Shire of Chittering
Detailed Flora Survey
Djidi-Djidi Ridge

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Executive Summary

The Shire of Chittering (the Shire) is proposing the construction of new walking trails and upgrades at Lot 3874, Bindoon. As part of the development process, the Shire has commissioned Natural Area Consulting Management and Services (Natural Area) to undertake biological surveys at the proposed site. Surveys included a detailed flora and vegetation survey and a basic fauna survey, including a preliminary black cockatoo habitat assessment. Information gathered during the surveys will inform stakeholders of the environmental values of the site.

The survey aimed to determine:

- flora species present (native and non-native)
- the extent and boundaries of vegetation type and condition
- the location of declared rare or priority flora, fauna and/or ecological communities
- preliminary habitat assessment for threatened black cockatoo habitat.

The flora and vegetation survey within site confirmed:

- the presence of two vegetation types:
    - *Eucalyptus accedens* and *E. wandoo* Open Woodland
    - *Corymbia calophylla* Open Woodland
- a total of 227 flora species present from 53 families
    - a total of 21 introduced (weeds) and 188 native flora species
- one confirmed and two unconfirmed priority flora species were found during the survey
- vegetation condition ranged from Completely Degraded to Excellent, with the majority of the survey area being in Very Good (34.90%) to Excellent (39.64%) condition.

The black cockatoo habitat assessment within the site confirmed:

- a total of 52 trees that satisfied the Commonwealth guidelines for Black Cockatoo habitat trees
- a total of 19 habitat trees with hollows, of which 16 contained hollows which are potentially suitable to provide nesting habitat due to their sufficient hollow entrance size
- the site overall contains several foraging opportunities in the form of Marri and Wandoo trees across the entire site, however no evidence of black cockatoo foraging was observed.

Recommendations have been made for the site in terms of proposed clearing areas which avoid the priority flora (confirmed and unconfirmed) and mature trees. An assessment of the survey outcomes has been made against the Western Australian 10 clearing principles.

Contents

1.0 Introduction

The Shire of Chittering (the Shire) is proposing the construction of new walking trails and upgrades to Djidi-Djidi Ridge, Chittering. As part of the development process, the Shire has commissioned Natural Area Consulting Management Services (Natural Area) to undertake biological surveys at the proposed site. Surveys included a detailed flora and vegetation survey and a basic fauna survey, including a preliminary black cockatoo habitat assessment. Information gathered during the surveys will inform stakeholders of the environmental values of the site and provide supporting information for potential clearing permit application to the Department of Water and Environmental Regulation (DWER).

1.1 Location

The survey area is approximately 64.2 ha and is located at Djidi-Djidi Ridge, along Chittering Rd. It is within the Shire of Chittering and approximately 11 km to the southeast of the Bindoon town centre (Figure 1). No environmentally sensitive areas are located within the boundary of the survey site, however there are two located within one kilometre to the southeast (Department of Water and Environmental Regulation 2021). Existing and proposed walking trails with a 10 m buffer and upgrades for caravan parking are outlined in Figure 1.

1.2 Scope

Activities undertaken by Natural Area included:

- desktop assessment activities to determine flora species, declared rare and priority listed species (DRF) and ecological communities with the potential to be present within the nominated area, including requests for DBCA database searches for flora and ecological communities
- detailed flora survey conducted in spring 2022 that included the installation of quadrats based on the number of vegetation types present in the survey area, along with a targeted search for DRF, in accordance with EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment
- a preliminary assessment of black cockatoo habitat and foraging sources along proposed trails and within a 10 m buffer zone either side of the trails (Figure 1) in accordance with the EPBC Act referral guidelines for three threatened black cockatoos
- presentation of findings in a formal report, including assessment against the clearing principles and provision of maps representing site assessment outcomes
- preparation of GIS shapefiles in IBSA format.

1.3 Objectives

The main objective of the survey was to collect sufficient data to adequately inform future clearing permit applications to DWER, as required by clearing provisions under the Environmental Protection Act 1986 (WA) (EP Act) and Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA) (Regulations).

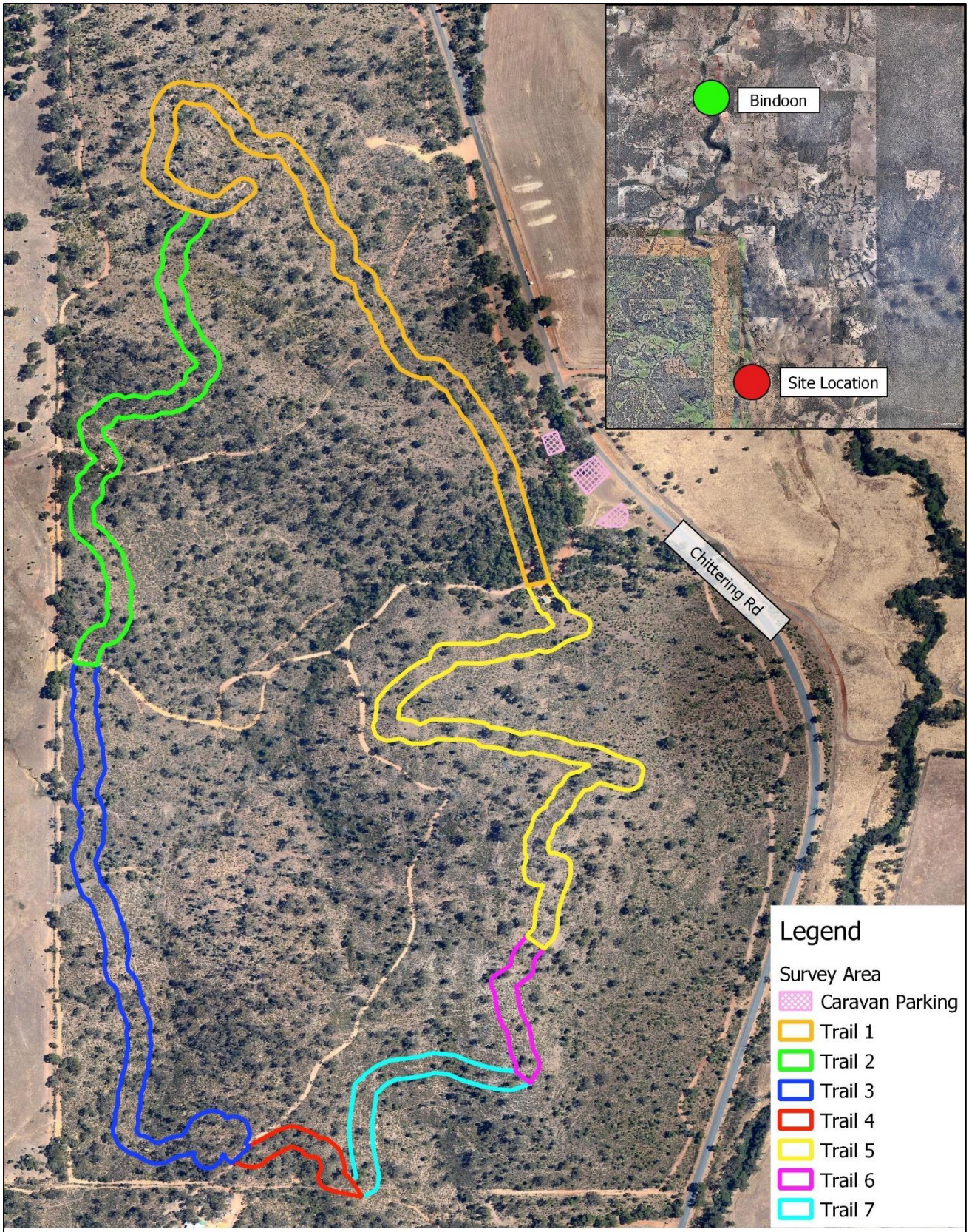

Figure 1:
Site Boundary
Djidi-Djidi Ridge, Chittering

2.0 Site Characteristics

The characteristics of a site have a strong bearing on the flora, vegetation, fauna, and ecological communities present. Key characteristics of the survey area are outlined in this section.

2.1 Regional Context

According to the Interim Biogeographical Regionalisation of Australia (IBRA) descriptions, the survey area is located within the Northern Jarrah Forest (JAF01) subregion. This region constitutes the area located to the east of the Darling Scarp, which is composed of Archean granite and metamorphic rock with an average elevation of 300 m, and containing granite outcrops (Mitchell & Williams, 2001). Vegetation of the area is characterised by Jarrah-Marri Forest in the west with valley areas of Bullich (*Eucalyptus megacarpa*) and Blackbutt (*Eucalyptus patens*). Eastern areas contain Wandoo (*Eucalyptus wandoo*) and Marri (*Corymbia calophylla*) woodlands with Powderbark (*Eucalyptus accedens*) on breakaways (Mitchell & Williams, 2001).

2.2 Climate

The climate experienced in the area is typically Mediterranean, with dry, hot summers and cool, wet winters. According to the Bureau of Meteorology (2022); Gingin Aero (009178), the region has an average:

- rainfall of 620.7mm pa, with rain falling predominantly between June and August
- maximum temperature ranging from 19.7 ^{o}C in winter to 33.2 ^{o}C in summer, with a maximum recorded temperature of 46.3 ^{o}C
- minimum temperatures ranging from 6.5 ^{o}C in winter to 14.4 ^{o}C in summer, with a minimum recorded temperature of -3.7 ^{o}C
- predominant wind directions include morning easterlies and westerly sea breezes during the summer months, with an average wind speed of 19.3 km/h.

2.3 Topography and Soils

The site is elevated and undulating with Australian Height Datum (AHD) ranging from 120 AHD in the southwest corner of the site, to 184 AHD at the crest of the hill located in the northwest corner, and 150 AHD at the peak located in the northeast of the site (DPIRD, 2022a) (Figure 2). Four soil types are present within the survey area; the Bindoon 1s Phase, Bindoon 1x Phase, Bindoon 2x Phase, and Bindoon 3x Phase (DPIRD, 2022a) (Figure 2). Descriptions of these soil types are outlined in Table 1.

Table 1: Soil types within Lot 3874

Name	Symbol	Description
Bindoon 1s Phase	253Bn_1s	Gentle to moderately crests and upper hillslopes. Light to fine textured, often shallow soils often with much coarse fraction. *Eucalyptus marginata*, *Corymbia calophylla*, *Eucalyptus wandoo* and *Eucalyptus accedens* and some *Allocasuarina huegeliana* on rock.
Bindoon 1x Phase	253Bn_1x	Very gentle to moderately sloping (<15%) crests and hill slopes. Fine to medium textured often shallow soils with much coarse fraction. *Eucalyptus marginata*, *Corymbia calophylla*, *Eucalyptus wandoo* and *Eucalyptus accedens* and some *Allocasuarina huegeliana* on rock.
Bindoon 2x Phase	253Bn_2x	Very gentle to moderate (<5-15%) middle and lower hill slopes. Occasional steep slopes may be present. Mixed red and yellow duplex soils with some uniform fine and medium textured, structured soils.
Bindoon 3x Phase	253Bn_3x	Very gentle to gentle foot and lower slopes. Colluvial soils accumulate to form sandy loam to medium clays with highly variable percentages of coarse fraction. *Eucalyptus calophylla* on sandier soils and *Eucalyptus loxophleba* and *Eucalyptus wandoo* on loams and clays.

Source: DPIRD, 2022a

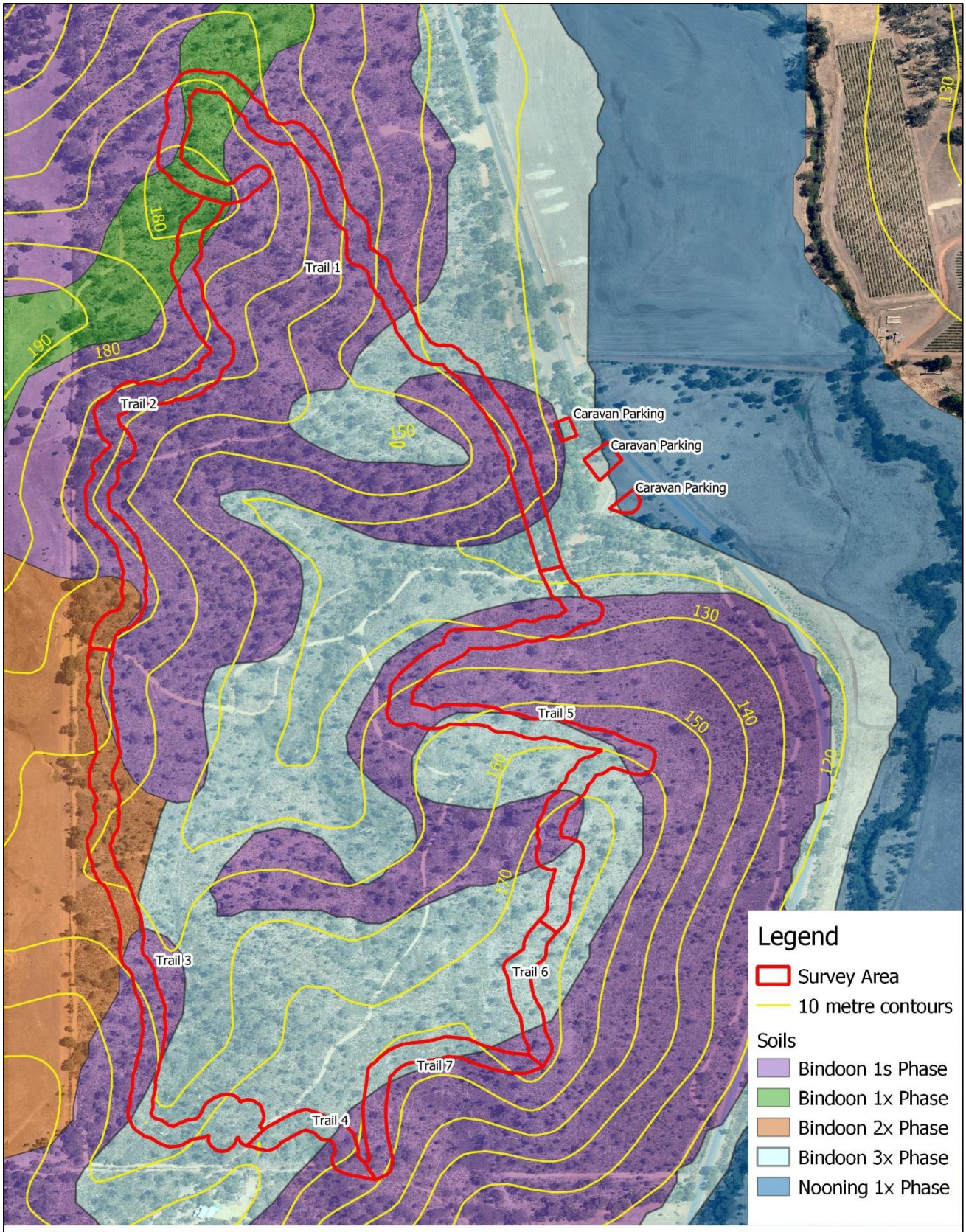

Figure 2:
Soil Types and Contours
Djidi-Djidi Ridge, Chittering

2.4 Vegetation Complex

Two vegetation complexes exist within the survey area; the Murray 2 complex and the Williams complex (DBCA, 2022a). Table 2 provides a description of each complex. The majority of the proposed walking trails boundaries consist of Murray 2 vegetation complex, with Trails 1 and 2 consisting of sections of the Williams vegetation complex (Figure 3). The pre-European extent of these vegetation complexes remaining is:

- 37.62% and 12.22% respectively within the Shire of Chittering
- 69.04% and 25.93% respectively within the Darling Plateau Subregion of the South-West Forests (Government of Western Australia, 2019)

Table 2: Vegetation Complexes

Name	Symbol	Description
Murray 2	My2	Dominated by open-forests of *Eucalyptus marginata*, *Corymbia calophylla* on valley slopes and open-forests of *E. marginata*, *C. calophylla* and *E. patens on the lower slopes*, with fringing woodlands of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* along streams.
Williams	Wi	Fringing woodland of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* along valleys floors. Vegetation relating to adjacent complexes occur on the fringes of the *E. rudis-M. rhaphiophylla* woodland.

