

Road Reserve Reconnaissance Flora and Vegetation Survey

Peel Business Park Trunk Infrastructure Extension

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No:	EEL11266.006			
Version:	Rev 0			
Date:	April 2018			



Document Status

Version	Purpose of Document	Author	Reviewed by	Review Date
Draft A	Draft for Client Review	CarGil	GilGla	13.11.17
Rev 0	Final for Issue	GilGla	JohHal	27.03.18

Approval for Issue of Final Report

Name	Signature	Date
J. Halleen	chatter.	04.04.18
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Summary

RPS Australia West Pty Ltd (RPS) was commissioned by LandCorp to undertake a reconnaissance flora and vegetation survey, inclusive of a targeted black cockatoo tree assessment, of approximately 15.7 kilometres (km) of road reserve in the Parklands, Stake Hill and Nambeelup localities (the survey area).

The reconnaissance flora and vegetation survey was undertaken in accordance with the Environmental Protection Authority's (EPA) Technical Guidance: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

The findings of the assessment can be summarised as follows:

- A total of 69 plant taxa were recorded for the current survey 14 of which were exotic (weed) species.
- No Threatened Flora (TF) species listed under the Wildlife Conservation Act 1950¹ (WC Act) or under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) were recorded within the survey area.
- No Priority Flora (PF) species listed by the Department of Biodiversity Conservation and Attractions (DBCA) were recorded within the survey area.
- Naturalised bushland weeds were recorded at high densities throughout all of the survey area, except for areas mapped in "Very Good" condition where disturbance by weeds was low.
- Of the 14 weed species recorded, none were determined to be Declared Pests under the *Biosecurity* and Agriculture Management Act 2007 (BAM Act) nor were they classified as Weed of National Significance (WONS).
- Eleven upland and dampland/wetland vegetation units were described and mapped for the remnant vegetation within the survey area. A description of these vegetation units follows
 - Remnant Tuart (Upland) Eucalyptus gomphocephala (tuart) remnant trees over a degraded understorey of annual and perennial naturalised alien (weed) herbs and grasses
 - Planted Trees and Shrubs (Upland) planted (non-endemic) eucalypts over emergent and planted native shrubs
 - Remnant Marri (Upland/Damplands) Corymbia calophylla (marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses
 - Flooded Gum Woodland (Dampland) Eucalyptus rudis subsp. rudis Low Open Woodland over Jacksonia sternbergiana, J furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland
 - Flooded Gum Forest over Sedgeland (Dampland) Eucalyptus rudis subsp. rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland
 - Casuarina obesa Forest (Wetland) Casuarina obesa Closed Forest over Lepidosperma sp., Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland

¹ The *Biodiversity Conservation Act 2016* will eventually fully replace the *Wildlife Conservation Act 1950* in listing threatened species and regulating the protection of native species, however these provisions cannot be brought into effect until the necessary Biodiversity Conservation Regulations have been endorsed.

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- Samphire-dominated Saltmarsh (Wetland) Tecticornia ?halocnemoides, T indica subsp. bidens and Cotula coronopifolia Closed Herbland
- Banksia Woodland (Upland) Scattered Eucalyptus marginata (jarrah) and Corymbia calophylla (marri) over *Banksia menziesii*, *B attenuata* and ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland
- Remnant Melaleuca preissiana (Dampland/Wetland) Melaleuca preissiana remnant trees over a degraded understorey of exotic grasses
- Melaleuca Closed Forest (Wetland) Eucalyptus rudis subsp. rudis (flooded gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia sp. Closed Sedgeland/ Herbland
- Remnant Mixed Trees (Upland and Dampland) Scattered Eucalyptus marginata (jarrah), Corymbia calophylla (marri), Allocasuarina fraseriana (sheoak), Banksia spp. and Melaleuca preissiana trees over a degraded understorey of naturalised alien (weed) herbs and grasses
- Scrub (Dampland) Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses.
- Vegetation condition ranged from "Very Good" to "Completely Degraded" throughout the survey area, with the majority of the vegetation within the road reserve, and areas adjacent to the road reserve and within the survey area, recorded in "Completely Degraded" condition. The vegetation associated with the Conservation Category Wetlands (CCW) was generally floristically and structurally intact and was mapped variously as "Good", "Good to Very Good" and "Very Good" condition.
- In assessing the conservation significance of flora within the survey area, consideration is given to rarity, biodiversity, endemism and representativeness of the flora in the area. Outcomes were as follows
 - Rarity of the survey area flora was assessed as low.
 - Floristic diversity was assessed as moderate.
 - Banksia Woodland vegetation within the survey area is not considered to have adequate conservation value to be considered a Matter of National Environmental Significance (MNES), and protected under the EBPC Act.
 - The samphire-dominated saltmarsh vegetation within the survey area is considered to have adequate conservation value to be considered a MNES, and protected under the EBPC Act.
 - The remnant *Eucalyptus gomphocephala* (tuart) remnant trees mapped within the survey area are associated with a large mapped patch of tuart woodland they would likely be considered a high priority for protection and management.
- The 74 remnant trees within the survey area with a diameter at breast height (DBH) greater than 500
 millimetres (mm) are considered potential night roosting and breeding habitat for black cockatoo species
 and therefore conservation significant.
- The survey area lies adjacent to, and in some places intersects with, environmental features identified in the desktop survey, most notably CCWs associated with Goegrup Lake and the Serpentine River on Gordon Road (Rd), and the CCW on Patterson Rd.



Conclusions

Much of the 15.7 km survey area alignment is in "Degraded" or worse condition with little or no intact native understorey. Sections of the survey area, however, are adjacent to, or intersect environmental features identified in the desktop survey such as mapped CCWs, records of the EPBC Act listed Subtropical and Temperate Coastal Saltmarsh ecological community and remnant trees associated with potential black cockatoo habitat.



1 Introduction

1.1 Project Background

RPS was commissioned by LandCorp to undertake a reconnaissance flora and vegetation survey, inclusive of a targeted black cockatoo tree assessment, of approximately 15.7 km of road reserve in the Parklands, Stake Hill and Nambeelup localities (the survey area; Figure A).

The Peel Business Park project requires the delivery of trunk infrastructure (sewer, power and water services) between Gordon Rd, Parklands, in the City of Mandurah to Paterson Rd, Nambeelup, in the Shire of Murray. The purpose of the reconnaissance survey is to investigate the flora and vegetation values and identify potential black cockatoo habitat within the proposed trunk infrastructure alignment and in the immediate vicinity. The findings of the reconnaissance survey will be used to inform the location of the trunk infrastructure and construction methods to be employed.

Much of the 15.7 km alignment (the eastern half) traverses cleared agricultural land where vegetation within the road reserves comprises scattered native trees over an understorey of weeds. However along Gordon Rd, Lakes Rd, Fowler Rd and Fishhawk Rd (the western portion of the alignment), native vegetation is generally more intact with areas of Tuart Woodland, Banksia Woodland, wetland-fringing *Eucalyptus rudis* subsp. *rudis* and *Melaleuca* spp. over sedgelands, either within or adjacent to the road reserve. This western portion of the alignment intersects a mapped Environmentally Sensitive Area (ESA) and Confirmed Roosting Habitat for black cockatoos (Western Australian Local Government Authority [WALGA] 2017).

1.2 Report Objectives

This reconnaissance flora and vegetation survey report presents the findings of the vegetation assessment and black cockatoo habitat tree assessment within the survey area. The assessment includes:

- desktop survey involving
 - a review of available literature, aerial imagery and spatial datasets to identify records of conservation significant flora, vegetation, and fauna
 - searches of the DBCA's Threatened and Priority Flora database (DEFL) and the Western Australian Herbarium's (WAH) Specimen and Ecological Communities database to identify records of significant flora and vegetation within the vicinity
- site visit to assess the vegetation type and condition within the survey area, confirm the presence of significant features identified in the database searches, and to produce maps of the proposed alignment identifying the location of any constraints identified
- targeted search for any Threatened Flora (TF) or Priority Flora (PF) species known from the area (as recorded in the DBCA database and NatureMap searches) in likely habitat
- targeted tree survey to identify potential black cockatoo breeding habitat
- assessment of the conservation significance of the vegetation and the identification of other mapped environmental constraints (e.g. wetlands and ESAs).

1.3 Legislative Context

State and Commonwealth legislation pertaining to the conservation of native flora, vegetation and fauna include (but are not limited to) the *Environmental Protection Act 1986* (EP Act), WC Act and EPBC Act.



Section 4A of the EP Act states that the following principles should be adhered to in order to protect the environment:

- Precautionary Principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Principle of Intergenerational Equity The present generation should ensure that the health, diversity
 and productivity of the environment is maintained or enhanced for the benefit of future generations.
- Principle of the Conservation of Biological Diversity and Ecological Integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.

1.3.1 Flora of Conservation Significance

TF are listed under listed if they are considered to be in danger of extinction, rare or otherwise in need of special protection. These taxa are legally protected under the WC Act. The removal of these taxa or impact to their surroundings is not permitted without prior ministerial approval. The DBCA maintains a list of PF species, which may be rare or threatened but for which there are either insufficient survey data to accurately determine their status, or which are rare but not currently considered to be threatened. A PF taxon is assigned to one of five priority categories. TF and PF categories are defined in Appendix A (Table A-1).

Many taxa listed as TF under the WC Act have additional protection as they are also listed as TF under one of six threat categories (Extinct; Extinct in the wild; Critically Endangered; Endangered; Vulnerable; or Conservation Dependent) under the EPBC Act. TF taxa are defined as MNES under the EPBC Act and penalties apply for any damage to individuals, populations or habitats of these flora species. EPBC Act conservation categories are defined in Appendix A (Table A-2).

1.3.2 Vegetation of Conservation Significance

Floristic Community Types (FCTs) are based on a survey of the vegetation of the Swan Coastal Plain (SCP) from Seabird to Dunsborough, completed by Gibson *et al.* (1994). The purpose of the Gibson *et al.* (1994) survey was to determine the number and type of vegetation communities present across the southern SCP and to then assess how much of each remained and whether they were protected within reserves. There were 509 bounded 10 metres (m) \times 10 m floristic sites surveyed. Each FCT defined as a result of Gibson *et al.* (1994) was given a Reservation Status and a Conservation Status (Appendix A, Tables A-3 and A-4).

Most of the SCP Threatened Ecological Communities (TECs) and/or Priority Ecological Communities (PECs) are defined by their FCT in Gibson *et al.* (1994).

TECs classified by DBCA in one of the TEC categories (Appendix A, Table A-5) have limited protection under State legislation. Other ecological communities are classified by DBCA in the category of PEC pending further survey and/or definition. PECs are not currently protected. Some TECs are also listed under the EPBC Act.

1.3.3 Revised Draft Referral Guideline for Black Cockatoos

The Revised Draft Referral Guideline for the Three Threatened Black Cockatoo Species (Department of the Environment and Energy [DEE] 2017) provides updated information and requirements on habitat quality, survey expectations, standards for mitigating impacts and significant impacts for black cockatoo species.

In addition to the information contained in the earlier 2012 guidance, the revised draft referral guideline identifies that the following actions are likely to result in significant impacts to these species:



- 1. Clearing of known nesting tree2 or breeding habitat.
- 2. Complete clearance of roost sites that are close to high quality foraging habitat and water resources in non-breeding areas.
- 3. Clearing very high to high quality foraging habitat.

² Any existing tree in which breeding has been recorded or suspected.



2 Methods

The reconnaissance flora and vegetation survey was undertaken in accordance with the EPA's Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

As stated in the guidance, a reconnaissance level survey is undertaken to provide context and gather broad information about a survey area. Generally, a reconnaissance survey is required where flora and vegetation values are well defined, the area is not likely to support significant flora or vegetation and the scale and nature of potential impacts are not likely to be significant. A reconnaissance survey is undertaken to verify the information obtained from the desktop study, characterise the flora and delineate the vegetation units present using low intensity sampling of the flora and vegetation, and identify the potential impacts of the proposed development on local flora and vegetation values particularly flora taxa of conservation significance.

In addition to delineation of vegetation units, the survey area was traversed to compile a flora inventory, and to search for conservation significant taxa that were identified in the desktop study as potentially occurring there.

2.1 Desktop Assessment

The main objective of the desktop assessment was to determine any environmental constraints that occur, or are likely to occur within the survey area or vicinity, and so assist in identifying conservation significant features during the field survey. Constraints included:

- ESAs (Declared by the Minister under section 51B of the EP Act)
- MNES (Protected under the EPBC Act)
- flora taxa and vegetation communities of conservation significance.

A review was undertaken of the flora, vegetation and other environmental data available for the survey area and surrounds which incorporated the following:

- regional historical climate, geological, soil and landform data
- regional vegetation mapping and datasets.

In addition, searches of the following State and Commonwealth databases were undertaken to identify constraints that may occur in the vicinity of the survey area:

- DBCA Flora and Ecological Communities databases
- NatureMap database conservation significant flora and vegetation
- Protected Matters Search Tool (DEE) MNES
- Landgate WAATLAS Shared Land Information Platform portal Geomorphic Wetlands of the Swan Coastal Plain.

The database searches were conducted within a 5 km radial area of the alignment for the DBCA flora database search and a 3 km radial area of the alignment for the DBCA ecological communities database search.



2.2 Field Survey

2.2.1 Reconnaissance Flora and Vegetation Assessment

The reconnaissance survey was carried out by qualified RPS Botanist Caroline Gill (under Licence for Scientific or Other Prescribed Purposes No. SL012170) between 26 and 27 September 2017 in accordance with the methods prescribed in the EPA's Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016).

