

**Flora and Vegetation Survey
Cardup-Siding Rd, Wright Rd and Soldier's Rd
Byford**



Prepared for: Shire of Serpentine -Jarrahdale

Prepared by: **Del Botanics**

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EXECUTIVE SUMMARY

This report has been prepared by Del Botanics on behalf of Shire of Serpentine -Jarrahdale to review remnant vegetation on the road verges of Cardup-Siding Rd, Wright Rd and Soldier's Rd, Byford. This report is the result of a spring botanical survey of the flora and vegetation within the survey area. The locations of these sites are shown on **Figure 1, 2, 3 and 4**.

The recent Flora and Vegetation Assessment undertaken in the area described above identified a number of flora species. The vegetation condition varies across the sites ranging from "Completely Degraded" to "Very Good".

Five vegetation communities in total across the three roadsides were recorded at a local level during the survey. No species of Threatened (T), or Priority Flora pursuant to *Biodiversity Conservation Act* 2016 and listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey were located during the time of the survey. Three Threatened Ecological Communities (TEC's) were observed during the survey.

STATEMENT OF LIMITATIONS

This environmental report has been prepared in accordance with the scope of services set out in the original quotation. In preparing the report, Del Botanics has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Del Botanics has not verified the accuracy or completeness of the data to the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Del Botanics will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed.

In accordance with the scope of services, Del Botanics has relied on the data and have conducted environmental field monitoring in the preparation of the report. The nature and extent of monitoring conducted is described in the report. Within the limitations imposed by the scope of services, the monitoring and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care. No other warranty, express or implied, is made.

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1. INTRODUCTION

1.1 BACKGROUND

This report has been prepared by Del Botanics on behalf of Shire of Serpentine -Jarrahdale to review remnant vegetation on the road verges of Cardup-Siding Road, Wright Road and Soldier's Road, Byford. A botanical survey of the flora species and vegetation was undertaken on 24th September, 7th October and 4th November 2019. The site is approximately 43 kilometres south east of the Perth central area. The site locations are shown on **Figures 1, 2, 3 & 4**.

1.2 PURPOSE OF THIS REPORT

This report was prepared to document the flora and vegetation that occurs within the areas described above. The flora species and vegetation were used to determine the significance of the site in regards to Threatened and Priority Flora and Threatened Ecological Communities.

In summary this report provides:

- Threatened Flora (T) and Threatened Ecological Communities (TEC's) Department of Biodiversity, Conservation and Attractions (DBCA) and a Department Environment and Energy (DEE) Database search to determine results for the site;
- A spring botanical survey; and
- An assessment of vegetation communities and conditions.

The survey includes a Tree Habitat Assessment for Black Cockatoo's as outlined in the *EPBC Act referral guidelines for three threatened black cockatoo species*. The tree habitat survey records trees which create potential habitats for fauna species, in particular Cockatoos. Significant trees with a Diameter at Breast Height (DBH) greater than 500mm (300mm for *Eucalyptus wandoo* and *Eucalyptus salmonophloia*) have been recorded; information is available in **Appendix C**.

A targeted search was undertaken along the roadsides described above, on foot using a Transverse sampling technique. The survey was undertaken using parallel sweeps, spaced at a distance apart appropriate to the species being searched for and the vegetation types being surveyed. Navigation of the sweeps were carried out using a combination of Magellan handheld Global Positioning System (GPS) and magnetic compasses. Targeted search locations are provided on **Figures 11-13**.

2. EXISTING ENVIRONMENT

2.1 SOILS AND GEOLOGY

The Swan Coastal Plain (SCP) is generally flat, approximately 20-30 km's wide along the Indian Ocean coast directly west of the Darling Scarp. It runs from Cape Naturaliste in the south to north of the city of Perth. The SCP mainly consists of fairly infertile sandy soil along with coastal sand dunes, river estuaries, and a number of wetlands.

The Swan Coastal Plain consists of several distinct landform elements or soil landscape systems. These include a series of three sand dune systems orientated parallel to the coastline. The oldest of these dune systems, and the closest to the eastern edge of the Plain, is the Bassendean Dune System. Between this dune system and the foothills of the Scarp is the Pinjarra Plain, a level, seasonally inundated alluvial plain made up of heavier soils. The Pinjarra Plain is also known as the Guildford Formation. Finally the Foothills of the Darling Scarp, also known as the Ridge Hill Shelf landscape system, form the eastern boundary of the Swan Coastal Plain. These foothills slope gently from the east to the west and are formed from coalescing alluvial fans and the remnants of marine terraces. There are also areas of colluvium and residual laterite found in this soil landscape system.

2.1.1 *Guildford Complex*

Cardup-Siding Road and Wright Road are a part of the Guildford Complex. Guildford soils are described as flat plain with medium textured, yellow duplex soils (sand/loam over clay), which may be waterlogged in winter.

This landform is the low lying and flat area found to the east of the SCP, mostly south of the Swan and Canning Rivers. As noted earlier, this landform is primarily of alluvial origin, formed by the major rivers that dissect the SCP. In effect, they are the floodplain of these rivers. Whilst the soils are primarily clay, there is also sand in the soils, which come from sand blown inland from the dunes in the west. This landform lies over the top of the eastern most Bassendean dunes. The clay nature of these soils and the generally low relief means that they are naturally poorly drained and hold surface water for most of winter

2.1.2 *Forrestfield Complex*

Soldier's Road is part of the Forrestfield and Guildford Complex. The Forrestfield complex is made up of the laterised foothills of the Darling Scarp and is dominated by gravelly and sandy soils. Imperfectly drained and duplex soil is common throughout this area, particularly in association with alluvial fans and drainage channels.

2.2 CLIMATE

The site is located on the Swan Coastal Plain of the Perth Metropolitan area, in a region with a Mediterranean climate of cool, wet winters and warm to hot, dry summers. The average annual rainfall in Cardup is around 961mm. Rain is frequent and heavy through the winter months. The average annual temperature is 17.9°c.

3. FLORA AND VEGETATION

The survey area lies in the Drummond Botanical Subdistrict within the Southwest Botanical Province as described by Beard (1990). Flora composition has been described by Beard (1990) as predominantly consisting of *Banksia* Low Woodlands on leached sands with *Melaleuca* swamps where ill drained and Woodlands of *Eucalyptus* spp. on less leached soils.

3.1 GUILDFORD COMPLEX

Cardup-Siding Road and Wright Road are part of the Guildford Vegetation complex, which is described as a mixture of open forest to tall open forest of Marri (*Corymbia calophylla*)- Wandoo (*Eucalyptus wandoo*)- Jarrah (*Eucalyptus marginata*) and woodland of Wandoo (*Eucalyptus wandoo*)- (with rare occurrences of *E. lane-poolei*). Minor components include *E. rudis* – *Melaleuca raphiophylla*.

3.2 FORRESTFIELD COMPLEX

Soldier's Road is a part of the Forrestfield and Guildford Vegetation Complex, which ranges from open forest of Marri (*Corymbia calophylla*) - Wandoo (*Eucalyptus wandoo*)- Jarrah (*Eucalyptus marginata*) to open forest of *E. marginata* - *C. calophylla* – Sheoak (*Allocasuarin fraseriana*) – *Banksia* spp. with fringing woodland of Flooded Gum (*E. rudis*) in the gullies that dissect this landform.

3.3 VEGETATION METHODS

A botanical survey was undertaken on 24th September, 7th October and 4th November 2019. The site was surveyed for flora species including, Threatened Flora (T), Priority Flora (PF), potential areas of Threatened Ecological Communities (TEC's) and vegetation condition. Each variation or difference in vegetation was recorded with a 10 metre by 10 metre or 2 metre by 50 metre quadrat. Data was recorded to statistically determine vegetation types and condition. In total, eleven quadrats and two releve's were assembled to record each change or variation in vegetation type. Each quadrat recorded flora species, heights, percentage cover and percentage dead and alive. Quadrats were not assembled permanently; quadrat data is available in **Appendix B**.

The survey methodology was undertaken in accordance with EPA Position Statement No.3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* and Technical Guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority, 2016).

All plant specimens collected during the field survey were dried, pressed and then sorted in accordance with the requirements of the Western Australian State Herbarium. Identification of specimens occurred through comparison with named material and through the use of taxonomic keys.

The use of standard data collection forms ensured the data was collected in a systematic and consistent manner. At each change in vegetation the following records were made:

- Condition/disturbance;
- Topography;
- Soils.

The vegetation communities occurring on this site were described in detail. Aerial photography was used to extrapolate and map plant communities in combination with running notes made during the course of the survey.

The survey includes a Tree Habitat Assessment for Black Cockatoo's as outlined in the *EPBC Act referral guidelines for three threatened black cockatoo species*. The tree habitat survey records trees which create potential habitats for fauna species, in particular Cockatoos. Significant trees with a DBH greater than 500mm (300mm for *Eucalyptus wandoo* and *Eucalyptus salmonophloia*) have been recorded; information is available in **Appendix C**.

A targeted search was undertaken along the roadsides describes above on foot using a Transverse sampling technique. The survey was undertaken using parallel sweeps, spaced at a distance apart appropriate to the species being searched for and the vegetation types being surveyed. Navigation of the sweeps were carried out using a combination of Magellan handheld Global Positioning System (GPS) and magnetic compasses. Survey data is provided on **Figures 11-13**.

3.4 DECLARED RARE AND PRIORITY FLORA

Species of Flora acquire "Threatened" "Presumed Extinct" or "Priority" conservation status where populations are restricted geographically or threatened by local processes. The Department of Biodiversity, Conservation and Attractions (DBCA) recognise these threats and subsequently applies regulations towards population protection and species conservation. The DBCA enforces regulations under the *Biodiversity Conservation Act 2016* to conserve Threatened species and protect significant populations. Priority Flora species are potentially rare or threatened and are classified in order of threat. Threatened and Priority Flora category definitions are listed in **Table 1**.

Threatened Flora species are gazetted under subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and therefore it is an offence to "take" or damage rare flora without Ministerial approval. Section 23F of the Act defines "to take" as "... to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora to cause or permit the same to be done by any means".

Table 1: Definition of Rare and Priority Flora Species *Biodiversity Conservation Act 2016*.

Conservation Code	Category
T	<p>Threatened species Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).</p> <p>Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.</p> <p>CR Critically endangered species Threatened species considered to be “facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines”. Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.</p> <p>EN Endangered species Threatened species considered to be “facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines”. Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.</p> <p>VU Vulnerable species Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”. Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.</p>
X	<p>Extinct species Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild. EX Extinct species Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.</p> <p>EW Extinct in the wild species Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.</p>
P1	<p>Priority 1: Poorly-known species Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
P2	<p>Priority 2: Poorly-known species Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey</p>

P3	<p>Priority 3: Poorly-known species Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>
P4	<p>Priority 4: Rare, Near Threatened and other species in need of monitoring (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

A search of the Department of Biodiversity, Conservation and Attractions (DBCA) NatureMap database identified a total of 75 Priority or Threatened species likely to occur within a 20km radius of the three roads. Records show sixteen, Threatened (T), six, Priority 1 (P1), nine Priority 2 (P2), twenty nine Priority 3 (P3) and fifteen Priority 4 (P4) species. These species are listed in **Table 2** below.

Table 2: NatureMap listed species

Species Name	Common Name	Conservation Code
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)		P1
<i>Acacia</i> sp. Binningup (G. Cockerton et al. WB 37784)		P1
<i>Boronia juncea</i> subsp. <i>juncea</i>		P1
<i>Calytrix simplex</i> subsp. <i>simplex</i>		P1
<i>Ptilotus sericostachyus</i> subsp. <i>roseus</i>		P1
<i>Stachystemon</i> sp. Keysbrook (R. Archer 17/11/99)		P1
<i>Acacia benthamii</i>		P2
<i>Bossiaea modesta</i>		P2
<i>Grevillea crowleyae</i>		P2
<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i>		P2
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>		P2
<i>Levenhookia pulcherrima</i>	Beautiful Stylewort	P2
<i>Millotia tenuifolia</i> var. <i>laevis</i>		P2
<i>Tetraria</i> sp. Chandala (G.J. Keighery 17055)		P2
<i>Thysanotus</i> sp. Badgingarra (E.A. Griffin 2511)		P2
<i>Acacia horridula</i>		P3
<i>Acacia oncinophylla</i> subsp. <i>oncinophylla</i>		P3
<i>Amanita carneiphylla</i>		P3
<i>Amanita fibrilloses</i>		P3
<i>Amanita kalamundae</i>	Kalamunda Lepidella	P3
<i>Amanita preissii</i>	Cinnamon-ring Lepidella	P3
<i>Amanita wadjukiorum</i>		P3
<i>Andersonia</i> sp. Audax (F. Hort, B. Hort & J. Hort 3179)		P3
<i>Angianthus drummondii</i>		P3
<i>Babingtonia urbana</i>	Coastal Plain Babingtonia	P3
<i>Banksia kippistiana</i> var. <i>paenepeccata</i>		P3
<i>Byblis gigantea</i>	Rainbow Plant	P3
<i>Carex tereticaulis</i>		P3
<i>Cyathochaeta teretifolia</i>		P3
<i>Dillwynia dillwynioides</i>		P3
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i> (G.J. Keighery 13459)		P3
<i>Grevillea manglesii</i> subsp. <i>dissectifolia</i>		P3
<i>Halgania corymbosa</i>		P3
<i>Isopogon drummondii</i>		P3
<i>Jacksonia gracillima</i>		P3
<i>Lasiopetalum glutinosum</i> subsp. <i>glutinosum</i>		P3
<i>Schoenus capillifolius</i>		P3
<i>Schoenus pennisetis</i>		P3
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)		P3
<i>Stackhousia</i> sp. Red-blotched corolla (A. Markey 911)		P3
<i>Stylidium aceratum</i>		P3
<i>Stylidium paludicola</i>		P3
<i>Styphelia filifolia</i>		P3

<i>Thysanotus anceps</i>		P3
<i>Acacia oncinophylla</i> subsp. <i>patulifolia</i>		P4
<i>Aponogeton hexatepalus</i>	Stalked Water Ribbons	P4
<i>Boronia tenuis</i>	Blue Boronia	P4
<i>Chorizema ulotropis</i>		P4
<i>Dodonaea hackettiana</i>	Hackett's Hopbush	P4
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>		P4
<i>Grevillea pimeleoides</i>		P4
<i>Kennedia beckxiana</i>	Cape Arid Kennedia	P4
<i>Lasiopetalum bracteatum</i>	Helena Velvet Bush	P4
<i>Senecio leucoglossus</i>		P4
<i>Stylidium ireneae</i>		P4
<i>Stylidium longitubum</i>	Jumping Jacks	P4
<i>Stylidium striatum</i>	Fan-leaved Triggerplant	P4
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)		P4
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>		P4
<i>Austrostipa jacobiana</i>		T
<i>Caladenia huegelii</i>	Grand Spider Orchid	T
<i>Calectasia cyanea</i>	Blue Tinsel Lily	T
<i>Diuris micrantha</i>		T
<i>Diuris purdiei</i>	Purdie's Donkey Orchid	T
<i>Drakaea elastica</i>	Glossy-leaved Hammer Orchid	T
<i>Drakaea micrantha</i>		T
<i>Eucalyptus x balanites</i>	Cadda Road Mallee	T
<i>Lasiopetalum pterocarpum</i>		T
<i>Lepidosperma rostratum</i>		T
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)		T
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)		T
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)		T
<i>Tetraria australiensis</i>		T
<i>Thelymitra stellata</i>	Star Orchid	T
<i>Verticordia plumosa</i> var. <i>ananeotes</i>		T

3.4.1 *Environment Protection and Biodiversity Conservation Act (1999) – Species level significance*

The *Environment Protection and Biodiversity Conservation (EPBC) Act, 1999*, promotes the conservation of biodiversity by providing strong protection for plants at a species level. Section 178 and 179 provides the lists and categories of threatened species under the Act and is presented in **Table 3** below.

Table 3: Categories of Threatened Species (EPBC Act, Section 179, 1999)

1	<p>Extinct A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.</p>
2	<p>Extinct in the Wild A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>
3	<p>Critically Endangered A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.</p>
4	<p>Endangered A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
5	<p>Vulnerable A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria..</p>
6	<p>Conservation Dependant A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.</p>

A search using the EPBC Protected Matters Tool was undertaken within a 10km radius of the site. The search result noted eighteen flora species of significance likely to occur in the area. Eleven flora species have been listed as Endangered; five species are listed as Vulnerable and two as Critically Endangered. These species are listed in **Table 4** below.

