	5415	*Calothamnus lateralis*			
290.	35797	*Calothamnus lateralis var. lateralis*			
291.	35816	*Calothamnus quadrifidus subsp. quadrifidus*			
292.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
293.	5439	*Calytrix angulata (Yellow Starflower)*			
294.	5441	*Calytrix aurea*			
295.	5458	*Calytrix flavescens (Summer Starflower)*			
296.	5460	*Calytrix fraseri (Pink Summer Calytrix)*			
297.	38767	*Campanella gregaria*			
298.	7909	*Carduus pycnocephalus (Slender Thistle)*	Y		
299.	43241	*Carex thecata*			
300.	2795	*Carpobrotus edulis (Hottentot Fig)*	Y		
301.	2951	*Cassytha flava (Dodder Laurel)*			
302.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
303.	2954	*Cassytha micrantha*			
304.	2956	*Cassytha pomiformis (Dodder Laurel)*			

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305.	2957	*Cassytha racemosa (Dodder Laurel)*			
306.	18321	*Casuarina glauca*	Y		
307.	1742	*Casuarina obesa (Swamp Sheoak, Kuli)*			
308.	6539	*Centaurium erythraea (Common Centaury)*	Y		
309.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
310.	1123	*Centrolepis caespitosa*			
311.	13122	*Centrolepis cephaloformis subsp. cephaloformis*			
312.	1125	*Centrolepis drummondiana*			
313.	1130	*Centrolepis humillima (Dwarf Centrolepis)*			
314.	1132	*Centrolepis mutica*			
315.	1134	*Centrolepis polygyna (Wiry Centrolepis)*			
316.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
317.		*Ceratopogonidae sp.*			
318.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
319.		*Cercophonius sulcatus*			
320.		*Cethegus fugax*			
321.	17685	*Chaetanthus aristatus*			
322.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
323.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
324.	18156	*Chamaecytisus palmensis (Tagasaste)*	Y		
325.	1280	*Chamaescilla corymbosa (Blue Squill)*			
326.	11299	*Chamaescilla corymbosa var. corymbosa*			
327.	8788	*Chamaescilla versicolor*			
328.	5498	*Chamelaucium uncinatum (Geraldton Wax)*			
329.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
330.	31	*Cheilanthes austrotenuifolia*			
331.	12818	*Cheilanthes sieberi subsp. sieberi*			
332.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
333.	33939	*Cherax cainii (Marron)*			
334.		*Cherax quinquecarinatus*			
335.		*Chironominae sp.*			
336.	267	*Chloris gayana (Rhodes Grass)*	Y		
337.	17706	*Chordifex sinuosus*			
338.	763	*Chorizandra enodis (Black Bristlerush)*			
339.	8971	*Chorizema cordatum*			
340.	3753	*Chorizema dicksonii (Yellow-eyed Flame Pea)*			
341.	12765	*Chorizema nanum*			
342.	3761	*Chorizema rhombeum*			
343.		*Chroicocephalus novaehollandiae*			
344.	11900	*Chrysanthemoides monilifera subsp. monilifera*	Y		
345.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
346.	25601	*Chrysococcyx lucidus (Shining Bronze Cuckoo)*			
347.	6543	*Cicendia filiformis (Slender Cicendia)*	Y		
348.	7935	*Cichorium intybus (Chicory)*	Y		
349.	24288	*Circus approximans (Swamp Harrier)*			
350.	7937	*Cirsium vulgare (Spear Thistle, Scotch Thistle)*	Y		
351.	48177	*Cladia muelleri*			
352.	28208	*Cladonia cervicornis subsp. verticillata*			
353.		*Clynotis severus*			
354.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
355.	24613	*Colluricincla harmonica subsp. rufiventris (Grey Shrike-thrush)*			
356.	38771	*Coltriciella dependens*			
357.	24399	*Columba livia (Domestic Pigeon)*	Y		
358.	4550	*Comesperma calymega (Blue-spike Milkwort)*			
359.	4551	*Comesperma ciliatum*			
360.	4564	*Comesperma virgatum (Milkwort)*			
361.	1882	*Conospermum stoechadis (Common Smokebush)*			
362.	15611	*Conospermum stoechadis subsp. stoechadis (Common Smokebush)*			
363.	6348	*Conostephium pendulum (Pearl Flower)*			
364.	6349	*Conostephium preissii*			
365.	1418	*Conostylis aculeata (Prickly Conostylis)*			
366.	11826	*Conostylis aculeata subsp. aculeata*			
367.	12109	*Conostylis aculeata subsp. preissii*			
368.	1420	*Conostylis androstemma (Trumpets)*			
369.	1423	*Conostylis aurea (Golden Conostylis)*			
370.	1429	*Conostylis caricina*			
371.	1436	*Conostylis juncea*			
372.	1454	*Conostylis setigera (Bristly Cottonhead)*			
373.	11597	*Conostylis setigera subsp. setigera*			
374.	1455	*Conostylis setosa (White Cottonhead)*			

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375.	7941	*Conyza parva*	Y		
376.		*Conyza sp.*			
377.		*Conyza sp. Mud07*			Y
378.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
379.	24362	*Coracina novaehollandiae subsp. novaehollandiae (Black-faced Cuckoo-shrike)*			
380.		*Corixidae sp.*			
381.		*Cormocephalus aurantiipes*			
382.		*Cormocephalus hartmeyeri*			
383.		*Cortinarius australiensis*			
384.	38776	*Cortinarius phalarus*			
385.	25592	*Corvus coronoides (Australian Raven)*			
386.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
387.	25593	*Corvus orru (Torresian Crow)*			
388.	24419	*Corvus splendens (House Crow)*			
389.	17104	*Corymbia calophylla (Marri)*			
390.	7946	*Cotula cotuloides (Smooth Cotula)*			
391.	24671	*Coturnix pectoralis (Stubble Quail)*			
392.	25701	*Coturnix ypsilophora (Brown Quail)*			
393.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
394.	25595	*Cracticus tibicen (Australian Magpie)*			
395.	25596	*Cracticus torquatus (Grey Butcherbird)*			
396.	13354	*Craspedia variabilis*			
397.	3136	*Crassula alata*	Y		
398.	17701	*Crassula closiana*			
399.	3137	*Crassula colorata (Dense Stonecrop)*			
400.	11563	*Crassula colorata var. colorata*			
401.	3138	*Crassula decumbens (Rufous Stonecrop)*			
402.	20271	*Crassula extrorsa*			
403.	15706	*Crassula natans var. minus*	Y		
404.	3144	*Crassula pedunculatis (Purple Stonecrop)*			
405.	7953	*Crepis foetida (Foetid Hawksbeard)*	Y		
406.	29054	*Crepis foetida subsp. foetida (Stinking Hawksbeard)*	Y		
407.	25398	*Crinia georgiana (Quacking Frog)*			
408.	25399	*Crinia glauerti (Clicking Frog)*			
409.	25400	*Crinia insignifera (Squelching Froglet)*			
410.	35838	*Cristonia biloba subsp. biloba*			
411.		*Crustulina bicruciata*			
412.	4792	*Cryptandra arbutiflora (Waxy Cryptandra)*			
413.	30893	*Cryptoblepharus buchananii*			
414.		*Cryptoerithus melindae*			
415.	24883	*Ctenophorus ornatus (Ornate Crevice-Dragon)*			
416.	25027	*Ctenotus australis*			
417.	25039	*Ctenotus fallens*			
418.	25047	*Ctenotus impar*			
419.	25049	*Ctenotus labillardieri*			
420.	6663	*Cuscuta epithymum (Lesser Dodder, Greater Dodder)*	Y		
421.	51	*Cyathea cooperi*	Y		
422.	768	*Cyathochaeta avenacea*			
423.		*Cyclosa bacilliformis*			Y
424.		*Cyclosa trilobata*			
425.	40661	*Cycnogeton lineare*			
426.	24322	*Cygnus atratus (Black Swan)*			
427.	283	*Cynodon dactylon (Couch)*	Y		
428.	815	*Cyperus tenellus (Tiny Flatsedge)*	Y		
429.		*Cyrtophora parnasia*			
430.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
431.	38781	*Dacryopinax spathularia*			
432.	7420	*Dampiera alata (Winged-stem Dampiera)*			
433.	7454	*Dampiera linearis (Common Dampiera)*			
434.	7462	*Dampiera pedunculata*			
435.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
436.	5508	*Darwinia citriodora (Lemon-scented Darwinia)*			
437.	5531	*Darwinia thymoides*			
438.	18193	*Darwinia thymoides subsp. thymoides*			
439.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
440.	1220	*Dasypogon obliquifolius*			
441.	6218	*Daucus glochidiatus (Australian Carrot)*			
442.	3799	*Daviesia cordata (Bookleaf)*			
443.	3805	*Daviesia decurrens (Prickly Bitter-pea)*			
444.	19747	*Daviesia decurrens subsp. decurrens*			

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445.	3815	*Daviesia horrida (Prickly Bitter-pea)*			
446.	16585	*Daviesia nudiflora subsp. nudiflora*			
447.	3832	*Daviesia physodes*			
448.	3835	*Daviesia preissii*			
449.	3839	*Daviesia rhombifolia*			
450.	3845	*Daviesia triflora*			
451.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
452.		*Demadiana cerula*			
453.	38785	*Descomyces angustisporus*			
454.	17663	*Desmocladus asper*			
455.	17691	*Desmocladus fasciculatus*			
456.	16595	*Desmocladus flexuosus*			
457.	46362	*Desmocladus lateriflorus*			
458.	1259	*Dianella revoluta (Blueberry Lily)*			
459.	11636	*Dianella revoluta var. divaricata*			
460.		*Diaprograpta striola*			
461.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
462.	306	*Dichelachne crinita (Longhair Plumegrass)*			
463.	1287	*Dichopogon capillipes*			
464.	17838	*Dielsia stenostachya*			
465.		*Dingosa serrata*			
466.		*Dinocambala ingens*			
467.	1509	*Dioscorea hastifolia (Warrine, Waram)*			
468.	24939	*Diplodactylus polyophthalmus*			
469.	19649	*Disa bracteata*	Y		
470.	7054	*Dischisma arenarium*	Y		
471.	7055	*Dischisma capitatum (Woolly-headed Dischisma)*	Y		
472.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
473.	12943	*Diuris brumalis*			
474.	10791	*Diuris carinata (Bee Orchid)*			
475.	11049	*Diuris corymbosa*			
476.	1632	*Diuris emarginata (Tall Donkey Orchid)*			
477.	1634	*Diuris laxiflora (Bee Orchid)*			
478.	1635	*Diuris longifolia (Common Donkey Orchid)*			
479.	12939	*Diuris magnifica*			
480.	46859	*Diuris ostrina*			
481.	1638	*Diuris setacea (Bristly Donkey Orchid)*			
482.		*Dolichopodidae sp.*			
483.	1640	*Drakaea glyptodon (King-in-his-carriage)*			
484.	11156	*Drakaea livida*			
485.	24470	*Dromaius novaehollandiae (Emu)*			
486.	3092	*Drosera bulbosa (Red-leaved Sundew)*			
487.	48751	*Drosera drummondii*			
488.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
489.	48747	*Drosera geniculata*			
490.	3097	*Drosera gigantea (Giant Sundew)*			
491.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
492.	3101	*Drosera heterophylla (Swamp Rainbow)*			
493.	48769	*Drosera indumenta*			
494.	3106	*Drosera macrantha (Bridal Rainbow)*			
495.	3109	*Drosera menziesii (Pink Rainbow)*			
496.	3114	*Drosera nitidula (Shining Sundew)*			
497.	13189	*Drosera oreopodion*			
498.	3118	*Drosera pallida (Pale Rainbow)*			
499.	29178	*Drosera porrecta*			
500.	8911	*Drosera rosulata*			
501.		*Drosera sp. "climbing"*			
502.	49090	*Drosera sp. Branched styles (S.C. Coffey 193)*			
503.	13185	*Drosera spilos*			
504.	3131	*Drosera stolonifera (Leafy Sundew)*			
505.	3133	*Drosera subhirtella (Sunny Rainbow)*			
506.		*Dytiscidae sp.*			
507.	25096	*Egernia kingii (King's Skink)*			
508.	25100	*Egernia napoleonis*			
509.		*Egretta novaehollandiae*			
510.	347	*Ehrharta calycina (Perennial Veldt Grass)*	Y		
511.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
512.		*Elanus axillaris*			
513.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
514.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			

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515.	32356	*Entosthodon subnudus*			
516.		*Eolophus roseicapillus*			
517.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
518.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
519.	11756	*Epilobium billardiereanum subsp. cinereum (Variable Willow Herb)*			
520.	6132	*Epilobium ciliatum*	Y		
521.	24567	*Epthianura albifrons (White-fronted Chat)*			
522.	376	*Eragrostis curvula (African Lovegrass)*	Y		
523.	379	*Eragrostis elongata (Clustered Lovegrass)*			
524.	13949	*Eremaea asterocarpa*			
525.	13950	*Eremaea asterocarpa subsp. asterocarpa*			
526.	5541	*Eremaea pauciflora*			
527.	14104	*Eremaea pauciflora var. pauciflora*			
528.	7189	*Eremophila clarkei (Turpentine Bush)*			
529.		*Eremophila sp.*			
530.		*Erigone prominens*			
531.	1646	*Eriochilus dilatatus (White Bunny Orchid)*			
532.	15413	*Eriochilus dilatatus subsp. undulatus*			
533.		*Eriophora biapicata*			
534.	4332	*Erodium botrys (Long Storksbill)*	Y		
535.	4335	*Erodium cygnorum (Blue Heronsbill)*			
536.	15446	*Eryngium pinnatifidum subsp. pinnatifidum*			
537.	5688	*Eucalyptus laeliae (Darling Range Ghost Gum)*			
538.	5690	*Eucalyptus lane-poolei (Salmon White Gum)*			
539.	5708	*Eucalyptus marginata (Jarrah, Djara)*			
540.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
541.	13548	*Eucalyptus marginata subsp. thalassica (Blue-leaved Jarrah)*			
542.	5739	*Eucalyptus patens (Swan River Blackbutt, Dwuda)*			
543.	5763	*Eucalyptus rudis (Flooded Gum, Kulurda)*			
544.	13511	*Eucalyptus rudis subsp. rudis*			
545.	5797	*Eucalyptus wandoo (Wandoo, Wondu)*			
546.	12906	*Eucalyptus wandoo subsp. wandoo*			
547.	3872	*Euchilopsis linearis (Swamp Pea)*			
548.		*Eucyrtops latior*			
549.		*Eukoenenia mirabilis*			Y
550.	13753	*Euphorbia dallachyana*			
551.	29940	*Euphorbia maculata*	Y		
552.	34757	*Euphorbia prostrata*	Y		
553.	4648	*Euphorbia terracina (Geraldton Carnation Weed)*	Y		
554.	3880	*Eutaxia virgata*			
555.	835	*Evandra pauciflora*			
556.	25621	*Falco berigora (Brown Falcon)*			
557.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
558.	25623	*Falco longipennis (Australian Hobby)*			
559.	24476	*Falco subniger (Black Falcon)*			
560.	24041	*Felis catus (Cat)*	Y		
561.	27748	*Flavoparmelia rutidota*			
562.	18392	*Freesia alba x leichtlinii*	Y		
563.	25727	*Fulica atra (Eurasian Coot)*			
564.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
565.	2969	*Fumaria capreolata (Whiteflower Fumitory)*	Y		
566.	32370	*Funaria hygrometrica*			
567.	899	*Gahnia ancistrophylla (Hooked-leaf Saw Sedge)*			
568.	900	*Gahnia aristata*			
569.	7321	*Galium divaricatum*	Y		
570.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
571.	24765	*Gallirallus philippensis subsp. mellori (Buff-banded Rail)*			
572.	434	*Gastridium phleoides (Nitgrass)*	Y		
573.	20475	*Gastrolobium capitatum*			
574.	20473	*Gastrolobium ebracteolatum*			
575.	3910	*Gastrolobium obovatum (Boat-leaved Poison)*			
576.	3924	*Gastrolobium spinosum (Prickly Poison)*			
577.	42314	*Gavicalis virescens (Singing Honeyeater)*			
578.	24959	*Gehyra variegata*			
579.	18143	*Genista monspessulana*	Y		
580.	25404	*Geocrinia leai (Ticking Frog)*			
581.		*Geogarypus taylori*			
582.	4340	*Geranium retrorsum*			
583.	25530	*Gerygone fusca (Western Gerygone)*			
584.	1518	*Gladiolus angustus (Long Tubed Painted Lady)*	Y		

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585.	1520	*Gladiolus caryophyllaceus (Wild Gladiolus)*	Y		
586.	6143	*Glischrocaryon aureum (Common Popflower)*			
587.	47962	*Glyciphila melanops (Tawny-crowned Honeyeater)*			
588.	7991	*Gnephosis drummondii*			
589.		*Gomphidae sp.*			
590.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
591.	3945	*Gompholobium aristatum*			
592.	10909	*Gompholobium confertum*			
593.	3950	*Gompholobium knightianum*			
594.	3951	*Gompholobium marginatum*			
595.	3954	*Gompholobium polymorphum*			
596.	3955	*Gompholobium preissii*			
597.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
598.	16746	*Gonocarpus benthamii subsp. benthamii*			
599.	6149	*Gonocarpus cordiger*			
600.	6160	*Gonocarpus paniculatus*			
601.	6161	*Gonocarpus pithyoides*			
602.	29362	*Goodenia coerulea*			
603.	12551	*Goodenia micrantha*			
604.	7538	*Goodenia pulchella*			
605.	24443	*Grallina cyanoleuca (Magpie-lark)*			
606.	14282	*Gratiola pubescens*			
607.	1964	*Grevillea bipinnatifida (Fuchsia Grevillea)*			
608.	19628	*Grevillea bipinnatifida subsp. bipinnatifida*			
609.	1997	*Grevillea endlicheriana (Spindly Grevillea)*			
610.	2066	*Grevillea pilulifera (Woolly-flowered Grevillea)*			
611.	2080	*Grevillea quercifolia (Oak-leaf Grevillea)*			
612.	14421	*Grevillea synapheae subsp. synapheae*			
613.	2102	*Grevillea tenuiflora (Tassel Grevillea)*			
614.	2122	*Grevillea wilsonii (Native Fuchsia)*			
615.		*Gripopterygidae sp.*			
616.		*Gymnopilus allantopus*			
617.		*Gyrinidae sp.*			
618.	1464	*Haemodorum brevisepalum*			
619.	1465	*Haemodorum discolor*			
620.	1468	*Haemodorum laxum*			
621.	1472	*Haemodorum simplex*			
622.	1474	*Haemodorum sparsiflorum*			
623.	1475	*Haemodorum spicatum (Mardja)*			
624.	438	*Hainardia cylindrica (Common Barbgrass)*	Y		
625.	2128	*Hakea amplexicaulis (Prickly Hakea)*			
626.	2131	*Hakea auriculata*			
627.	2137	*Hakea ceratophylla (Horned Leaf Hakea)*			
628.	2152	*Hakea cyclocarpa (Ramshorn)*			
629.	2166	*Hakea incrassata (Marble Hakea)*			
630.	2175	*Hakea lissocarpha (Honey Bush)*			
631.	2179	*Hakea marginata*			
632.	45333	*Hakea neospathulata*			
633.	2197	*Hakea prostrata (Harsh Hakea)*			
634.	2203	*Hakea ruscifolia (Candle Hakea)*			
635.	2206	*Hakea stenocarpa (Narrow-fruited Hakea)*			
636.	2212	*Hakea sulcata (Furrowed Hakea)*			
637.	2214	*Hakea trifurcata (Two-leaf Hakea)*			
638.	2215	*Hakea undulata (Wavy-leaved Hakea)*			
639.	2216	*Hakea varia (Variable-leaved Hakea)*			
640.	24295	*Haliastur sphenurus (Whistling Kite)*			
641.	25410	*Heleioporus eyrei (Moaning Frog)*			
642.	25412	*Heleioporus psammophilus (Sand Frog)*			
643.	6839	*Hemiandra pungens (Snakebush)*			
644.	25115	*Hemiergis initialis subsp. initialis*			
645.	6856	*Hemigenia incana (Silky Hemigenia)*			
646.	1293	*Hensmania turbinata*			
647.	5108	*Hibbertia acerosa (Needle Leaved Guinea Flower)*			
648.	5109	*Hibbertia amplexicaulis*			
649.	5114	*Hibbertia commutata*			
650.	20051	*Hibbertia diamesogenos*			
651.	5129	*Hibbertia glomerata*			
652.	19778	*Hibbertia glomerata subsp. darlingensis*			
653.	5134	*Hibbertia huegelii*			
654.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			

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655.	45534	*Hibbertia hypericoides subsp. hypericoides*			
656.	5161	*Hibbertia quadricolor*			
657.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
658.	5169	*Hibbertia serrata (Serrate Leaved Guinea Flower)*			
659.	11481	*Hibbertia spicata subsp. spicata*			
660.	48381	*Hibbertia striata*			
661.	5173	*Hibbertia subvaginata*			
662.	5176	*Hibbertia vaginata*			
663.	47965	*Hieraaetus morphnoides (Little Eagle)*			
664.	25734	*Himantopus himantopus (Black-winged Stilt)*			
665.	24491	*Hirundo neoxena (Welcome Swallow)*			
666.		*Hogna crispipes*			
667.		*Holconia westralia*			
668.	445	*Holcus setiger (Annual Fog)*	Y		
669.		*Holoplatys dejongi*			
670.	6222	*Homalosciadium homalocarpum*			
671.	450	*Hordeum marinum*	Y		
672.	3964	*Hovea chorizemifolia (Holly-leaved Hovea)*			
673.	3966	*Hovea pungens (Devil's Pins, Puyenak)*			
674.	3968	*Hovea trisperma (Common Hovea)*			
675.	12859	*Hovea trisperma var. trisperma*			
676.	12741	*Hyalosperma cotula*			
677.	12742	*Hyalosperma demissum*			
678.	5216	*Hybanthus calycinus (Wild Violet)*			
679.	5221	*Hybanthus floribundus*			
680.	12007	*Hybanthus floribundus subsp. floribundus*			
681.		*Hydnoplicata convoluta*			
682.		*Hydrobiosidae sp.*			
683.	6223	*Hydrocotyle alata*			
684.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
685.	6229	*Hydrocotyle diantha*			
686.	6236	*Hydrocotyle pilifera*			
687.		*Hydrophilidae sp.*			
688.		*Hydropsychidae sp.*			
689.		*Hydroptilidae sp.*			
690.	5181	*Hypericum japonicum (Matted St John's Wort)*			
691.	5817	*Hypocalymma angustifolium (White Myrtle, Kudjid)*			
692.	35070	*Hypocalymma angustifolium subsp. Swan Coastal Plain (G.J. Keighery 16777)*			
693.	5825	*Hypocalymma robustum (Swan River Myrtle)*			
694.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
695.	9352	*Hypochaeris radicata (Flat Weed, Cats-ear)*	Y		
696.	1070	*Hypolaena exsulca*			
697.	1071	*Hypolaena fastigiata*			
698.		*Idiommata blackwalli*			
699.	44926	*Ileodictyon gracile*			
700.	48508	*Inocybe brunneidisca*			
701.	40870	*Inocybe rufuloides*	Y		
702.	11	*Isoetes drummondii (Quillwort)*			
703.	910	*Isolepis cernua (Nodding Club-rush)*			
704.	20200	*Isolepis cernua var. setiformis*			
705.	911	*Isolepis congrua*			
706.	912	*Isolepis cyperoides*			
707.	14540	*Isolepis hystrix*	Y		
708.	917	*Isolepis marginata (Coarse Club-rush)*			
709.	919	*Isolepis oldfieldiana*			
710.	924	*Isolepis stellata (Star Club-rush)*			
711.		*Isopeda leishmanni*			
712.	2221	*Isopogon asper*			
713.	2237	*Isopogon sphaerocephalus (Drumstick Isopogon)*			
714.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
715.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
716.	1534	*Ixia polystachya (Variable Ixia)*	Y		
717.	3997	*Jacksonia alata*			
718.	4012	*Jacksonia furcellata (Grey Stinkwood)*			
719.	4018	*Jacksonia lehmannii*			
720.	4029	*Jacksonia sternbergiana (Stinkwood, Kapur)*			
721.	1298	*Johnsonia pubescens (Pipe Lily)*			
722.	19632	*Johnsonia pubescens subsp. pubescens*			
723.	1178	*Juncus bufonius (Toad Rush)*	Y		
724.	1180	*Juncus capitatus (Capitate Rush)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
725.	1184	*Juncus holoschoenus (Jointleaf Rush)*			
726.	1186	*Juncus microcephalus*	Y		
727.	1188	*Juncus pallidus (Pale Rush)*			
728.	1195	*Juncus subsecundus (Finger Rush)*			
729.		*Karaops ellenae*			
730.	4037	*Kennedia coccinea (Coral Vine)*			
731.	4041	*Kennedia microphylla*			
732.	4044	*Kennedia prostrata (Scarlet Runner)*			
733.	1221	*Kingia australis (Kingia, Pulonok)*			
734.	5832	*Kunzea ericifolia (Spearwood, Pondil)*			
735.	15498	*Kunzea glabrescens (Spearwood)*			
736.	5835	*Kunzea micrantha*			
737.	17461	*Kunzea micrantha subsp. micrantha*			
738.	5841	*Kunzea recurva*			
739.	3669	*Labichea punctata (Lance-leaved Cassia)*			
740.		*Laccaria lateritia*			
741.	13562	*Lachenalia aloides*	Y		
742.	19955	*Lachnagrostis plebeia*			
743.	18585	*Lagenophora huegelii*			
744.	14083	*Lambertia multiflora var. darlingensis*			
745.		*Lampona brevipes*			
746.		*Lampona yanchep*			
747.		*Lamponella ainslie*			
748.		*Lamponusa gleneagle*			
749.		*Laperousea blattifera*			
750.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
751.	5033	*Lasiopetalum floribundum (Free Flowering Lasiopetalum)*			
752.		*Latrodectus hasseltii*			
753.	1307	*Laxmannia ramosa (Branching Lily)*			
754.	11911	*Laxmannia ramosa subsp. ramosa*			
755.	11464	*Laxmannia sessiliflora subsp. australis*			
756.	1309	*Laxmannia squarrosa*			
757.	7568	*Lechenaultia biloba (Blue Leschenaultia)*			
758.	7572	*Lechenaultia expansa*			
759.	7574	*Lechenaultia floribunda (Free-flowering Leschenaultia)*			
760.	39038	*Leocarpus fragilis*			
761.	44490	*Leontodon rhagadioloides*	Y		
762.	1075	*Lepidobolus preissianus*			
763.	18074	*Lepidobolus preissianus subsp. preissianus*			
764.		*Lepidosperma aff. coastale (#134)*			Y
765.		*Lepidosperma aff. pubisquameum (#166)*			
766.		*Lepidosperma aff. resinosum*			
767.	925	*Lepidosperma angustatum*			
768.	42741	*Lepidosperma apricola*			
769.	41620	*Lepidosperma asperatum*			
770.	929	*Lepidosperma carphoides (Black Rapier Sedge)*			
771.	930	*Lepidosperma costale*			
772.		*Lepidosperma eastern terete scps (BJK&NG 232)*			
773.	936	*Lepidosperma leptostachyum*			
774.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
775.	940	*Lepidosperma pubisquameum*			
776.		*Lepidosperma pubisquameum "flat form"*			
777.	941	*Lepidosperma resinosum*			
778.	944	*Lepidosperma scabrum*			
779.		*Lepidosperma sp.*			
780.	29141	*Lepidosperma sp. Gosnells (A. Markey 1145)*			
781.	29150	*Lepidosperma sp. Margaret River (B.J. Lepschi 1841)*			
782.		*Lepidosperma sp. Mud3*			Y
783.	945	*Lepidosperma squamatum*			
784.	948	*Lepidosperma tetraquetrum*			
785.	1653	*Leporella fimbriata (Hare Orchid)*			
786.	1077	*Leptocarpus canus (Hoary Twine-rush)*			
787.	1078	*Leptocarpus coangustatus*			
788.	46375	*Leptocarpus decipiens*			
789.	46380	*Leptocarpus kraussii*			
790.		*Leptoceridae sp.*			
791.	2342	*Leptomeria cunninghamii*			
792.	2355	*Leptomeria squarrulosa*			
793.		*Leptophlebiidae sp.*			
794.	5850	*Leptospermum laevigatum (Coast Teatree)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
795.	1085	*Lepyrodia glauca*			
796.	1088	*Lepyrodia macra (Large Scale Rush)*			
797.	1090	*Lepyrodia muirii*			
798.	25131	*Lerista distinguenda*			
799.	25133	*Lerista elegans*			
800.	6360	*Leucopogon australis (Spiked Beard-heath)*			
801.	6367	*Leucopogon capitellatus*			
802.	6374	*Leucopogon conostephioides*			
803.	6400	*Leucopogon gracillimus*			
804.	6436	*Leucopogon propinquus*			
805.	6439	*Leucopogon pulchellus (Beard-heath)*			
806.	28302	*Leucopogon sp. Parkerville (A. Meebold 11654)*			
807.	6445	*Leucopogon squarrosus*			
808.	6454	*Leucopogon verticillatus (Tassel Flower)*			
809.	7676	*Levenhookia pusilla (Midget Stylewort)*			
810.	7677	*Levenhookia stipitata (Common Stylewort)*			
811.	25005	*Lialis burtonis*			
812.		*Libellulidae sp.*			
813.	31280	*Lichenomphalia chromacea*			
814.	31333	*Lichenomphalia umbellifera*			
815.	25661	*Lichmera indistincta (Brown Honeyeater)*			
816.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
817.	4363	*Linum trigynum (French Flax)*	Y		
818.	25388	*Litoria moorei (Motorbike Frog)*			
819.	7407	*Lobelia rhytidosperma (Wrinkled-seeded Lobelia)*			
820.	7408	*Lobelia tenuior (Slender Lobelia)*			
821.	9356	*Logfia gallica*	Y		
822.	476	*Lolium perenne (Perennial Ryegrass)*	Y		
823.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
824.		*Lolium sp.*			
825.		*Lomandra ?caespitosa*			
826.	1222	*Lomandra brittanii*			
827.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
828.	1228	*Lomandra hermaphrodita*			
829.	1229	*Lomandra integra*			
830.	1232	*Lomandra micrantha (Small-flower Mat-rush)*			
831.	1234	*Lomandra nigricans*			
832.	1236	*Lomandra odora (Tiered Matrush)*			
833.	1239	*Lomandra preissii*			
834.	1240	*Lomandra purpurea (Purple Mat Rush)*			
835.	1243	*Lomandra sericea (Silky Mat Rush)*			
836.		*Lomandra sp.*			
837.	1245	*Lomandra spartea*			
838.	1246	*Lomandra suaveolens*			
839.		*Longepi woodman*			
840.		*Longrita insidiosa*			
841.		*Lophoictinia isura*			
842.	4059	*Lotus angustissimus (Narrowleaf Trefoil)*	Y		
843.		*Lotus sp. Mud3*			Y
844.	8564	*Lotus subbiflorus*	Y		
845.	1092	*Loxocarya cinerea*			
846.		*Lycosa ariadnae*			
847.	1097	*Lyginia barbata*			
848.		*Lyginia barbata/imberbis*			
849.	18049	*Lyginia imberbis*			
850.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
851.	36373	*Lysimachia minima*	Y		
852.	6456	*Lysinema ciliatum (Curry Flower)*			
853.	6458	*Lysinema elegans*			
854.	2839	*Macarthuria australis*			
855.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
856.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
857.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
858.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
859.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
860.	25654	*Malurus splendens (Splendid Fairy-wren)*			
861.	24552	*Malurus splendens subsp. splendens (Splendid Fairy-wren)*			
862.	24583	*Manorina flavigula (Yellow-throated Miner)*			
863.		*Maratus pavonis*			
864.	17637	*Marianthus candidus (White Marianthus)*			