The field survey involved traversing the survey area in a vehicle and on foot to:

- Verify the data from the desktop survey at a local scale.
- Characterise the vegetation within the road reserve.
- Record mature remnant eucalyptus and corymbia trees within the road reserve that were of adequate size to provide roosting and nesting habitat for black cockatoo species.
- Identify any constraints and potential impacts of the proposed development on local flora, vegetation and fauna values, or other environmental features such as wetlands.

The total alignment was divided up into 16 sections (map units). For each section the following was documented and mapped:

- waypoint recorded on a hand-held GPS marking the photo-point and the point where the information was recorded
- photographs of the road reserve
- description of the remnant vegetation type (if any) and condition (adapted from Keighery 1994 and Trudgen 1988) within the road reserve
- identified constraints to clearing of the vegetation including vegetation in "Good" or better condition, flora
 or vegetation of conservation significance, mature remnant native trees, conservation significant
 wetlands and ESAs
- inventory of all the flora species recorded within the survey area.

2.2.2 Significant Tree Inventory

The Significant Tree Inventory was undertaken concurrently with the reconnaissance flora and vegetation assessment. The survey methods were informed by the Revised Draft Referral Guideline for three threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo. (DEE 2017a).

All Eucalyptus and Corymbia trees (alive and dead) that occurred within the survey area and had a DBH of 500 mm or greater were recorded using a hand-held GPS. The tree species name, health and presence of hollows were noted.

2.3 Data Analysis

2.3.1 Flora and Taxonomy

A vascular flora inventory was compiled from flora species recorded and collected within the road reserve survey area. Flora specimens were either identified in the field, or collected and identified using the resources (keys, publications and databases) of the WAH. Nomenclature was aligned with the current names in the DPaW WAH public interface database (WAH 2017).



2.3.2 Vegetation Mapping

Mapping was conducted using a combination of publicly available datasets (Heddle vegetation complexes, Geomorphic Wetlands of the Swan Coastal Plain, ESAs and DBCA Conservation Estates), aerial photointerpretation, and on-ground validation.

Vegetation description and mapping was conducted using a combination of aerial photo-interpretation, regional vegetation mapping, on-ground confirmation and vegetation structure data. Each vegetation unit was defined by the dominant plant species using the vegetation structure classes established under Bush Forever (Western Australian Planning Commission 2000) (Appendix A, Table A-6).

Vegetation condition mapping was conducted using aerial photo-interpretation and on-site confirmation. Vegetation condition was assessed using the Vegetation Condition Scale adapted from Keighery (1994) and Trudgen (1988) recommended in the EPA's Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016) (Appendix A, Table A-7).



3 Existing Information

3.1 Climate

The survey area is located on the SCP, which experiences a Mediterranean climate characterised by hot, dry summers and cool, wet winters, with an average maximum summer temperature of 30.5 °C and an average minimum winter temperature of 7 °C (Bureau of Meteorology 2017).

3.2 Geology and Soils

The SCP consists of five major geomorphological elements as defined by McArthur and Bettanay (1960). From west to east these are the Quindalup Dunes, Spearwood Dunes, Bassendean Dunes, Pinjarra Plain; and Ridge Hill Shelf. These systems lie roughly parallel to the coast and are distinguished by their geology, topography, vegetation and soils. The survey area traverses the Spearwood Dune System to the west of Goegrup Lake, and Bassendean Dunes and Pinjarra Plain east of Goegrup Lake. The Spearwood Dune System consists of slightly calcareous aeolian sand remnant from leaching of the underlying Pleistocene Tamala limestone. The Bassendean Dune System is described as being of generally low relief, often with broad swales or relatively flat sand sheets between the low dunes. Soils are predominantly deep grey leached quartz sands. The Pinjarra Plain is a piedmont and valley-flat alluvial plain consisting predominantly of clayey alluvium that has been transported by rivers and streams from the Darling and Dandaragan Plateaus.

3.3 Interim Biogeographical Regionalisation of Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) divides Australia into bioregions based on major biological and geographical/geological attributes (Thackway and Cresswell 1995). The IBRA currently recognises 89 bioregions and 419 biological subregions in Australia. The survey area lies within the Perth (SWA02) subregion of the SCP bioregion.

The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats and coastal limestone and the vegetation is described by Mitchell *et al.* (2002) as Heath and/or Tuart woodlands on limestone, Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes of various ages and Marri on colluvial and alluvials.

3.4 Beard Vegetation Mapping

The survey area is situated in South West Botanical Province and the Darling Botanical District (Beard 1990). This region typically consists of forest country with related woodlands and is divided into four botanic subdistricts. The survey area is located within the SCP Subregion in the Drummond Botanical Subdistrict, which consists mainly of the following vegetation communities according to Beard (1990):

- Banksia Low Woodland on leached sands and Melaleuca Swamps in poorly drained areas
- woodland of tuart (*Eucalyptus gomphocephala*); and jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) on less leached soils.

Vegetation mapping of the region was completed by Beard (1981) at a scale of 1:250,000. Shepherd *et al.* (2002) reassessed Beard's existing mapping dividing some of the broader vegetation units into smaller units.

The vegetation within the survey area is mapped as:

 Vegetation Association 1001 – Medium very sparse woodland; jarrah, with low woodland; banksia and casuarina



- Vegetation Association 1000 Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; teatree (Melaleuca spp.)
- Vegetation Association 968 Medium woodland; jarrah, marri and wandoo.

The remnant extent and reservation status of these vegetation associations within the IBRA Subregion is presented in Table 1.

Table 1Pre-European Extent, Current Extent and Reservation Status within the Perth IBRA
Subregion of the Swan Coastal Plain (SWA02) of the Beard Vegetation Associations
Represented within the Survey Area

Vegetation Association	Pre-European Extent (ha)	Current Extent (ha)	Extent Remaining (%)	Extent Remaining Protected for Conservation (%)
968	136,188	8,967	6.5	1.19
1000	94,175	23,670	25.13	2.06
1001	57,410	12,792	22.28	2.80

Source: Government of Western Australia 2016

3.5 Heddle Vegetation Complexes

Vegetation complexes are vegetation associations that are characteristic of various combinations of soil, landform and rainfall. A large part of the SCP has been mapped for vegetation complexes by Heddle *et al.* (1980). These complexes are closely related to the SCP Dune Systems (Quindalup, Spearwood, Bassendean, and Pinjarra Plain) and north to south variations in climate and rainfall.

Heddle et al. (1980) mapped the vegetation within the survey area (west to east) as:

- Yoongarillup Complex: Woodland to tall woodland of *E. gomphocephala* with *Agonis flexuosa* in the second storey. Less consistently an open forest of *E. gomphocephala E. marginata E. calophylla*
- Herdsman Complex: Sedgelands and fringing Woodlands
- Bassendean Complex Central and South: Vegetation ranges from woodland of *E. marginata* C. fraserana Banksia spp. to low woodland of Melaleuca spp. and sedgelands on the moister sites.

The remnant extent and reservation status of these vegetation complexes on the SCP is presented in Table 2. Vegetation complex mapping is presented in Figure B.

Table 2 Pre-European Extent, 2013 Extent and Reservation Status on the Swan Coastal Plain of the Heddle Vegetation Complexes Represented within the Survey Area

Vegetation Complex	Pre-European Extent (ha)	2013 Extent (ha)	Extent Remaining (%)	Extent Remaining with Formal Protection (%)
Yoongarillup	26,982	10,448	38.72	15.41
Herdsman	8,309	2,877	34.63	21.41
Bassendean Central and South	87,392	24,206	27.70	2.57

Source: Perth Biodiversity Program 2013



4 Results

4.1 Desktop Assessment

4.1.1 Threatened and Priority Flora Database Search Results

Searches of the DBCA Threatened and Priority Flora database and the WAH Specimen database were undertaken within a 5 km radius of the centre of the survey area.

A total of 22 species of conservation significance were found to occur within the 5 km search radius comprising six Threatened flora species, one Priority 1, two Priority 2, five Priority 3 and eight flora taxa (Table 3). Table 3 additionally identifies the listed species protection status under the EPBC Act.

The listed species were ranked in terms of their "likelihood of occurrence" within the survey area based on proximity of known records and habitat preference. Thirteen species listed in Table 3 were assessed as likely or possibly occurring within, or in close proximity to, the survey area based primarily on habitat preferences.

Conservation significant species records in the vicinity of the survey area are shown in Figure B.

Species	WC Act Status*	EPBC Act Status [†]	Likelihood of Occurrence within the Survey Area
Caladenia huegelii	Т	CR	Unlikely
Diuris drummondii	Т	VU	Unlikely
Drakaea elastica	Т	CR	Likely/Possible
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	Т	CR	Possible
Synaphea sp. Pinjarra (R. Davis 6578)	Т	CR	Unlikely
Tetraria australiensis	Т	VU	Unlikely
Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)	P1	-	Possible
Acacia benthamii	P2	-	Possible
Johnsonia pubescens subsp. cygnorum	P2	-	Possible
Beyeria cinerea subsp. cinerea	P3	-	Unlikely
Boronia capitata subsp. gracilis	P3	-	Possible
Cyathochaeta teretifolia	P3	-	Possible
Dillwynia dillwynioides	P3	-	Likely/Possible
Pimelea calcicola	P3	-	Unlikely
Caladenia speciosa	P4	-	Possible
Drosera occidentalis subsp. occidentalis	P4	-	Unlikely
Eucalyptus rudis subsp. cratyantha	P4	-	Likely/Possible

Table 3 Threatened and Priority Flora Recorded within a 5 km Radius of the Survey Area



Species	WC Act Status*	EPBC Act Status [†]	Likelihood of Occurrence within the Survey Area
Jacksonia sericea	P4	-	Unlikely
Microtis quadrata	P4	-	Unlikely
Ornduffia submersa	P4	-	Possible
Parsonsia diaphanophleba	P4	-	Possible
Rumex drummondii	P4	-	Possible

*WC Act † EPBC Act.

4.1.2 **Ecological Communities Database Search Results**

A search of the DBCA's Ecological Communities database was undertaken for TECs and PECs with records within a 3 km radius of the survey area.

The database searches returned 382 records of two EPBC listed TECs, Banksia Woodlands of the Swan Coastal Plain (371 records); and Subtropical and Temperate Coastal Saltmarsh ecological communities (seven records), one record of a Priority 3 PEC, and two records of a P2 PEC within a 3 km radius of the survey area. It should be noted that a number of FCTs, defined as part of the Floristic Survey of the SCP (Gibson et al. 1994), are included within the Banksia Woodlands ecological community. Some of these subcommunities within the Banksia Woodlands are highly restricted and listed as TECs or PECs in Western Australia. These have higher significance than sub-types known to be more common and should be provided specific or additional protection, particularly where assigned a higher threat rank than the Banksia Woodlands listing (DEE 2016). In this case FCTs 22 and 21c, listed as PECs are considered components of the EPBC listed Banksia Woodlands of the Swan Coastal Plain TEC.

Conservation significant ecological community records in the vicinity of the survey area are shown in Figure B. A description of these ecological communities is presented in Table 4. The survey area intersects the buffers of two of these EPBC listed TECs, Banksia Woodlands of the Swan Coastal Plain ecological community and Subtropical and Temperate Coastal Saltmarsh ecological community.

Table 4 TEC / FEC Records Within a 5 km Radius of the Survey Area	Table 4	TEC / PEC Records Within a 3 km Radius of the Survey Area
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TEC / PEC	Description	WC Act Status*	EPBC Act Status [†]
Banksia Woodlands of the Swan Coastal Plain ecological community	The ecological community is a woodland associated with the Swan Coastal Plain of south-west Western Australia. A key diagnostic feature is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy. The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range (DEE 2016).	-	Endangered



TEC / PEC	Description	WC Act Status*	EPBC Act Status [†]
Subtropical and Temperate Coastal Saltmarsh ecological community	The Subtropical and Temperate Coastal Saltmarsh (hereafter Coastal Saltmarsh) ecological community occurs within a relatively narrow margin of the Australian coastline, within the subtropical and temperate climatic zones south of the South-east Queensland IBRA bioregion boundary at 23°37' latitude along the east coast and south of (and including) Shark Bay at 26° on the west coast. The community consists mainly of salt-tolerant vegetation (halophytes) including grasses, herbs, reeds, sedges and shrubs. Succulent herbs and grasses generally dominate and vegetation is generally <0.5 m tall with the exception of some reeds and sedges. Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats (DEE 2013).	Priority 3	Vulnerable
FCT 22 – <i>Banksia ilicifolia</i> woodlands (A component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC)	Low lying sites generally consisting of <i>Banksia ilicifolia – B. attenuata</i> woodlands, but <i>Melaleuca preissiana</i> woodlands and scrubs are also recorded. Occurs on Bassendean and Spearwood systems in the central Swan Coastal Plain north of Rockingham. Typically has very open understorey, and sites are likely to be seasonally waterlogged.	Priority 3	Endangered
FCT 21c – Low-lying Banksia attenuata woodlands or shrublands (A component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC)	This type occurs sporadically between Gingin and Bunbury, and is largely restricted to the Bassendean system. The type tends to occupy lower lying wetter sites and is variously dominated by <i>Melaleuca preissiana, Banksia attenuata, B.</i> <i>menziesii, Regelia ciliata, Eucalyptus marginata</i> or <i>Corymbia</i> <i>calophylla.</i> Structurally, this community type may be 23 either a woodland or occasionally shrubland.	Priority 3	Endangered

*WC Act †EPBC Act

4.1.3 Geomorphic Wetlands of the Swan Coastal Plain

DBCA has developed a dataset which maps the location, boundaries and management category of wetlands on the SCP. A management category (Conservation, Resource Enhancement and Multiple Use in order of conservation priority) was assigned to each wetland to guide their management and protection.

The survey area intersects the mapped extents of three CCWs and one Resource Enhancement Wetland (REW) (Figure B; Table 5). The definitions and management objectives for the three wetland management categories see Appendix A, Table A-8).