Table 4: EPBC listed flora species

Species Name	Conservation Code
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	Critically Endangered
<i>Synaphea</i> sp. Serpentine (G.R Brand 103)	Critically Endangered
<i>Andersonia gracilis</i>	Endangered
<i>Diuris purdiei</i>	Endangered
<i>Drakaea elastic</i>	Endangered
<i>Eucalyptus x balanites</i>	Endangered
<i>Grevillea curviloba</i> subsp <i>incurva</i>	Endangered
<i>Lasiopetalum pterocarpum</i>	Endangered
<i>Thelymitra dedmaniarum</i>	Endangered
<i>Thelymitra stellata</i>	Endangered
<i>Verticordia plumose</i> var. <i>anaeotes</i>	Endangered
<i>Anthocercis gracilis</i>	Vulnerable
<i>Caladenia huegelii</i>	Vulnerable
<i>Diuris micrantha</i>	Vulnerable
<i>Drakaea micrantha</i>	Vulnerable
<i>Eleocharis keigheryi</i>	Vulnerable
<i>Tetraria australiensis</i>	Vulnerable

3.4.2 Department of Biodiversity, Conservation and Attractions (DBCA) Database Search

In addition to the background searches undertaken through the DBCA Naturemap and the DEE Protected Matters, a Threatened and Priority flora search was undertaken through the DBCA. The search is undertaken on records from the Threatened and Priority Flora Database (TPFL) and the WA Herbarium database (WAHerb), which provides known locations of each species. The results are provided below in **Table 5**. The search was conducted within a 10km radial area from the central coordinate. During the survey no DRF or Priority flora were located.

Table 5: DBCA listed flora species

Taxon	Conservation Status
<i>Babingtonia urbana</i>	P3
<i>Schoenus pennisetis</i>	P3
<i>Drosera occidentalis</i>	P4
<i>Parsonsia diaphanophleba</i>	P4
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	T
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T

3.5 THREATENED ECOLOGICAL COMMUNITIES

In Western Australia Threatened Ecological Communities (TEC's) are assessed through a procedure coordinated by the DBCA and are assigned to one of the categories outlined below in **Table 6**. While they are not afforded direct statutory protection at a State level (unlike Threatened Flora under the *Wildlife Conservation Act 1950*) their significance is acknowledged through other State environmental approval processes (i.e. Environmental Impact Assessment pursuant to Part IV of the *Environmental Protection Act 1986*). Scheduled TEC's are afforded statutory protection at a Federal level pursuant to the EPBC Act. The department has been identifying and listing threatened ecological communities since 1994 through the non-statutory process.

The WA Minister for Environment has endorsed 69 ecological communities as threatened in the following categories:

- 21 critically endangered
- 17 endangered
- 28 vulnerable
- 3 presumed totally destroyed.

Table 6: Categories of DBCA's Threatened Ecological Communities

PD	Presumably Totally Destroyed An ecological community that has been adequately searched for but for which no representative occurrences have been located.
CE	Critically Endangered An ecological community that has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future.
E	Endangered An ecological community that has been adequately surveyed and is not critically endangered but is facing a very high risk of total destruction in the near future.
V	Vulnerable An ecological community that has been adequately surveyed and is not critically endangered or endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future.

31 of these TECs, or components of them, are also listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*. As at June 2017, an additional 391 ecological communities (community types and sub-types) with insufficient information available to be considered a TEC, or which are rare but not currently threatened, have been placed on the Priority list and referred to as Priority Ecological Communities (PECs).

The EPBC Act provides for the strong protection of TEC's, which are listed under section 181 of the Act and are described as 'Critically Endangered', 'Endangered' or 'Vulnerable' under section 182. Schedules of protected TECs maintained pursuant to the EPBC Act are based on the same Floristic Community

Type's (FCT's) as adopted by DBCA, however not all TEC's listed by the DBCA are scheduled under the EPBC Act.

An EPBC Act Protected Matters Report indicated there are five known Threatened Ecological Communities (TEC's) likely to occur within a 5km radius of the area, these are listed in **Table 7**.

Table 7: EPBC listed Threatened Ecological Communities

Species Name	Conservation Code
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered
<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands of the Swan Coastal Plain	Endangered
Clay pans of the Swan Coastal Plain	Critically Endangered
<i>Corymbia calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils of the Swan Coastal Plain	Endangered
Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forest of the Swan Coastal Plain ecological community	Critically Endangered

3.5.1 Department of Biodiversity, Conservation and Attractions (DBCA) Database Search

In addition to the background searches undertaken through the DBCA Naturemap and the DEE Protected Matters, a Threatened Ecological Community search was undertaken through the DBCA. The search is undertaken on records from the DBCA, which provides known locations of TEC's. The results are provided below in **Table 8**. The search was conducted within a 20km radial area from the central coordinate.

Table 8: DBCA listed Threatened Ecological Communities

Species Name	Conservation Code
<i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands of the eastern side of the Swan Coastal Plain	Endangered
Banksia dominated Woodlands of the Swan Coastal Plain IBRA Region	Endangered
<i>Corymbia calophylla</i> - <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain	Vulnerable
<i>Corymbia calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils of the Swan Coastal Plain	Endangered
<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands of the Swan Coastal Plain	Endangered

During the site assessment three TEC's were recorded. The Endangered Banksia woodlands of the *Swan Coastal Plain ecological community* is likely to occur along Cardup-Siding Road (**Figure 5**). As the Survey Area is confined to the road verge the size of the site does not meet the size requirement for *Banksia* woodlands of the *Swan Coastal Plain ecological community*, however, in an assessment of a TEC the adjoining vegetation must be considered and as such the dominant species, the vegetation condition and the patch size fit the criteria for this area to be classified as the *Endangered Banksia woodlands of the Swan Coastal Plain ecological community*.

There are two Endangered *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) listed TEC's that have been observed during the field assessment on Soldier's Road. The vegetation recorded appears to be the Endangered TEC *Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain and the Endangered TEC *Corymbia calophylla-Kingia australis* woodlands on heavy soils of the Swan Coastal Plain (**Figure 7**). Further Floristic Community Analysis (FCT) will need to be undertaken to determine the species richness from the flora species recorded in the quadrats to confirm the vegetation community.

3.6 SIGNIFICANT TREES

A Tree Habitat Assessment for Black Cockatoo's as outlined in the EPBC Act referral guidelines for three threatened black cockatoo species was undertaken during the assessment. The tree habitat survey recorded trees with a diameter greater than 500mm (300mm for *Eucalyptus wandoo* and *Eucalyptus salmonophloia*) information is available in **Appendix C**.

A total of 171 significant habitat trees were recorded along the three road verges. Forty trees already have developed hollows for fauna habitat. It is important to retain all significant trees where possible. During the survey Cardup-Siding Rd recorded eight trees with suitable hollows for Black Cockatoo's. The 10 trees recorded along Wright Rd are not large enough for Black Cockatoo's but may develop into breeding hollows in years to come. Nine hollows suitable for Black Cockatoo's were recorded along Soldier's Road.

The two dominant tree species containing hollows recorded during the survey were Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*), which are important for food, nesting and roosting for all three black Cockatoo species (Carnaby's cockatoo (endangered), *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable), *Calyptorhynchus baudinii* and Forest red-tailed black cockatoo (vulnerable), *Calyptorhynchus banksii naso*). There is evidence of foraging (**Photographic Plate 5**) in the remnant vegetation along these roadsides which was observed during the survey. Visual sightings of Forest red-tailed black cockatoo was noted in the survey area during the survey.

3.7 VEGETATION CONDITION

Many bushland remnants have been historically and/or subject to ongoing degradation and are especially susceptible to disturbances arising as a result of indirect impacts from surrounding developments and human activity. Degradation is caused by a wide range of factors, including isolation and edge effects, weed invasion, plant diseases, changes in fire frequency and behaviour, landscape fragmentation, increased predation on native fauna by feral animals, resulting in a decrease in species richness and general modification of ecological function. These issues can affect the biodiversity rating and ecological viability of areas of remnant vegetation and should be assessed in line with conservation values.

Vegetation condition for each of the road verges has been described below in detail and is shown on **Figures 8, 9 and 10.**

4. VEGETATION ASSESSMENT RESULTS

4.1 CARDUP-SIDING ROAD

A total of 39 taxa, comprising of 21 families and 38 genera were recorded on site. A list of these species has been provided in **Appendix A**. Species representation was greatest among the Fabaceae, Myrtaceae, and Cyperaceae families.

4.1.1 *Introduced species*

Nine introduced flora species were recorded on the site. Species representation was greatest among the Poaceae (grasses), family. This represents 23% of the total number of flora species recorded on site.

4.1.2 *Threatened and Priority Flora*

No species of Threatened (T) or Priority Flora were recorded during the survey; No other flora, pursuant to the *Biodiversity Conservation Act 2016* and listed by the Department of Biodiversity, Conservation and Attractions (DBCAs) were located during the time of the survey. The botanical survey was undertaken in spring to coincide with the majority of the flowering times of the threatened species.

4.1.3 *EPBC listed Species and Threatened Ecological Communities*

The TEC *Banksia Woodlands of the Swan Coastal Plain ecological community* has been identified as occurring onsite. As the Survey Area is confined to the road verge the size of the site does not meet the size requirement for *Banksia* woodlands of the *Swan Coastal Plain ecological community*, however, in an assessment of a TEC the adjoining vegetation must be considered and as such the dominant species, the vegetation condition and the patch size fit the criteria for this area to be classified as the *Endangered Banksia woodlands of the Swan Coastal Plain ecological community*.

4.1.4 *Local Vegetation Communities*

Vegetation structure is used to determine the coverage in each vegetation community recorded. Definitions are shown in **Appendix E**.

Two vegetation communities were represented on the site at a local level; and have been described below in **Table 9**. Photographic representations of these vegetation communities are shown in the Quadrat data sheets in **Appendix B**. Vegetation communities, condition and quadrat locations are shown on **Figure 5 & 8**.

Table 9: Local Vegetation Community recorded along Cardup-Siding Rd, Byford October 2019

Community Descriptions
Vegetation Community 1 – Banksia woodland
Woodland of <i>Banksia attenuata</i> and <i>Eucalyptus marginata</i> over open shrubland of <i>Xanthorrhoea preissii</i> , <i>Eremaea pauciflora</i> , over open herbland of <i>Mesomelaena pseudostygia</i> , <i>Tetraria octandra</i> and <i>Loxocarya cinerea</i> sp.
Vegetation Community 2 – Marri-Jarrah woodland
Open Woodland of <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> over degraded grass dominated understorey

4.1.5 *Vegetation Condition*

The vegetation condition was rated according to the Vegetation Condition Scale from the *Technical Guidance Statement*, 2016. The definitions are described in **Appendix F**.

In general, the vegetation condition varied from “Degraded” to “Very Good” in the study area. Vegetation condition mapping is provided on **Figure 8**.

4.1.6 *Significant Trees*

Seventy eight significant trees have been recorded along the road verge. The trees consist of Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) of various heights and sizes. Tree locations are provided on **Figure 8** and are details are provided in **Appendix C**. Cardup Siding Road had the greatest number of significant trees within the Survey Area. Sixteen trees have developed hollows, with eight suitable for Black Cockatoo breeding (hollows >120mm diameter). Several trees have a DBH greater than (1000mm) indicating an estimated age of >300 years. These trees are significant and are providing valuable habitats not only for Black Cockatoos but a number of fauna species.

4.2 WRIGHT ROAD

A total of 49 taxa, comprising of 19 families and 39 genera were recorded on site. A list of these species has been provided in **Appendix A**. Species representation was greatest among the Myrtaceae family.

4.2.1 *Introduced species*

Twenty four introduced flora species were recorded on the site. Species representation was greatest among the Poaceae family. This represents 48% of the total number of flora species recorded on site.

4.2.2 *Threatened and Priority Flora*

No species of Threatened (T) or Priority Flora were recorded during the survey; No other flora, pursuant to the *Biodiversity Conservation Act 2016* and listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey. The botanical survey was undertaken in spring to coincide with the majority of the flowering times of the threatened species.

4.2.3 *EPBC listed Species and Threatened Ecological Communities*

No known TEC's were identified along Wright Road during the survey.

4.2.4 *Local Vegetation Communities*

Vegetation structure is used to determine the coverage in each vegetation community recorded. Definitions are shown in **Appendix E**.

One vegetation community was represented on the site at a local level; this has been described below in **Table 10**. Photographic representation of this vegetation community is shown in the Quadrat data sheets in **Appendix B**. Vegetation community, condition and quadrat locations are shown on **Figure 6 & 9**.

Table 10: Local Vegetation Communities Recorded along Wright Rd, Byford, October 2019

Community Descriptions
Vegetation Community 1 – Melaleuca Dampland
Low closed forest of Melaleuca spp. over closed herbland of * <i>Watsonia meriana</i> var. <i>bulbillifera</i>

4.2.5 *Vegetation Condition*

The vegetation condition was rated according to the Vegetation Condition Scale from the *Technical Guidance Statement*, 2016. The definitions are described in **Appendix F**.

In general, the vegetation condition along this road verge is dominated by weeds with little to no native vegetation. This vegetation is described as “Completely Degraded”.

4.2.6 *Significant Trees*

Forty seven significant Marri (*Corymbia calophylla*) and Flooded Gum (*Eucalyptus rudis*) trees have been recorded along Wright Road. The trees recorded consist of various heights and sizes. Ten trees have developed hollows. Tree locations are provided on **Figure 9** and details are provided in **Appendix C**.

4.3 SOLDIER'S ROAD

A total of 59 taxa, comprising of 21 families and 52 genera were recorded on site. A list of these species has been provided in **Appendix A**. Species representation was greatest among the Cyperaceae, Myrtaceae and Proteaceae families.

4.3.1 *Introduced species*

Seven introduced flora species were recorded on the site. Species representation was greatest among the Poaceae and Iridaceae families. This represents 12% of the total number of flora species recorded on site.

4.3.2 *Threatened and Priority Flora*

No species of Threatened (T) or Priority Flora were recorded during the survey; No other flora, pursuant to the *Biodiversity Conservation Act 2016* and listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey. The botanical survey was undertaken in spring to coincide with the majority of the flowering times of the threatened species.

4.3.3 *EPBC listed Species and Threatened Ecological Communities*

Two Endangered EPBC listed TEC's have been observed during the field assessment on Soldier's Road. TEC *Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain and TEC *Corymbia calophylla-Kingia australis* woodlands on heavy soils of the Swan Coastal Plain. A TEC assessment is required to confirm the extent of these communities.

4.3.4 *Local Vegetation Communities*

Vegetation structure is used to determine the coverage in each vegetation community recorded. Definitions are shown in **Appendix E**.

Two vegetation communities were represented on the site at a local level; these have been described below in **Table 11**. Photographic representations of these vegetation communities are shown in the Quadrat data in **Appendix B**. Vegetation communities, condition and quadrat locations are shown on **Figure 7 & 8**.

Table 11: Local Vegetation Communities Recorded along Soldier’s Road, October 2019

Community Descriptions
Vegetation Community 1 – Marri-Kingia- <i>Xanthorrhoea preissii</i>
Woodland of <i>Corymbia calophylla</i> over open shrubland of <i>Xanthorrhoea preissii</i> and <i>Kingia australis</i> over open herbland of <i>Mesomelaena tetragona</i> .
Vegetation Community 2 – Jarrah-Marri Woodland
Open Woodland of <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> over shrubland of <i>Xanthorrhoea preissii</i> , over very open herbland of <i>Lomandra</i> spp and <i>Conostylis</i> spp

4.3.5 *Vegetation Condition*

The vegetation condition was rated according to the Vegetation Condition Scale from the *Technical Guidance Statement*, 2016. The definitions are described in **Appendix F**.

In general, the vegetation condition varied from “Completely Degraded” to “Very Good” in the study area. Vegetation condition mapping is provided on **Figure 10**.

4.3.6 *Significant Trees*

Forty six significant Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) trees of various heights and sizes were recorded along Soldier’s Road. Fourteen trees have developed hollows and nine of those are suitable for Cockatoo nesting. Tree locations are provided on **Figure 10** and are details are provided in **Appendix C**.