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865.	17630	*Marianthus tenuis*			
866.	25758	*Megalurus gramineus (Little Grassbird)*			
867.		*Megapodagrionidae sp.*			
868.	34676	*Meionectes brownii (Swamp Raspwort)*			
869.	37580	*Melaleuca acutifolia*			
870.	36296	*Melaleuca armillaris subsp. armillaris*	Y		
871.	5925	*Melaleuca lateriflora (Gorada)*			
872.	5926	*Melaleuca lateritia (Robin Redbreast Bush)*			
873.	20297	*Melaleuca osullivanii*			
874.	18394	*Melaleuca parviceps*			
875.	5946	*Melaleuca pauciflora*			
876.	5952	*Melaleuca preissiana (Moonah)*			
877.	5958	*Melaleuca radula (Graceful Honeymyrtle)*			
878.	5959	*Melaleuca rhaphiophylla (Swamp Paperbark)*			
879.	5964	*Melaleuca seriata*			
880.	5978	*Melaleuca teretifolia (Banbar)*			
881.	5980	*Melaleuca thymoides*			
882.	5984	*Melaleuca uncinata (Broom Bush, Kwidjard)*			
883.	5987	*Melaleuca viminea (Mohan)*			
884.	13280	*Melaleuca viminea subsp. viminea*			
885.	47997	*Melanodryas cucullata (Hooded Robin)*			
886.	14985	*Melinis repens*	Y		
887.	24586	*Melithreptus brevirostris subsp. leucogenys (Brown-headed Honeyeater)*			
888.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
889.	25184	*Menetia greyii*			
890.	6885	*Mentha suaveolens (Apple Mint)*	Y		
891.	24598	*Merops ornatus (Rainbow Bee-eater)*			
892.	955	*Mesomelaena pseudostygia*			
893.	956	*Mesomelaena stygia*			
894.	11473	*Mesomelaena stygia subsp. stygia*			
895.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
896.		*Microcarbo melanoleucos*			
897.		*Microctenonyx subitaneus*			
898.	25693	*Microeca fascinans (Jacky Winter)*			
899.	485	*Microlaena stipoides (Weeping Grass)*			
900.	1658	*Microtis atrata (Swamp Mignonette Orchid)*			
901.	10954	*Microtis media (Tall Mignonette Orchid)*			
902.	15419	*Microtis media subsp. media*			
903.	8105	*Millotia myosotidifolia*			
904.	14344	*Millotia tenuifolia var. tenuifolia (Soft Millotia)*			
905.	4090	*Mirbelia dilatata (Holly-leaved Mirbelia)*			
906.	4100	*Mirbelia spinosa*			
907.	486	*Miscanthus sinensis (Eulalia)*	Y		
908.	7085	*Misopates orontium (Lesser Snapdragon)*	Y		
909.		*Missulena granulosa*			
910.		*Mituliodon tarantulinus*			
911.		*Miturga agelenina*			Y
912.		*Miturga catograpta*			
913.		*Molycria quadricauda*			
914.	7410	*Monopsis debilis*	Y		
915.	37440	*Monopsis debilis var. depressa*	Y		
916.	4662	*Monotaxis grandiflora (Diamond of the Desert)*			
917.	19585	*Monotaxis grandiflora var. grandiflora*			
918.	4666	*Monotaxis occidentalis*			
919.	19179	*Moraea flaccida (One-leaf Cape Tulip)*	Y		
920.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
921.	25192	*Morethia obscura*			
922.	24223	*Mus musculus (House Mouse)*	Y		
923.	24042	*Mustela putorius (European Polecat, Ferret)*	Y		
924.		*Muziris carinatus*			
925.		*Myandra bicincta*			
926.	25610	*Myiagra inquieta (Restless Flycatcher)*			
927.		*Nannoperca vittata*			
928.	25426	*Neobatrachus pelobatoides (Humming Frog)*			
929.	24738	*Neophema elegans (Elegant Parrot)*			
930.		*Neostorena vituperata*			Y
931.		*Nephila edulis*			
932.	492	*Neurachne alopecuroidea (Foxtail Mulga Grass)*			
933.	25252	*Notechis scutatus (Tiger Snake)*			
934.		*Notonectidae sp.*			

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935.		*Novakiella trituberculosa*			
936.	2401	*Nuytsia floribunda (Christmas Tree, Mudja)*			
937.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
938.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
939.	24195	*Nyctophilus gouldi (Gould's Long-eared Bat)*			
940.	41424	*Nyctophilus major (Greater Long-eared Bat)*			
941.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
942.		*Oecobius putus*			
943.	6137	*Oenothera affinis (Longflower Evening Primrose)*	Y		
944.	6140	*Oenothera mollissima*	Y		
945.	14292	*Oenothera stricta subsp. stricta*	Y		
946.	2365	*Olax benthamiana*			
947.	8133	*Olearia elaeophila*			
948.	32716	*Olearia lehmanniana*			
949.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
950.		*Oligochaeta sp.*			
951.		*Ommatoiulus moreletii*			
952.	18254	*Opercularia apiciflora*			
953.	7346	*Opercularia echinocephala (Bristly Headed Stink Weed)*			
954.	18255	*Opercularia vaginata (Dog Weed)*			
955.	4113	*Ornithopus compressus (Yellow Serradella)*	Y		
956.	4114	*Ornithopus pinnatus (Slender Serradella)*	Y		
957.		*Orthocladiinae sp.*			
958.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
959.		*Ostearius melanopygius*			
960.	4352	*Oxalis glabra*	Y		
961.	4355	*Oxalis perennans*			
962.	4356	*Oxalis pes-caprae (Soursob)*	Y		
963.		*Oxyopes gracilipes*			
964.		*Oxyopes rubicundus*			
965.		*Ozarchaea westraliensis*			
966.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
967.	27892	*Pannoparmelia wilsonii*			
968.		*Paralampona marangaroo*			
969.		*Paraplatoides nigrum*			
970.	3618	*Paraserianthes lophantha (Albizia)*			
971.	17114	*Paraserianthes lophantha subsp. lophantha*			
972.		*Parastacidae sp.*			
973.	25253	*Parasuta gouldii*			
974.	25255	*Parasuta nigriceps*			
975.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
976.	24625	*Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*			
977.	24626	*Pardalotus punctatus subsp. xanthopyge (Yellow-rumped Pardalote)*			
978.	25682	*Pardalotus striatus (Striated Pardalote)*			
979.	24630	*Pardalotus striatus subsp. westraliensis (Striated Pardalote)*			
980.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
981.	1542	*Patersonia babianoides*			
982.	1546	*Patersonia juncea (Rush Leaved Patersonia)*			
983.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
984.	30476	*Patersonia occidentalis var. latifolia*			
985.	30472	*Patersonia occidentalis var. occidentalis*			
986.	1551	*Patersonia pygmaea (Pygmy Patersonia)*			
987.	43760	*Pauridia occidentalis*			
988.	24674	*Pavo cristatus (Common Peafowl, Indian Peafowl)*	Y		
989.		*Pediana occidentalis*			
990.	4346	*Pelargonium littorale*			
991.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
992.		*Penemideopsis pusilla*			Y
993.	40424	*Pentameris airoides subsp. airoides*	Y		
994.	6245	*Pentapeltis peltigera*			
995.		*Pentasteron securifer*			
996.	6006	*Pericalymma ellipticum (Swamp Teatree)*			
997.	16477	*Pericalymma ellipticum var. ellipticum*			
998.	16478	*Pericalymma ellipticum var. floridum*			
999.	15501	*Pericalymma spongiocaule*			
1000.	2255	*Persoonia angustiflora*			
1001.	2273	*Persoonia saccata (Snottygobble)*			
1002.	27947	*Pertusaria gibberosa*			
1003.	48060	*Petrochelidon ariel (Fairy Martin)*			
1004.	48061	*Petrochelidon nigricans (Tree Martin)*			

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1005.	48066	*Petroica boodang (Scarlet Robin)*			
1006.	24659	*Petroica goodenovii (Red-capped Robin)*			
1007.	20391	*Petrophile juncifolia*			
1008.	2299	*Petrophile linearis (Pixie Mops)*			
1009.	2301	*Petrophile macrostachya*			
1010.	2308	*Petrophile seminuda*			
1011.	2311	*Petrophile squamata*			
1012.	2312	*Petrophile striata*			
1013.	25697	*Phalacrocorax carbo (Great Cormorant)*			
1014.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
1015.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
1016.	24409	*Phaps chalcoptera (Common Bronzewing)*			
1017.	25587	*Phaps elegans (Brush Bronzewing)*			
1018.		*Phenasteron longiconductor*			
1019.	18529	*Philotheca spicata (Pepper and Salt)*			
1020.	1172	*Philydrella drummondii*			
1021.	1173	*Philydrella pygmaea (Butterfly Flowers)*			
1022.	14306	*Philydrella pygmaea subsp. pygmaea*			
1023.		*Phlebia subceracea*			
1024.	1478	*Phlebocarya ciliata*			
1025.	1479	*Phlebocarya filifolia*			
1026.	554	*Phleum pratense (Timothy)*	Y		
1027.		*Pholiota communis*			
1028.		*Phryganoporus nigrinus*			
1029.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
1030.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
1031.	16825	*Phyllangium divergens*			
1032.	16177	*Phyllangium paradoxum*			
1033.	4675	*Phyllanthus calycinus (False Boronia)*			
1034.	13405	*Phyllopodium cordatum*	Y		
1035.	4141	*Phyllota gracilis*			
1036.		*Phytophthora cinnamomi*			
1037.	5232	*Pimelea argentea (Silvery Leaved Pimelea)*			
1038.	11404	*Pimelea imbricata var. major*			
1039.	11402	*Pimelea imbricata var. piligera*			
1040.	5266	*Pimelea suaveolens (Scented Banjine)*			
1041.	12041	*Pimelea suaveolens subsp. suaveolens*			
1042.	5269	*Pimelea sylvestris*			
1043.		*Pinkfloydia harveii*			
1044.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
1045.		*Platorish gelorup*			
1046.	25720	*Platycercus icterotis (Western Rosella)*			
1047.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
1048.	24747	*Platycercus spurius (Red-capped Parrot)*			
1049.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
1050.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
1051.	38825	*Pluteus pauperculus*			
1052.	571	*Poa annua (Winter Grass)*	Y		
1053.	573	*Poa drummondiana (Knotted Poa)*			
1054.	577	*Poa poiformis (Coastal Poa)*			
1055.	25703	*Podargus strigoides (Tawny Frogmouth)*			
1056.	25704	*Podiceps cristatus (Great Crested Grebe)*			
1057.	8175	*Podolepis gracilis (Slender Podolepis)*			
1058.		*Podotheca ?gnaphalioides*			
1059.	8183	*Podotheca chrysantha (Yellow Podotheca)*			
1060.	8184	*Podotheca gnaphalioides (Golden Long-heads)*			
1061.		*Poecilipta smaragdinea*			
1062.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
1063.	8188	*Pogonolepis stricta*			
1064.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
1065.	2419	*Polygonum aviculare (Wireweed)*	Y		
1066.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
1067.	583	*Polypogon tenellus*			
1068.		*Polypompholyx tenella scps*			
1069.	25722	*Polytelis anthopeplus (Regent Parrot)*			
1070.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
1071.	4691	*Poranthera microphylla (Small Poranthera)*			
1072.		*Poranthera microphylla/moorokatta*			
1073.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
1074.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1075.	24771	*Porzana tabuensis (Spotless Crake)*			
1076.	111	*Potamogeton ochreatus (Blunt Pondweed)*			
1077.	1669	*Prasophyllum cyphochilum (Pouched Leek Orchid)*			
1078.	1670	*Prasophyllum drummondii (Swamp Leek Orchid)*			
1079.	1672	*Prasophyllum fimbria (Fringed Leek Orchid)*			
1080.	1676	*Prasophyllum hians (Yawning Leek Orchid)*			
1081.	1680	*Prasophyllum parvifolium (Autumn Leek Orchid)*			
1082.		*Prionosternum nitidiceps*			
1083.		*Prionosternum scutatum*			
1084.		*Pseudolampona jarrahdale*			
1085.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
1086.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
1087.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
1088.	13255	*Pterochaeta paniculata*			
1089.	24702	*Pterodroma brevirostris (Kerguelen Petrel)*			
1090.		*Pterostylis aff. nana*			
1091.	48675	*Pterostylis atrosanguinea*			
1092.	1686	*Pterostylis barbata (Bird Orchid)*			
1093.	1693	*Pterostylis recurva (Jug Orchid)*			
1094.	12217	*Pterostylis sanguinea*			
1095.	1698	*Pterostylis vittata (Banded Greenhood)*			
1096.	2742	*Ptilotus manglesii (Pom Poms, Mulamula)*			
1097.	2751	*Ptilotus polystachyus (Prince of Wales Feather)*			
1098.	4181	*Pultenaea reticulata*			
1099.		*Purpureicephalus spurius*			
1100.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
1101.	8195	*Quinetia urvillei*			
1102.	28224	*Ramalina inflata subsp. australis*			
1103.		*Ramaria lorithamnus*			
1104.	2938	*Ranunculus trilobus (Buttercup)*	Y		
1105.	24245	*Rattus rattus (Black Rat)*	Y		
1106.		*Raveniella cirrata*			
1107.		*Raveniella peckorum*			
1108.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
1109.	6012	*Regelia ciliata*			
1110.	48096	*Rhipidura albiscapa (Grey Fantail)*			
1111.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
1112.	24454	*Rhipidura leucophrys subsp. leucophrys (Willie Wagtail)*			
1113.	13300	*Rhodanthe citrina*			
1114.	13234	*Rhodanthe manglesii*			
1115.		*Richardsonianidae sp.*			
1116.		*Rickenella fibula*			
1117.	1556	*Romulea rosea (Guildford Grass)*	Y		
1118.	10931	*Rosa chinensis x moschata*	Y		
1119.	3191	*Rubus ulmifolius (Blackberry)*	Y		
1120.	2429	*Rumex acetosella (Sorrel)*	Y		
1121.	40431	*Rytidosperma acerosum*			
1122.	40425	*Rytidosperma caespitosum*			
1123.	40426	*Rytidosperma occidentale*			
1124.	40430	*Rytidosperma pilosum*			
1125.	40427	*Rytidosperma setaceum*			
1126.		*Sandalodes scopifer*			
1127.	7602	*Scaevola calliptera*			
1128.	7613	*Scaevola glandulifera (Viscid Hand-flower)*			
1129.	7619	*Scaevola lanceolata (Long-leaved Scaevola)*			
1130.	7635	*Scaevola pilosa (Hairy Fan-flower)*			
1131.	13182	*Scaevola repens var. repens*			
1132.	17055	*Schinus molle*	Y		
1133.	6263	*Schoenolaena juncea*			
1134.		*Schoenus aff. brevisetis (Mud2, #135)*			
1135.	975	*Schoenus bifidus*			
1136.	978	*Schoenus brevisetis*			
1137.	979	*Schoenus caespititius*			
1138.	982	*Schoenus clandestinus*			
1139.	984	*Schoenus curvifolius*			
1140.	986	*Schoenus efoliatus*			
1141.	991	*Schoenus grammatophyllus*			
1142.	1002	*Schoenus nanus (Tiny Bog Rush)*			
1143.	1006	*Schoenus odontocarpus*			
1144.	17614	*Schoenus plumosus*			

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1145.	1011	*Schoenus rigens*			
1146.	1013	*Schoenus sculptus (Gimlet Bog-rush)*			
1147.		*Schoenus sp. aff. breviculmis sthcst*			Y
1148.	1016	*Schoenus subbarbatus (Bearded Bog-rush)*			
1149.	1017	*Schoenus subbulbosus*			
1150.	1019	*Schoenus subflavus (Yellow Bog-rush)*			
1151.	1020	*Schoenus sublateralis*			
1152.	1023	*Schoenus tenellus*			
1153.	1026	*Schoenus unispiculatus*			
1154.	6033	*Scholtzia involucrata (Spiked Scholtzia)*			
1155.		*Scolopendra laeta*			
1156.	6	*Selaginella gracillima (Tiny Clubmoss)*			
1157.	20663	*Senecio multicaulis subsp. multicaulis*			
1158.	25884	*Senecio pinnatifolius var. latilobus*			
1159.	8217	*Senecio quadridentatus*			
1160.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
1161.	11880	*Setaria pumila subsp. pumila*	Y		
1162.	613	*Setaria verticillata (Whorled Pigeon Grass)*	Y		
1163.	2909	*Silene gallica (French Catchfly)*	Y		
1164.	8224	*Siloxerus filifolius*			
1165.	8225	*Siloxerus humifusus (Procumbent Siloxerus)*			
1166.	14583	*Siloxerus multiflorus*			
1167.		*Simuliidae sp.*			
1168.	30948	*Smicrornis brevirostris (Weebill)*			
1169.	24108	*Sminthopsis crassicaudata (Fat-tailed Dunnart)*			
1170.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
1171.	7020	*Solanum linnaeanum (Apple of Sodom)*	Y		
1172.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
1173.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
1174.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
1175.		*Sondra aurea*			
1176.		*Sondra tristicula*			
1177.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
1178.	1558	*Sparaxis bulbifera*	Y		
1179.	4207	*Sphaerolobium medium*			
1180.	4211	*Sphaerolobium vimineum (Leafless Globe Pea)*			
1181.	4716	*Stachystemon vermicularis*			
1182.	4733	*Stackhousia monogyna*			
1183.	9070	*Stackhousia pubescens (Downy Stackhousia)*			
1184.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
1185.	2918	*Stellaria media (Chickweed)*	Y		
1186.	19403	*Stenopetalum gracile*			
1187.	2316	*Stirlingia latifolia (Blueboy)*			
1188.		*Storena formosa*			
1189.		*Storosa tetrica*			
1190.	25597	*Strepera versicolor (Grey Currawong)*			
1191.	25589	*Streptopelia chinensis (Spotted Turtle-Dove)*	Y		
1192.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
1193.		*Stylidium aff. androsaceum*			
1194.	7681	*Stylidium affine (Queen Triggerplant)*			
1195.	7684	*Stylidium amoenum (Lovely Triggerplant)*			
1196.	30278	*Stylidium androsaceum*			
1197.	25831	*Stylidium araeophyllum (Stilt Walker)*			
1198.		*Stylidium araeophyllum/neurophyllum*			
1199.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
1200.	7694	*Stylidium bulbiferum (Circus Triggerplant)*			
1201.	7696	*Stylidium calcaratum (Book Triggerplant)*			
1202.	7699	*Stylidium carnosum (Fleshy-leaved Triggerplant)*			
1203.	7702	*Stylidium ciliatum (Golden Triggerplant)*			
1204.	7712	*Stylidium despectum (Dwarf Triggerplant)*			
1205.	7713	*Stylidium dichotomum (Pins-and-needles)*			
1206.	7716	*Stylidium diuroides (Donkey Triggerplant)*			
1207.	7717	*Stylidium divaricatum (Daddy-long-legs)*			
1208.	7718	*Stylidium diversifolium (Touch-me-not)*			
1209.	7719	*Stylidium ecorne (Foot Triggerplant)*			
1210.	7736	*Stylidium hispidum (White Butterfly Triggerplant)*			
1211.	7742	*Stylidium inundatum (Hundreds and Thousands)*			
1212.	7749	*Stylidium leptophyllum (Needle-leaved Triggerplant)*			
1213.	7752	*Stylidium lineatum (Sunny Triggerplant)*			
1214.	25829	*Stylidium neurophyllum (Coastal Plain Triggerplant)*			

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1215.	7768	*Stylidium obtusatum (Pinafore Triggerplant)*			
1216.	7773	*Stylidium petiolare (Horn Triggerplant)*			
1217.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			
1218.	7782	*Stylidium pulchellum (Thumbelina Triggerplant)*			
1219.	33106	*Stylidium recurvum*			
1220.	7785	*Stylidium repens (Matted Triggerplant)*			
1221.		*Stylidium roseo-alatum*			
1222.	7790	*Stylidium roseoalatum (Pink-wing Triggerplant)*			
1223.	7798	*Stylidium schoenoides (Cow Kicks)*			
1224.		*Stylidium sp.*			
1225.	45594	*Stylidium tenue subsp. majusculum (Showy Fountain Triggerplant)*			
1226.	23511	*Stylidium thesioides (Delicate Triggerplant)*			
1227.	7806	*Stylidium utricularioides (Pink Fan Triggerplant)*			
1228.		*Stylopauropoides wungongensis*			Y
1229.	1260	*Stypandra glauca (Blind Grass)*			
1230.	6476	*Styphelia tenuiflora (Common Pinheath)*			
1231.		*Supunna funerea*			
1232.		*Supunna picta*			
1233.	24259	*Sus scrofa (Pig)*	Y		
1234.	25902	*Symphyotrichum squamatum (Bushy Starwort)*	Y		
1235.		*Symphytognatha picta*			
1236.	2321	*Synaphea acutiloba (Granite Synaphea)*			
1237.	2323	*Synaphea gracillima*			
1238.	2324	*Synaphea petiolaris (Synaphea)*			
1239.	16864	*Synaphea petiolaris subsp. petiolaris*			
1240.	2325	*Synaphea pinnata (Helena Synaphea)*			
1241.	29186	*Synaphea sp. Udumung (A.S. George 17058)*			
1242.		*Synothele durokoppin*			
1243.		*Synothele longbottomi*			
1244.		*Synothele michaelseni*			
1245.	32439	*Syntrichia papillosa*			
1246.		*Tabanidae sp.*			
1247.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
1248.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
1249.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
1250.	30870	*Taeniopygia guttata (Zebra Finch)*			
1251.	20024	*Tagetes erecta (Marigold)*	Y		
1252.		*Tanypodinae sp.*			
1253.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			
1254.		*Tasmanicosa leuckartii*			
1255.	20135	*Taxandria linearifolia*			
1256.	1034	*Tetraria capillaris (Hair Sedge)*			
1257.	1036	*Tetraria octandra*			
1258.	667	*Tetrarrhena laevis (Forest Ricegrass)*			
1259.	4535	*Tetratheca hirsuta (Black Eyed Susan)*			
1260.	48342	*Tetratheca hirsuta subsp. hirsuta*			
1261.	48341	*Tetratheca hirsuta subsp. viminea*			
1262.	4537	*Tetratheca nuda*			
1263.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
1264.	1702	*Thelymitra campanulata (Shirt Orchid)*			
1265.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
1266.	11053	*Thelymitra macrophylla*			
1267.	673	*Themeda triandra*			
1268.	5080	*Thomasia foliosa*			
1269.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
1270.	1318	*Thysanotus arbuscula*			
1271.	1319	*Thysanotus arenarius*			
1272.	1328	*Thysanotus dichotomus (Branching Fringe Lily)*			
1273.	1330	*Thysanotus fastigiatus*			
1274.	1338	*Thysanotus manglesianus (Fringed Lily)*			
1275.		*Thysanotus manglesianus/patersonii complex*			
1276.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
1277.	1343	*Thysanotus patersonii*			
1278.	46055	*Thysanotus sp. Coastal plain (N.H. Brittan 66/63)*			
1279.	1351	*Thysanotus sparteus*			
1280.	1354	*Thysanotus tenellus*			
1281.	1357	*Thysanotus thyrsoideus*			
1282.	1358	*Thysanotus triandrus*			
1283.	25203	*Tiliqua occipitalis (Western Bluetongue)*			

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1284.	25519	*Tiliqua rugosa*			
1285.		*Tinytrema yarra*			
1286.		*Tipulidae sp.*			
1287.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
1288.	8248	*Tolpis barbata (Yellow Hawkweed)*	Y		
1289.		*Trachycosmus sculptilis*			
1290.	19041	*Trachymene coerulea subsp. coerulea*			
1291.	6280	*Trachymene pilosa (Native Parsnip)*			
1292.		*Trachytrema castaneum*			
1293.	38845	*Trechispora farinacea*			
1294.	1481	*Tribonanthes australis (Southern Tiurndin)*			
1295.	1482	*Tribonanthes brachypetala (Nodding Tiurndin)*			
1296.	1483	*Tribonanthes longipetala (Branching Tiurndin)*			
1297.	1485	*Tribonanthes violacea (Violet Tiurndin)*			
1298.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
1299.	8251	*Trichocline spathulata (Native Gerbera)*			
1300.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
1301.	25521	*Trichosurus vulpecula (Common Brushtail Possum)*			
1302.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
1303.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
1304.	1362	*Tricoryne humilis*			
1305.	1363	*Tricoryne tenella*			
1306.	1038	*Tricostularia neesii*			
1307.	4289	*Trifolium angustifolium (Narrowleaf Clover)*	Y		
1308.	4291	*Trifolium arvense (Hare's Foot Clover)*	Y		
1309.	4292	*Trifolium campestre (Hop Clover)*	Y		
1310.	17763	*Trifolium campestre var. campestre (Hop Clover)*	Y		
1311.	4293	*Trifolium cernuum (Drooping Flower Clover)*	Y		
1312.	4295	*Trifolium dubium (Suckling Clover)*	Y		
1313.	17541	*Trifolium incarnatum var. incarnatum*	Y		
1314.	4313	*Trifolium subterraneum (Subterranean Clover)*	Y		
1315.	18587	*Triglochin nana*			
1316.	4737	*Tripterococcus brunonis (Winged Stackhousia)*			
1317.	1139	*Trithuria bibracteata*			
1318.	1141	*Trithuria submersa*			
1319.	1561	*Tritonia crocata*	Y		
1320.	13479	*Trymalium ledifolium var. rosmarinifolium*			
1321.	33418	*Trymalium odoratissimum subsp. odoratissimum*			
1322.	39103	*Tubifera ferruginosa*			
1323.	48147	*Turnix varius (Painted Button-quail)*			
1324.	24851	*Turnix velox (Little Button-quail)*			
1325.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
1326.	24983	*Underwoodisaurus milii (Barking Gecko)*			
1327.		*Urodacus novaehollandiae*			
1328.		*Urodacus planimanus*			
1329.		*Urodacus woodwardii*			
1330.	8255	*Ursinia anthemoides (Ursinia)*	Y		
1331.	38388	*Ursinia anthemoides subsp. anthemoides*	Y		
1332.	28227	*Usnea scabrida subsp. scabrida*			
1333.	7153	*Utricularia tenella*			
1334.	7157	*Utricularia violacea (Violet Bladderwort)*			
1335.	24386	*Vanellus tricolor (Banded Lapwing)*			
1336.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
1337.		*Veliidae sp.*			
1338.	7665	*Velleia trinervis*			
1339.	8257	*Vellereophyton dealbatum (White Cudweed)*	Y		
1340.		*Venator immansueta*			
1341.	7107	*Verbascum virgatum (Twiggy Mullein)*	Y		
1342.	6070	*Verticordia acerosa*			
1343.	15431	*Verticordia acerosa var. acerosa*			
1344.	12388	*Verticordia acerosa var. preissii*			
1345.	6076	*Verticordia densiflora (Compacted Featherflower)*			
1346.	15432	*Verticordia densiflora var. densiflora*			
1347.	6088	*Verticordia huegelii (Variegated Featherflower)*			
1348.	15433	*Verticordia huegelii var. huegelii*			
1349.	12430	*Verticordia huegelii var. stylosa*			
1350.	6107	*Verticordia pennigera*			
1351.	6110	*Verticordia plumosa (Plumed Featherflower)*			
1352.	12449	*Verticordia plumosa var. brachyphylla*			
1353.	15618	*Verticordia plumosa var. plumosa*			

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1354.	24206	*Vespadelus regulus (Southern Forest Bat)*			
1355.	4320	*Vicia hirsuta (Hairy Vetch)*	Y		
1356.	12070	*Vicia sativa subsp. sativa*	Y		
1357.	4325	*Viminaria juncea (Swishbush, Koweda)*			
1358.	24040	*Vulpes vulpes (Red Fox)*	Y		
1359.	722	*Vulpia bromoides (Squirrel Tail Fescue)*	Y		
1360.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
1361.	33101	*Vulpia myuros forma myuros*	Y		
1362.	7384	*Wahlenbergia capensis (Cape Bluebell)*	Y		
1363.	7386	*Wahlenbergia gracilenta (Annual Bluebell)*			
1364.	7389	*Wahlenbergia preissii*			
1365.	8282	*Waitzia suaveolens (Fragrant Waitzia)*			
1366.	17910	*Washingtonia filifera*	Y		
1367.	13103	*Watsonia borbonica*	Y		
1368.	1566	*Watsonia marginata*	Y		
1369.	1567	*Watsonia meriana (Bulbil Watsonia)*	Y		
1370.	18108	*Watsonia meriana var. bulbillifera*	Y		
1371.	18118	*Watsonia meriana var. meriana*	Y		
1372.		*Watsonia sp. Mud09*			Y
1373.	12072	*Wurmbea dioica subsp. alba*			
1374.	1253	*Xanthorrhoea gracilis (Graceful Grass Tree, Mimidi)*			
1375.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
1376.		*Xanthorrhoea sp.*			
1377.		*Xanthosia ?huegelii*			Y
1378.	6284	*Xanthosia candida*			
1379.	6285	*Xanthosia ciliata*			
1380.	6289	*Xanthosia huegelii*			
1381.	2331	*Xylomelum occidentale (Woody Pear, Djandin)*			
1382.	15819	*Xyris atrovirida*			
1383.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		
1384.		*Zebraplatys fractivittata*			
1385.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

