

# Report of a Supplementary Rare Flora and Vegetation survey along Cape Naturaliste Road, Dunsborough

---



Prepared for SW Environmental  
December 2017



PO Box 1180 Bunbury WA 6231  
[enquiries@ecoedge.com.au](mailto:enquiries@ecoedge.com.au)

<b>Version</b>	<b>Origin</b>	<b>Review</b>	<b>Review date</b>	<b>Ecoedge release approval</b>	<b>Issue date</b>
V1	M. Portman (previously Strang)	R. Smith	10/11/2017		
V2	R. Smith	M. Portman	13/12/2017		
Final Draft	M. Portman	S. Priddle (SW Env)	15/12/2017	M. Portman	13/12/2017
Final 15/01/2018	S. Priddle	M. Portman, R. Smith	28/12/2017 – 15/01/2018	M. Portman	15/01/2018
Final 24/01/2018	M. Portman	M. Portman	24/01/2018	M. Portman	24/01/2018

## Executive Summary

Ecoedge was engaged by SW Environmental in May 2017 to undertake a supplementary rare flora and vegetation survey along 2.29 km of Cape Naturaliste Road, in Dunsborough, in the City of Busselton ('Survey Area'). The Survey Area covers approximately 2.4 ha, most of which is remnant native vegetation.

The survey followed up on a preliminary flora survey undertaken in October 2016 by the then Department of Parks and Wildlife (now Department of Biodiversity, Conservation and Attractions (DBCA)). The survey was required to assess road reserve vegetation and adjacent areas that are likely to be affected by the construction of a proposed pathway between Dunn Bay Road and Our Lady of the Cape school, and to identify any flora constraints that may affect a clearing permit application.

The Survey Area contains habitat for *Caladenia excelsa*, which is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and as Threatened flora under the Western Australian *Wildlife Conservation Act 1950*. It also contains vegetation that may comprise one or more occurrences of the EPBC Act-listed Threatened ecological community (TEC) '*Banksia* Woodlands of the Swan Coastal Plain', which is listed as Endangered.

The field survey was undertaken on 28 September and 20 October 2017, in accordance with the Environmental Protection Authority's Technical Guidance (Environmental Protection Authority, 2016).

One hundred and forty-five vascular plant taxa were found within the Survey Area, including 15 introduced species. No Threatened flora or Priority species was found. The shrub *Daviesia divaricata* subsp. *divaricata* MS (of the Fabaceae family), which occurs within the Survey Area, is near its southern limit of distribution here, and the local populations are therefore considered important (Webb *et al.*, 2009).

One *Caladenia excelsa* plant was found within the Survey Area in 2010 in a degraded area of *Banksia* woodland near the cemetery (Astron Environmental Services, 2010) and again in spring 2016 (Lullfitz, 2016). Despite this plant being searched for both during the original survey on 28 September, and again on 20 October 2017, it was not found again.

Eight vegetation units were recognised within the Survey Area, two of them (vegetation units B and D) very likely belonging to the Commonwealth-listed *Banksia* Woodlands of the Swan Coastal Plain Threatened ecological community. Most of the approximately 0.25 ha of vegetation unit D (adjacent to 'Marri Reserve') is in Excellent condition, while the condition of unit B (approx. 0.15 ha) varies from Very Good to Degraded.

Another two vegetation units (C and E) are most likely part of the 'Dunsborough Swamp Forest' Priority 1 ecological community.

The impact area of this proposed pathway covers 1.1 ha. Of this area, approximately 0.095 ha (952 m<sup>2</sup>) was mapped as either vegetation unit B or D in Good to Excellent condition. This vegetation is part of a larger area of vegetation also mapped as vegetation that fits the criteria for the Commonwealth-listed *Banksia* Woodlands of the Swan Coastal Plain TEC. As such, it appears that the proposal for a pathway along Cape Naturalist Road, as it stands, regarding its potential to impact an area of *Banksia* Woodlands of the Swan Coastal Plain TEC, requires referral for assessment under the EPBC Act.

Another 0.072 ha of the proposed impact area of the pathway would affect 0.07 ha (723 m<sup>2</sup>) of units C or E, which are inferred to be the 'Dunsborough Swamp Forest' Priority 1 ecological community.

Despite not being re-found during the present survey there is a possibility that the *C. excelsa* plant previously found near the cemetery may re-appear above ground in subsequent years. It appears that the proposal for a pathway along Cape Naturalist Road, as it stands, is not likely to need referral under the Matters of National Environmental Significance (MNES) significant impact guidelines of the EPBC Act regarding its potential to impact on the habitat of *Caladenia excelsa*.

No other potential impacts of the proposed pathway likely to need referral under the MNES significant impact guidelines of the EPBC Act were found during the survey.

Three of the vegetation complexes mapped within the Survey Area by Mattiske and Havel (1998) as updated by Webb *et al.*, (2016) (the Abba, Karrakatta Central and South, and Southern River vegetation complexes) do not meet the National 30% of pre-European extent retention target. Consequently, every hectare remaining of vegetation within these complexes is important for conservation purposes, particularly the Abba complex, which is both highly cleared and very poorly represented within the CAR reserve system.

One Environmentally Sensitive Area has been designated over part of the northern end of the Survey Area associated with an historical occurrence of the DRF species *Caladenia excelsa*.

All the vegetation within the Survey Area is within a South West Regional Ecological Linkage, (Molloy *et al.* 2009). All vegetation has the proximity rating of "1a" or "1b" which are the two highest proximity ratings identified. The scale of the proposed clearing is not likely to impact upon the linkage.

## Contents

Executive Summary.....	3
Statement of Limitations .....	8
Reliance on Data .....	8
Report for Benefit of Client.....	8
1 Introduction.....	9
1.1 Project Scope.....	12
1.2 Biogeographic Region and Location.....	12
1.3 Geology .....	12
1.4 Vegetation Complex Description according to pre-European Mapping Datasets....	15
1.4.1 Assessment of Remaining Extent against Pre-European Extent .....	17
1.5 Threatened and Priority Ecological Communities.....	17
1.6 Threatened and Priority Flora .....	19
1.7 Ecological Linkages.....	24
1.8 Environmentally Sensitive Areas.....	25
2 Methods.....	28
2.1 Desktop Assessment .....	28
2.2 Field Survey .....	28
2.3 Survey Limitations .....	28
3 Results.....	29
3.1 Flora.....	29
3.2 Vegetation Units.....	29
3.3 Vegetation Condition .....	41
4 Discussion and Conclusions .....	46
4.1 Potential Impacts of the Proposed Pathway Construction.....	46
5 Recommendations.....	51
5.1 <i>Banksia</i> Woodlands of the Swan Coastal Plain .....	51
5.2 <i>Caladenia excelsa</i> .....	52
6 References .....	54
Appendix 1. Categories of Threatened Ecological Communities under the EPBC Act (DotEE, 2017a). .....	
Appendix 2. Protected Matters Search Tool and NatureMap reports. ....	

Appendix 3. Definitions of Declared Rare and Priority List flora (DBCA, 2017b). .....	17
Appendix 4. Categories of Threatened Species under the EPBC Act (DotEE, 2017c). .....	18
Appendix 5. Vegetation condition scale (EPA, 2016). .....	19
Appendix 6. List of vascular flora found within the Survey Area.....	20
Appendix 7. Photographs of Vegetation units mapped within the Survey Area.....	21
Appendix 8. Assessment of Survey Area vegetation against Banksia Woodlands of the Swan Coastal Plain ecological community criteria .....	22
Appendix 9. Assessment of the <i>Caladenia excelsa</i> population against MNES criteria.....	23

### Table of Tables

Table 1. Soil Mapping Units occurring within the Survey Area (Tille and Lanzke, 1990). .....	14
Table 2. Vegetation complexes mapped as occurring within the Survey Area (Webb <i>et al.</i> , 2016). .....	15
Table 3. Vegetation Complexes mapped within the Survey Area with regard to the national retention target (Government of Western Australia, 2017). .....	17
Table 4. Threatened and Priority Ecological Communities occurring within 10 km of the Survey Area (Gibson <i>et al.</i> , 1994; DPaW, 2016a; DBCA 2017a; DotEE, 2017b).....	19
Table 5. Rare and Priority listed Flora within 5 km of the Survey Area (DBCA, 2017c; DotEE, 2017b). .....	21
Table 6. Limitations with regard to assessment adequacy and accuracy. ....	29
Table 7. Summary of vegetation condition classes within the Survey Area (EPA, 2016). .....	41
Table 8. Condition and patch minimum sizes for the 'Banksia Woodlands of the Swan Coastal Plain' TEC to be protected under the EPBC Act (DotEE, 2016). .....	51

### Table of Figures

Figure 1. Aerial Photograph showing location of Survey Area. ....	10
Figure 2. The Survey Area is made up of five sections. ....	11
Figure 3. Soil landscapes occurring within the Survey Area. ....	13
Figure 4. Vegetation complexes mapped as occurring within the Survey Area (Webb <i>et al.</i> , 2016). .....	16
Figure 5. Linkage proximity rating values assigned to patches of remnant vegetation within a landscape (from Molloy <i>et al.</i> , 2009). .....	25
Figure 6. The Survey Area in relation to regional ecological linkages (Molloy <i>et al.</i> , 2009). ..	26
Figure 7. The Survey Area in relation to designated Environmentally Sensitive Areas.....	27
Figure 9. Vegetation units mapped within Sections 1 and 2 of the Survey Area. ....	34
Figure 10. Vegetation units mapped within Section 3 of the Survey Area. ....	35
Figure 11. Vegetation units mapped within Section 4 of the Survey Area. ....	36

Figure 12. Vegetation units mapped within Section 5 of the Survey Area. ....	37
Figure 13. TEC occurrence mapped within Section 3 of the Survey Area. ....	38
Figure 14. TEC and PEC occurrences mapped within Section 4 of the Survey Area.....	39
Figure 15. TEC occurrence mapped within Section 5 of the Survey Area. ....	40
Figure 16. Condition of vegetation in Sections 1 and 2 of the Survey Area.....	42
Figure 17. Condition of vegetation in Section 3 of the Survey Area. ....	43
Figure 18. Condition of vegetation in Section 4 of the Survey Area. ....	44
Figure 19. Condition of vegetation in Section 5 of the Survey Area. ....	45
Figure 20. Sections 1 and 2 of the Survey Area showing the proposed impact area.....	47
Figure 21. Section 3 of the Survey Area showing the proposed impact area. ....	48
Figure 22. Section 4 of the Survey Area showing the proposed impact area. ....	49
Figure 23. Section 5 of the Survey Area showing the proposed impact area. ....	50

## Statement of Limitations

### Reliance on Data

In the preparation of this report, Ecoedge 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. Unless stated otherwise in the report, Ecoedge 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. Ecoedge 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 to Ecoedge.

### Report for Benefit of Client

The report has been prepared for the benefit of the Client and for no other party. Ecoedge assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of Ecoedge or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.



## 1 Introduction

Ecoedge was engaged by SW Environmental in May 2017 to undertake a supplementary rare flora along 2.29 km of Cape Naturaliste Road, in Dunsborough, in the City of Busselton ('Survey Area') (**Figure 1**). The Survey Area is approximately 2.4 ha in area, and comprises five sections (**Figure 3**).

The survey followed up on a preliminary flora survey undertaken in October 2016 by the then Department of Parks and Wildlife (now Department of Biodiversity, Conservation and Attractions (DBCA)). The survey was required to assess road reserve vegetation and adjacent areas that are likely to be affected by the construction of a proposed pathway between Dunn Bay Road and Our Lady of the Cape school, and to identify any flora constraints that may affect a clearing permit application. Specifically, the survey was required to ascertain the conservation values of the remnant vegetation regarding the following:

- The vegetation within Section 3 of the Survey Area is ideal habitat for *Caladenia excelsa*, which is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Western Australian *Wildlife Conservation Act 1950* (WC Act). A new population of *Caladenia excelsa* was located on the road verge within Section 4 of the Survey Area.
- The EPBC Act listed Threatened Ecological Community 'Banksia Woodlands of the Swan Coastal Plain' (Endangered) occurs within reserve 42393 (Section 3). Vegetation within the southern extent of Marri Reserve (Section 5 of the Survey Area) is consistent with the EPBC Act listed (Endangered) 'Banksia Woodlands of the Swan Coastal Plain' Threatened Ecological Community.

The flora and vegetation survey was undertaken in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016). This report compiles findings of the field survey.

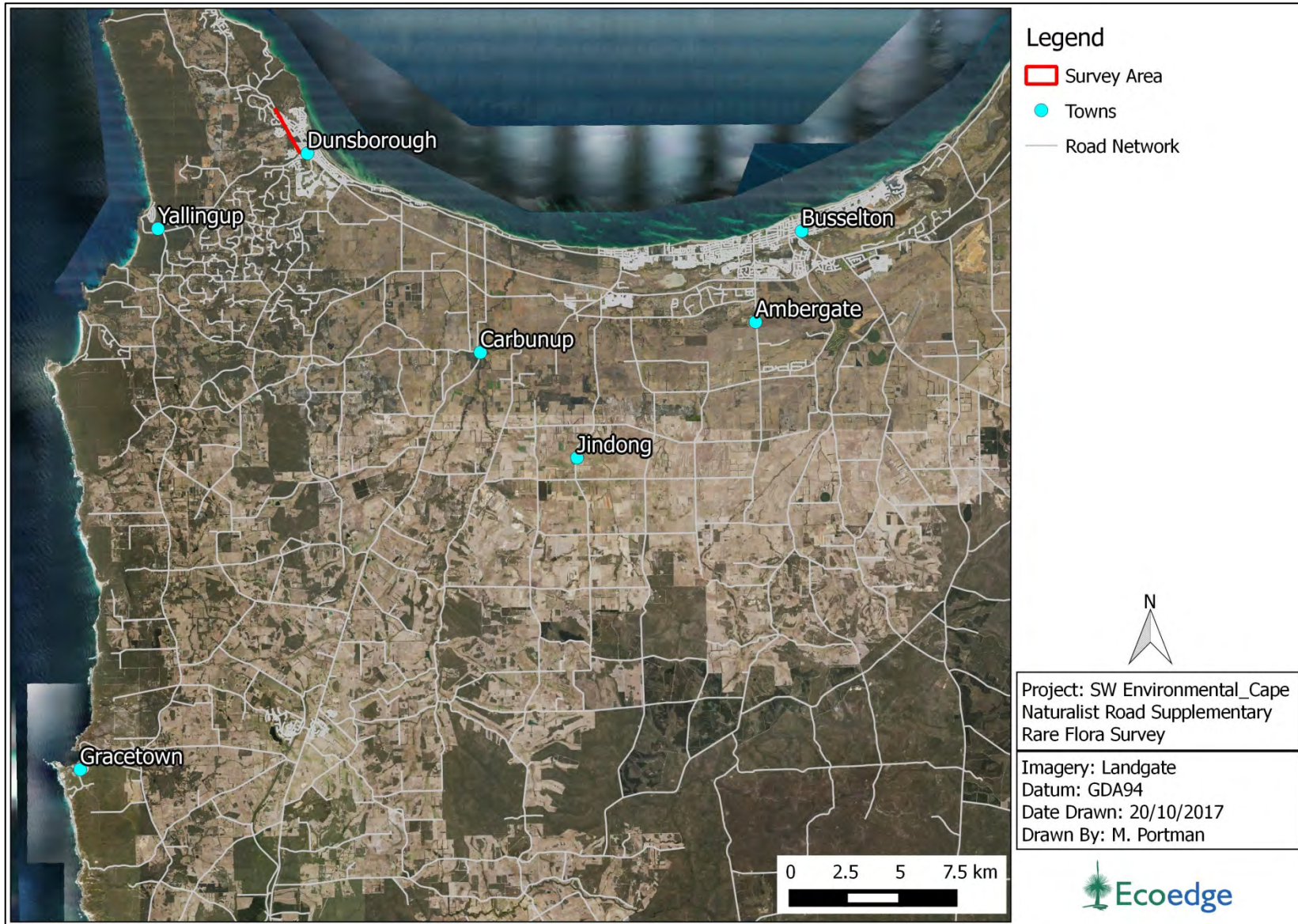


Figure 1. Aerial Photograph showing location of Survey Area.

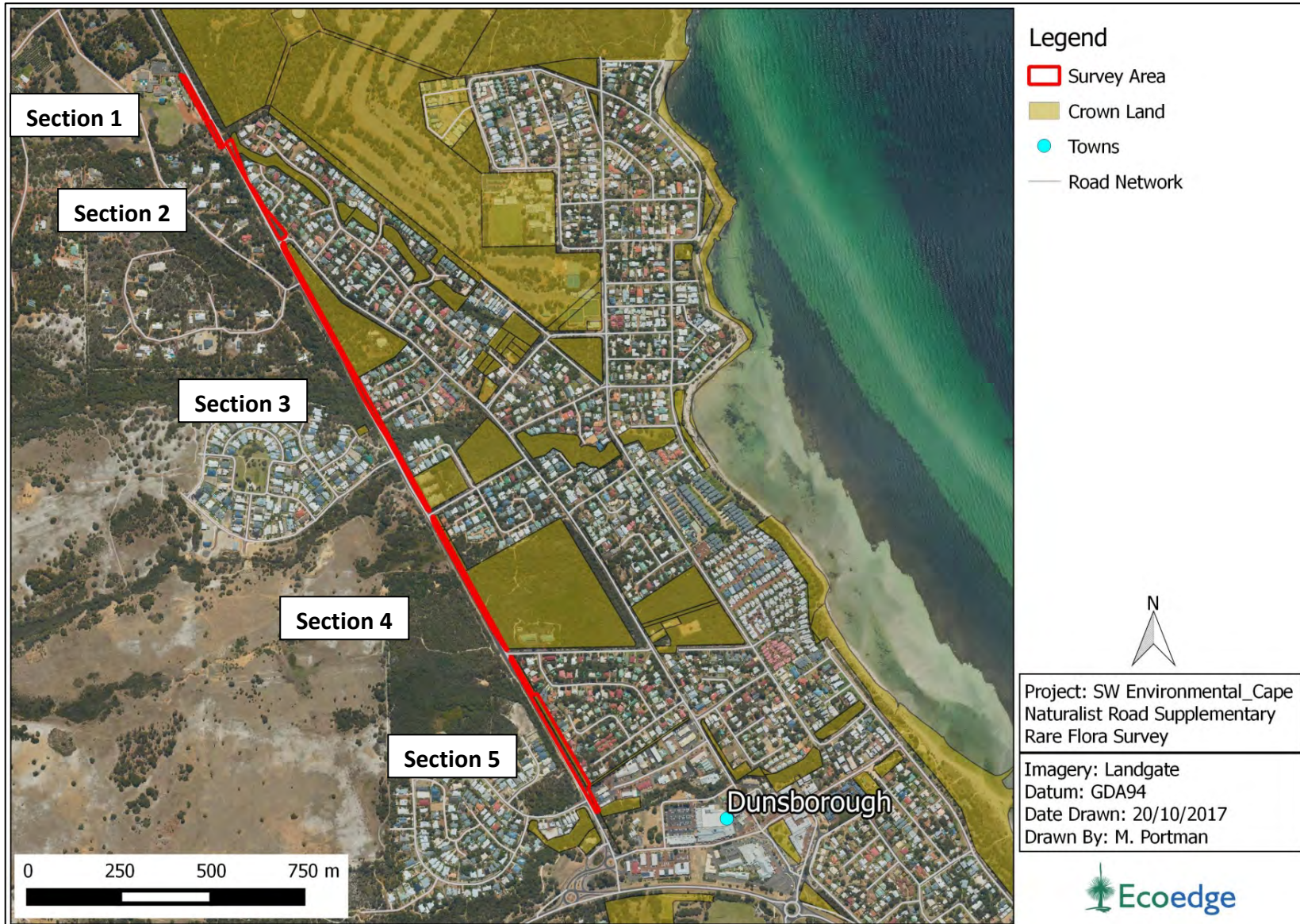


Figure 2. The Survey Area is made up of five sections.

## 1.1 Project Scope

The scope of the survey was to:

- conduct a targeted rare flora survey (particularly for *C. excelsa*) and assess the vegetation against the definition of the EPBC Act listed 'Banksia woodlands on the Swan Coastal Plain' on the road reserve and adjacent areas along Cape Naturaliste Road (SLK 0.23-2.52).
- Prepare a report summarising findings of the field survey, and providing advice regarding the requirement for referral under the EPBC Act of the proposed pathway construction

## 1.2 Biogeographic Region and Location

The Survey Area crosses the boundary between the Southern Jarrah Forest (JFA02) sub-region of the Jarrah Forest biogeographic region in the north, and the Perth subregion of the Swan Coastal Plain (SWA) region in the south, as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Commonwealth of Australia, 2016). The boundary is located about midway along Section 5 of the Survey Area however vegetation of the Survey Area is likely to be transitional between these two bioregions.

The Survey Area is located near the Dunsborough townsite in the City of Busselton. It begins at Straight Line Kilometre (SLK) 0.23 and extends for approximately 2.29 kilometres, to SLK 2.52. It comprises road reserve and adjacent areas that contain remnant vegetation. The Survey Area totals approximately 2.4 ha.

## 1.3 Geology

The Survey Area is situated on the Wilyabrup Valleys (216Wv), Abba (213Ab) and Spearwood (211Sp) soil landscape systems. These are defined as granitic valleys; poorly drained flats; and sand dunes and plains respectively (Tille and Lantzke, 1990).