5. CONCLUSIONS AND RECOMMENDATIONS

The recent Flora and Vegetation Assessment on Cardup-Siding Rd, Wright Rd and Soldier's Rd, Byford, identified a number of flora species. The vegetation condition varies across the site ranging from "Completely Degraded" to "Very Good".

Over the three sites five vegetation communities were recorded at a local level during the survey. No species of Threatened (T), or Priority Flora pursuant to the *Biodiversity Conservation Act 2016* and listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were located during the time of the survey were located on Cardup-Siding Road, Wright Road or Soldier's Road during the time of the survey. Three Threatened Ecological Communities (TEC's) were located during the survey.

A total of 171 significant habitat trees were recorded along the three road verges. Forty trees already have developed hollows for fauna habitat. It is important to retain all significant trees where possible.

Based on the results of this survey, Del Botanics proposes the following recommendations:

- Where possible, retain large mature trees that provide fauna habitats; and
- Undertake a Threatened Ecological Community (TEC) assessment on the Banksia woodland, Marri-Kingia woodland and Marri-*Xanthorrhoea preissii* woodland.

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FIGURES

Figure 1: Location Plan

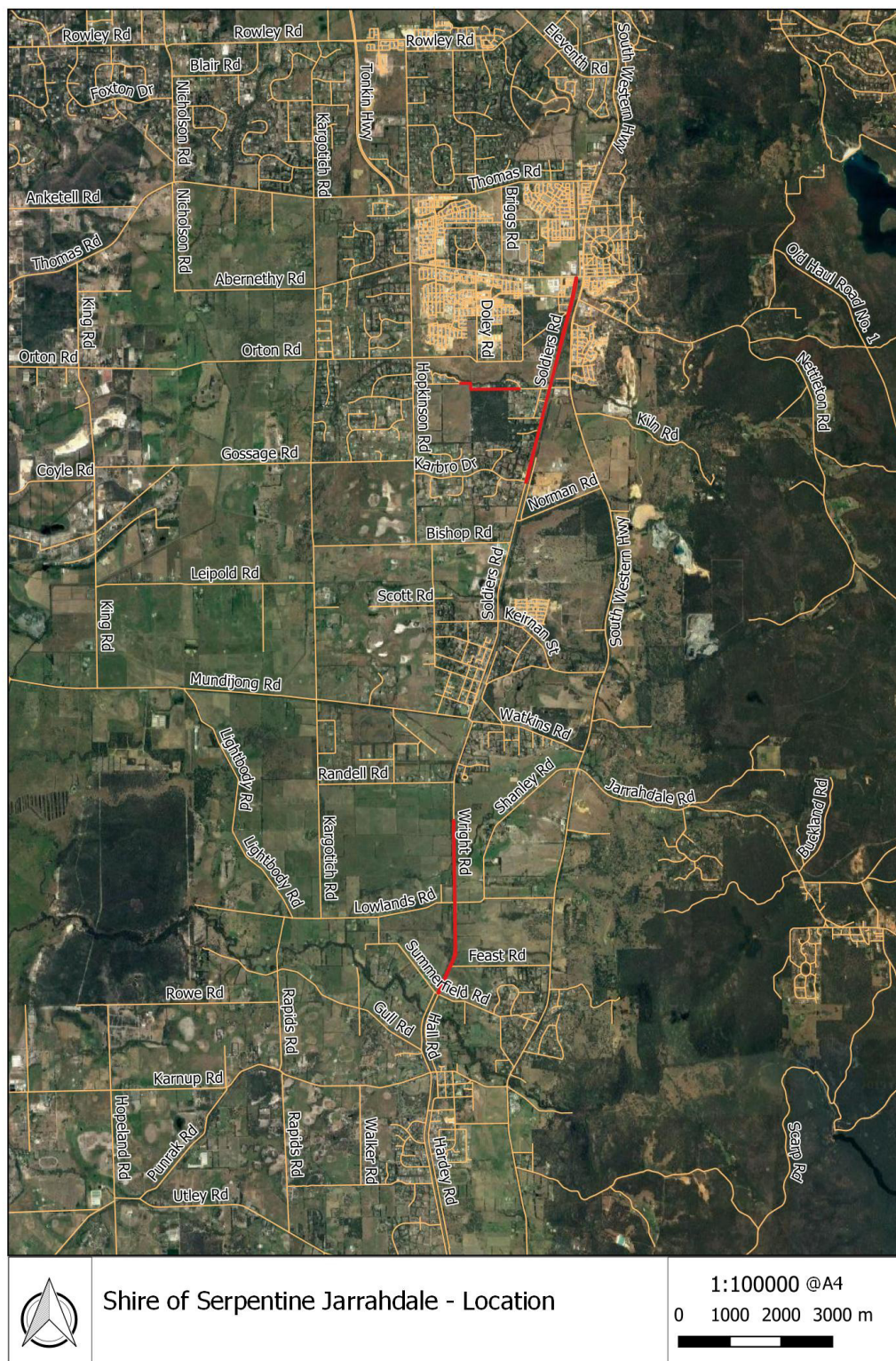


Figure 2: Site Location Cardup-Siding Road

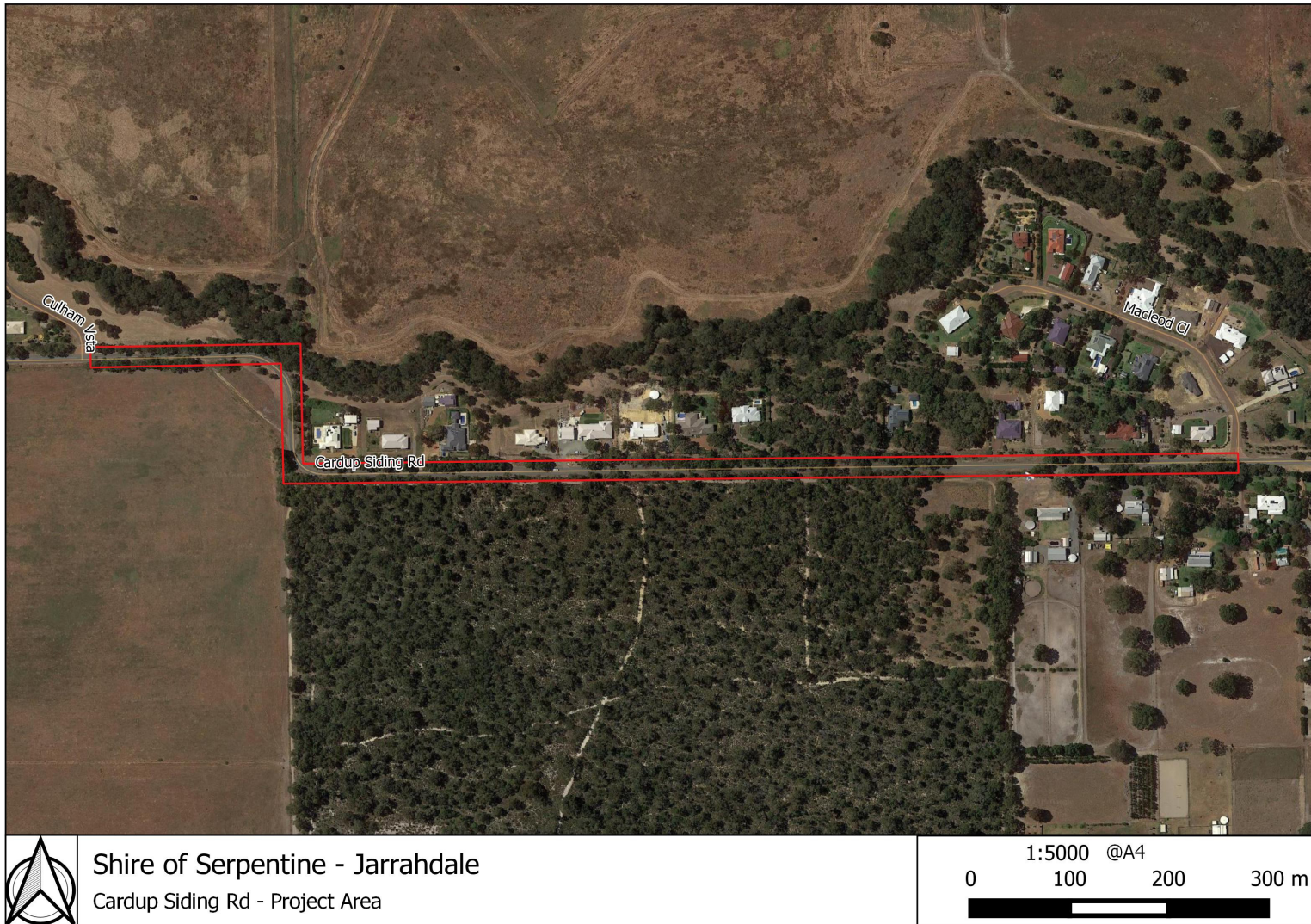


Figure 3: Site Location Wright Road

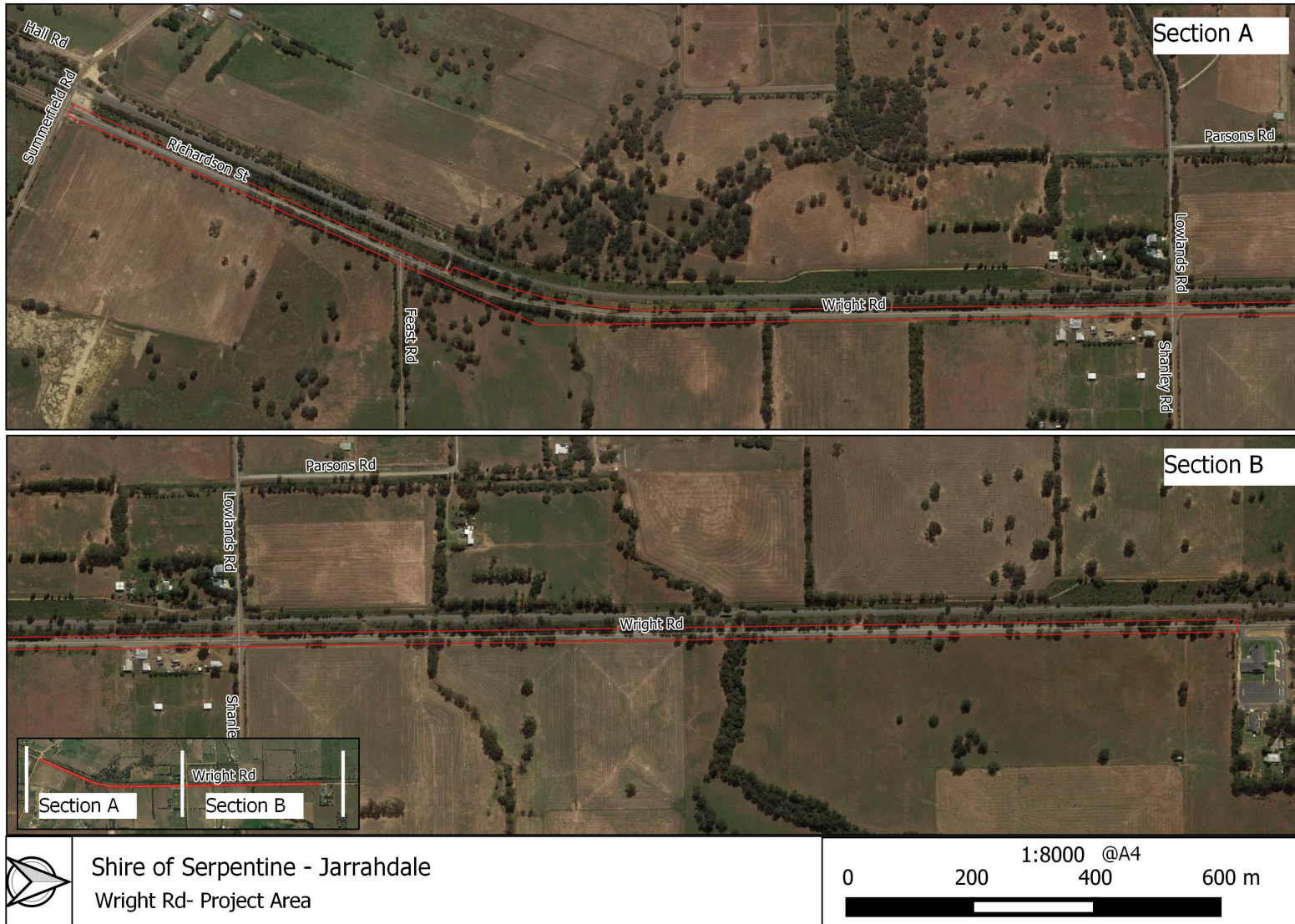


Figure 4: Site Location Soldier's Road

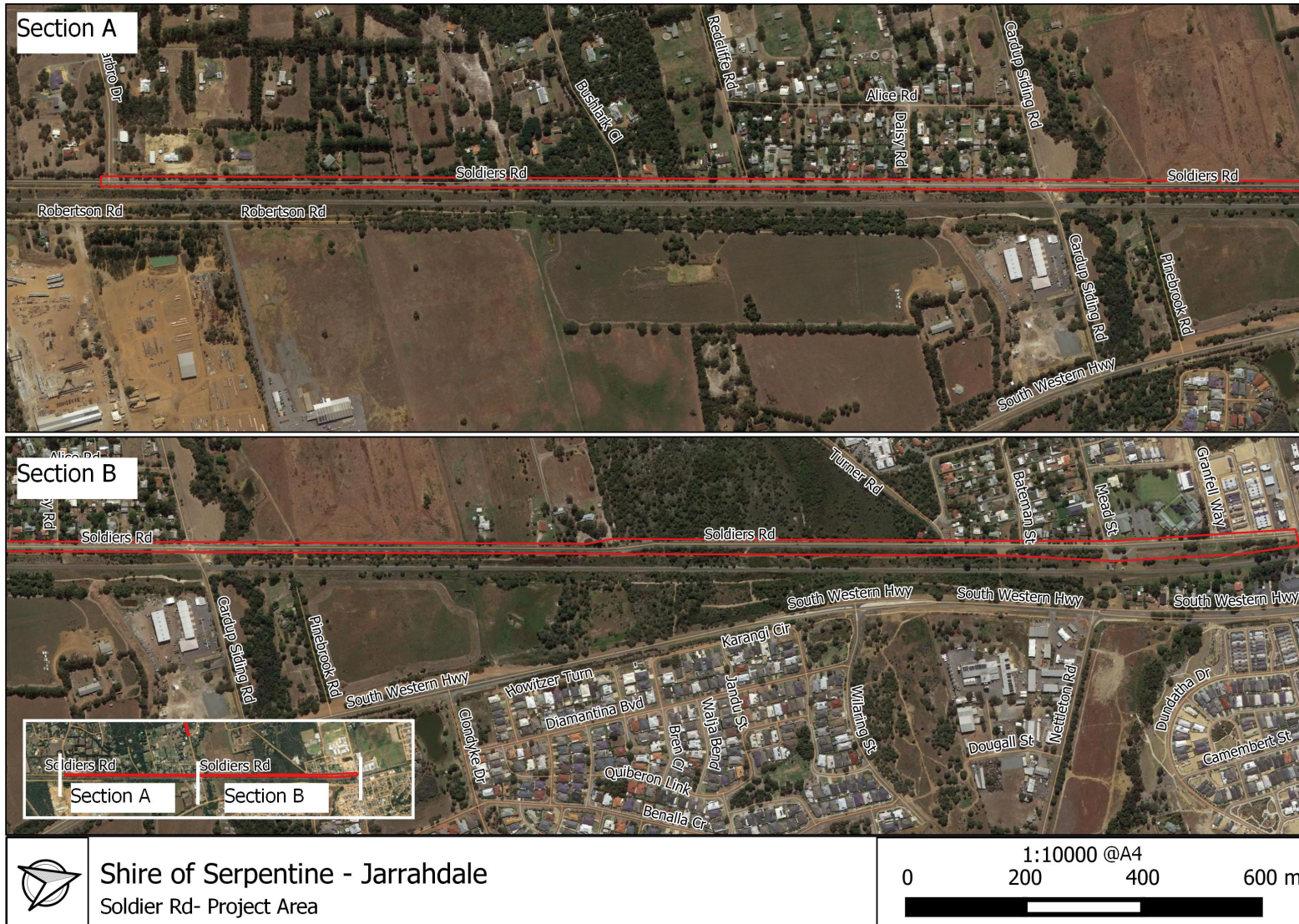


Figure 5: Vegetation Communities and Quadrat Locations Cardup-Siding Road