APPENDIX B - EPBC PROTECTED MATTERS SEARCH REPORT

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 21-Mar-2022

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	28
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	3
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	4
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	18
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Forrestdale and thomsons lakes	Within 10km of Ramsar site	In feature area
Peel-yalgorup system	30 - 40km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In feature area
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area	In feature area
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area	In feature area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat may occur within area	In feature area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area	In feature area
Anthocercis gracilis Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area	In feature area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In feature area
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat likely to occur within area	In feature area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area	In feature area
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat may occur within area	In feature area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Synaphea sp. Fairbridge Farm (D. Papenfus 696)			
Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Synaphea sp. Pinjarra Plain (A.S. George 17182)			
[86878]	Endangered	Species or species habitat known to occur within area	In feature area
Synaphea sp. Serpentine (G.R. Brand 103)			
[86879]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Tetraria australiensis			
Southern Tetraria [10137]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thelymitra stellata			
Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51517]	WA	In feature area
Commonwealth Land - [51380]	WA	In feature area
Commonwealth Land - [50876]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Cardup	Nature Reserve	WA	In feature area
Unnamed WA46818	Nature Reserve	WA	In buffer area only
Unnamed WA51963	Conservation Park	WA	In buffer area only
Watkins Road	Nature Reserve	WA	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
South West WA RFA	Western Australia	In buffer area only

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Byford Rail Extension, Byford, WA	2020/8764	Controlled Action	Post-Approval	In buffer area only
Tonkin Highway Extension ??? Thomas Road to South Western Highway	2019/8608	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Abernethy Road upgrade (Kardan, Tourmaline & Soldiers) Byford, WA	2015/7441	Not Controlled Action	Completed	In buffer area only
BaptistCare Byford Aged Care Facility	2021/9111	Not Controlled Action	Completed	In feature area
Bristile Holdings Pty Ltd, Cardup Brickworks, South of Byford	2020/8834	Not Controlled Action	Completed	In feature area
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In buffer area only
Gold Fusion Pty Ltd /Residential development/South Western Highway 40km southeast of Perth /WA/Develop approximately 473ha of land for residential and commercial development	2014/7185	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Residential Development, Lots 3, 5 and 900 Taylor Rd Mundijong, WA	2019/8457	Not Controlled Action	Completed	In feature area
Residential development at Lot 54 Cockram Street and Lot 119 Sparkman Road, Mundijong	2020/8618	Not Controlled Action	Completed	In buffer area only
Residential development at Taylor Road and Adams Street, Mundijong, WA	2020/8780	Not Controlled Action	Completed	In buffer area only
Residential Development Various Lots Doley Road, Orton Road and Lawrence Way, Beenyup Grove Byford, Western Australia	2020/8779	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Undertake a Controlled Fuel Reduction Burn	2008/4262	Not Controlled Action	Completed	In feature area
Urban development of Lots 9049 and 9063, The Glades, Byford, WA	2015/7607	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Subdivision on Abernethy Road, Byford	2009/4767	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Residential Development Doley Road, Orton Road and Lawrence Way	2020/8679	Referral Decision	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX C - FLORA SPECIES BY VEGETATION UNIT

*denotes introduced (weed) species

Family	N/I	Species	Veg Unit						
			BsXp	CcXp	CcXpKa	EwTo	Rehab	Er(P)	Cc(P)
Amaranthaceae		*Ptilotus manglesii*			+				
Apiaceae		*Pentapeltis peltigera*		+					
Apiaceae		*Xanthosia atkinsoniana*		+					
Asparagaceae		*Laxmannia squarrosa*	+	+	+	+			
Asparagaceae		*Lomandra drummondii*		+					
Asparagaceae		*Lomandra hermaphrodita*	+	+		+			
Asparagaceae		*Lomandra preissii*	+	+	+				
Asparagaceae		*Lomandra sonderi*		+	+	+			
Asparagaceae		*Lomandra* sp.				+			
Asparagaceae		*Thysanotus gracilis*			+				
Asparagaceae		*Thysanotus patersonii*			+				
Asteraceae		*Trichocline spathulata*		+					
Asteraceae		*Ursinia anthemoides*		+	+	+			
Casuarinaceae		*Allocasuarina humilis*				+			
Colchicaceae		*Burchardia congesta*	+	+		+			
Cyperaceae		*Cyathochaeta avenacea*		+	+	+			
Cyperaceae		*Mesomelaena tetragona*		+		+			
Cyperaceae		*Morelotia octandra*	+	+	+	+			
Dasypogonaceae		*Kingia australis*		+	+	+			
Dilleniaceae		*Hibbertia hypericoides*		+		+			
Droseraceae		*Drosera erythrorhiza*	+	+					
Droseraceae		*Drosera macrantha*	+	+	+	+			
Fabaceae		*Acacia lateriticola*	+	+	+	+			
Fabaceae		*Acacia pulchella*				+	+		
Fabaceae		*Acacia saligna*					+		
Fabaceae	*	*Chamaecytisus palmensis*		+					
Fabaceae		*Chorizema dicksonii*				+			
Fabaceae		*Daviesia decipiens*		+					
Fabaceae		*Daviesia decurrens*	+						
Fabaceae		*Daviesia physodes*		+					
Fabaceae		*Gompholobium marginatum*	+	+	+	+			
Fabaceae		*Gompholobium tomentosum*	+				+		
Fabaceae		*Sphaerolobium medium*		+					
Fabaceae	*	*Trifolium* sp.		+		+		+	
Goodeniaceae		*Dampiera decurrens*		+					
Goodeniaceae		*Dampiera linearis*	+						
Goodeniaceae		*Lechenaultia biloba*	+	+	+	+	+		
Haemodoraceae		*Anigozanthos manglesii*	+	+	+		+		
Haemodoraceae		*Conostylis aculeata*			+				
Haemodoraceae		*Conostylis setigera*	+	+	+				
Haemodoraceae		*Haemodorum laxum*	+			+			
Haemodoraceae		*Haemodorum* sp.				+			
Hemerocallidaceae		*Caesia micrantha*				+			
Hemerocallidaceae		*Caesia occidentalis*	+	+					
Hemerocallidaceae		*Chamaescilla corymbosa*	+	+	+				
Hemerocallidaceae		*Johnsonia pubescens* subsp. *cygnorum*			+				
Iridaceae	*	*Freesia alba* x *leichtlinii*		+					
Iridaceae		*Patersonia occidentalis*		+		+			
Iridaceae		*Patersonia pygmaea*		+					
Iridaceae	*	*Romulea rosea*			+				
Iridaceae	*	*Watsonia meriana*		+		+		+	

Family	N/I	Species	Veg Unit						
			BsXp	CcXp	CcXpKa	EwTo	Rehab	Er(P)	Cc(P)
Lamiaceae		*Hemiandra pungens*		+					
Lauraceae		*Cassytha racemosa*			+	+			
Loranthaceae		*Nuytsia floribunda*			+	+			
Myrtaceae		*Babingtonia camphorosmae*		+					
Myrtaceae		*Beaufortia elegans*					+		
Myrtaceae		*Corymbia calophylla*	+	+	+	+			+
Myrtaceae		*Darwinia citriodora*				+			
Myrtaceae		*Eucalyptus drummondii*		+					
Myrtaceae		*Eucalyptus marginata*		+					
Myrtaceae		*Eucalyptus rudis*						+	
Myrtaceae		*Eucalyptus* sp.					+		
Myrtaceae		*Eucalyptus wandoo*				+			
Myrtaceae	*	*Leptospermum laevigatum*	+				+		
Orchidaceae		*Caladenia latifolia*	+						
Orchidaceae		*Cyanicula sericea*				+			
Orchidaceae	*	*Disa bracteata*			+				
Orchidaceae		*Prasophyllum macrostachyum*		+					
Orchidaceae		*Thelymitra* sp.	+						
Orchidaceae		*Thelymitra benthamiana*			+				
Oxalidaceae	*	*Oxalis ? glabra*		+					
Phyllanthaceae		*Phyllanthus calycinus*				+			
Phyllanthaceae		*Poranthera microphylla*	+						
Poaceae		*Amphipogon turbinatus*		+					
Poaceae		*Austrostipa nitida*		+	+				
Poaceae	*	*Briza maxima*	+	+	+	+			+
Poaceae	*	*Briza minor*	+		+	+			
Poaceae	*	*Ehrharta calycina*	+	+	+	+	+	+	+
Poaceae	*	*Eragrostis curvula*	+			+		+	+
Poaceae		*Neurachne alopecuroidea*	+	+	+	+	+		
Polygalaceae		*Comesperma calymega*	+						
Proteaceae		*Banksia dallanneyi*		+		+			
Proteaceae		*Banksia sessilis*	+				+		
Proteaceae		*Grevillea pilulifera*		+					
Proteaceae		*Hakea lissocarpha*		+					
Proteaceae		*Hakea undulata*				+	+		
Proteaceae		*Stirlingia latifolia*			+				
Proteaceae		*Synaphea gracillima*				+			
Restionaceae		*Desmocladus fasciculatus*		+	+				
Rhamnaceae		*Trymalium odoratissimum* subsp. *odoratissimum*				+		+	
Stylidiaceae		*Levenhookia pusilla*	+						
Stylidiaceae		*Stylidium ? rhipidium*			+				
Stylidiaceae		*Stylidium piliferum*			+				
Stylidiaceae		*Stylidium repens*			+				
Xanthorrhoeaceae		*Xanthorrhoea gracilis*	+						
Xanthorrhoeaceae		*Xanthorrhoea preissii*	+	+	+	+			

APPENDIX D – VEGETATION SITE DATA

Site CR01

Date	15 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405900mE 6431979mN
Vegetation Unit	CcXp - *Corymbia calophylla* and *Eucalyptus marginata* Low Woodland over *Xanthorrhoea preissii* with occasional *Kingia australis* Tall Sparse Shrubland over *Mesomelaena tetragona* Sedgeland
Slope	Gentle
Landform	Lower slope/ foothills
Soil Colour	Pale brown
Soil Type	Sandy loamy clay
Litter	70%
Bare Ground	0%
Fire Age	>10 Years
Vegetation Condition	Good
Disturbances/Impacts	Weeds



Phase 1



Phase 2

Species	Height (m)	% Cover
Corymbia calophylla	10	8
Eucalyptus drummondii	8	15
Kingia australis	3	2
Xanthorrhoea preissii	2	10
**Ehrharta calycina*	1	1
Mesomelaena tetragona	0.7	2
**Briza maxima*		+
Caesia occidentalis		+
**Chamaecytisus palmensis*		+
Chamaescilla corymbosa		+
Cyathochaeta avenacea		+
Drosera macrantha		+
**Freesia alba* x *leichtlinii*		+
Hakea lissocarpha		+
Laxmannia squarrosa		+
Lomandra drummondii		+
Lomandra hermaphrodita		+
Lomandra preissii		+
Morelotia octandra		+
Neurachne alopecuroidea		+
**Oxalis ? glabra*		+
Prasophyllum macrostachyum		+
**Trifolium* sp.		+
**Ursinia anthemoides*		+

Site CR02

Date	15 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405415mE 6430087mN
Vegetation Unit	CcXpKa - *Corymbia calophylla* Low Open Woodland over *Xanthorrhoea preissii* and *Kingia australis* Tall Sparse Shrubland over *Laxmannia squarrosa* Low Forbland
Slope	Flat
Landform	Lower slope/ foothills
Soil Colour	Pale brown
Soil Type	Sand
Litter	25%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good – Very Good
Disturbances/Impacts	Weeds



Phase 1



Phase 2

Species	Height (m)	% Cover
Corymbia calophylla	6	8
Kingia australis	3	2
Xanthorrhoea preissii	2	6
Laxmannia squarrosa	0.01	70
Acacia lateriticola		+
Anigozanthos manglesii		+
Austrostipa nitida		+
**Briza maxima*		+
**Briza minor*		+
Cassytha racemosa		+
Chamaescilla corymbosa		+
Conostylis aculeata		+
Conostylis setigera		+
Cyathochaeta avenacea		+
Desmocladus fasciculatus		+
**Disa bracteata*		+
Drosera macrantha		+
Drosera macrantha		+
**Ehrharta calycina*		+
Gompholobium marginatum		+
Johnsonia pubescens subsp. *cygnorum*		+
Lechenaultia biloba		+
Lomandra preissii		+
Lomandra sonderi		+
Morelotia octandra		+
Neurachne alopecuroidea		+
Nuytsia floribunda		+
Ptilotus manglesii		+
**Romulea rosea*		+
Stirlingia latifolia		+
Stylidium ? rhipidium		+
Stylidium piliferum		+
Stylidium repens		+
Thelymitra benthamiana		+
Thysanotus gracilis		+
Thysanotus patersonii		+
**Ursinia anthemoides*		+

Site CR03

Date	15 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405567mE 6430706mN
Vegetation Unit	CcXp - *Corymbia calophylla* and *Eucalyptus marginata* Low Woodland over *Xanthorrhoea preissii* with occasional *Kingia australis* Tall Sparse Shrubland over *Mesomelaena tetragona* Sedgeland
Slope	Flat
Landform	Lower slope/ foothills
Soil Colour	Brown
Soil Type	Sand
Litter	70%
Bare Ground	0%
Fire Age	>10 Years
Vegetation Condition	Very Good-Excellent
Disturbances/Impacts	Weeds



Phase 1



Phase 2

Species	Height (m)	% Cover
Corymbia calophylla	8	15
Eucalyptus marginata	8	15
Xanthorrhoea preissii	1.5	5
Mesomelaena tetragona	0.4	1
Cyathochaeta avenacea	0.2	1
Morelotia octandra	0.2	1
Acacia lateriticola		+
Amphipogon turbinatus		+
Anigozanthos manglesii		+
Austrostipa nitida		+
Babingtonia camphorosmae		+
Banksia dallanneyi		+
Burchardia congesta		+
Burchardia congesta		+
Chamaescilla corymbosa		+
Conostylis setigera		+
Dampiera decurrens		+
Daviesia decipiens		+
Daviesia physodes		+
Desmocladus fasciculatus		+
Drosera erythrorhiza		+
Gompholobium marginatum		+
Grevillea pilulifera		+
Hakea lissocarpha		+
Hemiandra pungens		+
Hibbertia hypericoides		+
Laxmannia squarrosa		+
Lechenaultia biloba		+
Lomandra hermaphrodita		+
Lomandra sonderi		+
Patersonia occidentalis		+
Patersonia pygmaea		+
Pentapeltis peltigera		+
Sphaerolobium medium		+
Trichocline spathulata		+
Xanthosia atkinsoniana		+

Site CR04

Date	16 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405566mE 6430847mN
Vegetation Unit	BsXp - *Corymbia calophylla* Low Open Woodland over *Banksia sessilis* Tall Shrubland over *Xanthorrhoea preissii* Shrubland
Slope	Flat
Landform	Lower slope/ foothills
Soil Colour	Brown
Soil Type	Sandy loamy gravel
Litter	60%
Bare Ground	2%
Fire Age	>10 Years
Vegetation Condition	Good
Disturbances/Impacts	Weeds, historic clearing



Phase 1



Phase 2

Species	Height (m)	% Cover
Corymbia calophylla	10	5
Banksia sessilis	3	60
Xanthorrhoea preissii	1.5	3
**Ehrharta calycina*	0.2	40
Acacia lateriticola		+
Anigozanthos manglesii		+
**Briza maxima*		+
**Briza minor*		+
Burchardia congesta		+
Caesia occidentalis		+
Caladenia latifolia		+
Chamaescilla corymbosa		+
Comesperma calymega		+
Conostylis setigera		+
Dampiera linearis		+
Daviesia decurrens		+
Drosera erythrorhiza		+
Drosera macrantha		+
**Eragrostis curvula*		+
Gompholobium marginatum		+
Gompholobium tomentosum		+
Haemodorum laxum		+
Laxmannia squarrosa		+
Lechenaultia biloba		+
**Leptospermum laevigatum*		+
Levenhookia pusilla		+
Lomandra hermaphrodita		+
Lomandra preissii		+
Morelotia octandra		+
Neurachne alopecuroidea		+
Poranthera microphylla		+
Thelymitra sp.		+
Xanthorrhoea gracilis		+

Site CR05r

Date	16 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405497mE 6430576mN
Vegetation Unit	Rehab - Rehabilitation with planted endemic and non species
Slope	Flat
Landform	Lower slope/ foothills
Soil Colour	Brown
Soil Type	Sandy loamy gravel
Litter	40%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Degraded-Good
Disturbances/Impacts	Historic clearing



Species	Height (m)	% Cover
Eucalyptus sp.	4	2
Banksia sessilis	3	50
Acacia saligna	3	2
Acacia pulchella	1.5	2
**Ehrharta calycina*	0.2	20
Anigozanthos manglesii		+
Beaufortia elegans		+
Gompholobium tomentosum		+
Hakea undulata		+
Leschenaultia biloba		+
**Leptospermum laevigatum*		+
Neurachne alopecuroidea		+

Site CR06r

Date	16 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405324mE 6429714mN
Vegetation Unit	Er(P) - *Eucalyptus rudis* Open Woodland over *Trymalium odoratissimum* subsp. *odoratissimum* Shrubland over grassess and weeds
Slope	Moderate
Landform	Medium drainage line
Soil Colour	Pale brown
Soil Type	Sandy loamy gravel
Litter	5%
Bare Ground	40%
Fire Age	>10 Years
Vegetation Condition	Completely Degraded-Degraded
Disturbances/Impacts	Weeds, clearing, erosion



Species	Height (m)	% Cover
Eucalyptus rudis	14	10
Trymalium odoratissimum subsp. *odoratissimum*	3	40
**Watsonia meriana*	0.8	30
**Ehrharta calycina*	0.3	10
**Eragrostis curvula*		+
**Trifolium* sp.		+

Site CR07

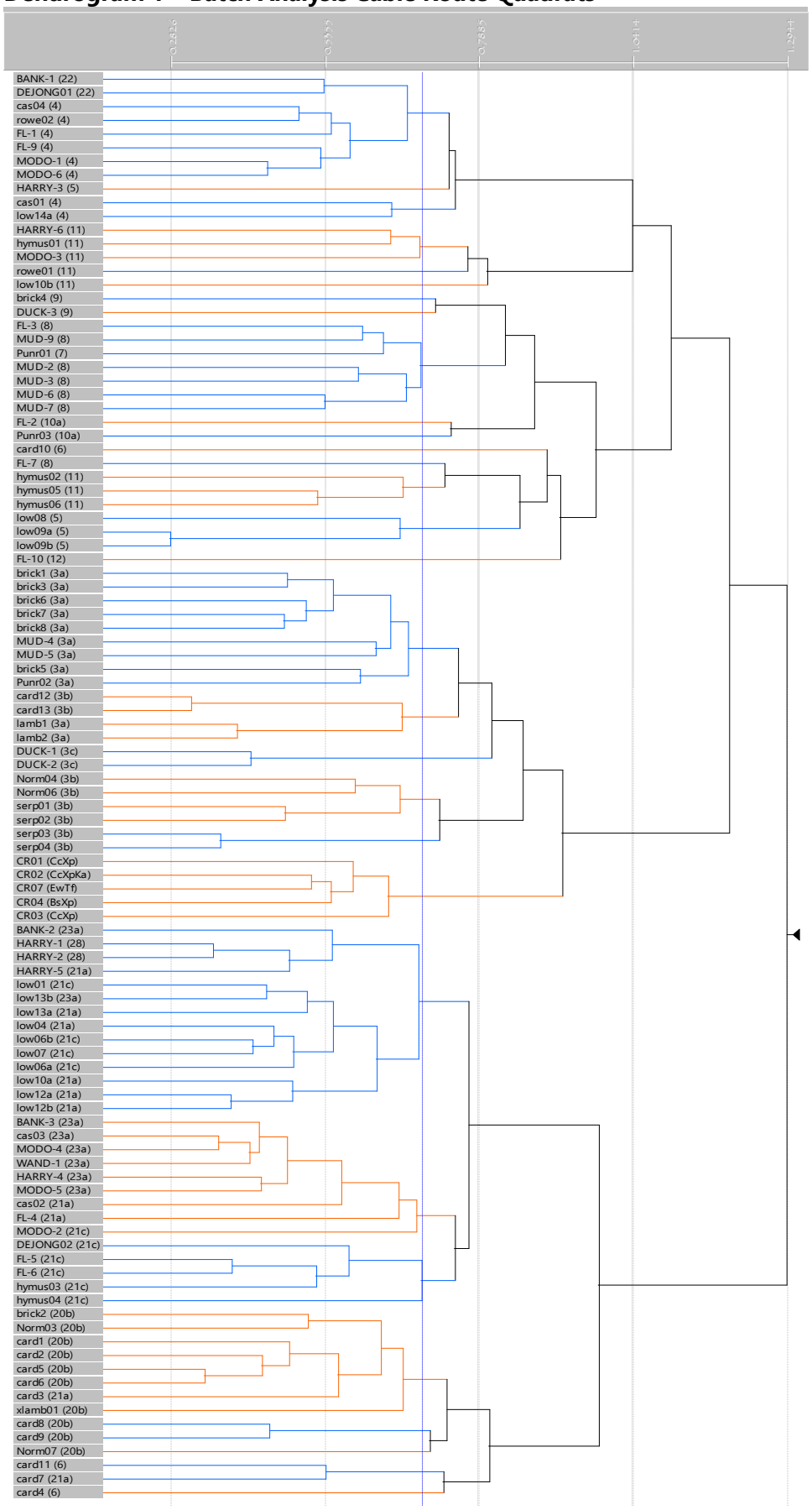
Date	16 September 2021
Botanist	Kellie Bauer-Simpson
Quadrat Size	10 x 10 m
NW Corner Coordinates	405317mE 6429743mN
Vegetation Unit	EwTo - *Eucalyptus wandoo* and *Corymbia calophylla* Low Woodland over *Trymalium odoratissimum* subsp. *odoratissimum*, *Kingia australis* and *Xanthorrhoea preissii* Shrubland *Mesomelaena tetragona* and *Laxmannia squarrosa* Sedgeland
Slope	Gentle
Landform	Midslope
Soil Colour	Pale brown
Soil Type	Sandy loamy gravel
Litter	30%
Bare Ground	2%
Fire Age	>10 Years
Vegetation Condition	Good
Disturbances/Impacts	Weeds



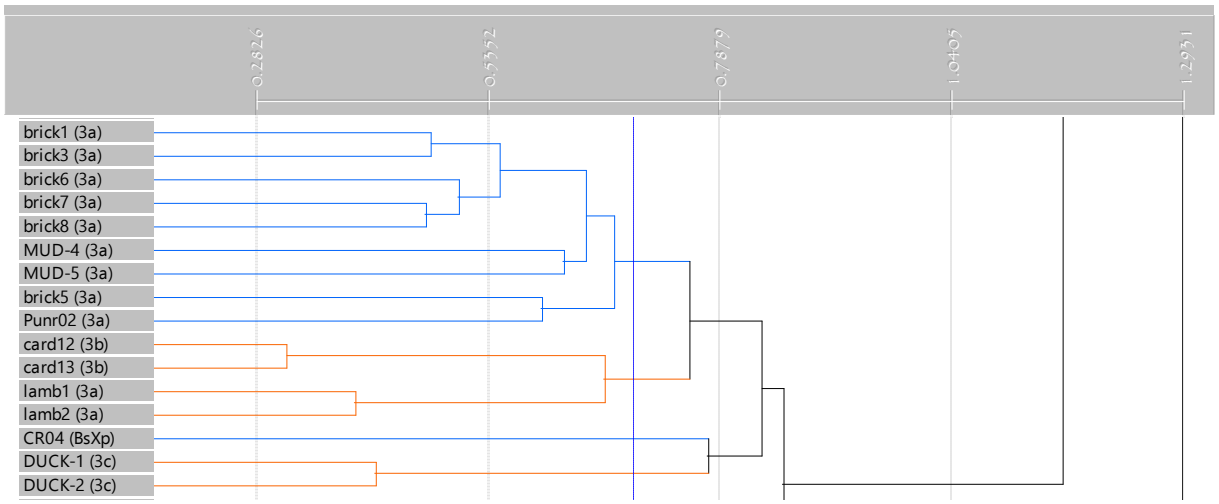
Species	Height (m)	% Cover
Eucalyptus wandoo	8	15
Corymbia calophylla	5	4
Trymalium odoratissimum subsp. *odoratissimum*	2	40
Kingia australis	1	5
Xanthorrhoea preissii	0.8	5
Mesomelaena tetragona	0.4	6
Laxmannia squarrosa	0.01	4
Acacia lateriticola		+
Acacia pulchella		+
Banksia dallanneyi		+
**Briza maxima*		+
**Briza minor*		+
Burchardia congesta		+
Caesia micrantha		+
Cassytha racemosa		+
Chorizema dicksonii		+
Cyanicula sericea		+
Cyathochaeta avenacea		+
Darwinia citriodora		+
Drosera macrantha		+
**Ehrharta calycina*		+
**Eragrostis curvula*		+
Gompholobium marginatum		+
Haemodorum laxum		+
Haemodorum sp.		+
Hakea undulata		+
Hibbertia hypericoides		+
Lechenaultia biloba		+
Lomandra hermaphrodita		+
Lomandra sonderi		+
Lomandra sp.		+
Morelotia octandra		+
Neurachne alopecuroidea		+
Nuytsia floribunda		+
Patersonia occidentalis		+
Phyllanthus calycinus		+
Synaphea gracillima		+
**Trifolium* sp.		+
**Ursinia anthemoides*		+
**Watsonia meriana*		+
Allocasuarina humilis		Associated

APPENDIX E – FLORISTIC ANALYSIS RESULTS (DENDROGRAMS)

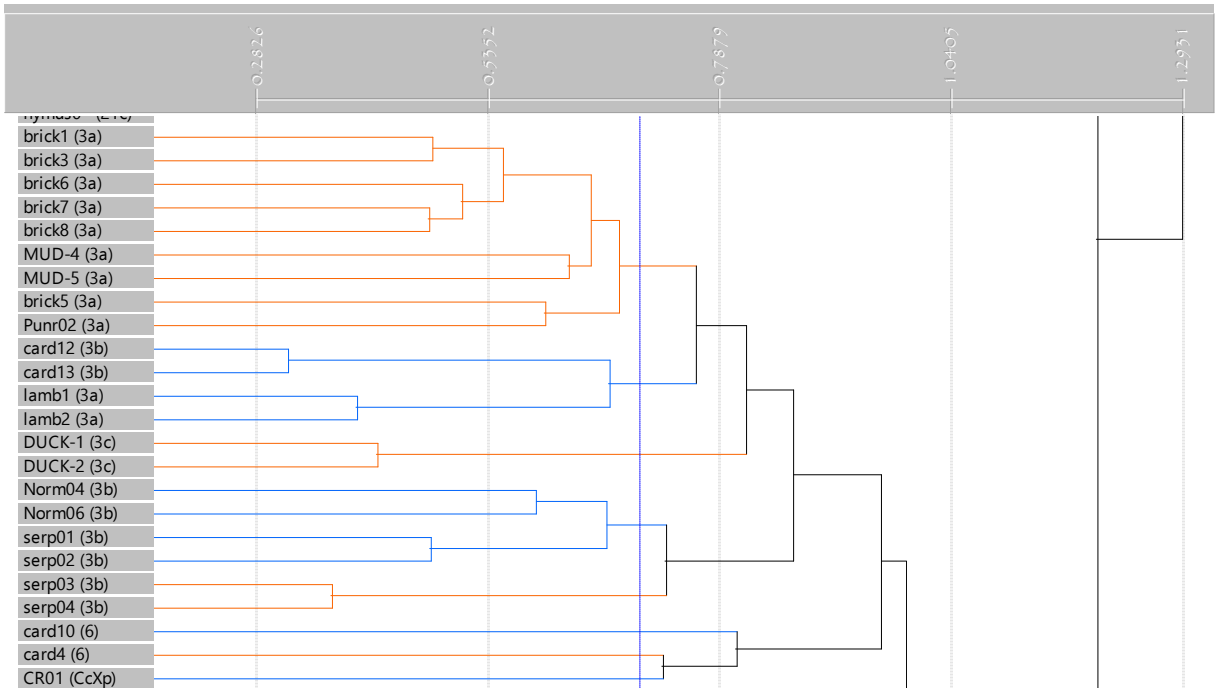
Dendrogram 1 – Batch Analysis Cable Route Quadrats



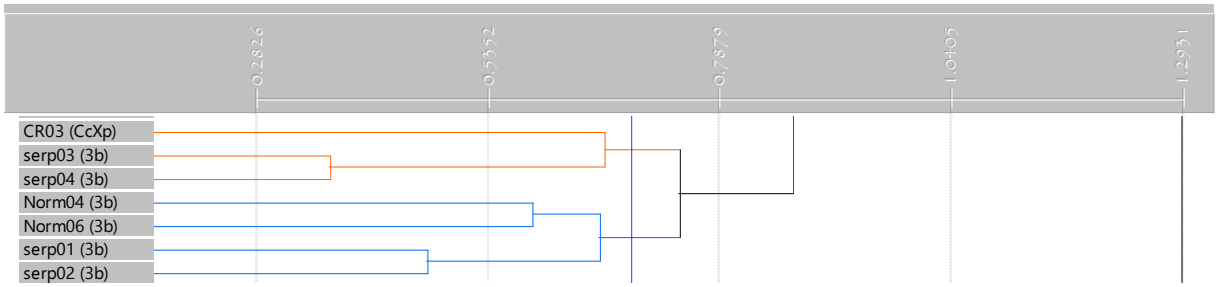
Dendrogram 2 – BsXp SSI CR04



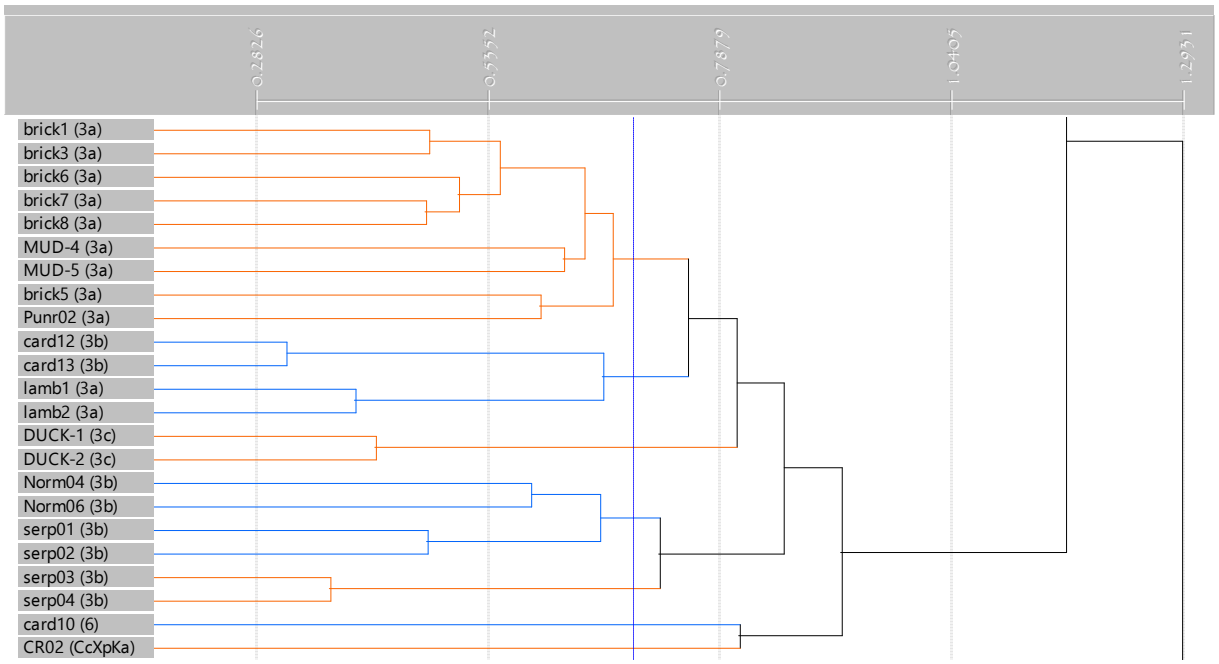
Dendrogram 3 – CcXp SSI CR01



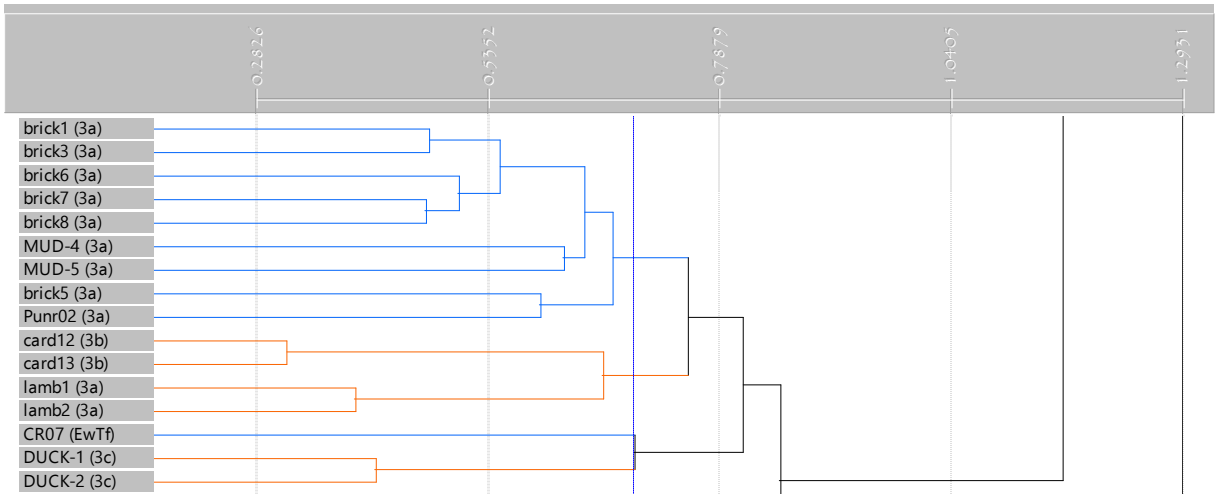
Dendrogram 4 – CcXp SSI CR03



Dendrogram 5 – CcXpKa SSI CR02



Dendrogram 6 – EwTf SSI CR07



Appendix B

Natural Area RSR Tower – Detailed and Targeted Flora Survey

MetCONNX

RSR Tower

Detailed and Targeted Flora Survey

Natural Area Holdings Pty Ltd
Whadjuk Country
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www.naturalarea.com.au



Acknowledgement of Country

Ngala kaaditj Noongar moort keyen kaadak nidja boodja.
Natural Area acknowledges the Traditional Owners of the lands on which we operate, and recognises their continuing connection to lands, waters and communities.