Soil landscape systems are further separated into soil phases or mapping units, based on their characteristics and position in the landscape. Six occur within the Survey Area, as mapped by Tille and Lantzke (1990). These are shown in **Figure 3** and described in **Table 1**.

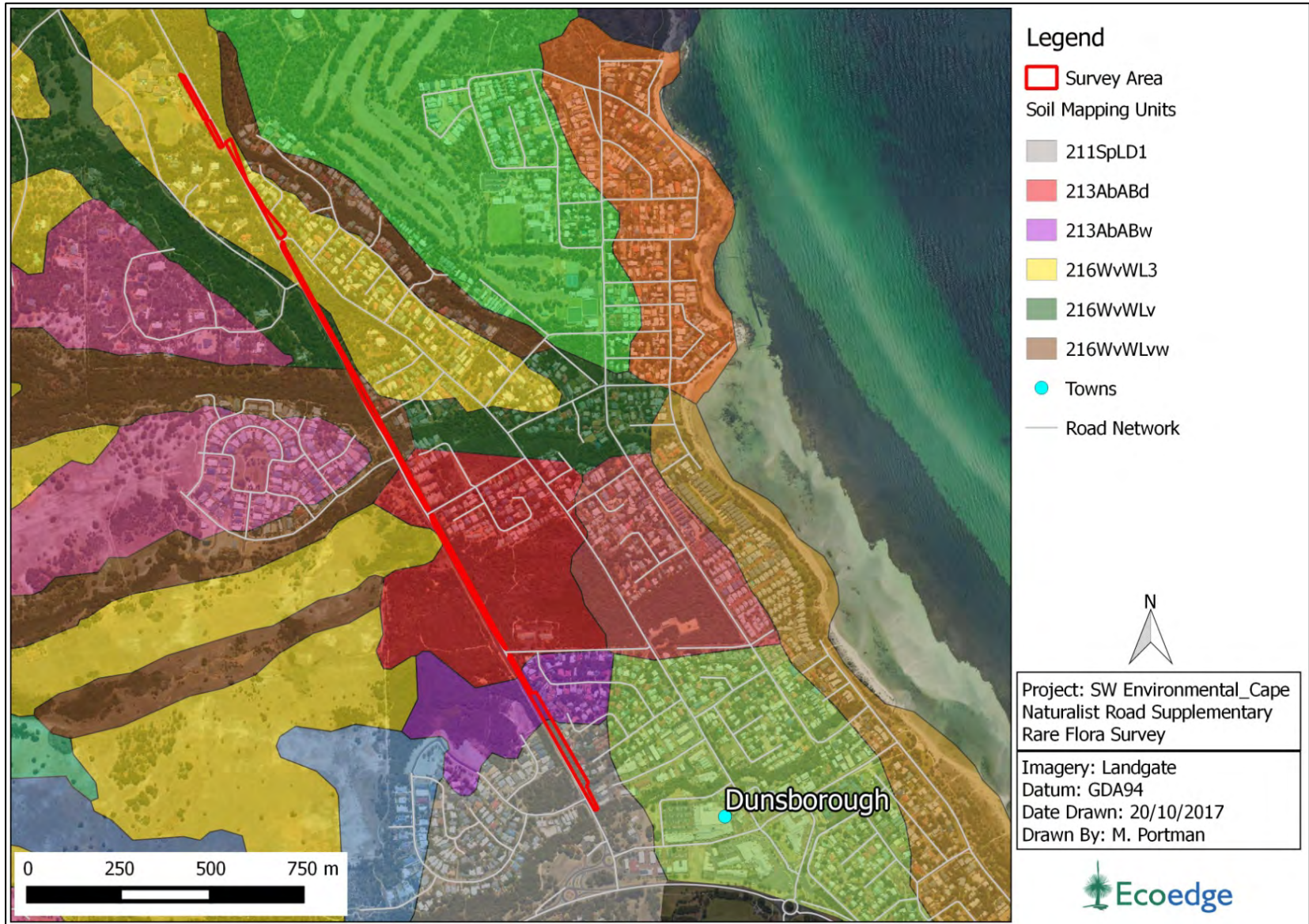


Figure 3. Soil landscapes occurring within the Survey Area.

Table 1. Soil Mapping Units occurring within the Survey Area (Tille and Lanzke, 1990).

Soil Mapping Unit	Description
216WvWL3	Loamy gravels, duplex sandy gravels, brown deep loamy duplexes and friable red/brown and brown loamy earths
216WvWLv	Loamy gravels, duplex sandy gravels, stony soils, brown deep loamy duplexes and friable red/brown and brown loamy earths
216WvWLvw	Loamy gravels, duplex sandy gravels, brown deep loamy duplexes and friable red/brown and brown loamy earths
213AbABd	Pale deep sands with some grey deep sandy duplexes
213AbABw	Wet and Semi-wet soils with pale sandy earths and pale deep sands
211SpLD1	Yellow and brown deep sands

#### 1.4 Vegetation Complex Description according to pre-European Mapping Datasets

Variation in vegetation mainly reflects the variations in soil and moisture condition of a landscape.

In 2016, the Department of Parks and Wildlife (DPaW) revised the mapping datasets for the Darling Scarp and Plateau Regional Forest Agreement (RFA) mapping of Matiske and Havel (1998) and the Swan Coastal Plain mapping of Heddle *et al.* (1980). The purpose of the revision was to fill data gaps and improve alignment and correlation between the two datasets (Webb, *et al.* 2016).

The Survey Area is located over the boundary between the two datasets – the 1:50,000 Mapping of Vegetation Complexes in the South West Forest Region of Western Australia (Matiske & Havel 1998) as updated by Webb *et al.* (2016), and the 1:250,000 Swan Coastal Plain Vegetation Complexes (Heddle *et al.* 1980) mapping as updated by Webb *et al.* (2016). According to these datasets, vegetation in the Survey Area is mapped as the Wilyabrup (W2 and Ww2), Abba, Karrakatta Central and South, and Southern River vegetation complexes. These are described in **Table 2** and mapped in **Figure 4**.

Table 2. Vegetation complexes mapped as occurring within the Survey Area (Webb *et al.*, 2016).

Vegetation Complex	Description
Wilyabrup (W2)	Open forest of <i>Corymbia calophylla</i> - <i>Allocasuarina decussata</i> - <i>Agonis flexuosa</i> on deeply incised valleys in perhumid and humid zones.
Wilyabrup (Ww2)	Tall open forest of <i>Corymbia calophylla</i> - <i>Agonis flexuosa</i> on flats and valleys in perhumid and humid zones.
Abba	Woodland of <i>Corymbia calophylla</i> - <i>Agonis flexuosa</i> - <i>Allocasuarina fraseriana</i> - <i>Nuytsia floribunda</i> on mild slopes in the humid zone.
Karrakatta Central and South	Predominantly open forest of <i>Eucalyptus gomphocephala</i> (Tuart) - <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri) and woodland of <i>Eucalyptus marginata</i> (Jarrah) - <i>Banksia</i> species. <i>Agonis flexuosa</i> (Peppermint) is co-dominant south of the Capel River.
Southern River	Open woodland of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus marginata</i> (Jarrah) - <i>Banksia</i> species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds.

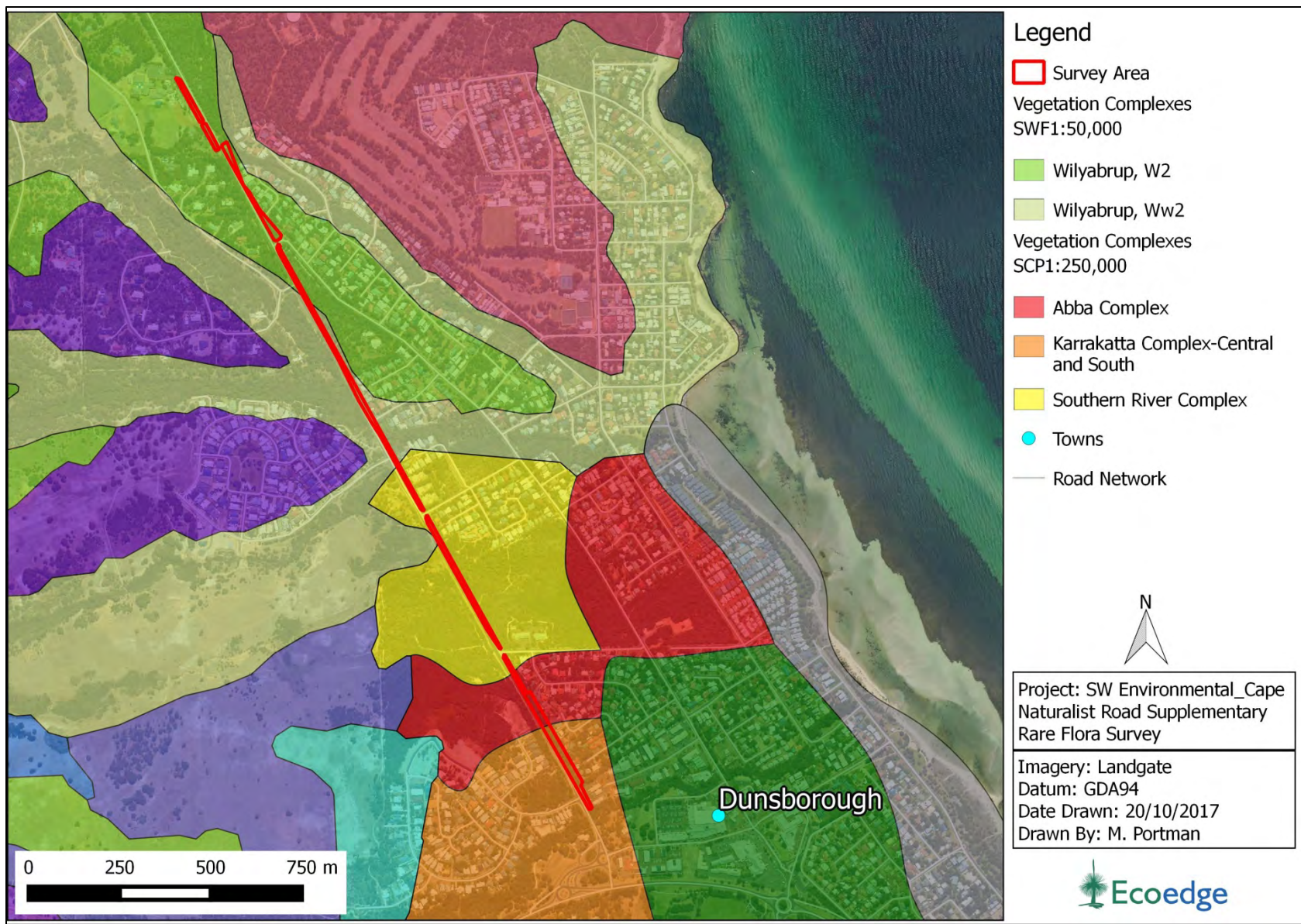


Figure 4. Vegetation complexes mapped as occurring within the Survey Area (Webb *et al.*, 2016).



### 1.4.1 Assessment of Remaining Extent against Pre-European Extent

In 2001, the Commonwealth of Australia stated National Targets and Objectives for Biodiversity Conservation, which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected (Environment Australia, 2001).

In its report on the *Statewide Vegetation Statistics incorporating the CAR Reserve Analysis*, the Government of Western Australia provides information on the pre-European and current extent of the ecological communities of Western Australia and reports on the status of the Comprehensive, Adequate and Representative (CAR) reserve system for WA (Government of Western Australia, 2017). This system is also based on the National retention targets of 30% overall. Only reserves managed by DBCA under the *Conservation and Land Management Act 1984* are considered for inclusion in the "CAR Reserve Analysis".

**Table 3** lists the percentage remaining of each vegetation complex and whether the Commonwealth 30% retention target is met (Environment Australia, 2001).

Table 3. Vegetation Complexes mapped within the Survey Area with regard to the national retention target (Government of Western Australia, 2017).

Vegetation Complex	% Remaining of pre-European	Is the 30% Target Met?	Current percentage remaining within all DPaW managed land* (%)
Wilyabrup (W2)	32.05%	Yes	1.55%
Wilyabrup (Ww2)	37.8%	Yes	0.47%
Abba	6.6%	No	0.36%
Karrakatta Central and South	23.61%	No	7.41%
Southern River	18.44%	No	1.59%

\* Excludes Crown Freehold Department Interest Lands that are managed under Section 8(a) of the *Conservation and Land Management Act 1984*.

### 1.5 Threatened and Priority Ecological Communities

Ecological communities are defined by Western Australia's DBCA (previously DPaW and the Department of Environment and Conservation (DEC)) as "...naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an

ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide ecological services.” (DEC, 2013).

Through a non-statutory process, the Minister for Environment may list communities that are considered to be at threat as either Threatened or Priority Ecological Communities. A Threatened Ecological Community (TEC) is one which is found to fit into one of the following categories; Presumed Totally Destroyed (PD), Critically Endangered (CE), Endangered (E) or Vulnerable (V) (DEC, 2013). Possible threatened ecological communities that do not meet survey criteria are added to DBCA’s Priority Ecological Community Lists under Priorities 1, 2 and 3 (referred to as P1, P2, P3). Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4 (P4). P4 ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5 (P5) (DEC, 2013). The current listing of Threatened and Priority Ecological Communities is specified in DPaW (2016a) and DBCA (2017b).

Threatened Ecological Communities can also be listed under the Commonwealth *EPBC Act* (Department of the Environment and Energy (DotEE), 2017a; Department of Environment, Water, Heritage and the Arts (DEWHA), 1999). There are three categories of TEC under the *EPBC Act*: Critically Endangered (CE), Endangered (E) and Vulnerable (V). These are defined in **Appendix 1**.

A Protected Matters Search Tool query for communities listed under the EPBC Act occurring within a 5 km radius of the Survey Area was undertaken (DotEE, 2017b, **Appendix 2**), and the current DPaW and DBCA TEC and PEC listings were consulted (DPaW 2016a; DBCA 2017a).

Threatened and Priority Ecological Communities known to occur within 5 km of the Survey Area are listed in **Table 4**.

Table 4. Threatened and Priority Ecological Communities occurring within 10 km of the Survey Area (Gibson *et al.*, 1994; DPaW, 2016a; DBCA 2017a; DotEE, 2017b).

Community Name	Community Description	Status (WA)	Status (EPBC Act)
<i>Banksia</i> woodlands of the Swan Coastal Plain Ecological Community	' <i>Banksia</i> Woodlands of the Swan Coastal Plain' – is a Commonwealth listed TEC consisting of numerous State-listed threatened and priority communities, as well as some non-listed communities.	Various	EN
SCP3b	<i>Corymbia calophylla</i> - <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain	VU	
Meelup Granites	<i>Calothamnus graniticus</i> heaths on south west coastal granites	VU	
Swan Coastal Plain Paluslope Wetlands	Whicher Scarp Paluslope Wetlands	P1	

Note: This table only includes TECs and PECs that are known of and mapped by DBCA and are included in their database.

## 1.6 Threatened and Priority Flora

Species of flora and fauna are defined as having Threatened or Priority conservation status where their populations are restricted geographically or threatened by local processes. The Department of Environment Regulation recognises these threats of extinction and consequently applies regulations towards population and species protection.

Threatened flora species are gazetted under Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950*<sup>1</sup> (WC Act) and therefore it is an offence to “take” or damage rare flora without Ministerial approval. Section 6 of the WC Act defines “to take” as “... to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means.”

Priority Flora are under consideration for future declaration as “rare flora”, dependent on more information. Species classified as Priority One to Three (referred to as P1, P2 and P3) are in need of further survey to determine their status, while Priority Four (P4) species require

<sup>1</sup> Transition to the *Biodiversity Conservation Act 2016* will commence in the near future although at the time of preparation of this report, the WC Act, 1950 is current in regards to the conservation of Threatened and Priority flora.

monitoring every 5-10 years. Under the WC Act, Threatened Flora are ranked according to their level of threat using IUCN Red List categories and criteria of Extinct (EX), Critically Endangered (CE), Endangered (EN) or Vulnerable (VU). Definitions of categories of Threatened and Priority Flora as defined by the WC Act are included in **Appendix 3** (DBCA, 2017b).

Under the EPBC Act, a species may be listed in one of six categories; the definitions of these categories are summarised in **Appendix 4** (DotEE, 2017c).

Threatened or Priority flora occurring within 5 km of the Survey Area generated from a NatureMap search (DBCA, 2017d; **Appendix 2**) are listed in **Table 5**. Taxa listed under the EPBC Act (based on results of the Protected Matters Search Tool query (DotEE, 2017b; **Appendix 2**)) are noted.

A few of the species listed in **Table 5** could potentially occur within the Survey Area, based on an assessment of their preferred habitats. All species listed would have either been flowering at the time of survey or could be identified in the field without flowers.

Table 5. Rare and Priority listed Flora within 5 km of the Survey Area (DBCA, 2017c; DotEE, 2017b).

Species	Cons Status*	Flowering	Description and Habitat	Likelihood of Occurrence
<i>Brachyscias verecundus</i>	T (CE)		Annual (or ephemeral), herb, 0.012-0.022 m high, entirely glabrous. Fl. white/cream. In a moss sward. On a granite outcrop.	Low
<i>Banksia nivea</i> subsp. <i>uliginosa</i>	T (EN)	Aug-Sep	Dense, erect, non-lignotuberous shrub, 0.2–1.5 m high. Fl. yellow, brown. Sandy clay, gravel.	None
<i>Caladenia excelsa</i>	T (EN)	Sep-Oct	Tuberous, perennial, herb, 0.45-0.9 m high. Fl. green, white, red. White, grey or brown sand, sandy loam.	Moderate
<i>Darwinia whicherensis</i>	T (EN)	Oct-Nov	Erect low shrub to 30 cm, flowers green, outer red. Winter-wet area of shrubland over shallow red clay over ironstone	None
<i>Gastrolobium papilio</i>	T (EN)	Oct-Dec	Tangled, clumped shrub, to 1.5 m high. Fl. cream-red. Sandy clay over ironstone and laterite. Flat plains.	None
<i>Lambertia echinata</i> subsp. <i>occidentalis</i>	T (EN)	Feb/May-Jun/Oct	Prickly, much-branched, non-lignotuberous shrub, to 3 m high. Fl. yellow. White sandy soils over laterite, orange/brown-red clay over ironstone.	None
<i>Petrophile latericola</i>	T (EN)	Nov	Multi-stemmed shrub, 0.4-1.5 m high. Fl. yellow. Red lateritic clay. Winter-wet flats.	None
<i>Sphenotoma drummondii</i>	T (EN)	Sep-Dec	Tufted shrub, 0.15-0.5 m high. Fl. white. Stony or shallow soils over granite or quartzite. Steep rocky slopes, crevices of rocks.	None
<i>Wurmbea calcicola</i> T.Macfarlane	T (EN)	Jun	Cormous, perennial, herb, to 0.25 m high. Fl. white. Loam. Coastal limestone cliffs.	None
<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T (VU)	Jun-Nov	Erect, open, non-lignotuberous shrub, 1.2–4 m high. Fl. yellow, Jun–Nov. White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats.	None
<i>Chamelaucium</i> sp. S Coastal Plain (R.D. Royce 4872)	T (VU)	Oct-Dec	Winter-wet areas, loams and ironstone.	None
<i>Caladenia busselliana</i>	T	Sept-Oct	Tuberous, perennial, herb, 0.2–0.3 m high. Fl. green, yellow, cream. Sandy loam. Winter-wet swamps	Low

Species	Cons Status*	Flowering	Description and Habitat	Likelihood of Occurrence
<i>Caladenia caesarea</i> subsp. <i>maritima</i>	T	Aug-Sep	Tuberous, perennial, herb, 0.15–0.2 m high. Fl. green, yellow, brown. Loam, granite. Rock outcrops	None
<i>Caladenia huegelii</i>	T	Sep-Oct	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green, cream, red. Grey or brown sand, clay loam.	Low
<i>Caladenia viridescens</i>	T	Sep-Oct	Tuberous, perennial, herb, 0.25–0.4 m high. Fl. green, yellow. Loam, grey sand.	Low
<i>Drakaea micrantha</i>	T	Sep-Oct	Tuberous, perennial, herb, 0.15–0.3 m high. Fl. red, yellow. White-grey sand.	Moderate
<i>Eucalyptus x phylacis</i>	T	May	Mallee or tree, to 5 m high, bark rough & flaky on trunk. Fl. cream. Laterite, loam over granite. Coastal areas.	None
<i>Gastrolobium argyrotrichum</i>	T	Oct/Nov	Erect shrubs to 1.5 m tall. Yellow flowers with red. Granite outcrops.	None
<i>Eucalyptus relicta</i>	P2	Jan-Feb	Mallee or tree, to 7 m high, bark rough all the way to branchlets, thick, grey; leaves lanceolate-falcate, dark olive-green, glossy above, dull and paler below. Fl. cream. Grey clay-loam. Undulating upper slopes, along creeklines.	None
<i>Thelymitra variegata</i>	P2	Jun-Sep	Tuberous, perennial, herb, 0.1–0.35 m high. Fl. orange, red, purple, pink. Sandy clay, sand, laterite.	Low
<i>Acacia ancistrophylla</i> var. <i>perarcuata</i>	P3	Aug-Sep	Rounded or obconic shrub, 0.6-1.6 m high, to 6 m wide. Fl. yellow. Red sand, clay loam, loam. Undulating plains.	Low
<i>Acacia lateriticola</i> var. Glabrous variant (B.R.Maslin 6765)	P3	Aug-Oct	Shrub, 0.4–0.8 m high. Fl. yellow. Lateritic soils.	Low
<i>Johnsonia inconspicua</i>	P3	Oct-Nov	Rhizomatous, tufted perennial, grass-like or herb, 0.1–0.3 m high, to 0.2 m wide. Fl. green, white, pink. White-grey or black sand. Low dunes, winter-wet flats.	Moderate
<i>Acacia semitrullata</i>	P4	May-Oct	Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream, white. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Moderate

Species	Cons Status*	Flowering	Description and Habitat	Likelihood of Occurrence
<i>Boronia tenuis</i>	P4	Aug-Nov	Procumbent or erect & slender shrub, 0.1–0.5 m high. Fl. blue, pink, white. Laterite, stony soils, granite.	Low
<i>Calothamnus graniticus</i> subsp. <i>graniticus</i>	P4	May-Jun	Erect, multi-stemmed shrub, 1-2.5 m high. Fl. red. Skeletal sandy soils. Granite outcrops.	None
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4	Jul-Sep	Tree, 5-20 m high, bark rough, box-type. Fl. white. Loam. Flats, hillsides.	Low
<i>Eucalyptus virginea</i>	P4	Dec-Jan/Jul	Tree to 12 m high, bark smooth, powdery, white. Fl. white. Clay or sandy loam, shallow soil over granite, laterite loam over clay. Lower slopes near watercourses, edge of rock outcrops, gently sloping sites	None

Note: The WC Act Conservation Status is shown, EPBC Act status, where relevant, is in brackets.