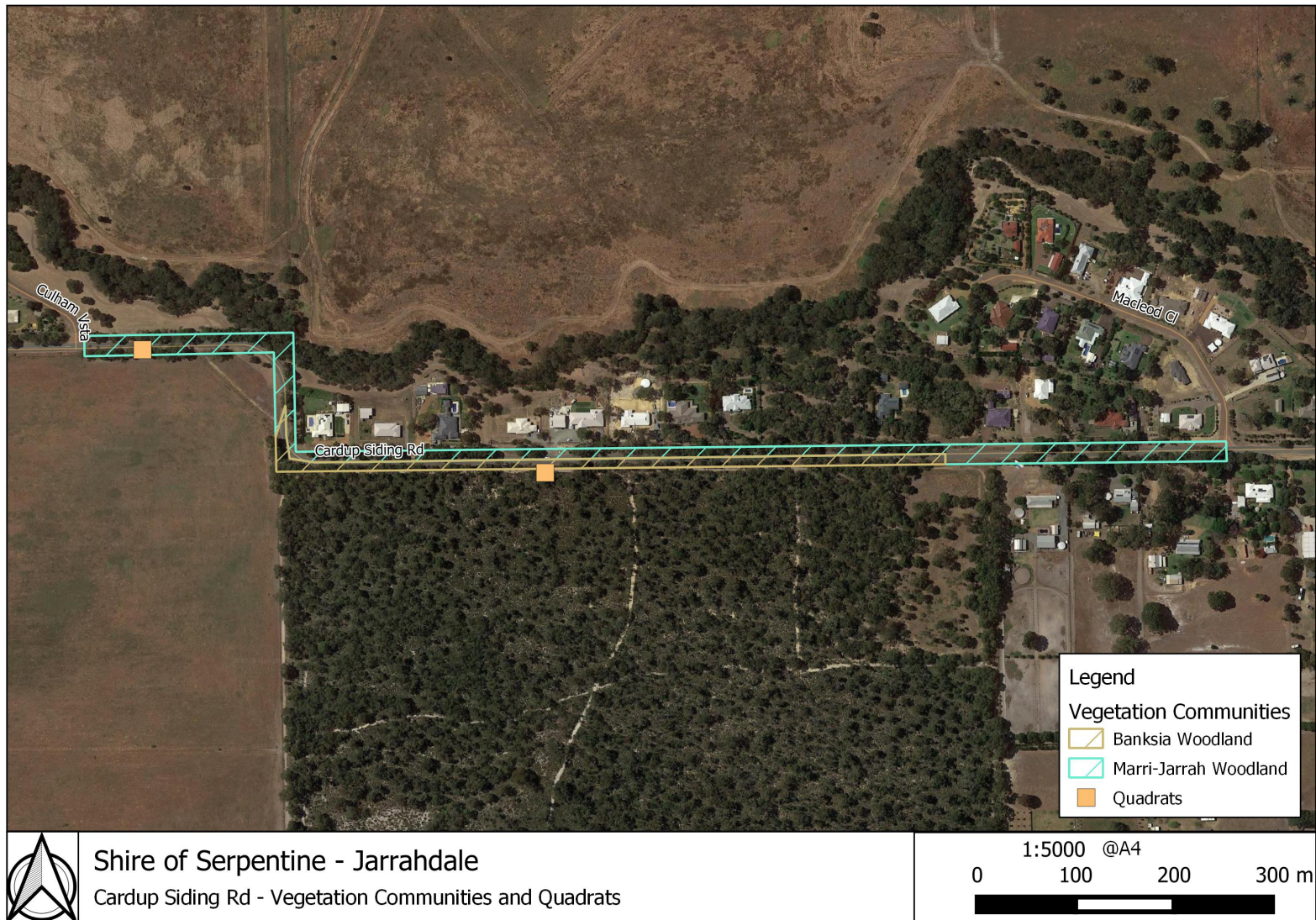


Figure 6: Vegetation Communities and Quadrat Locations Wright Road

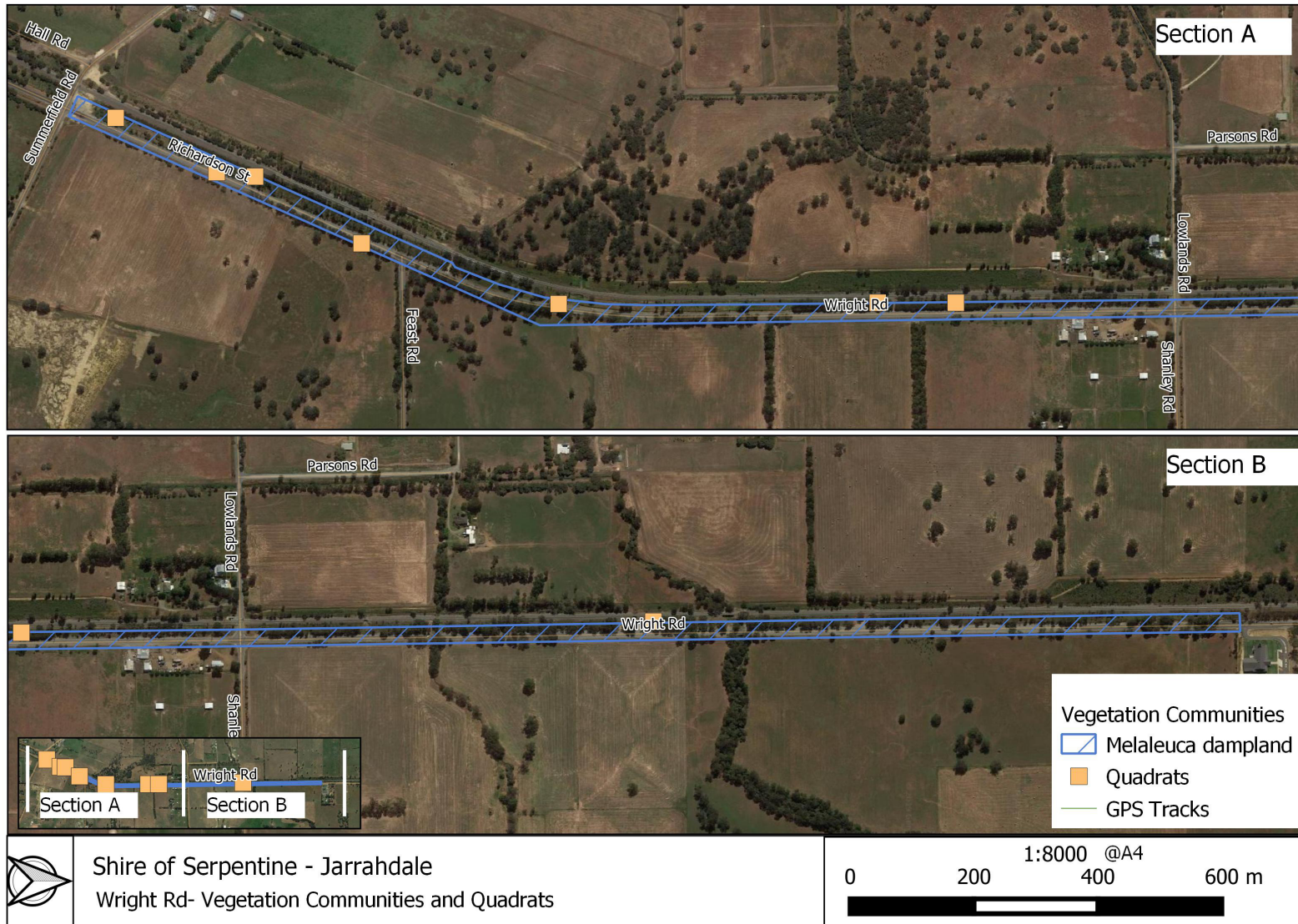


Figure 7: Vegetation Communities and Quadrat Locations Soldier's Road

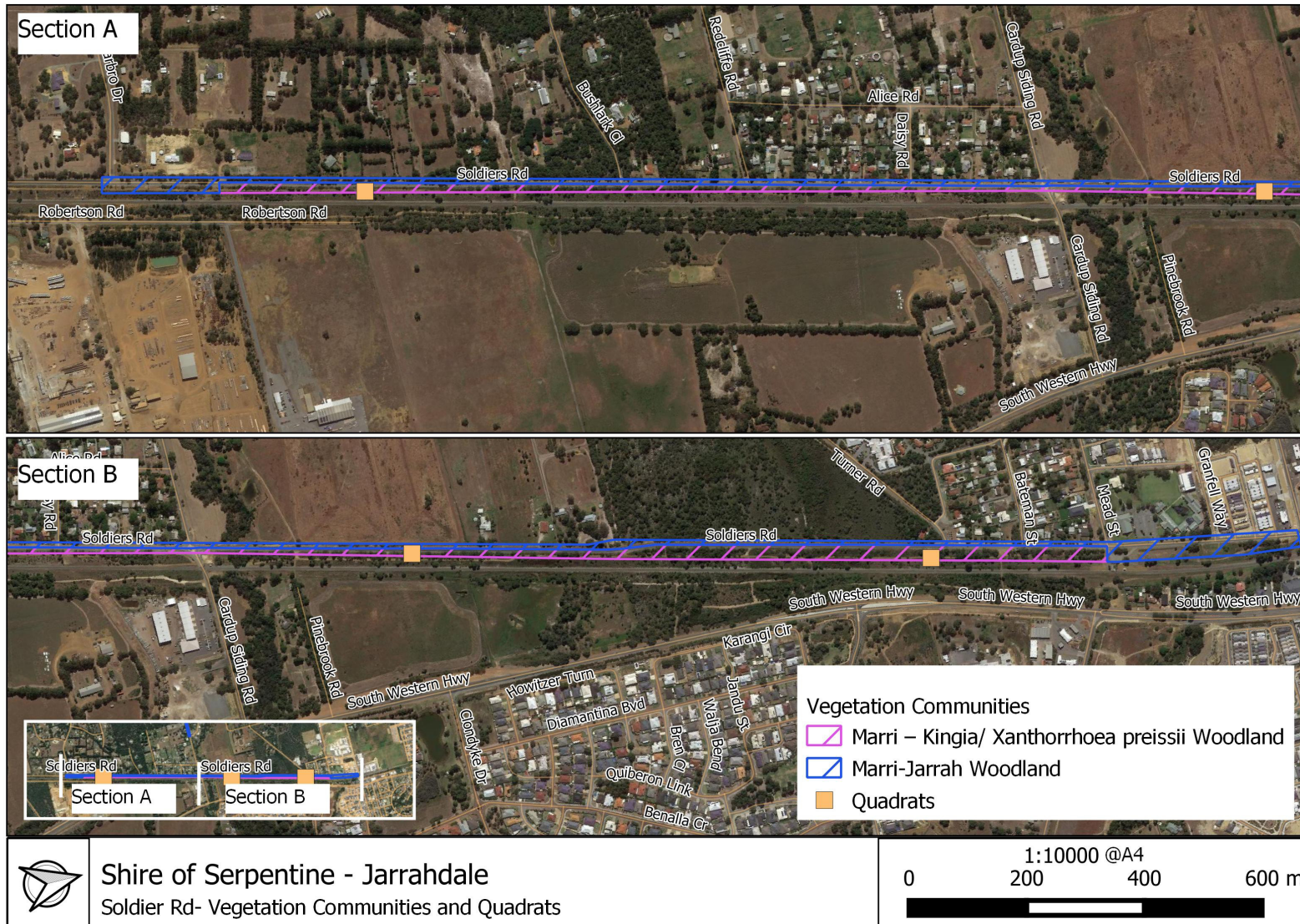


Figure 8: Vegetation Condition and Significant Trees Cardup-Siding Road

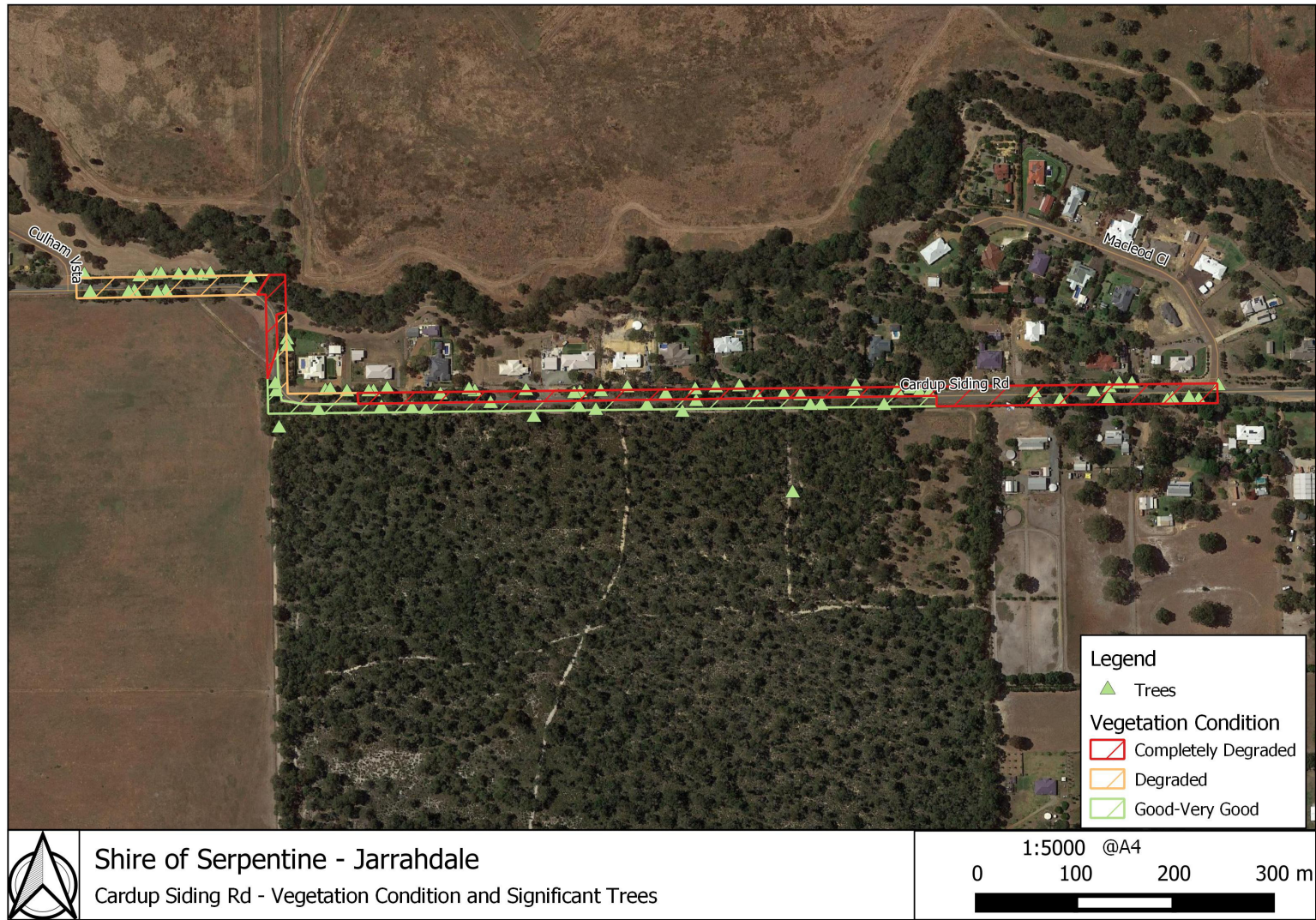


Figure 9: Vegetation Condition and Significant Trees Wright Road

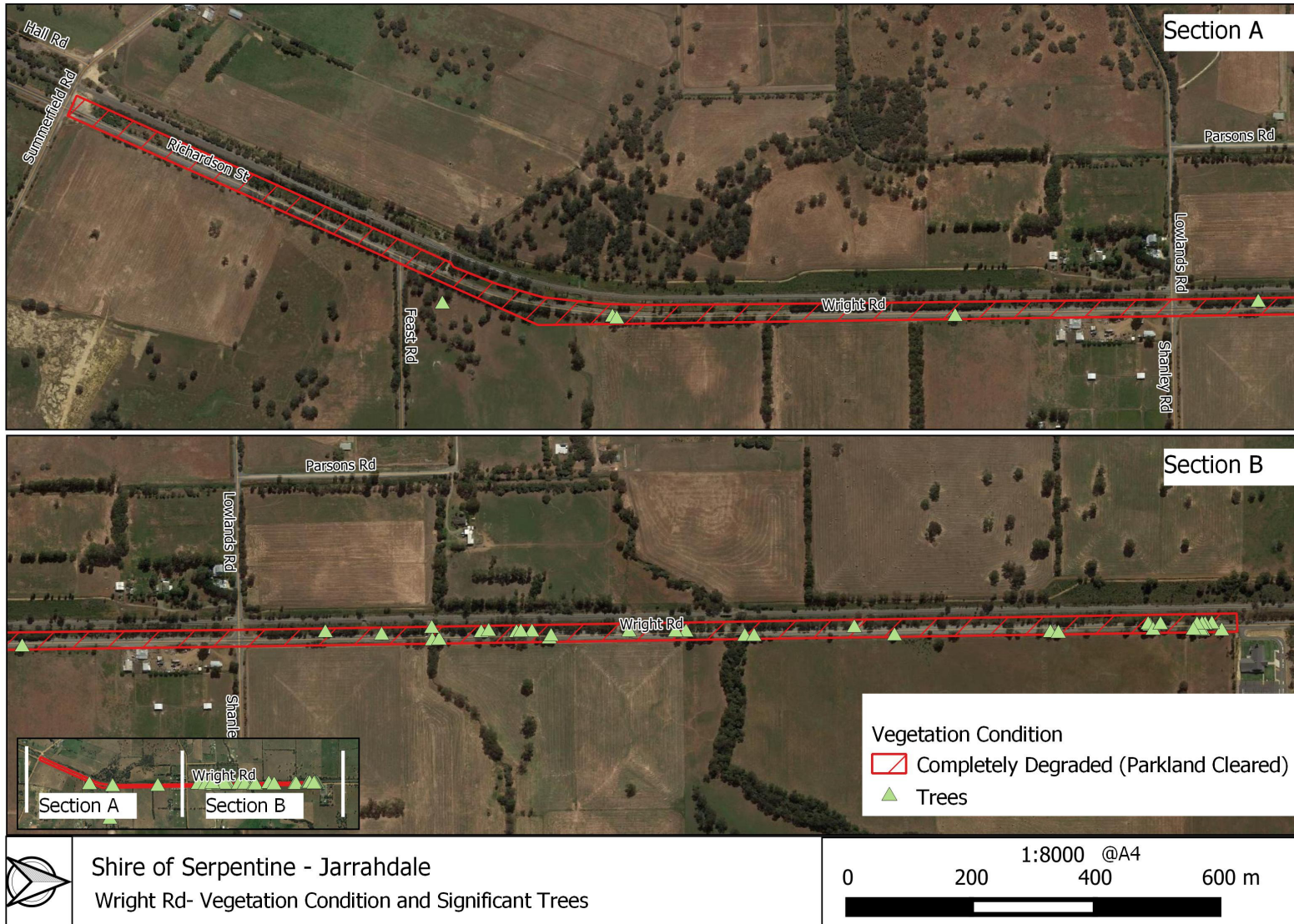


Figure 10: Vegetation Condition and Significant Trees Soldier's Road

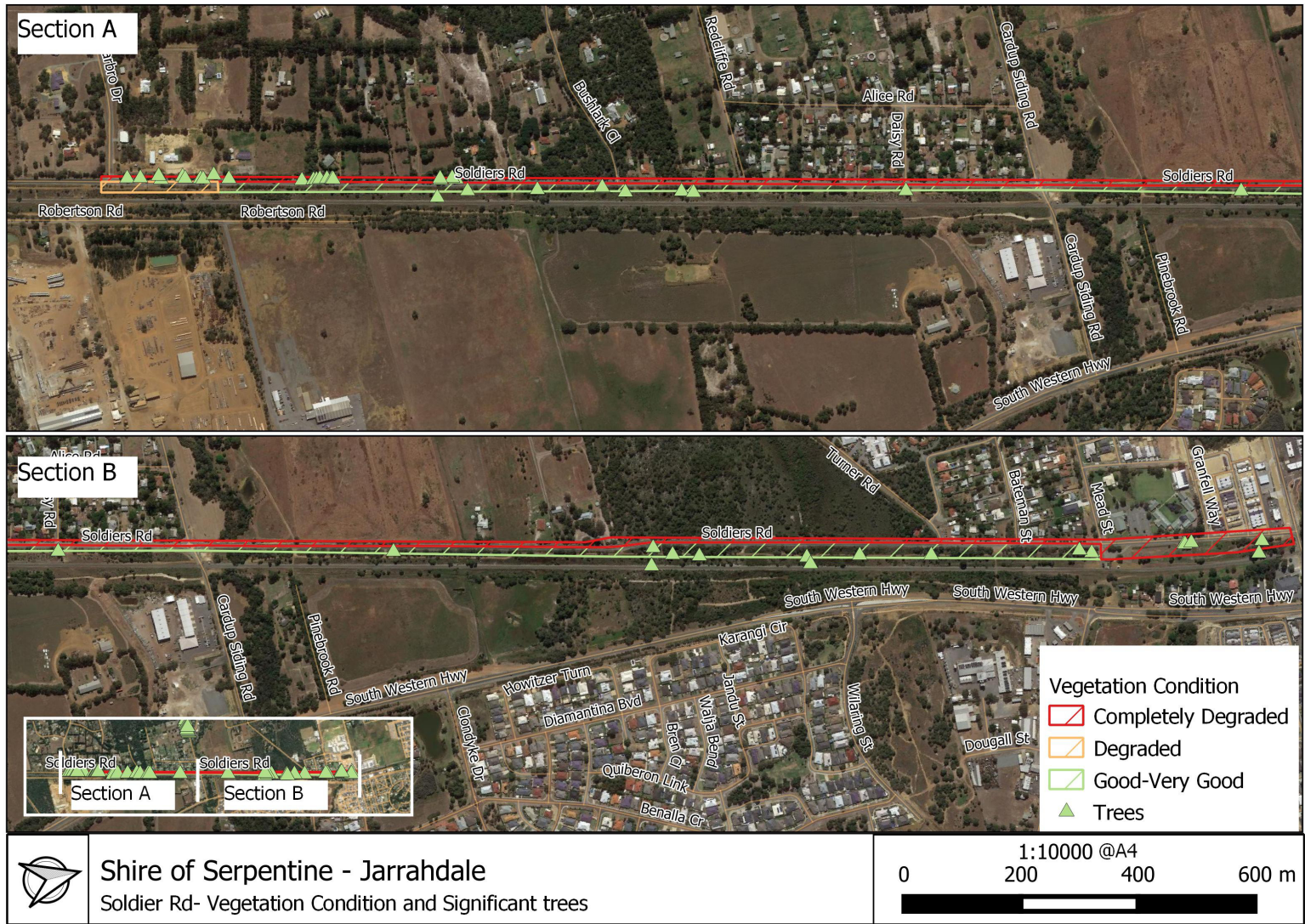


Figure 11: DRF Survey Data Cardup-Siding Road

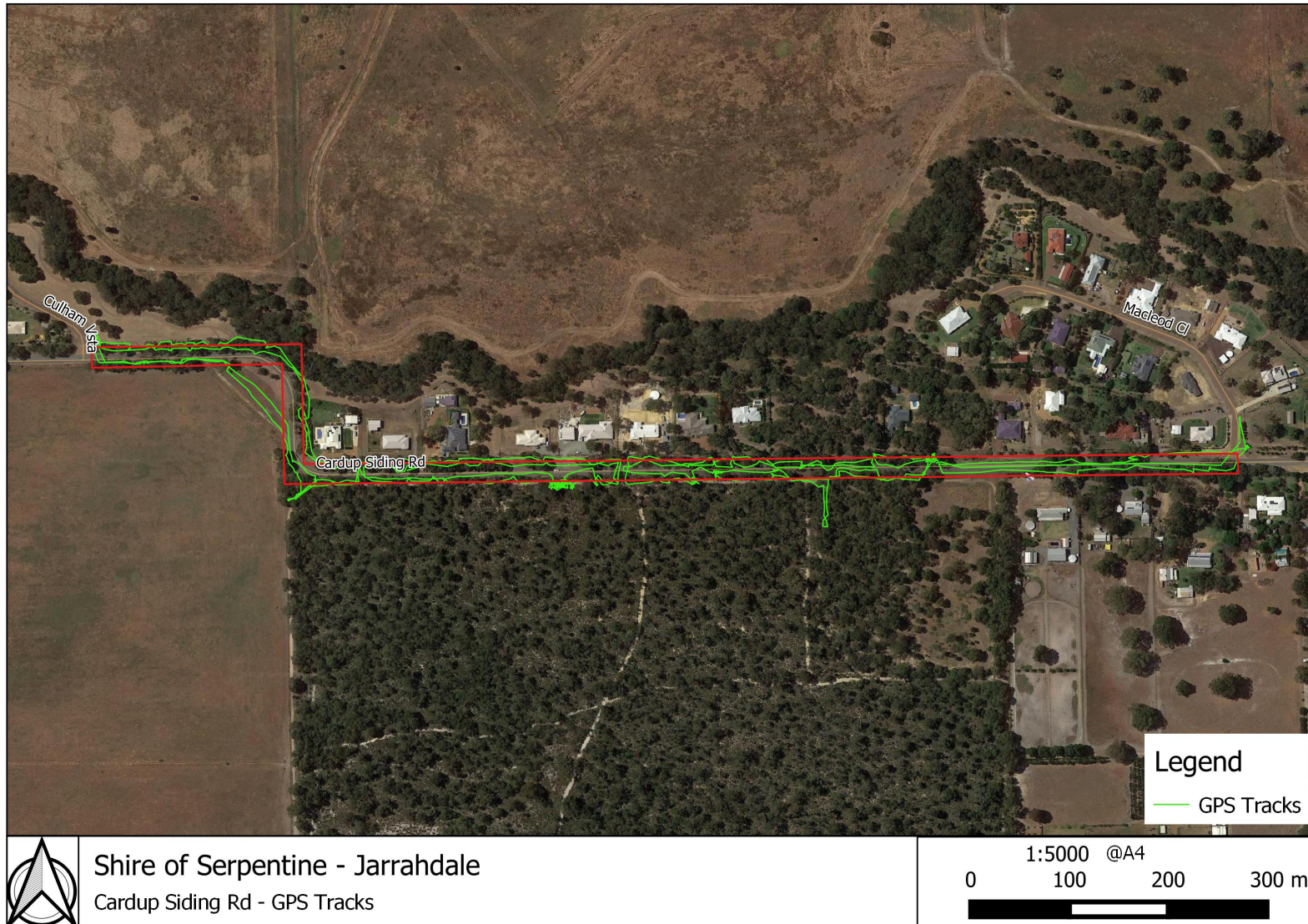


Figure 12: DRF Survey Data Wright Road

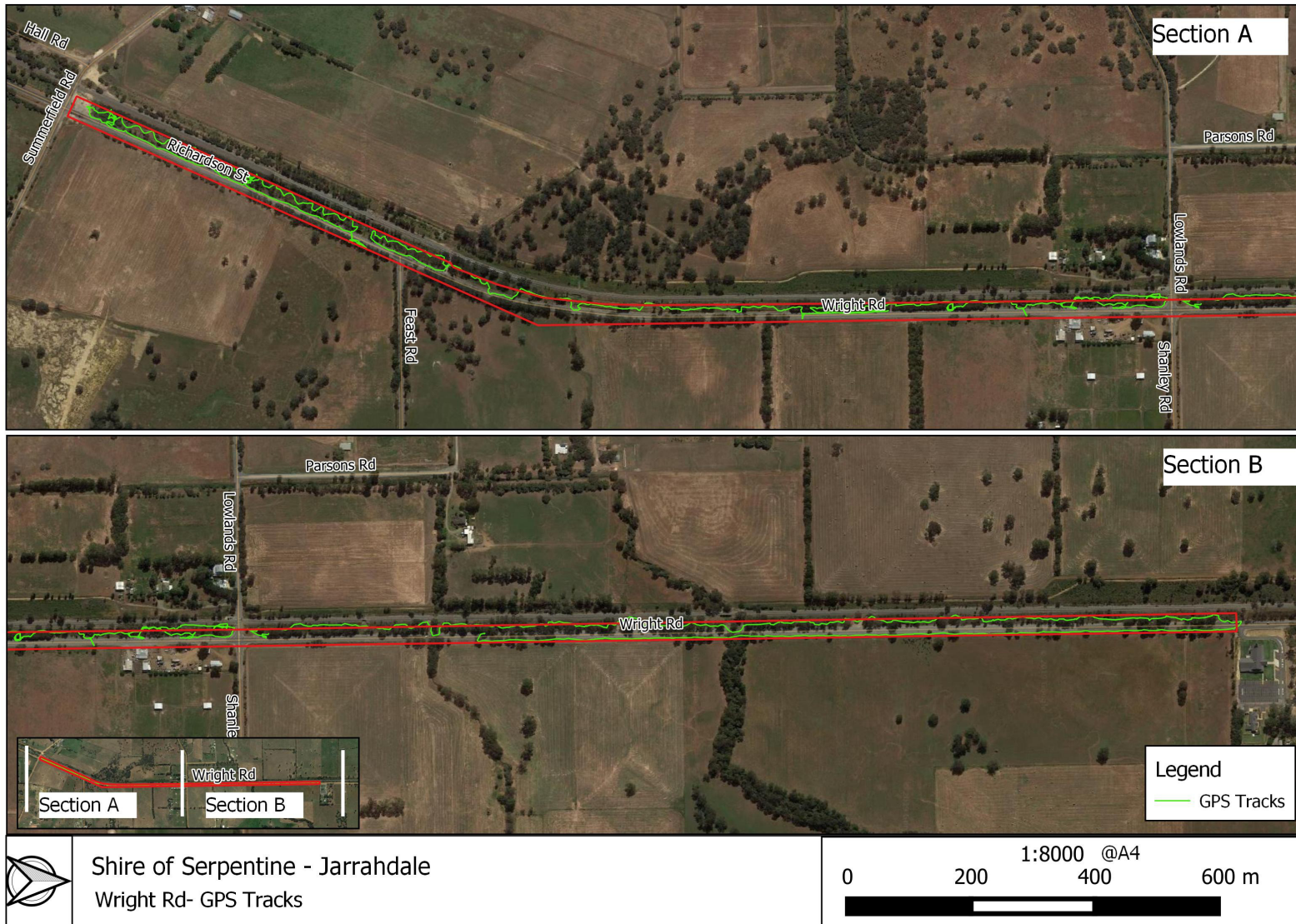
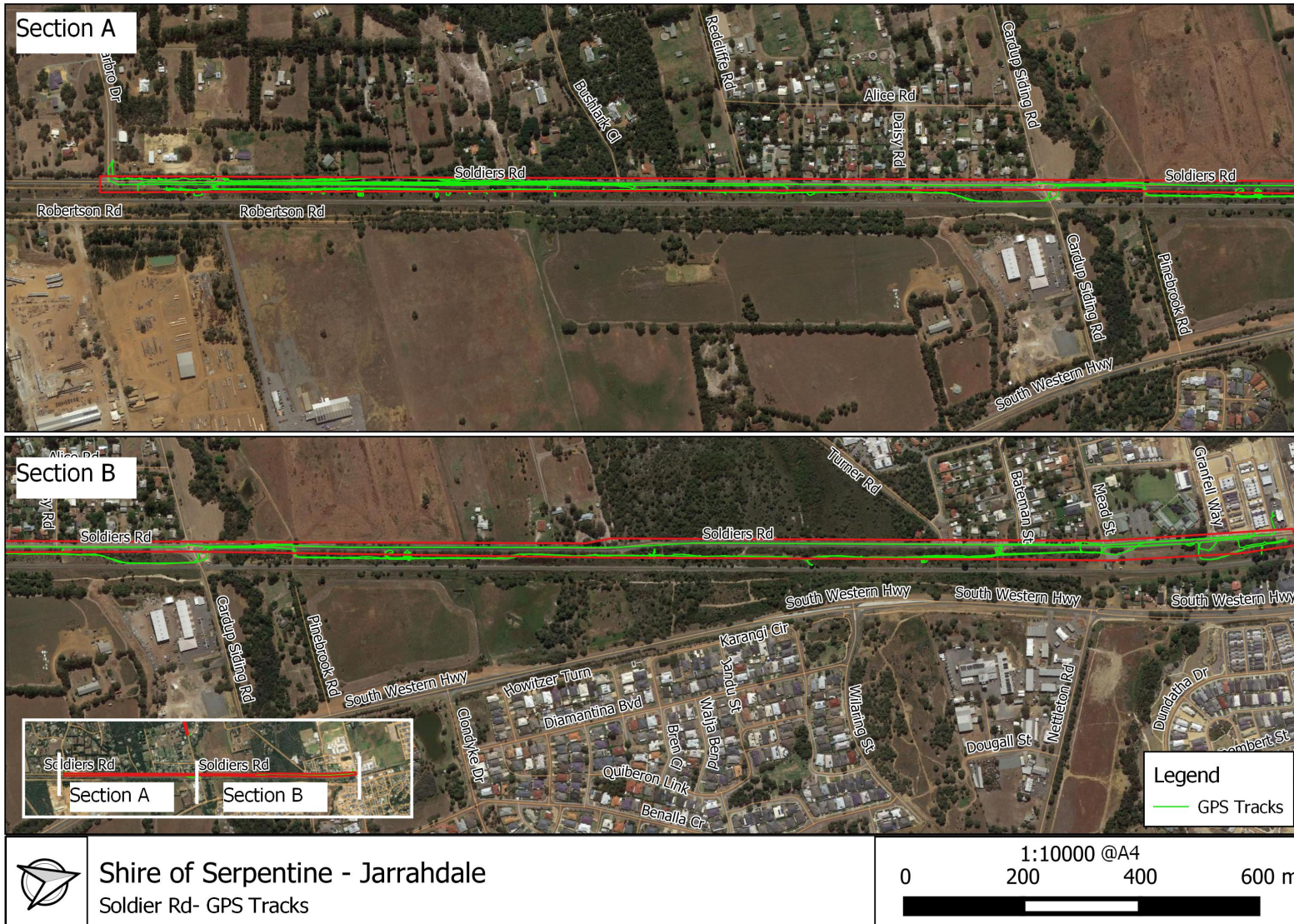
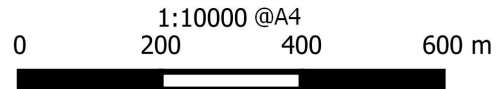