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System Certifications

Environmental management system registered to ISO 14001:2015
Quality management system registered to ISO 9001:2015
Occupational health and safety management system registered to ISO 45001:2018

Document Title	METX R RSR Tower Flora Survey
Location	ConsultingSP/Shared Documents/MetCONNX/022 Flora & Fauna Survey/Variations/2024 10 135 RSR Tower/Reporting/METX R RSR Tower Flora Survey.docx

Draft/Version No.	Date	Changes	Prepared by	Approved by	Status
Draft	Feb 2025	New Document	JW	ZS/LI	Draft for client comment
V1	Mar 2025	Changes to address comments	JW	ZS	Released

Executive Summary

Natural Area Consulting Management Services (Natural Area) was commissioned by MetCONNX to undertake additional flora surveys within a proposed Radio Systems Replacement (RSR) tower site. The additional flora surveys included a detailed and targeted flora survey. Results from this survey will provide site-specific information to supplement previous environmental surveys of the broader area conducted by Focused Vision Consulting (FVC) (FVC, 2022). This survey will identify conservation significant values within the proposed RSR tower site to inform land use planning and provide supporting documentation for environmental assessment and approval.

The flora survey determined the following:

- A total of 59 flora species comprised of 21 (36 %) native and 38 (64 %) introduced species.
- No threatened flora, as listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) or *Biodiversity Conservation Act 2016* (WA) (BC Act) were recorded on site.
- One declared pest (DP), One- leaf Cape Tulip (**Moraea flaccida*) was present across the site in low densities (<5 %).
- One vegetation type, *Corymbia calophylla* woodland across the site.
- Vegetation condition assessed to be in a degraded (47.6 %) or completely degraded (52.4 %).
- The survey site is not considered an extant occurrence of a threatened or priority ecological community (TEC/PEC) due to the current degraded to completely degraded vegetation condition.

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1.0 Introduction

MetCONNX has commissioned Natural Area Consulting Management Services (Natural Area) to undertake additional flora surveys within a proposed Radio Systems Replacement (RSR) tower site. Along with the Byford Rail Extension (BRE) project, the proposed upgrades to the existing rail network's radio system will ensure a more efficient, reliable and railway network. Focused Vision Consulting (FVC) has previously completed a detailed flora and vegetation assessment of the broader area (FVC,2022). The results from this survey provides supplementary, site-specific information for the proposed RSR tower site.

1.1 Location

The site resides in the suburb of Cardup, within the Shire of Serpentine-Jarrahdale, 50 km south-east of the Perth Central Business District. The survey extent spans approximately 0.37 ha and is located between Soldiers Road and the existing South-Western Railway corridor (Figure 1).

1.2 Scope

The main objective of the flora survey is to provide additional information on the environment values of the proposed site to inform land use planning and provide supporting documentation for environmental assessment and approval. Scope of works included:

- Desktop assessment of previous environmental surveys and relevant environmental databases.
- Targeted flora survey to identify and record populations and presence of conservation significant flora species.
- Detailed flora survey to identify vegetation type, condition and compiling a comprehensive flora species list of both native and non-native flora species.
- Determination of the presence of any threatened or priority ecological communities (TEC/PEC).



Figure 1:
Site Location

Cardup, Western Australia

Legend

Site Location

Client:	MetCONNX
Date:	04/02/2025
Created by:	J. Wei
Image Source:	Nearmap, 2025
Datum:	GDA2020 / MGA zone 50
Scale:	1: 1000

0 15 30 m

N

1.3 Legislative Context

State and federal environment-related laws impact how environmental values are governed in Western Australia. The following legislation and policies are relevant to this report.

***Biosecurity and Agriculture Management Act 2007* (WA)**

The *Biosecurity and Agriculture Management Act 2007* (WA) (BAM Act) regulates the framework for plant and animal pest and disease biosecurity in Western Australia. The framework provides for the control of declared flora and fauna species (declared organisms) that are known to be a significant environmental threat and the management, control and prevention of these declared plants and animals.

***Biodiversity Conservation Act 2016* (WA)**

The *Biodiversity Conservation Act 2016* (WA) (BC Act) aims to protect and conserve biodiversity as well as to promote the ecologically sustainable use of biodiversity components in the State. The BC Act provides the statute relating to conservation and legal protection of flora, fauna, and ecological communities. The BC Act follows the principles of ecologically sustainable development, detailing that decision-making processes should effectively integrate long-term and short-term economic, environmental, social, and equity considerations.

***Environmental Protection Act 1986* (WA)**

The *Environmental Protection Act 1986* (WA) (EP Act) provides for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement, and management of the environment connected with the foregoing. The Environmental Protection Authority (EPA) is established under this act and provides a structured policy framework that is consistent with the EP Act. The EPA produces the guidelines and procedures associated with conducting environmental assessments in line with the EP Act.

***Environment Protection and Biodiversity Conservation Act 1999* (Cth)**

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) serves to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places. The primary objective of the EPBC Act is to promote the conservation of biodiversity and the sustainable use of natural resources while allowing for ecologically sustainable development. The EPBC Act allows for the creation of conservation agreements between the Australian government and individuals, communities, or organisations to support the conservation of biodiversity.

2.0 Site Characteristics

2.1 Regional Context

The site is located within the Swan Coastal Plain (SWA02) Interim Biogeographic Regionalisation for Australia (IBRA) subregion (Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2024a). This region is a low-lying coastal plain with woodlands dominated by *Banksia* or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperback in swamp areas (Mitchell *et al*., 2002).

2.2 Climate

The survey site has a Mediterranean climate, characterised by dry, hot summers and cool, wet winters. According to the Bureau of Meteorology (BoM) (2025); Jandakot Aero WA, site number 009172, 2025, the region has an average:

- Rainfall of 807.5mm annually, with rain falling predominantly between May and August, peaking in July.
- Maximum temperature ranging from 18.1 °C in winter to 31.7 °C in summer, with a maximum recorded temperature of 46.6 °C.
- Minimum temperatures ranging from 7.2 °C in winter to 17.2 °C in summer, with a minimum recorded temperature of -3.4 °C.

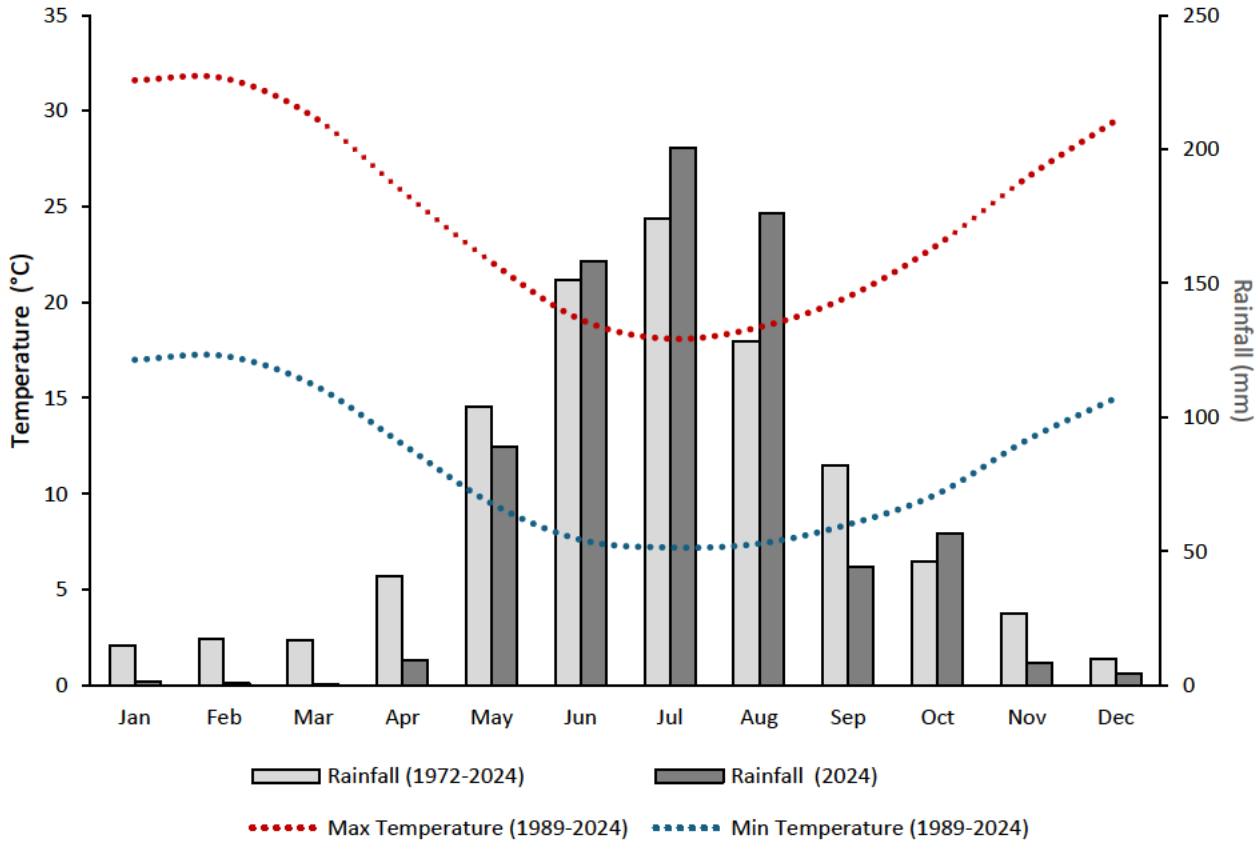


Figure 2: Temperature and rainfall data for the Jandakot Aero WA, site number 009172. Source: BoM, 2025.

2.3 Topography and Soils

One soil type was identified to occur with the site, namely the Forrestfield F2b phase (Department of Primary Industries and Regional Development (DPIRD), 2022). This soil type typically consists of well drained, gravelly acidic yellow duplex soils of varying depths, occurring on low slopes and foot slopes. The site is flat and sits at 54 m Australian Height Datum (AHD) (DPIRD, 2019).

2.4 Vegetation Complex

One vegetation complex exists within the site boundary, the Guildford Complex. It is described by Heddle *et al.* (1980) by a mixture of Marri-Wandoo-Jarrah woodland with minor components including the fringing woodland of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* along the streams with the rare occurrence of *Eucalyptus lane-poolei*. The other remnant plant species in the complex includes *Banksia grandis*, *Kingia australis*, *Xanthorrhoea preissii* and species of *Hardenbergia* spp. and *Hibbertia* spp. The pre-European extent of this vegetation complex remaining is:

- 5.09 % within the Swan Coastal Plain
- 4.25 % within the Shire of Serpentine-Jarrahdale (Government of Western Australia, 2019).

2.5 Geomorphic Wetlands

The site resides within a multiple use flat palusplain (Armadale Palusplain, UFI 15383). Several other geomorphic wetlands are also recorded in close proximity (Table 1, Figure 3).

Table 1: Geomorphic wetlands

Wetland Name	Wetland Classification	Management Category	Location
Armadale Palusplain UFI 15383	Palusplain	Multiple Use	Site resides within this geomorphic wetland
Unknown UFI 15382	Palusplain	Multiple Use	Resides immediately east of site
Byford Rail Reserve UFI 14505	Palusplain	Conservation	Occurs within 100 m south of site
Cardup Brook UFI 14542	Palusplain	Resource Enhancement	Occurs 200 m northeast of the site
Unknown UFI 15384	Creek	Resource Enhancement	Occurs 200 m northwest of the site
Unknown UFI 13010	Palusplain	Conservation	Occurs 300 m north of the site

2.6 Environmental Sensitive Area

The survey area is located within a listed as a Bush Forever site (site number 350; Serpentine Rail/Road Reserves and Adjacent Bushland) and is therefore classified as an Environmentally Sensitive Area (ESA) (Department of Water Environment and Regulations (DWER), 2021)



Figure 3:
Geomorphic Wetlands

Cardup, Western Australia

Legend

- Conservation
- Multiple Use
- Resource Enhancement
- Site Location

Client:	MetCONNX
Date:	12/02/2025
Created by:	J. Wei
Image Source:	Nearmap, 2025
Datum:	GDA2020 / MGA zone 50
Scale:	1: 4000

0 50 100 m

N

3.0 Methodology

3.1 Desktop and Literature Review

The desktop survey included reviewing online databases and previous environmental surveys to gather contextual knowledge and determine preliminary site characteristics including:

- likely native and non-native flora and fauna species present
- current extent of native vegetation
- general floristic community types
- likely presence of threatened or priority flora and fauna species
- likely presence of any threatened or priority ecological communities.

The following databases and reports were accessed to obtain relevant information:

- NatureMap (Department of Biodiversity, Conservation and Attractions (DBCA), 2024a)
- Protected Matters Search Tool (DCCEEW), 2024b) (Appendix 2)
- FloraBase (WA Herbarium, 1998-)
- Threatened and priority flora database search (DBCA, 2024b)
- Threatened and priority ecological community database search (DBCA, 2024c).

Conservation code definitions for the State and Commonwealth are provided in Appendix 2.

3.2 On-ground Flora Survey

3.2.1 Targeted Flora Survey

The targeted flora survey was conducted in accordance with *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority (EPA), 2016). Samples were collected, or photographs taken of unfamiliar species to enable later identification.

Natural Area undertook the survey on 15 November 2024, with key data recorded using QField software on a handheld tablet. Survey activities included:

- Traversing the entirety of the site and conducting a search for conservation significant flora species with the potential to occur in the area.
- Marking locations of any conservation significant flora identified and determining population size and extent.
- Recording vegetation type including dominant over, middle and understorey species to describe vegetation type in line with the National Vegetation Information System (NVIS) Level V – Association (Executive Steering Committee for Australian Vegetation Information (ESCAVI), 2003).
- Condition using the scale attributed to Keighery (Table 2) (EPA, 2016).
- The use of GPS to map significant species and boundaries of differing vegetation type and condition.
- Recording evidence of disturbance, such as fire.

3.2.2 Detailed Flora Survey

The flora and vegetation survey was conducted in accordance with *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016). Samples were collected, or photographs taken of unfamiliar species to enable later identification.

Natural Area undertook the survey on 15 November 2024, with key data recorded using QField software on a handheld tablet. Survey activities included:

- Setting out a total of three 100 m^2 quadrats comprised of two 20 x 5m and one 10 x 10 m quadrat across the one vegetation type present.
- Photographing each quadrat in the north-west corner and recording GPS coordinates using GDA2020 Zone 50 datum.
- Recording landscape characteristics including soil types/colour, aspect, slope, surface rock, topography and drainage using Natural Area's modified recording sheets based on the NAIA templates developed for the Perth Biodiversity Project.
- Determining leaf litter depth, percentage cover, and percentage of bare ground.
- Recording percentage cover, height, number alive/dead stems and life form for each flora species in the quadrats.
- Marking locations of any conservation significant flora, declared pests (DP) and/or Weeds of National Significance (WoNS) identified.
- Recording vegetation type including dominant over, middle and understorey species to describe vegetation type in line with the National Vegetation Information System (NVIS) Level V – Association (Executive Steering Committee for Australian Vegetation Information (ESCAVI), 2003).
- Vegetation condition was assessed using the rating scale attributed to Keighery (Table 2) (EPA, 2016).
- The use of GPS to map significant species and boundaries of differing vegetation type and condition
- Recording evidence of disturbance, such as fire.

Table 2: Vegetation condition ratings

Category		Description
1	Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
3	Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds, partial clearing, dieback and grazing.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.

Category		Description
		Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
6	Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: EPA, 2016.

3.3 Limitations

The limitations associated with the flora survey undertaken are outlined in Table 3 below.

Table 3: Flora survey limitations

Potential Limitation	Degree of Limitation	Comments
Availability of contextual information	None	Local and regional context information was readily available.
Competency/ experience of team	None	Survey activities were undertaken by experienced environmental scientists who have extensive experience undertaking flora surveys within the Swan Coastal Plain bioregion.
Proportion of flora recorded/ collected, any identification issues	None	A total of 59 flora species (taxa) were recorded across 17 families, comprising of 21 native and 38 introduced (weeds) species. All species were identified to species level.
Survey effort and extent	None	The entirety of the site (0.37 ha) was surveyed in one day.
Access restrictions	None	Site was accessible with no access restrictions.
Survey timing	Minor	Detailed and targeted survey was undertaken in late spring (November 2024). While this is still within the optimal season for flora surveys within the Swan Coastal Plain, early spring flowering annuals may have undergone seasonal senescence and may not present during the survey. A two-phase, detailed flora survey was carried out by FVC in 2021 (FVC, 2022). Survey areas included the current RSR tower site. By interrogating and including the results collected by FVC, the area has been sufficiently surveyed to account for seasonal and annual variation.
Disturbances	None	No recent disturbances which may have had an impact on survey results (e.g. fire, recent clearing or floods) were identified during the survey.

4.0 Flora Survey Results

4.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 55 conservation significant species to occur within 10 km of the survey area (Table 4). NatureMap indicated 38 conservation significant flora species listed under the BC Act or by the Western Australian Herbarium (1998-), as potentially occurring within 10 km of the site (DBCA, 2024a). A review of the Protected Matters Search Tool (PMST) (DCCEEW, 2024) indicated 20 significant flora species listed under the EPBC Act as potentially occurring within a 10 km radius of the site (Appendix 2). A review of the DBCA (2024b) threatened and priority flora database indicated 45 threatened or priority species have been recorded within 10 km of the site.

Of the conservation significant species potentially found in the area, it was determined that the site conditions (soil type, drainage, location) may be suitable for 12 (highlighted green) of these species (Table 4). Conservation code descriptions are provided in Appendix 2.

Table 4: Threatened and Priority flora species listed by NatureMap, PMST and DBCA

Species Name	Cons Code (WA)	Cons Code (Cth)	NatureMap	PMST	DBCA
Acacia horridula	P3		X		X
Acacia lasiocarpa var. bracteolata long peduncle variant	P1		X		X
Acacia oncinophylla subsp. *oncinophylla*	P3		X		X
Acacia oncinophylla subsp. *patulifolia*	P4				X
Andersonia gracilis	T/EN	EN		X	
Angianthus drummondii	P3		X		X
Anthocercis gracilis	T/VU	VU		X	
Aponogeton hexatepalus	P4		X		X
Babingtonia urbana	P3		X		X
Banksia kippistiana var. *paenepeccata*	P3				X
Banksia mimica	T/VU	EN		X	
Caladenia huegelii	T/CR	EN	X	X	X
Calectasia cyanea	CR		X		
Calectasia grandiflora	P2		X		X
Carex tereticaulis	P2		X		X
Dillwynia dillwynioides	P2		X		X
Diuris drummondii	T/EN	VU		X	
Diuris micrantha	T/VU	VU		X	

Species Name	Cons Code (WA)	Cons Code (Cth)	NatureMap	PMST	DBCA
Diuris purdiei	T/EN	EN	X	X	X
Drakaea elastica	T/CR	EN	X	X	X
Drosera occidentalis	P4		X		X
Drosera oreopodion	T/CR		X		X
Eleocharis keigheryi	T/VU	VU		X	
Eryngium pinnatifidum subsp. *palustre*	P3		X		X
Eucalyptus rudis subsp. *cratyantha*	P4		X		X
Eucalyptus x balanites	T/EN	EN		X	X
Grevillea crowleyae	P2		X		
Grevillea curviloba	T/CR	EN		X	X
Isopogon autumnalis	P3				X
Jacksonia gracillima	P3		X		X
Johnsonia pubescens subsp. *cygnorum*	P2		X		X
Lasiopetalum glutinosum subsp. *glutinosum*	P3				X
Lasiopetalum pterocarpum	T/CR	EN	X	X	X
Lepidosperma rostratum	T/EN	EN	X	X	X
Leucopogon sp. Busselton	P2				X
Levenhookia pulcherrima	P3		X		
Millotia tenuifolia var. *laevis*	P2		X		X
Morelotia australiensis	T/VU	VU	X	X	X
Parsonsia diaphanophleba	P4		X		X
Pithocarpa corymbulosa	P3		X		X
Ptilotus sericostachyus subsp. *roseus*	Ex				X
Schoenus capillifolius	P3		X		X
Schoenus pennisetis	P3		X		X
Schoenus sp. Waroona	P3		X		X
Senecio leucoglossus	P4		X		X
Stylidium aceratum	P3		X		X
Synaphea odocoileops	P1		X		X
Synaphea sp. Fairbridge Farm	T/CR	CR	X	X	X
Synaphea sp. Pinjarra Plain	T/EN	EN	X	X	X

Species Name	Cons Code (WA)	Cons Code (Cth)	NatureMap	PMST	DBCA
Synaphea sp. Serpentine	T/CR	CR	X	X	X
Thelymitra magnifica	T/CR				X
Thelymitra stellata	T/EN	EN		X	X
Verticordia lindleyi subsp. *lindleyi*	P4		X		X
Verticordia plumosa var. *ananeotes*	T/CR	EN	X	X	X

4.1.1 Threatened and Priority Ecological Communities

A review of the PMST report and DBCA database for ecological communities identified several TECs and PECs that could potentially occur within 10 km of the site. They include 7 TECs listed under the EPBC Act, and 14 TEC/PECs listed under the BC Act. Ecological community names and their corresponding State and Commonwealth conservation status are outlined in Table 5.

Table 5: Potential TEC/PECs within 10 km of the site

Community Name		Conservation Code	
EPBC Act	BC Act	EPBC Act	BC Act
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	*Corymbia calophylla -Kingia Australia* woodlands on heavy soils (FCT 3a as originally described in Gibson *et al.* 1994)	EN	CR
-	*Corymbia calophylla- Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b as originally described in Gibson *et al.* 1994)	-	EN
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (FCT3c as originally described in Gibson *et al.* 1994)	EN	EN
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community	Tuart (*Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain	CR	P3
Banksia Woodlands of the Swan Coastal Plain ecological community	*Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (FCT 20b as originally described in Gibson *et al.* 1994)	EN	CR
	Banksia ilicifolia woodlands (FCT 22 as originally described in Gibson *et al.* 1994)		P3

Community Name		Conservation Code	
EPBC Act	BC Act	EPBC Act	BC Act
	Banksia Woodlands of the Swan Coastal Plain ecological community		P3
	Low lying *Banksia attenuata* woodlands or shrublands (FCT 21c as originally described in Gibson *et al.* 1994)		P3
Empodisma peatlands of southwestern Australia	-	EN	-
Clay Pans of the Swan Coastal Plain	Herb rich saline shrublands in clay pans (FCT 7 as originally described in Gibson *et al.* 1994)	CR	EN
	Dense shrublands on clay flats (FCT 9 as originally described in Gibson *et al.* 1994)		EN
	Herb rich shrublands in clay pans (FCT 8 as originally described in Gibson *et al.* 1994)		EN
	Shrublands on dry clay flats (FCT 10a as originally described in Gibson *et al.* 1994)		EN
-	*Casuarina obesa* Association	-	P1
Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	EN	CR

4.2 Flora Survey Results

4.2.1 Flora

A total of 59 flora species (taxa) were recorded from 17 families during the field survey, comprising of 21 (36 %) native species and 38 (64 %) introduced weeds. Examples of native flora species are shown in Figure 4 and weed species in Figure 5. A complete flora species list is provided in Appendix 4.

No conservation significant flora listed under the EPBC Act or the BC Act were identified on site. One DP was identified within the survey site, namely the One-leaf Cape Tulip (**Moraea flaccida*). This DP was found in low densities (<5 %) and spread across the site. DPs are listed on the Western Australian Organism List (WAOL) under the BAM Act (DPIRD, 2025a). This classification requires the landowner/land manager to control the population to limit damage as a result of the presence of these species (DPIRD, 2025b).



Corymbia calophylla (Marri)



Mesomelaena tetragona (Semaphore Sedge)

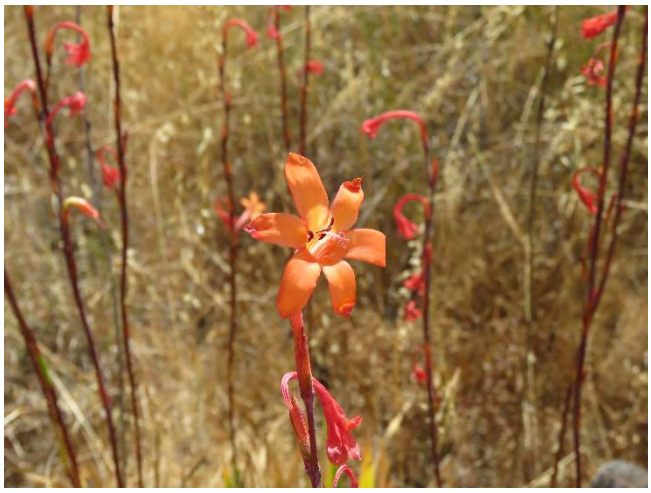


Banksia dallanneyi (Couch Honeypot)



Kingia australis (Kingia)

Figure 4: Examples of native flora species recorded.



Bugle Lily (**Watsonia meriana* var. *bulbillifera*)



One-leaf Cape Tulip (**Moraea flaccida*; DP)

Figure 5: Examples of introduced flora species recorded.

4.2.2 Vegetation Types

One vegetation type, *Corymbia calophylla* open woodland was recorded within the site. This vegetation type consists of *Corymbia calophylla* open woodland over *Xanthorrhoea preissii* shrubland over closed introduced grassland. Introduced grasses including the African Lovegrass (**Eragrostis curvula*) and Perennial Veldt Grass (**Ehrharta calycina*) dominate the understorey. Vegetation type is shown in Figure 6.

4.2.3 Vegetation Condition

Vegetation condition on site ranged from degraded to completely degraded (Table 6). The majority of the site has lost its basic vegetation structure with the understorey dominated by aggressive weed species (Figure 6 and 7).

Table 6: Vegetation condition within RSR tower site

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0	0	0	0	0.176	0.194	0.37
Area (%)	0	0	0	0	47.6	52.4	100



Figure 6: *Corymbia calophylla* open woodland.



Figure 7:
Vegetation Condition

Cardup, Western Australia

Legend

- Degraded
- Completely Degraded
- Cleared
- Site Location

Client:	MetCONNX
Date:	13/02/2025
Created by:	J. Wei
Image Source:	Nearmap, 2025
Datum:	GDA2020 / MGA zone 50
Scale:	1: 1000

0 15 30 m

N

4.2.4 Threatened and Priority Communities

The desktop assessment identified 7 TECs listed under the EPBC Act, and 14 TEC/PECs listed under the BC Act to potentially occur within the survey site. However, when considering the locality, soil type, landform, species composition and general site conditions, possible alignment with three *Corymbia calophylla* (Marri) TECs on heavy soils is more likely. The three Marri TECs and their corresponding conservation listing are presented in Table 7 below.