## 1.7 Ecological Linkages

Information for this section is taken from Molloy *et al.* (2009) and their report on the South West Regional Ecological Linkages (SWREL) Project.

Ecological linkages are defined as:

*“A series of (both contiguous and non-contiguous) patches which, by virtue of their proximity to each other, act as stepping stones of habitat which facilitate the maintenance of ecological processes and the movement of organisms within, and across, a landscape.”*

Regional ecological linkages link protected patches of regional significance by retaining the best (condition) patches available as stepping stones for flora and fauna between regionally significant areas. This increases the long-term viability of all the constituent areas.

The SWREL report is the result of collaboration between the Western Australian Local Government Association’s *South West Biodiversity Project* and the then Department of Environment and Conservation’s *Swan Bioplan* to provide a tool for the identification of ecological linkages and guidance for the protection of linkages through planning policy documents.

Molloy *et al.* (2009) assessed and assigned “proximity value ratings” to all patches of remnant native vegetation as a way of indicating their distance from the nearest regional ecological linkage axis line. These values are defined in **Figure 5**. It should be noted however, that the proximity value of a patch of remnant vegetation to an ecological linkage is not intended to replace the need to consider the other biodiversity conservation values of that patch of remnant vegetation.

Molloy *et al.* (2009) identify a regional ecological linkage axis line running parallel with and close to the entire length of the Survey Area (**Figure 6**). Another runs perpendicular to the Survey Area, at its southernmost extent. As a result of the location of these axes, vegetation within the Survey Area is assigned proximity rating values of “1a” and “1b”, which are the two highest categories. Vegetation within the Survey Area forms part of two regional ecological linkages.

While there is no statutory basis for regional ecological linkages identified through the SWREL project, the importance of ecological linkages have been recognised as an environmental policy consideration in EPA and Planning policy over the last decade (EPA, 2009 and references therein). In its statement regarding the SWREL Project, the EPA stated that even though Ecological Linkages are just one measure of the conservation values of a patch of remnant vegetation it expected that:

*In preparing plans and proposals for development, consideration will be given to both the site-specific biodiversity conservation values of patches of native*



vegetation, as well as the landscape function and core linkage significance of a patch in supporting the maintenance of ecological linkage (EPA, 2009).

Figure 5. Linkage proximity rating values assigned to patches of remnant vegetation within a landscape (from Molloy *et al.*, 2009).

1a: with an edge touching or <100m from a linkage
1b: with an edge touching or <100m from a natural area selected in 1a
1c: with an edge touching or <100m from a natural area selected in 1b
2a: with an edge touching or <500m from a linkage
2b: with an edge touching or <500m from a natural area selected in 2a
2c: with an edge touching or <500m from a natural area selected in 2b
3a: with an edge touching or <1000m from a linkage
3b: with an edge touching or <1000m from a natural area selected in 3a
3c: with an edge touching or <1000m from a natural area selected in 3b

## 1.8 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are protected under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and are selected for their environmental values at state or national levels (Government of Western Australia, 2005). They include;

- Defined wetlands and riparian vegetation within 50 m;
- Areas covered by Threatened Ecological Communities;
- Area of vegetation within 50 m of Threatened Flora;
- Bush Forever sites; and
- Declared World Heritage property sites.

The northernmost part of the Survey Area overlaps a designated Environmentally Sensitive Area (ESA) that is most likely associated with a *Caladenia excelsa* occurrence (**Figure 7**). Another ESA is mapped adjacent to the Survey Area associated with the Meelup Granites TEC.

ESAs may be relevant to the Project only in the limited context of clearing exemptions in relation to the Clearing Regulations, which do not apply in ESAs.

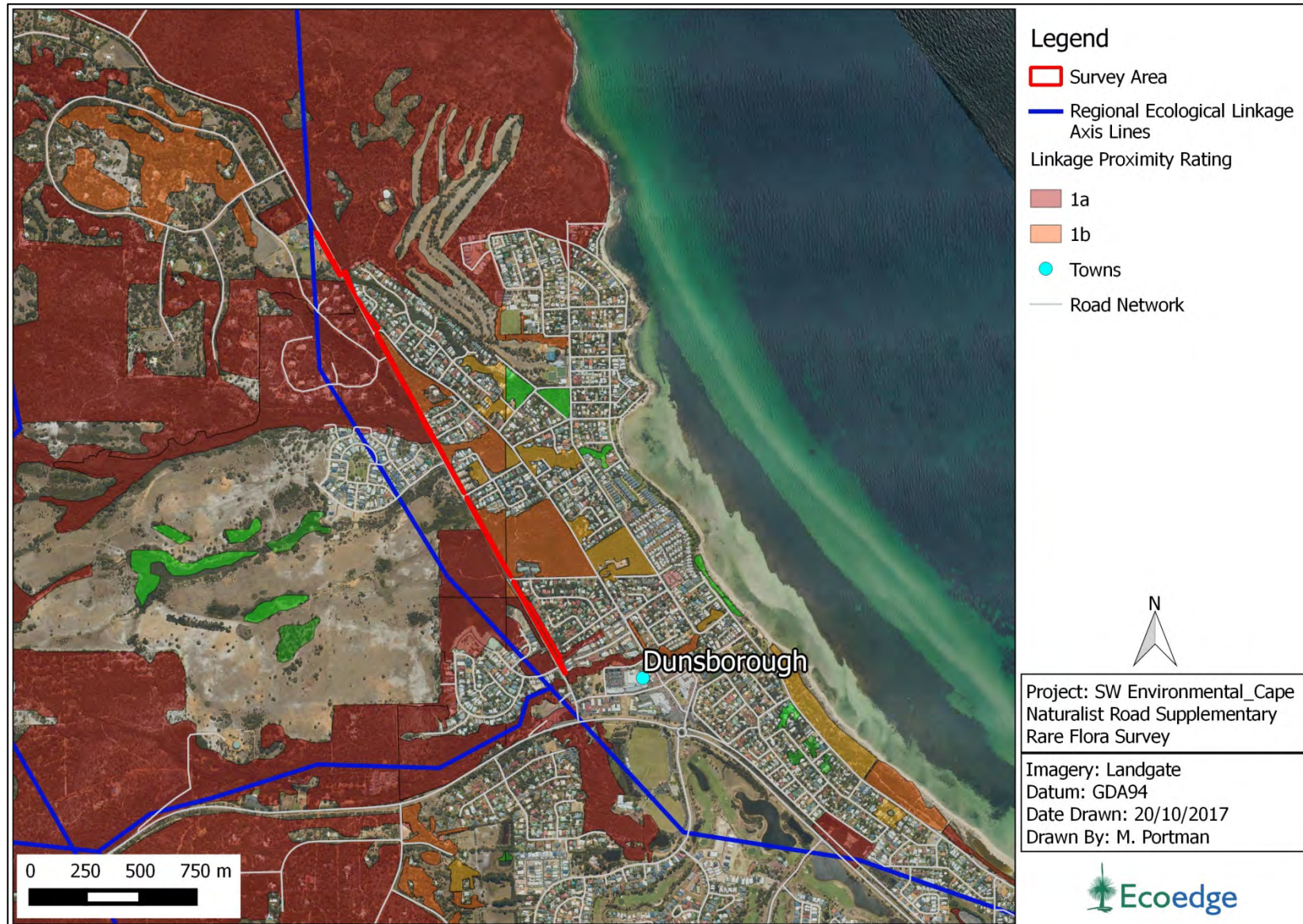


Figure 6. The Survey Area in relation to regional ecological linkages (Molloy *et al.*, 2009).

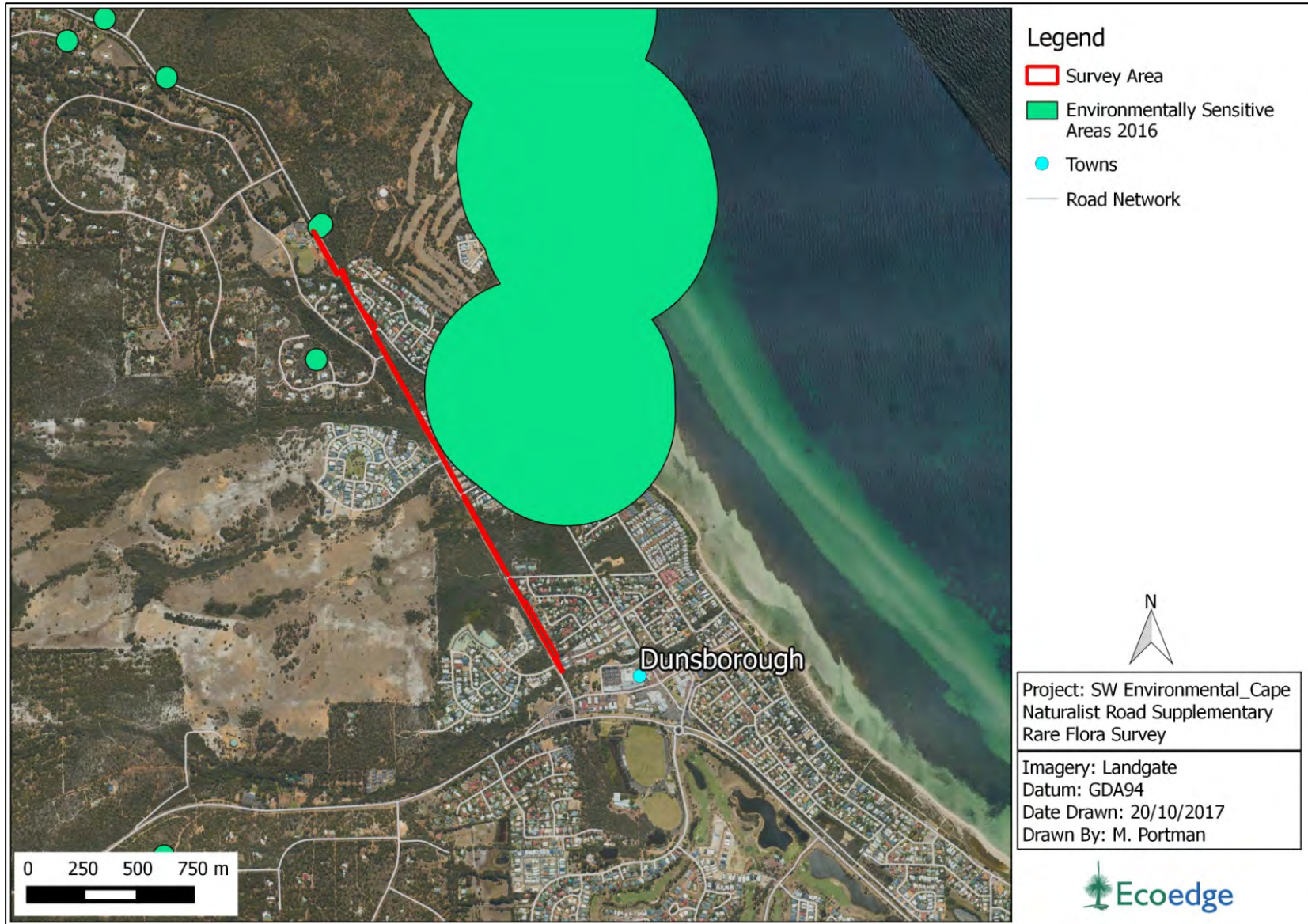


Figure 7. The Survey Area in relation to designated Environmentally Sensitive Areas.

## 2 Methods

### 2.1 Desktop Assessment

Prior to the field survey, a “desktop assessment” was carried out, as is detailed in the introduction, by carrying out a NatureMap search (DBCA, 2017c; **Appendix 2**) to generate a list of all flora (including rare flora) occurring within 5 km of the Survey Area A Protected Matters Search Tool report was generated to determine whether any Matters of National Environmental Significance<sup>2</sup> (MNES) were known to occur within or near to the Survey Area (DotEE, 2017b) (**Appendix 2**). This data was used to establish the list of Threatened and Priority flora to target during the survey, as well as providing a list of what other plant taxa might be encountered during the survey.

Vegetation condition was assessed against the method of (EPA 2016) (**Appendix 5**).

### 2.2 Field Survey

The survey was carried out on 28 September and 20 October 2017 by Russell Smith (SL flora permit #11843). The alignment was walked in and notes on vegetation structure and species composition were taken at 27 assessment points. A comprehensive list of flora was compiled. Photos were taken of species not identified in the field for later identification. Taxonomy was checked against the latest WA Herbarium census download DBCA (2017e).

### 2.3 Survey Limitations

Potential limitations of the assessment are addressed in **Table 6**.

---

<sup>2</sup> Nine areas of Matters of National Environmental Significance are defined under the EPBC Act. Of these one, *Nationally listed threatened species and ecological communities*, relates specifically to flora and vegetation values.

Table 6. Limitations with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	No	The survey scope was prepared in consultation with the client and was designed to comply with EPA requirements.
Proportion of flora identified	Negligible	The survey was carried out at the end of September, which is within the prime season for flowering in the south-west of Western Australia.
Climatic and seasonal effects	Moderate	Rainfall for the wet season in the Dunsborough area (1st April – 31st October) was below average. This may have resulted in a lower proportion of some annual species germinating, however rainfall over the “spring” growing season was about average.
Availability of contextual information	Negligible	Comprehensive regional surveys of remnant vegetation, as well as more localised surveys, have been carried out on the southern Swan Coastal Plain.
Completeness of the survey	Negligible	The whole search area was covered on foot. Flowering was excellent.
Skill and knowledge of the botanists	Negligible	The senior field botanist conducting the survey has had extensive experience in botanical surveys in south west Australia over a period of 25 years.

### 3 Results

For mapping purposes, the Survey Area has been divided into two sections, as shown in **Figure 2**.

#### 3.1 Flora

One hundred and forty-five vascular plant taxa were found within the Survey Area, including 15 introduced species (**Appendix 6**). No Threatened flora (Declared Rare Flora) or Priority species was found. The shrub *Daviesia divaricata* subsp. *divaricata* MS (of the Fabaceae family), which occurs within the Survey Area, is near its southern limit of distribution here, and the local populations are therefore considered important (Webb *et al.*, 2009).

One *Caladenia excelsa* plant was found within the Survey Area in 2010 in a degraded area of Banksia woodland near the cemetery (Ekologica, 2010b) and again in 2016 (Lullfitz, 2016). Despite this plant being searched for both during the original survey on 28 September, and again on 20 October 2017, it was not found again.

#### 3.2 Vegetation Units

Eight vegetation units were recognised within the Survey Area. The descriptions are partly based on a previous survey that covered part of the present Survey Area carried out by one

of the co-authors of this report (Ekologica, 2011; Astron Environmental, 2010). The vegetation units are listed and discussed below, and shown in **Figures 8 - 11**. The location and extent of Survey Area vegetation that is inferred to represent occurrences of either TECs or PECs is shown in **Figures 12 – 14**.

**A Woodland on Ludlow flats (grey-brown sand) (SpLD1)**

Open woodland of *Corymbia calophylla* over low woodland of *Agonis flexuosa*, *Banksia grandis*, and *Xylomelum occidentale* over tall shrubland of *Jacksonia furcellata* over open heath dominated by *Acacia pulchella*, *Adenanthos meisneri*, *Daviesia horrida*, *Gastrolobium praemorsum*, *Hardenbergia comptoniana*, *Spyridium globulosum* and *Xanthorrhoea preissii* over scattered grasses of *Austrodanthonia setacea* and *Austrostipa campylachne*, scattered herbs of *Burchardia congesta* and sedges of *Lepidosperma squamatum*. [Condition: Degraded].

This vegetation unit is generally quite disturbed and much of it has been subject to ‘amenity’ plantings of non-locally indigenous species. It has some floristic affinity with SCP21b (Southern *Banksia attenuata* woodland) (Gibson *et al.*, 1994).

**B Woodland on Abba deep sandy rises (grey sand) (AbABd) – inferred to be a TEC (EPBC Act)**

Scattered trees of *Corymbia calophylla* over a woodland or low woodland of *Allocasuarina fraseriana*, *Banksia attenuata*, *Banksia grandis*, *Banksia ilicifolia*, *Eucalyptus marginata* and *Xylomelum occidentale* over open heath/low open heath dominated by *Hakea ruscifolia*, *Jacksonia furcellata*, *Daviesia horrida*, *Melaleuca thymoides*, *Hibbertia hypericoides*, *Acacia pulchella*, *Acacia mooreana*, *Stirlingia latifolia*, *Dasypogon bromeliifolius* and *Xanthorrhoea preissii* over open sedgeland of *Phlebocarya ciliata*, *Hypolaena exsulca*, *Tetraria octandra*, *Lyginia barbata* and scattered herbs including *Styloidium repens* and *Burchardia congesta*. [Condition: Varies from Good to Degraded]

This vegetation unit occurs on similar soil to vegetation unit A but it is mapped as the Abba Plain deep sandy rises unit. Vegetation unit B is also generally in much better condition. Webb *et al.* (2009) consider that the soil at this location is an example of Bassendean Sand overlying Pinjarra Plain (Abba) soil. The dominant species are scattered *Corymbia calophylla*, with *Agonis flexuosa*, *Allocasuarina fraseriana*, *Banksia attenuata*, *B. grandis*, *B. ilicifolia*, and *Xylomelum occidentale* forming a lower tree layer. *Melaleuca raphiophylla*, *Acacia saligna* and *Hakea varia* are present in localised wetter areas.

As well as having a species-rich tree-layer the understorey is rich in shrub species; typical taxa include *Acacia mooreana* and *A. pulchella*, *Adenanthos meisneri*, *Calothamnus sanguineus*, *Hakea ruscifolia* and *Stirlingia latifolia*. It has some floristic affinity to SCP21b

(Southern *Banksia attenuata* woodland) (Gibson *et al.*, 1994) but is closer in composition to the Whicher Scarp community B2 (Western Whicher Scarp *Banksia attenuata* woodland) (Keighery *et al.*, 2008). It is probably equivalent to the *Corymbia calophylla*, *Agonis flexuosa* and *Banksia attenuata* Low Forest Community described by Webb *et al.*, (2009). In either case it fits the criteria of the Federally-listed Swan Coastal Plain *Banksia* woodland TEC. Vegetation unit B is present in Sections 3, 4 and 5 of the Survey Area.

**C Low closed forest on Abba wet flats (AbABw) – inferred to be a P1 PEC**

Low closed forest of *Melaleuca raphiophylla* and *Acacia divergens*, *Acacia saligna*, *Agonis flexuosa* over *Exocarpos odoratus*, *Taxandria linearifolia*, *Spyridium globulosum*, *Hakea varia*, *Xanthorrhoea brunonis* shrubland over *Schoenus laevigatus* or *Lepidosperma longitudinale* sedgeland. [Condition: Varies from Degraded – Good].

The Low closed forest on Abba wet flats vegetation unit is characterised by an overstorey of *Melaleuca raphiophylla* and occasionally *M. preissiana*. Much of it has been disturbed in the past by road and drainage works. *Acacia saligna*, *A. divergens*, *Exocarpos odoratus*, *Hakea varia* and *Taxandria linearifolia* are prominent in the shrub layer. The sedge *Schoenus laevigatus* often dominates the shrub layer and the herb *Centella asiatica* is common along shallow drainage lines in the association. This vegetation unit has some affinity with SCP13 (Deeper wetlands on heavy soils) (Gibson *et al.*, 1994), and also the ‘Dunsborough Swamp Forest’ (*Corymbia calophylla*, *Melaleuca raphiophylla*, *Banksia littoralis*, *Eucalyptus rudis*, *Agonis flexuosa* low open forest with seasonal subsoil moisture of the Dunsborough area) P1 PEC. Vegetation unit C is present in Section 5 of the Survey Area.