Table 5	Geomorphic Wetlands of the SCP in the Vicinity of the Survey Area
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ID	Management Category	Location	Figure No.
3941	Conservation	Survey area crosses river	Figure B-3
15239	Conservation	Survey area abuts wetland boundary	Figure B-4
14608	Conservation	Survey area intersects wetland	Figure B-9
4832	Conservation	Survey area intersects wetland	Figure B-9
4585	Resource Enhancement	Survey area abuts wetland boundary	Figure B-7



4.1.4 Environmentally Sensitive Areas

ESAs are declared by the Minister for Environment under section 51B of the EP Act and protected under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (the Regulations) in an effort to prevent the incremental degradation of important environmental values such as TF, TECs or conservation significant wetlands (CCWs and REWs).

Exemptions for the clearing of native vegetation under the Regulations do not apply in ESAs. Clearing permits are generally required to support the clearing of native vegetation within ESAs.

The ESAs intersecting the survey area are presented in Table 6 and shown in Figure B.

Table 6 ESAs Intersecting the Survey A	rea
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Environmentally Sensitive Areas	Figure No.
Subtropical and Temperate Coastal Saltmarsh – EPBC-listed TEC buffer Conservation Category Wetland UFI 3941 – Serpentine River and buffer	Figure B-3
Conservation Category Wetland UFI 15239 – Serpentine River and buffer	Figure B-4
Conservation Category Wetland UFI 4832 and 14608 and buffer	Figure B-9 and Figure B-10

4.1.5 DBCA Managed Lands

The survey area adjoins one A Class Nature Reserve (Goegrup Lake Nature Reserve) on Gordon Rd, Parklands (Figure B-2).

4.2 Field Survey

4.2.1 Flora

4.2.1.1 Flora Statistics

A total of 69 plant taxa were recorded for the current survey 14 of which were exotic (weed) species. In addition to this there were numerous planted tree and shrub species which were not recorded for this survey. The list of species recorded for the survey area is presented in Appendix B. It should be noted that this list is by no means exhaustive - this reconnaissance level survey involved low-level sampling of the flora, with a focus primarily on dominant and keystone species (to accurately characterise the vegetation types present), as well as species of conservation significance (including environmentally significant weeds). As such the list does not include some common pasture weeds (grasses and herbs) and native and weed microflora which were likely present at the time of the survey.

These taxa represent 54 genera from 25 families. The families and genera represented by the greatest number of species are presented in Table 7 and Table 8.

Family	Common Name	No. of Taxa
MYRTACEAE	Myrtles	14
POACEAE	Grasses	7
PROTEACEAE	Proteas	6
CYPERACEAE	Sedges	6
FABACEAE	Peas	6

Table 7 Dominant Families within the Survey Area

EEL11266.006 | Road Reserve Reconnaissance Flora and Vegetation Survey | Peel Business Park Trunk Infrastructure Extension | April 2018



Genus	Common Name	No. of Taxa
Banksia	Banksias	4
Eucalyptus/Corymbia	Eucalypts	4
Jacksonia		3

Table 8 Dominant Genera within the Survey Area

4.2.1.2 Flora of Conservation Significance

No TF species listed under the WC Act or under the EPBC Act were recorded within the survey area.

No PF species as currently listed by the DBCA were recorded within the survey area.

4.2.1.3 Introduced Flora (Weeds)

Fourteen introduced flora taxa were recorded from the survey area representing 20% of the total flora taxa recorded. Naturalised bushland weeds were recorded at high densities throughout all of the survey area except for areas mapped in "Very Good" condition where disturbance by weeds was low.

The Western Australian Organism List (WAOL) database was searched to determine the legal status of each weed recorded, and any control requirements. Of the 14 weed species recorded, none were determined to be Declared Pests under the BAM Act nor were they classified as WONS.

4.2.2 Vegetation

4.2.2.1 Vegetation Units

For the current survey eleven upland and dampland/wetland vegetation units were described and mapped for all of the remnant vegetation within the survey area. It should be noted that most of these units represented highly modified vegetation in degraded condition no longer representative of the original floristic communities that would have occurred there. The only units representing structurally and floristically intact vegetation communities were those associated with the Serpentine River and Goegrup Lake foreshores, and to a lesser extent the CCW wetland (UFI 4832) on Patterson Rd, Nambeelup (Flooded Gum Woodland; *Casuarina obesa* Woodland; Samphire-dominated Saltmarsh; and Melaleuca Closed Forest).

A description of these 11 vegetation units follows. Vegetation Unit mapping is presented in Figure C at the rear of the report.

4.2.2.1.1 Remnant Tuart (Upland)

Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey of annual and perennial naturalised alien (weed) herbs and grasses – This vegetation occurred within the road reserve along sections of Gordon and Lakes Rds within the western portion of the survey area. Remnant Tuart trees within the road reserve are shown in Figures C-1; C-2; and C-3 and Plate 1. The trees recorded along Gordon Rd belong to a medium-sized patch (>10 ha \leq 100 ha) as defined by DEE (2017b) of mapped Tuart Woodland (WALGA 2017).





Plate 1 Remnant Eucalyptus gomphocephala (Tuart), Gordon Rd Reserve

4.2.2.1.2 Planted Trees and Shrubs (Upland)

Planted (non-endemic) eucalypts over emergent and planted native shrubs occurred within the southern road reserve of Gordon Rd (Figure C1 and Plate 2), and are the product of historical road-side landscaping.



Plate 2 Planted Trees and Shrubs, Gordon Rd and Lakes Rd

4.2.2.1.3 Remnant Marri (Upland/Dampland)

Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses occurred at numerous locations along the alignment (Figure C3, C4, C5, C9, and C10 and Plate 3) within and adjacent to the road reserve. These trees were mature and generally in excellent health except for several dead individuals recorded on Patterson Rd.





Plate 3 Remnant Corymbia calophylla (Marri), Lakes Rd

4.2.2.1.4 Flooded Gum Woodland (Dampland)

Eucalyptus rudis subsp. *rudis* Low Open Woodland over *Jacksonia sternbergiana, J. furcellata* and *Kunzea glabrescens* Tall Shrubland over *Grevillea vestita* and *Regelia inops* Shrubland over a mixed Open Sedgeland / Herbland / Grassland. This vegetation was in "Good" to "Very Good" condition and recorded on Lakes Rd in close proximity to the Serpentine River (Figure B-3 and Plate 4). This vegetation comprised remnant and recovering (after clearing) vegetation with an altered structure but floristically intact.



Plate 4 Eucalyptus rudis subsp. rudis (Flooded Gum) Woodland, Serpentine River, Lakes Rd

4.2.2.1.5 Flooded Gum Forest over Sedgeland (Dampland)

Eucalyptus rudis subsp. *rudis* and *Melaleuca rhaphiophylla* Low Open to Closed Forest over *Baumea juncea* and *Lepidosperma* sp. Closed Sedgeland (Figure B-3 and Plate 5). This vegetation interfaced the Flooded Gum Woodland upslope (described above) and the *Casuarina obesa* Closed Forest. It was intact structurally and floristically and ranged in condition from "Very Good" to "Good" depending on the disturbance level from weeds.





Plate 5 Eucalyptus rudis subsp. rudis (Flooded Gum) Forest over Sedgeland, Serpentine River, Lakes Rd

4.2.2.1.6 Casuarina obesa Forest (Wetland)

Casuarina obesa Closed Forest over *Lepidosperma* sp., *Baumea juncea, Gahnia trifida* and *Juncus krausii* Closed Sedgeland (Figure B-3 and Plate 6). This vegetation fringed the saltmarsh and extended along the river foreshore on both sides of the Serpentine River.



Plate 6 Casuarina obesa Closed Forest over Closed Sedgeland, Serpentine River, Lakes Rd

4.2.2.1.7 Samphire-dominated Saltmarsh (Wetland)

Tecticornia ?halocnemoides, T. indica subsp. *bidens* and *Cotula coronopifolia* Closed Herbland. This saltmarsh vegetation is fringed by *Casuarina obesa* Closed Forest and extends from the foreshore of the Serpentine River to the shore of Goegrup Lake to the west (Figure B-3 and Plate 7). This vegetation is synonymous with the conservation significant Subtropical and Temperate Coastal Saltmarsh ecological community which is listed as Vulnerable under the EPBC Act and Priority 3 by the Western Australian state government. The extent of this ecological community record buffer (retrieved from the DBCA database search) is presented in Figure B-3.





Plate 7 Samphire-dominated Saltmarsh, Serpentine River, Lakes Rd

4.2.2.1.8 Banksia Woodland (Upland)

Scattered *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) over *Banksia menziesii*, *B. attenuata* and *B. ilicifolia* Low Open Woodland over mixed Shrubland over an exotic Closed Grassland (Plate 8). This vegetation was mapped within the road reserve along Fowler and Fishhawk Rds (Figures C-3 and C-4), with condition generally ranging from "Degraded" to "Good" throughout its extent (Figures D-3 and D-4).



Plate 8 Banksia Woodland, Fowler and Fishhawk Rds

4.2.2.1.9 Remnant Melaleuca preissiana (Dampland/Wetland)

Melaleuca preissiana remnant trees over a degraded understorey of exotic grasses (Plate 9). This vegetation occurred throughout much of the eastern portion of the survey area along Lakes Rd, Gull Rd and Patterson Rd (Figures C-5 to C-9 and C-14 to C-16) in "Completely Degraded" condition due to the absence of an intact understorey.





Plate 9 Remnant Melaleuca preissiana Trees, Lakes, Gull and Patterson Rds

4.2.2.1.10 Melaleuca Closed Forest (Wetland)

Eucalyptus rudis subsp. rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland (Figures C-9 and C-10; Plate 10). This vegetation unit was mapped for the CCW UFI 4832 on Patterson Rd and was in generally "Good" condition based on the high weed load within the understorey.



Plate 10 Melaleuca Closed Forest, CCW UFI 4832, Patterson Rd

4.2.2.1.11 Remnant Mixed Trees (Upland and Dampland)

Scattered *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), *Allocasuarina fraseriana* (Sheoak), *Banksia* spp. and *Melaleuca preissiana* trees over a degraded understorey of naturalised alien (weed) herbs and grasses (Plate 11). This vegetation was mapped for sections of Patterson Rd (Figure C-10 to C-12).





Plate 11 Remnant Mixed Trees, Patterson Rd

4.2.2.1.12 Scrub (Dampland)

Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses (Plate 12). This vegetation was mapped for sections of Patterson Rd (Figure C-13 and C-14).

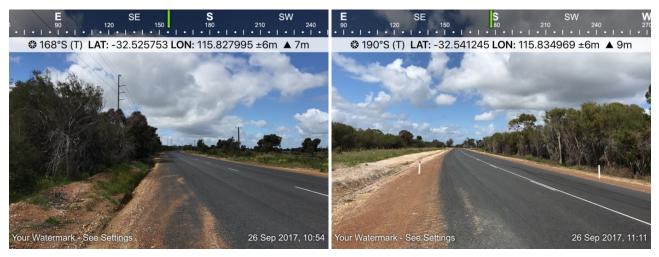


Plate 12 Kunzea glabrescens / Adenanthos cygnorum/Jacksonia furcellata Scrub, Patterson Rd

4.2.2.2 Vegetation Condition

Vegetation condition ranged from "Very Good" to "Completely Degraded" throughout the survey area, with the majority of the vegetation within the road reserve, and areas adjacent to the road reserve and within the survey area, recorded in "Completely Degraded" condition. The vegetation associated with the CCW wetlands (Serpentine River and CCW UFI 4832 on Patterson Rd, Nambeelup) was generally floristically and structurally intact and was mapped variously as "Good", "Good to Very Good" and "Very Good" condition, apart from these small intact areas however, most of the vegetation within the survey area had a generally high weed load. Vegetation condition mapping is presented in Figures D-1 to D-16 at the rear of the report.



4.2.3 Significant Trees

A total of 74 trees with a DBH greater than 500 mm within the survey area were recorded (Appendix C; Figures C-1 to C-16). The number of trees recorded for each species is presented in Table 9.

Species	Number recorded
Eucalyptus gomphocephala (tuart)	23
Corymbia calophylla (marri)	18
Eucalyptus rudis subsp. rudis (flooded gum)	20
Eucalyptus marginata subsp. marginata (jarrah)	9
Planted non-endemic eucalypt	4

Table 9 Tree Species Recorded with a DBH >500 mm

Eucalyptus gomphocephala (tuart), Corymbia calophylla (marri), Eucalyptus rudis subsp. rudis (flooded gum), and Eucalyptus marginata (jarrah) are recognised by the DEE (2017a) to provide potential breeding and night-roosting habitat for black cockatoos.



5 Discussion

5.1 **Floristic Diversity and Representation**

In assessing the conservation significance of flora within the survey area, consideration is given to rarity, biodiversity, endemism and representativeness of the flora in the area.

5.1.1 Rarity

The rarity of the flora was assessed via the various categories of TF (protected under the WC Act and under the EPBC Act) and PF (listed by DBCA).

No TF were recorded within the survey area for the current survey.

No PF species as currently listed by DBCA were recorded within the survey area.

The rarity of the survey area flora was assessed as low.

5.1.2 Biodiversity

A total of fifty-six native taxa were recorded for the survey area.

Floristic diversity was assessed as moderate.

5.2 Vegetation Conservation Significance

5.2.1 Bioregional Representation

On a regional scale the survey area is mapped as vegetation association Vegetation Associations 968; 1000; and 1001 (Shepherd *et al.* 2002) and Bassendean Complex Central and South; Herdsman Complex; and Yoongarillup Complex (Heddle *et al.* 1980). Of these three associations the one with the least remaining is Vegetation Association 968 (Medium woodland; jarrah, marri & wandoo) which has only 6.5% (8,967 ha) of its original (pre-European) extent remaining and only 1.2% protected for conservation (Government of Western Australia 2016). Vegetation Association 968 is mapped for a patch of remnant vegetation adjacent to a section of road reserve on Patterson Rd (Figure D-12 and D-13), however, the intact portions of this patch occur outside the survey area to the east of the road reserve. There are no records of this vegetation in "Good" or better condition within the survey area.