Table 7: TECs likely to occur on site

Community Name		Conservation Code	
EPBC Act	**BC Act**	**EPBC Act**	**BC Act**
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	*Corymbia calophylla -Kingia Australia* woodlands on heavy soils (FCT 3a as originally described in Gibson *et al.* 1994)	EN	CR
-	*Corymbia calophylla- Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (FCT 3b as originally described in Gibson *et al.* 1994)	-	EN
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	*Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (FCT3c as originally described in Gibson *et al.* 1994)	EN	EN

Due to the degraded (47.6 %) and completely degraded (52.4 %) vegetation condition of the RSR tower site, quadrat analysis against Gibson *et al*. 1994 and Keighery *et al*. 2012 is not suitable even with the exclusion of weed species. The loss of basic vegetation strata and low native species richness, as recorded on site, provides inadequate data and skew FCT assignments, resulting in inconclusive results. In order to determine presence of the potential TECs, inference to soil, landform, general species composition and other field observations were utilised.

All three TECs can be found within the Swan Coastal Plain and have been recorded on the Forrestfield complex within the Ridge Hill Shelf landform. As such, the RSR tower site meets the general site locality and habitat condition for the three Marri TECs to be present. Both DBCA ecological community database (DBCA, 2024c) and FVC (2022) indicates the presence of FCT 3b on site. FVC (2022), through floristic analysis, determined greatest similarity for FCT 3b. Sample quadrats from FVC were established in vegetation assessed to be in good or better condition, further south of the RSR tower site. Species recorded within the RSR tower site were compared against the suite of taxa associated with potential TECs to determine proportion of species overlap and alignment with the FCTs. Of the 21 native species recorded within the RSR tower site, there is a low proportion of overlap with species commonly in any of the three FCTs (3a, 3b, 3c) (Appendix 5). A community is required to be in a good or better condition to be considered as part of a TEC (DBCA, 2024d), as there are no areas of vegetation in good or better condition within the RSR tower site, it is not considered to be an extant occurrence of the TEC.

5.0 Implications of Results

5.1 Flora and Vegetation

A total of 59 flora species were recorded during the field survey, comprising of a higher proportion of introduced weed species (64 %). Due to the presence of aggressive weeds in high densities, including the presence of one DP; One-leaf Cape Tulip (*_Moraea flaccida_), native ground storey species were impacted and not well represented across site. Vegetation has been subjected to historical and recent disturbance from adjacent land use, likely contributing to its current degraded to completely degraded condition.

5.2 Conservation Significant Flora

No conservation significant flora listed under the EPBC Act or the BC Act were recorded on site.

5.3 Threatened Ecological Communities

No TEC listed under the EPBC Act is likely to occur on site. Desktop assessment and previous environmental surveys indicates a high likelihood for FCT 3b (Endangered under BC Act) to occur on site. However, it is not considered an extant TEC occurrence due to the current degraded to completely degraded vegetation condition and does not meet the minimum good condition criteria. Basic vegetation structure has been lost with the understorey dominated by aggressive grass weeds. Native species richness is low (21 species) with evidence of clearing and anthropogenic disturbance within or directly adjacent to the site.

6.0 References

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Appendix 1: PMST Report 10 km

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-May-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	40
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	7
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	15
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	35
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Forrestdale and thomsons lakes	Within 10km of Ramsar site	In buffer area only
Peel-yalgorup system	20 - 30km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area	In feature area
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area	In feature area
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area	In buffer area only
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Zanda latirostris listed as Calyptorhynchus latirostris			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area	In feature area
INSECT			
Leioproctus douglasiellus			
a short-tongued bee [66756]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Neopasiphae simplicior			
A native bee [66821]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Bettongia penicillata ogilbyi			
Woylie [66844]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Myrmecobius fasciatus			
Numbat [294]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Pseudocheirus occidentalis			
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Setonix brachyurus			
Quokka [229]	Vulnerable	Species or species habitat known to occur within area	In feature area
OTHER			
Westralunio carteri			
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
PLANT			
Andersonia gracilis			
Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Anthocercis gracilis			
Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In feature area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area	In buffer area only
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat known to occur within area	In feature area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area	In buffer area only
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area	In feature area
Morelotia australiensis listed as Tetraria australiensis Southern Tetraria [92784]	Vulnerable	Species or species habitat known to occur within area	In feature area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Synaphea sp. Pinjarra Plain (A.S.George 17182) [86878]	Endangered	Species or species habitat known to occur within area	In feature area
Synaphea sp. Serpentine (G.R.Brand 103) [86879]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area	In feature area
Verticordia plumosa var. ananeotes Tufted Plumed Featherflower [23871]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area	In feature area
Charadrius leschenaultii			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51919]	WA	In buffer area only
Commonwealth Land - [50876]	WA	In buffer area only
Commonwealth Land - [50854]	WA	In buffer area only
Commonwealth Land - [51524]	WA	In buffer area only
Commonwealth Land - [51976]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [51517]	WA	In buffer area only
Commonwealth Land - [51380]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Banksia	Nature Reserve	WA	In buffer area only
Cardup	Nature Reserve	WA	In buffer area only
Gooralong	Conservation Park	WA	In buffer area only
Karnet	Nature Reserve	WA	In buffer area only
Lambkin	Nature Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Modong	Nature Reserve	WA	In buffer area only
NTWA Bushland covenant (0011)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0076)	Conservation Covenant	WA	In buffer area only
Serpentine	National Park	WA	In buffer area only
Unnamed WA42044	Nature Reserve	WA	In buffer area only
Unnamed WA46587	Nature Reserve	WA	In buffer area only
Unnamed WA46818	Nature Reserve	WA	In feature area
Unnamed WA51784	Nature Reserve	WA	In buffer area only
Unnamed WA51963	Conservation Park	WA	In buffer area only
Watkins Road	Nature Reserve	WA	In buffer area only

Regional Forest Agreements

[Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
South West WA RFA	Western Australia	In buffer area only

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Huntly Bauxite Mine Transition	2022/09204		Assessment	In buffer area only
Keirnan Park Recreation Precinct	2023/09573		Referral Decision	In buffer area only
Orton Road Upgrade Project	2023/09680		Completed	In buffer area only
Controlled action				
Alcoa Pinjarra Refinery Production Increase and Bauxite Export	2020/8743	Controlled Action	Completed	In buffer area only
Byford Rail Extension, Byford, WA	2020/8764	Controlled Action	Post-Approval	In buffer area only
Byford Whitby Quarry, portion of Mining Lease M701240	2021/9045	Controlled Action	Further Information Request	In buffer area only
Clearing, mining and rehabilitation Scrivener Road	2015/7577	Controlled Action	Further Information	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Gravel reserves			Request	
Construction of Road and Extension of Utilities on Turner Street, Serpentine	2008/4670	Controlled Action	Post-Approval	In buffer area only
Extraction of sand from Lot 6 Banksia Road & lots 300 & 301 Boomerang Road, WA	2010/5622	Controlled Action	Post-Approval	In buffer area only
Tonkin Highway Extension ??? Thomas Road to South Western Highway	2019/8608	Controlled Action	Post-Approval	In feature area
Not controlled action				
'Looping 10' gas transmission pipeline from Kwinana to Hopelands	2005/2212	Not Controlled Action	Completed	In buffer area only
Abernethy Road upgrade (Kardan, Tourmaline & Soldiers) Byford, WA	2015/7441	Not Controlled Action	Completed	In buffer area only
BaptistCare Byford Aged Care Facility	2021/9111	Not Controlled Action	Completed	In buffer area only
Bristile Holdings Pty Ltd, Cardup Brickworks, South of Byford	2020/8834	Not Controlled Action	Completed	In buffer area only
Construction of international rowing course and commercial/residential areas	2003/1034	Not Controlled Action	Completed	In buffer area only
Development of a wholesale nursery	2012/6622	Not Controlled Action	Completed	In buffer area only
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In buffer area only
Gold Fusion Pty Ltd /Residential development/South Western Highway 40km southeast of Perth /WA/Devel	2014/7185	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Oakford Village development, Shire of Serpentine-Jarrahdale, WA	2018/8157	Not Controlled Action	Completed	In buffer area only
Residential Development, Hilbert	2020/8675	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Residential Development, Lots 3, 5 and 900 Taylor Rd Mundijong, WA	2019/8457	Not Controlled Action	Completed	In feature area
Residential development at Lot 54 Cockram Street and Lot 119 Sparkman Road, Mundijong	2020/8618	Not Controlled Action	Completed	In buffer area only
Residential development at Taylor Road and Adams Street, Mundijong, WA	2020/8780	Not Controlled Action	Completed	In buffer area only
Residential Development Various Lots Doley Road, Orton Road and Lawrence Way, Beenyup Grove Byford,	2020/8779	Not Controlled Action	Completed	In buffer area only
Sand quarry, Lot 102 King Road, Oldbury, WA	2015/7439	Not Controlled Action	Completed	In buffer area only
Serpentine Sports Reserve, Protection of Dieback Free Area	2008/4337	Not Controlled Action	Completed	In buffer area only
Tonkin Highway Extension	2001/470	Not Controlled Action	Completed	In buffer area only
Undertake a Controlled Fuel Reduction Burn	2008/4262	Not Controlled Action	Completed	In buffer area only
Urban development of Lots 9049 and 9063, The Glades, Byford, WA	2015/7607	Not Controlled Action	Completed	In buffer area only
Wungong Transfer Mains Project	2007/3532	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Subdivision on Abernethy Road, Byford	2009/4767	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Residential Development Doley Road, Orton Road and Lawrence Way	2020/8679	Referral Decision	Completed	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix 2: Conservation Codes

Western Australia

Conservation Code	Name	Description
T	Threatened	Flora or fauna that is rare or likely to become extinct, ranked according to their level of threat using IUCN Red List criteria (Schedules 1-3 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
CR	Critically endangered	Species considered to be facing an extremely high risk of extinction within the wild in the immediate future
EN	Endangered	Species considered to be facing a very high risk of extinction in the wild in the near future
VU	Vulnerable	Species considered to be facing a high risk of extinction in the wild in the medium-term future
EX	Extinct Species	Species where 'there is no reasonable doubt that the last member of the species has died (Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
EW	Extinct in the Wild	Species that are known to only survive in cultivation, in captivity, or as a naturalised population well outside its past range; and it has not been recorded in its known or expected habitat at appropriate seasons anywhere in its past range, despite surveys over a timeframe appropriate to its life cycle and form
MI	Migratory Species	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth (Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice)
CD	Conservation Dependent	Species of special conservation interest (conservation dependent fauna), being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened (Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice)
OS	Specially Protected	Fauna otherwise in need of special protection to ensure their conservation (Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice)
P	Priority Species	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or

Conservation Code	Name	Description
		flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.
P1	Priority One	Poorly known species – Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either very small or on lands not managed for conservation, such as road verges, urban areas, farmland, active mineral lease and under threat of habitat destruction or degradation.
P2	Priority Two	Poorly known species – Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, such as national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves and similar.
P3	Priority Three	Poorly known species – Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat
P4	Priority Four	Rare or near threatened and other species in need of monitoring.

Source: DBCA, 2023.

Commonwealth

Category	Description
Critically Endangered	Species facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Species facing a very high risk of extinction in the wild in the near future
Vulnerable	Species facing a high risk of extinction in the wild in the medium term

Source: DBCA, 2023.

Appendix 3: Quadrat Data

Quadrat No.:	Q1
Date:	15/11/2024
Personnel:	JW, TC
Northing:	6432187
Easting:	405897
Topography:	Lower slope
Aspect:	West
Slope:	1-3 %
Soil:	Sandy loam
Colour:	Brown
Gravel:	0 %
Rock:	0 %
Leaf Litter:	2 %
Bare Ground:	1 %
Drainage:	Well
Condition:	Degraded



Notes: *Corymbia calophylla* open woodland (5 x 20 m due to linear corridor)

Native Species	Cover (%)	Height (m)	Weed Species	Cover (%)	Height (m)
Corymbia calophylla	60.00	7.00	**Acacia longifolia*	0.10	0.30
Gompholobium marginatum	0.10	0.10	**Albuca flaccida*	0.20	0.30
Melaleuca lateritia	0.20	0.30	**Babiana angustifolia*	5.00	0.20
Xanthorrhoea brunonis	0.10	0.30	**Briza maxima*	2.00	2.00
Xanthorrhoea preissii	4.00	1.50	**Chamaecytisus palmensis*	1.50	1.50
Corymbia calophylla	60.00	7.00	**Ehrharta calycina*	4.00	0.60
			**Eragrostis curvula*	40.00	1.00
			**Freesia leichtlinii* subsp. *alba × leichtlinii subsp. leichtlinii*	1.00	0.20
			**Ixia fuscocitrina*	30.00	0.20
			**Lotus subbiflorus*	0.20	0.10
			**Lysimachia arvensis*	0.10	0.10
			**Romulea rosea*	1.00	0.10

Native Species	Cover (%)	Height (m)	Weed Species	Cover (%)	Height (m)
			**Trifolium campestre*	0.20	0.10
			**Vulpia myuros*	0. 5	0.20

Note: *denotes introduced species.

Quadrat No.:	Q2
Date:	15/11/2024
Personnel:	JW, TC
Northing:	6432118
Easting:	405889
Topography:	Upper slope
Aspect:	Southeast
Slope:	1-3 %
Soil:	Sandy loam
Colour:	Brown
Gravel:	0 %
Rock:	0 %
Leaf Litter:	5 %
Bare Ground:	1.5 %
Drainage:	Well
Condition:	Degraded



Notes: *Corymbia calophylla* open woodland

Native Species	Cover (%)	Height (m)	Weed Species	Cover (%)	Height (m)
Acacia saligna	5	3.0	**Aira caryophyllea*	1	0.1
Aristida contorta	0.3	0.3	**Avena barbata*	0.5	1.0
Borya sphaerocephala	3	0.1	**Brachypodium distachyon*	2	0.2
Corymbia calophylla	55	8.0	**Briza maxima*	10	0.3
Haemodorum laxum	0.1	0.3	**Briza minor*	0.1	0.1
Lomandra caespitosa	0.2	0.3	**Disa bracteata*	0.1	0.2
Microtis media	0.2	0.2	**Dittrichia graveolens*	0.1	0.1
Xanthorrhoea preissii	3	1.2	**Ehrharta calycina*	1	0.8
			**Eragrostis curvula*	10	1.0
			**Freesia leichtlinii* subsp. *alba* × *leichtlinii* subsp. *leichtlinii*	3	0.1
			**Gaudium laevigatum*	0.2	0.3
			**Lysimachia arvensis*	0.2	0.1
			**Melinis repens*	0.2	0.2

Native Species	Cover (%)	Height (m)	Weed Species	Cover (%)	Height (m)
			**Romulea rosea*	1	0.1
			**Trifolium angustifolium*	0.3	0.2
			**Ursinia anthemoides*	0.2	0.2
			**Vicia hirsuta*	0.2	0.2

Note: *denotes introduced species.

Quadrat No.:	Q3
Date:	15/11/2024
Personnel:	JW, TC
Northing:	6432107
Easting:	405878
Topography:	Flat
Aspect:	NA
Slope:	0%
Soil:	Sandy loam
Colour:	Brown
Gravel:	0 %
Rock:	0 %
Leaf Litter:	2 %
Bare Ground:	3 %
Drainage:	Well
Condition:	Degraded



Notes: *Corymbia calophylla* open woodland (5 x 20 m due to linear corridor)

Native Species	Cover (%)	Height (m)	Weed Species	Cover (%)	Height (m)
Corymbia calophylla	70	8.0	**Briza maxima*	0.1	0.2
Grevillea wilsonii	1	0.5	**Cenchrus clandestinus*	0.2	0.1
Lepidosperma pubisquameum	1	0.5	**Ehrharta calycina*	2	0.8
Stirlingia latifolia	4	0.6	**Ehrharta longiflora*	0.5	0.3
Xanthorrhoea preissii	8	3.0	**Eragrostis curvula*	8	1.0
			**Freesia leichtlinii* subsp. *alba* × *leichtlinii* subsp. *leichtlinii*	10	0.1

Note: *denotes introduced species.

Appendix 4: Species List

The complete flora list for the site is provided in the table below with flora listed by family, and vegetation type they occurred within indicated. *Denotes introduced species and # denotes species that are native to Western Australia but not to this local region.

Family	Species Name	Common Name
Fabaceae	**Acacia iteaphylla*	
Fabaceae	**Acacia longifolia*	
Poaceae	**Aira caryophyllea*	Silvery Hairgrass
Asparagaceae	**Albuca flaccida*	
Poaceae	**Avena barbata*	Bearded Oat
Iridaceae	**Babiana angustifolia*	
Poaceae	**Brachypodium distachyon*	False Brome
Brassicaceae	**Brassica tournefortii*	Mediterranean Turnip
Brassicaceae	**Brassica barrelieri* subsp. *oxyrrhina*	Smooth-stem Turnip
Poaceae	**Briza maxima*	Blowfly Grass
Poaceae	**Briza minor*	Shivery Grass
Poaceae	**Cenchrus clandestinus*	Kikuyu Grass
Fabaceae	**Chamaecytisus palmensis*	Tagasaste
Poaceae	**Cynodon dactylon*	Couch
Orchidaceae	**Disa bracteata*	South African Orchid
Asteraceae	**Dittrichia graveolens*	Stinkwort
Poaceae	**Ehrharta calycina*	Perennial Veldt Grass
Poaceae	**Ehrharta longiflora*	Annual Veldt Grass
Poaceae	**Eragrostis curvula*	African Lovegrass
Geraniaceae	**Erodium botrys*	Long Storksbill
Iridaceae	**Freesia leichtlinii* subsp. *alba* × *leichtlinii* subsp. *leichtlinii*	
Myrtaceae	*Gaudium laevigatum	Coast Teatree
Asteraceae	**Hypochaeris glabra*	Smooth Cats-ear
Iridaceae	**Ixia fuscocitrina*	
Fabaceae	**Lotus subbiflorus*	
Primulaceae	**Lysimachia arvensis*	Pimpernel

Family	Species Name	Common Name
Poaceae	**Melinis repens*	
Iridaceae	**Moraea flaccida*	One-leaf Cape Tulip
Oxalidaceae	**Oxalis purpurea*	Largeflower Wood Sorrel
Iridaceae	**Romulea rosea*	Guildford Grass
Asteraceae	**Sonchus oleraceus*	Common Sowthistle
Proteaceae	**Stirlingia latifolia*	Blueboy
Fabaceae	**Trifolium angustifolium*	Narrowleaf Clover
Fabaceae	**Trifolium campestre*	Hop Clover
Asteraceae	**Ursinia anthemoides*	
Fabaceae	**Vicia hirsuta*	Hairy Vetch
Poaceae	**Vulpia myuros*	Rat's Tail Fescue
Iridaceae	**Watsonia meriana* var. *bulbillifera*	Bugle Lily
Fabaceae	*Acacia saligna*	Orange Wattle
Poaceae	*Aristida contorta*	Bunched Kerosene Grass
Myrtaceae	*Babingtonia camphorosmae*	Camphor Myrtle
Proteaceae	*Banksia dallanneyi*	Couch Honeypot
Boryaceae	*Borya sphaerocephala*	Pincushions
Myrtaceae	*Corymbia calophylla*	Marri
Myrtaceae	*Eucalyptus drummondii*	Drummond's Gum
Fabaceae	*Gompholobium marginatum*	
Proteaceae	*Grevillea wilsonii*	Native Fuchsia
Haemodoraceae	*Haemodorum laxum*	Bloodroot
Dasypogonaceae	*Kingia australis*	Kingia
Cyperaceae	*Lepidosperma pubisquameum*	
Asparagaceae	*Lomandra caespitosa*	Tufted Mat Rush
Myrtaceae	*Melaleuca holosericea*	Melaleuca holosericea?
Myrtaceae	*Melaleuca lateritia*	Robin Redbreast Bush
Cyperaceae	*Mesomelaena tetragona*	Semaphore Sedge
Orchidaceae	*Microtis media*	Tall Mignonette Orchid
Asteraceae	*Quinetia urvillei*	
Proteaceae	*Stirlingia latifolia*	Blueboy
Xanthorrhoeaceae	*Xanthorrhoea brunonis*	

Family	Species Name	Common Name
Xanthorrhoeaceae	*Xanthorrhoea preissii*	Grass tree

Appendix 5: FCT Species Comparison

Family	Taxon	FCT			RSR Tower Site
		3a	3b	3c	
Fabaceae	*Acacia barbinervis*		1		
Fabaceae	*Acacia drewiana*	1	1		
Fabaceae	*Acacia latericola*		1		
Fabaceae	*Acacia saligna*				1
Fabaceae	*Acacia teretifolia*		1		
Hemerocallidaceae	*Agrostocrinum scabrum*	1	1	1	
Casuarinaceae	*Allocasuarina microstachya*	1			
Poaceae	*Aristida contorta*				1
Myrtaceae	*Babingtonia camphorosmae*	1	1	1	1
Proteaceae	*Banksia armata*		1	1	
Proteaceae	*Banksia dallanneyi*				1
Myrtaceae	*Beaufortia macrostemon*	1	1		
Myrtaceae	*Beaufortia purpurea*			1	
Boryaceae	*Borya sphaerocephala*	1	1	1	1
Fabaceae	*Bossiaea angustifolia*		1		
Colchicaceae	*Burchardia multiflora*	1		1	
Myrtaceae	*Calothamnus hirsutus*	1			
Myrtaceae	*Calothamnus quadrifidus*		1		
Myrtaceae	*Calothamnus sanguineus*			1	
Myrtaceae	*Calytrix aurea*	1			
Hemerocallidaceae	*Chamaescilla versicolor*	1			
Haemodoraceae	*Conostylis caricina*	1		1	
Haemodoraceae	*Conostylis setosa*		1		
Myrtaceae	*Corymbia calophylla*				1
Fabaceae	*Cristonia biloba*	1	1	1	
Myrtaceae	*Darwinia thymoides* subsp. *thymoides*	1			
Restionaceae	*Desmocladus lateriflorus*			1	
Droseraceae	*Drosera bulbigena*	1			
Droseraceae	*Drosera bulbosa*	1	1	1	

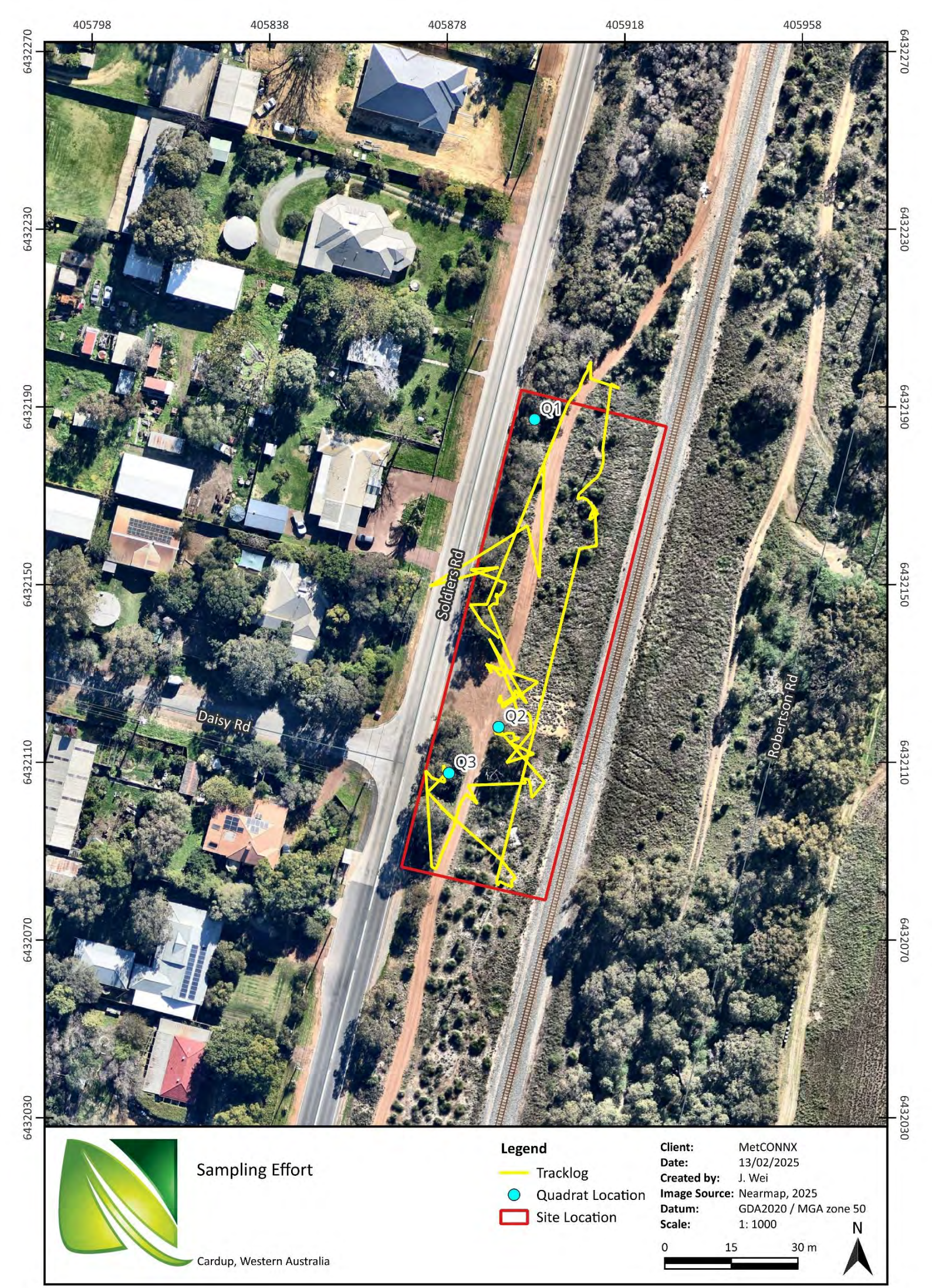
Family	Taxon	FCT			RSR Tower Site
		3a	3b	3c	
Droseraceae	*Drosera erythrorhiza*	1	1	1	
Droseraceae	*Drosera heterophylla*	1		1	
Myrtaceae	*Eucalyptus drummondii*				1
Myrtaceae	*Eucalyptus lane-poolei*	1	1		
Myrtaceae	*Eucalyptus wandoo*			1	
Fabaceae	*Gompholobium aristatum*	1	1		
Fabaceae	*Gompholobium knightianum*	1	1	1	
Fabaceae	*Gompholobium marginatum*	1	1	1	1
Fabaceae	*Gompholobium polymorphum*	1	1	1	
Proteaceae	*Grevillea bipinnatifida*	1	1	1	
Proteaceae	*Grevillea obtusifolia*	1			
Proteaceae	*Grevillea pilulifera*			1	
Proteaceae	*Grevillea wilsonii*	1	1		1
Haemodoraceae	*Haemodorum laxum*				1
Haemodoraceae	*Haemodorum simplex*	1		1	
Proteaceae	*Hakea auriculata*	1	1		
Proteaceae	*Hakea ceratophylla*	1	1		
Proteaceae	*Hakea conchifolia*		1		
Proteaceae	*Hakea cyclocarpa*		1		
Proteaceae	*Hakea erinacea*			1	
Proteaceae	*Hakea marginata*	1			
Proteaceae	*Hakea myrtoides*			1	
Proteaceae	*Hakea stenocarpa*		1		
Proteaceae	*Hakea undulata*		1	1	
Dilleniaceae	*Hibbertia commutata*		1	1	
Proteaceae	*Isopogon asper*	1	1		
Proteaceae	*Isopogon dubius*		1		
Campanulaceae	*Isotropis cuneifolia* subsp. *glabra*	1			
Fabaceae	*Jacksonia alata*			1	
Fabaceae	*Jacksonia restioides*	1			

Family	Taxon	FCT			RSR Tower Site
		3a	3b	3c	
Fabaceae	*Kennedia stirlingii*			1	
Dasypogonaceae	*Kingia australis*	1	1	1	1
Myrtaceae	*Kunzea micrantha*	1			
Myrtaceae	*Kunzea recurva*	1		1	
Proteaceae	*Lambertia multiflora* var. *darlingensis*	1	1		
Malvaceae	*Lasiopetalum glutinosa*	1			
Asparagaceae	*Laxmannia grandiflora*			1	
Cyperaceae	*Lepidosperma pubisquameum*				1
Dasypogonaceae	*Lomandra brittanii*	1	1		
Asparagaceae	*Lomandra caespitosa*				1
Asparagaceae	*Lomandra odora*	1	1		
Myrtaceae	*Melaleuca holosericea*				1
Myrtaceae	*Melaleuca lateritia*				1
Myrtaceae	*Melaleuca osullivanii*	1			
Myrtaceae	*Melaleuca radula*		1		
Cyperaceae	*Mesomelaena graciliceps*		1		
Cyperaceae	*Mesomelaena tetragona*	1	1	1	1
Orchidaceae	*Microtis media*				1
Asteraceae	*Millotia tenuifolia*	1	1		
Poaceae	*Neurachne alopecuroidea*	1	1	1	
Rubiaceae	*Opercularia apiciflora*		1	1	
Iridaceae	*Patersonia juncea*	1	1	1	
Apiaceae	*Pentapeltis peltigera*		1		
Proteaceae	*Persoonia elliptica*				
Proteaceae	*Petrophile biloba*		1		
Proteaceae	*Petrophile seminuda*	1	1		
Proteaceae	*Petrophile squamata*	1			
Philydraceae	*Philydrella drummondii*	1			
Philydraceae	*Philydrella pygmaea*	1	1	1	
Thymelaeaceae	*Pimelea imbricata* var. *major*	1	1	1	

Family	Taxon	FCT			RSR Tower Site
		3a	3b	3c	
Asteraceae	*Podolepis gracilis*	1	?		
Orchidaceae	*Prasophyllum drummondii*	1	1		
Amaranthaceae	*Ptilotus declinatus*			1	
Asteraceae	*Quinetia urvillei*				1
Goodeniaceae	*Scaevola calliptera*		1		
Goodeniaceae	*Scaevola lanceolata*	1			
Apiaceae	*Schoenolaena juncea*	1			
Proteaceae	*Stirlingia latifolia*				1
Stylidiaceae	*Stylidium affine*	1		1	
Stylidiaceae	*Stylidium breviscapum*		1	1	
Stylidiaceae	*Stylidium dichotomum*	1	1	1	
Stylidiaceae	*Stylidium ecorne*	1			
Hemerocallidaceae	*Stypandra glauca*			1	
Proteaceae	*Synaphea acutiloba*	1	1	1	
Malvaceae	*Thomasia foliosa*		1		
Malvaceae	*Thomasia macrocarpa*	1			
Asparagaceae	*Thysanotus dichotomus*			1	
Haemodoraceae	*Tribonanthes australis*	1			
Haemodoraceae	*Tribonanthes brachypetala*			1	
Haemodoraceae	*Tribonanthes longipetala*	1		1	
Rhamnaceae	*Trymalium ledifolium*	1			
Rhamnaceae	*Trymalium odoratissimum*		1		
Myrtaceae	*Verticordia huegelii*	1			
Myrtaceae	*Verticordia pennigera*	1			
Xanthorrhoeaceae	*Xanthorrhoea acanthostachya*		1		
Xanthorrhoeaceae	*Xanthorrhoea brunonis*				1
Xanthorrhoeaceae	*Xanthorrhoea gracilis*		1		
Xanthorrhoeaceae	*Xanthorrhoea preissii*				1
Apiaceae	*Xanthosia candida*	1	1	1	

Source: DBCA, 2024d.