**D Woodland on Abba deep sandy rises (yellow-brown sandy loam) (AbABd) – inferred to be a TEC (EPBC Act)**

Woodland to open forest of *Corymbia calophylla* and *Eucalyptus marginata* over *Agonis flexuosa*, *Banksia grandis* and scattered *Allocasuarina fraseriana* and *Banksia attenuata* over open heath dominated by *Xylomelum occidentale*, *Jacksonia furcellata*, *Daviesia horrida*, *Adenanthos meisneri* and *Acacia pulchella* over scattered low open shrubland of *Acacia mooreana*, *Hibbertia hypericoides*, *Hibbertia cunninghamii* and *Dampiera linearis* and open sedgeland of *Hypolaena pubescens*, *Lepidosperma squamatum*, *Mesomelaena tetragona*, *Tetraria capillaris* and *Tetraria octandra*. [Condition: Very Good].

This vegetation unit occurs at the transition between the Swan Coastal Plain and the Wilyabrup Valleys soil-landscape system of the Margaret River Plateau. It is quite variable in floristic composition, which reflects soil moisture availability, slope and soil texture. Within the Survey Area the soils range from gravelly yellow-brown loamy sand to red-brown sandy loam. The dominant species are *Corymbia calophylla* and *Eucalyptus marginata*, with *Agonis*

*flexuosa*, *Allocasuarina fraseriana*, *Banksia attenuata* and *Xylomelum occidentale* forming a secondary tree layer. It is likely to meet the criteria for the Federally-listed Swan Coastal Plain *Banksia* woodlands TEC. Vegetation unit D is present in Section 4 of the Survey Area.

**E Low Open forest on Abba deep sandy rises (dampland) (AbABd) – Inferred to be a P1 PEC**

Low closed forest to closed forest of *Melaleuca raphiophylla*, *M. preissiana*, *Agonis flexuosa* and *Banksia littoralis* with scattered emergent *Corymbia calophylla* over tall open scrub of *Acacia divergens*, *Acacia saligna*, *Dasypogon hookeri*, *Jacksonia furcellata*, *Taxandria linearifolia*, *Astartea* sp. Gingalup, *Kunzea glabrescens*, *Viminaria juncea* and *Xanthorrhoea preissii* over sedgeland of *Cyathochaeta clandestina*, *Schoenus laevigatus* or (locally) *Lepidosperma longitudinale*. [Condition: Varies from Good – Very Good].

Floristically, this community has similarities to vegetation unit D, sharing with it overstorey species such as *Agonis flexuosa*, *Corymbia calophylla*, *Banksia grandis* and *Xylomelum occidentale* which occur in the drier parts of vegetation unit E. However, wetland species such as *Banksia littoralis*, *Taxandria linearifolia*, *Schoenus laevigatus* and *Viminaria juncea* distinguish this association. As with vegetation unit D, this unit is floristically like the Priority 1 PEC ‘Dunsborough Swamp Forest’ (with at least 20 species in common) which occurs less than 200 m to the east in Marri Reserve (part of the Dunsborough Urban Bushland: Webb *et al.*, 2009). This vegetation was identified by Keating and Trudgen (1986) as ‘*Melaleuca preissiana*. *M. raphiophylla* (Swamp Paperbark) Open Forest’. The least disturbed occurrences of this vegetation type were found in Marri Reserve and the adjacent Armstrong Reserve. The only other occurrences were in the Eagle Bay area on cleared land where only the watercourse and its immediate vegetation have been retained. Vegetation unit E is present in Section 4 of the Survey Area.

**F Low Closed forest on Yelverton wet valleys (WsYLvw)**

Low closed forest *Melaleuca raphiophylla* and *Agonis flexuosa* with emergent trees of *Corymbia calophylla* and *Eucalyptus rudis* over tall open scrub of *Taxandria linearifolia* over tall sedgeland of *Lepidosperma tetraquetrum* [Condition varies: Degraded to Very Good].

This vegetation unit is floristically and structurally similar to unit F but occurs on a different soil-landscape system. It occurs along an ephemeral stream. Most of the vegetation either side of the stream has been disturbed as a result of nearby housing development.

**G Open forest on Wilyabrup slopes (WvWL3)**

Open forest of *Eucalyptus marginata* and *Corymbia calophylla* open forest over *Agonis flexuosa* low woodland over open heath dominated by *Bossiaea linophylla*, *Acacia pulchella*, *Hakea lissocarpha*, *Hovea elliptica*, *Jacksonia furcellata*, *Phyllanthus calycinus* and *Xanthorrhoea preissii* on grey-brown sandy loam.



Most of this vegetation unit within the Survey Area has been disturbed by road and track making and other urban infrastructure works. The vegetation unit has similarities with several described by Keating and Trudgen (1986) and appears to be quite extensive on the lower slopes of the Leeuwin-Naturaliste Ridge.

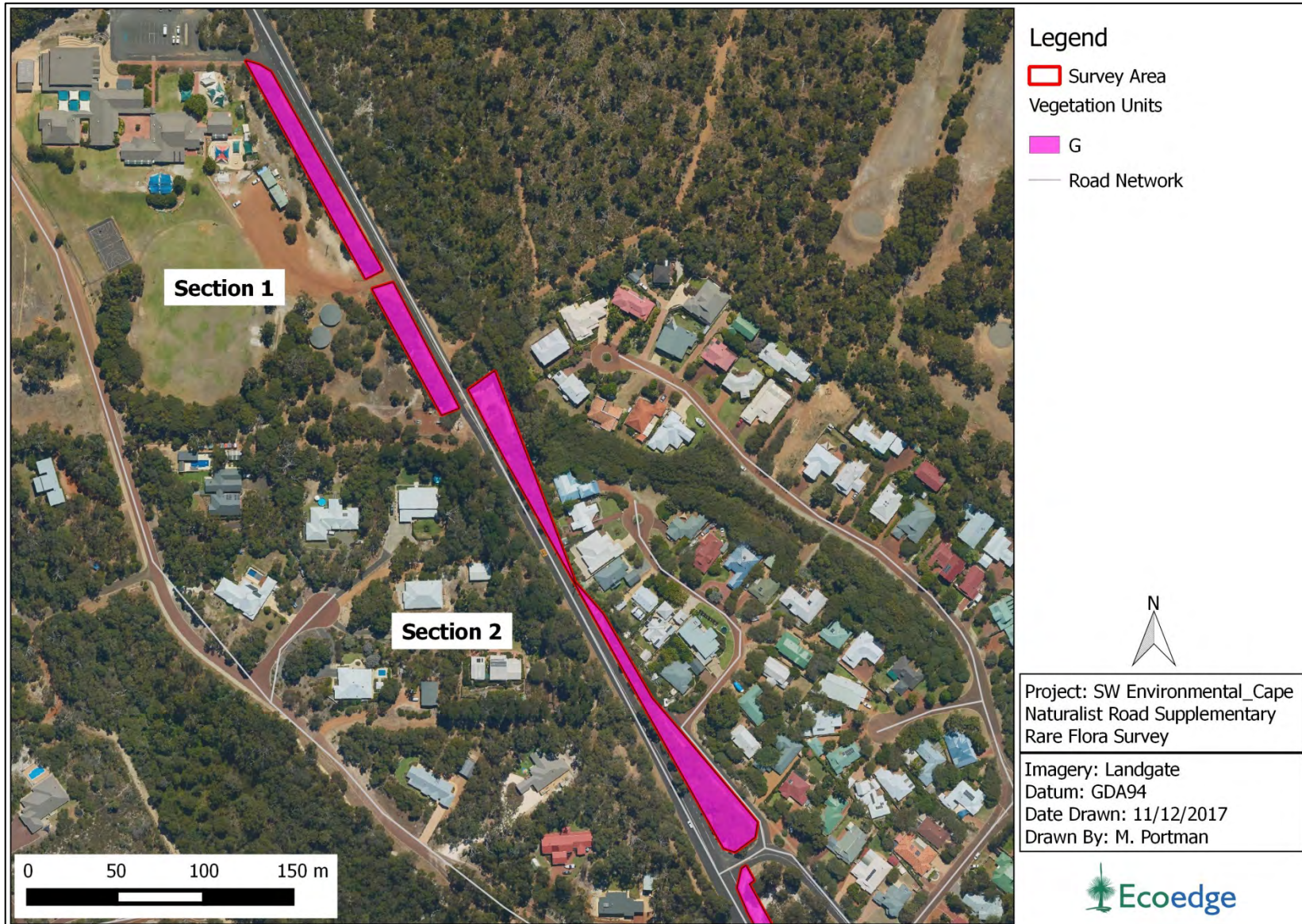


Figure 8. Vegetation units mapped within Sections 1 and 2 of the Survey Area.

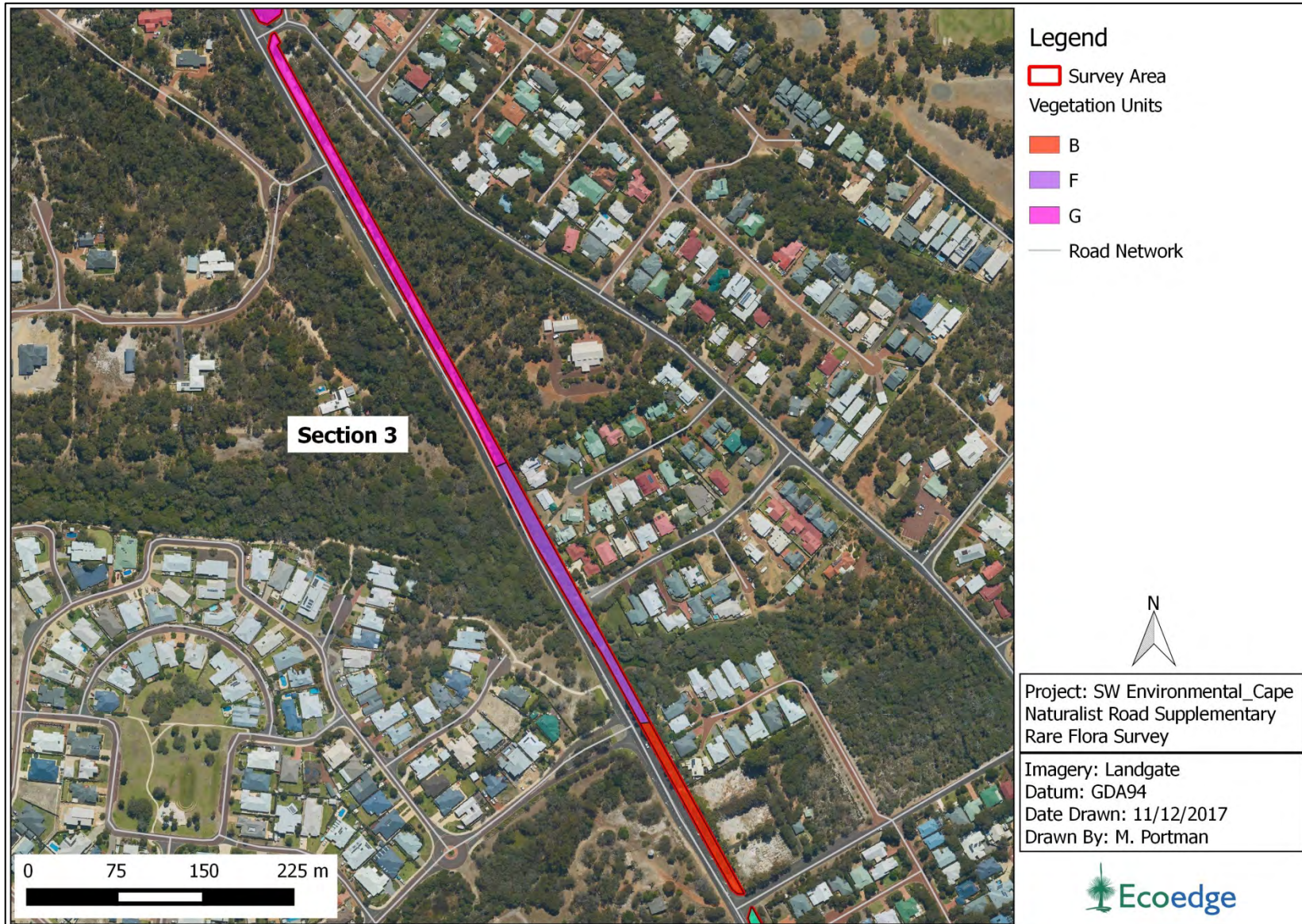


Figure 9. Vegetation units mapped within Section 3 of the Survey Area.

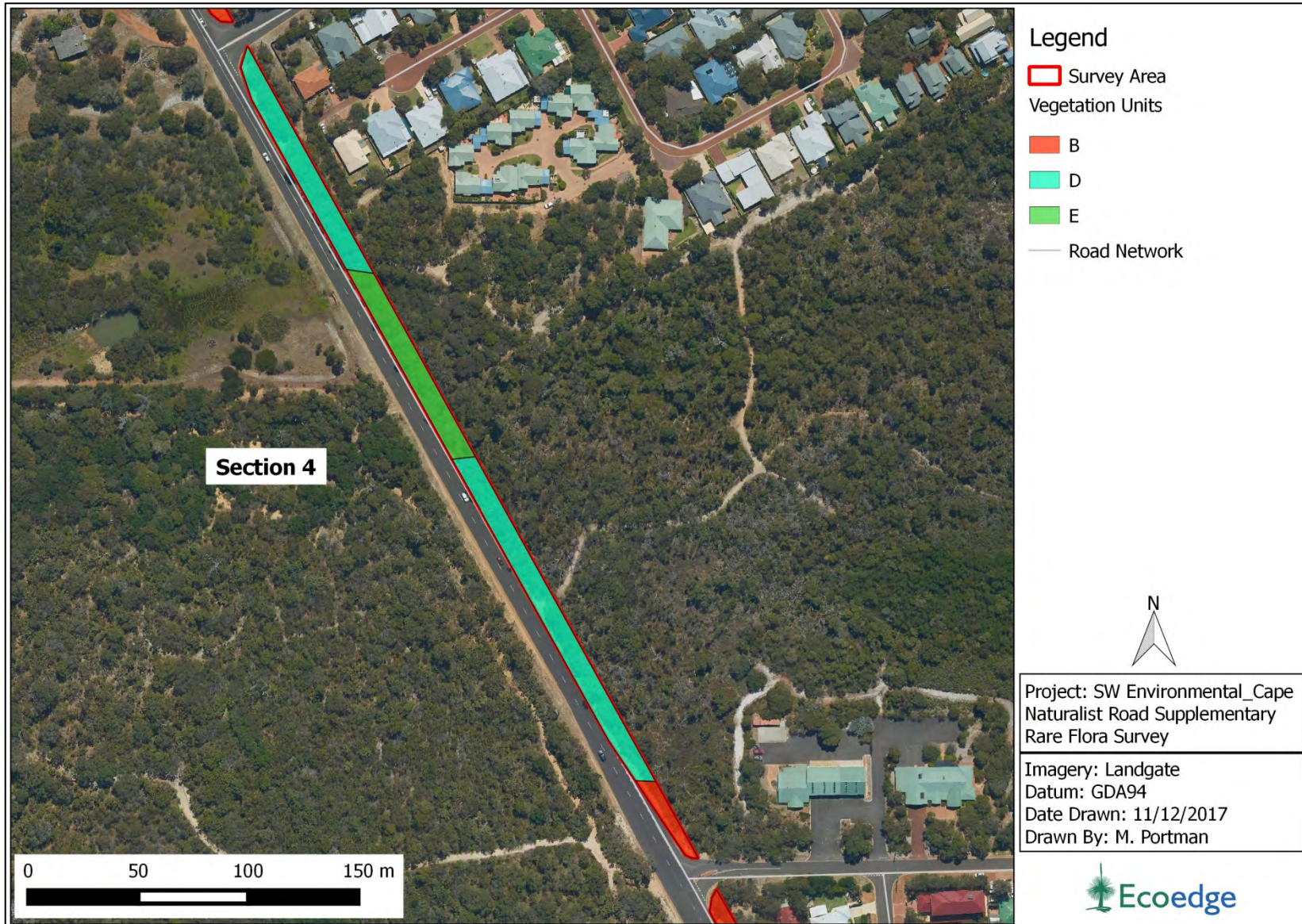


Figure 10. Vegetation units mapped within Section 4 of the Survey Area.

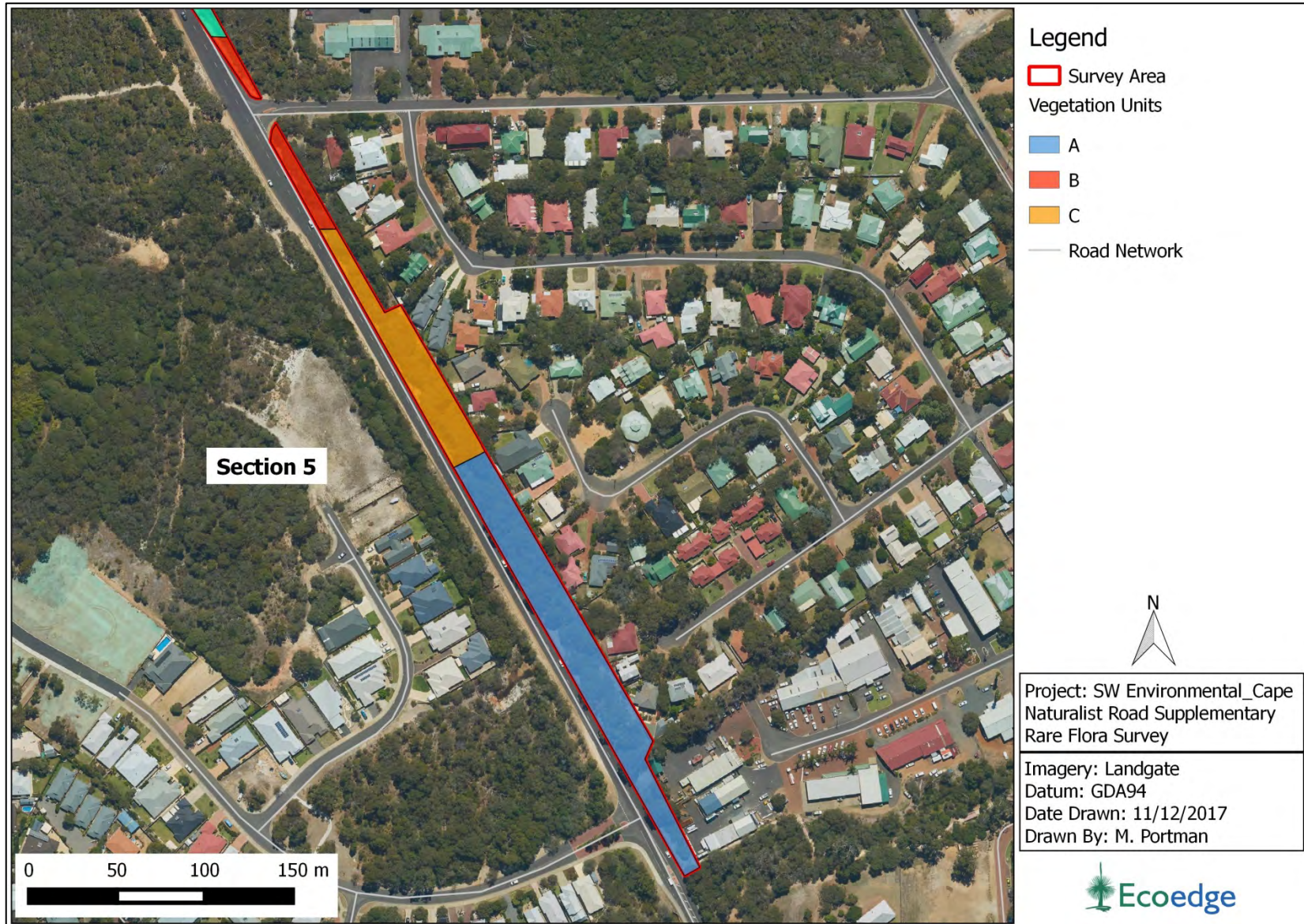


Figure 11. Vegetation units mapped within Section 5 of the Survey Area.