Source: Heddle et al., 1980

2.5 Hydrology

There are no known geomorphic wetlands present within the survey site. However, a multiple use palusplain wetland (Feature ID: 13487) runs directly east of Chittering Rd, adjacent to the site. The Palusplain is, at its closest point, approximately 76 m from the walking trail clearing zone (DBCA, 2022b; Appendix 6).

2.6 Heritage Values

No known European or Aboriginal heritage sites exist within the survey site (DPLH, 2022; Government of Western Australia, 2022). The Aboriginal Heritage Inquiry System (DPLH, 2022) indicated that one registered site exists within 5 km of the survey area. The registered site 15979, the Avon River, holds value as a mythological water source, camp, and food source site.

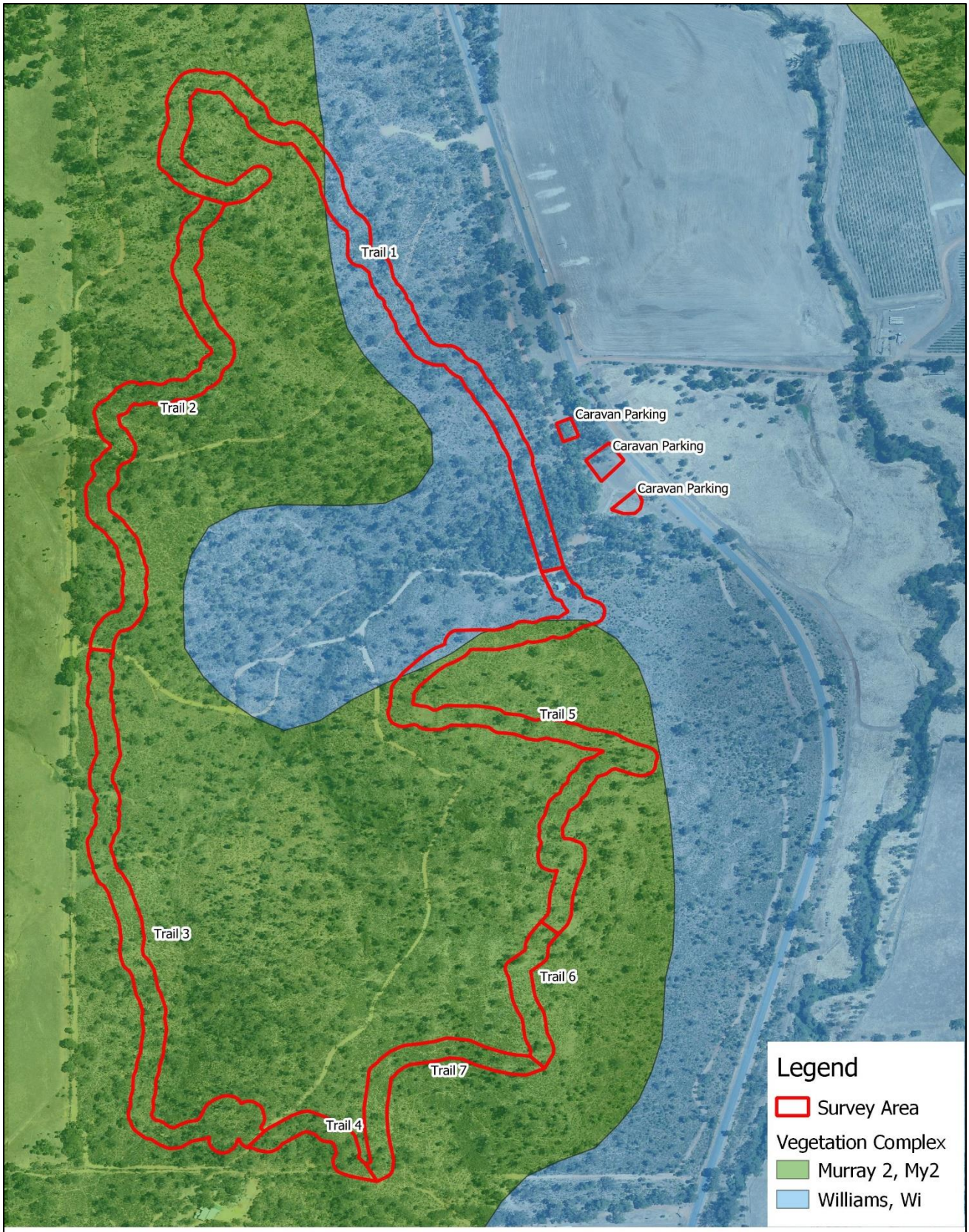

Figure 3:
Vegetation Complexes
Djidi-Djidi Ridge, Chittering

2.7 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 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). According to NationalMap the survey site occurs within an area classified as:

- Carnaby's Cockatoo Areas requiring investigation as feeding habitat in the Jarrah Forest IBRA Region (Department of Biodiversity, Conservation and Attractions (DBCA), 2022c)
- Carnaby's Cockatoo Unconfirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA regions (DBCA, 2022d)
- Carnaby's Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA region (DBCA, 2022e).

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 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 were accessed to obtain relevant information:

- NatureMap (DBCA, 2022f)
- Protected Matters Search Tool (Department of the Agriculture, Water and Environment (DAWE), 2022a) (Appendix 1)
- FloraBase (DBCA, 2022g)
- Threatened and priority flora and ecological community database searches (DBCA, 2022h).

Summary sheets of threatened flora potentially occurring in the area were created for quick reference in the field and are provided in Appendix 2.

3.2 On-ground Flora Survey

Natural Area ecologists Kylie Sadgrove and Shelley Hill undertook a flora survey on the 19th to 21st of September 2022, with key data recorded using Mappt software on a handheld tablet. The flora and vegetation survey was conducted in accordance with *Technical Guidance-Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority, 2016). Samples were collected, or photographs taken of unfamiliar species to enable later identification. Survey activities included:

- identification of flora species present by traversing the survey area, including targeting rare and priority species indicated as potentially present during desktop assessments
- assessing boundaries of vegetation type and condition extent across the survey area
- setting out a total of six 10 x 10 m quadrats across the two vegetation types present within the survey area (Figure 4), recording landscape characteristics including soil types/colour, aspect, slope, surface rock, topography and drainage, determining leaf litter depth and percentage cover, percentage bare ground, species composition (height and cover) within quadrats (Appendix 4)
- recording evidence of disturbance, such as fire.

It should be noted that quadrats were established within Trail 1, despite it being pre-existing and not requiring further clearing, as the vegetation type present within this site was consistent with that observed in the caravan parking survey areas. These areas were not of sufficient size and were comprised of predominantly revegetation and introduced species, therefore not being accurately representative of the vegetation type.

3.2.1 Vegetation Type

The vegetation type was determined using the structural classes described in *Bush Forever Volume 2* (Government of Western Australia, 2000), and records dominant over, middle and understorey species. A description of the various structural classes is provided in Table 3.

Table 3: Vegetation structural classes

Life Form/Height Class	Canopy Percentage Cover			
	100 – 70%	**70 – 30%**	**30 – 10%**	**10 – 2 %**
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland
Trees 10 – 30 m	Closed forest	Open forest	Woodland	Open woodland
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland
Tree Mallee	Closed tree mallee	Tree mallee	Open tree mallee	Very open tree mallee
Shrub Mallee	Closed shrub mallee	Shrub mallee	Open shrub mallee	Very open shrub mallee
Shrubs over 2 m	Closed tall scrub	Tall open scrub	Tall shrubland	Tall open shrubland
Shrubs 1 – 2 m	Closed heath	Open heath	Shrubland	Open shrubland
Shrubs under 1 m	Closed low heath	Open low heath	Low shrubland	Low open shrubland
Grasses	Closed grassland	Grassland	Open grassland	Very open grassland
Herbs	Closed herbland	Herbland	Open herbland	Very open herbland
Sedges	Closed sedgeland	Sedgeland	Open sedgeland	Very open sedgeland

Source: Government of Western Australia, 2000

3.2.2 Vegetation Condition

Vegetation condition was assessed using the rating scale attributed to Keighery in *Technical Guidance-Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016) (Table 4).

Table 4: 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.

Category		Description
		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. 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 Black Cockatoo Habitat Assessment

A preliminary black cockatoo habitat assessment was undertaken in conjunction with the flora survey activities. The habitat assessment was conducted along the proposed trails and within a 10 m buffer zone either side of the trails. Activities included:

- 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 DBH ≥ 500 mm
- recording the height, 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.

3.4 Limitations

The limitations associated with this survey are outlined in Table 5 below.

Table 5: Flora survey and Black Cockatoo habitat assessment limitations

Potential Limitation	Degree of Limitation	Comments
Availability of contextual information	None	Government data on regional and local contextual information are readily available for the survey area.
Competency/experience of team	None	Survey activities were undertaken by experienced ecologists who have extensive experience undertaking detailed flora and vegetation surveys as well as undertaking habitat assessments for Black Cockatoos within the Swan Coastal Plain and Jarrah Forrest bioregions.
Proportion of flora recorded/collected, any identification issues	Minor	A total of 227 flora species (taxa) were recorded from 53 families during the field survey, including 21 introduced (weeds) and 188 native species. Of these, 12 species (5.3%) were unable to be identified to species level due to a lack of diagnostic characteristics present at the time

Potential Limitation	Degree of Limitation	Comments
		of survey. Four of these species were able to be identified to genus level and two to family level, with the remaining being herbaceous species unable to be identified. One of these herbaceous species could potentially be an Orchidaceae species, closely resembling the leaf structure of the Priority 2 species *Thelymitra variegata*, however precise identification would require the presence of diagnostic characteristics, and therefore a targeted survey during the flowering period of this species. No other unidentified species are considered to be threatened or priority flora following comparison with desktop data. One further species has been identified as likely to be the Priority 3 species *Acacia drummondii* subsp. *affinis.* This identification has been made on the basis of leaf and seed pod morphology, however flowers are required to confirm identification, and therefore a targeted survey during the flowering period of this species.
Survey effort and extent	None	A detailed flora and vegetation survey was undertaken over a period of three days, with the entire survey area traversed and all flora species and vegetation type/condition within the survey area being adequately surveyed. A total of six quadrats were established to adequately survey the two vegetation types present. The quadrats for the *Corymbia calophylla* open woodland were established within Trail 1 as the caravan parking survey areas were not of sufficient size and were comprised of predominantly revegetation and introduced species, therefore not being accurately representative of the vegetation type. A targeted Black Cockatoo habitat search was undertaken involving the marking of trees with a DBH ≥ 500 mm and recording significant characteristics. As this was a targeted search for this species other faunal groups which may have been present within the site have not been recorded. Black cockatoo hollow assessment was conducted from the ground and is therefore limited to those hollows visible from ground-

Potential Limitation	Degree of Limitation	Comments
		level. As such, not all hollows may have been observed, as new growth, dense foliage and position in the landscape can hide hollows from vision. Additionally, internal hollow inspections would be required to confirm hollow characteristics such as internal hollow depth and structure and therefore their suitability to support nesting by Black Cockatoos. The boundaries used in this report to distinguish the caravan parking survey areas are a general indication only, created to represent the approximate areas specified by the Shire, as precise clearing locations/extents were not provided.
Access restrictions	None	Ecologists were able to traverse throughout the survey area with no restriction.
Survey timing	Minor	The survey was undertaken during Spring which is the optimal season for flora surveys within the Jarrah Forrest subregion. Whilst the survey was undertaken during flowering season, some species may flower earlier or later in the season and therefore may not be able to be identified. Of the 25 conservation significant flora species identified in the desktop survey as being likely to occur within the survey area, nine have flowering periods outside of the survey period. The majority of these species (eight) are perennial shrub and herb species for which identification would have been possible outside of their flowering periods. One species, *Thelymitra dedmaniarum*, is a herbaceous orchid species for which flowers are required for identification. This species, however, flowers within the Summer period (November – January) and has not been previously identified within 10 km of the survey area. The survey was undertaken within the main breeding season for Black Cockatoos, therefore this was not a limitation for the Black Cockatoo habitat assessment.
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

NatureMap identified a total of 658 flora species which could potentially occur within a 10 km radius of the survey area including:

- 509 dicotyledons
- 140 monocotyledons
- three ferns.

A desktop survey of online databases indicated the potential for a total of 42 conservation significant species to occur within 10 km of the survey area (Table 6). NatureMap indicated 24 conservation significant flora species listed under the *Biodiversity Conservation Act 2016* (WA), as potentially occurring within a 10 km radius of the site (DBCA, 2022f). A review of the Protected Matters Search Tool (PMST) (DAWE, 2022a) indicated 21 significant flora species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the site (Appendix 1). A review of the DBCA (2022h) threatened and priority flora database indicated 11 threatened or priority species have been recorded within 10 km of the site.

Of the conservation significant species potentially found within the area, it was determined that the site conditions (soil type, drainage, location) may be suitable for 25 (highlighted green) of these species (Table 6). Conservation code descriptions are provided in Appendix 3.

Table 6: Threatened and Priority flora species listed by NatureMap, PMST and DBCA

Species Name	Cons. Code	PMST	Nature Map	DBCA
Acacia anomala	VU	X	X	
Acacia drummondii subsp. *affinis*	P3		X	X
Acacia lasiocarpa var. *	P1		X	
Acacia pulchella var. *reflexa* acuminate bracteole variant	P3		X	
Adenanthos cygnorum subsp. *chamaephyton*	P3		X	X
Andersonia gracilis	EN	X		
Anigozanthos humilis subsp. *chrysanthus*	P4		X	
Chamelaucium lullfitzii	EN	X		
Conospermum densiflorum subsp. *unicephalatum*	EN	X		
Darwinia carnea	EN	X		
Diplolaena andrewsii	EN	X		
Diuris purdiei	EN	X		
Drakaea elastica	EN	X		

Species Name	Cons. Code	PMST	Nature Map	DBCA
Drosera sewelliae	P2		X	
Eleocharis keigheryi	VU	X		
Eryngium pinnatifidum subsp. *umbraphilum*	P2		X	
Eucalyptus leprophloia	EN	X		
Gastrolobium crispatum	P1		X	X
Gastrolobium nudum	P2		X	
Grevillea althoferorum subsp. *fragilis*	CR		X	X
Grevillea christineae	EN	X		
Grevillea corrugata	EN/VU	X	X	X
Grevillea curviloba	EN	X		
Grevillea flexuosa	VU	X		
Hibbertia glomerata subsp. *ginginensis*	P2		X	
Hypocalymma sylvestre	EN	X	X	X
Lasiopetalum caroliae	P3		X	
Macarthuria keigheryi	EN	X		
Melaleuca sciotostyla	EN	X		
Millotia tenuifolia var. *laevis*	P2		X	
Oxymyrrhine coronata	P4		X	X
Ptychosema pusillum	VU	X		
Schoenus natans	P4		X	X
Stylidium squamellosum	P2		X	
Synaphea grandis	P4		X	
Synaphea sp. Fairbridge Farm	CR	X		
Tetratheca pilifera	P3		X	
Thelymitra dedmaniarum	EN	X		
Thelymitra stellata	EN	X	X	X
Thelymitra variegata				X
Thysanotus sp. *Badgingarra*	P2		X	
Verticordia lindleyi subsp. *lindleyi*	P4		X	X

4.1.1 Threatened and Priority Ecological Communities

A review of the PMST report identified one listed Threatened Ecological Communities (TECs) that could potentially occur within 10 km of the site, Banksia Woodlands of the Swan Coastal Plain, which is listed as Endangered (DAWE, 2022a). A review of DBCA's Threatened Communities database indicated that the nearest known record of this TEC is approximately 5.5 km to the west of the survey area (DBCA, 2022h).

4.2 Field Survey

4.2.1 Vegetation Types

A total of two vegetation types were recorded during the survey, being *Eucalyptus accedens* and *E. wandoo* Open Woodland throughout the majority of the site, and *Corymbia calophylla* Open Woodland occurring within the majority of Trail 1 and the entirety of the caravan parking area. Vegetation types are described in Table 7 and shown in Figure 4.