Figure 13: DRF Survey Data Soldier's Road



Shire of Serpentine - Jarrahdale
Soldier Rd- GPS Tracks



PHOTOGRAPHIC PLATES



Plate 1: Cardup-Siding Road, Banksia Woodland in Very Good condition



Plate 2: Wright Road vegetation in Completely Degraded Condition



Plate 3: Soldier's Road *Marri-Kingia-Xanthorrhoea preissii* in Very Good Condition



Plate 4: Habitat Tree, Cardup-Siding Road



Plate 5: Evidence of Cockatoo feeding

APPENDIX A
VASCULAR PLANT SPECIES RECORDED

**APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT
ALONG CARDUP-SIDING ROAD, CARDUP, OCTOBER 2019**
(*DENOTES A WEED SPECIES)

Family	Genus/Species
Apiaceae	<i>Daucus glochidiatus</i>
Apocynaceae	* <i>Gomphocarpus fruticosus</i>
Araceae	* <i>Zantedeschia aethiopica</i>
Asparagaceae	<i>Laxmannia ? squarrosa</i> * <i>Asparagus asparagoides</i>
Asteraceae	* <i>Ursinia anthemoides</i>
Casuarinaceae	<i>Allocasuarina humilis</i>
Colchicaceae	<i>Burchardia</i> sp
Cyperaceae	<i>Lepidosperma ?effusum</i> <i>Mesomelaena pseudostygia</i> <i>Tetragonia octandra</i>
Dasygongonaceae	<i>Dasygongon bromeliifolius</i> <i>Kingia australis</i>
Dilleaniaceae	<i>Hibbertia hypericoides</i>
Fabaceae	* <i>Lupinus angustifolius</i> <i>Gompholobium tomentosum</i> <i>Jacksonia sternbergiana</i> <i>Kennedia prostrata</i> <i>Labichea punctata</i>
Haemodoraceae	<i>Conostylis juncea</i> <i>Haemodorum</i> sp
Hemerocallidaceae	<i>Agrostocrinum scabrum</i>
Myrtaceae	<i>Babingtonia camphorosmae</i> <i>Corymbia calophylla</i> <i>Eremaea pauciflora</i> <i>Eucalyptus marginata</i> <i>Hypocalymma robustum</i>
Orchidiaceae	<i>Thelymitra macrophylla</i>
Poaceae	* <i>Avena barbata</i> * <i>Briza maxima</i> * <i>Bromus diandrus</i> * <i>Ehrharta calycina</i> * <i>Ehrharta calycina</i> <i>Neurachne alopecuroidea</i>
Polygalaceae	<i>Comesperma calymega</i>
Proteaceae	<i>Banksia attenuata</i>
Restionaceae	<i>Loxocarya cinerea</i>
Thymelaeaceae	<i>Pimelea</i> sp
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>

**APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT
ALONG WRIGHT ROAD, CARDUP, OCTOBER 2019**

(*DENOTES A WEED SPECIES)

Family	Genus/Species
Apocynaceae	* <i>Gomphocarpus fruticosus</i>
Araceae	<i>Lemna disperma</i>
Asteraceae	* <i>Arctotheca calendula</i>
	* <i>Sonchus oleraceus</i>
Casuarinaceae	<i>Casuarina obesa</i>
Cyperaceae	<i>Isolepis marginata</i>
	<i>Lepidosperma calcicola</i>
	<i>Lepidosperma costale</i>
Fabaceae	* <i>Vicia americana</i>
	<i>Acacia saligna</i>
	<i>Viminaria juncea</i>
Hemerocallidaceae	<i>Stypantra glauca</i>
Iridaceae	* <i>Moraea flaccida</i>
	* <i>Romulea rosea</i>
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>
Juncaceae	<i>Juncus pallidus</i>
Juncaginaceae	<i>Cynnogeton lineare</i>
Lamiaceae	* <i>Salvia reflexa</i>
Malvaceae	* <i>Malva parviflora</i>
Myrtaceae	<i>Calothamnus quadrifidus</i>
	<i>Corymbia calophylla</i>
	<i>Eucalyptus rudis</i>
	<i>Kunzea ericifolia</i>
	<i>Melaleuca ?pauciflora</i>
	<i>Melaleuca ?viminea</i>
	<i>Melaleuca ?viminea</i> Lindl. subsp. <i>viminea</i>
	<i>Melaleuca osullivanii</i>
	<i>Melaleuca rhapiophylla</i>
	<i>Melaleuca viminea</i>
Oxalidaceae	* <i>Oxalis ?corniculata</i>
	* <i>Oxalis glabra</i>
	* <i>Oxalis pes-caprae</i>
Poaceae	* <i>Avena barbata</i>
	* <i>Briza maxima</i>
	* <i>Bromus diandrus</i>
	* <i>Cynodon dactylon</i>
	* <i>Ehrharta calycina</i>
	* <i>Eragrostis curvula</i>
	* <i>Hordeum vulgare</i>
	* <i>Lolium sp</i>
	* <i>Paspalum sp</i>
	* <i>Vulpia sp</i>
Polygonaceae	<i>Persicaria decipiens</i>
Primulaceae	* <i>Lysimachia arvensis</i>
Proteaceae	<i>Hakea sulcata</i>
	<i>Hakea varia</i>

Xanthorrhoeaceae

Viminaria juncea

Xanthorrhoea preissii

**APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT
ALONG SOLDIER'S ROAD, CARDUP, OCTOBER 2019**
(*DENOTES A WEED SPECIES)

Family	Genus/Species
Apiaceae	<i>Xanthosia huegelii</i>
Asparagaceae	<i>Laxmannia ?ramosa</i> subsp. <i>ramosa</i> <i>Lomandra brittanii</i> <i>Sowerbaea laxiflora</i>
Asteraceae	* <i>Ursinia anthemoides</i> * <i>Taraxacum khatoonae</i>
Caryophyllaceae	* <i>Spergula breviflora</i>
Cyperaceae	<i>Cyathochaeta avenacea</i> <i>Isolepis marginata</i> <i>Lepidosperma squamatum</i> <i>Mesomelaena tetragona</i> <i>Tetraria octandra</i>
Dasygongonaceae	<i>Kingia australis</i>
Droseraceae	<i>Drosera ?menziesii</i> <i>Drosera</i> sp
Fabaceae	<i>Acacia drewiana</i> subsp. <i>drewiana</i> <i>Gompholobium marginatum</i> <i>Gompholobium tomentosum</i>
Goodeniaceae	<i>Dampiera linearis</i> <i>Lechenaultia biloba</i>
Haemodoraceae	<i>Anigozanthos manglesii</i> <i>Anigozanthos viridis</i> <i>Conostylis aculeata</i> <i>Conostylis setigera</i> <i>Haemodorum</i> sp
Haloragaceae	<i>Gonocarpus cordiger</i>
Hemerocallidaceae	<i>Caesia micrantha</i>
Iridaceae	* <i>Romulea rosea</i> * <i>Watsonia meriana</i> var. <i>bulbillifera</i> <i>Babiana</i> sp <i>Patersonia occidentalis</i> <i>Patersonia pygmaea</i>
Lauraceae	<i>Cassytha ? racemosa</i>
Myrtaceae	<i>Calytrix aurea</i> <i>Corymbia calophylla</i> <i>Hypocalymma angustifolium</i> <i>Pericalymma ellipticum</i> var. <i>floridum</i> <i>Verticordia densiflora</i> var. <i>densiflora</i>
Poaceae	* <i>Aira caryophylla</i> * <i>Briza maxima</i> * <i>Ehrharta calycina</i> <i>Austrostipa hemipogon</i> <i>Neurachne alopecuroidea</i> <i>Rytidosperma occidentale</i>
Proteaceae	<i>Adenanthos meisneri</i>

	<i>Banksia bipinnatifida</i>
	<i>Hakea sulcata</i>
	<i>Hakea trificata</i>
	<i>Petrophile biloba</i>
	<i>Synaphea ?petiolaris</i>
	<i>Synaphea petiolaris subsp. petiolaris</i>
Restionaceae	<i>Desmocladius sp</i>
	<i>Leptocarpus ?canus</i>
	<i>Leptocarpus decipiens</i>
Rubiaceae	<i>Opercularia vaginata</i>
Stylidiaceae	<i>Stylidium repens</i>
Thymelaeaceae	<i>Pimelea imbricata var. piligera</i>
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>

APPENDIX B
QUADRAT DATA

Del Botanics

FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 7/10/19	Site: Cardup-Siding Rd Q1
GPS Datum: 50 0404658 6432340	Topography: Mid Slope	Litter cover: 70% Twigs, 80 % leaves 20 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Grey sands
Vegetation Description: Banksia Woodland		
Vegetation Condition: Very Good		
Observations: Limited disturbances, adjacent to very good bushland. Fallen logs providing good fauna habitat		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Dasyopogon bromeliifolius</i>	30	100		4
	<i>Xanthorrhoea preissii</i>	2	100		9
	* <i>Briza maxima</i>	15	100		0.5
	* <i>Ursinia anthemoides</i>	15	100		0.5
	<i>Banksia attenuata</i>	7	100		15
	<i>Allocasuarina humilis</i>	90	100		1
	<i>Kennedia prostrata</i>	T	100		0.2
	* <i>Ehrharta calycina</i>	80	100		0.5
	<i>Eucalyptus marginata</i>	30	100		40
	<i>Burchardia</i> sp	45	100		0.5
	<i>Eremaea pauciflora</i>	60	100		7
	<i>Jacksonia sternbergiana</i>	5	70	30	10
	<i>Loxocarya cinerea</i>	15	100		20
	<i>Mesomelaena pseudostygia</i>	60	100		13
	<i>Hibbertia hypericoides</i>	40	100		3
	<i>Laxmannia ? squarrosa</i>	10	100		2
	<i>Agrostocrinum scabrum</i>	50	100		1.5
	<i>Gompholobium tomentosum</i>	50	100		0.5

	<i>Haemodorum</i> sp	60	100		6
	<i>Thelymitra macrophylla</i>	15	100		0.1
	<i>Lepidosperma ?effusum</i>	100	100		5
	<i>Conostylis juncea</i>	15	100		2
	<i>Babingtonia camphorosmae</i>	80	100		2
	<i>Tetragia octandra</i>	20	100		12
	<i>Labichea punctata</i>	25	100		1
	<i>Hypocalymma robustum</i>	40	100		5
	<i>Daucus glochidiatus</i>	1	100		0.1
	<i>Comesperma calymega</i>	15	100		0.1
	<i>Neurachne alopecuroidea</i>	10	100		3
	<i>Pimelea</i> sp	50	100		1

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 7/10/19	Site: Cardup-Siding Rd Q2
GPS Datum: 50 0404249 6432465	Topography: Mid Slope	Litter cover: 10% Twigs, 40 % leaves 20 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Grey sands
Vegetation Description: Marri-Jarrah Woodland		
Vegetation Condition: Degraded		
Observations: High number of weeds, 50m x 2m Quadrat		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Corymbia calophylla</i>	2000	100		70
	* <i>Bromus diandrus</i>	40	100		70
	<i>Kingia australis</i>	40	100		5
	* <i>Asparagus asparagoides</i>	T	100		1
	* <i>Avena barbata</i>	100	100		3
	* <i>Ehrharta calycina</i>	100	100		15
	* <i>Lupinus angustifolius</i>	70	100		5
	* <i>Gomphocarpus fruticosus</i>	100	100		1
	* <i>Zantedeschia aethiopica</i>	80	100		1

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Q1
GPS Datum: 50 0403778 6420613	Topography: lower Slope	Litter cover: 30% Twigs, 5 % leaves 5 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Melaleuca closed woodland over *Watsonia		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		

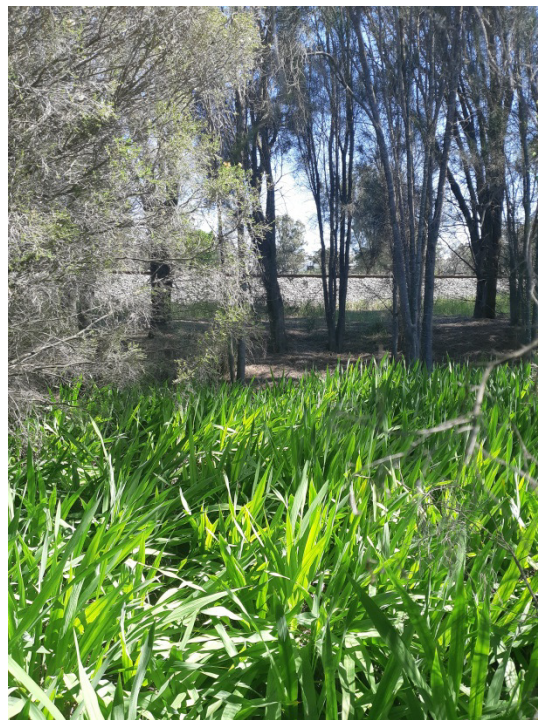


Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Melaleuca ?viminea</i>	4000	100		80
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	60	100		70
	<i>Lepidosperma costale</i>	60	100		10
	<i>Xanthorrhoea preissii</i>	100	100		10
Opp	<i>Casuarina ? obesa</i>		100		
Opp	<i>Viminaria juncea</i>		100		
	* <i>Ehrharta longifolia</i>	40	100		0.1

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Revele 1
GPS Datum: 50 0403866 6420776	Topography: lower Slope	Litter cover: % Twigs, % leaves % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Melaleuca closed woodland over *Watsonia		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Melaleuca viminea</i>				
	* <i>Lysimachia arvensis</i>				
	* <i>Avena barbata</i>				
	* <i>Lolium sp</i>				
	* <i>Moraea flaccida</i>				
	* <i>Oxalis glabra</i>				
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>				
	* <i>Arctotheca calendula</i>				
	* <i>Ehrharta longifolia</i>				

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Releve 2
GPS Datum: 50 0404079 6421328	Topography: lower Slope	Litter cover: % Twigs, % leaves % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Completely Degraded Roadside		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	* <i>Avena barbata</i>	100	100		40
	* <i>Oxalis glabra</i>	15	100		10
	* <i>Ehrharta longifolia</i>	100	100		10
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	40	100		10
	<i>Casuarina ? obesa</i>	1000	100		10
	* <i>Arctotheca calendula</i>	10	100		2
	* <i>Romulea rosea</i>	10	100		0.5