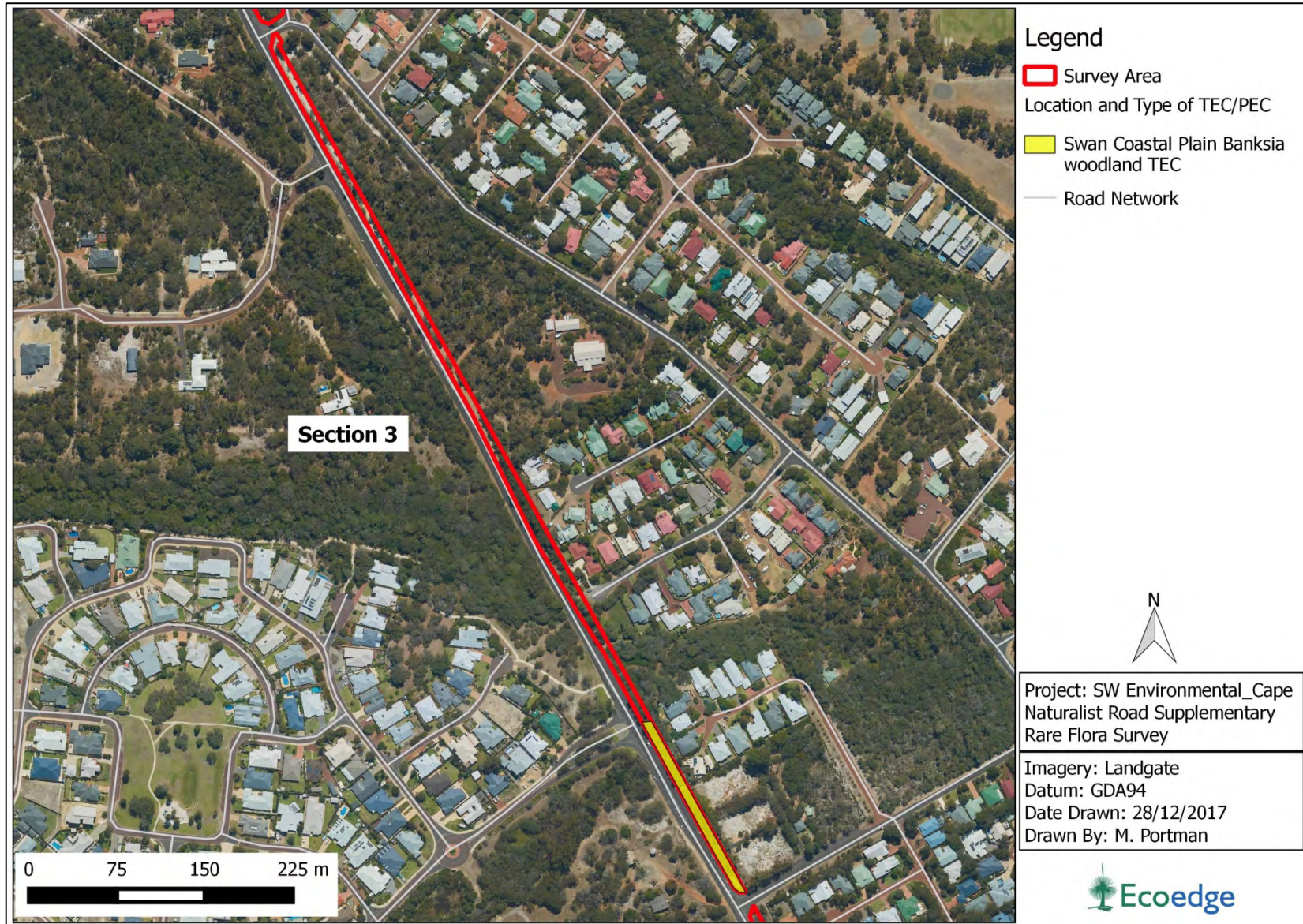


Figure 12. TEC occurrence mapped within Section 3 of the Survey Area.

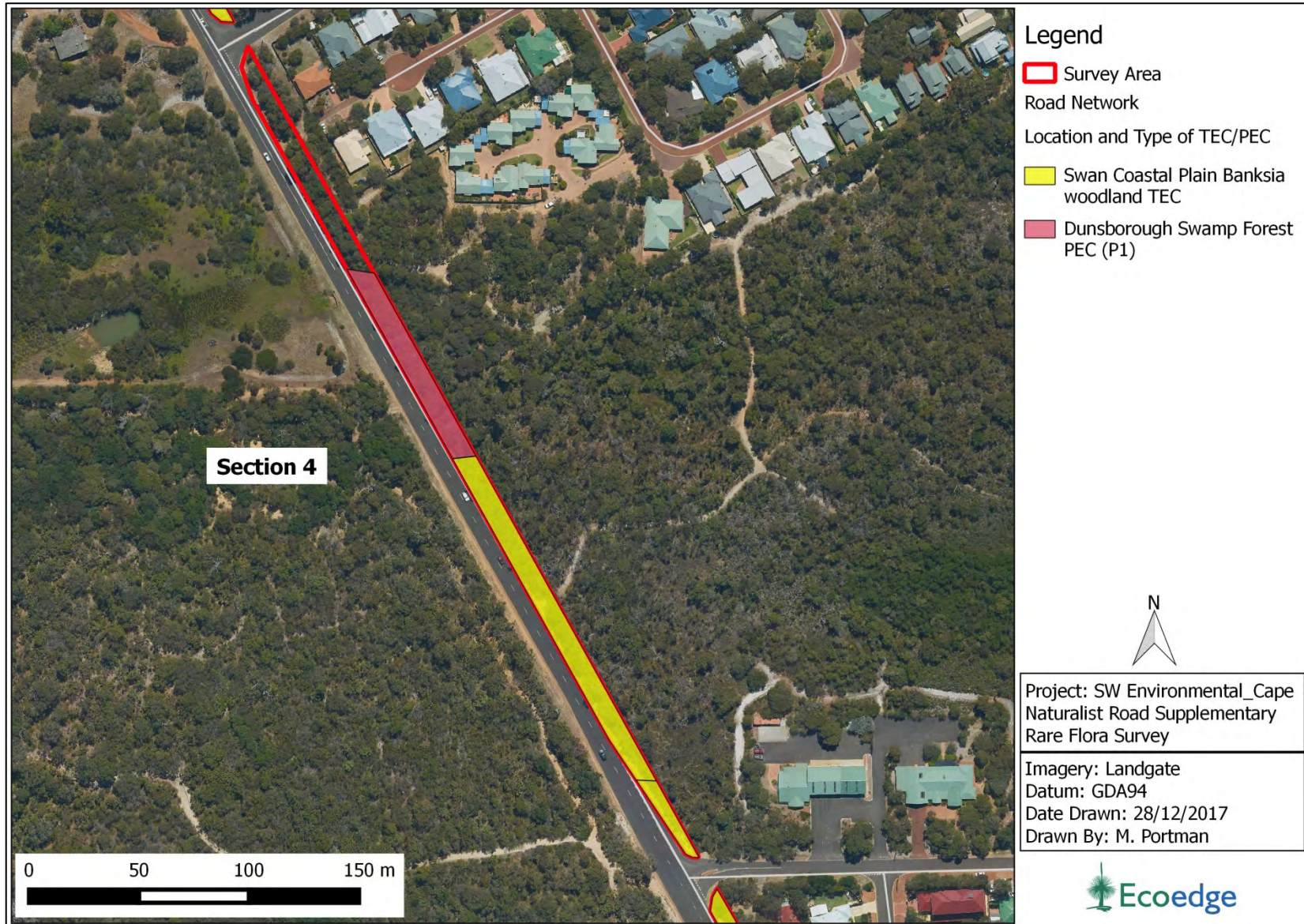


Figure 13. TEC and PEC occurrences mapped within Section 4 of the Survey Area.



Figure 14. TEC occurrence mapped within Section 5 of the Survey Area.



### 3.3 Vegetation Condition

Vegetation condition is mapped in **Figures 15 - 18**. About 31% of the remnant native vegetation in the Survey Area was classed as 'Good', 'Very Good' or 'Excellent' (**Table 7**). Of the remainder, about 42% was in 'Degraded' or 'Completely Degraded' condition, with the rest being areas along the edge of Cape Naturaliste Road completely cleared of vegetation.

All the vegetation classified as Very Good condition is adjacent to the Marri Nature Reserve. Further in from the roadside, outside the Survey Area, the vegetation is often in Excellent condition.

Table 7. Summary of vegetation condition classes within the Survey Area (EPA, 2016).

Condition	Area (Ha)	%
Excellent	0.24	10
Very Good	0.22	9.2
Good	0.28	11.7
Degraded	0.59	24.6
Completely Degraded	0.43	17.9
Cleared	0.64	26.6
<b>Total</b>	<b>2.40</b>	<b>100.0</b>

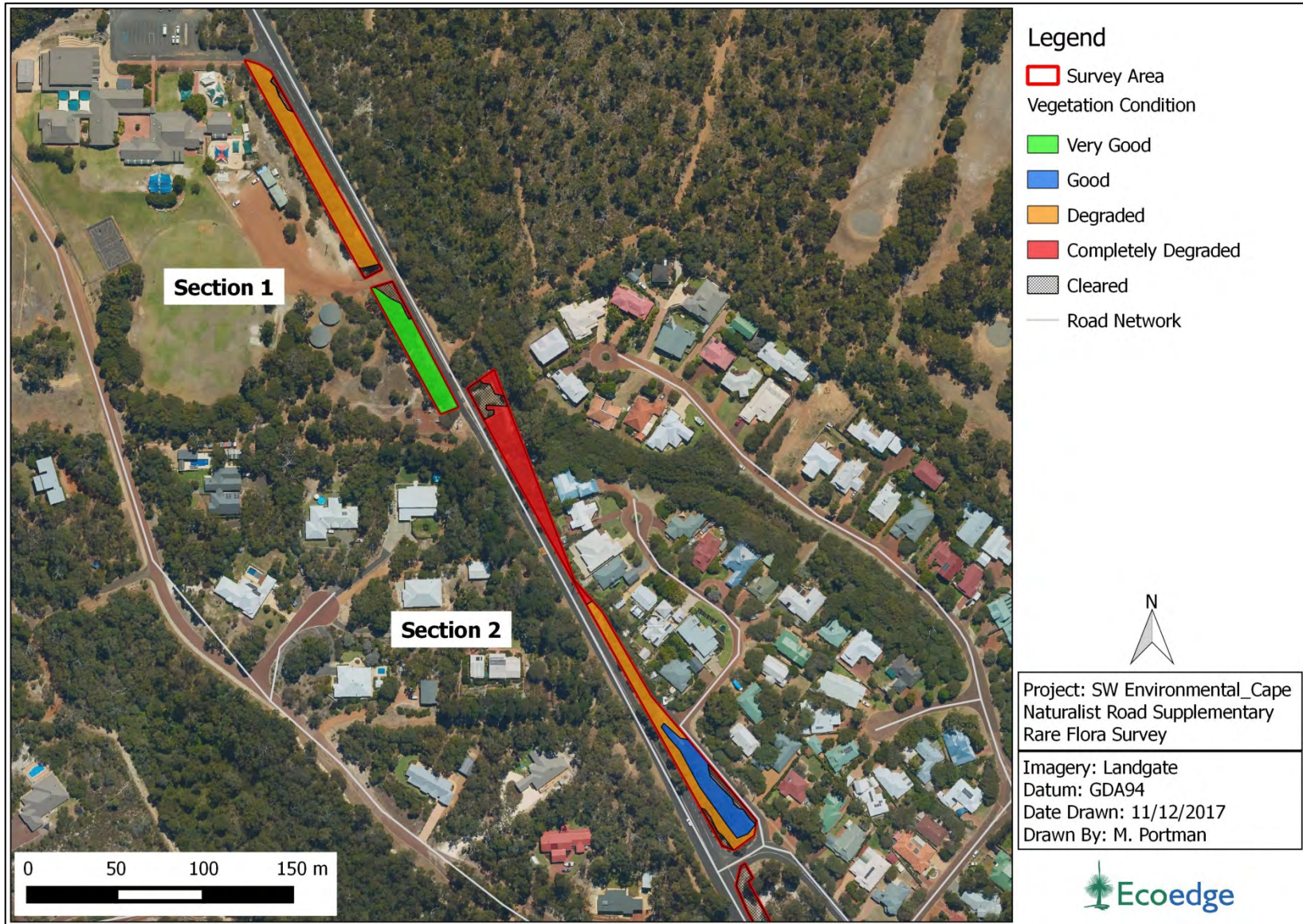


Figure 15. Condition of vegetation in Sections 1 and 2 of the Survey Area.

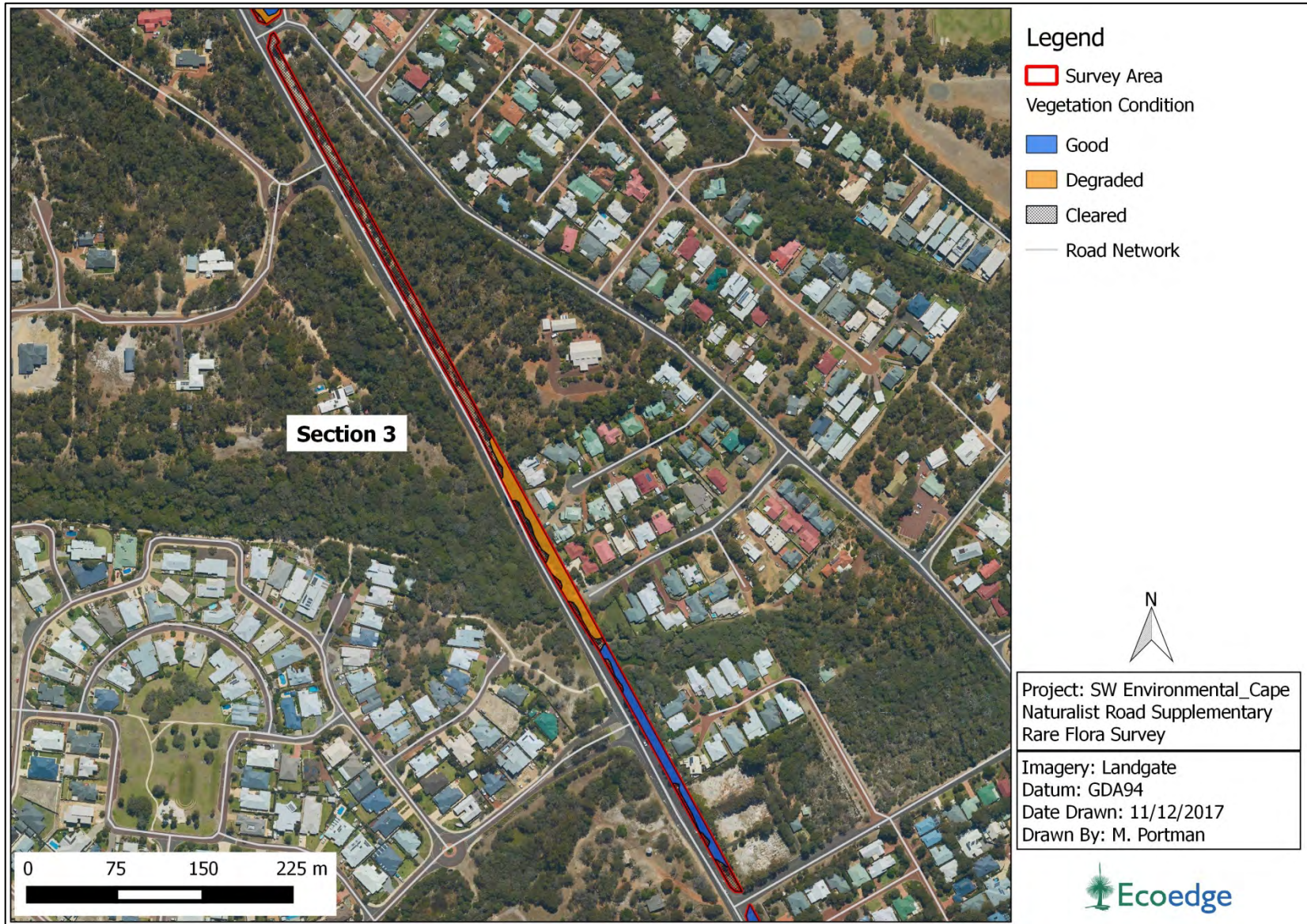


Figure 16. Condition of vegetation in Section 3 of the Survey Area.

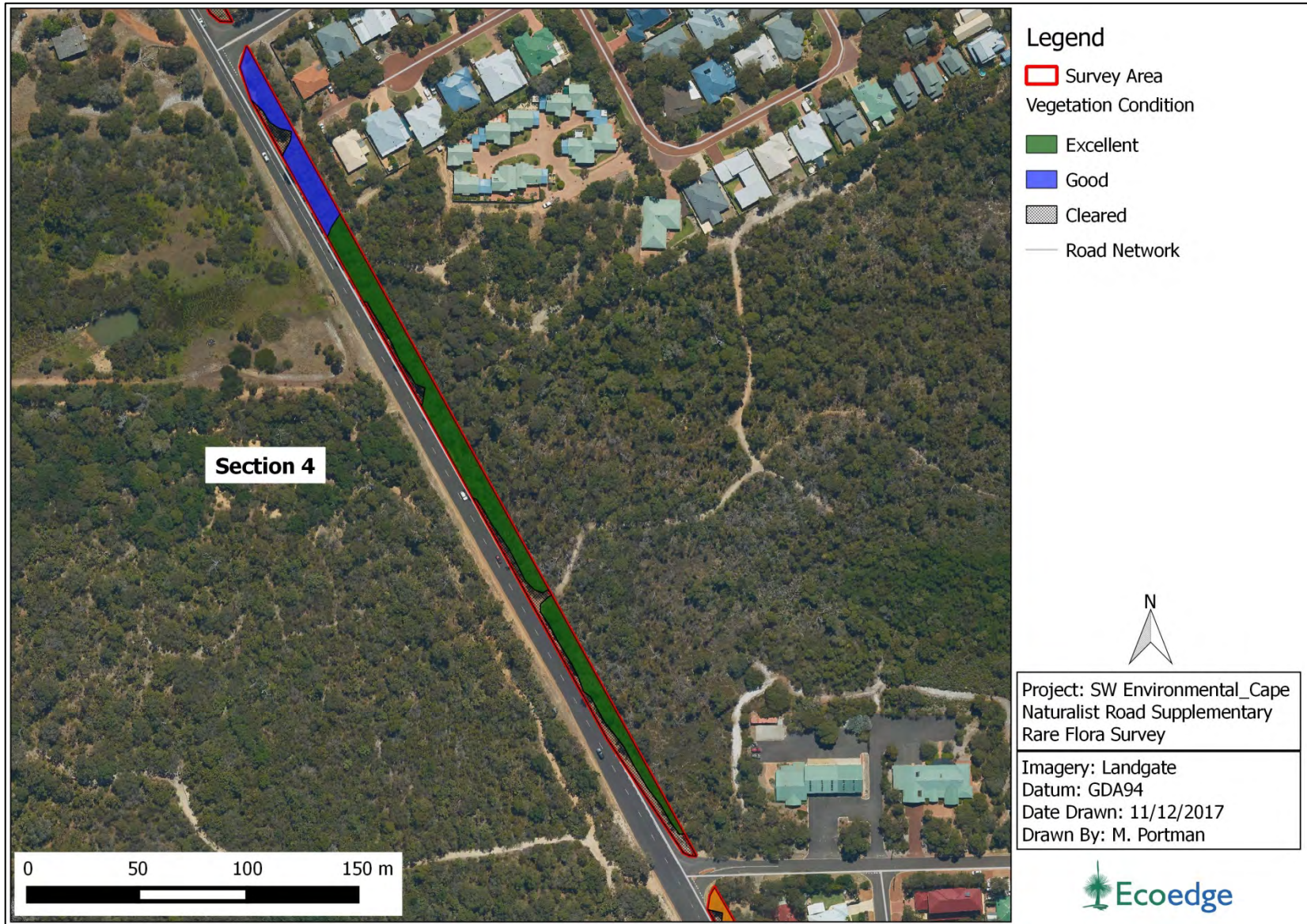


Figure 17. Condition of vegetation in Section 4 of the Survey Area.

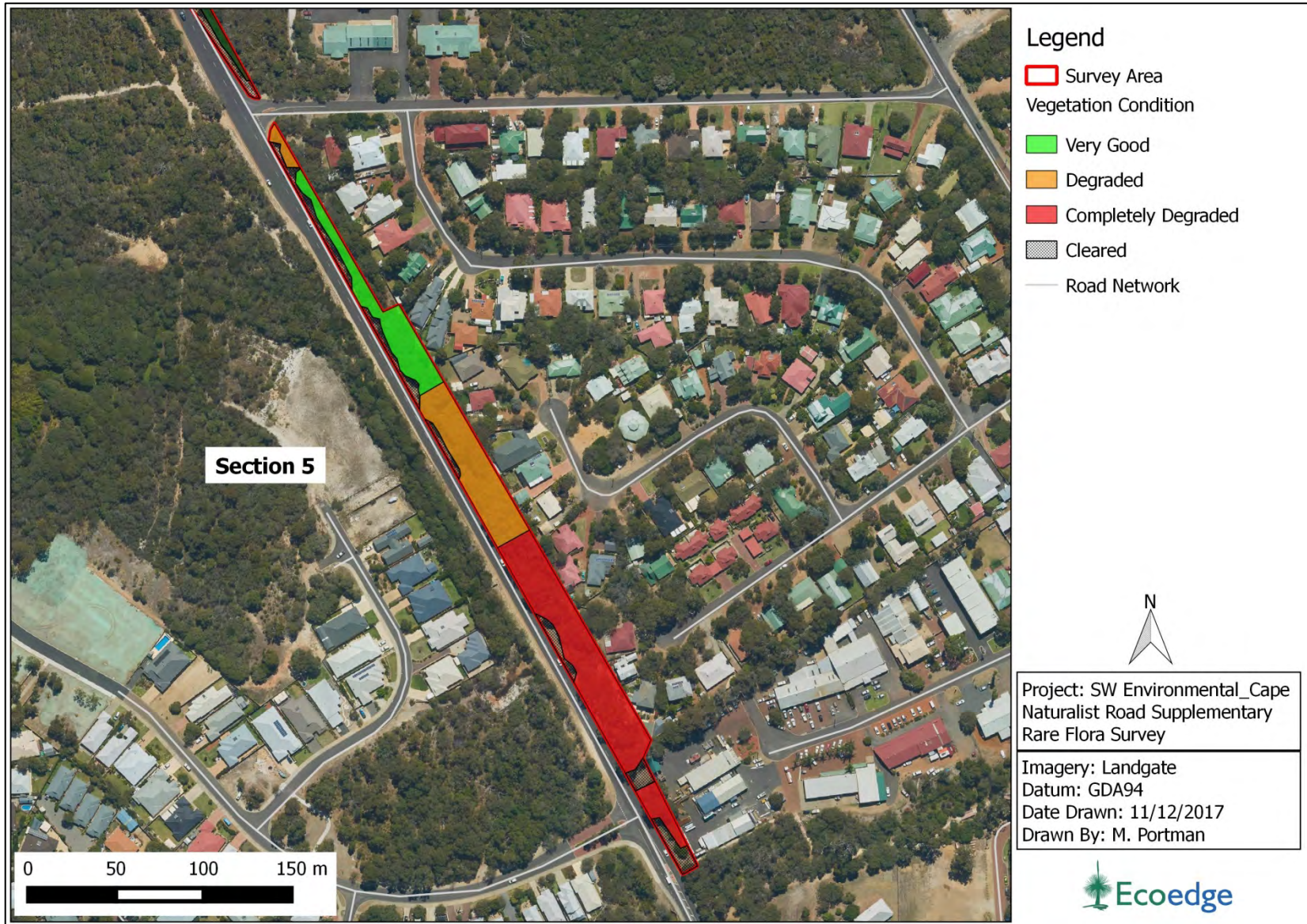


Figure 18. Condition of vegetation in Section 5 of the Survey Area.