Table 7: Vegetation type within Djidi-Djidi Ridge, Chittering

Vegetation Type	Description	Photograph
Eucalyptus accedens and *E. wandoo* Open Woodland	An open woodland of *Eucalyptus accedens* and *E. wandoo* over mixed bushland shrubs and an understorey of native herbs and introduced grasses.	
Corymbia calophylla Open Woodland	An open woodland of *Corymbia calophylla* over mixed bushland shrubs and an understorey of native herbs and introduced grasses. This vegetation type also contained areas of wetland sedges and herbs in the southern section of Trail 1 and the most northern caravan parking area, as well as revegetation in the remaining two caravan parking areas.	

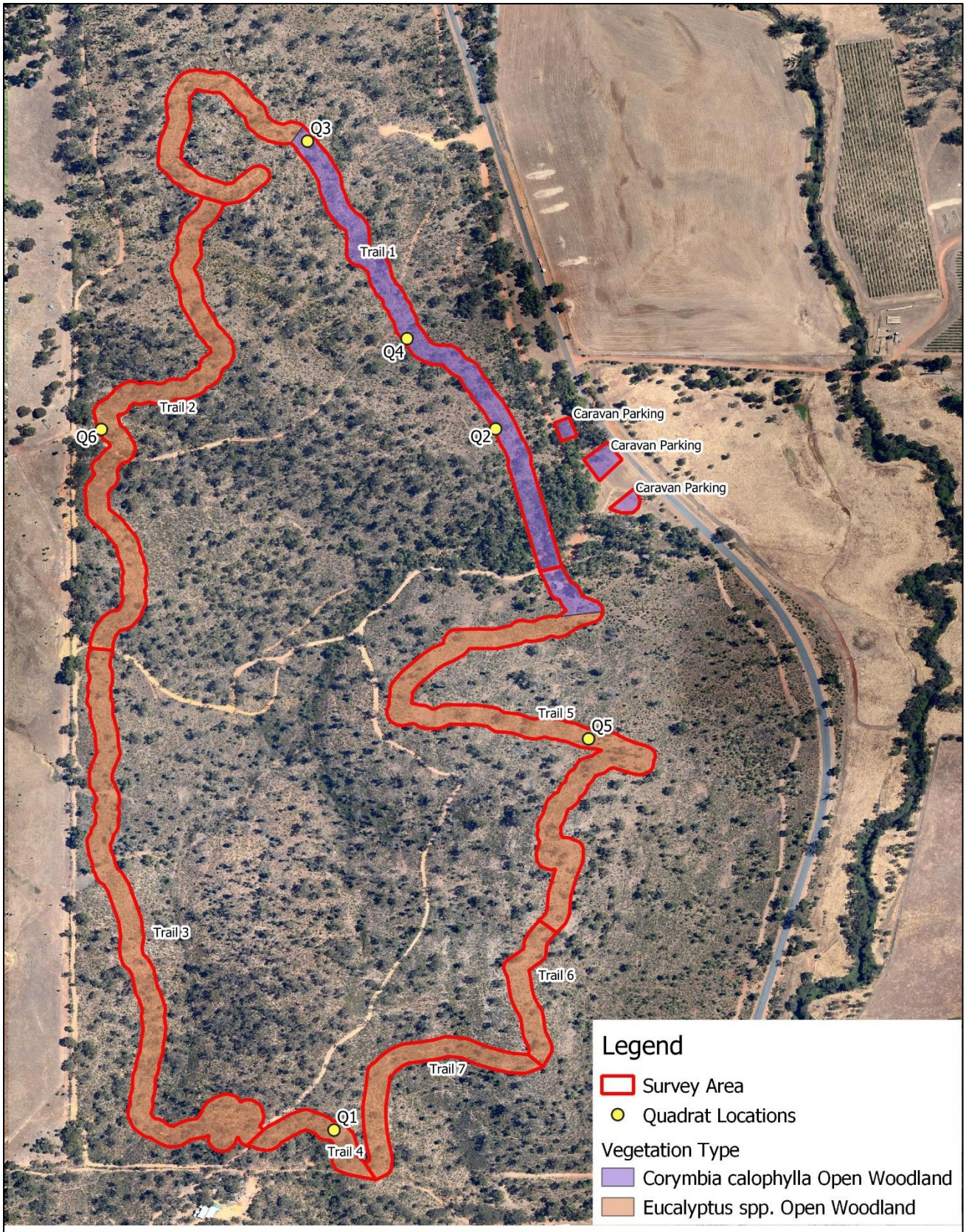

Figure 4:
Vegetation Types
Djidi-Djidi Ridge, Chittering

4.2.2 Flora

A total of 227 flora species (taxa) were recorded from 53 families during the field survey, including 21 introduced (weeds) and 188 native species. Native species diversity was highest in the *Eucalyptus accedens* and *E. wandoo* open woodland (155 species) in comparison to the *Corymbia calophylla* open woodland (106 species), however both vegetation types exhibited an equal number of introduced species (27 species). Examples of native flora species are shown in Figure 5 and weed species in Figure 6. A complete flora species list is provided in Appendix 5.

One confirmed species of conservation significance, *Tetratheca pilifera*, was identified within Djidi-Djidi Ridge within the *Eucalyptus accedens* and *E. wandoo* Open Woodland vegetation type. This species is listed as Priority 3 (P3) at the State level under the Biodiversity Conservation Act (2016). Confirmation of the identification of this species was conducted following field activities and as a result, individual locations and population extent were not recorded.

Additionally, two further potential species of conservation significance were identified, however complete identification was not possible as a result of insufficient diagnostic characteristics. A total of six populations and 28 individuals of what is most likely to be *Acacia drummondii* subsp. *affinis* (P3) were identified within the survey area, ranging from populations of one individual to approximately 20 individuals (located just outside of Trail 7). Of these, three populations totalling to four individuals are located within the trail alignments, with the remaining individuals identified within close proximity (Figure 7). This species has been previously identified within the survey area and noted as being locally common following a fire event (DBCA, 2022h). *Acacia drummondii* subsp. *affinis* (P3) is very similar in appearance to *Acacia lateriticola*, which is not of conservation significance, with the main differentiating characteristic being the presence of globular (*A. lateriticola*) or oblong (*A. drummondii* subsp. *affinis*) flowers. However, the individuals observed during the September survey were identified to be post-flowering and within the fruiting stage. As such, identification of the species has been made through the analysis of leaf and seed pod morphology.

One species identified within the *Eucalyptus accedens* and *E. wandoo* open woodland vegetation type, potential *Orchidaceae* sp., has the potential to be the Priority 2 species *Thelymitra variegata* due to the appearance of the leaves, however the size of the individual and the lack of diagnostic characteristics inhibited a definite identification. The location of this species is shown in Figure 7. This species was identified as potentially occurring during the desktop survey, however it has not been identified previously within a 10 km radius of the survey area.

Two Declared Pests (DP) and/or Weeds of National Significance (WoNS) were identified within the survey site, being Bridal Creeper (**Asparagus asparagoides*; DP, WoNS), and One-leaf Cape Tulip (**Moraea flaccida*; DP). The populations of these species are predominantly outside of the survey area, however Bridal Creeper was identified within parts of all three caravan parking areas. Bridal Creeper was also identified in close proximity to Trail 5 and One-leaf Cape Tulip was identified in the area between the two most northern caravan parking areas. The locations of these species are shown in Figure 7.

A total of 12 species (5.3%) were unable to be identified to species level due to a lack of diagnostic characteristics present at the time of survey. Five species were identified to genus level: **Vitis* sp. (a grapevine), *Diuris* sp. (a donkey orchid post-flowering), *Pterostylis* sp. (a snail orchid post-flowering) and

Stylidium sp. (a small *Stylidium* prior to flowering). A further two species were identified to family level: *Poaceae sp. (an introduced grass) and Cyperaceae sp. (a native sedge). An additional six species were unable to be identified to family level, one of which being the aforementioned potential Orchidaceae species. The remaining five were all herbaceous species, which are not considered to be conservation significant flora, Declared Pests or Weeds of National Significance following comparison with desktop data.

Stylidium affine (Queen Triggerplant)

Isopogon divergens (Spreading Coneflower)

Daviesia polyphylla

Grevillea bipinnatifida (Fuchsia Grevillea)

Stackhousia monogyna

Tetratheca pilifera (P3)

Figure 5: Examples of native flora species recorded

Cape Weed (**Arctotheca calendula*)

Bridal Creeper (**Asparagus asparagoides; DP, WoNS*)

**Vitis* sp.

Suckling Clover (**Trifolium dubium*)

Largeflower Wood Sorrel (**Oxalis purpurea*)

Flat Weed (**Hypochaeris radicata*)

Figure 6: Examples of introduced flora species recorded

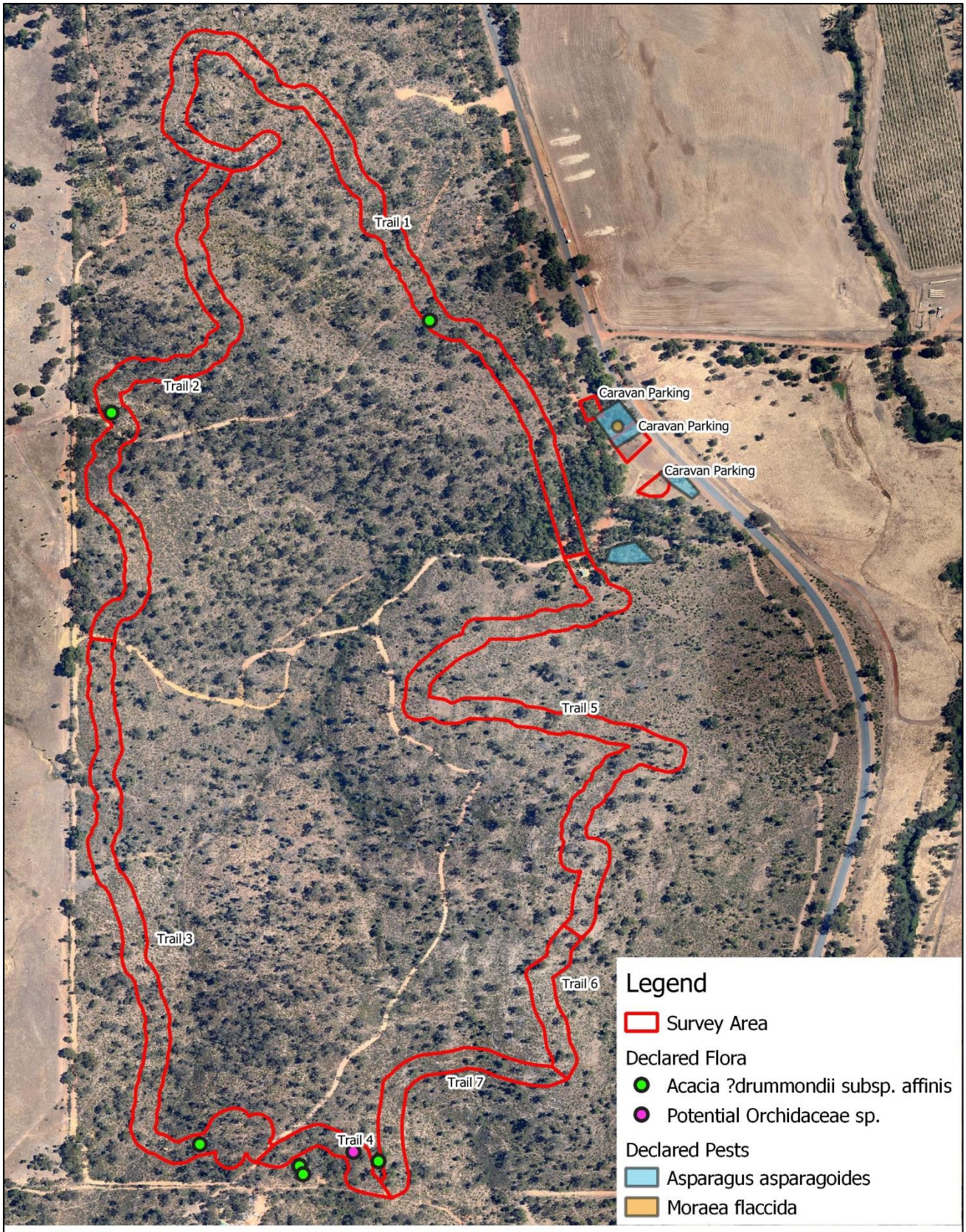

Figure 7:
Significant Flora and Declared Pest Locations Djidi-Djidi Ridge, Chittering

4.2.3 Vegetation Condition

Vegetation condition within Djidi-Djidi Ridge ranged from Completely Degraded to Excellent, with most of the survey area being in Very Good to Excellent condition (Table 8, Figure 8). The only area of Completely Degraded vegetation was located within Trail 3 and consisted of a drainage channel originating from adjacent farmland, with no overstorey and a very high weed coverage. The areas identified to be in Degraded condition were located throughout the survey area, and primarily consist of areas cleared for fire breaks or infrastructure/parking and the adjacent vegetation with low native cover and high weed coverage.

Table 8: Vegetation condition within Djidi-Djidi Ridge

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0	2.78	2.45	1.24	0.52	0.02	7.01
Area (%)	0	39.64	34.90	17.71	7.44	0.31	100

4.2.4 Threatened and Priority Communities

No threatened or priority ecological communities were found within the survey area during the 2022 survey.

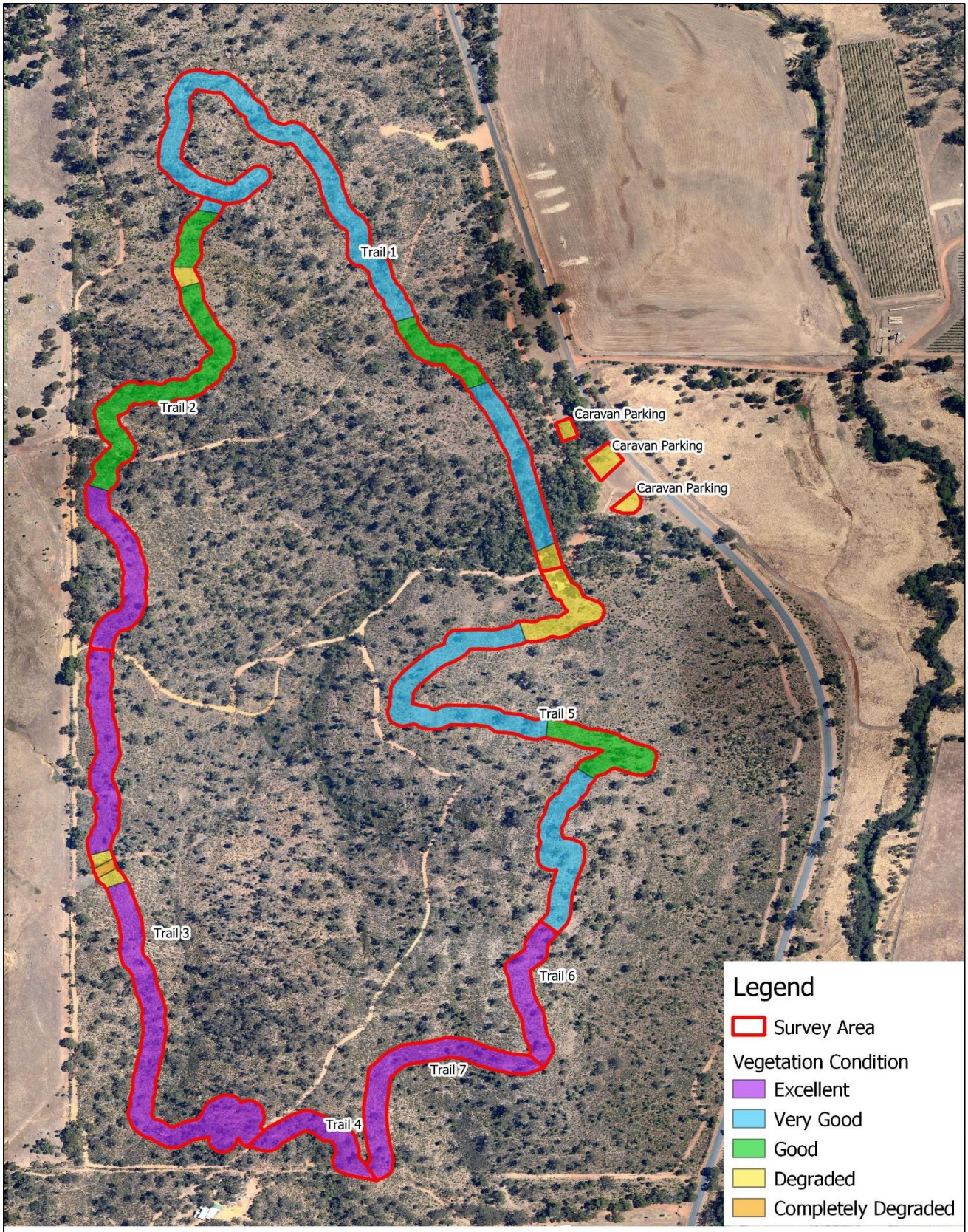

Figure 8:
Vegetation Condition
Djidi-Djidi Ridge, Chittering

5.0 Black Cockatoo Habitat Assessment Results

5.1 Desktop Survey

A desktop search of NatureMap database (DBCA, 2022) and the Protected Matters Search Tool (DAWE, 2022a) indicated the potential for the Carnaby's Black Cockatoo (*Zanda latirostris*) and the Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) to occur within the survey area (Table 9).