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Q2
GPS Datum: 50 0403873 6420838	Topography: lower Slope	Litter cover: 30% Twigs, 40 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Melaleuca – Casuarina closed woodland		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Opp	<i>Juncus pallidus</i>		100		
	<i>Xanthorrhoea preissii</i>	100	100		5
	<i>Melaleuca viminea</i>	600	100		20
	<i>Casuarina obesa</i>	1000	100		30
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	60	100		80
Opp	<i>Hakea varia</i>		100		
	<i>Persicaria decipiens</i>		100		
	<i>Lepidosperma costale</i>	70	100		2
Opp	<i>Cynnogeton lineare</i>				

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Q3
GPS Datum: 50 0403981 6421010	Topography: Mid Slope	Litter cover: 10% Twigs, 40 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Completely Degraded roadside		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
Opp	<i>Casuarina obesa</i>				
	* <i>Lolium sp</i>	40	100		20
	* <i>Romulea rosea</i>	20	100		5
	<i>Viminaria juncea</i>	180	100		2
	* <i>Oxalis glabra</i>	4	100		6
	* <i>Avena barbata</i>	50	100		8
	* <i>Lysimachia arvensis</i>	20	100		3.5
	* <i>Ehrharta longifolia</i>	30	100		1
	* <i>Ehrharta calycina</i>	15	100		3
	* <i>Hordeum vulgare</i>	12	100		1
	* <i>Malva parviflora</i>	5	100		0.1
	* <i>Salvia reflexa</i>	7	100		0.1
	<i>Persicaria decipiens</i>	10	100		1

	<i>Lemna disperma</i>	1	100		2
	<i>Isolepis marginata</i>	20	100		3
	<i>Cycnogeton lineare</i>	40	100		0.5

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Q4
GPS Datum: 50 0404077 6421843	Topography: Lower Slope	Litter cover: 10% Twigs, 80 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Melaleuca Woodland with *Watsonia		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Melaleuca ?viminea</i> subsp. <i>viminea</i>	600	100		10
	<i>Casuarina obesa</i>	600	100		10
	<i>Xanthorrhoea preissii</i>	100	100		10
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	60	100		80
	* <i>Oxalis glabra</i>	10	100		20
	<i>Calothamnus quadrifidus</i>	120	100		3

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 24/09/19	Site: Wright Rd Q5
GPS Datum: 50 0404077 6421969	Topography: Lower Slope	Litter cover: 10% Twigs, 80 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Melaleuca Woodland with *Watsonia		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Melaleuca ?viminea. subsp. viminea</i>	600	100		95
	* <i>Watsonia meriana var. bulbifera</i>	60	100		20
	* <i>Ehrharta calycina</i>	60	100		2
	<i>Calothamnus quadrifidus</i>	120	100		5
	* <i>Vulpia sp</i>	10	100		4
	* <i>Lolium sp</i>	15	100		0.1
	* <i>Oxalis glabra</i>	4	100		4
	* <i>Arctotheca calendula</i>	3	100		0.4
	<i>Casuarina obesa</i>	1200	100		4
	<i>Corymbia calophylla</i>	120	100		2
	<i>Melaleuca osullivanii</i>	230	100		2

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 7/10/19	Site: Wright Rd Q6
GPS Datum: 50 04040059 6422989	Topography: Mid Slope	Litter cover: 10% Twigs, 10 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Melaleuca Woodland with grassy weeds understorey		
Vegetation Condition: Completely Degraded		
Observations: Lack of native understorey		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	* <i>Gomphocarpus fruticosus</i>	200	100		4
	* <i>Avena barbata</i>	100	100		12
	* <i>Vicia americana</i>	T	100		1
	<i>Viminaria juncea</i>	120	100		1
	<i>Melaleuca rhapsiophylla</i>	320	100		15
	* <i>Eragrostis curvula</i>	100	100		15
	<i>Hakea sulcata</i>	150	100		2
	* <i>Paspalum</i> sp	40	100		1
	* <i>Bromus diandrus</i>	50	100		10
	* <i>Briza maxima</i>	30	100		10
	* <i>Oxalis glabra</i>	5	100		10
	* <i>Oxalis pes-caprae</i>	25	100		5
	* <i>Ehrharta longifolia</i>	30	100		6
	<i>Kunzea ericifolia</i>	300	100		7
	* <i>Cynodon dactylon</i>	40	100		8
	<i>Acacia saligna</i>	200	100		1
	<i>Eucalyptus rudis</i>	750	100		35
	* <i>Oxalis</i> sp	10	100		5
Opp	<i>Casuarina obesa</i>				
	* <i>Sonchus oleraceus</i>	40	100		5

	<i>Melaleuca osullivanii</i>	250	100		0.1
	<i>Stypandra glauca</i>	20	100		2

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 4/11/19	Site: Soldier's Rd Q1
GPS Datum: 50 0406315 6433813	Topography: Mid Slope	Litter cover: 10% Twigs, 10 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Marri –Kingia/ <i>Xanthorrhoea preissii</i>		
Vegetation Condition: Good		
Observations: Invasion of * <i>Watsonia</i> , Low weeds		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Corymbia calophylla</i>	1200	100		20
	<i>Xanthorrhoea preissii</i>	100	100		18
	* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	100	100		3
	* <i>Ehrharta calycina</i>	80	100		0.25
	<i>Neurachne alopecuroidea</i>	60	100		1
	<i>Mesomelaena tetragona</i>	60	100		12
	<i>Pimelea imbricata</i> var. <i>piligera</i>	30	100		0.5
	<i>Hakea triflicata</i>	250	80	20	12
	* <i>Ursinia anthemoides</i>	15	100		0.1
	<i>Laxmannia ?ramosa</i> subsp. <i>ramosa</i>	20	90	10	1.2
	* <i>Aira caryophyllea</i>	10	100		0.1
	<i>Pericalymma ellipticum</i> var. <i>floridum</i>	80	100		1.5
	<i>Kingia australis</i>	250	100		6
	<i>Conostylis aculeata</i>	20	100		0.5
	<i>Babiana</i> sp	20	100		0.1

	<i>Leptocarpus decipens</i>	100	100		0.5
	<i>Calytrix aurea</i>	120	100		1
	<i>Caesia micrantha</i>	40	100		0.5
	<i>Tetraria octandra</i>	40	100		5
	<i>Sowerbaea laxiflora</i>	50	100		0.2
	<i>Gonocarpus cordiger</i>	50	100		2
	<i>Haemodorum sp</i>	50	100		0.3
	<i>Acacia drewiana</i> subsp. <i>drewiana</i>	25	100		0.5
	<i>Lechenaultia biloba</i>	25	100		0.5
	<i>Isolepis marginata</i>	30	100		2
	<i>Cyathochaeta avenacea</i>	50	100		1
	<i>Drosera sp</i>	15	100		0.1
	* <i>Romulea rosea</i>	15	100		0.01

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 4/11/19	Site: Soldier's Rd Q2
GPS Datum: 50 0406053 6432799	Topography: Mid Slope	Litter cover: 10% Twigs, 80 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown clay/loam
Vegetation Description: Marri –Kingia/Xanthorrhoea preissii		
Vegetation Condition: Very Good		
Observations: Low weeds, good structure and density		



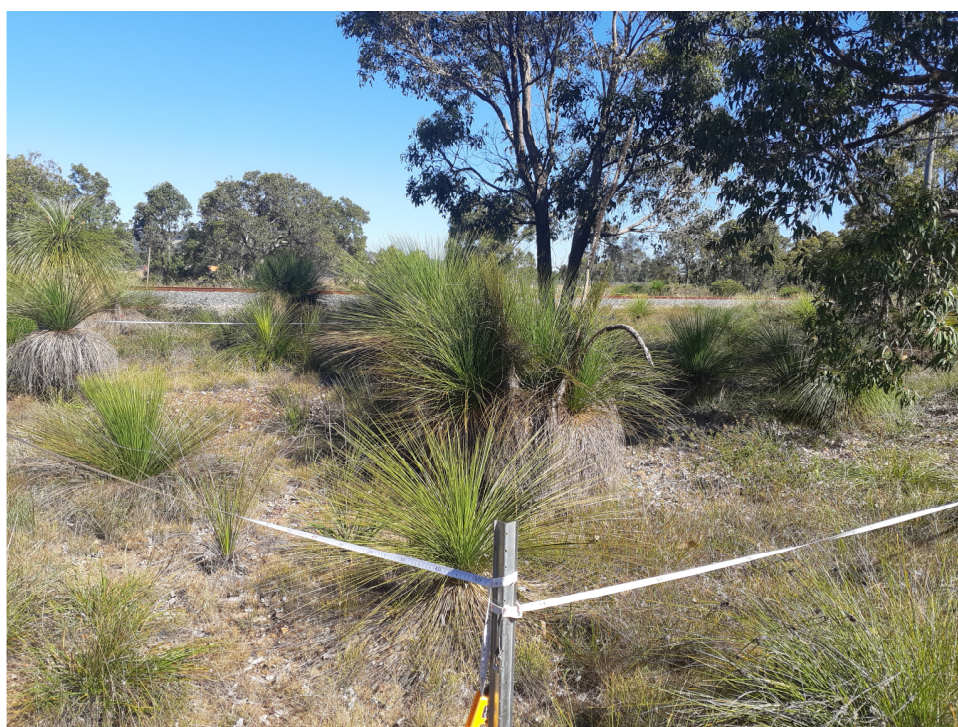
Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Corymbia calophylla</i>	1000	100		60
	<i>Mesomelaena tetragona</i>	50	100		70
	<i>Xanthorrhoea preissii</i>	170	100		8
	<i>Kingia australis</i>	250	100		3.5
	<i>Banksia bipinnatifida</i>	20	90	10	1
	<i>Hypocalymma angustifolium</i>	30	100		0.5
	* <i>Briza maxima</i>	15	100		0.1
	<i>Cyathochaeta avenacea</i>	100	100		0.3
	<i>Conostylis aculeata</i>	20	100		1
	* <i>Watsonia meriana var. bulbifera</i>	20	100		1
	<i>Haemodorum sp</i>	100	100		0.3
opp	<i>Gonocarpus cordiger</i>				
	<i>Dampiera linearis</i>	20	100		0.1
	<i>Petrophile biloba</i>	250	50	50	3
	<i>Caesia micrantha</i>	50	100		2
	<i>Lechenaultia biloba</i>	10	100		0.2
	<i>Lomandra brittanii</i>	30	100		2

	<i>Conostylis setigera</i>	12	100		0.1
	<i>Desmocladius</i> sp	8	100		0.01
	<i>Neurachne alopecuroidea</i>	10	100		2
	<i>Drosera</i> sp	T	100		0.01
	* <i>Taraxacum khatoonae</i>	5	100		0.1
	<i>Hakea sulcata</i>	100	100		1
	<i>Cassutha ? racemosa</i>	T	100		0.1
	<i>Opercularia vaginata</i>	40	100		4
	<i>Tetraria octandra</i>	20	100		2
	<i>Lepidosperma squamatum</i>	50	100		3
	* <i>Spargula breviflora</i>	100	100		0.1

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FIELD SHEET – FLORA AND VEGETATION SURVEY

Job Code: SoSJ	Date: 4/11/19	Site: Soldier's Rd Q3
GPS Datum: 50 0405614 6431038	Topography: Mid Slope	Litter cover: 10% Twigs, 60 % leaves 10 % logs
Age since fire: <10 yrs	Disturbance: Hi Med Lo	Soils: Brown gravelly clay/loam
Vegetation Description: Marri – <i>Kingia/Xanthorrhoea preissii</i>		
Vegetation Condition: Very Good		
Observations: Low weeds, good structure and density		



Coll No.	Taxon	Ht (cm)	% Alive	% Dead	% Cover
	<i>Corymbia calophylla</i>	1200	100		40
	<i>Xanthorrhoea preissii</i>	200	100		8
	<i>Kingia australis</i>	250	100		6
	<i>Mesomelaena tetragona</i>	70	100		5
	<i>Neurachne alopecuroidea</i>	10	100		40
	<i>Patersonia occidentalis</i>	40	100		0.5
	<i>Anigozanthos manglesii</i>	100	100		0.5
	<i>Gompholobium tomentosum</i>	40	100		1
	<i>Verticordia densiflora</i> var. <i>densiflora</i>	60	100		3
	<i>Desmocladus</i> sp	7	100		2
	<i>Tetraria octandra</i>	40	100		9
	<i>Patersonia pygmaea</i>	15	100		1
	<i>Acacia drewiana</i> subsp. <i>drewiana</i>	30	100		0.5
	<i>Stylidium repens</i>	8	100		2
	<i>Synaphea petiolaris</i> subsp. <i>petiolaris</i>	40	100		1
	<i>Laxmannia ?ramosa</i> Lindl. subsp. <i>ramosa</i>	15	100		0.5

	<i>Lechenaultia biloba</i>	50	100		0.5
	<i>Haemodorum sp</i>	50	100		0.1
	<i>Gompholobium marginatum</i>	30	100		0.1
	<i>Conostylis setigera</i>	12	100		0.2
	<i>Xanthosia huegelii</i>	5	100		0.1
	<i>Lepidosperma squamatum</i>	30	100		1
	<i>Gonocarpus cordiger</i>	30	100		0.2
	<i>Austrostipa hemipogon</i>	100	100		0.1
	<i>Rytidosperma occidentale</i>	100	100		0.01

APPENDIX C
SIGNIFICANT TREE DATA

Cardup –Siding Road Significant Trees

	Species	GPS Location (50)	DBH (mm)	Height (Metres)	Health	Comments
1	<i>Corymbia calophylla</i>	0404506 6332366	595	30	Good	Multiple branches
2	<i>Corymbia calophylla</i>	0404492 6432363	537	20	Good	Multiple branches
3	<i>Corymbia calophylla</i>	0404487 6432363	754	30	Good	Multiple branches
4	<i>Corymbia calophylla</i>	0404465 6432363	684	20	Good	Multiple branches
5	<i>Eucalyptus marginata</i>	0404500 6432347	1002	20	Dead	2x Large Cocky size hollows, bees in hollows
6	<i>Eucalyptus marginata</i>	0404531 6432346	550	15	Good	Multiple branches
7	<i>Eucalyptus marginata</i>	0404545 6432345	611	15	Dead	1x Large hollow
8	<i>Eucalyptus marginata</i>	0404611 6432351	604	15	Stressed	Multiple branches
9	<i>Eucalyptus marginata</i>	0404655 6432337	1059	30	Good	Multiple branches
10	<i>Eucalyptus marginata</i>	0404701 6432347	646	30	Good	Multiple branches
11	<i>Eucalyptus marginata</i>	0404718 6432344	1352	20	Dead	2x Large Cocky size hollows
12	<i>Eucalyptus marginata</i>	0404723 6432363	970	20	Good	multiple branches (2nd trunk over 300mm)
13	<i>Eucalyptus marginata</i>	0404702 6432362	544	20	Good	Multiple branches
14	<i>Eucalyptus marginata</i>	0404696 6432361	544	20	Good	Multiple branches
15	<i>Eucalyptus marginata</i>	0404647 6432364	961	20	Good	multiple branches (2nd trunk over 500mm)
16	<i>Corymbia calophylla</i>	0404595 6432363	970	20	Good	Multiple branches
17	<i>Corymbia calophylla</i>	0404589 6432365	713	20	Good	Multiple branches
18	<i>Corymbia calophylla</i>	0404560 6432360	623	20	Good	Multiple branches
19	<i>Corymbia calophylla</i>	0405034 6432551	1219	30	Good	Multiple branches (some canker)
20	<i>Corymbia calophylla</i>	0405011 6432349	598	20	Good	Multiple branches
21	<i>Eucalyptus marginata</i>	0404947 6432349	1082	15	Good	2x small hollows, Multiple branches
22	<i>Eucalyptus marginata</i>	0404936 6432349	732	15	Good	2x small hollows, 1x large hollow, bee's in hollows. Some dead branches
23	<i>Eucalyptus marginata</i>	0404882 6432359	970	20	Good	Multiple branches
24	<i>Eucalyptus marginata</i>	0404820 6432353	763	15	Good	1x Medium, 2x Large Hollows, Multiple branches, Bee's in hollows
25	<i>Eucalyptus marginata</i>	0404806 6432342	910	20	Good	2x Medium, 1x Large Hollows