Appendix 6: Sampling Effort



Sampling Effort

Cardup, Western Australia

Legend

- Tracklog
- Quadrat Location
- Site Location

Client:	MetCONNX
Date:	13/02/2025
Created by:	J. Wei
Image Source:	Nearmap, 2025
Datum:	GDA2020 / MGA zone 50
Scale:	1: 1000

0 15 30 m

N

Appendix C

Natural Area – MCR Environmental Surveys

MetCONNX

MCR Environmental Surveys – Abernethy Road to Mundijong Junction (CH42870)

Natural Area Holdings Pty Ltd
Whadjuk Country
57 Boulder Road, Malaga WA 6090
Ph: (08) 9209 2767
info@naturalarea.com.au
www.naturalarea.com.au



Acknowledgement of Country

Ngala kaaditj Noongar moort keyen kaadak nidja boodja.
Natural Area acknowledges the Traditional Owners of the lands on which we operate, and recognises their continuing connection to lands, waters and communities.

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System Certifications

Environmental management system registered to ISO 14001:2015
Quality management system registered to ISO 9001:2015
Occupational health and safety management system registered to ISO 45001:2018

Document Title	MCR Environmental Surveys – Abernethy Road to Mundijong Junction (CH42
Location	MetCONNX/2024 Quotes/2024 04 022 MCR Environmental Survey Scope/Report/METX R - MCR Environmental Surveys.docx

Draft/Version No.	Date	Changes	Prepared by	Approved by	Status
D1	13/05/2024	New Document	BD	JW/LI	Released

Executive Summary

Natural Area Consulting Management Services (Natural Area) was contracted by MetCONNX to undertake a basic fauna survey and a black cockatoo habitat assessment along the main cable route (MCR) along Soldiers Road, Cardup for the Byford Rail Extension (BRE) project.

Natural Area environmental scientists traversed the site and undertook the two surveys simultaneously. The surveys returned the following results:

- five fauna species were found on site from four families
- one conservation significant species, the Forest Red Tail Black Cockatoo (*Calyptorhynchus banksii naso*) was found on site
- no evidence of black cockatoo roosting was found on site, however no nocturnal survey was undertaken to confirm whether the site is used for roosting
- 171 potential breeding trees were found on site, with 20 trees having hollows present
- two suitable hollows were recorded out of the 20 hollows present, in the following species of tree:
  - *Corymbia calophylla*
  - *Eucalyptus marginata*
- there is 16.70 ha of high-quality foraging habitat on site, with 152 individual potential foraging trees recorded
- of the 152 potential foraging trees, seven showed either direct or indirect signs of black cockatoos foraging
- all trees with foraging evidence were *Corymbia calophylla*.

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1.0 Introduction

Natural Area Consulting Management Services (Natural Area) was contracted by MetCONNX to undertake environmental surveys within the rail corridor along Soldiers Road, Cardup within the Shire of Serpentine Jarrahdale. The environmental surveys were required as part of the Byford Rail Extension (BRE) project.

1.1 Location

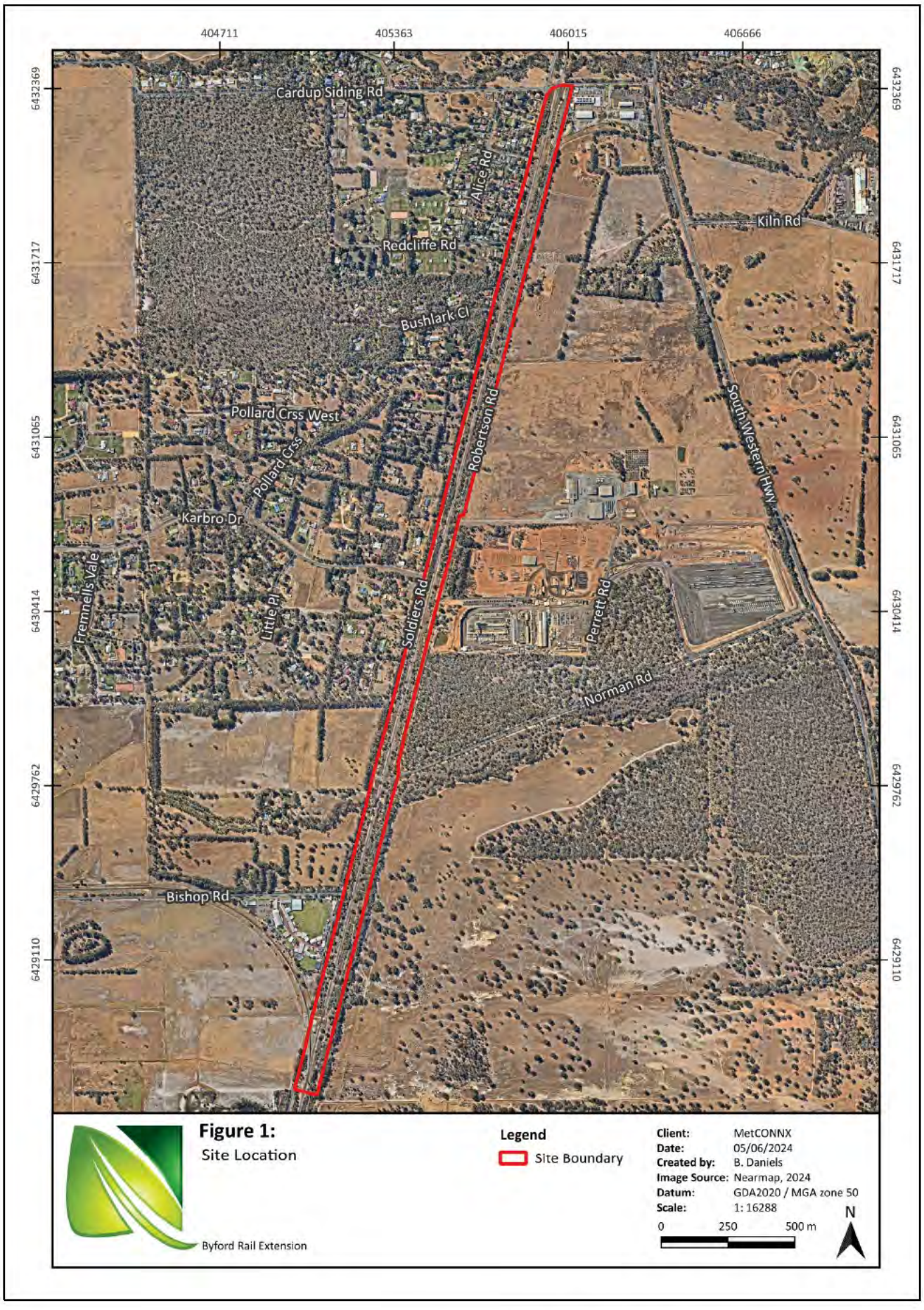
The site is located within the Shire of Serpentine Jarrahdale, along Soldiers Road. The site begins at the Soldiers Road/ Cardup Siding Road intersection in Cardup and extends southwest to the Mundijong Junction train station in Mundijong (Figure 1). The site is located within an Environmentally Sensitive Area (Department of Water and Environmental Regulation (DWER), 2021).

1.2 Scope

The scope of the environmental surveys at Abernethy Road to Mundijong Junction included:

- a basic fauna survey including the following:
  - searching for presence of tracks, scats, diggings, and bones
  - searching through micro-habitat including examining hollow logs, turning over rocks/logs and debris
  - an aural and visual search to identify bird species
  - recording GPS locations of conservation significant species observed
- a black cockatoo habitat assessment to collect the following data:
  - the GPS locations of each potential habitat tree
  - the height, DBH, health, and species of each potential habitat tree
  - evidence of hollows, including size, type, and location within the tree.

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404711
405363
406015
406666
6432369
6431717
6431065
6430414
6429762
6429110
Cardup Siding Rd
Alice Rd
Redcliffe Rd
Kiln Rd
Bushlark Cl
Robertson Rd
South Western Hwy
Pollard Crss West
Pollard Crss
Karbro Dr
Fremnells Vale
Little Pl
Soldiers Rd
Perrett Rd
Norman Rd
Bishop Rd
Figure 1:
Site Location
Byford Rail Extension
Legend
Site Boundary
Client: MetCONNX
Date: 05/06/2024
Created by: B. Daniels
Image Source: Nearmap, 2024
Datum: GDA2020 / MGA zone 50
Scale: 1: 16288
0 250 500 m
N

2.0 Site Characteristics

The characteristics of the site have a strong bearing on the fauna and black cockatoo species present. The key characteristics of the Abernethy Road to Mundijong Junction site are outlined in this section.

2.1 Regional Context

The site is located within the Perth (SWA02) IBRA subregion (Department of Climate Change, Energy, the Environment and Water (DCCEW), 2024a). This region is characterised by low lying plains, with some swampy areas and duricrusted Mesozoic sediments rising in the east. Soils are generally comprised of colluvial and aeolian sands, alluvial river flats and coastal limestones (Mitchell, Williams and Desmond, 2002). Banksia, Jarrah and Marri dominate the landscape, with some areas of Casuarina obesa – Marri woodlands and Melaleuca shrublands (Mitchell et al., 2002).

2.2 Climate

The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters. According to the Bureau of Meteorology (2024); Karnet WA, site number 009111, 2024, the region has an average:

- Rainfall of 1134.2 mm pa, with rain falling predominantly between May and September
- Maximum temperature ranging from 16.0 °C in winter to 29.8 °C in summer, with a maximum recorded temperature of 44.5 °C
- Minimum temperatures ranging from 6.6 °C in winter to 14.9 °C in summer, with a minimum recorded temperature of -2.0 °C
- Predominant wind directions include morning easterlies and afternoon westerlies with an average wind speed of 12.8 km/h and gusts of more than 100 km/h.

2.3 Black Cockatoo Habitat

There is the potential for the three threatened black cockatoos and their habitat to occur on site, including the Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (Cwlth), the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and the Baudin's Black Cockatoo (*Zanda baudinii*) listed as Vulnerable. All are listed as Threatened under the *Biodiversity Conservation Act 2016* (WA)(BC Act). The survey site occurs within an area classified as the following:

- Carnaby's Cockatoo Areas requiring investigation as feeding habitat in the Swan Coastal Plain IBRA Region (Department of Biodiversity, Conservation and Attractions (DBCA), 2018a)
- Carnaby's Cockatoo Unconfirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA regions (DBCA, 2018b)

The site also occurs within 6 km of areas classified as the following:

- Black Cockatoo Roosting Site with Buffer (DBCA, 2019a)
- Carnaby's Cockatoo Unconfirmed Roosting Site with Buffer (DBCA, 2018c)
- Carnaby's Cockatoo Confirmed Roosting Site with Buffer (DBCA, 2018d)

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3.0 Methodology

3.1 Desktop and Literature Review

The desktop survey included reviewing online databases to gather contextual knowledge and determine preliminary site characteristics including:

- likely native fauna and black cockatoo species present
- current extent of native vegetation
- likely presence of threatened or priority fauna species.

Conservation code definitions for the State and Commonwealth are provided in Appendix 1.

3.2 On-ground Fauna Survey

The fauna survey was completed in accordance with a Basic Fauna Survey as outlined in the *Technical Guidance, Terrestrial vertebrate fauna surveys for environmental impact assessment* (Environmental Protection Authority (EPA), 2020). Natural Area environmental scientists traversed the site across six days in May 2024 and undertook this survey in conjunction with other survey activities. A basic survey is defined as a low-intensity survey, which gathers broad fauna and habitat information including opportunistic fauna observations (EPA, 2020). The fauna survey included recording opportunistic sightings of fauna species while traversing the survey area, along with recording evidence of their presence in the form of:

- scats
- tracks
- diggings
- burrows, dens and warrens
- runnels (vegetative tunnels)
- calls.

3.3 Black Cockatoo Habitat Assessment

A Black Cockatoo habitat assessment was conducted in accordance with *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo* (Department of Agriculture, Water and the Environment (DAWE), 2022).

Natural Area environmental scientists undertook the survey across six days in May 2024 with key data recorded using Mappt software on a handheld tablet. Survey activities included:

- traversing the whole site in a systematic grid search
- recording the location and evidence of breeding, roosting and foraging activities (e.g. chew marks, feathers, scats)
- marking the GPS locations of each habitat tree with a diameter at breast height (DBH) ≥ 500 mm (≥ 300 mm for *Eucalyptus wandoo* (Wandoo) and *Eucalyptus salmonophloia* (Salmon Gum))
- recording the height, DBH, health, and species of each habitat tree
- recording evidence of hollows, including size, type, and location within the tree
- recording foraging habitat, vegetation type, and condition.

The black cockatoo foraging quality scoring tool was applied to determine the quality of foraging at all sites. Due to the proximity of sites, they were assessed collectively as a single foraging patch. The tool assigns the site with a score from 0 (low quality) to 10 (high quality) based on factors such as foraging potential,

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connectivity, proximity to breeding sites, proximity to roosting sites and impact from significant plant diseases. The foraging quality scoring tool template is provided below in Table 1.

Table 1: Foraging quality scoring tool template

Starting score		Baudin's Cockatoo	Carnaby's Cockatoo	Forest Red-tailed Black-Cockatoo
10		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as Banksia spp. (including Dryandra spp.), Hakea spp. and Grevillea spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. This tool only applies to sites equal to or larger than 1 hectare in size.
Attribute	**Sub-tractions**	**Context adjustor (attributes reducing functionality of foraging habitat)**		
Foraging potential	-2	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.
Connectivity	-2	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.
Proximity to breeding	-2	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.
Proximity to roosting	-1	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.
Impact from significant plant disease	-1	Subtract 1 if your site has disease present (e.g. Phytophthora spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. Phytophthora spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. Phytophthora spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.
Total score		Enter score	Enter score	Enter score
Appraisal		To support your habitat score, you should provide an overall appraisal of the habitat on the impact site and within 20km of the impact area to clearly explain and justify the score. It should include discussion on the foraging habitat's proximity to other resources (e.g. exact distance to proximate resources), frequency of use of proximate sites, the degree of evidence and description of vegetation type and condition.		

Source: DAWE, 2022

3.4 Limitations

The limitation associated with the project are outlined in Table 2 below.

Table 2: Fauna and black cockatoo survey limitations

Potential Limitation	Degree of Limitation	Comments
Availability of contextual information	None	Regional and local information was readily available for the site. Database searches and previous surveys of the site were made available to Natural Area.
Competency/experience of team	None	Survey activities were undertaken by experienced environmental scientists who have extensive experience undertaking fauna surveys and black cockatoo habitat assessments within the Swan Coastal Plain, Jarrah Forest and Avon Wheatbelt.
Survey effort and extent	Minor	All of site was able to be traversed. The survey effort (basic fauna survey and black cockatoo habitat assessment was appropriate for the requirements of the project. All potential black cockatoo hollows were able to be checked for occupancy by using a telescopically mounted go-pro. No nocturnal survey was undertaken to determine roosting habitat. Surveys were undertaken during daylight hours and found no evidence of black cockatoo roosting however, a nocturnal survey should be undertaken to confirm this.
Access restrictions	None	No access restrictions were present at the time of the surveys.
Disturbances	None	No recent disturbances which may have had an impact on survey results (e.g. fire, recent clearing or floods) were identified during the survey.

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4.0 Fauna Survey Results

4.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 70 conservation significant fauna species to occur within 10 km of the survey area (Table 3). NatureMap indicated 26 conservation significant species listed under the *Biodiversity Conservation Act 2016* (WA) as potentially occurring within a 10 km radius of the site (DBCA, 2024a). The Protected Matters Search Tool (PMST) indicated 27 threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the site (DCCEEW, 2024b) (Appendix 2). A review of the DBCA threatened and priority fauna species database indicated the potential for 64 conservation significant fauna species to occur within a 20 km radius of the site (DBCA, 2024b).

Both abiotic (soil, climate) as well as biotic (food resources, predator pressure) will determine the suitability of habitats for specific fauna assemblages, based on their ecological requirements. Evaluating the site locality, existing conditions and known home ranges, Natural Area determined that the following 14 species (highlighted green in Table 3) have the potential to be present within the survey site.

Table 3: Threatened and Priority fauna species listed by DBCA

Species Name	Lifeform	Cons Code (WA)	Cons Code (EPBC)	DBCA	PMST	Nature Map
Acanthophis antarcticus	REPTILE	P3		X		X
Actitis hypoleucos	BIRD	MI	MI	X	X	X
Apus pacificus	BIRD	MI	MI	X	X	
Arenaria interpres	BIRD	MI	MI	X		
Bettongia penicillata ogilbyi	MAMMAL	CR	EN	X	X	
Bubulcus ibis as Ardea ibis	BIRD		MI		X	
Botaurus poiciloptilus	BIRD	EN	EN	X	X	
Cacatua pastinator pastinator	BIRD	CD		X		
Calidris acuminata	BIRD	MI	MI	X	X	
Calidris canutus	BIRD	EN	EN & MI	X		
Calidris ferruginea	BIRD	CR	CR & MI	X	X	X
Calidris melanotos	BIRD	MI	MI	X	X	
Calidris pugnax	BIRD	MI	MI	X		
Calidris ruficollis	BIRD	MI	MI	X		X
Calidris subminuta	BIRD	MI	MI	X		
Calidris tenuirostris	BIRD	CR	CR & MI	X		
Calyptorhynchus banksii naso	BIRD	VU	VU	X	X	X

Species Name	Lifeform	Cons Code (WA)	Cons Code (EPBC)	DBCA	PMST	Nature Map
Charadrius dubius	BIRD	MI	MI	X		
Charadrius leschenaultii	BIRD	VU	VU & MI	X	X	
Chlidonias leucopterus	BIRD	MI	MI	X		
Ctenotus delli	REPTILE	P4		X		X
Ctenotus gemmula (Swan Coastal Plain subpopulation)	REPTILE	P3		X		
Dasyurus geoffroii	MAMMAL	VU	VU	X	X	X
Dasyurus geoffroii fortis	MAMMAL	VU	VU	X		X
Elanus scriptus	BIRD	P4		X		
Falco peregrinus	BIRD	OS		X		X
Falco peregrinus macropus	BIRD	OS		X		
Falsistrellus mackenziei	MAMMAL	P4		X		
Geotria australis	FISH	P3		X		X
Glareola maldivarum	BIRD	MI	MI	X		
Haliaeetus leucogaster	BIRD		MI		X	
Hydromys chrysogaster	MAMMAL	P4		X		X
Hydroprogne caspia	BIRD	MI	MI	X		X
Isoodon fusciventer	MAMMAL	P4		X		X
Ixobrychus dubius	BIRD	P4		X		
Leipoa ocellata	BIRD	VU	VU	X	X	X
Lerista lineata	REPTILE	P3		X		
Limosa lapponica	BIRD	MI	MI	X		
Limosa limosa	BIRD	MI	MI	X		
Merops ornatus	BIRD		MI		X	
Motacilla cinerea	BIRD		MI		X	
Myrmecobius fasciatus	MAMMAL	EN	EN	X	X	X
Neelaps calonotos	REPTILE	P3		X		
Notamacropus eugenii derbianus	MAMMAL	P4		X		X
Notamacropus irma	MAMMAL	P4		X		
Numenius madagascariensis	BIRD	CR	CR & MI	X	X	
Oxyura australis	BIRD	P4		X		X

Species Name	Lifeform	Cons Code (WA)	Cons Code (EPBC)	DBCA	PMST	Nature Map
Pandion haliaetus	BIRD	MI	MI	X	X	
Phaethon rubricauda	BIRD	MI & P4	MI	X		
Phascogale tapoatafa wambenger	MAMMAL	CD		X		X
Platycercus icterotis xanthogenys	BIRD	P4		X		
Plegadis falcinellus	BIRD	MI	MI	X		X
Pluvialis fulva	BIRD	MI	MI	X		
Pluvialis squatarola	BIRD	MI	MI	X		
Pseudocheirus occidentalis	MAMMAL	CR	CR	X	X	X
Rostratula australis	BIRD		EN		X	
Setonix brachyurus	MAMMAL	VU	VU	X	X	X
Stercorarius longicaudus	BIRD	MI	MI	X		
Sternula nereis nereis	BIRD		VU		X	
Thalassarche chrysostoma	BIRD	VU	EN & MI	X		
Thalasseus bergii	BIRD	MI	MI	X		
Thinornis cucullatus	BIRD	P4		X	X	
Tringa glareola	BIRD	MI	MI	X		
Tringa nebularia	BIRD	MI	MI	X	X	X
Tringa stagnatilis	BIRD	MI	MI	X		
Tyto novaehollandiae novaehollandiae	BIRD	P3		X		
Westralunio carteri	OTHER	VU	VU	X	X	X
Zanda baudinii	BIRD	EN	EN	X	X	X
Zanda latirostris	BIRD	EN	EN	X	X	X
Zanda sp. 'white-tailed black cockatoo'	BIRD	EN	EN			X

4.2 Basic Fauna Survey Results

Five fauna species from four different families were observed during the survey (Table 4). There were four bird species and one mammal. One conservation significant species, the Forest Red Tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable) was found on site. The Common Brushtail Possum (*Trichosurus vulpecula*) was observed through the presence of fresh scat on site. All other recorded species were directly observed on site. Examples of fauna species observed on site have been provided in Figure 2.

Table 4: Fauna observations within the rail alignment. * denotes introduced species

Family	Species Name	Common Name
Bird		
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red Tailed Black Cockatoo
Campephagidae	*Coracina novaehollandiae*	Black- Faced Cuckooshrike
Psittaculidae	*Purpureicephalus spurius*	Red- capped Parrot
Psittaculidae	*Barnardius zonarius*	Australian Ringneck
Mammal		
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum



Red- capped Parrot (*Purpureicephalus spurius*)



Forest Red Tailed Black Cockatoo (*Calyptorhynchus banksii naso*)

Figure 2: Fauna species observed. *denotes introduced species.

5.0 Black Cockatoo Habitat Assessment Results

5.1 Desktop Survey

A desktop search of the Naturemap (DBCA, 2024a), DBCA threatened and priority list (DBCA, 2024b) and PMST (DCCEW, 2024b) databases show that all three black cockatoo species are likely to occur on site (Table 5). Both abiotic (soil, climate) as well as biotic (food resources, predator pressure) will determine the suitability of habitats for specific fauna assemblages, based on their ecological requirements. Evaluating the site locality, existing conditions and known home ranges, Natural Area determined that all three species have the potential to be present within the survey site.

Table 5: Black cockatoo species with the potential to occur on site as listed by the DBCA database

Species Name	Cons Code (WA)	Cons Code (EPBC)	DBCA	PMST	Nature Map
Zanda baudinii	EN	EN	X	X	X
Zanda latirostris	EN	EN	X	X	X
Calyptorhynchus banksii naso	VU	VU	X	X	X

5.2 Field Survey

5.2.1 Black Cockatoo Roosting Habitat

No evidence of roosting in the form of scats or feathers was observed within the survey area at the time of the survey; however, dusk surveys would be required to confirm whether any roost sites are present within proximity to the survey area.

5.2.2 Black Cockatoo Breeding Habitat

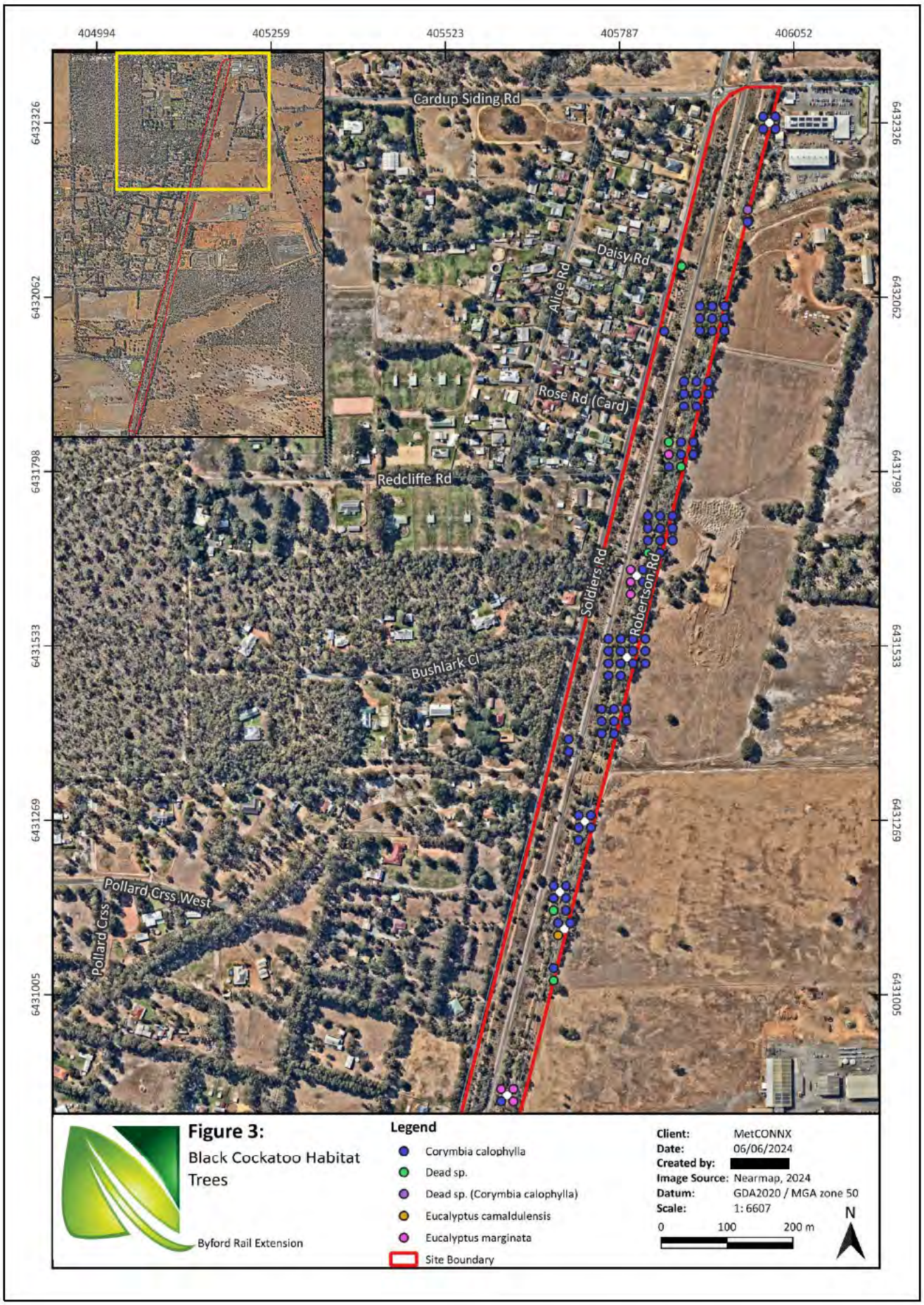
A total of 171 potential breeding trees (DBH ≥ 500 mm) were found within the rail alignment (Figures 3 - 5). Trees consisted of 11 different species:

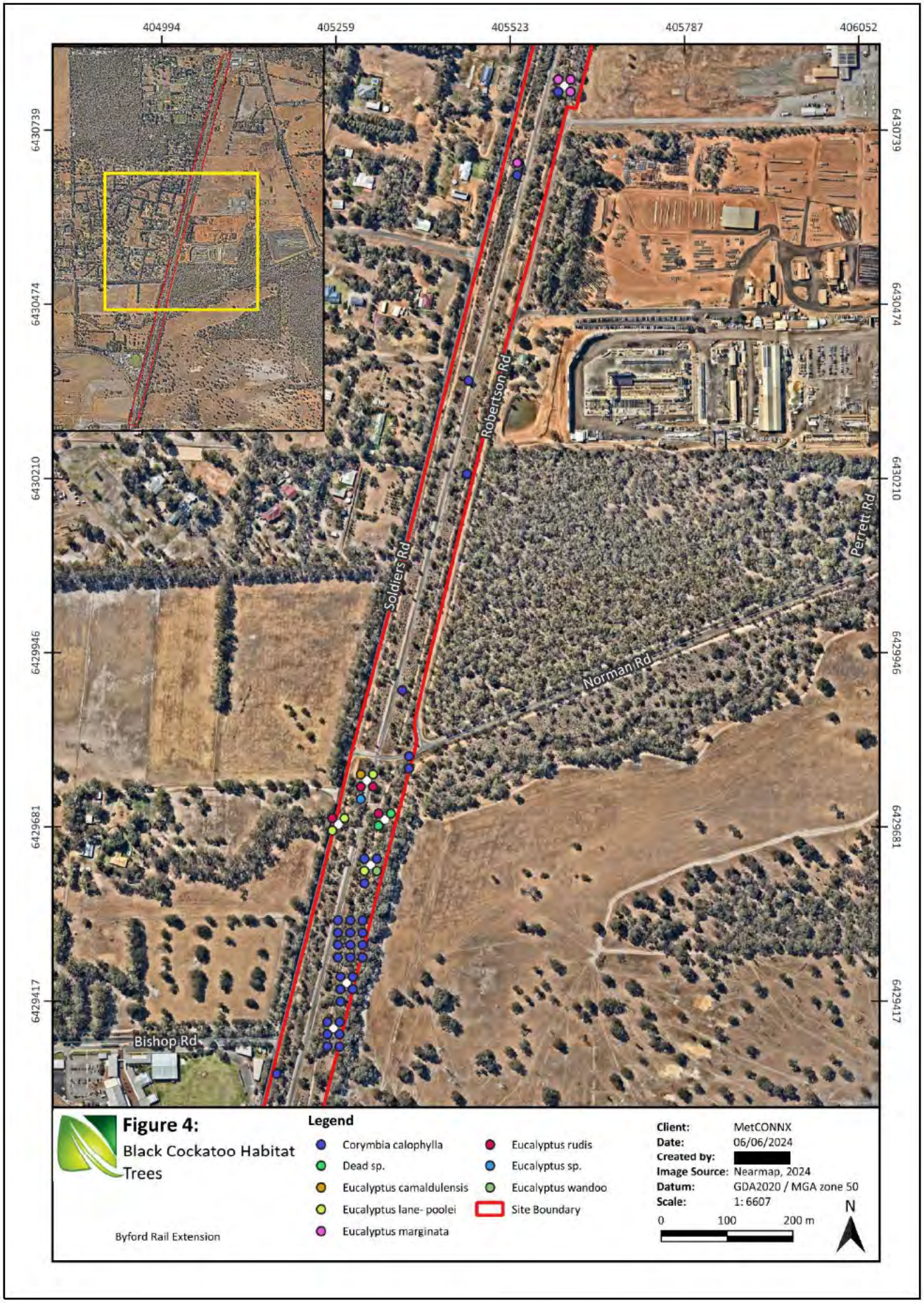
- *Allocasuarina fraseriana*
- *Corymbia calophylla*
- Dead sp.
- Dead sp. *(Corymbia calophylla)*
- *#Eucalyptus camaldulensis*
- *#Eucalyptus lane- poolei*
- *Eucalyptus marginata*
- *Eucalyptus rudis*
- *Eucalyptus* sp.
- *Eucalyptus wandoo*