Table 9: Black Cockatoo species listed by NatureMap and PMST

Species Name	Cons Code	Nature Map	PMST	Presence
Zanda latirostris	EN	X	X	Breeding known to occur within area
Calyptorhynchus banksii naso	VU	X	X	Species or species habitat known to occur within area

5.2 Field Survey

A total of 52 trees that satisfied the Commonwealth guidelines for Black Cockatoo trees (trees with DBH greater than 500 mm) were recorded within Djidi-Djidi Ridge (DAWE, 2022b). The majority of the trees recorded were Marri (*Corymbia calophylla*; 40.38%) and Wandoo (*Eucalyptus wandoo*; 26.92%), both of which are high priority species for black cockatoo nesting, roosting and foraging (DEC, 2011). All trees were observed to be in a mature and good condition, with the exception of two dead *Eucalyptus* sp. trees. Trees recorded were located predominantly within the boundaries of the survey area, however three trees in very close proximity to the boundary of the trails were recorded, as well as 13 trees outside of the caravan parking survey area boundaries.

Of the trees recorded, a total of 19 (36.54%) were identified to contain hollows, with the total number of hollows observed being 41 and the average number of hollows per tree being approximately two. Those trees containing hollows were located only within the *Eucalyptus accedens* and *E. wandoo* Open Woodland, with no Marri individuals being identified to contain hollows. As such, no trees with hollows were recorded within the caravan parking areas. Hollows recorded had entrance diameters ranging from 50 mm to 250 mm. The minimum entrance diameter requirement for hollows utilised by black cockatoos is 100 mm (Cherriman, 2022), and as such a total of 30 hollows (from 16 trees) observed were of a suitable entrance diameter. Of all the hollows identified, one was observed to be occupied by a Galah (*Eolophus roseicapilla*) and four were occupied by feral bees (**Apis mellifera*). Examples of habitat trees and hollows observed are shown in Figures 9 and 10 and the locations of all habitat trees are shown in Figure 11, with data provided in Appendix 7. No evidence of black cockatoo foraging was observed surrounding the habitat trees identified, however Carnaby's Black Cockatoos were heard calling nearby during the survey.

Powderbark Wandoo (*Eucalyptus accedens*)

Wandoo (*Eucalyptus wandoo*)

Marri (*Corymbia calophylla*)

Dead *Eucalyptus* sp.

Figure 9: Examples of habitat trees observed in Djidi-Djidi Ridge

A suitably sized hollow in *Eucalyptus wandoo*

A suitably sized hollow in *Eucalyptus accedens*

An unsuitably sized hollow in *Eucalyptus accedens*

Evidence of hollow use by Galahs

Figure 10: Examples of hollows observed in Djidi-Djidi Ridge

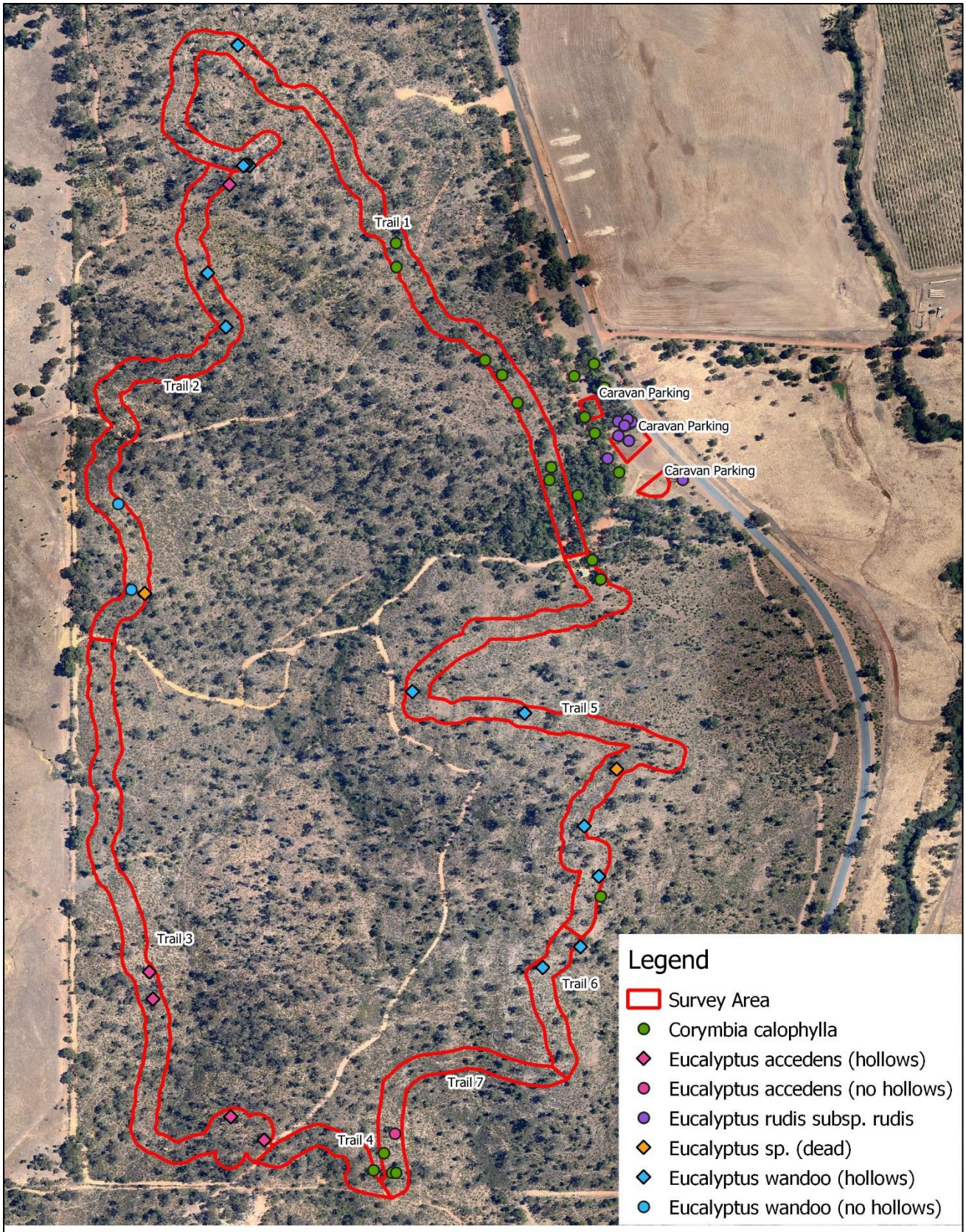

Figure 11:
Black Cockatoo Habitat Tree Locations
Djidi-Djidi Ridge, Chittering

6.0 Implications of Results

6.1 Flora and Vegetation

Two vegetation types were recorded during the survey, being *Eucalyptus accedens* and *E. wandoo* Open Woodland which occurred throughout the majority of the site, and *Corymbia calophylla* Open Woodland which occurred within the majority of Trail 1 and the entirety of the caravan parking area. The flora survey identified a total of 227 flora species (taxa) from 53 families, including 21 introduced (weeds) and 188 native species, with the following counts per vegetation type:

- 155 native species and 27 weed species in the *Eucalyptus accedens* and *E. wandoo* Open Woodland
- 106 native species and 27 weed species in the *Corymbia calophylla* Open Woodland.

Two Declared Pests (DP) and/or Weeds of National Significance (WoNS) were identified within the survey site, being Bridal Creeper (**Asparagus asparagoides*; DP, WoNS), and One-leaf Cape Tulip (**Moraea flaccida*; DP). Whilst these species were primarily identified outside of the survey area, Bridal Creeper is located within all three caravan parking areas, and the remaining populations identified are within close proximity to the clearing area. Declared pests are listed on the Western Australian Organism List (WAOL) under the *Biosecurity and Agriculture Management Act 2007* (WA), a classification which requires the landowner/land manager to control the population to limit damage as a result of the presence of these species (DPIRD, 2022b). It is recommended that the control of these species be undertaken prior to any clearing activity to prevent the spread of vegetative material including seeds and rhizomes through the survey area. Additionally, Natural Area recommends the implementation of hygiene practices during clearing to prevent spread.

A total of 12 species (5.3%) were unable to be identified to species level due to a lack of diagnostic characteristics present at the time of survey. Five species were identified to genus level and a further two species were identified to family level. A total of six species were unable to be identified to family level, one of which being the potential Orchidaceae species. The remaining five were all herbaceous species, which are not considered to be conservation significant flora, Declared Pests or Weeds of National Significance following comparison with desktop data.

6.2 Significant Flora

One confirmed species of conservation significance, *Tetratheca pilifera*, was identified within both vegetation types. The confirmation of the locations and population extent of these individuals will be required prior to clearing for trail development and it is recommended that, where necessary, the trail alignment be altered to avoid any impacts to this species. Two unconfirmed species of conservation significance were identified, being *Acacia drummondii* subsp. *affinis* within both vegetation types, and a potential *Orchidaceae* sp. which may be *Thelymitra variegata* within the *Eucalyptus accedens* and *E. wandoo* Open Woodland. Further targeted surveys within the flowering period of these species would be required for the confirmation of identification and to determine population numbers and extent. If these species are confirmed to be of conservation significance, Natural Area recommends alteration of the trail alignments to eliminate impacts to these species.

Of the 25 conservation significant flora species identified in the desktop survey as being likely to occur within the survey area, all but nine species have flowering periods within the survey period (Spring). The majority of those species with divergent flowering periods (eight) are perennial shrub and herb species for which identification would have been possible outside of their flowering periods. One species, *Thelymitra dedmaniarum*, is a herbaceous orchid species for which flowers are required for identification. This species has not been previously identified within 10 km of the survey area, however its presence is possible due to the presence of granite within the survey area. A targeted flora survey for this species would be required within its flowering period (November – January) for confirmation of presence or absence.

6.3 Threatened Ecological Communities

Results of the PMST report (DAWE, 2022a) indicated the potential for one Threatened Ecological Community, Banksia Woodlands of the Swan Coastal Plain, to occur within a 10 km radius of the survey area (refer to section 4.1.1). A review of DBCA's Threatened Communities database indicated that the nearest known record of this TEC is approximately 5.5 km to the west of the survey area (DBCA, 2022h). Vegetation types and species composition recorded during the survey do not meet that required for this TEC, and Djidi-Djidi Ridge is therefore not classified as a TEC.

6.4 Black Cockatoo Habitat Assessment

Djidi-Djidi Ridge contains a total of 52 trees that satisfied the Commonwealth guidelines for Black Cockatoo habitat trees. The majority of the trees recorded were from species which are considered to be high priority species for black cockatoo nesting, roosting and foraging; Marri (*Corymbia calophylla*; 40.38%) and Wandoo (*Eucalyptus wandoo*; 26.92%) (DEC, 2011).

The majority of the trees recorded which were associated with the trails were located within the boundary of the 10 m buffer surrounding the trails (65.38%), with a further three trees noted within close proximity to this boundary. It is recommended that, where necessary, the trail alignment be altered to avoid any clearing of habitat trees as well as negative impacts on the structural integrity of the root system of each tree. Of those trees recorded which were associated with the caravan parking areas, only two were within the clearing boundaries. However, it should be noted that these boundaries are a general indication only as precise clearing extents have not been provided. As such, a further 13 trees were recorded in close proximity to these boundaries to account for possible adjustments. As before, it is recommended that, where necessary, the clearing boundaries be altered to avoid any clearing of habitat trees as well as negative impacts on the structural integrity of the root system of each tree.

Of the trees recorded, a total of 19 (36.54%) were identified to contain hollows, with the total number of hollows observed being 41. All trees containing hollows were observed within the *Eucalyptus accedens* and *E. wandoo* open woodland vegetation type. The majority of these hollows (73.17%) were considered to be of a suitable entrance diameter for use by black cockatoos (Cherriman, 2022). Only four hollows were observed to be occupied by feral bees, therefore only having a minor impact on the ability for these hollows to be utilised by black cockatoos. It should be noted that black cockatoo hollow assessment was conducted from the ground and is therefore limited to those hollows visible from ground-level. As such, not all hollows may have been observed, as new growth, dense foliage and position in the landscape can hide hollows from vision. Additionally, internal hollow inspections would be required to confirm hollow characteristics such as internal hollow depth and structure and therefore their suitability to support nesting by Black Cockatoos.

No evidence of black cockatoo foraging was observed surrounding the habitat trees identified, however the area is considered to be of foraging value to black cockatoos due to the presence of a number of preferred foraging flora species.

6.5 Assessment Against Clearing Principles

An assessment of information obtained during the 2022 survey has been made against the Western Australian 10 clearing principles. It is suggested that the clearing application may be at variance with six (A, B,C, F, G, and J) of the ten clearing principles (Table 10).