5.2.2 National Threatened Ecological Communities

The survey area intersects the buffers of two EPBC listed TECs, Banksia Woodlands of the Swan Coastal Plain ecological community and Subtropical and Temperate Coastal Saltmarsh ecological community.

A third potential nationally significant ecological community also intersects the survey area - the state listed Priority 3 PEC Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community has recently been nominated to the Australian Government to be considered for listing as threatened under the EPBC Act. The nomination was assessed by the independent Threatened Species Scientific Committee and the outcomes documented in the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Ecological Community Draft Conservation Advice (DEE 2017b).

These three nationally-significant communities and their representation within the survey area are discussed below.



5.2.2.1 Banksia Woodlands of the Swan Coastal Plain Ecological Community

The Banksia Woodland vegetation mapped for the survey area potentially corresponds to the Banksia Woodlands of the Swan Coastal Plain Ecological Community TEC. However, in order to qualify as a legitimate TEC record the Banksia vegetation within the survey area must satisfy the key diagnostic characteristics for the ecological community as set out in the Conservation Advice for the species (DEE 2016) in terms of its location and physical environment, soils and landform, structure and composition. It must:

- occur within the Swan Coastal Plain IBRA bioregion
- occur on well-drained, low nutrient soils on deep Bassendean sands
- have a distinctive upper sclerophyllous layer of low trees, dominated by Banksia attenuata (and/or B. ilicifolia), have an emergent tree layer (Eucalyptus marginata), have an understorey of a layer of sclerophyllous shrubs of various heights and a herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs, that sometimes includes grasses.

Additionally the vegetation must meet the minimum condition threshold of Good (adapted from Keighery 1994 and Trudgen 1988).

Finally, the vegetation must meet the minimum patch size thresholds (>0.5 ha in "Excellent" condition; >1 ha in "Very Good" condition; or 2 ha in "Good" condition).

Although the Banksia Woodland within the survey area meets the diagnostic characteristics for the TEC, it does not meet the minimum condition or patch size thresholds because there is less than 1 ha in "Good" condition within the survey area.

The Banksia Woodland vegetation within the survey area is not considered to be representative of the EPBC listed Banksia Woodlands of the Swan Coastal Plain Ecological Community TEC.

5.2.2.2 Subtropical and Temperate Coastal Saltmarsh Ecological Community

Subtropical and Temperate Coastal Saltmarsh ecological community, is listed by DBCA as a Priority 3 PEC, and listed under the EPBC Act as a Vulnerable TEC.

Documented occurrences of this community are located at Goegrup Lake and at the Lakes Rd crossing of the Serpentine River within the survey area (Figures B-1 to B-3). The samphire-dominated saltmarsh vegetation unit described and mapped for the current survey (Figure C-3; Section 4.2.2.1) was assessed against the key diagnostic characteristics set out in the Conservation Advice (Threatened Species Scientific Committee 2013) in order to determine if this vegetation constitutes a record of the TEC. As stated in the Conservation Advice, to qualify as a record of this TEC the vegetation must:

- occur south of 23° 37' S latitude from the central Mackay coast on the east coast of Australia, southerly around to Shark Bay on the west coast of Australia (26° latitude), and including the Tasmanian coast and islands within the above range
- occur on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts
- occur on places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences, but not areas receiving only aerosol spray
- occur on sandy or muddy substrate and may include coastal clay pans (and the like)
- consist of dense to patchy areas of characteristic coastal saltmarsh plant species (i.e. salt-tolerant herbs, succulent shrubs or grasses, that may also include bare sediment as part of the mosaic)
- have proportional cover by tree canopy such as mangroves, Melaleucas or Casuarinas not greater than 50%.



Additionally the vegetation must meet the minimum condition threshold of < 50% weed cover i.e. the saltmarsh must be dominated by native saltmarsh plants, and the patch must be greater in size than 0.1 ha.

The samphire-dominated saltmarsh vegetation within the survey area meets the diagnostic characteristics for the TEC, and the minimum condition and patch size thresholds.

The samphire-dominated saltmarsh vegetation within the survey area is considered to have adequate conservation value to be considered a MNES, and protected under the EBPC Act.

5.2.2.3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Ecological Community

The remnant *Eucalyptus gomphocephala* (Tuart) remnant trees mapped for the current survey within the road reserve along sections of Gordon and Lakes Rds in the western portion of the survey area were assessed against the key diagnostic characteristics set out in the Conservation Advice (DEE 2017b) in order to determine if this vegetation constitutes a record of the TEC. As stated in the Conservation Advice, to qualify as a record of this TEC the vegetation must:

- occur in the Swan Coastal Plain Bioregion within the state of Western Australia and primarily occur on the Spearwood and Quindalup dune systems, but can also occur on the Bassendean dunes and Pinjarra Plain,on the banks of rivers and wetlands, or below the Darling and Whicher escarpments where they define a plateau to the east of the Swan Coastal Plain
- occur (most commonly) as a woodland, or in a variety of structural forms, including closed forest, open forest, woodland, open woodland, closed mallee forest, open mallee forest, mallee woodland and open mallee woodland
- have a dominant canopy of tuart (Eucalyptus gomphocephala)
- have established tuart trees present, meeting the patch definition.

The remnant Eucalyptus gomphocephala (Tuart) remnant trees mapped within the road reserve along Gordon and Lakes Rds have not retained an intact native understorey and are in "Degraded" condition however, because they are associated with a large mapped patch of Tuart Woodland (WALGA 2017) they would likely be considered a high priority for protection and management.

5.2.3 Western Australian Threatened and Priority Ecological Communities

No state-listed TECs were recorded within the survey area for the current survey.

The three EPBC-listed TECs discussed in Section 5.2.2 are listed at a state level as PECs.

5.3 Fauna Habitat

The 74 remnant trees within the survey area with a DBH greater than 500 mm are considered potential night roosting and breeding habitat for black cockatoos and therefore conservation significant.

5.4 Other Conservation Significant Features

The survey area lies adjacent to, and in some places intersects with, environmental features identified in the desktop survey such as CCWs and ESAs. Most notably these include the CCWs associated with Goegrup Lake and the Serpentine River on Gordon Rd, and the CCW on Patterson Rd.



6 Conclusions

Much of the 15.7 km survey area alignment is in Degraded or Completely Degraded condition with little or no intact native understorey. Sections of the survey area, however, are adjacent to, or intersect environmental features identified in the desktop survey such as remnant tuart trees associated with Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community which is listed as Endangered and protected under the EPBC Act, records of Subtropical and Temperate Coastal Saltmarsh ecological community which is listed as Vulnerable and protected under the EPBC Act, Conservation Category Wetlands, and potential breeding and roosting habitat trees for Endangered Fauna species (black cockatoos)

No conservation significant flora (TF or PF), identified in the database searches as occurring within a 5 km radius of the alignment, were recorded. Given that most of the survey area lacks an intact native understorey, and/or vegetation in "Good" or better condition (deemed suitable habitat) it is not likely that any remnant vegetation within the road reserve is necessary for the continued existence of TF or PF.



7 References

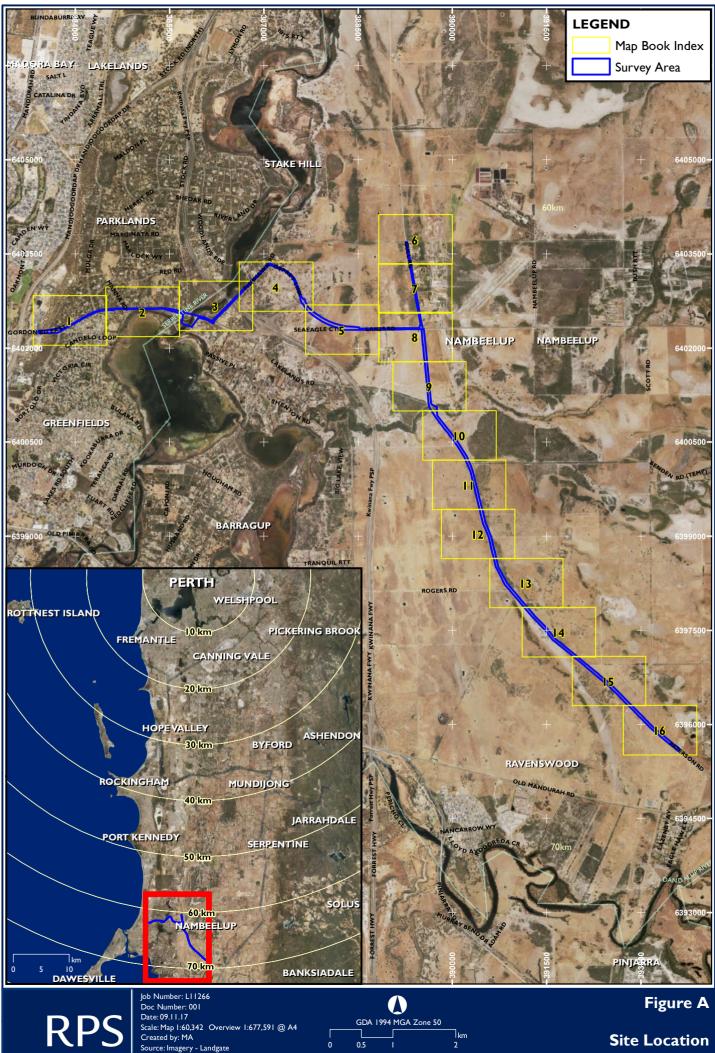
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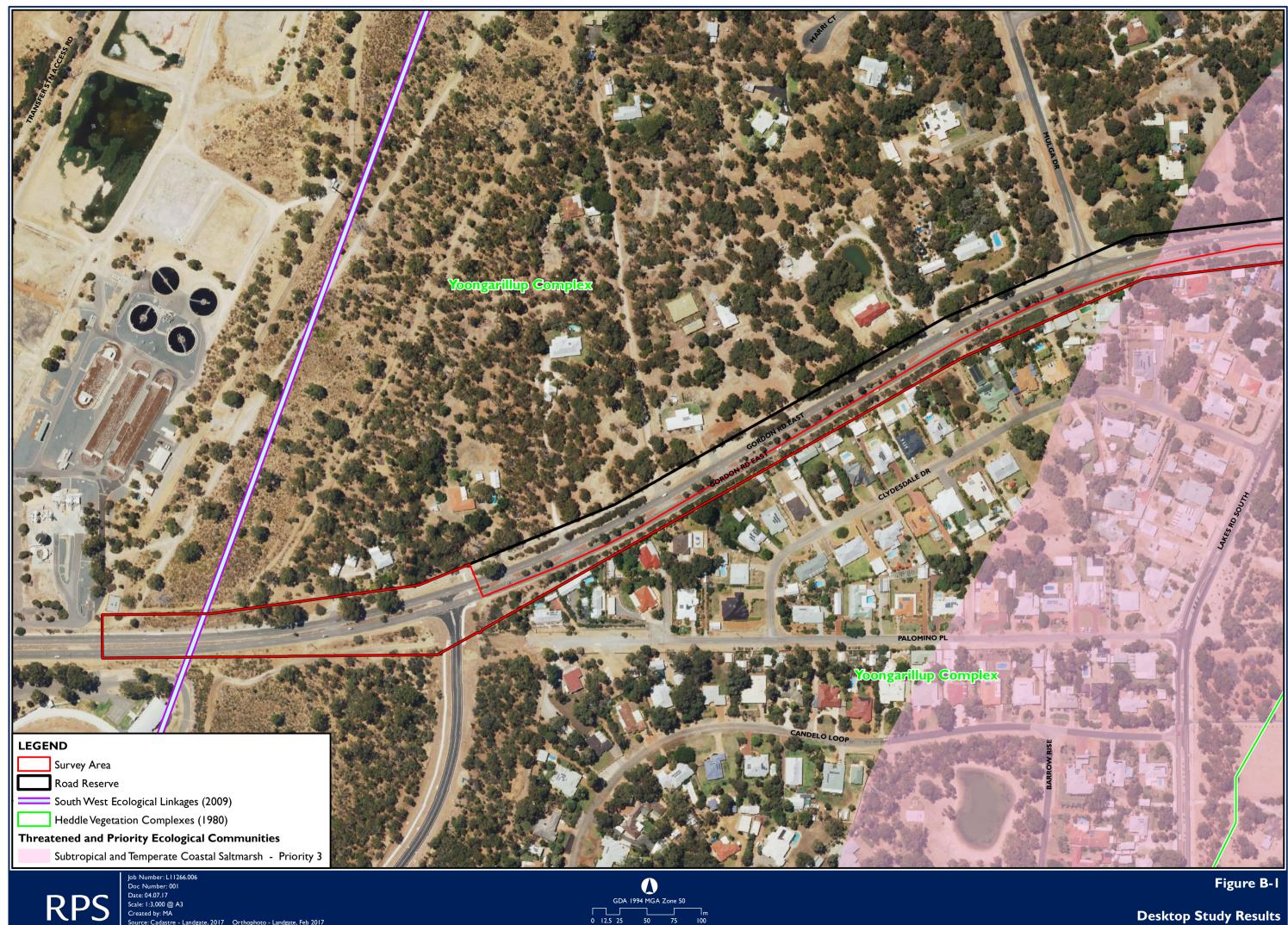
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Figures