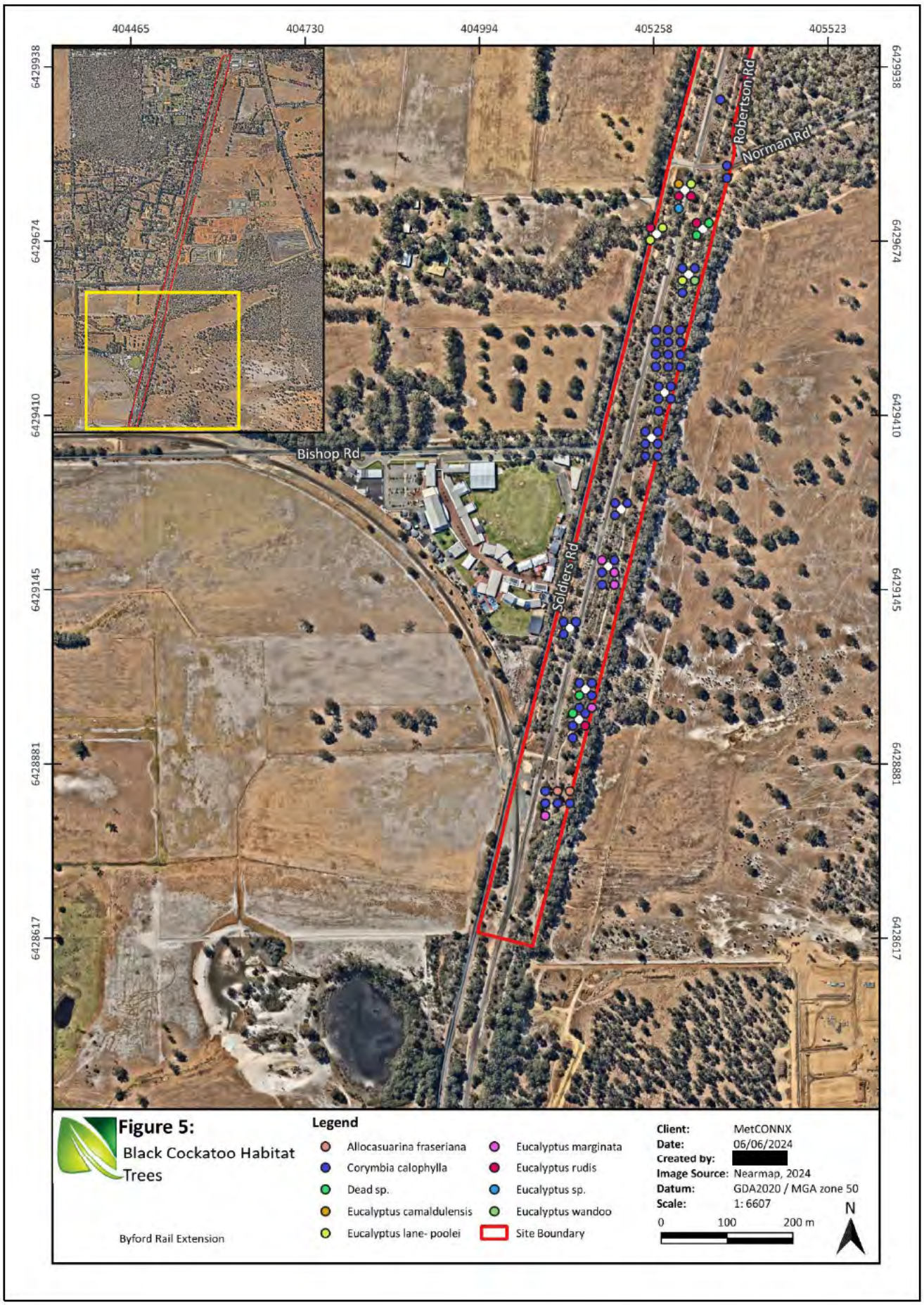
The size of the potential habitat trees ranged from 500 to 1273 mm DBH. Of these potential habitat trees, 20 had hollows present (Figure 6). Two of the hollows were deemed suitable for black cockatoo breeding purposes and had a suitable size, appropriate entrance angle, height on trunk and no current occupants, one of which showed evidence of possible usage by black cockatoos previously (Figure 7). Unsuitable hollows were classed as such due to a small entrance size (< 100 mm) or insufficient space inside the hollow. Three hollows also had bees present; however, these were already deemed unsuitable due to size.

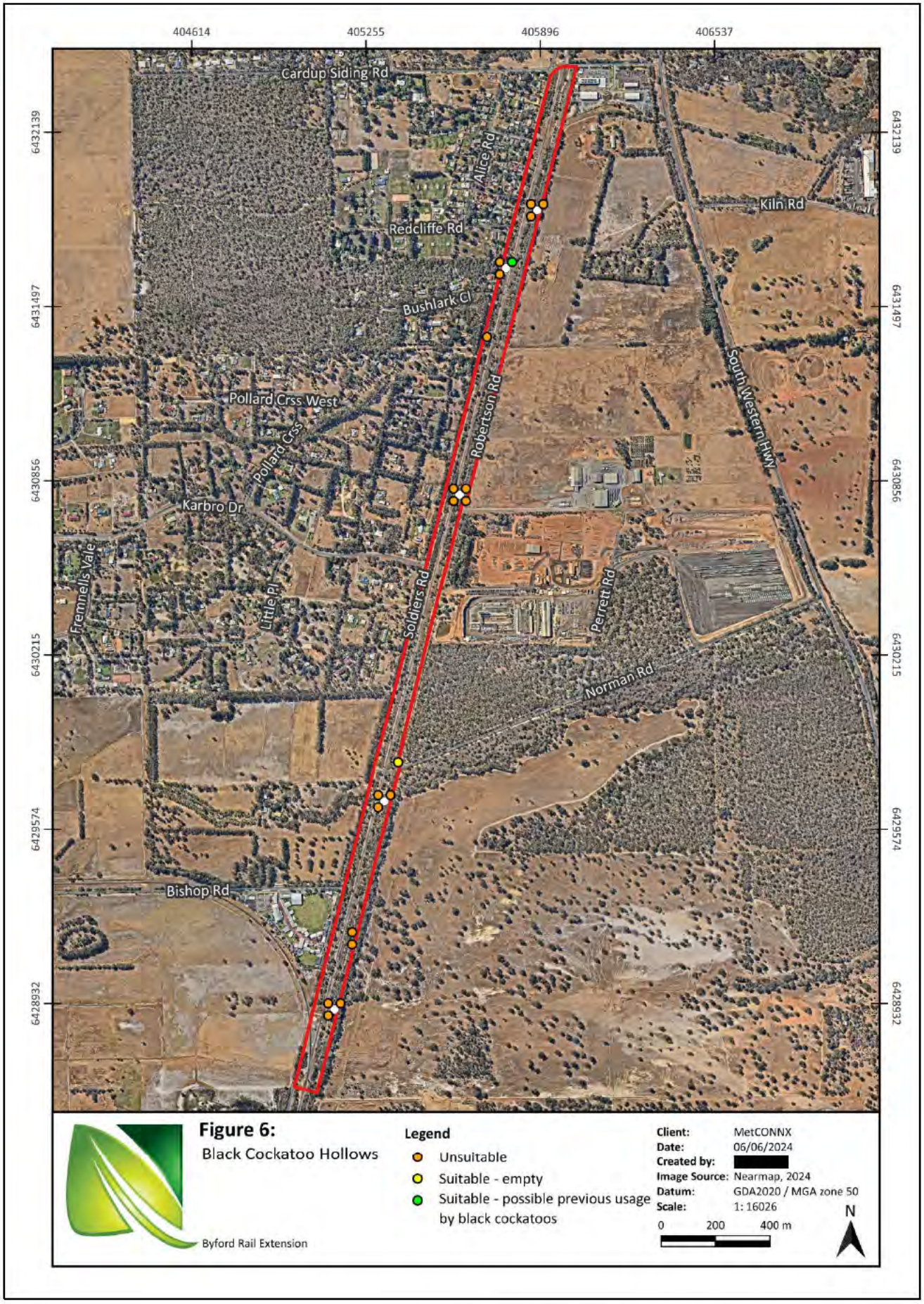
Complete black cockatoo habitat tree data has been provided in Appendix 3.

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404994
405259
405523
405787
406052
6432326
6432062
6431798
6431533
6431269
6431005
Cardup Siding Rd
Daisy Rd
Alice Rd
Rose Rd (Card)
Redcliffe Rd
Soldiers Rd
Robertson Rd
Bushlark Cl
Pollard Crss West
Pollard Crss
Figure 3:
Black Cockatoo Habitat Trees
Byford Rail Extension
Legend
Corymbia calophylla
Dead sp.
Dead sp. (Corymbia calophylla)
Eucalyptus camaldulensis
Eucalyptus marginata
Site Boundary
Client: MetCONNX
Date: 06/06/2024
Created by: [redacted]
Image Source: Nearmap, 2024
Datum: GDA2020 / MGA zone 50
Scale: 1: 6607
0 100 200 m
N

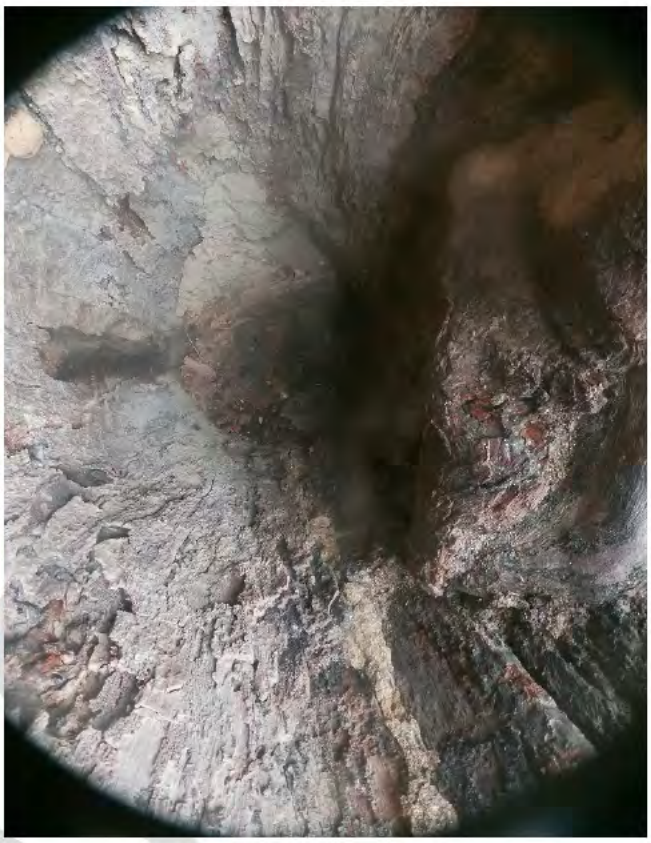

404994
405259
405523
405787
406052
6430739
6430474
6430210
6429946
6429681
6429417
Robertson Rd
Soldiers Rd
Perrett Rd
Norman Rd
Bishop Rd
Figure 4:
Black Cockatoo Habitat Trees
Byford Rail Extension
Legend
Corymbia calophylla
Dead sp.
Eucalyptus camaldulensis
Eucalyptus lane- poolei
Eucalyptus marginata
Eucalyptus rudis
Eucalyptus sp.
Eucalyptus wandoo
Site Boundary
Client: MetCONNX
Date: 06/06/2024
Created by: [redacted]
Image Source: Nearmap, 2024
Datum: GDA2020 / MGA zone 50
Scale: 1: 6607
0 100 200 m
N


404465
404730
404994
405258
405523
6429938
6429674
6429410
6429145
6428881
6428617
Robertson Rd
Norman Rd
Bishop Rd
Soldiers Rd
Figure 5:
Black Cockatoo Habitat Trees
Byford Rail Extension
Legend
Allocasuarina fraseriana
Corymbia calophylla
Dead sp.
Eucalyptus camaldulensis
Eucalyptus lane- poolei
Eucalyptus marginata
Eucalyptus rudis
Eucalyptus sp.
Eucalyptus wandoo
Site Boundary
Client: MetCONNX
Date: 06/06/2024
Created by: [redacted]
Image Source: Nearmap, 2024
Datum: GDA2020 / MGA zone 50
Scale: 1: 6607
0 100 200 m
N


404614
405255
405896
406537
6432139
6431497
6430856
6430215
6429574
6428932
Cardup Siding Rd
Alice Rd
Kiln Rd
Redcliffe Rd
Bushlark Cl
Robertson Rd
South Western Hwy
Pollard Crss West
Pollard Crss
Karbro Dr
Fremnells Vale
Little Pl
Soldiers Rd
Perrett Rd
Norman Rd
Bishop Rd
Figure 6:
Black Cockatoo Hollows
Byford Rail Extension
Legend
Unsuitable
Suitable - empty
Suitable - possible previous usage by black cockatoos
Client: MetCONNX
Date: 06/06/2024
Created by: [redacted]
Image Source: Nearmap, 2024
Datum: GDA2020 / MGA zone 50
Scale: 1: 16026
0 200 400 m
N



Hollow possibly used by black cockatoos



Example of a suitable hollow





Examples of unsuitable hollows

Figure 7: Examples of hollows found on site

5.2.3 Black Cockatoo Foraging Habitat

Vegetation types have been previously mapped for the site, with six appropriate vegetation types for black cockatoo foraging purposes, with a total area of 16.70 ha (Focused Vision Consulting, 2022) (Appendix 4). A breakdown of these vegetation types in regard to potential use by each black cockatoo species has been provided in Table 6. A total of 152 individual trees were recorded as potential black cockatoo foraging trees during the current survey, with foraging evidence recorded at seven individual trees. Potential foraging species recorded on site consisted of:

- *Allocasuarina fraseriana*
- *Corymbia calophylla*
- *Eucalyptus camaldulensis*
- *Eucalyptus marginata*
- *Eucalyptus sp.*
- *Eucalyptus wandoo.*

Both direct and indirect evidence of black cockatoo foraging was found on site (Figure 8). Indirect evidence included chewed marri nuts. Chew marks were identified to be from Forest Red Tail Black Cockatoos. Forest Red Tail Black Cockatoos (*Calyptorhynchus banksii naso*) were also observed to be feeding on Marri (*Corymbia calophylla*) site at the time of the survey. The black cockatoo habitat foraging scoring tool (DAWE, 2022) was used to determine the quality of the foraging available within the Byford Rail alignment. Results have been outlined in Table 7.

Table 6: Habitat areas per black cockatoo species.

Baudin's Cockatoo	Carnaby's Cockatoo	Forest Red- tailed Black Cockatoo
Total Area of Foraging Habitat (ha)		
16.70	16.70	15.65
Habitat Types		
▪ Banksia/ Xanthorrhoea Woodland ▪ Marri/ Xanthorrhoea Woodland ▪ Marri/ Xanthorrhoea/ Kingia Woodland ▪ Wandoo Woodland ▪ Marri over weeds ▪ *Eucalyptus rudis* over weeds ▪ Rehab	▪ Banksia/ Xanthorrhoea Woodland ▪ Marri/ Xanthorrhoea Woodland ▪ Marri/ Xanthorrhoea/ Kingia Woodland ▪ Wandoo Woodland ▪ Marri over weeds ▪ *Eucalyptus rudis* over weeds ▪ Rehab	▪ Marri/ Xanthorrhoea Woodland ▪ Marri/ Xanthorrhoea/ Kingia Woodland ▪ Wandoo Woodland ▪ Marri over weeds

Source: Focused Vision Consulting, 2022

Table 7: Foraging quality scoring tool results

Starting score	Baudin's Cockatoo	Carnaby's Cockatoo	Forest Red-tailed Black-Cockatoo
10	Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as Banksia spp. (including Dryandra spp.), Hakea spp. and Grevillea spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. This tool only applies to sites equal to or larger than 1 hectare in size.

Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat)		
Foraging potential	-2	8 (-2)	8 (-2)	10
Connectivity	-2	8	8	10
Proximity to breeding	-2	8	8	10
Proximity to roosting	-1	8	8	10
Impact from significant plant disease	-1	8	8	10
Total score		**8**	**8**	**10**
Appraisal	The site consists of Marri, Jarrah, Wandoo and proteaceous trees and shrubs along a roadside. There are areas of *Eucalyptus rudis* woodlands and planted eucalyptus and proteaceous species (Focused Vision Consulting, 2022). The site is larger than 1 ha. Vegetation types have been previously mapped for the site, with 16.70 ha of appropriate foraging vegetation overall (Focused Vision Consulting, 2022). There is evidence of feeding from Forest Red Tail Black Cockatoos only. The site falls within known feeding areas and an unconfirmed breeding site. The site is in close proximity (<20 km) of known night roosting habitat. There were no significant impacts from plant disease observed on site at the time of the survey. According to the *Referral Guideline for 3 WA Threatened Black Cockatoo Species* (DAWE, 2022) the site contains high quality foraging habitat (score of >4) for all three black cockatoo species.			

Source: DAWE, 2022

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Foraging evidence of Forest Red Tailed Black Cockatoos on Marri nuts



Forest Red Tail Black Cockatoos sighted foraging

Figure 8: Examples of black cockatoo foraging.

6.0 Implications of Results

6.1 Fauna

Fauna species throughout site included members from four families. A total of five species were found throughout site. Four species found were bird species, and one was a mammal. Birds were sighted through visual observation of the animal, and the mammal (Common Brushtail Possum) was found by secondary evidence (fresh scat). One conservation significant fauna species was found within the site, the Forest Red Tail Black Cockatoo (*Calyptorhynchus banksii naso*). This species is classified as Vulnerable under both WA and federal legislation.

6.2 Black Cockatoo Habitat

No evidence of black cockatoo roosting was found on site however, a nocturnal/ dusk survey would be required to confirm night roosting on site.

There were 172 potential breeding trees (DBH >500 mm) found on site. Of these, 20 had hollows present. A further internal hollow inspection with a telescopically mounted camera found that only two of the hollows are potentially suitable for black cockatoo breeding use (of an appropriate size and shape). These hollows were located in a *Corymbia calophylla* (Marri) and a *Eucalyptus marginata* (Jarrah) tree. One hollow showed chew marks on the inside, which can be a sign of previous black cockatoo habitation. No other signs of habitation were sighted however so this hollow has been classified as a potential breeding hollow. Unsuitable hollows were too small, too fractured or occupied by bees, and as such were classified as unsuitable.

Suitable vegetation present on site included several Eucalypt species (*Eucalyptus* spp. and *Corymbia calophylla*). Other vegetation types found on site during a previous survey included *Banksia* woodlands and planted areas consisting of *Eucalyptus* and proteaceous species (Focused Vision Consulting, 2022). There was 16.70 ha consisting of seven vegetation types of appropriate foraging habitat for Carnaby's and Baudin's black cockatoos and 15.65 ha consisting of four vegetation types of suitable foraging habitat for Forest Red Tail Black Cockatoos. Overall, 152 individual trees were marked as potential foraging habitat, with seven trees showing evidence of foraging activity. All seven trees were *Corymbia calophylla*. When assessed using the *Black Cockatoo Foraging Scoring Tool* (DAWE, 2022), it was found that the site consists of an appropriate size (>1 ha) and composition of foraging habitat for all three black cockatoo species and provides high quality black cockatoo feeding habitat (score of 5 - 10). Additionally, Forest Red Tail Black Cockatoos were seen foraging on site at the time of the survey. Chewed Marri nuts were found at the base of trees, indicating the site provides sizable foraging habitat for black cockatoos.

Overall, the site possesses suitable foraging habitat and potentially suitable breeding habitat for black cockatoos. The site is currently in use as a feeding ground for Forest Red Tail Black Cockatoos.

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Appendix 1: Conservation Codes

Western Australia

Conservation Code	Name	Description
T	Threatened	Flora or fauna that is rare or likely to become extinct, ranked according to their level of threat using IUCN Red List criteria (Schedules 1-3 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
CR	Critically endangered	Species considered to be facing an extremely high risk of extinction within the wild in the immediate future
EN	Endangered	Species considered to be facing a very high risk of extinction in the wild in the near future
VU	Vulnerable	Species considered to be facing a high risk of extinction in the wild in the medium-term future
EX	Extinct Species	Species where 'there is no reasonable doubt that the last member of the species has died (Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
EW	Extinct in the Wild	Species that are known to only survive in cultivation, in captivity, or as a naturalised population well outside its past range; and it has not been recorded in its known or expected habitat at appropriate seasons anywhere in its past range, despite surveys over a timeframe appropriate to its life cycle and form
MI	Migratory Species	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth (Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice)
CD	Conservation Dependent	Species of special conservation interest (conservation dependent fauna), being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened (Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice)
OS	Specially Protected	Fauna otherwise in need of special protection to ensure their conservation (Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice)
P	Priority Species	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or

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Conservation Code	Name	Description
		flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.
P1	Priority One	Poorly known species – Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either very small or on lands not managed for conservation, such as road verges, urban areas, farmland, active mineral lease and under threat of habitat destruction or degradation.
2	Priority Two	Poorly known species – Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, such as national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves and similar.
3	Priority Three	Poorly known species – Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat
4	Priority Four	Rare or near threatened and other species in need of monitoring.

(Source: DBCA, 2020)

Commonwealth

Category	Description
Critically Endangered	Species facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Species facing a very high risk of extinction in the wild in the near future
Vulnerable	Species facing a high risk of extinction in the wild in the medium term

(Source: DBCA, 2019a)

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Appendix 2: Protected Matters Search Tool

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EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-May-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	40
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	7
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	15
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	35
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Forrestdale and thomsons lakes	Within 10km of Ramsar site	In buffer area only
Peel-yalgorup system	20 - 30km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area	In feature area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area	In buffer area only
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area	In feature area
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area	In feature area
Empodisma peatlands of southwestern Australia	Endangered	Community may occur within area	In buffer area only
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Zanda latirostris listed as Calyptorhynchus latirostris			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area	In feature area
INSECT			
Leioproctus douglasiellus			
a short-tongued bee [66756]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Neopasiphae simplicior			
A native bee [66821]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Bettongia penicillata ogilbyi			
Woylie [66844]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Myrmecobius fasciatus			
Numbat [294]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Pseudocheirus occidentalis			
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Setonix brachyurus			
Quokka [229]	Vulnerable	Species or species habitat known to occur within area	In feature area
OTHER			
Westralunio carteri			
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
PLANT			
Andersonia gracilis			
Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area	In feature area
Anthocercis gracilis			
Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area	In feature area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area	In buffer area only
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area	In feature area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat known to occur within area	In feature area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area	In buffer area only
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area	In feature area
Morelotia australiensis listed as Tetraria australiensis Southern Tetraria [92784]	Vulnerable	Species or species habitat known to occur within area	In feature area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Synaphea sp. Pinjarra Plain (A.S.George 17182) [86878]	Endangered	Species or species habitat known to occur within area	In feature area
Synaphea sp. Serpentine (G.R.Brand 103) [86879]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area	In feature area
Verticordia plumosa var. ananeotes Tufted Plumed Featherflower [23871]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat likely to occur within area	In feature area
Charadrius leschenaultii			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51919]	WA	In buffer area only
Commonwealth Land - [50876]	WA	In buffer area only
Commonwealth Land - [50854]	WA	In buffer area only
Commonwealth Land - [51524]	WA	In buffer area only
Commonwealth Land - [51976]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - [51517]	WA	In buffer area only
Commonwealth Land - [51380]	WA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Banksia	Nature Reserve	WA	In buffer area only
Cardup	Nature Reserve	WA	In buffer area only
Gooralong	Conservation Park	WA	In buffer area only
Karnet	Nature Reserve	WA	In buffer area only
Lambkin	Nature Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Modong	Nature Reserve	WA	In buffer area only
NTWA Bushland covenant (0011)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0076)	Conservation Covenant	WA	In buffer area only
Serpentine	National Park	WA	In buffer area only
Unnamed WA42044	Nature Reserve	WA	In buffer area only
Unnamed WA46587	Nature Reserve	WA	In buffer area only
Unnamed WA46818	Nature Reserve	WA	In feature area
Unnamed WA51784	Nature Reserve	WA	In buffer area only
Unnamed WA51963	Conservation Park	WA	In buffer area only
Watkins Road	Nature Reserve	WA	In buffer area only

Regional Forest Agreements

[Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State	Buffer Status
South West WA RFA	Western Australia	In buffer area only

EPBC Act Referrals

[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Huntly Bauxite Mine Transition	2022/09204		Assessment	In buffer area only
Keirnan Park Recreation Precinct	2023/09573		Referral Decision	In buffer area only
Orton Road Upgrade Project	2023/09680		Completed	In buffer area only
Controlled action				
Alcoa Pinjarra Refinery Production Increase and Bauxite Export	2020/8743	Controlled Action	Completed	In buffer area only
Byford Rail Extension, Byford, WA	2020/8764	Controlled Action	Post-Approval	In buffer area only
Byford Whitby Quarry, portion of Mining Lease M701240	2021/9045	Controlled Action	Further Information Request	In buffer area only
Clearing, mining and rehabilitation Scrivener Road	2015/7577	Controlled Action	Further Information	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Gravel reserves			Request	
Construction of Road and Extension of Utilities on Turner Street, Serpentine	2008/4670	Controlled Action	Post-Approval	In buffer area only
Extraction of sand from Lot 6 Banksia Road & lots 300 & 301 Boomerang Road, WA	2010/5622	Controlled Action	Post-Approval	In buffer area only
Tonkin Highway Extension ??? Thomas Road to South Western Highway	2019/8608	Controlled Action	Post-Approval	In feature area
Not controlled action				
'Looping 10' gas transmission pipeline from Kwinana to Hopelands	2005/2212	Not Controlled Action	Completed	In buffer area only
Abernethy Road upgrade (Kardan, Tourmaline & Soldiers) Byford, WA	2015/7441	Not Controlled Action	Completed	In buffer area only
BaptistCare Byford Aged Care Facility	2021/9111	Not Controlled Action	Completed	In buffer area only
Bristile Holdings Pty Ltd, Cardup Brickworks, South of Byford	2020/8834	Not Controlled Action	Completed	In buffer area only
Construction of international rowing course and commercial/residential areas	2003/1034	Not Controlled Action	Completed	In buffer area only
Development of a wholesale nursery	2012/6622	Not Controlled Action	Completed	In buffer area only
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed	In buffer area only
Gold Fusion Pty Ltd /Residential development/South Western Highway 40km southeast of Perth /WA/Devel	2014/7185	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Oakford Village development, Shire of Serpentine-Jarrahdale, WA	2018/8157	Not Controlled Action	Completed	In buffer area only
Residential Development, Hilbert	2020/8675	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Residential Development, Lots 3, 5 and 900 Taylor Rd Mundijong, WA	2019/8457	Not Controlled Action	Completed	In feature area
Residential development at Lot 54 Cockram Street and Lot 119 Sparkman Road, Mundijong	2020/8618	Not Controlled Action	Completed	In buffer area only
Residential development at Taylor Road and Adams Street, Mundijong, WA	2020/8780	Not Controlled Action	Completed	In buffer area only
Residential Development Various Lots Doley Road, Orton Road and Lawrence Way, Beenyup Grove Byford,	2020/8779	Not Controlled Action	Completed	In buffer area only
Sand quarry, Lot 102 King Road, Oldbury, WA	2015/7439	Not Controlled Action	Completed	In buffer area only
Serpentine Sports Reserve, Protection of Dieback Free Area	2008/4337	Not Controlled Action	Completed	In buffer area only
Tonkin Highway Extension	2001/470	Not Controlled Action	Completed	In buffer area only
Undertake a Controlled Fuel Reduction Burn	2008/4262	Not Controlled Action	Completed	In buffer area only
Urban development of Lots 9049 and 9063, The Glades, Byford, WA	2015/7607	Not Controlled Action	Completed	In buffer area only
Wungong Transfer Mains Project	2007/3532	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Residential Subdivision on Abernethy Road, Byford	2009/4767	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Referral decision				
Residential Development Doley Road, Orton Road and Lawrence Way	2020/8679	Referral Decision	Completed	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix 3: Black Cockatoo Habitat Assessment Data

Black cockatoo habitat data has been provided in the table below. Trees with suitable hollows for breeding have been highlighted in green.

Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Allocasuarina fraseriana	Breeding/Foraging	615	No	No	405115.0983	6428853.597
Allocasuarina fraseriana	Breeding/Foraging	810	No	No	405111.2704	6428834.139
Corymbia calophylla	Breeding/Foraging	772	No	No	405856.6724	6431707.165
Corymbia calophylla	Breeding/Foraging	1020	No	No	405846.5653	6431671.493
Corymbia calophylla	Breeding/Foraging	1009	No	No	405891.4525	6431840.043
Corymbia calophylla	Breeding/Foraging	668	No	No	405938.4206	6432029.402
Corymbia calophylla	Breeding/Foraging	644	No	No	405914.0448	6431932.196
Corymbia calophylla	Breeding/Foraging	538	No	No	405906.6131	6431902.766
Corymbia calophylla	Breeding/Foraging	555	No	No	405886.6963	6431828.153
Corymbia calophylla	Breeding/Foraging	767	No	No	405790.0475	6431434.72
Corymbia calophylla	Breeding/Foraging	515	No	No	405727.7702	6431187.023
Corymbia calophylla	Breeding/Foraging	592	No	No	405682.2142	6431017.581
Corymbia calophylla	Breeding/Foraging	567	No	No	405863.8068	6431735.108
Corymbia calophylla	Breeding/Foraging	760	Yes	Yes	405373.3072	6429819.831
Corymbia calophylla	Breeding/Foraging	558	No	No	405699.0007	6431131.863
Corymbia calophylla	Breeding/Foraging	778	No	No	405295.0997	6429534.371
Corymbia calophylla	Breeding/Foraging	878	No	No	405295.591	6429515.643

Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Corymbia calophylla	Breeding/Foraging	703	No	No	405303.344	6429611.735
Corymbia calophylla	Breeding/Foraging	579	No	No	405913.7883	6431953.528
Corymbia calophylla	Breeding/Foraging	542	No	No	405732.6253	6431258.828
Corymbia calophylla	Breeding/Foraging	593	No	No	405898.8849	6431922.266
Corymbia calophylla	Breeding/Foraging	589	No	No	405761.9246	6431389.055
Corymbia calophylla	Breeding/Foraging	601	No	No	405788.4156	6431447.835
Corymbia calophylla	Breeding/Foraging	773	No	No	405128.7665	6429103.109
Corymbia calophylla	Breeding/Foraging	773	No	No	405941.8002	6432039.267
Corymbia calophylla	Breeding/Foraging	1139	No	No	405928.7369	6431979.948
Corymbia calophylla	Breeding/Foraging	647	No	No	405810.7502	6431522.201
Corymbia calophylla	Breeding/Foraging	623	No	No	405872.6012	6431779.895
Corymbia calophylla	Breeding/Foraging	599	No	No	405891.225	6431889.972
Corymbia calophylla	Breeding/Foraging	599	No	No	405708.991	6431164.774
Corymbia calophylla	Breeding/Foraging	589	No	No	405292.4585	6429570.208
Corymbia calophylla	Breeding/Foraging	517	No	No	406012.8576	6432323.435
Corymbia calophylla	Breeding/Foraging	610	No	No	405841.8885	6431679.043
Corymbia calophylla	Breeding/Foraging	520	No	No	405117.7315	6428805.223
Corymbia calophylla	Breeding/Foraging	533	No	No	405247.1285	6429359.109
Corymbia calophylla	Breeding/Foraging	966	No	No	405797.4673	6431530.722
Corymbia calophylla	Breeding/Foraging	625	No	No	405823.0697	6431729.104

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Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Corymbia calophylla	Breeding/Foraging	515	No	No	405249.0061	6429381.159
Corymbia calophylla	Breeding/Foraging	626	No	No	405870.3428	6431757.805
Corymbia calophylla	Breeding/Foraging	5258	No	No	405169.0475	6429306.644
Corymbia calophylla	Breeding/Foraging	527	No	No	405928.341	6432080.262
Corymbia calophylla	Breeding/Foraging	502	No	No	405258.6142	6429528.591
Corymbia calophylla	Breeding/Foraging	500	No	No	405162.9745	6428971.148
Corymbia calophylla	Breeding/Foraging	636	No	No	405867.005	6431746.488
Corymbia calophylla	Breeding/Foraging	622	No	No	405290.4359	6429509.686
Corymbia calophylla	Breeding/Foraging	517	No	No	405459.9855	6430358.406
Corymbia calophylla	Breeding/Foraging	667	No	No	405810.3564	6431513.615
Corymbia calophylla	Breeding/Foraging	501	No	No	405134.319	6428969.15
Corymbia calophylla	Breeding/Foraging	650	No	No	405274.2937	6429574.155
Corymbia calophylla	Breeding/Foraging	550	No	No	406013.0493	6432316.395
Corymbia calophylla	Breeding/Foraging	795	No	No	405843.8986	6431659.917
Corymbia calophylla	Breeding/Foraging	544	No	No	405928.4855	6432013.773
Corymbia calophylla	Breeding/Foraging	539	No	No	405783.6127	6431478.535
Corymbia calophylla	Breeding/Foraging	553	No	No	405137.4853	6429092.725
Corymbia calophylla	Breeding/Foraging	677	No	No	405666.5529	6431180.19
Corymbia calophylla	Breeding/Foraging	508	No	No	405935.7953	6432056.564
Corymbia calophylla	Breeding/Foraging	651	No	No	405115.6841	6428804.67

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Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Corymbia calophylla	Breeding/Foraging	904	No	No	405782.732	6431410.311
Corymbia calophylla	Breeding/Foraging	500	No	No	405321.5023	6429642.203
Corymbia calophylla	Breeding/Foraging	669	No	No	405870.9429	6431815.529
Corymbia calophylla	Breeding/Foraging	575	No	No	405247.3812	6429365.837
Corymbia calophylla	Breeding/Foraging	590	No	No	405886.1376	6431886.749
Corymbia calophylla	Breeding/Foraging	558	No	No	405228.3809	6429253.488
Corymbia calophylla	Breeding/Foraging	568	No	No	405587.6346	6430789.384
Corymbia calophylla	Breeding/Foraging	547	No	No	405136.9609	6429003.935
Corymbia calophylla	Breeding/Foraging	709	No	No	405606.409	6430872.608
Corymbia calophylla	Breeding/Foraging	550	No	No	405284.1541	6429479.046
Corymbia calophylla	Breeding/Foraging	675	No	No	405283.7497	6429471.656
Corymbia calophylla	Breeding/Foraging	508	No	No	405704.2245	6431103.463
Corymbia calophylla	Breeding/Foraging	784	No	No	405457.3915	6430217
Corymbia calophylla	Breeding/Foraging	515	No	No	405767.1857	6431390.55
Corymbia calophylla	Breeding/Foraging	597	No	No	405848.0838	6431749.865
Corymbia calophylla	Breeding/Foraging	731	No	No	405922.0506	6432080.707
Corymbia calophylla	Breeding/Foraging	529	No	No	405709.4665	6431266.22
Corymbia calophylla	Breeding/Foraging	528	No	No	405287.2271	6429515.093
Corymbia calophylla	Breeding/Foraging	625	No	No	405238.9601	6429543.179
Corymbia calophylla	Breeding/Foraging	794	No	No	405114.4045	6428799.692

Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Corymbia calophylla	Breeding/Foraging	855	No	No	405192.1831	6429163.293
Corymbia calophylla	Breeding/Foraging	542	No	No	405229.8747	6429242.376
Corymbia calophylla	Breeding/Foraging	1031	No	No	405267.9287	6429394.034
Corymbia calophylla	Breeding/Foraging	713	No	No	405697.8194	6431095.954
Corymbia calophylla	Breeding/Foraging	830	No	No	405286.6742	6429462.883
Corymbia calophylla	Breeding/Foraging	615	Yes	No	405538.0021	6430682.487
Corymbia calophylla	Breeding/Foraging	797	No	No	405365.7099	6429757.621
Corymbia calophylla	Breeding/Foraging	614	No	No	405783.2811	6431470.044
Corymbia calophylla	Breeding/Foraging	591	No	No	405267.2427	6429386.358
Corymbia calophylla	Breeding/Foraging	1273	No	No	405870.4314	6431772.047
Corymbia calophylla	Breeding/Foraging	526	No	No	405671.0668	6431139.87
Corymbia calophylla	Breeding/Foraging	665	No	No	405807.0227	6431552.753
Corymbia calophylla	Breeding/Foraging	542	No	No	405153.6973	6428997.303
Corymbia calophylla	Breeding/Foraging	595	No	No	405828.9818	6431681.061
Corymbia calophylla	Breeding/Foraging	790	No	No	405300.3874	6429543.032
Corymbia calophylla	Breeding/Foraging	554	No	No	405804.2804	6431487.687
Corymbia calophylla	Breeding/Foraging	560	No	No	405895.1271	6431986.646
Corymbia calophylla	Breeding/Foraging	544	No	No	405777.8103	6431440.192
Corymbia calophylla	Breeding/Foraging	500	No	No	405818.9306	6431569.777
Corymbia calophylla	Breeding/Foraging	809	No	No	405298.8936	6429520.451

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Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Corymbia calophylla	Breeding/Foraging	609	Yes	No	405750.8479	6431557.417
Corymbia calophylla	Breeding/Foraging	522	No	No	405195.2793	6429176.617
Corymbia calophylla	Breeding/Foraging	547	No	No	405158.5275	6428973.903
Corymbia calophylla	Breeding/Foraging	633	No	No	405907.1999	6431897.728
Corymbia calophylla	Breeding/Foraging	805	No	No	405932.8113	6432003.785
Corymbia calophylla	Breeding/Foraging	508	No	No	405127.0618	6429066.039
Corymbia calophylla	Breeding/Foraging	564	No	No	405789.9759	6431466.837
Corymbia calophylla	Breeding/Foraging	768	No	No	405251.2659	6429369.174
Corymbia calophylla	Breeding/Foraging	626	No	No	405278.5397	6429464.818
Corymbia calophylla	Breeding/Foraging	519	No	No	405154.6477	6428973.427
Corymbia calophylla	Breeding/Foraging	668	No	No	405810.4578	6431550.208
Corymbia calophylla	Breeding/Foraging	545	No	No	405741.8879	6431278.342
Corymbia calophylla	Breeding/Foraging	629	No	No	405738.8897	6431230.626
Corymbia calophylla	Breeding/Foraging	538	No	No	405109.5199	6428835.6
Corymbia calophylla	Breeding/Foraging	911	No	No	405750.3564	6431301.714
Corymbia calophylla	Breeding/Foraging	501	No	No	405785.1041	6431481.189
Corymbia calophylla	Breeding/Foraging	561	No	No	406005.9624	6432293.756
Corymbia calophylla	Breeding/Foraging	548	No	No	405274.6375	6429429.643
Corymbia calophylla	Breeding/Foraging	550	No	No	405258.9327	6429514.828
Corymbia calophylla	Breeding/Foraging	884	No	No	405824.0557	6431585.888

Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Corymbia calophylla	Breeding/Foraging	500	No	No	405359.3345	6429888.723
Corymbia calophylla	Breeding/Foraging	538	No	No	405913.3549	6431939
Corymbia calophylla	Breeding/Foraging	863	No	No	405145.5472	6429219.616
Corymbia calophylla	Breeding/Foraging	715	No	No	405977.4807	6432183.646
Corymbia calophylla	Breeding/Foraging	746	No	No	405829.9654	6431619.517
Corymbia calophylla	Breeding/Foraging	567	No	No	405774.6469	6431372.89
Corymbia calophylla	Breeding/Foraging	501	No	No	406026.4166	6432373.706
Corymbia calophylla	Breeding/Foraging	939	No	No	405267.3785	6429439.256
Corymbia calophylla	Breeding/Foraging	549	No	No	405720.2406	6431398.035
Corymbia calophylla	Breeding/Foraging	598	No	No	405804.8927	6431520.291
Corymbia calophylla	Breeding/Foraging	680	No	No	405146.8655	6428947.96
Corymbia calophylla	Breeding/Foraging	685	No	No	405808.3274	6431504.228
Corymbia calophylla	Breeding/Foraging	596	No	No	405804.2804	6431487.687
Corymbia calophylla	Breeding/Foraging	516	No	No	405855.135	6432010.45
Corymbia calophylla	Breeding/Foraging	550	No	No	405267.9157	6429425.746
Corymbia calophylla	Breeding/Foraging	740	Yes	No	405776.9972	6431663.098
Corymbia calophylla	Breeding/Foraging	1245	Yes	No	405700.1429	6431385.367
Dead sp.	Breeding	574	Yes	No	405884.3181	6431834.692
Dead sp.	Breeding	768	Yes	No	405153.3169	6428936.895
Dead sp.	Breeding	558	No	No	405692.5826	6431071.543

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Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Dead sp.	Breeding	660	No	No	405338.9934	6429686.59
Dead sp.	Breeding	501	No	No	405707.7082	6431156.684
Dead sp.	Breeding	693	No	No	405324.5538	6429687.303
Dead sp.	Breeding	526	No	No	405849.1518	6431713.188
Dead sp.	Breeding	1006	No	No	405881.6371	6432109.033
Dead sp.	Breeding	730	Yes	No	405159.6625	6428977.465
Dead sp.	Breeding	756	Yes	No	405887.2279	6431854.442
Dead sp. (Corymbia calophylla)	Breeding	654	No	No	405986.1776	6432206.394
Eucalyptus camaldulensis	Breeding/Foraging	625	No	No	405300.4604	6429781.306
Eucalyptus camaldulensis	Breeding/Foraging	534	No	No	405708.6917	6431112.181
Eucalyptus lane- poolei	Breeding	548	No	No	405281.0306	6429758.431
Eucalyptus lane- poolei	Breeding	558	Yes	No	405323.4789	6429646.968
Eucalyptus lane- poolei	Breeding	534	No	No	405259.8675	6429677.896
Eucalyptus lane- poolei	Breeding	520	No	No	405261.5026	6429682.029
Eucalyptus marginata	Breeding/Foraging	719	Yes	No	405882.772	6431864.838
Eucalyptus marginata	Breeding/Foraging	654	Yes	No	405609.4846	6430823.977
Eucalyptus marginata	Breeding/Foraging	785	Yes	No	405623.8697	6430839.42
Eucalyptus marginata	Breeding/Foraging	695	No	No	405836.8023	6431634.985
Eucalyptus marginata	Breeding/Foraging	852	Yes	No	405208.7171	6429201.823
Eucalyptus marginata	Breeding/Foraging	528	No	No	405529.6975	6430695.768

Species	Habitat Type	DBH (mm)	Hollows Present	Suitable Hollows	Easting	Northing
Eucalyptus marginata	Breeding/Foraging	640	Yes	No	405628.4667	6430871.431
Eucalyptus marginata	Breeding/Foraging	1008	Yes	No	405199.2782	6429187.968
Eucalyptus marginata	Breeding/Foraging	662	No	No	405166.7362	6429041.425
Eucalyptus marginata	Breeding/Foraging	577	No	No	405832.3049	6431639.658
Eucalyptus marginata	Breeding/Foraging	952	No	No	405195.0862	6429136.606
Eucalyptus marginata	Breeding/Foraging	1083	Yes	No	405103.9217	6428816.345
Eucalyptus marginata	Breeding/Foraging	600	No	No	405600.1141	6430772.118
Eucalyptus marginata	Breeding/Foraging	885	Yes	Yes	405781.1851	6431695.045
Eucalyptus rudis	Breeding	860	No	No	405294.7623	6429715.311
Eucalyptus rudis	Breeding	795	No	No	405127.9807	6428917.706
Eucalyptus rudis	Breeding	550	No	No	405266.4283	6429695.622
Eucalyptus rudis	Breeding	1154	No	No	405334.6374	6429703.207
Eucalyptus rudis	Breeding	519	No	No	405324.021	6429767.792
Eucalyptus sp.	Breeding/Foraging	825	Yes	No	405328.1763	6429735.52
Eucalyptus wandoo	Breeding/Foraging	500	Yes	No	405315.956	6429647.652

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Appendix 4: Vegetation Type Mapping

Source: Focused Vision Consulting, 2022.

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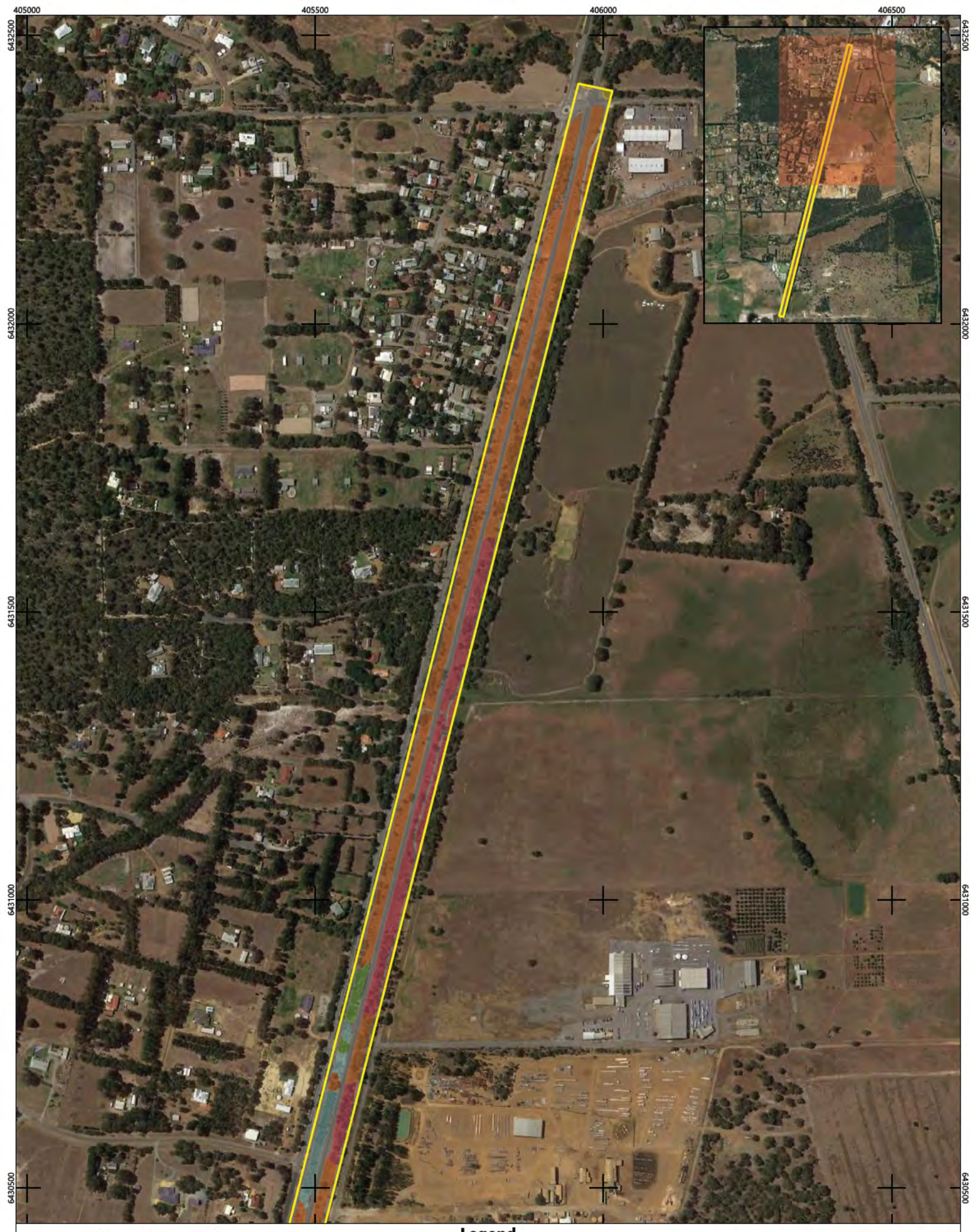


Figure 12a - Vegetation Units of the Survey Area

FOCUSED VISION consulting

PTA21002g 02 June 2022



Figure 12b - Vegetation Units

FOCUSED VISION consulting

PTA21002g 02 June 2022

Appendix D

Site photos



Figure 1: September 2025



Figure 2: September 2025



Figure 3: September 2025



Figure 4: September 2025



Figure 5: September 2025



Figure 6: March 2026



Figure 7: March 2026



Figure 8: March 2026



Figure 9: March 2026



Figure 10: March 2026

Appendix E

Offset calculations

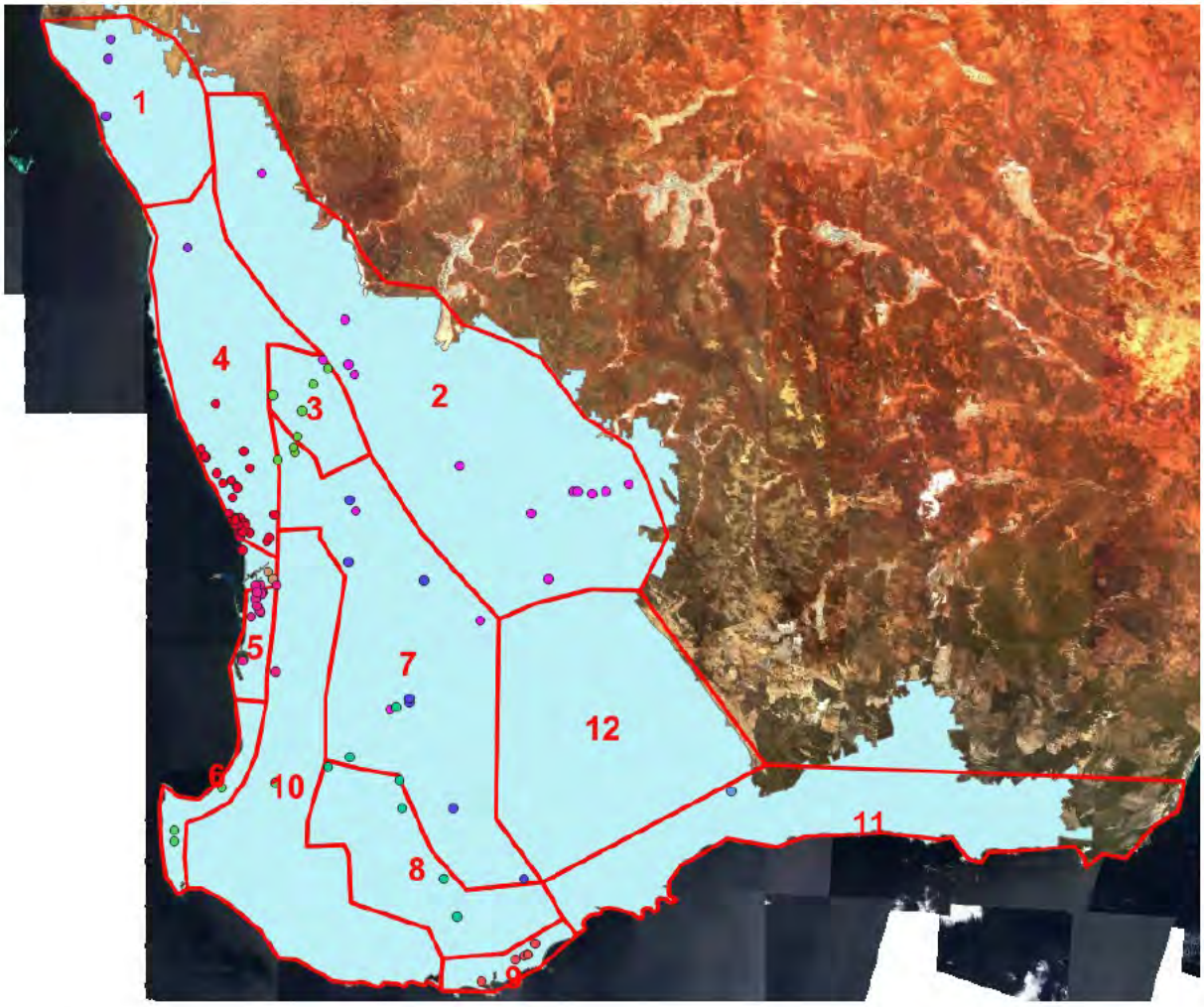
The Department has identified standard metric input values to be used in the Offsets Calculator (or the Commonwealth equivalent) when calculating the 'offset area required' input to a monetary contribution calculation. These are provided in the table below.

These standard values are based on the Department's experience in delivering land acquisitions via the Part V fund and represent the most likely offset outcomes. They are to be applied to calculations for land acquisition offsets only

Parameter	Standard value	Rationale
Current quality of offset site	8 – where the impact is on the northern* Swan Coastal Plain 7 – where the impact is on the southern* Swan Coastal Plain 6 – where the impact is in the Wheatbelt 8 – where the impact is on the South Coast or in the Jarrah Forest	The geographic spread of the quality values reflects that the locations of offset sites likely to be associated with those impact sites will vary in quality. The values themselves are based on the Department's understanding of land potentially available and the Department's previous experience in delivering land acquisitions.
Future quality WITHOUT offset	As above. No change to the input value.	In the absence of specific site information that might indicate threatening processes, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset	As above. No change to the input value.	As monetary contributions do not generally account for management actions that would improve site quality, it is reasonable to assume no change in quality.
Time until ecological benefit	1 year	No change to ecological values is expected, therefore the minimum value is input.
Confidence in offset result	90%	The Department is confident that an acquisition will occur; monetary contributions for offsets with low likelihood of being acquitted will generally not be accepted.
Duration of offset implementation	20 years	As the acquired land will be incorporated into the conservation estate, it will be protected in perpetuity. The maximum value is therefore applied.
Time until offset site secured	3 years	Accounts for the delay in finding a property, conducting due diligence and negotiating the acquisition with DBCA.

Parameter	Standard value	Rationale
Risk of loss WITHOUT offset	15%	Land zoned 'rural' is typically acquired as offsets. 15% is a conservative risk of loss score that can be applied for this zoning. It is consistent with most direct offsets accepted by the Department.
Risk of loss WITH offset	5%	As the acquired land will be incorporated into the conservation estate, the lowest risk of loss score is therefore applied.

The Department has identified standard values to use in determining the 'rate per hectare' input to a monetary contribution calculation, based on 2019 Valuer General Rates. These are provided in the table below.



Offset location category boundaries (red outlines) relative to the intensive land use zone (light blue area). For reference, offset contributions held in the Part V fund at the time of writing are shown as points.

Offset location category	Example values to be offset	Offset area required					
		< 20 ha	20 ha to < 50 ha	50 ha to < 100 ha	100 ha to < 200 ha	200 ha to < 500 ha	> 500 ha
1	Significant remnant vegetation (highly cleared area) CC breeding and foraging habitat	$8,770	$4,600	$2,020	$1,110	$730	$640
2	Significant remnant vegetation (highly cleared area) CC breeding and foraging habitat	$10,280	$5,400	$2,370	$1,300	$860	$750
3	CC breeding and foraging habitat Significant remnant vegetation (highly cleared area)	$12,040	$6,330	$2,780	$1,520	$1,000	$880
4	CC foraging habitat Banksia Woodlands of the SCP TEC Tuart Woodlands TEC	$22,390	$11,760	$5,160	$2,830	$1,870	$1,640
5	CC and FRTBC foraging habitat Banksia Woodlands of the SCP TEC Tuart Woodland TEC	$35,000	$18,390	$8,070	$4,420	$2,920	$2,560
6	CC, BC and FRTBC breeding and foraging habitat WRP habitat Significant remnant vegetation (highly cleared area) Banksia Woodlands of the SCP TEC Tuart Woodland TEC	$51,690	$27,150	$11,920	$6,530	$4,310	$3,780
7	CC foraging and breeding habitat Significant remnant vegetation (highly cleared area)	$22,390	$11,760	$5,160	$2,830	$1,870	$1,640
8	CC, BC and FRTBC foraging and breeding habitat Red-tailed phascogale habitat Significant remnant vegetation (highly cleared area)	$21,470	$11,280	$4,950	$2,710	$1,790	$1,570
9	CC, BC and FRTBC breeding and foraging habitat WRP habitat Kwongkan Shrublands TEC Significant remnant vegetation (highly cleared area)	$21,470	$11,280	$4,950	$2,710	$1,790	$1,570
10	BC and FRTBC breeding and foraging habitat WRP habitat	$51,690	$27,150	$11,920	$6,530	$4,310	$3,780

Offset location category	Example values to be offset	Offset area required					
		< 20 ha	20 ha to < 50 ha	50 ha to < 100 ha	100 ha to < 200 ha	200 ha to < 500 ha	> 500 ha
11	CC breeding and foraging habitat WRP habitat Kwongkan Shrublands TEC Significant remnant vegetation (highly cleared area)	$21,470	$11,280	$4,950	$2,710	$1,790	$1,570
12	Significant remnant vegetation (highly cleared area)	$6,000	$3,150	$1,380	$760	$500	$440

CC = Carnaby's cockatoo, BC = Baudin's cockatoo, FRTBC = Forest red-tailed black cockatoo, WRP = Western Ringtail Possum, SCP = Swan Coastal Plain, TEC = Threatened Ecological Community

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	BC forging habitat		Surrounding area contains Marri trees which is a key foraging habitat for all three threatened species of Black Cockatoo.
Type of environmental value	Species (flora/fauna)		Buadin's Cockatoo, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo.
Conservation significance of environmental value	Rare/threatened species - endangered		The species with the highest listing, in this case, is endangered (Baudin's and Carnaby's Cockatoos).
Landscape-level value impacted	yes/no		No.
Significant impact			
Description	BC foraging habitat		Marri trees are primary foraging habiat for all three species of threatened black cockatoos.
Significant impact (hectares) / Type of feature	0.01		Clearing area of 0.005 ha.
Quality (scale) / Number	7.00		The project area is mapped as Marri/ Xanthorrhoea/ Kingia Woodland (Focused Vision, 2022) which includes Corymbia calophylla (Marri), a key foraging species for all three species of threatened black cockatoo. The vegetation is also located within an extensively cleared area and both direct and indirect evidence of foraging was observed during surveys (Focused Vision, 2022). Therefore, the proposed clearing area is considered to be high-quality foraging habitat for black cockatoos.
Rehabilitation credit			
Description	0		N.A - clearing is not temporary.
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Monetary		Puchasing Land / changing zoning / conservation covenant etc.
Proposed offset (area in hectares)	0.06		Area required based on calculation.
Current quality of offset site / Start number (of type of feature)	7.00		Foraging quality should be similar to proposal.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	7.00		Generally states the same unless evidence provided that degradation will occur.
Future quality WITH offset (scale) / Future number WITH offset	7.00		Conservation only, will not change the quality of the habitat.
Time until ecological benefit (years)	1.00		It is expeced that the transfer will be completed within 12 months.
Confidence in offset result (%)	0.9		High success as land will be conserve.
Duration of offset implementation (maximum 20 years)	20.00		Offset should be long-term and enduring, so maximum time is applied.
Time until offset site secured (years)	3.00		Assumed three years to obtain land.
Risk of future loss WITHOUT offset (%)	15.0%		Assumed there is a moderate to high risk of loss without protection.
Risk of future loss WITH offset (%)	5.0%		Assumed that the acquisition will mean a low risk of loss.
Offset ratio (Conservation area only)	N/A		N/A

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	TEC SCP 3b - Vulnerable		*Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson *et al*, (1994))
Type of environmental value	Ecological community		SCP 3b
Conservation significance of environmental value	Threatened ecological community - vulnerable		Vulnerable
Landscape-level value impacted	yes/no		No
Significant impact			
Description	TEC SCP 3b		TEC SCP 3b - Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al, (1994))
Significant impact (hectares) / Type of feature	0.01		Clearing area of 0.005 ha.
Quality (scale) / Number	7.00		Vegetation is in Degraded-Good condition.
Rehabilitation credit			
Description	0		N.A - clearing is not temporary.
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Monetary		Puchasing Land / changing zoning / conservation covenant etc.
Proposed offset (area in hectares)	0.06		Area required based on calculation.
Current quality of offset site / Start number (of type of feature)	7.00		Vegetation quality should be similar to proposal.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	7.00		Generally states the same unless evidence provided that degradation will occur.
Future quality WITH offset (scale) / Future number WITH offset	7.00		Conservation only, will not change the quality of the habitat.
Time until ecological benefit (years)	1.00		It is expeced that the transfer will be completed within 12 months.
Confidence in offset result (%)	0.9		High success as land will be conserve.
Duration of offset implementation (maximum 20 years)	20.00		Offset should be long-term and enduring, so maximum time is applied.
Time until offset site secured (years)	3.00		Assumed three years to obtain land.
Risk of future loss WITHOUT offset (%)	15.0%		Assumed there is a moderate to high risk of loss without protection.
Risk of future loss WITH offset (%)	5.0%		Assumed that the acquisition will mean a low risk of loss.
Offset ratio (Conservation area only)	N/A		N/A