## 4 Discussion and Conclusions

A survey of approximately 2.29 km of verge along Cape Naturaliste Road, covering a total area of 2.4 ha resulted in 145 vascular plant taxa being identified, including 15 introduced species. No Threatened flora (Declared Rare Flora) (including those listed under the Commonwealth EPBC Act) or Priority species was found.

The single plant of the threatened orchid *Caladenia excelsa* previously found within the Survey Area on two occasions (Ekologica, 2010b; SW Environmental 2016) was not re-located despite searches on 28 September and 20 October 2017. A 50 m radius around the location of the plant re-located in 2016 comprises an Environmentally Significant Area (ESA) (Lullfitz, 2016), and the road and cemetery reserve adjacent to it within the ESA would represent the critical habitat for the population. Eight vegetation units were recognised within the Survey Area, two of them (vegetation units B and D) very likely belonging to the Commonwealth-listed *Banksia* Woodlands of the Swan Coastal Plain Threatened ecological community, where they meet relevant size/condition thresholds. Most of the approximately 0.25 ha of vegetation unit D (adjacent to 'Marri Reserve') is in Excellent condition, while the condition of unit B (approx. 0.15 ha) varies from Very Good to Degraded.

Another two vegetation units (C and E) are most likely part of the 'Dunsborough Swamp Forest' Priority 1 ecological community.

Three of the vegetation complexes mapped within the Survey Area (Abba, Karrakatta Central and South, and Southern River vegetation complexes) do not meet the National 30% of pre-European extent retention target. Consequently, every hectare remaining of vegetation within these complexes is important for conservation purposes, particularly the Abba complex, which is both highly cleared and very poorly represented within the CAR reserve system.

### 4.1 Potential Impacts of the Proposed Pathway Construction

A pedestrian path and cycleway is proposed that will connect the school at the northern end of the Survey Area with the Dunsborough urban centre. The impact area of this proposed pathway covers 1.1 ha and is contained within the Survey Area as well as extending in several places on to existing paths (**Figures 19 - 22**).

Overlaying the proposed impact area on vegetation condition mapping for the Survey Area revealed that approximately 0.27 ha of vegetation in Good to Excellent condition would be impacted by the proposed pathway. Of this area, approximately 0.095 ha (952 m<sup>2</sup>) was mapped as either vegetation unit B or D, which are inferred to belong to the Commonwealth-listed *Banksia* Woodlands of the Swan Coastal Plain threatened ecological community.

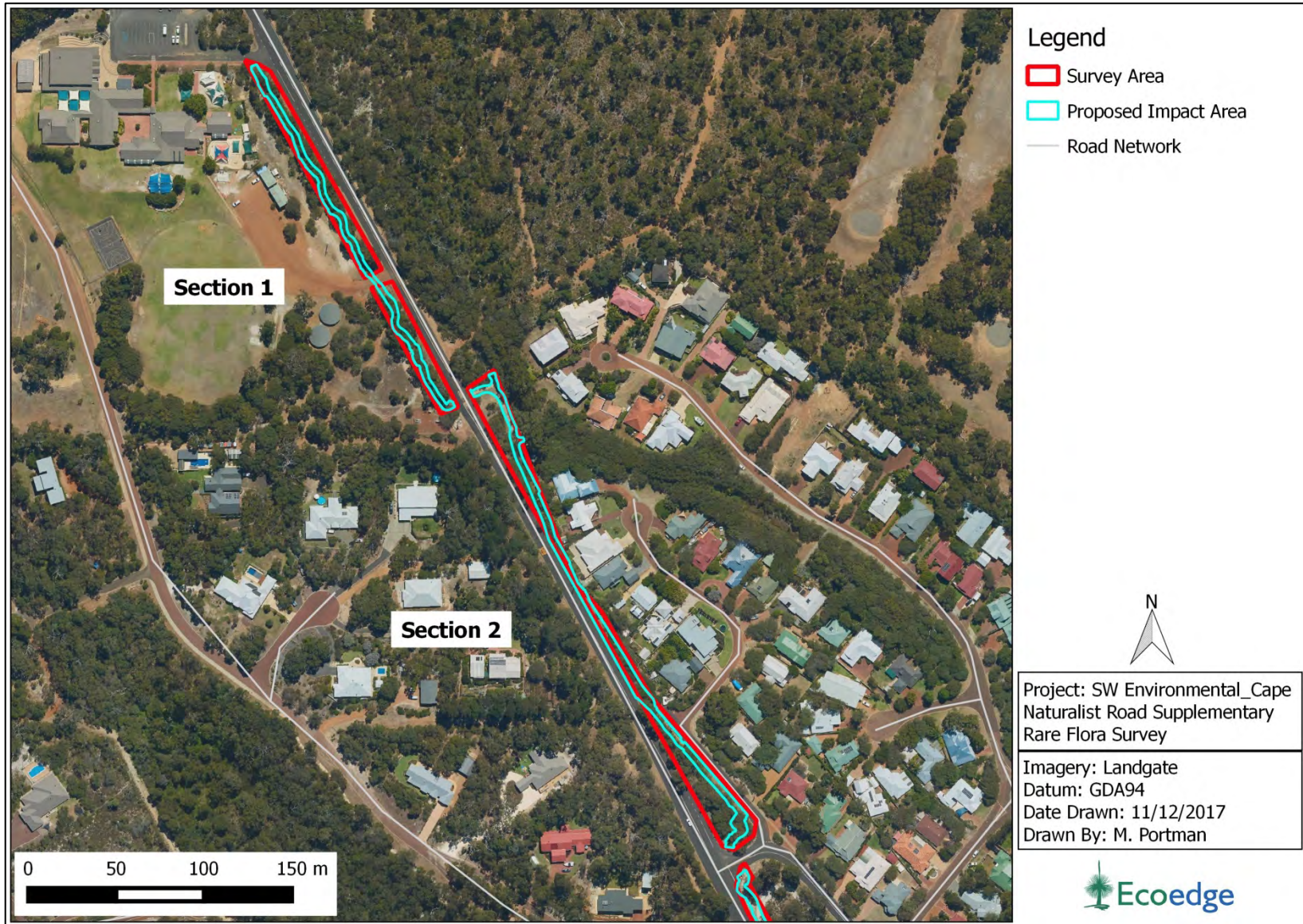


Figure 19. Sections 1 and 2 of the Survey Area showing the proposed impact area.

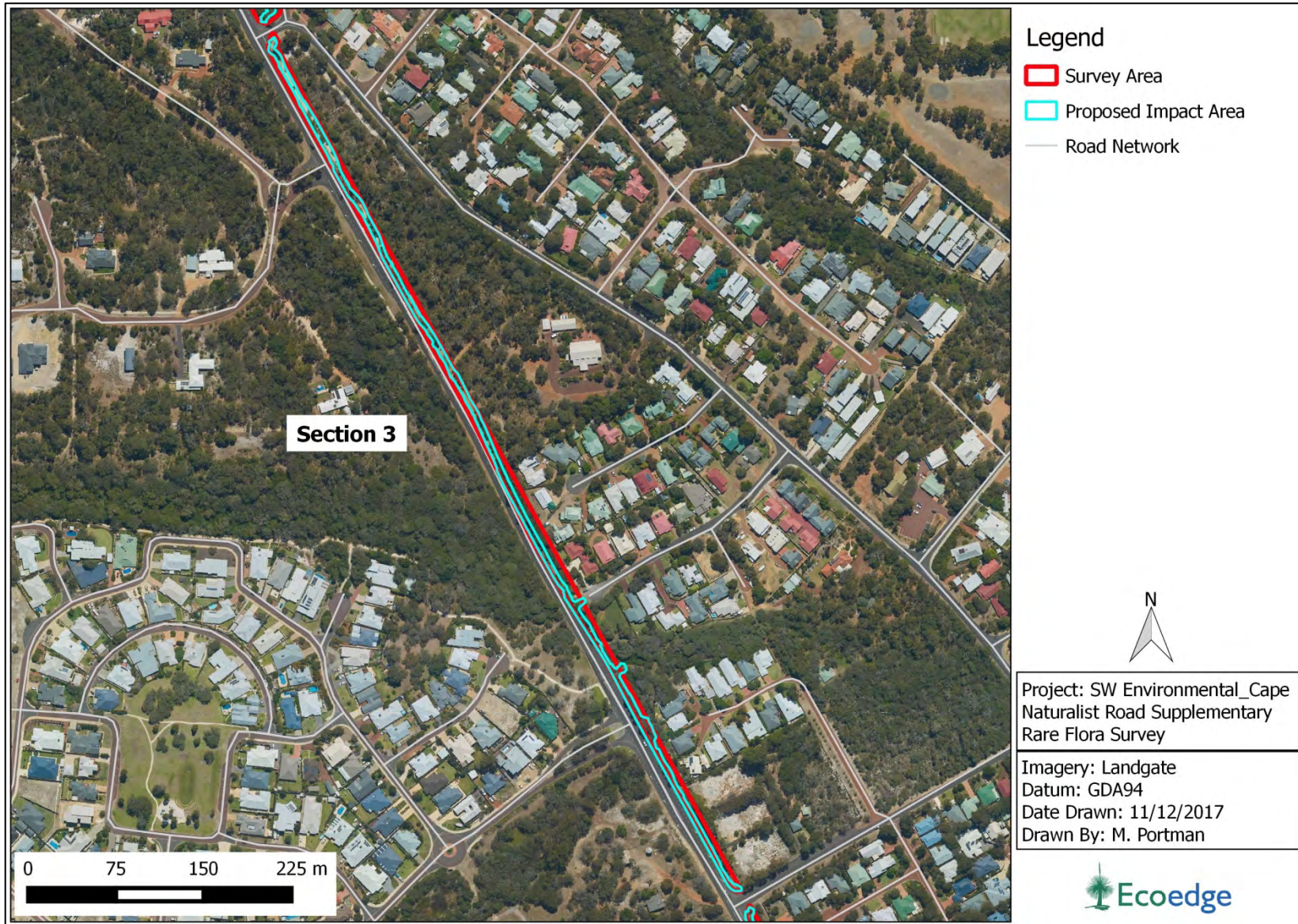


Figure 20. Section 3 of the Survey Area showing the proposed impact area.





Figure 21. Section 4 of the Survey Area showing the proposed impact area.



Figure 22. Section 5 of the Survey Area showing the proposed impact area.

Another 0.072 ha of the proposed impact area of the pathway would affect 0.07 ha (723 m<sup>2</sup>) of units C or E, which are inferred to be the ‘Dunsborough Swamp Forest’ Priority 1 ecological community.

Despite not being re-found during the present survey there is a possibility that the *C. excelsa* plant previously found near the cemetery may re-appear above ground in subsequent years.

## 5 Recommendations

### 5.1 *Banksia* Woodlands of the Swan Coastal Plain

As noted in **Section 5**, approximately 0.095 ha (952 m<sup>2</sup>) of the vegetation within the proposed impact area was mapped as either vegetation unit B or D, both of which are inferred to belong to the Commonwealth-listed *Banksia* Woodlands of the Swan Coastal Plain Threatened ecological community. Specifically, vegetation unit B is inferred to belong to Whicher Scarp community B2 (Western Whicher Scarp *Banksia attenuata* woodland) and unit D, because it has *B. attenuata* as a co-dominant, is also inferred to meet the criteria of the *Banksia* Woodlands of the Swan Coastal Plain TEC.

Not all patches of vegetation that meet the description of *Banksia* Woodlands of the Swan Coastal Plain are protected under the EPBC Act, however, as area and condition thresholds apply (Commonwealth of Australia, 2016b). These are specified in **Table 8**.

Table 8. Condition and patch minimum sizes for the ‘*Banksia* Woodlands of the Swan Coastal Plain’ TEC to be protected under the EPBC Act (DotEE, 2016).

Condition Category	Minimum Patch Sizes
‘Pristine’	No minimum patch size applies
‘Excellent’	0.5 ha or 5,000 m <sup>2</sup> (e.g. 50 m x 100 m)
‘Very Good’	1 ha or 10,000 m <sup>2</sup> (e.g. 100 m x 100 m)
‘Good’	2 ha or 20,000 m <sup>2</sup> (e.g. 200 m x 100 m)
To be considered as part of the EPBC Act ecological community a patch should meet at least the Good Condition category.	

Even though only about 0.095 ha of bushland that meets the criteria of the *Banksia* Woodlands of the Swan Coastal Plain TEC is present within the Survey Area, the potentially affected area is contiguous with similar vegetation within Marri Reserve. The Marri Reserve vegetation is assigned by Webb *et al.* (2009; p. 56) to their ‘Bassendean Dune *Banksia* Woodland’ vegetation plant community, which also fits the criteria of *Banksia* Woodlands of the Swan Coastal Plain TEC. This vegetation is almost all in Very Good/Excellent condition and is in excess of 5 ha. Because the Survey Area TEC vegetation is physically part of this larger area of TEC vegetation, it meets the Commonwealth minimum size criteria and therefore any works that may impact on this vegetation should be referred for assessment

under the EPBC Act. An assessment of the Survey Area vegetation against the *Banksia* Woodlands of the Swan Coastal Plain TEC Guidance for Referrals is included in **Appendix 8**.

Among the protection and conservation actions recommended for the *Banksia* Woodlands of the Swan Coastal Plain TEC (DotEE, 2016), are;

- Prevent further clearance, fragmentation or detrimental modification of remnants of the ecological community and of surrounding native vegetation, for example, during residential development, basic raw materials extraction, and associated infrastructure development. High conservation value, unmodified and older growth areas are particularly important for retention and management.
- Prevent impacts to native vegetation, native fauna, hydrology or soil structure from any developments and activities adjacent to or near patches of the ecological community by planning for and appropriately avoiding or mitigating off-site effects. For instance, apply recommended buffers of at least 20–50 m around patches of the ecological community and avoid activities that could cause significant hydrological change or eutrophication.
- Liaise with local councils and State authorities to ensure that cumulative impacts, from activities undertaken as part of broader or related projects (e.g. road works, developments), are reduced when planning individual activities.
- Prior to removal of any trees, or use of heavy machinery that may also damage the understorey, ensure comprehensive flora and fauna surveys have identified threatened species on site and their potential shelter and nesting sites, for example hollows, burrows, rocks and tree crevices, as well as visible nests. Damage to these should be avoided altogether, but if approved for removal, care should be taken to appropriately relocate fauna.

**Recommendation:** Based on the assessment against *Banksia* Woodlands of the Swan Coastal Plain ecological community - Guidance for referrals (**Appendix 8**), as it stands, regarding its potential to impact 0.095 ha of *Banksia* Woodlands of the Swan Coastal Plain TEC, the proposal for a pathway along Cape Naturalist Road requires referral for assessment under the EPBC Act.

## 5.2 *Caladenia excelsa*

As noted in **Section 3.1**, a single plant of the Threatened species *Caladenia excelsa* was found within the proposed impact area of the Cape Naturaliste Road dual use pathway. *Caladenia excelsa* is listed as an Endangered species under the EPBC Act. Even though this plant was not found during the current survey it is not possible to be certain that the plant is not still there as a tuber that did not send up a flowering spike this year.

The single plant of *C. excelsa* that has been found on the road verge adjacent to the Dunsborough cemetery occurs within an area of vegetation that is inferred to be the

*Banksia* Woodlands of the Swan Coastal Plain ecological community. The vegetation was assessed to be in Good condition but covers only about 1,200 m<sup>2</sup>, which is below the minimum patch size to be considered an occurrence of the community under the Approved Conservation Advice (for the *Banksia* Woodlands of the Swan Coastal Plain Ecological Community (DotEE, 2016). An assessment of the this population against the MNES criteria is included in **Appendix 9**.

**Recommendation:** Based on the assessment against MNES significant impact guidelines (**Appendix 9**), as it stands, regarding its potential to impact on the habitat of *Caladenia excelsa*, the proposal for a pathway along Cape Naturalist Road is not likely to need referral for assessment under the EPBC Act.

No other potential impacts of the proposed pathway likely to need referral under the Matters of National Environmental Significance significant impact guidelines of the EPBC Act were found during the survey.

## 6 References

- Astron Environmental Services (2010). *Water Corporation Dunsborough Transfer Mains Expansion Flora, Vegetation and Fauna Survey, and Wetland Assessment*. Prepared for Kellogg Brown & Root Pty Ltd.
- Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*. Environment Australia, Department of Environment and Heritage, Canberra, Australian Capital Territory.
- Commonwealth of Australia (2016a). *Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Subregions)*. Department of the Environment and Energy. <https://data.gov.au/dataset/interim-biogeographic-regionalisation-for-australia-ibra-version-7-subregions>
- Commonwealth of Australia (2016b). *Banksia Woodlands of the Swan Coastal Plain: a nationally-protected ecological community*.
- Department of Biodiversity Conservation and Attractions (2017a). *Priority ecological communities list (June 2017)*. [http://www.dbca.wa.gov.au/images/plants-animals/threatened-species/threatened ecological communities endorsed by the minister for the environment june 2017.pdf](http://www.dbca.wa.gov.au/images/plants-animals/threatened-species/threatened_ecological_communities_endorsed_by_the_minister_for_the_environment_june_2017.pdf) Department of Biodiversity Conservation and Attractions.
- Department of Biodiversity Conservation and Attractions (DBCA) (2017b). *Conservation Codes for Western Australian Flora and fauna*. [http://www.dbca.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Conservation code definitions.pdf](http://www.dbca.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Conservation_code_definitions.pdf)
- Department of Biodiversity Conservation and Attractions (2017d). *NatureMap*, Western Australian Herbarium. <http://naturemap.dpaw.wa.gov.au/default.aspx> accessed 23rd August 2017.
- Department of Biodiversity Conservation and Attractions (2017e). *The WA Herbarium Census of WA Plants Database* (WACENSUS: 'Max': 22/11/2017 download).
- Department of Environment and Conservation (DEC) (2013). *Definitions, categories and criteria for threatened and priority ecological communities*. Department of Environment and Conservation, Perth, Western Australia.
- Department of Environment, Water, Heritage and the Arts (DEWHA) (1999) *Environment Protection and Biodiversity Conservation Act 1999*. Department of Environment, Water, Heritage and the Arts. Canberra, Australian Capital Territory.

Department of Parks and Wildlife (2016a). Threatened ecological communities endorsed by the Minister for the Environment (October 2016).

[https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened ecological communities endorsed by the minister october 2016.pdf](https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/threatened_ecological_communities_endorsed_by_the_minister_october_2016.pdf)

Department of the Environment and Energy (2016). *Banksia* Woodlands of the Swan Coastal Plain. Approved Conservation Advice (incorporating listing advice) for the *Banksia* Woodlands of the Swan Coastal Plain Ecological Community.

Department of the Environment and Energy (DotEE) (2017a). *Threatened ecological communities under the EPBC Act*. <http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl>

Department of the Environment and Energy (DotEE) (2017b). *Protected Matters Search Tool query*. Generated 25 August 2017

Department of the Environment and Energy (DotEE) (2017c). *Categories of Threatened species under the EPBC Act*. <http://www.environment.gov.au/biodiversity/threatened/species.html> Accessed 29 September 2017

Department of Environment Regulation (DER) (2016). *Environmentally Sensitive Areas GIS Mapping Dataset*. 2016 Version. Perth, Western Australia <https://www2.landgate.wa.gov.au/web/guest/57> (DER016).

Ekologica (2010a). *Targeted rare flora search of part of Naturaliste Road, Dunsborough*. Report to Astron Environmental Services.

Ekologica (2011). *Flora survey of part Lot 74, Atlanta Elbow, Dunsborough*. Report to Ecosystem Solutions, Dunsborough.

Environment Australia (2001). *National objectives and targets for biodiversity conservation 2001–2005*. <http://www.environment.gov.au/resource/national-objectives-and-targets-biodiversity-conservation-2001-2005>

Environmental Protection Authority of WA (2016). *Technical Guidance Flora and Vegetation Surveys for Environmental Impact*. EPA, Perth, Western Australia. [http://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/EPA/Technical/Guidance/FloraandVegetationsurvey Dec13.pdf](http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA/Technical/Guidance/FloraandVegetationsurvey_Dec13.pdf)

Environmental Protection Authority of WA (EPA) (2009). *South West Regional Ecological Linkages*. *Environmental protection Bulletin No. 8*. EPA, Perth, Western Australia.