Site Location

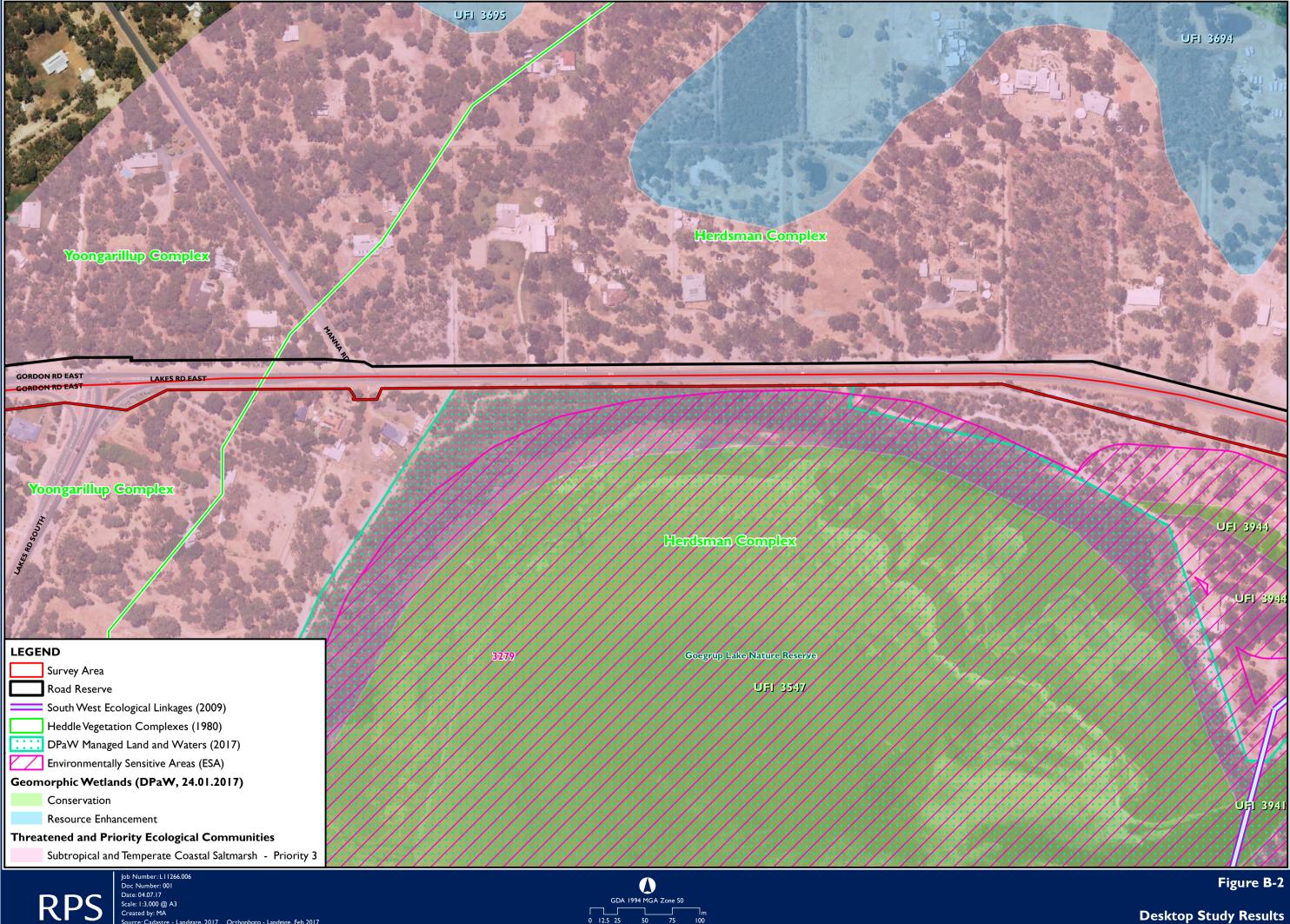


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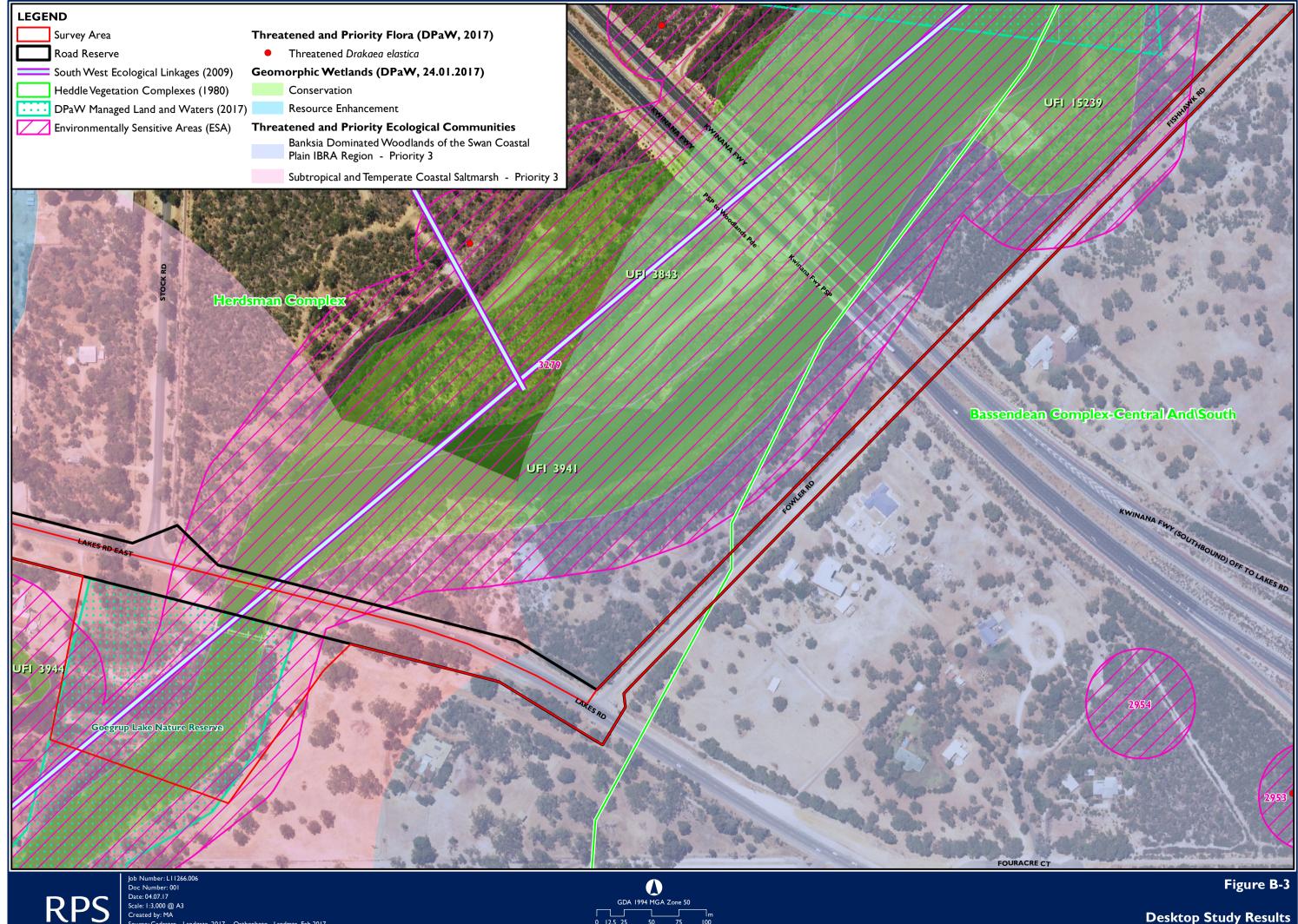


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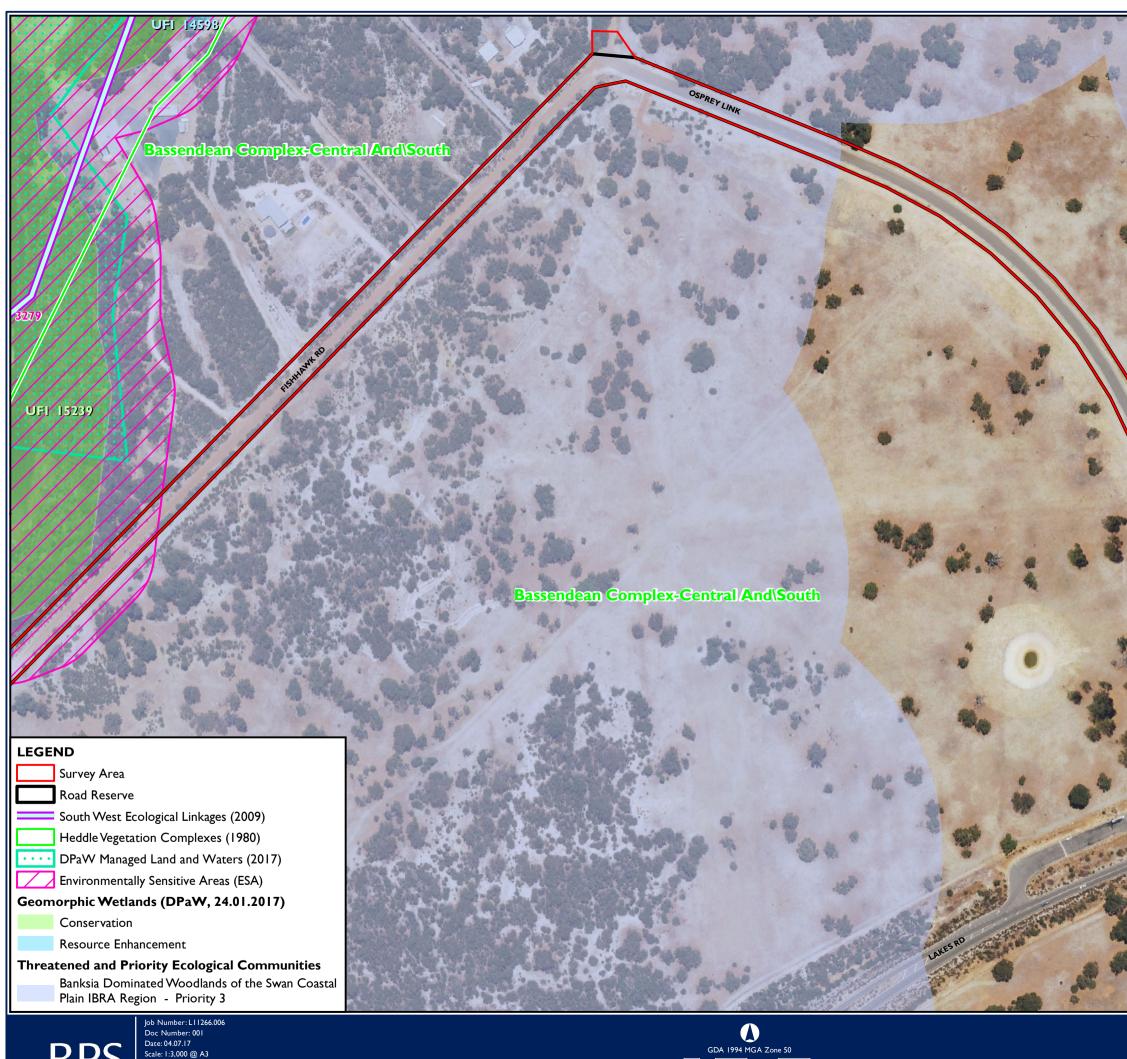