Table 10: Assessment against the clearing principles

Clearing Principles		Comment
A	Native vegetation should not be cleared if it comprises a high level of biological diversity	The proposed site to be cleared may be at variance with this principle: ▪ the survey area recorded a total of 227 flora species (taxa) were recorded from 53 families during the field survey, including 21 introduced (weeds) and 188 native species, across two vegetation types: - 155 native species and 27 weed species in the *Eucalyptus accedens* and *E. wandoo* open woodland - 106 native species and 27 weed species in the *Corymbia calophylla* open woodland ▪ vegetation condition was in predominantly Excellent (39.64%) and Very Good (34.90%) condition ▪ one confirmed species of conservation significance was identified; *Tetratheca pilifera* (P3) ▪ two unconfirmed species of conservation significance were identified; *Acacia drummondii* subsp. *affinis* (P3) and a potential *Orchidaceae* sp. which may be *Thelymitra variegata* (P2).
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.	The proposed site to be cleared may be at variance with this principle: ▪ no black cockatoo individuals or evidence of feeding were observed during survey activities ▪ a total of 52 potential habitat trees (DBH ≥ 500 mm) were recorded within or in close proximity to the survey area ▪ the majority of the trees recorded were Marri (*Corymbia calophylla*; 40.38%) and Wandoo (*Eucalyptus wandoo*; 26.92%), both of which are considered high priority species for black cockatoo nesting, roosting and foraging ▪ flora species consistent with foraging habitat for threatened black cockatoos occur with the proposed clearing area including *Banksia* and *Eucalyptus* species ▪ vegetation within the remaining area of Djidi-Djidi Ridge surrounding the proposed trails and caravan parking areas also compromises of high value foraging species with vegetation in good condition

Clearing Principles		Comment
		▪ the vegetation within the survey area is likely to provide high quality habitat for other fauna species due to the presence of high native understorey, midstorey, leaf litter and dead wood cover, as well as outcrops and water sources which provide necessary harbourage and foraging resources. A detailed fauna survey would need to be undertaken to confirm the presence and extent of high-quality fauna habitat and to determine the presence of other conservation significant fauna species.
C	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	The proposed site to be cleared may be at variance with this principle: ▪ the desktop survey identified the possibility for the presence of 25 threatened flora species ▪ one confirmed species of conservation significance was identified; *Tetratheca pilifera* (P3), of which the population extent within that area has not previously been recorded ▪ two unconfirmed species of conservation significance were identified: - a total of six populations and 28 individuals of potentially *Acacia drummondii* subsp. *affinis* (P3) - one individual of a potential *Orchidaceae* sp. which may be *Thelymitra variegata* (P2).
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	The proposed site to be cleared is not likely to be at variance with this clearing principle: ▪ desktop survey results indicated the potential presence of one threatened ecological community, Banksia Woodlands of the Swan Coastal Plain, within a 10 km radius of the survey area however the nearest known record of this TEC was approximately 5.5 km to the west ▪ no threatened or priority ecological communities were found within the survey area as vegetation types and species composition recorded during the survey do not meet that required for the Banksia Woodlands of the Swan Coastal Plain TEC.
E	Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	The proposed site to be cleared is not likely to be at variance with this clearing principle: ▪ the survey site resides within the Northern Jarrah Forest (JAF01) IBRA subregion and consists of two vegetation complexes: the Murray 2 complex and the Williams complex (DBCA, 2022a). The pre-European extent of these vegetation complexes remaining is: - 37.62% and 12.22% respectively within the Shire of Chittering

Clearing Principles		Comment
		- 69.04% and 25.93% respectively within the Darling Plateau Subregion of the South-West Forests (Government of Western Australia, 2019) ▪ the proposed clearing area is a total of 7.01 ha within Djidi-Djidi Ridge, which is approximately 64 ha in area of predominantly good quality native vegetation ▪ the site is located in close proximity to a number of areas of good quality native vegetation, including Julimar State Forest.
F	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	The proposed site to be cleared may be at variance with this clearing principle: ▪ the survey area and the surrounding bushland does not contain any known geomorphic wetlands ▪ Djidi-Djidi Ridge contains a drainage channel originating from the agricultural paddock at the western boundary, with a section of this channel close to the origin passing through the survey area.
G	Native Vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The proposed site to be cleared may be at variance with this clearing principle: ▪ the vegetation within the survey area is in predominantly Excellent (39.64%) and Very Good (34.90%) condition ▪ clearing of the proposed tracks is likely to cause the degradation of surrounding vegetation as a result of edge effects as well as trampling and the spread of weeds and potentially pests and pathogens by foot traffic. This is likely to have the highest impact on the vegetation between the tracks and the southern and western borders of Djidi-Djidi Ridge due to the presence of cleared agricultural land in close proximity on either side.
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.	The proposed site to be cleared is not likely to be at variance with this clearing principle: ▪ the proposed clearing is not expected to impact adjacent or nearby conservation areas as the site is not located in close proximity to any conservation areas and is predominantly bordered by agricultural land-uses.
I	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or groundwater.	The proposed site to be cleared is not likely to be at variance with this clearing principle: ▪ the purpose of the proposed clearing is for the creation of walking trails, which is not expected to impact the quality of surface or groundwater, however the site contains a drainage channel originating from the agricultural paddock at the western boundary, with a section of this channel close to the origin passing through the survey area.

Clearing Principles		Comment
J	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The proposed site to be cleared may be at variance with this clearing principle: ▪ the potential obstruction of the origin of the drainage channel may alter the path of the watercourse or cause increased flooding at the mouth of the channel if blocked ▪ to prevent flooding trail design should incorporate water management of the existing features of the site and adjacent properties.

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Appendix 1: PMST Report 10 km

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: 06-Jul-2022

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	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	32
Listed Migratory Species:	8

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:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	12
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:	8
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

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			
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 latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area	In feature area
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petrogale lateralis lateralis Black-flanked Rock-wallaby, Mororong, Black-footed Rock Wallaby [66647]	Endangered	Species or species habitat likely to occur within area	In buffer area only
OTHER			
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
Acacia anomala Grass Wattle, Chittering Grass Wattle [8153]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area	In buffer area only
Chamelaucium sp. Gingin (N.G.Marchant 6) Gingin Wax [88881]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Conospermum densiflorum subsp. unicephalatum One-headed Smokebush [64871]	Endangered	Species or species habitat may occur within area	In buffer area only
Darwinia carnea Mogumber Bell, Narrogin Bell [9736]	Endangered	Species or species habitat may occur within area	In buffer area only
Diplolaena andrewsii [6601]	Endangered	Species or species habitat may occur within area	In feature area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat may occur within area	In buffer area only
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus leprophloia Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat may occur within area	In buffer area only
Grevillea christineae Christine's Grevillea [64520]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Grevillea corrugata a shrub [65445]	Endangered	Species or species habitat known to occur within area	In feature area
Grevillea curviloba subsp. curviloba Curved-leaf Grevillea [64908]	Endangered	Species or species habitat may occur within area	In buffer area only
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area	In buffer area only
Grevillea flexuosa Zig Zag Grevillea [2957]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hypocalymma sylvestre [86384]	Endangered	Species or species habitat known to occur within area	In feature area
Macarthuria keigheryi Keighery's Macarthuria [64930]	Endangered	Species or species habitat may occur within area	In buffer area only
Melaleuca sciotostyla Wongan Melaleuca [24324]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Ptychosema pusillum			
Dwarf Pea [11268]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Synaphea sp. Fairbridge Farm (D. Papenfus 696)			
Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra dedmaniarum			
Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra stellata			
Star Sun-orchid [7060]	Endangered	Species or species habitat known 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
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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

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 - [50954]	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
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine 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 overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may 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
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

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Barracca	Nature Reserve	WA	In buffer area only
Burroloo Well	Nature Reserve	WA	In buffer area only
Chittering Lakes	Nature Reserve	WA	In buffer area only
Moondyne	Nature Reserve	WA	In buffer area only
Mount Byroomanning	Nature Reserve	WA	In buffer area only
Unnamed WA41938	Nature Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Unnamed WA42560	5(1)(g) Reserve	WA	In buffer area only
Unnamed WA44713	5(1)(g) 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 feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Chittering-Needonga Lakes	WA	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Clearing and development of Lot 9001 Rosewood Drive, Chittering, WA	2016/7759	Controlled Action	Further Information Request	In buffer area only
Great Northern Highway-Bindoon Bypass, WA	2017/8035	Controlled Action	Post-Approval	In buffer area only
Great Northern Highway Muchea to Wubin Upgrade Stage 2 - Muchea North, WA	2016/7656	Controlled Action	Post-Approval	In buffer area only
Mine 2 million tonnes per annum of bauxite ore from a variety of properties	2010/5719	Controlled Action	Completed	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	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.

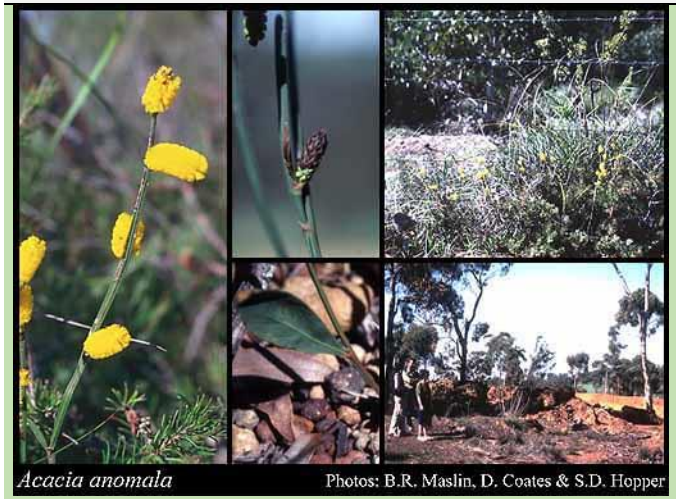
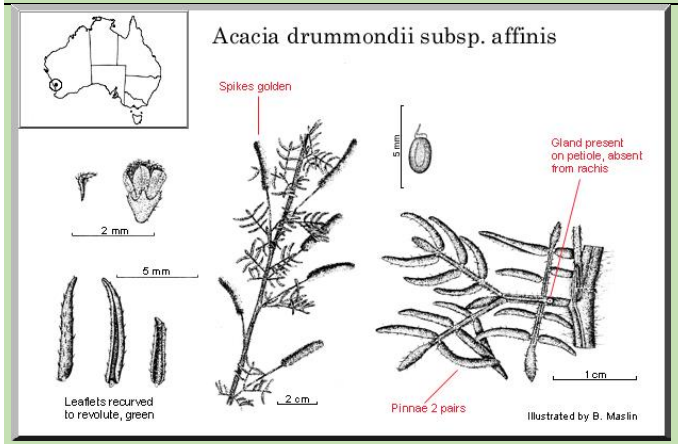
Acknowledgements

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

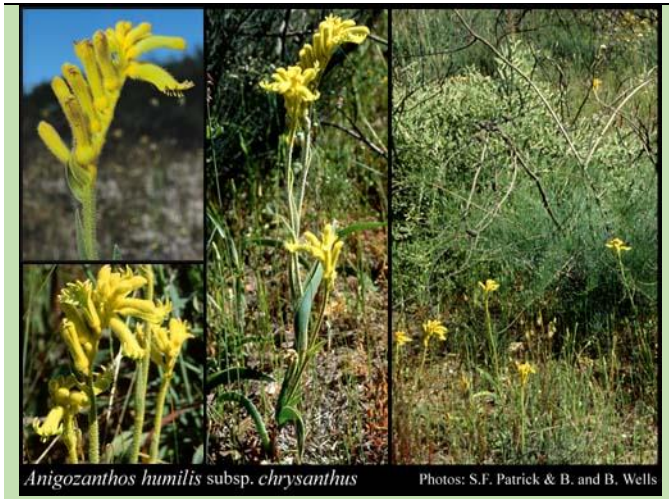
-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, 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.

Appendix 2: Significant Species

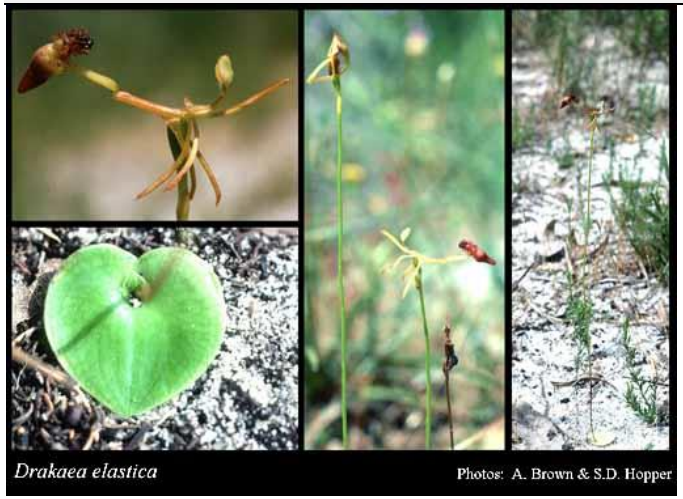
Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Grass Wattle	Slender, rush-like shrub, 0.2-0.5 m high. Fl. Yellow.	Aug to Sep.	Lateritic soils. Slopes.	T	Y	Soil type suitable.
		Erect shrub, 0.3-1 m high. Fl. Yellow.	Jul to Aug.	Lateritic gravelly soils.	P3	Y	Soil type suitable.
Acacia lasiocarpa var. *		No information.	No information.	No information.	No information.		

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
Acacia pulchella var. reflexa acuminate bracteole variant		Shrub, 0.3-1 m high. Fl. yellow	Jul to Sep.	Sandy loam or sandy clay over laterite. Woodland.	P3	Y	Soil type suitable.
		Prostrate, mat-forming, non-lignotuberous shrub, to 0.3 m high. Fl. white-cream-pink-green/green.	Jul or Sep to Dec or Jan.	Grey sand, lateritic gravel.	P3	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple.	Sep to Nov.	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	T	N	Soil type unsuitable.
	Golden Catspaw	Rhizomatous, perennial, herb, 0.2-0.4(-0.8) m high. Fl. Yellow.	Jul to Oct.	Grey or yellow sand.	P4	Y	Soil type suitable.
Chamelaucium lullfitzii		No information.	No information.	No information.	T	N	Soil type unsuitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Erect, much-branched shrub, 0.3-0.6 m high, inflorescence a spike. Fl. cream/white & blue.	Sep to Nov.	Clay soils. Low-lying areas.	T	N	Soil type unsuitable.
	Mogumber Bell	Spreading shrub, 0.2-0.45 m high. Fl. green & red.	Oct to Dec.	Lateritic loam & gravel.	T	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Erect shrub, 0.5-1 m high, inner involucral bracts glabrous, leaves broadly cordate. Fl. Red.	Jul to Oct.	Loam, clay. Granite outcrops & hillsides.	T	Y	Soil type suitable.
	Purdie's Donkey Orchid	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. Yellow.	Sep to Oct.	Grey-black sand, moist. Winter-wet swamps.	T	N	Soil type unsuitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Glossy-leaved Hammer Orchid	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow.	Oct to Nov.	White or grey sand. Low-lying situations adjoining winter-wet swamps.	T	N	Soil type unsuitable.
	Red Woolly Sundew	Fibrous-rooted, rosetted perennial, herb, to 0.06 m high, to 0.025 m wide. Fl. Orange.	Oct.	Laterite & silica sand soils.	P2	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Eleocharis keigheryi	Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. Green.	Aug to Nov.	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	T	N	Soil type unsuitable.
Eryngium pinnatifidum subsp. Umbraphilum		No information.	No information.	No information.	P2	N	Soil type unsuitable.
Eucalyptus leprophloia  	Scaly Butt Mallee	(Mallee), 2-5(-8) m high, bark rough loose & flaky to 1 m. Fl. cream-white.	Aug to Oct.	White or grey sand over laterite. Valley slopes.	T	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Tall shrub, to 2.5 m high. Fl. Yellow & orange & red.	Sep to Oct.	Yellow or brown sandy loam, red laterite soils. Steep gullies, slopes, ridges, breakaways.	P1	Y	Soil type suitable.
		Spreading, twiggy shrub, to 0.8 m high. Fl. Orange & red.	Feb.	Red-brown clay, brown loam, gravel, laterite, granite. Flats, slopes, hilltops, ridges, valleys, breakaways.	P2	Y	Soil type suitable.
Grevillea althoferorum subsp. fragilis		No information.	No information.	No information.	T	N	Soil type unsuitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Erect, wiry shrub, 0.5-0.6 m high. Fl. white-cream.	Aug to Sep.	Clay loam, sandy clay, often moist.	T	N	Soil type unsuitable.
Grevillea corrugata		Shrub, 1.5-2.5 m high. Fl. White.	? Aug to Sep.	Gravelly loam. Roadsides.	T	Y	Soil type suitable.
Grevillea curviloba		Prostrate to erect shrub, 0.1-2.5 m high. Fl. white-cream.	Aug to Oct.	Grey sand, sandy loam. Winter-wet heath.	T	N	Soil type unsuitable.