- Government of Western Australia (1950). *Wildlife Conservation Act 1950*. Perth, Western Australia.
- Government of Western Australia (1984). *Conservation and Land Management Act 1984*. Perth, Western Australia.
- Government of Western Australia (2005). *Environmental Protection (Environmentally Sensitive Areas) Notice 2005 (Environmental Protection Act 1986)*. Government Gazette, No.55.
- Lullfitz, B. (2016). Cape Naturaliste Road shared pathway - Flora and Fauna issues. Letter to S. Priddle of SW Environmental from B. Lullfitz, Department of Department of Biodiversity Conservation and Attractions, Busselton.
- South West Biodiversity Project (2007). *South West Biodiversity Project Mapping & Information Instalment 2 January 2007*. Western Australian Local Government Association. Perth, Western Australia.
- Tille, P.J. and Lantzke, N.J. (1990). *Busselton-Margaret River-Augusta land capability study*. Western Australian Department of Agriculture, Land Resources Series No. 5.
- Webb, A., Keighery, B., Keighery, G., Longman, V., Black, A. and O'Conner, A. (2009). The flora and vegetation of the Busselton Plain (Swan Coastal Plain) : a report for the Department of Environment and Conservation as part of the Swan Bioplan Project. Dept. of Environment and Conservation, Perth, Western Australia.
- Webb, A., Kinloch, J., Keighery, G. and Pitt, G. (2016). *The Extension of Vegetation Complex Mapping to Landform boundaries within the Swan Coastal Plain Landform and Forested Region of South West Western Australia*. Department of Parks and Wildlife, Bunbury, WA.



Appendix 1. Categories of Threatened Ecological Communities under the EPBC Act (DotEE, 2017a).

Category	Definition
Critically endangered	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable	If, at that time, an ecological, community is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).

## Appendix 2. Protected Matters Search Tool and NatureMap Reports for the Survey Area.



# 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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 25/08/17 11:01:46

[Summary](#)

[Details](#)

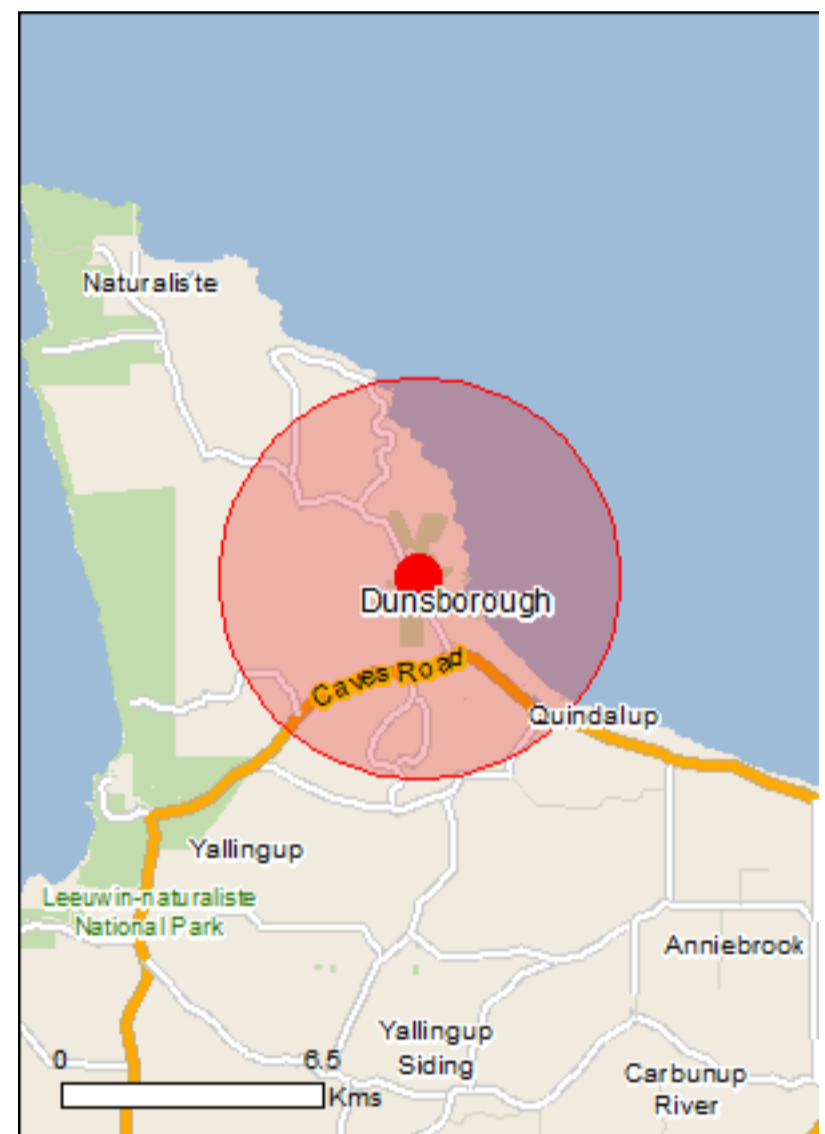
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

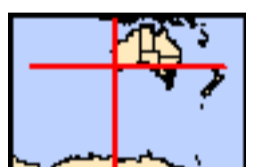
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 5.0Km



# Summary

## Matters of National Environmental 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	60
<a href="#">Listed Migratory Species:</a>	38

## Other Matters Protected by the EPBC Act

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

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

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	69
<a href="#">Whales and Other Cetaceans:</a>	13
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Invasive Species:</a>	25
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	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.

Name	Status	Type of Presence
<a href="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>	Endangered	Community likely to occur within area
<a href="#">Clay Pans of the Swan Coastal Plain</a>	Critically Endangered	Community likely to occur within area

### Listed Threatened Species

[ [Resource Information](#) ]

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Anous tenuirostris melanops</a> Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Calyptorhynchus baudinii</a> Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding known to occur within area
<a href="#">Calyptorhynchus latirostris</a> Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Foraging, feeding or

Name	Status	Type of Presence
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	related behaviour likely to occur within area
<a href="#">Halobaena caerulea</a> Blue Petrel [1059]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Limosa lapponica baueri</a> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
<a href="#">Limosa lapponica menzbieri</a> Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pterodroma mollis</a> Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
<a href="#">Thalassarche cauta cauta</a> Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thalassarche cauta steadi</a> White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<b>Crustaceans</b>		
<a href="#">Engaewa reducta</a> Dunsborough Burrowing Crayfish [82675]	Critically Endangered	Species or species habitat likely to occur within area
<b>Fish</b>		
<a href="#">Nannatherina balstoni</a> Balston's Pygmy Perch [66698]	Vulnerable	Species or species

Name	Status	Type of Presence
habitat may occur within area		
<b>Mammals</b>		
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Breeding known to occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
<a href="#">Neophoca cinerea</a> Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Vulnerable	Breeding known to occur within area
<b>Plants</b>		
<a href="#">Banksia nivea subsp. uliginosa</a> Swamp Honeypot [82766]	Endangered	Species or species habitat likely to occur within area
<a href="#">Banksia squarrosa subsp. argillacea</a> Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat may occur within area
<a href="#">Brachyscias verecundus</a> Ironstone Brachyscias [81321]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Caladenia busselliana</a> Bussell's Spider-orchid [24369]	Endangered	Species or species habitat likely to occur within area
<a href="#">Caladenia caesarea subsp. maritima</a> Cape Spider-orchid [64856]	Endangered	Species or species habitat known to occur within area
<a href="#">Caladenia excelsa</a> Giant Spider-orchid [56717]	Endangered	Species or species habitat likely to occur within area
<a href="#">Caladenia huegelii</a> King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
<a href="#">Caladenia viridescens</a> Dunsborough Spider-orchid [56776]	Endangered	Species or species habitat likely to occur within area
<a href="#">Chamelaucium sp. S coastal plain (R.D.Royce 4872)</a> Royce's Waxflower [87814]	Vulnerable	Species or species habitat may occur within area
<a href="#">Darwinia whicherensis</a> Abba Bell [83193]	Endangered	Species or species habitat may occur within area
<a href="#">Drakaea elastica</a> Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat may occur within area
<a href="#">Drakaea micrantha</a> Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur

Name	Status	Type of Presence within area
<a href="#">Eucalyptus x phylacis</a> Meelup Mallee [87817]	Endangered	Species or species habitat known to occur within area
<a href="#">Gastrolobium papilio</a> Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area
<a href="#">Lambertia echinata subsp. occidentalis</a> Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within area
<a href="#">Petrophile latericola</a> Laterite Petrophile [64532]	Endangered	Species or species habitat may occur within area
<a href="#">Sphenotoma drummondii</a> Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area
<a href="#">Wurmbea calcicola</a> Naturaliste Nancy [64691]	Endangered	Species or species habitat may occur within area

## Reptiles

<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

## Sharks

<a href="#">Carcharias taurus (west coast population)</a> Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

## Listed Migratory Species

[ [Resource Information](#) ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardenna carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area



Name	Threatened	Type of Presence
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Hydroprogne caspia</a> Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Onychoprion anaethetus</a> Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
<a href="#">Phoebastria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche cauta</a> Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<b>Migratory Marine Species</b>		
<a href="#">Balaena glacialis australis</a> Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
<a href="#">Caperea marginata</a> Pygmy Right Whale [39]		Species or species habitat may occur within area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
<a href="#">Lagenorhynchus obscurus</a> Dusky Dolphin [43]		Species or species habitat may occur within area
<a href="#">Lamna nasus</a> Porbeagle, Mackerel Shark [83288]		Species or species

Name	Threatened	Type of Presence
<a href="#">Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		habitat may occur within area  Species or species habitat may occur within area
<a href="#">Manta birostris</a> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Other Matters Protected by the EPBC Act

### Commonwealth Land

[ [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.

#### Name

Commonwealth Land -

### Listed Marine Species

[ [Resource Information](#) ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Anous tenuirostris melanops</a> Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat known to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Catharacta skua</a> Great Skua [59472]		Species or species habitat may occur within area
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Halobaena caerulea</a> Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
<a href="#">Larus pacificus</a> Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat likely to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Phoebetria fusca</a> Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
<a href="#">Pterodroma mollis</a> Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
<a href="#">Puffinus assimilis</a> Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
<a href="#">Sterna anaethetus</a> Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
<a href="#">Sterna caspia</a> Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
<a href="#">Thalassarche cauta</a> Tasmanian Shy Albatross [89224]	Vulnerable*	related behaviour may occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Species or species habitat may occur within area
<a href="#">Thinornis rubricollis</a> Hooded Plover [59510]		Foraging, feeding or related behaviour likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
<b>Fish</b>		
<a href="#">Acentronura australe</a> Southern Pygmy Pipehorse [66185]		Species or species habitat likely to occur within area
<a href="#">Campichthys galei</a> Gale's Pipefish [66191]		Species or species habitat may occur within area
<a href="#">Heraldia nocturna</a> Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
<a href="#">Hippocampus angustus</a> Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
<a href="#">Hippocampus breviceps</a> Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
<a href="#">Hippocampus subelongatus</a> West Australian Seahorse [66722]		Species or species habitat may occur within area
<a href="#">Histiogamphelus cristatus</a> Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
<a href="#">Lissocampus caudalis</a> Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
<a href="#">Lissocampus fatiloquus</a> Prophet's Pipefish [66250]		Species or species habitat may occur within area
<a href="#">Lissocampus runa</a> Javelin Pipefish [66251]		Species or species habitat may occur within area
<a href="#">Maroubra perserrata</a> Sawtooth Pipefish [66252]		Species or species habitat may occur within area
<a href="#">Mitotichthys meraculus</a> Western Crested Pipefish [66259]		Species or species

Name	Threatened	Type of Presence
<a href="#">Nannocampus subosseus</a> Bonyhead Pipefish, Bony-headed Pipefish [66264]		habitat may occur within area  Species or species habitat may occur within area
<a href="#">Phycodurus eques</a> Leafy Seadragon [66267]		Species or species habitat may occur within area
<a href="#">Phyllopteryx taeniolatus</a> Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
<a href="#">Pugnaso curtirostris</a> Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
<a href="#">Solegnathus lettiensis</a> Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
<a href="#">Stigmatopora argus</a> Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
<a href="#">Stigmatopora nigra</a> Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
<a href="#">Stigmatopora olivacea</a> a pipefish [74966]		Species or species habitat may occur within area
<a href="#">Urocampus carinirostris</a> Hairy Pipefish [66282]		Species or species habitat may occur within area
<a href="#">Vanacampus margaritifer</a> Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
<a href="#">Vanacampus phillipi</a> Port Phillip Pipefish [66284]		Species or species habitat may occur within area
<a href="#">Vanacampus poecilolaemus</a> Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
<b>Mammals</b>		
<a href="#">Arctocephalus forsteri</a> Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
<a href="#">Neophoca cinerea</a> Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
<b>Reptiles</b>		
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence related behaviour known to occur within area
<b>Whales and other Cetaceans</b>		
<b>[ Resource Information ]</b>		
Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat may occur within area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
<a href="#">Caperea marginata</a> Pygmy Right Whale [39]		Species or species habitat may occur within area
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Breeding known to occur within area
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
<a href="#">Lagenorhynchus obscurus</a> Dusky Dolphin [43]		Species or species habitat may occur within area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area

## Extra Information

### Regional Forest Agreements

[ [Resource Information](#) ]

Note that all areas with completed RFAs have been included.

Name	State
<a href="#">South West WA RFA</a>	Western Australia

### Invasive Species

[ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
------	--------	------------------

#### Birds

Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
-------------------------------------	--	--

Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
--	--	--

Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
--	--	--

Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
---	--	--

#### Mammals

Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
------------------------------------	--	--

Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
--	--	--

Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
--	--	--

Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
---	--	--

Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
-----------------------------------	--	--

Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
--	--	--

Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
---	--	--

Sus scrofa Pig [6]		Species or species habitat likely to occur within area
-----------------------	--	--

Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
------------------------------------	--	--

#### Plants



Name	Status	Type of Presence
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

# Coordinates

-33.6037 115.09448

# Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

# Cape Nat Rd NatureMap cons sig spp Report

Created By Guest user on 23/08/2017

**Kingdom** Plantae

**Conservation Status** Conservation Taxon (T, X, IA, S, P1-P5)

**Current Names Only** Yes

**Core Datasets Only** Yes

**Method** 'By Circle'

**Centre** 115° 05' 49" E, 33° 36' 30" S

**Buffer** 5km

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
1.	14048 <i>Acacia ancistrophylla</i> var. <i>perarcuata</i>		P3	
2.	14930 <i>Acacia lateriticola</i> var. <i>Glabrous variant</i> (B.R.Maslin 6765)		P3	
3.	3537 <i>Acacia semitrullata</i>		P4	
4.	4444 <i>Boronia tenuis</i> (Blue Boronia)		P4	
5.	13615 <i>Caladenia busselliana</i>		T	
6.	13616 <i>Caladenia caesarea</i> subsp. <i>maritima</i>		T	
7.	13619 <i>Caladenia excelsa</i>		T	
8.	1596 <i>Caladenia huegelii</i> (Grand Spider Orchid)		T	
9.	13622 <i>Caladenia viridescens</i>		T	
10.	11273 <i>Calothamnus graniticus</i> subsp. <i>graniticus</i>		P4	
11.	13635 <i>Drakaea micrantha</i>		T	
12.	20852 <i>Eucalyptus relictus</i>		P2	
13.	13512 <i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>		P4	
14.	19629 <i>Eucalyptus virginea</i>		P4	
15.	13024 <i>Eucalyptus x phylacis</i>		T	
16.	44440 <i>Gastrolobium argyrotichum</i>		T	
17.	6868 <i>Hemigenia rigida</i>		P1	
18.	1296 <i>Johnsonia inconspicua</i>		P3	
19.	1717 <i>Thelymitra variegata</i> (Queen of Sheba)		P2	

**Conservation Codes**

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

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

Appendix 3. Definitions of Threatened and Priority List flora under the WC Act (DBCA, 2017b).

Conservation code	Category
T	Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the <i>Wildlife Conservation Act 1950</i> . 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 (CR, EN, VU, EX). A species that is listed as Threatened and assessed as 'Critically Endangered' would therefore have its status written as T (CR).
P1	Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3	Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
P4	Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

Appendix 4. Categories of Threatened Species under the EPBC Act (DotEE, 2017c).

Category	Definition
Extinct (Ex)	A native species is eligible to be included in the <b>extinct</b> category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (ExW)	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.
Critically Endangered (CE)	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.
Endangered (EN)	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.
Vulnerable (VU)	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.
Conservation Dependent (CD)	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time, 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 within a period of 5 years.

## Appendix 5. Vegetation condition scale (EPA, 2016).

Vegetation Condition	South West and Interzone Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
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.
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.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
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.
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 and shrubs.

## Appendix 6. List of vascular flora found within the Survey Area.

<b>FAMILY</b>	<b>SPECIES</b>	<b>NATURALISED</b>
Anarthriaceae	<i>Anarthria prolifera</i>	
Anarthriaceae	<i>Lyginia barbata</i>	
Apiaceae	<i>Centella asiatica</i>	
Apiaceae	<i>Homalosciadium homalocarpum</i>	
Apiaceae	<i>Platysace tenuissima</i>	
Apiaceae	<i>Xanthosia candida</i>	
Apiaceae	<i>Xanthosia huegelii</i>	
Araliaceae	<i>Hedera helix</i>	*
Asparagaceae	<i>Asparagus asparagoides</i>	*
Asparagaceae	<i>Lomandra purpurea</i>	
Asparagaceae	<i>Lomandra sericea</i>	
Asparagaceae	<i>Sowerbaea laxiflora</i>	
Asteraceae	<i>Conyza sumatrensis</i>	*
Asteraceae	<i>Dittrichia graveolens</i>	*
Asteraceae	<i>Hypochaeris glabra</i>	*
Casuarinaceae	<i>Allocasuarina fraseriana</i>	
Celastraceae	<i>Stackhousia monogyna</i>	
Colchicaceae	<i>Burchardia congesta</i>	
Cyperaceae	<i>Cyathochaeta clandestina</i>	
Cyperaceae	<i>Lepidosperma longitudinale</i>	
Cyperaceae	<i>Lepidosperma squamatum</i>	
Cyperaceae	<i>Lepidosperma tenue</i>	
Cyperaceae	<i>Lepidosperma tetraquetrum</i>	
Cyperaceae	<i>Mesomelaena tetragona</i>	
Cyperaceae	<i>Schoenus laevigatus</i>	
Cyperaceae	<i>Tetraria capillaris</i>	
Cyperaceae	<i>Tetraria octandra</i>	
Dasyopogonaceae	<i>Dasyopogon bromeliifolius</i>	
Dasyopogonaceae	<i>Dasyopogon hookeri</i>	
Dennstaedtiaceae	<i>Pteridium esculentum</i>	
Dilleniaceae	<i>Hibbertia cunninghamii</i>	
Dilleniaceae	<i>Hibbertia hypericoides</i>	
Dilleniaceae	<i>Hibbertia racemosa</i>	
Droseraceae	<i>Drosera menziesii</i>	
Droseraceae	<i>Drosera pallida</i>	
Ericaceae	<i>Andersonia involucrata</i>	
Ericaceae	<i>Leucopogon australis</i>	
Ericaceae	<i>Leucopogon oxycedrus</i>	
Ericaceae	<i>Leucopogon parviflorus</i>	
Ericaceae	<i>Leucopogon propinquus</i>	
Fabaceae	<i>Acacia divergens</i>	
Fabaceae	<i>Acacia iteaphylla</i>	*
Fabaceae	<i>Acacia longifolia</i>	*



<b>FAMILY</b>	<b>SPECIES</b>	<b>NATURALISED</b>
Fabaceae	<i>Acacia mooreana</i>	
Fabaceae	<i>Acacia myrtifolia</i>	
Fabaceae	<i>Acacia paradoxa</i>	*
Fabaceae	<i>Acacia pulchella</i>	
Fabaceae	<i>Acacia saligna</i>	
Fabaceae	<i>Bossiaea eriocarpa</i>	
Fabaceae	<i>Bossiaea linophylla</i>	
Fabaceae	<i>Callistachys lanceolata</i>	
Fabaceae	<i>Chamaecytisus palmensis</i>	*
Fabaceae	<i>Chorizema nanum</i>	
Fabaceae	<i>Daviesia divaricata</i>	
Fabaceae	<i>Gastrolobium praemorsum</i>	
Fabaceae	<i>Gompholobium tomentosum</i>	
Fabaceae	<i>Hardenbergia comptoniana</i>	
Fabaceae	<i>Hovea chorizemifolia</i>	
Fabaceae	<i>Hovea elliptica</i>	
Fabaceae	<i>Hovea stricta</i>	
Fabaceae	<i>Hovea trisperma</i>	
Fabaceae	<i>Isotropis cuneifolia</i>	
Fabaceae	<i>Jacksonia furcellata</i>	
Fabaceae	<i>Kennedia coccinea</i>	
Fabaceae	<i>Mirbelia dilatata</i>	
Fabaceae	<i>Pultenaea reticulata</i>	
Fabaceae	<i>Viminaria juncea</i>	
Goodeniaceae	<i>Dampiera linearis</i>	
Goodeniaceae	<i>Dampiera trigona</i>	
Goodeniaceae	<i>Scaevola calliptera</i>	
Haemodoraceae	<i>Anigozanthos flavidus</i>	
Haemodoraceae	<i>Anigozanthos manglesii</i>	
Haemodoraceae	<i>Conostylis aculeata</i>	
Haemodoraceae	<i>Conostylis aculeata</i> subsp. <i>gracilis</i>	
Haemodoraceae	<i>Haemodorum laxum</i>	
Haemodoraceae	<i>Phlebocarya ciliata</i>	
Hemerocallidaceae	<i>Agrostocrinum hirsutum</i>	
Hemerocallidaceae	<i>Johnsonia lupulina</i>	
Iridaceae	<i>Patersonia umbrosa</i>	
Juncaceae	<i>Juncus microcephalus</i>	*
Lauraceae	<i>Cassytha racemosa</i>	
Lindsaeaceae	<i>Lindsaea linearis</i>	
Menyanthaceae	<i>Ornduffia parnassifolia</i>	
Myrtaceae	<i>Astartea zephyra</i>	
Myrtaceae	<i>Agonis flexuosa</i>	
Myrtaceae	<i>Calothamnus sanguineus</i>	
Myrtaceae	<i>Calytrix flavescens</i>	