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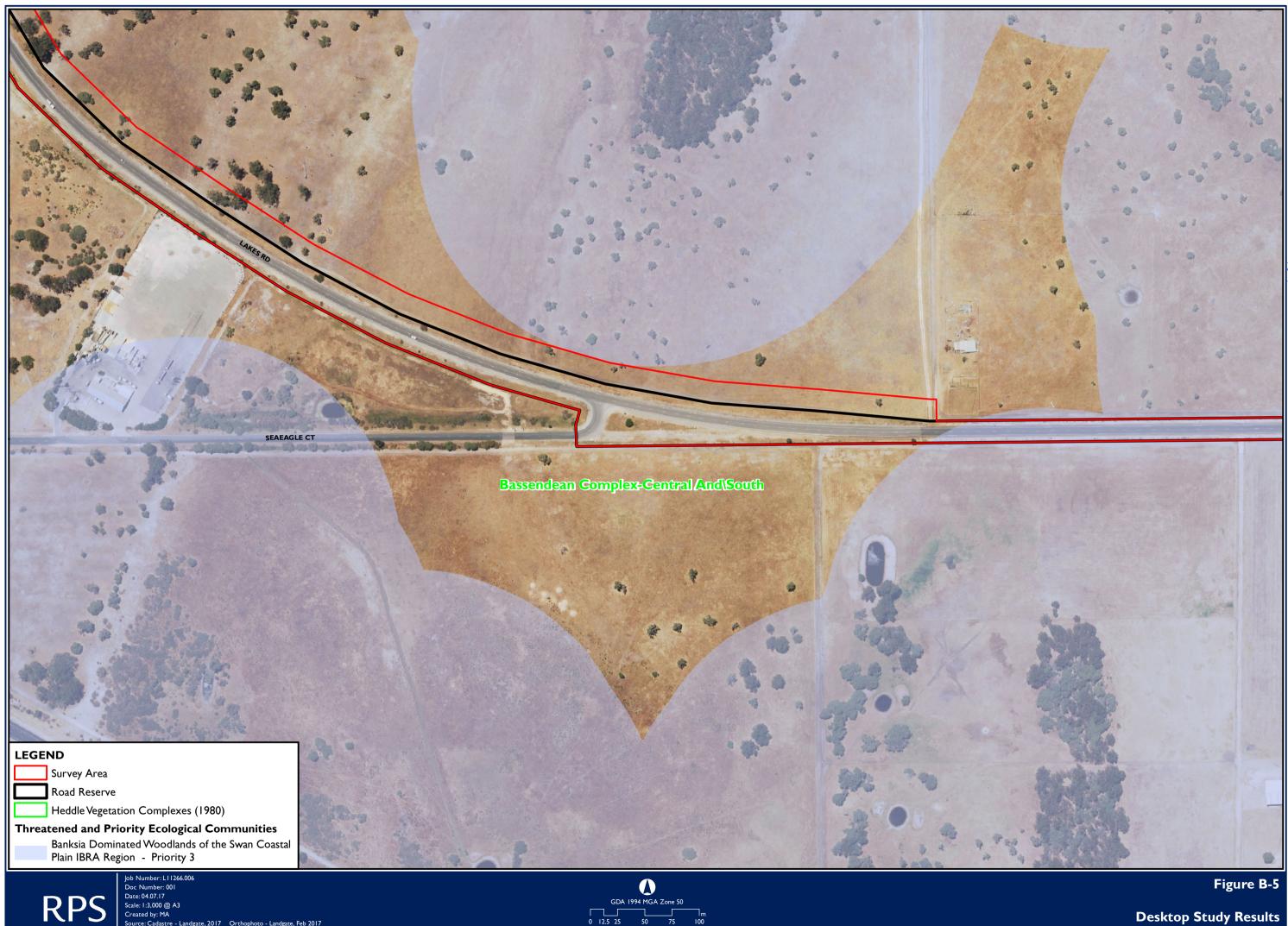
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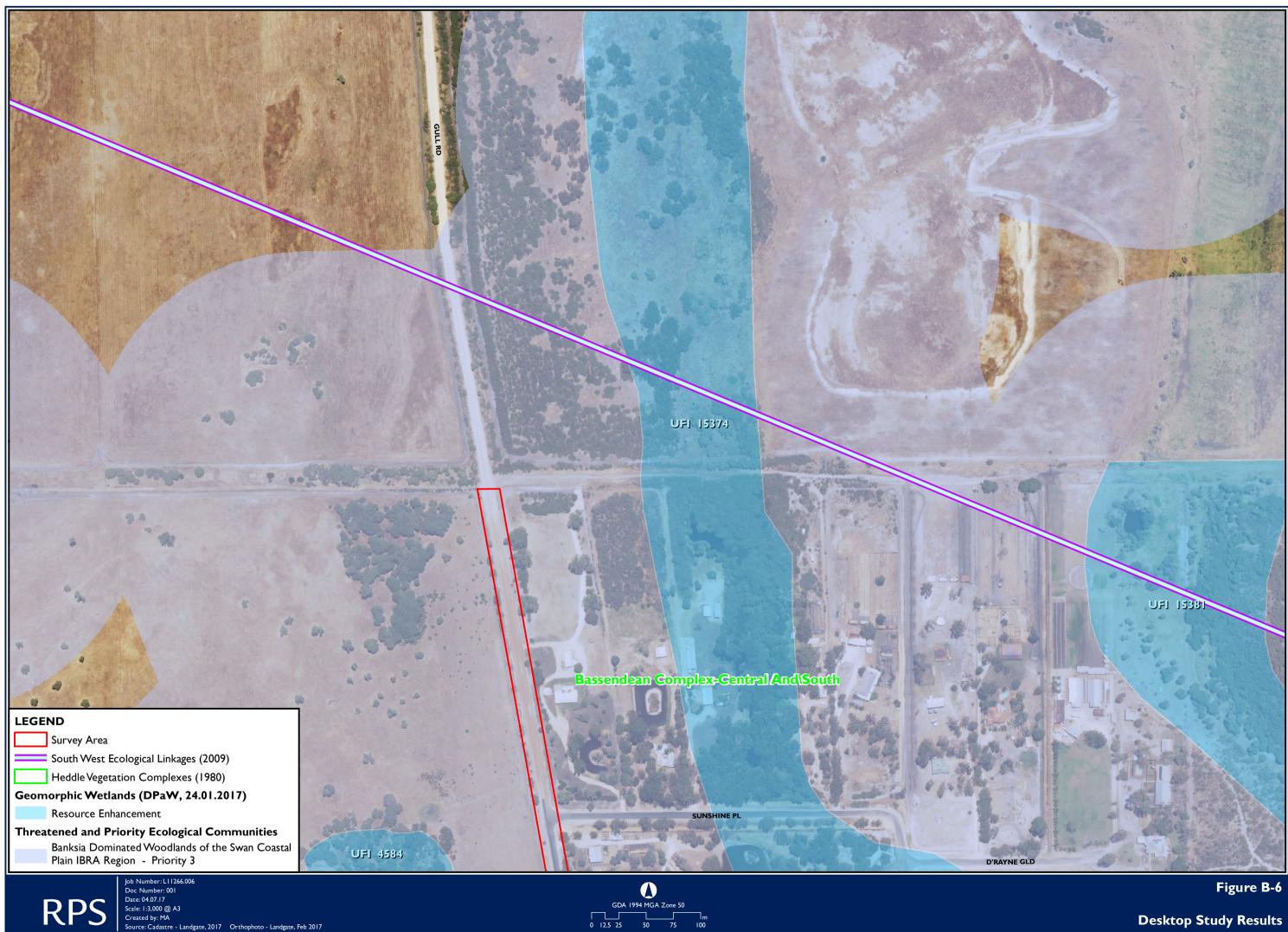
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Figure B-4

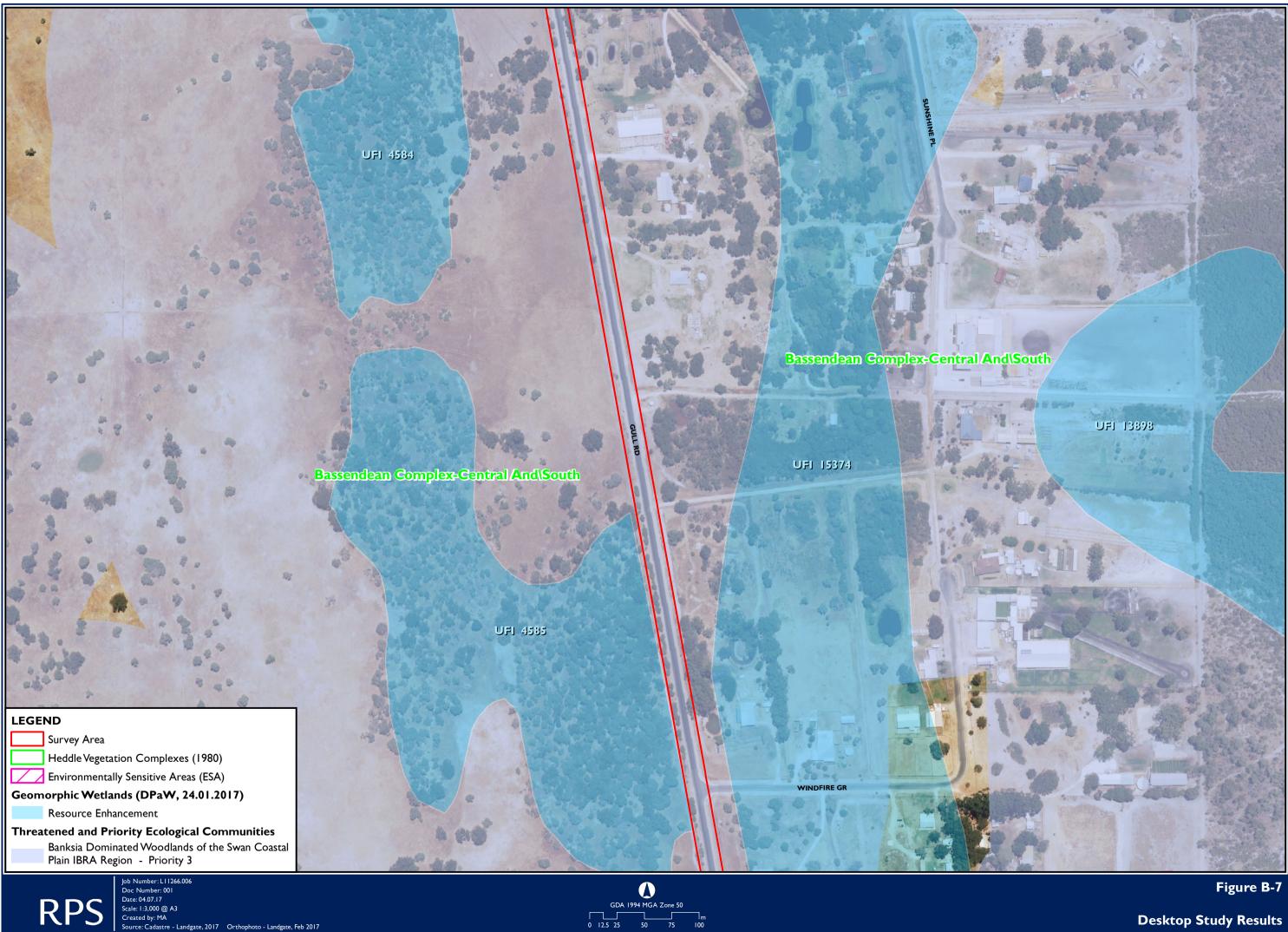


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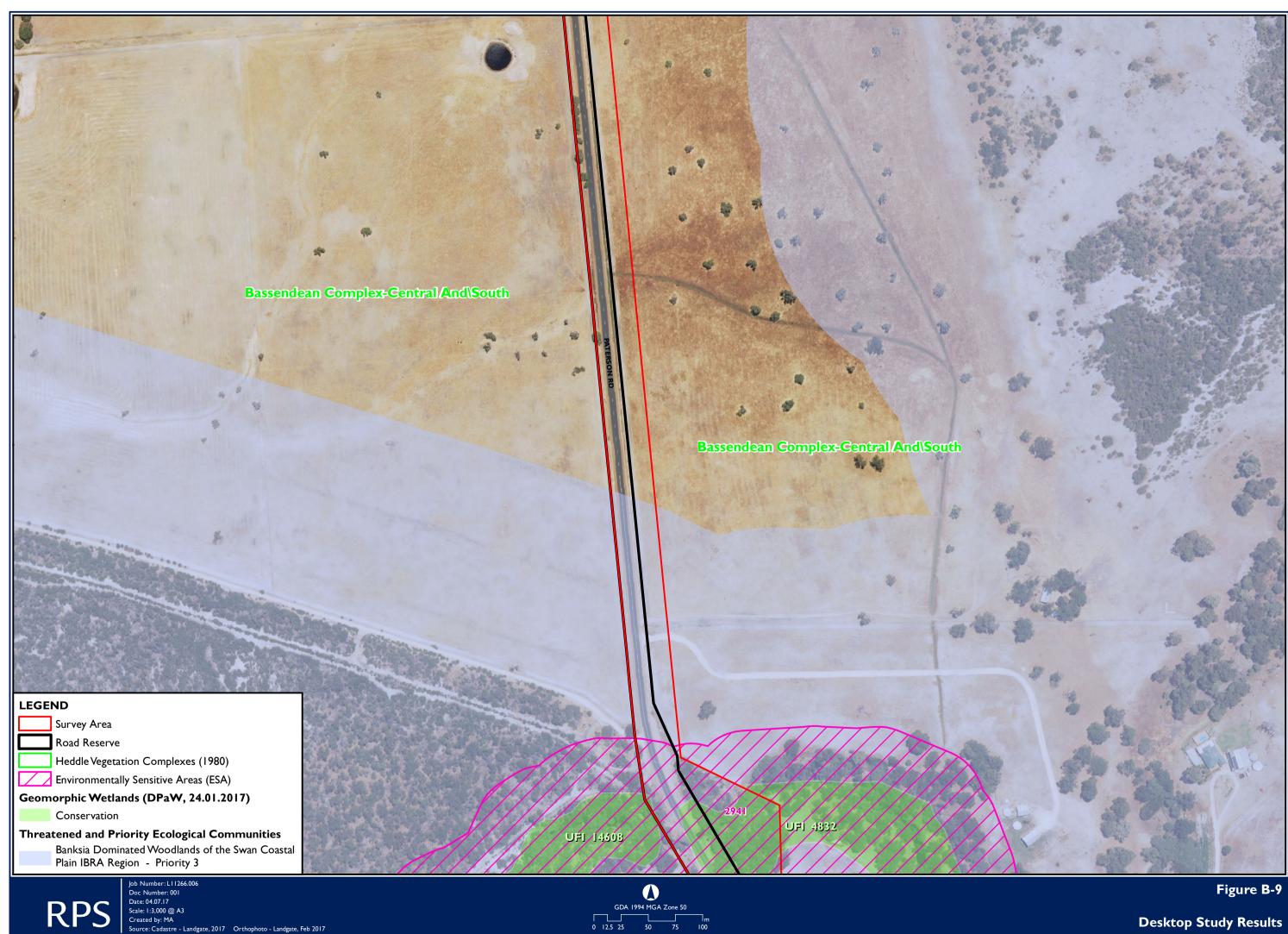
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Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region - Priority 3