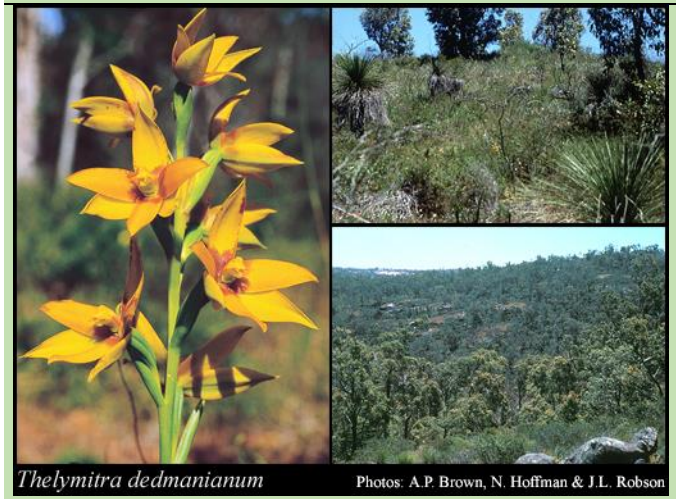
Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Tangled Grevillea	Irregular, few-branched, non-lignotuberous shrub, to 2 m high. Fl. creamy-yellow.	Jul to Oct.	Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways.	T	Y	Soil type suitable.
		Erect shrub, to 0.5 m high. Fl. Yellow.	Jul to Sep.	Sand, brown clay, laterite. Near roadsides.	P2	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
Hypocalymma sylvestre		Spreading shrub, 0.6 m high. Fl. Yellow.	Aug.	Yellow-brown sandy loam. Woodland on lateritic hilltop.	T	Y	Soil type suitable.
Lasiopetalum caroliae		No information.	No information.	No information.	P3	N	Soil type unsuitable.
		Erect or spreading perennial, herb or shrub, 0.2-0.4 m high, 0.3-0.6 m wide.	Sep to Dec or Feb to Mar.	White or grey sand.	T	Y	Soil type suitable.

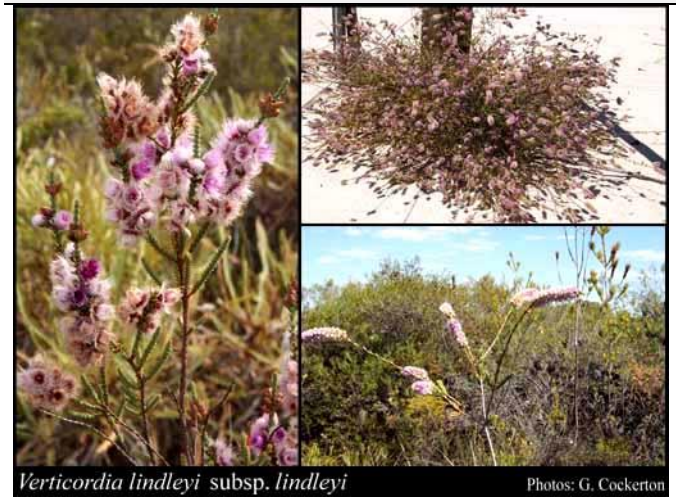
Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Wongan Melaleuca	Spreading shrub, 0.6-1.5 m high. Fl.	Aug.	Orange clayey sand with lateritic pebbles. Scree slopes.	T	Y	Soil type suitable.
Millotia tenuifolia var. laevis		Ascending to erect annual, herb, 0.02-0.1 m high. Fl. Yellow.	Sep to Oct.	Granite or laterite soils.	P2	Y	Soil type suitable.
Oxymyrrhine coronata		No information.	No information.	No information.	P4	N	Soil type unsuitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Dwarf Pea	Perennial, herb, mostly 0.05-0.1 m high. Fl. red & brown & yellow.	Aug to Oct.	Sand. Rises.	T	Y	Soil type suitable.
	Floating Bog-rush	Aquatic annual, grass-like or herb (sedge), 0.3 m high. Fl. Brown.	Oct.	Winter-wet depressions.	P4	N	Soil type unsuitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Caespitose perennial, herb, 0.12-0.35 m high, leaves tufted, linear to narrowly oblanceolate, 1-5 cm long, 0.8-2.5 mm wide, apex subacute, margin entire, glandular. Scape glandular throughout. Inflorescence racemose. Fl. Yellow.	Oct to Nov.	Brown to red-brown clay loam. Winter-wet habitats and depressions, open woodland, shrubland.	P2	N	Soil type unsuitable.
Synaphea grandis		Tufted shrub, ca 0.3 m high. Fl. Yellow.	Oct to Nov.	Laterite.	P4	Y	Soil type suitable.
		Dense, clumped shrub, to 0.3 m high, to 0.4 m wide. Fl. Yellow.	Oct.	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	T	N	Soil type unsuitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Spreading shrub, 0.1-0.3 m high. Fl. Purple.	Aug to Oct.	Gravelly soils.	P3	Y	Soil type suitable.
	Cinnamon Sun Orchid	Tuberous, perennial, herb, to 0.8 m high. Fl. Yellow.	Nov to Dec or Jan.	Granite.	T	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
	Star Orchid	Tuberous, perennial, herb, 0.15-0.25 m high. Fl. yellow & brown.	Oct to Nov.	Sand, gravel, lateritic loam.	T	Y	Soil type suitable.
	Queen of Sheba	Tuberous, perennial, herb, 0.1-0.35 m high. Fl. orange & red & purple & pink	Jun to Sep.	Sandy clay, sand, laterite.	P2	Y	Soil type suitable.
Thysanotus sp. Badgingarra		Perennial, herb (with tuberous roots), ca 0.35 m high. Fl. Blue.	Dec.	Grey sand with lateritic gravel.	P2	Y	Soil type suitable.

Picture	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood (Y/N)	Comment
		Erect shrub, 0.2-0.75 m high. Fl. Pink.	May or Nov to Dec or Jan.	Sand, sandy clay. Winter-wet depressions.	P4	N	Soil type unsuitable.

Appendix 3: 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.
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: Department of Biodiversity, Conservation and Attractions, 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: Department of Biodiversity, Conservation and Attractions, 2020

Appendix 4: Quadrat Data

Quadrat No.:	Q1
Survey Date:	20/09/2022
Personnel:	KS, SNH
Latitude:	-31.4909635
Longitude:	116.1120347
Topography:	Upper slope
Aspect:	SE
Slope:	3-5%
Soil:	Brown loan
Gravel:	30%
Rock:	0%
Leaf Litter:	5%
Bare Ground:	3%
Drainage:	Well-draining
Condition:	Excellent

Notes: *Eucalyptus accedens* and *E. wandoo* open woodland

Species	Cover (%)	Height (m)
**Briza maxima*	0.1	0.2
**Foeniculum vulgare*	0.1	0.2
**Hypochaeris glabra*	0.1	0.1
**Romulea rosea*	0.2	0.2
Acacia pulchella var. *pulchella*	1.0	0.3
Acacia teretifolia	0.1	0.3
Acacia ?drummondii subsp. *affinis*	0.2	0.3
Ammothryon grandiflorum	0.1	0.2
Amphipogon amphipogonoides	0.1	0.1
Andersonia lehmanniana	1.0	0.2
Babingtonia camphorosmae	0.5	0.2
Banksia dallanneyi	3.0	0.2
Banksia dallanneyi subsp. dallanneyi var. *mellicula*	0.2	0.2
Beaufortia macrostemon	1.0	0.2
Bossiaea eriocarpa	5.0	0.3
Burchardia congesta	0.1	0.4
Caladenia flava	0.1	0.2

Species	Cover (%)	Height (m)
Calothamnus sanguineus	20.0	0.3
Calytrix sylvana	2.0	0.2
Chorizema dicksonii	5.0	0.3
Dillwynia laxiflora	0.2	0.3
Drosera menziesii	0.1	0.2
Drosera spilos	0.1	0.1
Gompholobium marginatum	0.1	0.1
Grevillea pilulifera	0.1	0.3
Haemodorum discolor	1.0	0.4
Haemodorum laxum	0.1	0.3
Hakea undulata	0.5	0.3
Hibbertia hypericoides	1.0	0.3
Hibbertia lasiopus	0.1	0.2
Hydrocotyle callicarpa	0.1	0.1
Jacksonia restioides	5.0	0.2
Laxmannia grandiflora	0.1	0.2
Lepidosperma scabrum	0.1	0.3
Leucopogon pulchellus	2.0	0.4
Lomandra sericea	0.5	0.3
Neurachne alopecuroidea	1.0	0.3
Patersonia rudis	1.0	0.3
Petrophile striata	5.0	0.3
Philotheca spicata	20.0	0.4
Potential *Orchidaceae* sp.	0.1	0.1
Sphaerolobium medium	30.0	0.3
Stylidium affine	0.1	0.2
Stylidium sp. (not currently flowering-unable to accurately identify)	0.1	0.1
Stylidium tenue subsp. *majusculum*	0.1	0.2
Synaphea acutiloba	1.0	0.3
Thelymitra crinita	0.1	0.2
Trachymene pilosa	0.1	0.1
Tripterococcus brunonis	0.1	0.3
Xanthorrhoea acanthostachya	20.0	0.5
Xanthosia ciliata	0.1	0.1

Note: *denotes introduced species.

Quadrat No.:	Q2
Survey Date:	20/09/2022
Personnel:	KS, SNH
Latitude:	-31.4844636
Longitude:	116.1135334
Topography:	Mid slope
Aspect:	E
Slope:	5-10%
Soil:	Brown loam
Gravel:	50%
Rock:	3%
Leaf Litter:	30%
Bare Ground:	0%
Drainage:	Well-draining
Condition:	Good

Notes: *Corymbia calophylla* open woodland
Carnaby's Black Cockatoos calling

Species	Cover (%)	Height (m)
**Briza maxima*	60.0	0.2
**Ehrharta longiflora*	0.1	0.2
**Gladiolus caryophyllaceus*	0.5	0.3
**Hypochaeris glabra*	0.1	0.1
**Lysimachia arvensis*	0.1	0.2
**Oxalis corniculata*	0.1	0.1
**Romulea rosea*	1.0	0.2
**Stachys arvensis*	0.1	0.1
Acacia pulchella	1.0	0.4
Anigozanthos bicolor	0.1	0.2
Banksia dallanneyi	0.1	0.2
Bossiaea eriocarpa	40.0	0.5
Burchardia congesta	0.5	0.3
Caesia micrantha	0.1	0.2
Chamaescilla corymbosa	0.5	0.2
Cheilanthes austrotenuifolia	30.0	0.2
Conostylis setigera	0.1	0.2
Corymbia calophylla	60.0	8.0

Species	Cover (%)	Height (m)
Dampiera alata	2.0	0.3
Daviesia polyphylla	0.2	0.3
Desmocladus asper	40.0	0.2
Drosera erythrorhiza	0.1	0.1
Drosera menziesii	0.1	0.3
Gastrolobium calycinum	20.0	0.4
Gompholobium marginatum	0.5	0.2
Grevillea pilulifera	2.0	0.3
Haemodorum discolor	2.0	0.3
Haemodorum laxum	0.5	0.3
Hibbertia hypericoides	1.0	0.3
Hibbertia diamesogenos	0.3	0.2
Hypocalymma angustifolium	0.5	0.3
Lagenophora huegelii	0.3	0.2
Lawrencella rosea	0.1	0.2
Lechenaultia biloba	1.0	0.2
Lepidosperma apricola	0.5	0.3
Lysiandra calycina	1.0	0.4
Morelotia octandra	2.0	0.2
Neurachne alopecuroidea	0.2	0.2
Opercularia vaginata	20.0	0.2
Orthrosanthus laxus	2.0	0.3
Pauridia occidentalis var. *quadriloba*	0.1	0.1
Podolepis gracilis	0.1	0.1
Sowerbaea laxiflora	2.0	0.2
Stackhousia monogyna	1.0	0.2
Stypandra glauca	1.0	0.3
Thysanotus gracilis	0.1	0.1
Thysanotus manglesianus	0.1	0.3
Tricoryne elatior	0.1	0.2
Unidentifiable sp. 1	0.1	0.1
Xanthorrhoea gracilis	3.0	0.2
Xanthorrhoea preissii	30.0	1.0
Xanthosia candida	0.5	0.2

Note: *denotes introduced species.

Quadrat No.:	Q3
Survey Date:	21/09/2022
Personnel:	KS, SNH
Latitude:	-31.4817966
Longitude:	116.1117882
Topography:	Mid slope
Aspect:	SE
Slope:	5-10%
Soil:	Brown loam
Gravel:	10%
Rock:	5%
Leaf Litter:	15%
Bare Ground:	1%
Drainage:	Well-draining
Condition:	Very Good

Notes: *Corymbia calophylla* open woodland

Species	Cover (%)	Height (m)
**Briza maxima*	12.0	0.2
**Briza minima*	15.0	0.2
**Hypochaeris glabra*	0.1	0.1
**Hypochaeris radicata*	0.1	0.1
**Lysimachia arvensis*	5.0	0.2
**Oxalis purpurea*	0.1	0.1
**Romulea rosea*	2.0	0.2
**Ursinia anthemoides*	0.2	0.2
Allocasuarina humilis	3.0	1.0
Babingtonia camphorosmae	3.0	0.2
Banksia sessilis var. *sessilis*	5.0	0.4
Bossiaea eriocarpa	30.0	0.4
Burchardia congesta	0.1	0.3
Cassytha pomiformis	3.0	0.5
Chamaescilla corymbosa	0.1	0.2
Cheilanthes austrotenuifolia	3.0	0.2
Corymbia calophylla	10.0	6.0

Species	Cover (%)	Height (m)
Desmocladus asper	30.0	0.2
Drosera menziesii	0.1	0.3
Gompholobium marginatum	0.1	0.2
Grevillea pilulifera	1.0	0.3
Haemodorum discolor	0.5	0.3
Hakea erinacea	2.0	1.0
Hibbertia hypericoides	2.0	0.3
Hypocalymma robustum	2.0	0.3
Laxmannia squarrosa	20.0	0.1
Lepidosperma scabrum	0.1	0.3
Lepidosperma squamatum	2.0	0.3
Levenhookia stipitata	0.1	0.1
Lysiandra calycina	2.0	0.4
Morelotia octandra	8.0	0.3
Neurachne alopecuroidea	5.0	0.2
Opercularia vaginata	15.0	0.3
Petrophile striata	0.5	0.3
Stylidium tenue subsp*. majusculum*	0.1	0.2
Stypandra glauca	2.0	0.3
Tetratheca confertifolia	0.5	0.2
Thelymitra crinita	0.1	0.1
Thysanotus manglesianus	0.1	0.2
Unidentifiable sp. 2	0.1	0.2
Xanthorrhoea gracilis	5.0	0.4
Xanthorrhoea preissii	10.0	1.0

Note: *denotes introduced species.

Quadrat No.:	Q4
Survey Date:	21/09/2022
Personnel:	KS, SNH
Latitude:	-31.4836265
Longitude:	116.1127118
Topography:	Mid slope
Aspect:	SE
Slope:	1-3%
Soil:	Brown loam
Gravel:	0%
Rock:	0%
Leaf Litter:	1%
Bare Ground:	50%
Drainage:	Well-draining
Condition:	Very Good

Notes: *Corymbia calophylla* open woodland
Parrots feeding

Species	Cover (%)	Height (m)
**Briza maxima*	40.0	0.2
**Briza minima*	1.0	0.2
**Lupinus angustifolius*	0.5	0.3
**Lysimachia arvensis*	0.1	0.2
**Romulea rosea*	5.0	0.2
**Ursinia anthemoides*	0.1	0.2
Acacia pulchella	15.0	0.5
Acacia saligna	0.2	0.5
Acacia ?drummondii subsp. *affinis*	0.1	0.2
Austrostipa compressa	0.2	0.3
Bossiaea eriocarpa	0.5	0.3
Burchardia congesta	0.1	0.2
Cassytha pomiformis	5.0	0.3
Cheilanthes austrotenuifolia	0.5	0.2
Corymbia calophylla	40.0	8.0
Dampiera alata	50.0	0.3
Daviesia decurrens	2.0	0.3

Species	Cover (%)	Height (m)
Desmocladus asper	40.0	0.3
Dichopogon capillipes	0.5	0.2
Diuris sp.	0.1	0.2
Drosera erythrorhiza	0.1	0.1
Drosera menziesii	0.1	0.2
Gastrolobium calycinum	2.0	0.5
Gompholobium marginatum	0.5	0.2
Grevillea pilulifera	5.0	0.3
Haemodorum discolor	0.1	0.2
Haemodorum laxum	0.1	0.2
Hibbertia hypericoides	1.0	0.2
Hibbertia diamesogenos	0.5	0.5
Hypocalymma robustum	20.0	0.4
Lechenaultia biloba	8.0	0.2
Lomandra caespitosa	0.1	0.2
Lysiandra calycina	5.0	0.4
Neurachne alopecuroidea	0.5	0.3
Opercularia vaginata	10.0	0.2
Stylidium affine	0.1	0.2
Stypandra glauca	2.0	0.3
Tribonanthes longipetala	0.1	0.2
Trichocline spathulata	0.1	0.2
Xanthorrhoea preissii	5.0	1.0

Note: *denotes introduced species.