<b>FAMILY</b>	<b>SPECIES</b>	<b>NATURALISED</b>
Myrtaceae	<i>Corymbia calophylla</i>	
Myrtaceae	<i>Eucalyptus marginata</i>	
Myrtaceae	<i>Eucalyptus rudis</i>	
Myrtaceae	<i>Hypocalymma robustum</i>	
Myrtaceae	<i>Kunzea glabrescens</i>	
Myrtaceae	<i>Melaleuca raphiophylla</i>	
Myrtaceae	<i>Melaleuca scabra</i>	
Myrtaceae	<i>Melaleuca thymoides</i>	
Myrtaceae	<i>Taxandria linearifolia</i>	
Myrtaceae	<i>Taxandria parviceps</i>	
Orchidaceae	<i>Caladenia attingens</i>	
Orchidaceae	<i>Caladenia chapmanii</i>	
Orchidaceae	<i>Caladenia flava</i>	
Orchidaceae	<i>Caladenia macrostylis</i>	
Orchidaceae	<i>Diuris corymbosa</i>	
Orchidaceae	<i>Diuris longifolia</i>	
Orchidaceae	<i>Lyperanthus serratus</i>	
Orchidaceae	<i>Thelymitra macrophylla</i>	
Phyllanthaceae	<i>Phyllanthus calycinus</i>	
Pittosporaceae	<i>Billardiera variifolia</i>	
Plantaginaceae	<i>Plantago lanceolata</i>	*
Poaceae	<i>Rytidosperma setaceum</i>	
Poaceae	<i>Amphipogon turbinatus</i>	
Poaceae	<i>Austrostipa campylachne</i>	
Poaceae	<i>Cynodon dactylon</i>	*
Poaceae	<i>Ehrharta calycina</i>	*
Poaceae	<i>Ehrharta longiflora</i>	*
Poaceae	<i>Eragrostis curvula</i>	*
Poaceae	<i>Tetrarrhena laevis</i>	
Polygalaceae	<i>Comesperma virgatum</i>	
Proteaceae	<i>Adenanthos barbiger</i>	
Proteaceae	<i>Adenanthos meisneri</i>	
Proteaceae	<i>Banksia attenuata</i>	
Proteaceae	<i>Banksia dallanneyi</i>	
Proteaceae	<i>Banksia grandis</i>	
Proteaceae	<i>Banksia ilicifolia</i>	
Proteaceae	<i>Grevillea manglesioides</i>	
Proteaceae	<i>Hakea ruscifolia</i>	
Proteaceae	<i>Hakea varia</i>	
Proteaceae	<i>Persoonia elliptica</i>	
Proteaceae	<i>Persoonia longifolia</i>	
Proteaceae	<i>Petrophile linearis</i>	
Proteaceae	<i>Xylomelum occidentale</i>	
Restionaceae	<i>Desmocladius fasciculatus</i>	

<b>FAMILY</b>	<b>SPECIES</b>	<b>NATURALISED</b>
Restionaceae	<i>Desmocladius flexuosus</i>	
Restionaceae	<i>Hypolaena exsulca</i>	
Restionaceae	<i>Hypolaena pubescens</i>	
Rhamnaceae	<i>Spyridium globulosum</i>	
Rutaceae	<i>Philotheca spicata</i>	
Santalaceae	<i>Exocarpos odoratus</i>	
Stylidiaceae	<i>Levenhookia stipitata</i>	
Stylidiaceae	<i>Stylidium brunonianum</i>	
Stylidiaceae	<i>Stylidium repens</i>	
Thymelaeaceae	<i>Pimelea rosea</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea brunonis</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea gracilis</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>	
Zamiaceae	<i>Macrozamia riedlei</i>	

## Appendix 7. Photographs of Vegetation units mapped within the Survey Area

### Vegetation Unit A



#### **Woodland on Ludlow flats (grey-brown sand) (SpLD1)**

Open woodland of *Corymbia calophylla* over low woodland of *Agonis flexuosa*, *Banksia grandis*, and *Xylomelum occidentale* over tall shrubland of *Jacksonia furcellata* over open heath dominated by *Acacia pulchella*, *Adenanthos meisneri*, *Daviesia horrida*, *Gastrolobium praemorsum*, *Hardenbergia comptoniana*, *Spyridium globulosum* and *Xanthorrhoea preissii* over scattered grasses of *Austrodanthonia setacea* and *Austrostipa campylachne*, scattered herbs of *Burchardia congesta* and sedges of *Lepidosperma longitudinale* and *L. squamatum*. [Condition: Poor].

## Vegetation unit B



### **Woodland on Abba deep sandy rises (grey sand) (AbABd)**

Scattered trees of *Corymbia calophylla* over a woodland or low woodland of *Allocasuarina fraseriana*, *Banksia attenuata*, *Banksia grandis*, *Banksia ilicifolia*, *Eucalyptus marginata* and *Xylomelum occidentale* over open heath/low open heath dominated by *Hakea ruscifolia*, *Jacksonia furcellata*, *Daviesia horrida*, *Melaleuca thymoides*, *Hibbertia hypericoides*, *Acacia pulchella*, *Acacia mooreana*, *Stirlingia latifolia*, *Dasyopogon bromeliifolius* and *Xanthorrhoea preissii* over open sedgeland of *Phlebocarya ciliata*, *Hypolaena exsulca*, *Tetraria octandra*, *Lyginia barbata* and scattered herbs including *Stylidium repens* and *Burchardia congesta*.  
[Condition: Varies from Good to Poor]

## Vegetation unit C



### **Low closed forest on Abba wet flats (AbABw)**

Low closed forest of *Melaleuca raphiophylla* and *Acacia divergens*, *Acacia saligna*, *Agonis flexuosa* over *Exocarpos odoratus*, *Taxandria linearifolia*, *Spyridium globulosum*, *Hakea varia*, *Xanthorrhoea brunonis* shrubland over *Schoenus laevigatus* or *Lepidosperma longitudinale* sedgeland. [Condition: Varies from Poor – Good].

## Vegetation unit D



### **Woodland on Abba deep sandy rises (yellow-brown sandy loam) (AbABd)**

Woodland to open forest of *Corymbia calophylla* and *Eucalyptus marginata* over *Agonis flexuosa*, *Banksia grandis* and scattered *Allocasuarina fraseriana* and *Banksia attenuata* over open heath dominated by *Xylomelum occidentale*, *Jacksonia furcellata*, *Daviesia horrida*, *Adenanthos meisneri* and *Acacia pulchella* over scattered low open shrubland of *Acacia mooreana*, *Hibbertia hypericoides*, *Hibbertia cunninghamii* and *Dampiera linearis* and open sedgeland of *Hypolaena pubescens*, *Lepidosperma squamatum*, *Mesomelaena tetragona*, *Tetraria capillaris* and *Tetraria octandra*. [Condition: Very Good].

## Vegetation unit E



### **Low Open forest on Abba deep sandy rises (dampland) (AbABd)**

Low closed forest to closed forest of *Melaleuca raphiophylla*, *M. preissiana*, *Agonis flexuosa* and *Banksia littoralis* with scattered emergent *Corymbia calophylla* over tall open scrub of *Acacia divergens*, *Acacia saligna*, *Dasypogon hookeri*, *Jacksonia furcellata*, *Taxandria linearifolia*, *Astartea* sp. Gingalup, *Kunzea glabrescens*, *Viminaria juncea* and *Xanthorrhoea preissii* over sedgeland of *Cyathochaeta clandestina*, *Schoenus laevigatus* or (locally) *Lepidosperma longitudinale*. [Condition: Varies from Good – Very Good].



## Vegetation unit F



### Low Closed forest on Yelverton wet valleys (WsYLvw)

Low closed forest *Melaleuca raphiophylla* and *Agonis flexuosa* with emergent trees of *Corymbia calophylla* and *Eucalyptus rudis* over tall open scrub of *Taxandria linearifolia* over tall sedgeland of *Lepidosperma tetraquetrum* [Condition varies: Degraded to Very Good].

## Vegetation unit G



### **Open forest on Wilyabrup slopes (WvWL3)**

Open forest of *Eucalyptus marginata* and *Corymbia calophylla* open forest over *Agonis flexuosa* low woodland over open heath dominated by *Bossiaea linophylla*, *Acacia pulchella*, *Hakea lissocarpha*, *Hovea elliptica*, *Jacksonia furcellata*, *Phyllanthus calycinus* and *Xanthorrhoea preissii* on grey-brown sandy loam.



## Appendix 8. Assessment for Cape Naturalist Road proposed Dual-use Path\_December 2017

### ***Banksia Woodlands of the Swan Coastal Plain ecological community - Guidance for referrals under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).***

**This guidance document accompanies the *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain Ecological Community* (the conservation advice), which is the key document for identifying the ecological community, available at <http://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=131>.**

The purpose of this document is to provide guidance to persons preparing referrals under the EPBC Act for actions that may impact the Banksia Woodlands of the Swan Coastal Plain ecological community (the Banksia Woodlands TEC), which is listed as threatened under the EPBC Act. When considering whether or not an action will have a significant impact on the Banksia Woodlands TEC, the Department will consider a range of variables relevant to an individual patch and the broader occurrences of the Banksia Woodlands TEC.

Referrals under the EPBC Act for a proposed action that may impact the Banksia Woodlands TEC should include information to demonstrate whether native vegetation in the project site or in other off-site areas that may be impacted by the action (e.g. by hydrological changes), is the Banksia Woodlands TEC; and whether the action will result in a significant impact to the Banksia Woodlands TEC.

In order to determine this, referrals should firstly consider whether any native vegetation is consistent with the description and key diagnostic characteristics which classify the Banksia Woodlands TEC (as outlined in the conservation advice), including location, structure, composition.

If any native vegetation is consistent with the key diagnostic characteristics, the referral then needs to consider additional information, which describes the condition, sub-community, size and specific characteristics of the Banksia Woodlands TEC that may be impacted by the proposed action.

Informed by this information, referrals should then consider whether the proposed action has a real chance or possibility in resulting in a significant impact to the Banksia Woodlands TEC.

#### Key diagnostic characteristics

- Must meet these characteristics to be considered the Banksia Woodlands TEC
- If the key diagnostic characteristics are met, the additional information should be provided for consideration

#### Additional information

- Define the condition, size, sub-community and specific characteristics of the ecological community

#### Significant impact guidelines

- Discuss the likelihood that the proposed action has a real chance or possibility in resulting in a significant impact
- Impacts expected need to be explained and, to the extent possible, quantified.

The following information should be provided in a referral to assist the decision makers in determining whether there is a real chance or possibility that the proposed action will result in

a significant impact to the EPBC Act listed Banksia Woodlands TEC. In the absence of adequate information, the Department will take a precautionary approach in assessing the likelihood of significant impacts to a vegetation community that could be considered to be the Banksia Woodlands TEC.

### Key diagnostic characteristics

**Table 1:** Key diagnostic characteristics of the Banksia Woodlands TEC

Key diagnostic characteristics <sup>♦</sup>	Information	Key diagnostic questions* (Refer to Section 2.2 of the conservation advice for a complete explanation of these diagnostic features)	Response (yes/no/possibly) and discussion (Use as much space as necessary) <sup>#</sup>
Location and physical environments	Bioregion	Is the proposal site within the Swan Coastal Plain IBRA bioregion (including Dandaragan plateau), or adjacent areas within the Jarrah Forest IBRA bioregion?	Yes
Soils and Landform	Soil type	Is the soil type consistent with where the Banksia Woodlands TEC may occur?	Yes
	Location in the landscape, topography	Is the topography consistent with where the Banksia Woodlands TEC may occur?	Yes
Structure	Tree composition, understory composition, diversity, species	Is the structure consistent with the characteristics set out in the conservation advice?	Yes
Composition	Dominant tree species, emergent tree layer, understory	Is the composition consistent with the characteristics set out in the conservation advice?	Yes

♦ Further information on the key diagnostic characteristics is provided in the BWSCP Conservation Advice.

\* The Banksia Woodlands TEC may comprise restored or revegetated flora. Do not exclude vegetation from being classed as the Banksia Woodlands TEC because it is restored or revegetated flora.

# Any discussion should include references to appropriate supporting information and data.

### Additional information

**Table 2:** Additional information to characterise the Banksia Woodlands TEC

Key diagnostic characteristics <sup>♦</sup>	Information	Relevant content to be discussed in the referral (Relevant section of BWSCP Conservation advice)	Response and discussion (Use as much space as necessary) <sup>#</sup>
Location and physical environments	Regional distribution and quality	Quantity/quality of vegetation community in, and in the region around, the site where the proposed action will occur (Section 2.2.2)	Good to Excellent condition. Action will occur adjacent to road and conservation reserves >10 ha in area.

Patch condition	Condition thresholds	What is the patch condition using the condition categories outlined in Section 2.2.2 <b>Note:</b> A patch could vary in quality over the range of the patch.	Good to Excellent, with > 5ha Very Good/Excellent
Patch Size	Patch size in hectares	Is the patch size large enough to meet criteria in Section 2.2.3? <b>Note:</b> Patch boundaries are not limited to the proposal site.	Yes
	Surrounding buffer	What is the size and vegetation community of the surrounding buffer? (Section 2.2.3) and what is the connectivity to the surrounding vegetation? <b>Note:</b> The assessments of a patch should initially be centred on the area of highest native floristic diversity and/or cover i.e. the best condition area of the patch and one patch could be made up of several sub-communities.	Adjacent to a conservation reserve totalling approx.. 9 ha. Condition mainly Very Good/Excellent.
Other condition considerations	Presence/absence and spread of <i>Phytophthora cinnamomi</i> (dieback)	If present, how much dieback exists and is the proposed action likely to spread dieback further? (Appendix D5) If not present, can its introduction be prevented?	Patchy dieback present in adjacent reserve (1 – 2 ha)
	Presence/absence weeds	Does the patch contain weeds? (Appendix D6) Which species are present and how can they be managed?	Yes, mainly small annual weeds.
	Any other notable disturbance to the site where relevant (i.e. fragmentation, fire regimes, bare patches, erosion, feral animals)	What disturbance is present which may degrade the quality of the community or species? (Appendix D) For any/each form of disturbance, what is the degree of the disturbance? Is there evidence of recruitment of key native plant species following disturbance?	
	Patch isolation	Is the patch connected to other areas of Banksia Woodland or is it isolated? (Section 2.2)	Other areas of Banksia woodland within 500 m.
Sub-community and vegetation unit	Broad scale structural unit (Beard vegetation associations)	Provide the best corresponding Beard vegetation association (s) (Appendix C1)	Veg Assoc. 1000
	Floristic community types (Gibson et al., 1994; Keighery et al., 2008)	Provide the closest resemblance of floristic community type(s) with reference to those discussed in Appendix C2 of the BWSCP Conservation advice (Appendix C2 and Section 1.3.2) <b>Note:</b> there is potential for multiple sub-communities within a patch.	Whicher Scarp community B2 (Western Whicher Scarp <i>Banksia attenuata</i> woodland)
	Western Australian ecological community listing	Is this ecological community listed in Western Australia? (Section 2.2.2) <b>Note:</b> Ecological communities which are also listed as threatened or Priority ecological communities in Western Australia have higher significance than sub-types known to be more	Yes

		common and should be provided specific or additional protection.	
Surveying	Timing of the surveying	Ideally surveys should be undertaken in spring with two sampling periods to capture early and late flowering species (Section 2.2.2). When was sampling undertaken at the proposed site? Is there any reason why the vegetation community could not be readily identified (e.g. due to recent disturbance such as fire)? <b>Note:</b> Section 2.2.4 of the BWSCP Conservation advice has guidance on timing/protocols for surveys (e.g. after fire).	September/October 2017

♦ Further information on the key diagnostic characteristics is provided in the BWSCP Conservation advice.

# Any discussion should include references to appropriate supporting information and data.

### Assessment of significant impacts

The discussion of the likelihood that the proposed action has a real chance or possibility in resulting in a significant impact to the Banksia Woodlands TEC should consider the significant impact criteria for critically endangered and endangered ecological communities outlined in the Department's [Significant Impact Guidelines 1.1 - Matters of National Environmental Significance, Commonwealth of Australia, 2013](#) and the conservation advice (particularly the other factors outlined in section [2.2.4 Step 4: Further information to assist in determining the presence of the ecological community and significant impacts](#)).

Impacts expected need to be explained and, to the extent possible, quantified.

Consider representing this information in the following table:

<b>Significant Impact Criteria</b> <i>An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:</i>	<b>Description of proposed action in relation to significant impact criteria</b>	<b>Likelihood</b> <i>(known, likely, possible, unlikely)</i>
Reduce the extent of an ecological community	0.095 ha Swan Coastal Plain Banksia Woodlands TEC cleared.	Likely
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Clearing of part of edge of TEC occurrence	Likely
Adversely affect habitat critical to the survival of an ecological community	Clearing of part of edge of TEC occurrence	Likely
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Clearing of 0.095 ha of TEC occurrence	Possible
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Clearing of 0.095 ha of TEC occurrence	Unlikely
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:	Clearing of 0.095 ha of TEC occurrence	Unlikely

<ul style="list-style-type: none"> <li>— assisting invasive species, that are harmful to the listed ecological community, to become established, or</li> <li>— causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community</li> </ul>		
Interfere with the recovery of an ecological community	Clearing of 0.095 ha of TEC occurrence	Unlikely

**Conclusion: Based on the above, referral of the proposal for assessment under the EPBC Act is recommended.**

## Appendix 9. Assessment of the *Caladenia excelsa* population against MNES criteria

### Assessment of the population of Endangered *Caladenia excelsa* on Cape Naturalist Road (East side of Cape Naturaliste Rd from Crown Reserve 42393 to Hansen St) against Commonwealth Matters of National Environmental Significance criteria

---

The following Significant Impact Criteria for Critically Endangered and Endangered species were established under the EPBC Act (DotE, 2013)<sup>1</sup>.

#### Significant impact criteria

An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:

- **lead to a long-term decrease in the size of a population**

The population is confined to a single plant first observed in 2010 and again in 2016. It was not found during an inspection in spring 2017. The location of the population is on a narrow road reserve that will be directly impacted by the proposed dual-use path. It is not clear whether the plant seen in 2010 is the same as that seen in 2016, however the proposed path will remove about 50% of the roadside habitat of the population. Under the proposal as it currently stands, no impact to the individual(s) is anticipated, as such it is unlikely that the proposed path will lead to a long-term decrease in the size of the population.

- **reduce the area of occupancy of the species**

The proposed path will remove about 50% of the roadside potential habitat of the population, however only one or two plants have been recorded in this area, and under the current proposal these individual(s) will not be impacted, and as such it is unlikely to reduce the area currently occupied by those plants.

- **fragment an existing population into two or more populations**

The proposed action is unlikely to fragment an existing population into two or more populations because the population probably consist of only one plant.

- **adversely affect habitat critical to the survival of a species**

The relatively small area of potential habitat where the *C. excelsa* occurs that would be directly affected by the proposed path (225 m<sup>2</sup>) is unlikely to constitute habitat critical to the survival of the species. At least 10 sub-populations of the species occur within National Park.

- **disrupt the breeding cycle of a population**

---

<sup>1</sup> Department of the Environment (DotE) 2013. Matters of National Environmental Significance Significant Impact Guidelines 1.1. Commonwealth of Australia.



Not known.

- **modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**

The proposed action is unlikely to lead to a significant modification, destruction, removal, isolation or decrease the availability or quality of habitat to the extent that the species is likely to decline because of the relatively large number (c. 30) of populations and sub-populations and because around a third of these are in National Park.

- **result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat**

It is unlikely that the proposed action will result in the introduction of invasive species becoming established in the species' habitat. The habitat where the population is already degraded through the action of *Phytophthora* disease and the presence of some weeds.

- **introduce disease that may cause the species to decline, or**

The habitat of the *C. excelsa* population is already affected by the action of *Phytophthora* disease. Provided good disease risk hygiene measures are employed during the proposed action, and because there is only one plant present (and there are no others known from within 100 m) it is unlikely that introduction of disease will occur that may cause the species to decline.

- **interfere with the recovery of the species.**

As noted above the Cape Naturalist Road population consists of only one or two species (if it is still present at all). There are no other known populations of *C. excelsa* within 100 m and therefore the proposed action is unlikely to interfere with the recovery of the species.

**Conclusion: Based on the assessment above, the proposal does not require referral for assessment under the EPBC Act for impacts to *Caladenia excelsa*.**