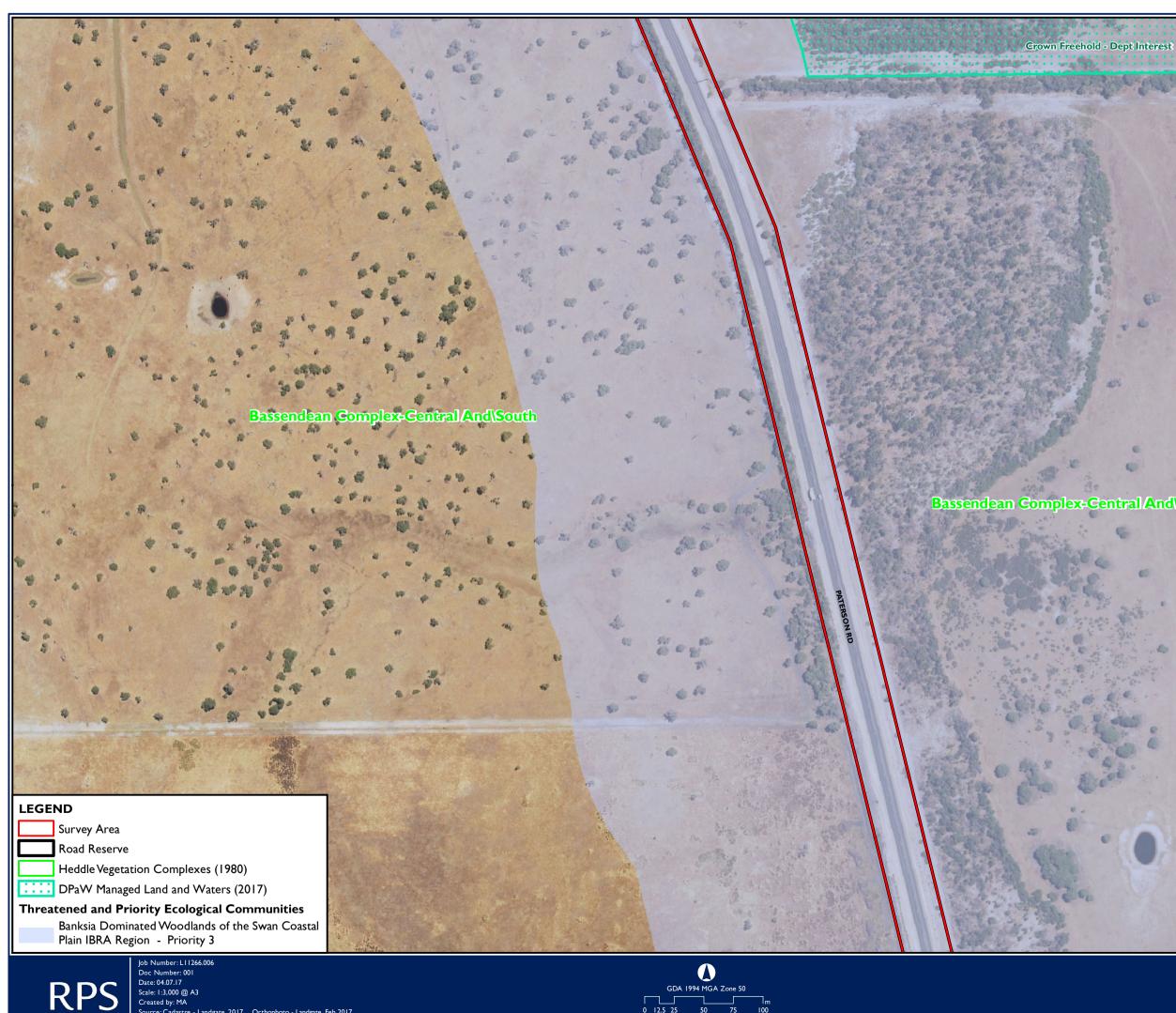
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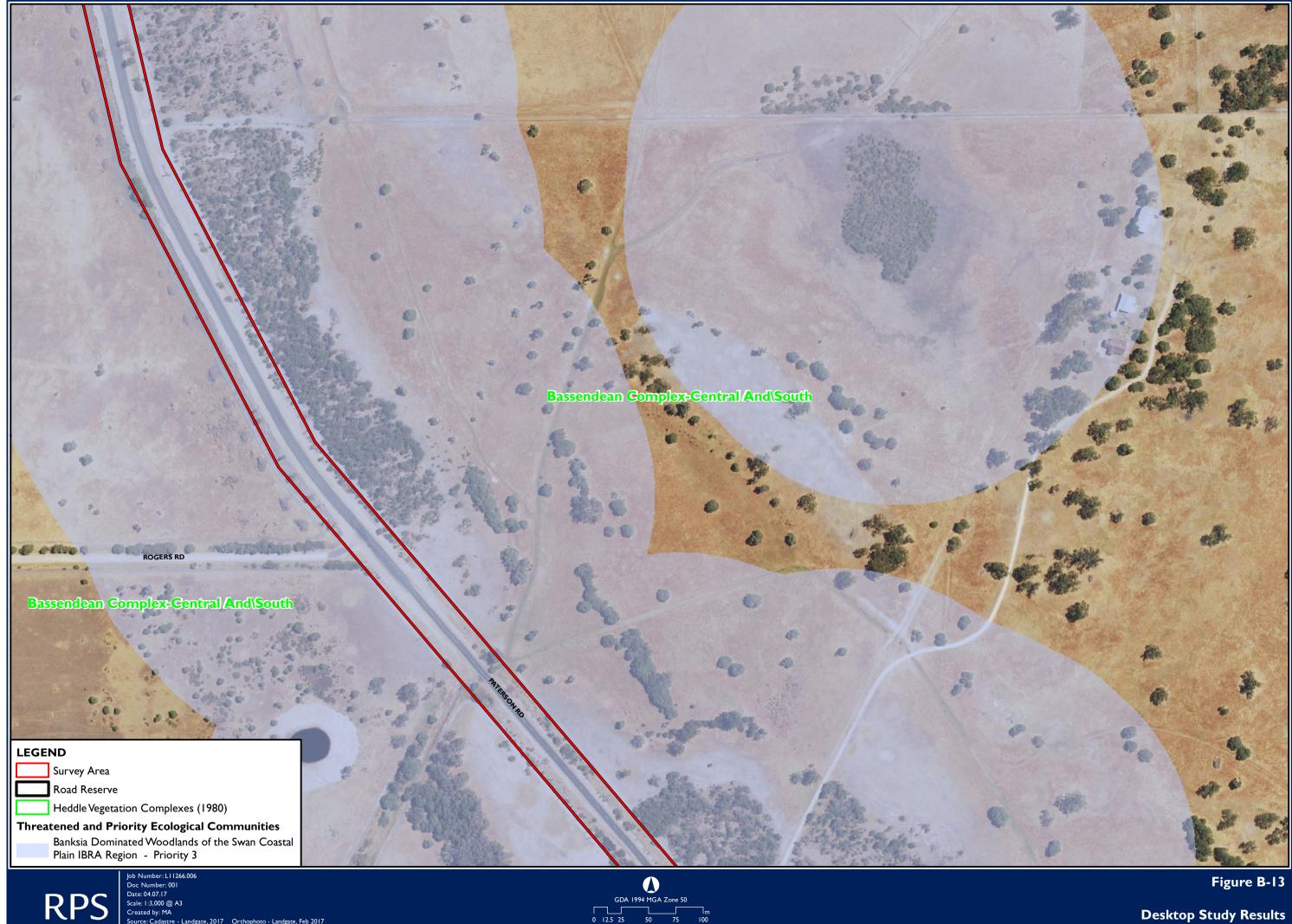
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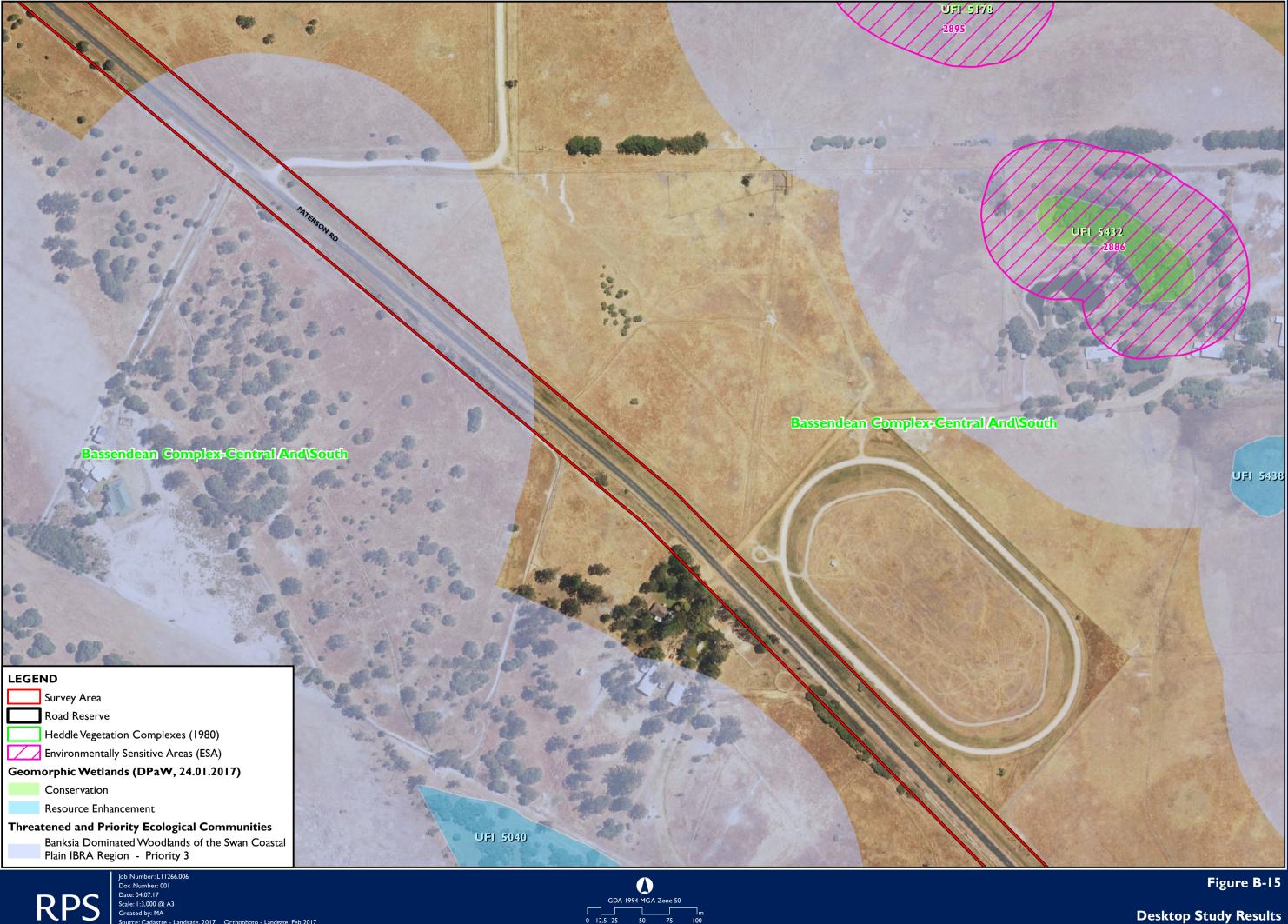


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Figure B-14



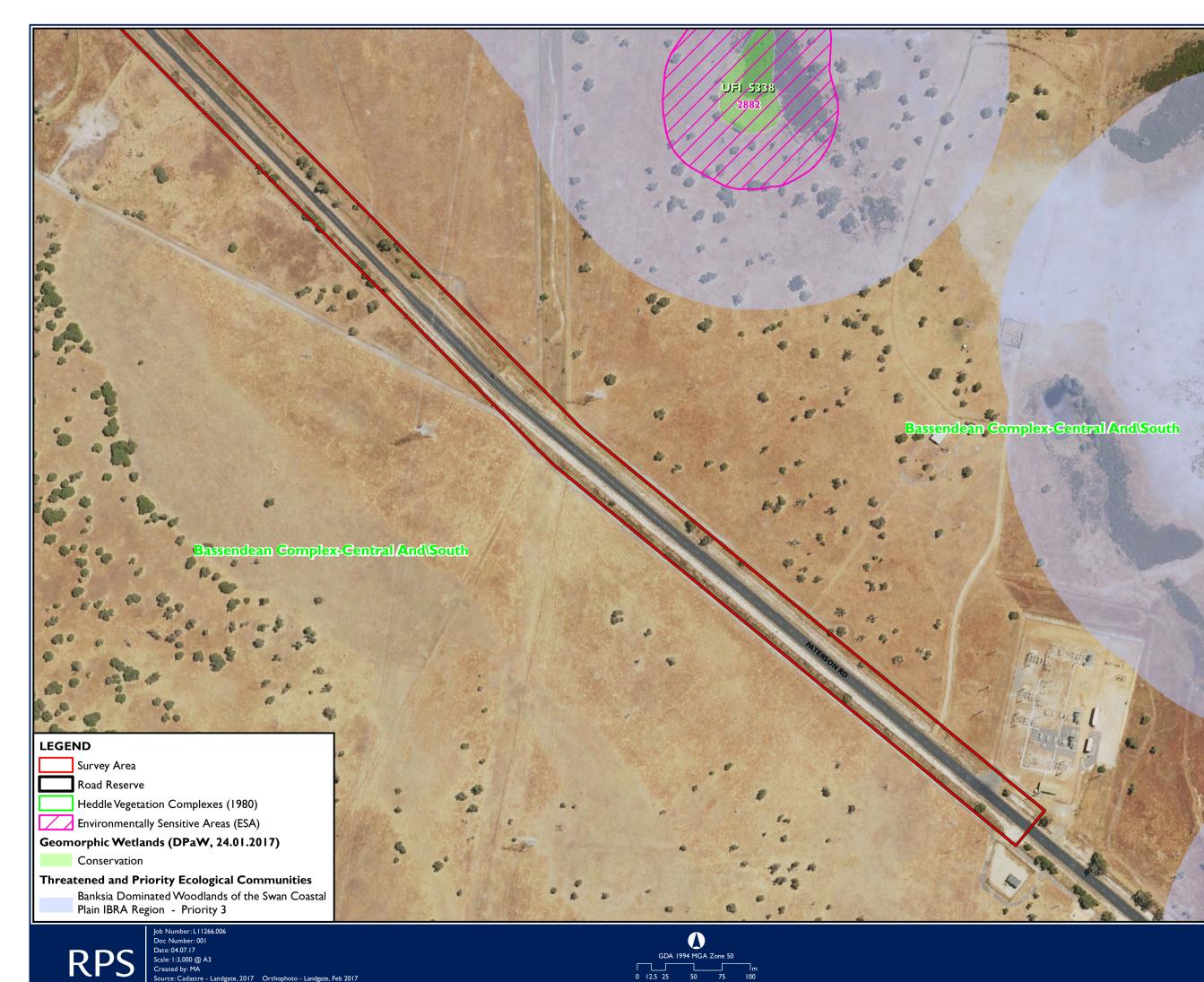
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Figure B-16