Quadrat No.:	**Q5**
Survey Date:	21/09/2022
Personnel:	KS, SNH
Latitude:	-31.4873368
Longitude:	116.1143953
Topography:	Mid slope
Aspect:	N
Slope:	3-5%
Soil:	Brown loam
Gravel:	0%
Rock:	0%
Leaf Litter:	80%
Bare Ground:	0%
Drainage:	Well-draining
Condition:	Good

Notes: *Eucalyptus accedens* and *E. wandoo* open woodland

Species	**Cover (%)**	**Height (m)**
**Briza maxima*	60.0	0.2
**Briza minima*	1.0	0.2
**Ehrharta calycina*	0.1	0.2
**Erodium botrys*	0.5	0.2
**Hypochaeris glabra*	0.1	0.1
**Lysimachia arvensis*	0.5	0.2
**Lythrum hyssopifolia*	1.0	0.1
**Oxalis corniculata*	1.0	0.2
**Romulea rosea*	1.0	0.2
**Stachys arvensis*	0.1	0.2
**Trifolium angustifolium*	0.1	0.2
**Trifolium dubium*	1.0	0.2
Cheilanthes austrotenuifolia	1.0	0.2
Dampiera alata	10.0	0.3
Desmocladus asper	20.0	0.2
Dichopogon capillipes	0.2	0.3
Eucalyptus wandoo	10.0	12.0

Species	Cover (%)	Height (m)
Gastrolobium calycinum	0.5	0.3
Haemodorum discolor	5.0	0.2
Haemodorum laxum	5.0	0.2
Hakea lissocarpha	1.0	0.4
Hibbertia commutata	2.0	0.3
Hypocalymma robustum	50.0	0.5
Lepidosperma apricola	0.5	0.2
Lepidosperma scabrum	0.2	0.2
Lysiandra calycina	1.0	0.3
Opercularia vaginata	5.0	0.2
Stackhousia monogyna	0.5	0.2
Stypandra glauca	0.5	0.2
Unidentifiable sp. 1	0.1	0.1
Xanthorrhoea gracilis	10.0	0.5
Xanthorrhoea preissii	20.0	1.0

Note: *denotes introduced species.

Quadrat No.:	Q6
Survey Date:	21/09/2022
Personnel:	KS, SNH
Latitude:	-31.4844682
Longitude:	116.1098765
Topography:	Mid slope
Aspect:	SE
Slope:	5-10%
Soil:	Brown loam
Gravel:	50%
Rock:	2%
Leaf Litter:	80%
Bare Ground:	50%
Drainage:	Well-draining
Condition:	Excellent

Notes: *Eucalyptus accedens* and *E. wandoo* open woodland

Species	Cover (%)	Height (m)
**Briza maxima*	5.0	0.2
**Hypochaeris glabra*	0.1	0.1
**Hypochaeris radicata*	0.1	0.1
**Lysimachia arvensis*	0.1	0.2
**Romulea rosea*	0.2	0.2
**Stachys arvensis*	0.1	0.2
**Ursinia anthemoides*	0.1	0.1
Acacia pulchella	1.0	0.5
Acacia ?drummondii subsp. *affinis*	0.5	0.3
Babingtonia camphorosmae	0.5	0.2
Billardiera fraseri	0.5	0.3
Bossiaea eriocarpa	20.0	0.4
Burchardia congesta	0.1	0.3
Caesia micrantha	0.1	0.2
Caladenia flava	0.1	0.1
Chamaescilla corymbosa	0.1	0.1
Conostylis setigera	0.2	0.2
Desmocladus asper	2.0	0.2
Dichopogon capillipes	0.1	0.2

Species	Cover (%)	Height (m)
Drosera erythrorhiza	0.1	0.1
Eucalyptus accedens	15.0	8.0
Eucalyptus wandoo	10.0	6.0
Gompholobium marginatum	0.1	0.2
Grevillea pilulifera	1.0	0.3
Haemodorum discolor	0.5	0.3
Hakea lissocarpha	10.0	0.5
Hibbertia commutata	0.5	0.3
Hibbertia hypericoides	10.0	0.3
Hibbertia lasiopus	0.2	0.3
Jacksonia restioides	0.1	0.2
Lagenophora huegelii	0.5	0.2
Lepidosperma scabrum	1.0	0.2
Leucopogon pulchellus	5.0	0.3
Lomandra caespitosa	0.5	0.2
Lomandra caespitosa	0.1	0.2
Lomandra sericea	0.2	0.3
Lysiandra calycina	0.5	0.3
Morelotia octandra	1.0	0.2
Neurachne alopecuroidea	0.1	0.2
Pauridia occidentalis var*. quadriloba*	0.1	0.2
Pterostylis sp.	0.1	0.1
Ptilotus manglesii	0.1	0.1
Stylidium tenue subsp*. majusculum*	0.1	0.2
Stypandra glauca	1.0	0.3
Synaphea acutiloba	2.0	0.2
Tetratheca pilifera	0.5	0.2
Trachymene pilosa	0.1	0.1
Tripterococcus brunonis	0.1	0.2
Trymalium ledifolium	2.0	0.4
Unidentifiable sp. 2	0.1	0.2
Unidentifiable sp. 3	0.1	0.1
Xanthorrhoea gracilis	20.0	1.0
Xanthorrhoea preissii	3.0	0.5

Note: *denotes introduced species.

Appendix 5: Species List

The complete flora list for the site is provided in the table below with flora listed by species, 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 ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Apiaceae	**Foeniculum vulgare*	Fennel	X	
Asparagaceae	**Asparagus asparagoides* (DP, WoNS)	Bridal Creeper	X	X
Asteraceae	**Arctotheca calendula*	Cape Weed	X	
Asteraceae	**Arctotheca sp.*		X	
Asteraceae	**Cotula coronopifolia*	Waterbuttons		X
Asteraceae	**Hypochaeris glabra*	Smooth Cats-ear	X	X
Asteraceae	**Hypochaeris radicata*	Flat Weed	X	X
Asteraceae	**Pseudognaphalium luteoalbum*	Jersey Cudweed	X	
Asteraceae	**Sonchus asper*	Rough Sowthistle		X
Asteraceae	**Ursinia anthemoides*	Ursinia	X	X
Fabaceae	**Acacia iteaphylla*		X	
Fabaceae	**Lupinus angustifolius*	Narrowleaf Lupin	X	X
Fabaceae	**Trifolium angustifolium*	Narrowleaf Clover	X	
Fabaceae	**Trifolium dubium*	Suckling Clover	X	X
Geraniaceae	**Erodium botrys*	Long Storksbill	X	
Iridaceae	**Gladiolus caryophyllaceus*	Wild Gladiolus	X	X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Iridaceae	**Hesperantha falcata*			X
Iridaceae	**Moraea flaccida (DP)*	One-leaf Cape Tulip		X
Iridaceae	**Romulea rosea*	Guildford Grass	X	X
Lamiaceae	**Stachys arvensis*	Staggerweed	X	X
Lythraceae	**Lythrum hyssopifolia*	Lesser Loosestrife	X	
Oleaceae	**Olea europaea*	Olive		X
Orobanchaceae	**Orobanche minor*	Lesser Broomrape	X	
Oxalidaceae	**Oxalis corniculata*	Yellow Wood Sorrel	X	X
Oxalidaceae	**Oxalis pes-caprae*	Soursob	X	
Oxalidaceae	**Oxalis purpurea*	Largeflower Wood Sorrel	X	X
Papaveraceae	**Fumaria capreolata*	Whiteflower Fumitory	X	
Poaceae	**Avena barbata*	Bearded Oat	X	
Poaceae	**Briza maxima*	Blowfly Grass	X	X
Poaceae	**Briza minima*	Shivery Grass	X	X
Poaceae	**Cynodon dactylon*	Couch		X
Poaceae	**Ehrharta calycina*	Perennial Veldt Grass	X	
Poaceae	**Ehrharta longiflora*	Annual Veldt Grass		X
Poaceae	**Paspalum dilatatum*			X
Poaceae	**Poaceae sp.*			X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Polygonaceae	**Rumex crispus*	Curled Dock		X
Primulaceae	**Lysimachia arvensis*	Pimpernel	X	X
Solanaceae	**Solanum nigrum*	Black Berry Nightshade		X
Vitaceae	**Vitis sp.*			X
Amaranthaceae	*Ptilotus manglesii*	Pom Poms	X	X
Amaranthaceae	*Ptilotus polystachyus*	Prince of Wales Feather		X
Apiaceae	*Xanthosia candida*		X	X
Apiaceae	*Xanthosia huegelii*		X	
Apiaceae	*Xanthosia ciliata*		X	
Apiaceae	*Eryngium pinnatifidum*	Blue Devils		X
Araliaceae	*Hydrocotyle callicarpa*	Small Pennywort	X	
Araliaceae	*Trachymene pilosa*	Native Parsnip	X	
Asparagaceae	*Dichopogon capillipes*		X	X
Asparagaceae	*Lomandra caespitosa*	Tufted Mat Rush	X	X
Asparagaceae	*Lomandra sericea*	Silky Mat Rush	X	
Asparagaceae	*Thysanotus multiflorus*	Many-flowered Fringe Lily	X	X
Asparagaceae	*Thysanotus tenellus*		X	
Asparagaceae	*Laxmannia grandiflora*		X	X
Asparagaceae	*Laxmannia squarrosa*		X	X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Asparagaceae	*Sowerbaea laxiflora*	Purple Tassels	X	X
Asparagaceae	*Thysanotus gracilis*			X
Asteraceae	*Lagenophora huegelii*		X	X
Asteraceae	*Lawrencella rosea*		X	X
Asteraceae	*Olearia paucidentata*	Autumn Scrub Daisy		X
Asteraceae	*Podolepis gracilis*	Slender Podolepis		X
Asteraceae	*Senecio diaschides*		X	
Asteraceae	*Craspedia variabilis*		X	
Asteraceae	*Quinetia urvillei*		X	
Asteraceae	*Trichocline spathulata*	Native Gerbera		X
Campanulaceae	*Lobelia rhombifolia*	Tufted Lobelia	X	
Casuarinaceae	*Allocasuarina huegeliana*	Rock Sheoak	X	
Casuarinaceae	*Allocasuarina humilis*	Dwarf Sheoak	X	X
Celastraceae	*Stackhousia monogyna*		X	X
Celastraceae	*Tripterococcus brunonis*	Winged Stackhousia	X	X
Colchicaceae	*Burchardia congesta*		X	X
Colchicaceae	*Burchardia multiflora*	Dwarf Burchardia	X	X
Cyperaceae	*Ammothryon grandiflorum*	Large Flowered Bog-rush	X	X
Cyperaceae	*Cyperaceae sp.*			X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Cyperaceae	*Lepidosperma apricola*		X	X
Cyperaceae	*Lepidosperma pubisquameum*			X
Cyperaceae	*Lepidosperma scabrum*		X	X
Cyperaceae	*Lepidosperma squamatum*			X
Cyperaceae	*Cyathochaeta avenacea*		X	
Cyperaceae	*Morelotia octandra*		X	X
Dilleniaceae	*Hibbertia commutata*		X	X
Dilleniaceae	*Hibbertia hypericoides*	Yellow Buttercups	X	X
Dilleniaceae	*Hibbertia polystachya*			X
Dilleniaceae	*Hibbertia diamesogenos*		X	X
Dilleniaceae	*Hibbertia lasiopus*	Large Hibbertia	X	
Droseraceae	*Drosera erythrorhiza*	Red Ink Sundew	X	X
Droseraceae	*Drosera macrantha*	Bridal Rainbow		X
Droseraceae	*Drosera menziesii*	Pink Rainbow	X	X
Droseraceae	*Drosera spilos*		X	
Elaeocarpaceae	*Tetratheca pilifera (P3)*		X	
Elaeocarpaceae	*Tetratheca confertifolia*		X	X
Ericaceae	*Andersonia lehmanniana*		X	
Ericaceae	*Leucopogon pulchellus*	Beard-heath	X	X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Fabaceae	*Acacia acuminata*	Jam	X	
Fabaceae	*Acacia alata*	Winged Wattle	X	
Fabaceae	*Acacia pulchella*	Prickly Moses	X	X
Fabaceae	*Acacia pulchella var. pulchella*		X	
Fabaceae	*Acacia saligna*	Orange Wattle		X
Fabaceae	*Acacia teretifolia*		X	
Fabaceae	*Acacia ?drummondii subsp. affinis (P3)*		X	X
Fabaceae	*Bossiaea eriocarpa*	Common Brown Pea	X	X
Fabaceae	*Chorizema dicksonii*	Yellow-eyed Flame Pea	X	X
Fabaceae	*Daviesia cordata*		X	
Fabaceae	*Daviesia decurrens*	Prickly Bitter-pea		X
Fabaceae	*Daviesia polyphylla*		X	X
Fabaceae	*Dillwynia laxiflora*		X	X
Fabaceae	*Gastrolobium calycinum*	York Road Poison	X	X
Fabaceae	*Gastrolobium acutum*		X	
Fabaceae	*Gastrolobium spinosum*	Prickly Poison	X	
Fabaceae	*Gompholobium marginatum*		X	X
Fabaceae	*Hovea trisperma*	Common Hovea	X	
Fabaceae	*Jacksonia sternbergiana*	Stinkwood	X	

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Fabaceae	*Jacksonia restioides*		X	
Fabaceae	*Kennedia stirlingii*	Bushy Kennedia	X	X
Fabaceae	*Pultenaea ericifolia*		X	
Fabaceae	*Sphaerolobium medium*		X	
Fabaceae	*Viminaria juncea*	Swishbush		X
Geraniaceae	*Erodium cygnorum*	Blue Heronsbill	X	
Goodeniaceae	*Dampiera alata*	Winged-stem Dampiera	X	X
Goodeniaceae	*Dampiera lavandulacea*		X	
Goodeniaceae	*Lechenaultia biloba*	Blue Leschenaultia		X
Goodeniaceae	*Goodenia berardiana*		X	
Haemodoraceae	*Anigozanthos bicolor*	Little Kangaroo Paw	X	X
Haemodoraceae	*Anigozanthos manglesii*	Mangles Kangaroo Paw		X
Haemodoraceae	*Conostylis setigera*	Bristly Cottonhead	X	X
Haemodoraceae	*Haemodorum discolor*		X	X
Haemodoraceae	*Haemodorum laxum*		X	X
Haemodoraceae	*Tribonanthes longipetala*	Branching Tiurndin	X	X
Hemerocallidaceae	*Tricoryne elatior*	Yellow Autumn Lily		X
Hemerocallidaceae	*Caesia micrantha*	Pale Grass-lily	X	X
Hemerocallidaceae	*Chamaescilla corymbosa*	Blue Squill	X	X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Hemerocallidaceae	*Dianella revoluta*	Blueberry Lily	X	
Hemerocallidaceae	*Stypandra glauca*	Blind Grass	X	X
Hypoxidaceae	*Pauridia occidentalis var. quadriloba*		X	X
Iridaceae	*Orthrosanthus laxus*	Morning Iris		X
Iridaceae	*Patersonia juncea*	Rush Leaved Patersonia		X
Iridaceae	*Patersonia rudis*	Hairy Flag	X	
Juncaceae	*Juncus kraussii*	Sea Rush		X
Juncaceae	*Juncus subsecundus*	Finger Rush		X
Lamiaceae	*Hemigenia argentea*		X	
Lauraceae	*Cassytha pomiformis*	Dodder Laurel	X	X
Malvaceae	*Thomasia foliosa*		X	
Myrtaceae	*Babingtonia camphorosmae*	Camphor Myrtle	X	X
Myrtaceae	*Beaufortia macrostemon*	Darling Range Beaufortia	X	
Myrtaceae	*Calothamnus sanguineus*	Silky-leaved Blood flower	X	
Myrtaceae	*Calytrix sylvana*		X	
Myrtaceae	*Corymbia calophylla*	Marri	X	X
Myrtaceae	*Eucalyptus accedens*	Powderbark Wandoo	X	
Myrtaceae	*Eucalyptus rudis subsp. rudis*	Flooded gum		X
Myrtaceae	*Eucalyptus wandoo*	Wandoo	X	