26	<i>Eucalyptus marginata</i>	0404770 6432349	986	15	Good	1x Medium, 4x Large, multiple branches, bee's in hollows
27	<i>Eucalyptus marginata</i>	0404750 6432367	1438	20	Good	1x Large hollow, multiple branches
28	<i>Eucalyptus marginata</i>	0404789 6432360	716	20	Good	1x Small hollow, multiple branches
29	<i>Eucalyptus marginata</i>	0404789 6432360	576	20	Good	Multiple branches
30	<i>Eucalyptus marginata</i>	0404819 6432365	547	20	Good	Multiple branches
31	<i>Corymbia calophylla</i>	0404840 6432367	923	20	Good	Multiple branches
32	<i>Corymbia calophylla</i>	0404864 6432368	668	20	Good	Multiple branches
33	<i>Corymbia calophylla</i>	0404882 6432358	633	20	Good	Multiple branches
34	<i>Corymbia calophylla</i>	0404909 6432360	954	20	Good	Multiple branches
35	<i>Corymbia calophylla</i>	0404918 6432260	636	20	Good	Multiple branches
36	<i>Corymbia calophylla</i>	0404926 6432359	763	20	Good	Multiple branches
37	<i>Eucalyptus marginata</i>	0404980 6432363	802	20	Good	Multiple branches
38	<i>Corymbia calophylla</i>	0404982 6432369	821	20	Good	3x Small hollows, multiple branches
39	<i>Corymbia calophylla</i>	0405024 6432364	913	20	Good	Multiple branches
40	<i>Corymbia calophylla</i>	0405038 6432366	1009	20	Good	Multiple branches
41	<i>Eucalyptus marginata</i>	0405351 6432369	1601	20	Good	Multiple branches
42	<i>Corymbia calophylla</i>	0405331 6432355	849	20	Good	Multiple branches
43	<i>Corymbia calophylla</i>	0405321 6432356	534	20	Good	Multiple branches
44	<i>Eucalyptus marginata</i>	0405321 6432357	1537	30	Good	3x Small, 7x Large hollows, bee's in 2 of the hollows, Multiple branches
45	<i>Eucalyptus marginata</i>	0405304 6432356	1130	20	Good	Multiple branches
46	<i>Eucalyptus marginata</i>	0405299 6432354	642	20	Good	Multiple branches
47	<i>Eucalyptus marginata</i>	0405239 6432356	926	20	Good	Multiple branches
48	<i>Eucalyptus marginata</i>	0405190 6432354	1297	20	Good	Multiple branches
49	<i>Corymbia calophylla</i>	0405165 6432353	604	20	Good	Multiple branches
50	<i>Corymbia calophylla</i>	0405047 6432362	658	20	Good	Multiple branches
51	<i>Corymbia calophylla</i>	0405057 6432361	604	20	Good	Multiple branches
52	<i>Corymbia calophylla</i>	0405164 6432362	1254	20	Good	Multiple branches
53	<i>Eucalyptus marginata</i>	0405224 6432363	1028	20	Good	Multiple branches
54	<i>Eucalyptus marginata</i>	0405240 6432367	617	20	Good	Multiple branches

55	<i>Eucalyptus marginata</i>	0405250 6432371	1104	20	Good	Multiple branches
56	<i>Eucalyptus marginata</i>	0405263 6432371	687	20	Good	Multiple branches
57	<i>Corymbia calophylla</i>	0404317 6432481	748	20	Good	Multiple branches
58	<i>Corymbia calophylla</i>	0404326 6432483	515	20	Good	Multiple branches
59	<i>Corymbia calophylla</i>	0404367 6432479	614	20	Good	Multiple branches
60	<i>Corymbia calophylla</i>	0404404 6432416	572	20	Good	Multiple branches
61	<i>Corymbia calophylla</i>	0404404 6432409	490	20	Good	Multiple branches
62	<i>Corymbia calophylla</i>	0404443 6432364	732	20	Good	Multiple branches
63	<i>Corymbia calophylla</i>	0404448 6432365	786	20	Good	Multiple branches
64	<i>Corymbia calophylla</i>	0404436 6432344	572	15	Good	Multiple branches
65	<i>Corymbia calophylla</i>	0404396 6432326	738	20	Good	Multiple branches
66	<i>Corymbia calophylla</i>	0404393 6432363	716	15	Good	Multiple branches
67	<i>Corymbia calophylla</i>	0404392 6432371	665	30	Good	1x Small hollow, Multiple branches
68	<i>Corymbia calophylla</i>	0404281 6432465	585	20	Good	Multiple branches
69	<i>Corymbia calophylla</i>	0404272 6432464	671	20	Good	Multiple branches
70	<i>Corymbia calophylla</i>	0404249 6432465	706	20	Good	Multiple branches
71	<i>Corymbia calophylla</i>	0404243 6432464	579	20	Good	Multiple branches
72	<i>Corymbia calophylla</i>	0404204 6432464	738	20	Good	Multiple branches
73	<i>Corymbia calophylla</i>	0404198 6432482	550	15	Good	Multiple branches
74	<i>Corymbia calophylla</i>	0404256 6432480	627	15	Good	Multiple branches
75	<i>Eucalyptus rudis</i>	0404254 6432480	592	10	Good	3x Small hollows, Multiple branches
76	<i>Corymbia calophylla</i>	0404271 6432482	639	20	Good	Multiple branches
77	<i>Corymbia calophylla</i>	0404276 6432483	588	20	Good	1x Small hollow, Multiple branches
78	<i>Corymbia calophylla</i>	0404294 6432482	611	20	Good	Multiple branches
79	<i>Corymbia calophylla</i>	0404306 6432482	636	20	Good	Multiple branches

Wright Road Significant Trees

	Species	GPS Location (50)	DBH (metres)	Height (Metres)	Health	Comments
1	<i>Eucalyptus rudis</i>	0404073 6432877	658	15	Good	3x Small hollows, Multiple branches
2	<i>Eucalyptus rudis</i>	0404073 6423877	684	15	Good	2x Medium hollows, Multiple branches, Bee's in hollows
3	<i>Eucalyptus rudis</i>	0404073 6423877	487	15	Good	Multiple branches
4	<i>Eucalyptus rudis</i>	0404074 6423911	763	15	Good	1x Small hollow, Multiple branches
5	<i>Eucalyptus rudis</i>	0404063 6423895	477	15	Good	Multiple branches
6	<i>Eucalyptus rudis</i>	0404064 6423884	445	15	Good	Multiple branches
7	<i>Eucalyptus rudis</i>	0404064 6423879	334	15	Good	Multiple branches
8	<i>Eucalyptus rudis</i>	0404064 6423879	381	15	Good	Multiple branches
9	<i>Eucalyptus rudis</i>	0404064 6423871	397	15	Good	Multiple branches
10	<i>Eucalyptus rudis</i>	0404098 6421391	1687	15	Good	2x Small hollows, Multiple branches
11	<i>Eucalyptus rudis</i>	0404101 6421418	684	15	Good	Multiple branches
12	<i>Eucalyptus rudis</i>	0404104 6421425	1591	15	Good	3x small, 5x Medium hollows, Multiple branches
13	<i>Corymbia calophylla</i>	0404100 6421972	763	15	Good	Multiple branches
14	<i>Corymbia calophylla</i>	0404080 6421143	1352	20	Good, some branches are dead	1x Small hollow, Multiple branches
15	<i>Corymbia calophylla</i>	0404077 6422462	604	10	Good	2x Small, 1x Medium hollow, Multiple branches
16	<i>Corymbia calophylla</i>	0404081 6422553	617	15	Good	3x Small hollows, Multiple branches
17	<i>Eucalyptus rudis</i>	0404090 6422635	748	20	Good	Multiple branches
18	<i>Eucalyptus rudis</i>	0404089 6422646	668	20	Good	Multiple branches
19	<i>Corymbia calophylla</i>	0404077 6422714	868	20	Good	1xMedium hollow, Multiple branches
20	<i>Corymbia calophylla</i>	0404075 6422726	646	20	Good	Multiple branches
21	<i>Eucalyptus rudis</i>	0404077 6422771	897	15	Good	Multiple branches
22	<i>Eucalyptus rudis</i>	0404077 6522771	547	15	Good	Multiple branches
23	<i>Eucalyptus rudis</i>	0404087 6422824	413	15	Good	Multiple branches
24	<i>Eucalyptus rudis</i>	0404083 6422827	413	15	Good	Multiple branches
25	<i>Corymbia calophylla</i>	0404076 66422796	897	20	Good	Multiple branches

26	<i>Eucalyptus rudis</i>	0404076 6422778	658	20	Good	Multiple branches
27	<i>Corymbia calophylla</i>	0404070 6522634	649	20	Good	Multiple branches
28	<i>Eucalyptus rudis</i>	0404076 6422953	649	20	Good	Multiple branches
29	<i>Eucalyptus rudis</i>	0404076 6423045	649	15	Good	Multiple branches
30	<i>Eucalyptus rudis</i>	0404076 6423028	499	15	Good	Multiple branches
31	<i>Eucalyptus rudis</i>	0404076 6423028	649	20	Good	Multiple branches
32	<i>Eucalyptus rudis</i>	0404083 6423140	1273	20	Good	Multiple branches
33	<i>Eucalyptus rudis</i>	0404083 6423155	1273	20	Good	Multiple branches
34	<i>Eucalyptus rudis</i>	0404083 6423155	827	15	Good	Multiple branches
35	<i>Eucalyptus rudis</i>	0404069 6423317	1009	15	Good	Multiple branches
36	<i>Eucalyptus rudis</i>	0404082 6523382	779	15	Good	Multiple branches
37	<i>Corymbia calophylla</i>	0404077 6423634	464	15	Good	Multiple branches
38	<i>Eucalyptus rudis</i>	0404078 6423647	318	20	Good	Multiple branches
39	<i>Eucalyptus rudis</i>	0404066 6423795	579	15	Good	Multiple branches
40	<i>Eucalyptus rudis</i>	0404066 3423795	394	15	Good	Multiple branches
41	<i>Eucalyptus rudis</i>	0404066 6423795	350	15	Good	Multiple branches
42	<i>Eucalyptus rudis</i>	0404064 6423792	776	15	Good	Multiple branches
43	<i>Eucalyptus rudis</i>	0404064 6423792	636	15	Good	Multiple branches
44	<i>Eucalyptus rudis</i>	0404064 6423792	350	20	Good	Multiple branches
45	<i>Eucalyptus rudis</i>	0404073 6423800	700	20	Good	Multiple branches
46	<i>Eucalyptus rudis</i>	0404064 6423812	783	20	Good	Multiple branches
47	<i>Eucalyptus rudis</i>	0404064 6423812	700	15	Good	Multiple branches
48	<i>Eucalyptus rudis</i>	0404073 6423865	716	20	Good	1xMedium hollow, Multiple branches

Soldier's Road Significant Trees

	Species	GPS Location (50)	DBH (metres)	Height (Metres)	Health	Comments
1	<i>Corymbia calophylla</i>	0405511 6430724	668	25	G	Multiple branches
2	<i>Corymbia calophylla</i>	0405513 6430729	668	25	G	Multiple branches
3	<i>Eucalyptus marginata</i>	0405510 6430752	827	25	D	1xSmall, 1x Large hollow, multiple branches
4	<i>Corymbia calophylla</i>	0405525 6430780	773	20	G	Multiple branches
5	<i>Corymbia calophylla</i>	0405564 6430923	252	25	D	Potential hollows
6	<i>Eucalyptus sp</i>	0405569 6430946	633	20	G	Multiple branches
7	<i>Eucalyptus marginata</i>	0405570 6430952	531	20	G	Multiple branches
8	<i>Corymbia calophylla</i>	0405570 6430959	579	25	G	Multiple branches, some canker
9	<i>Corymbia calophylla</i>	0405573 6430973	588	25	G	Multiple branches
10	<i>Corymbia calophylla</i>	0405576 6430983	679	25	G	Multiple branches
11	<i>Corymbia calophylla</i>	0405577 6430985	646	25	G	Multiple branches
12	<i>Corymbia calophylla</i>	0405637 6431227	627	25	G	Multiple branches
13	<i>Corymbia calophylla</i>	0405633 6431220	588	25	G	Multiple branches
14	<i>Corymbia calophylla</i>	0405631 6431196	897	25	G	Multiple branches
15	<i>Corymbia calophylla</i>	0405628 6431196	1002	25	G	Multiple branches
16	<i>Corymbia calophylla</i>	0406451 6434482	2.07	20	G	2x Small hollows, multiple branches
17	<i>Corymbia calophylla</i>	0406474 6434470	658	20	G	Multiple branches
18	<i>Corymbia calophylla</i>	0406419 6434327	592	15	G	Multiple branches (white ants)
19	<i>Corymbia calophylla</i>	0406420 6434329	533	20	G	Multiple branches
20	<i>Corymbia calophylla</i>	0406420 6434342	700	20	G	Multiple branches, some canker
21	<i>Corymbia calophylla</i>	0406391 6434141	859	18	D	1x small, 1x large hollow, multiple branches, Bee's using hollow
22	<i>Corymbia calophylla</i>	0406380 6434118	923	20	D	2x large hollows, multiple branches, bees's using hollows
23	<i>Corymbia calophylla</i>	0406317 6433824	1037	20	G	2x small hollows, multiple branches, bee's
24	<i>Corymbia calophylla</i>	0406282 6433683	977	14	D, dead crown	Multiple branches
25	<i>Corymbia calophylla</i>	0406260 6433578	843	15	D, dead crown	Multiple branches, Bee's

26	<i>Corymbia calophylla</i>	0406275 6433582	763	20	G	Multiple branches
27	<i>Corymbia calophylla</i>	0406205 6433367	633	20	G	Multiple branches
28	<i>Eucalyptus marginata</i>	0406205 6433367	617	18	G	Multiple branches
29	<i>Corymbia calophylla</i>	0406201 6433268	611	18	D	1x Medium hollow, multiple branches
30	<i>Eucalyptus marginata</i>	0406189 6433315	716	20	G	Multiple branches
31	<i>Eucalyptus marginata</i>	0406166 6433280	1244	15	G	1x Large hollow, multiple branches
32	<i>Corymbia calophylla</i>	0406046 6432767	678	20	G	Multiple branches
33	<i>Corymbia calophylla</i>	0405881 6432107	1072	15	D	2x Large hollow, multiple branches
34	<i>Corymbia calophylla</i>	0405664 6431181	668	20	G	Multiple branches
35	<i>Eucalyptus marginata</i>	0405666 6431244	748	20	G	Multiple branches (some dead)
36	<i>Corymbia calophylla</i>	0405698 6331382	1279	15	D	4x Large hollow, multiple branches
37	<i>Corymbia calophylla</i>	0405725 6431511	604	20	G	Multiple branches
38	<i>Corymbia calophylla</i>	0405746 6431554	617	15	G	Multiple branches
39	<i>Corymbia calophylla</i>	0405772 6431665	786	20	D	Large hollows
40	<i>Eucalyptus marginata</i>	0405780 6431688	844	20	D, dead crown	2x Medium hollows
41	<i>Eucalyptus marginata</i>	0405474 6430580	676	20	G	4x small, 1x medium, 1x large hollows, multiple branches
42	<i>Eucalyptus marginata</i>	0405480 6430606	811	20	G	1x medium, 1x large hollows, multiple branches
43	<i>Corymbia calophylla</i>	0405493 6430646	700	20	G	Multiple branches
44	<i>Eucalyptus marginata</i>	0405485 6430643	1114	25	G	4x Large hollow, multiple branches
45	<i>Eucalyptus marginata</i>	0405498 6430690	725	25	G	3x Medium hollow, multiple branches
46	<i>Eucalyptus marginata</i>	0405503 6430694	550	20	G	Multiple branches (2x trunks)

APPENDIX D
VEGETATION STRUCTURE CLASSES

Appendix D: Vegetation Structure Classes

Life Form/ Height Class	Canopy Cover (percentage)			
	100% - 70%	70% - 30%	30% - 10%	10% - 2%
Trees 10-30m	Closed Forest	Open Forest	Woodland	Open Woodland
Trees < 10m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs > 2m	Closed Tall Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland
Shrubs 1-2m	Closed Heath	Open Heath	Shrubland	Open Shrubland
Shrubs < 1m	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

APPENDIX E
VEGETATION CONDITION SCALE

Appendix E: Vegetation Condition Scale (Technical Guidance Statement, 2016)

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are nonaggressive species.
Very Good (3)	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing
Good (4)	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded (6)	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.