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Myrtaceae	*Hypocalymma angustifolium*	White Myrtle	X	X
Myrtaceae	*Hypocalymma robustum*	Swan River Myrtle	X	X
Myrtaceae	*Kunzea praestans*		X	
Myrtaceae	*Melaleuca radula*	Graceful Honeymyrtle	X	
Myrtaceae	*Melaleuca trichophylla*		X	
Myrtaceae	*Verticordia acerosa*		X	
Myrtaceae	*Verticordia insignis*		X	
Orchidaceae	*Caladenia denticulata*		X	X
Orchidaceae	*Caladenia flava*	Cowslip Orchid	X	
Orchidaceae	*Caladenia longicauda*	Common White Spider Orchid	X	
Orchidaceae	*Caladenia macrostylis*	Leaping Spider Orchid	X	
Orchidaceae	*Cyanicula gemmata*	Blue China Orchid	X	
Orchidaceae	*Diuris sp.*			X
Orchidaceae	*Diuris porrifolia*		X	X
Orchidaceae	*Leporella fimbriata*	Hare Orchid	X	
Orchidaceae	*Potential Orchidaceae sp.*		X	
Orchidaceae	*Prasophyllum gracile*		X	
Orchidaceae	*Pterostylis sp.*		X	
Orchidaceae	*Pyrorchis nigricans*	Red beaks	X	

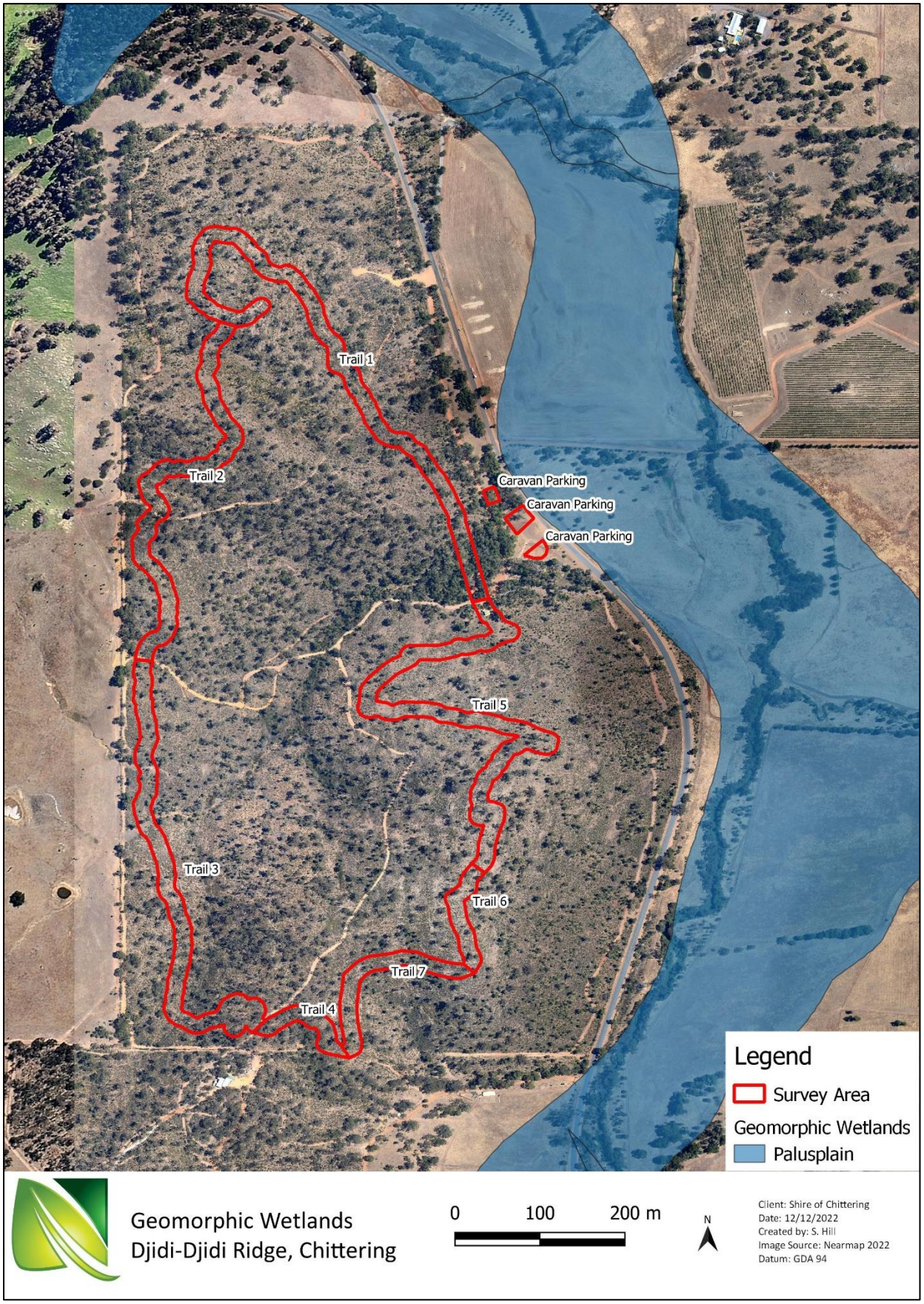
Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Orchidaceae	*Thelymitra antennifera*	Vanilla Orchid	X	
Orchidaceae	*Thelymitra crinita*	Blue Lady Orchid	X	X
Phyllanthaceae	*Lysiandra calycina*	False Boronia	X	X
Pittosporaceae	*Billardiera fraseri*	Elegant Pronaya	X	
Poaceae	*Amphipogon amphipogonoides*		X	
Poaceae	*Amphipogon turbinatus*			X
Poaceae	*Austrostipa compressa*			X
Poaceae	*Austrostipa flavescens*			X
Poaceae	*Microlaena stipoides*	Weeping Grass	X	X
Poaceae	*Neurachne alopecuroidea*	Foxtail Mulga Grass	X	X
Poaceae	*Tetrarrhena laevis*	Forest Ricegrass	X	
Polygalaceae	*Comesperma volubile*	Love Creeper	X	
Polygonaceae	*Muehlenbeckia adpressa*	Climbing Lignum	X	
Proteaceae	*Banksia armata*	Prickly Dryandra	X	
Proteaceae	*Banksia dallanneyi*	Couch Honeypot	X	X
Proteaceae	*Banksia fraseri*		X	
Proteaceae	*Banksia sessilis var. sessilis*			X
Proteaceae	*Banksia bipinnatifida subsp. multifida*		X	
Proteaceae	*Banksia dallanneyi subsp. dallanneyi var. mellicula*		X	

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Proteaceae	*Banksia fraseri*			X
Proteaceae	*Conospermum polycephalum*		X	
Proteaceae	*Grevillea bipinnatifida*	Grevillea bipinnatifida	X	
Proteaceae	*Grevillea pilulifera*	Woolly-flowered Grevillea	X	X
Proteaceae	*Hakea erinacea*	Hedge-hog Hakea	X	X
Proteaceae	*Hakea lissocarpha*	Honey Bush	X	
Proteaceae	*Hakea undulata*	Wavy-leaved Hakea	X	
Proteaceae	*Hakea incrassata*	Marble Hakea	X	
Proteaceae	*Isopogon asper*		X	
Proteaceae	*Isopogon divergens*	Spreading Coneflower	X	
Proteaceae	*Petrophile striata*		X	X
Proteaceae	*Synaphea acutiloba*	Granite Synaphea	X	
Pteridaceae	*Cheilanthes austrotenuifolia*		X	X
Restionaceae	*Desmocladus asper*		X	X
Restionaceae	*Lepidobolus preissianus*		X	
Rhamnaceae	*Cryptandra arbutiflora var. arbutiflora*			X
Rhamnaceae	*Cryptandra myriantha*		X	
Rhamnaceae	*Trymalium ledifolium*		X	
Rosaceae	*Acaena echinata*	Sheep's Burr	X	X

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
Rubiaceae	*Opercularia vaginata*	Dog Weed	X	X
Rutaceae	*Philotheca spicata*	Pepper and Salt	X	
Stylidiaceae	*Levenhookia stipitata*	Common Stylewort		X
Stylidiaceae	*Stylidium affine*	Queen Triggerplant	X	X
Stylidiaceae	*Stylidium petiolare*	Horn Triggerplant	X	
Stylidiaceae	*Stylidium sp.*		X	
Stylidiaceae	*Stylidium ciliatum*	Golden Triggerplant		X
Stylidiaceae	*Stylidium dichotomum*	Pins-and-needles	X	
Stylidiaceae	*Stylidium pycnostachyum*	Downy Triggerplant	X	
Stylidiaceae	*Stylidium tenue subsp. majusculum*	Showy Fountain Triggerplant	X	X
Stylidiaceae	*Stylidium xanthellum*			X
Thymelaeaceae	*Pimelea imbricata*		X	X
Xanthorrhoeaceae	*Xanthorrhoea acanthostachya*		X	X
Xanthorrhoeaceae	*Xanthorrhoea gracilis*	Graceful Grass Tree	X	X
Xanthorrhoeaceae	*Xanthorrhoea preissii*	Grass tree	X	X
Zamiaceae	*Macrozamia fraseri*			X
	Unidentifiable sp. 1		X	X
	Unidentifiable sp. 2		X	X
	Unidentifiable sp. 3		X	

Family	Species ID	Common Name	*Eucalyptus accedens* and *E. wandoo* open woodland	*Corymbia calophylla* open woodland
	Unidentifiable sp. 4		X	
	Unidentifiable sp. 5		X	

Appendix 6: Hydrology



Appendix 7: Habitat Tree Data

Species	DBH	Hollow Count	Entrance Type	Entrance Size	Hollow Height (m)	Comments	Latitude	Longitude
Corymbia calophylla	550	None	-	-	-	p799	-31.4844193	116.1135323
Corymbia calophylla	560	None	-	-	-	p660	-31.4911788	116.1122643
Corymbia calophylla	560	None	-	-	-	p801	-31.4841729	116.1133969
Corymbia calophylla	570	None	-	-	-	p757	-31.4849852	116.1138301
Corymbia calophylla	573	None	-	-	-	p662	-31.4912011	116.1124273
Corymbia calophylla	580	None	-	-	-	p121-127	-31.4910284	116.1123559
Corymbia calophylla	580	None	-	-	-	p515	-31.4845439	116.1141259
Corymbia calophylla	580	None	-	-	-	p652	-31.4858032	116.1141918
Corymbia calophylla	590	None	-	-	-	p755	-31.4852333	116.1140637
Corymbia calophylla	600	None	-	-	-	p25-28	-31.4850315	116.1144279
Corymbia calophylla	622	None	-	-	-	p618	-31.4887669	116.1142666
Corymbia calophylla	630	None	-	-	-	p111-116	-31.4840425	116.1132460
Corymbia calophylla	630	None	-	-	-	p802	-31.4840751	116.1142079
Corymbia calophylla	640	None	-	-	-		-31.4830120	116.1124618
Corymbia calophylla	650	None	-	-	-	p663	-31.4912016	116.1124635
Corymbia calophylla	660	None	-	-	-	p117-120	-31.4841832	116.1140322
Corymbia calophylla	680	None	-	-	-	p104-111	-31.4842847	116.1142984

Species	DBH	Hollow Count	Entrance Type	Entrance Size	Hollow Height (m)	Comments	Latitude	Longitude
Corymbia calophylla	680	None	-	-	-	p128-131	-31.4846854	116.1142141
Corymbia calophylla	740	None	-	-	-	p517	-31.4859727	116.1142652
Corymbia calophylla	770	None	-	-	-	p756	-31.4850978	116.1138140
Corymbia calophylla	990	None	-	-	-	p803	-31.4832222	116.1124655
Eucalyptus accedens	518	1	Chimney	20x20	6	p751	-31.4896701	116.1103197
Eucalyptus accedens	560	None	-	-	-	p649	-31.4908568	116.1124531
Eucalyptus accedens	565	3	Side, side, side	5x5, 10x10, 10x10	10, 8, 8	p742	-31.4907067	116.1110057
Eucalyptus accedens	600	1	Side	10x10	7	p753	-31.4894322	116.1102882
Eucalyptus accedens	630	2	Chimney, side	25x25, 15x15	8, 8	p735	-31.4909123	116.1112997
Eucalyptus accedens	645	2	Side x2	5x5, 5x5	8, 8, 10	p849	-31.4824962	116.1109940
Eucalyptus rudis subsp. rudis	505	None	-	-	-	p60-65	-31.4845875	116.1145395
Eucalyptus rudis subsp. rudis	520	None	-	-	-	p21-24	-31.4849085	116.1143266
Eucalyptus rudis subsp. rudis	525	None	-	-	-	p29-34	-31.4847090	116.1144222
Eucalyptus rudis subsp. rudis	535	None	-	-	-	p1-8	-31.4850140	116.1149127
Eucalyptus rudis subsp. rudis	545	None	-	-	-	p66-71	-31.4845629	116.1145036
Eucalyptus rudis subsp. rudis	560	None	-	-	-	p55-59	-31.4846180	116.1144755

Species	DBH	Hollow Count	Entrance Type	Entrance Size	Hollow Height (m)	Comments	Latitude	Longitude
Eucalyptus rudis subsp. rudis	610	None	-	-	-	p72-77	-31.4845815	116.1144201
Eucalyptus rudis subsp. rudis	700	None	-	-	-	p 11-16	-31.4850960	116.1149889
Eucalyptus rudis subsp. rudis	780	None	-	-	-	p17-20	-31.4847524	116.1145140
Eucalyptus sp. (dead)	645	3	Chimney x3	20x20, 15x15, 15x15	9, 10, 10	p814	-31.4860977	116.1102476
Eucalyptus sp. (dead)	650	3	Side, chimney, chimney	5x5, 30x30, 30x30	8, 6, 6	p597	-31.4876456	116.1144064
Eucalyptus wandoo	500	1	Chimney	5x5	8	p633, beehive	-31.4812688	116.1110681
Eucalyptus wandoo	500	1	Chimney	20x20	6	p813, beehive	-31.4832748	116.1108025
Eucalyptus wandoo	500	2	Side x2	10x10, 10x10	8, 10	p846, one with beehive	-31.4893922	116.1137550
Eucalyptus wandoo	515	None	-	-	-	p817	-31.4860651	116.1101293
Eucalyptus wandoo	545	6	Side x6	5 at 10x10, 5x5	8, 9	p859	-31.4823301	116.1111167
Eucalyptus wandoo	570	3	Side x3	all 5x5	8	p627	-31.4892095	116.1140876
Eucalyptus wandoo	575	4	Side x4	15x15, 5x5, 8x8, 5x5	6, 8, 9, 9	p606	-31.4881471	116.1141207
Eucalyptus wandoo	585	1	Chimney	20x20	8	p851, beehive	-31.4823233	116.1111381
Eucalyptus wandoo	590	2	Chimney x2	10x10, 20x20	8, 9	p855, one hollow has a galah	-31.4823278	116.1111693
Eucalyptus wandoo	595	1	Side	10x10	8	p577	-31.4871518	116.1135957

Species	DBH	Hollow Count	Entrance Type	Entrance Size	Hollow Height (m)	Comments	Latitude	Longitude
Eucalyptus wandoo	610	3	Side x3	10x10, 5x5, 5x5	8	p616	-31.4885896	116.1142495
Eucalyptus wandoo	625	1	Chimney x4	20x20, 15x15, 20x20, 25x25	9, 8, 8, 6	p560	-31.4869620	116.1126063
Eucalyptus wandoo	660	None	-	-	-	p818	-31.4853100	116.1100150
Eucalyptus wandoo	1000	1	chimney	30x30	5	p838	-31.4837503	116.1109634