LEGEND	Vegetation Unit	Description	
1	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland	
2	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland	·
3	Flooded Gum Forest over Sedgeland	Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland	
4	Flooded Gum Woodland	Eucolyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.	
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifalia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland	ALC: NO
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs	and any of the second
7	Remnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	A state of the state
8	Remnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	A Provent
9	Remnant Mixed Trees	Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey	et al.
10	Remnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey	
П	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland	A REAL
12	Scrub	Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses	- the particular and





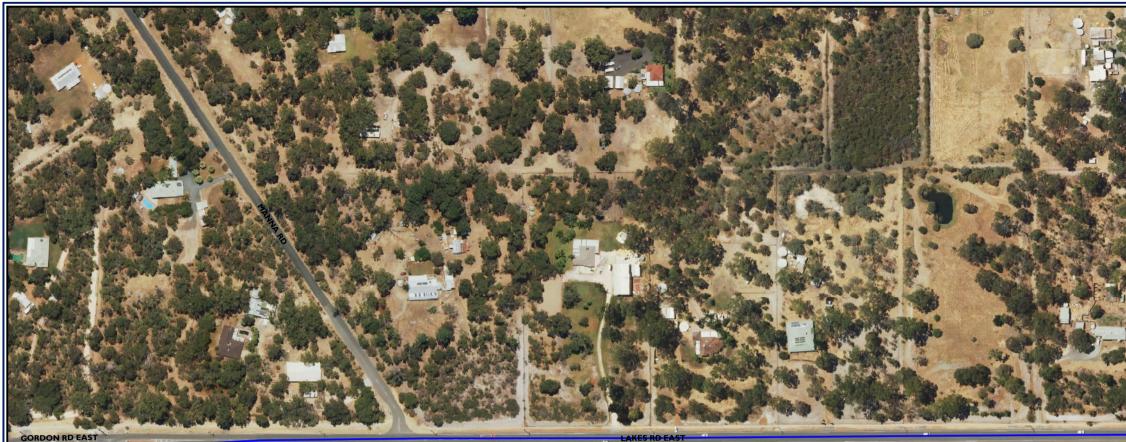
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Figure C-I



ID	Vegetation Unit	Description	
I	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland	
2		Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland	
3		Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland	Stand a fill and a stand and a
4	Flooded Gum Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.	
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland	
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs	THE PARTY AND
7	Remnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	
8	Remnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	
9	Remnant Mixed Trees	Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey	and the prover it is the
10	Remnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey	
11	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland	
12	Scrub	Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses	

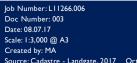




Figure C-2

LEGEND	Vegetation Unit	Description	1
1	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland	
2	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland	
3	Flooded Gum Forest over Sedgeland	Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland	
4	Flooded Gum Woodland	Eucolyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.	
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland	
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs	*
7	Remnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	
8	Remnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	
9	Remnant Mixed Trees	Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey	
10	Remnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey	
н	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland	
12	Scrub	Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses	







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LEGEND Survey Area Significant Trees Corymbia calophylla - Alive no hollows Eucalyptus gomphocephala - Alive no hollows Eucalyptus rudis - Alive no hollows Planted Non-endemic Eucalypt - Alive no hollows

Figure C-3

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1	I	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed	Par's	2 7	ja a		ú.* 4
10 Mar 240			Grassland					
	2	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland	14 e 1				*
			and Baumea juncea, Gahnia trifida and Juncus krausii <u>Closed Sedgeland</u> Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and		1 .se			*
		Flooded Gum Forest over Sedgeland Flooded Gum Woodland	and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low		te se			
	3	Flooded Gum Forest over Sedgeland Flooded Gum Woodland	and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and	and the	*			
	3 4 5	Flooded Gum Forest over Sedgeland Flooded Gum Woodland	and Baumea juncea, Gahnia trifida and Juncus krausii <u>Closed Sedgeland</u> <u>Eucalyptus rudis and Melaleuca rhaphiophylla</u> Low Open to Closed Forest over Baumea juncea and <u>Lepidosperma sp. Closed Sedgeland</u> <u>Eucalyptus rudis Low Open Woodland over</u> Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. <u>Eucalyptus rudis (Flooded Gum) and Melaleuca</u> rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and "Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs	and the	*		R. 10% - 48	
	3 4 5	Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest	and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus palidus, Baumea juncea, Lepidosperma sp. and "Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed)	and the	*		· · · · · · · · · · · · · · · · · · ·	
	3 4 5	Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs	and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	and the			· · · · · · · · · · · · · · · · · · ·	
	3 4 5	Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri	and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fioseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a	and the				
	3 4 5	Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana	and Baumea juncea, Gahnia trifida and Juncus krausii <u>Closed Sedgeland</u> Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astarea soparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Carymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak),	and the				
	3 4 5 6 7 8 8 9	Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana Remnant Mixed Trees	and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus palidus, Baumea juncea, Lepidosperma sp. and "Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Carymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fioseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey Eucalyptus gomphocephala (Tuart) remnant trees					



LEGEND

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Survey Area

Significant Trees

- Corymbia calophylla Alive no hollows
- * Corymbia calophylla Dead no hollows
- Eucalyptus marginata Alive no hollows ***

 - Eucalyptus marginata Dead with hollows





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LEGEND	Vegetation Unit	Description		「「「「「「「」」」を見ていていた。	And the second
I	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland			
2	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland			1
3	Flooded Gum Forest over Sedge	Eucalyptus rudis and Melaleuca rhaphiophylla Low Eland Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland			
4	Flooded Gum Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.			
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland			100 ·
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native			The second
7	Remnant Marri	shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses			5. ···
8	Remnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses			8 33
9	Remnant Mixed Trees	Scattered Eucolyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey			646
10	Remnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey			1
11	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland		And	
12	Scrub	Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses			
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LEGEND

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Survey Area

Significant Trees

- Corymbia calophylla Alive no hollows
- Corymbia calophylla Dead no hollows
- Eucalyptus rudis Alive no hollows







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Figure C-8

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LEGEND	Vegetation Unit	Description	the state of the		N RD		**	-
1	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland				CARLER AND		-
	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii <u>Closed Sedgeland</u> Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and						80
4	Flooded Gum Woodland	Lepidasperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.					*	*
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland				C. Maria	- and	
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs		Mar Martin		and the second se		
7	Remnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed)					A	
8	Remnant Melaleuca preissiana	herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and	a data a star a star	ALCON C			6	
9	Remnant Mixed Trees	grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a	NAN SH	TE AND		C.A.K	A. Deix	
10	Remnant Tuart	degraded understorey Eucalyptus gomphocephala (Tuart) remnant trees	CARA A			**	and the second second	ALL AND
	Samphiro dominatod Saltmarh	over a degraded understorey Tecticornia ? halocnemoides, T. indica subsp. bidens and		r Lat	5	5	and the state	
		Cotula coronopifolia Closed Herbland Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses	the second	A The		***		
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LEGEND

Survey Area

Significant Trees

- Corymbia calophylla Alive no hollows
- * Corymbia calophylla Dead with hollows
- Eucalyptus rudis Alive no hollows ***



LEGEND	Vegetation Unit Banksia Woodland	Description Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland	
2	Casuarina obesa Forest	over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii	
3	Flooded Gum Forest over Sedgeland	Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland	· · · · · · · · · · · · · · · · · · ·
4	Flooded Gum Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.	
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and #Watsonia Sp. Closed Sedgeland/Herbland	
6 7	Planted Trees and Shrubs Remnant Marri	Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed)	1.
8	Remnant Melaleuca preissiana	herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and	
9	Remnant Mixed Trees	grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a de ara dei undocusoasi	
10	Remnant Tuart	degraded understorey Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey	
11	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland	* * *
	Scrub	Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a	the fit is the second s



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Figure C-10

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ID Vegetation U	nit	Description	F # # #	********	ar .	55 POO 64	1 9	No.	12 - O.4 -
Banksia Wood	lland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland			2. 0. 0	Rei			
Casuarina obe	esa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland	· · · · · · · · · · · · · · · · · · ·	A		****	ALL B	· 御歌書	a or
Flooded Gum	Forest over Sedgeland	Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland			4	- h	* 5	SCONF	
Flooded Gum	Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.	R 4 3.	e	67 67 68	808 71	-	5	
Melaleuca Clo	osed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca thaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and			***	*			
Planted Trees	and Shrubs	*Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs	A Charles			· • 20.	TO CONTRACTOR	1	
Remnant Mar	ri	Shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses			an 1 m	in the the			
Remnant Melo	aleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses					12		
Remnant Mixe	ed Trees	Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a			*	· m. 900	Sin St		Constant.
Remnant Tuai	nt	degraded understorey Eucalyptus gomphocephala (Tuart) remnant trees			1 12 10 10				· Page and
-	ninated Saltmarsh	over a degraded understorey Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland	A AND A	Stand R.					
Scrub		Could coronoppiol Closed Herbland Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs		e	-			1.3	The state
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Survey Area

Significant Trees



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* Eucalyptus marginata - Dead with hollows

Eucalyptus marginata - Alive no hollows

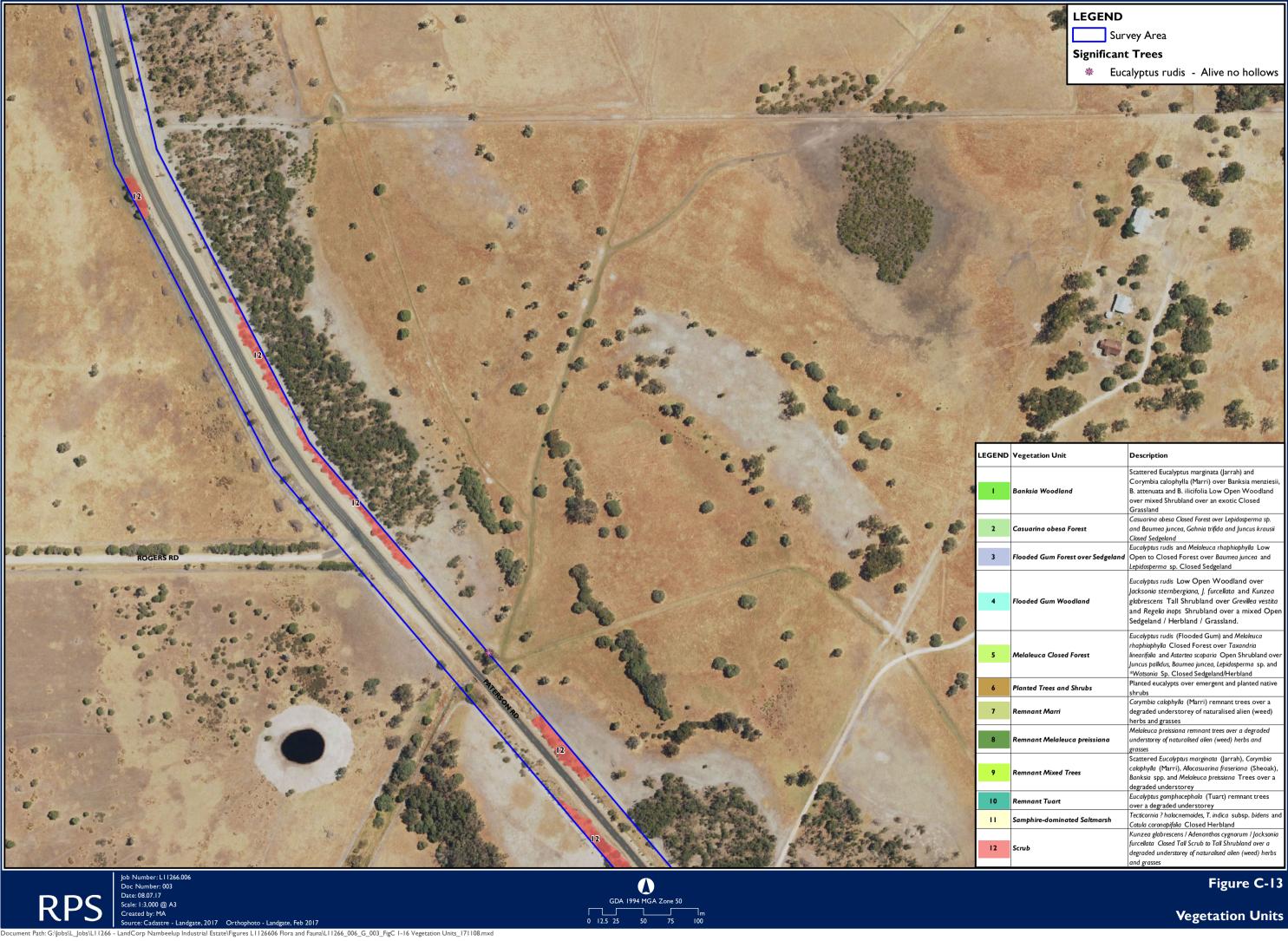


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	egetation Unit	Description		Star 18		11 12 12 12 12 12 12 12 12 12 12 12 12 1		*
1 Bar	anksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland				-		9
2 Cas	asuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland	A. C. S.			· Martin ·		
3 Floo		Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland			and a start		and the second	
4 Floo	ooded Gum Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.			-			
5 Mel		Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland	r		· · ·	20		PATE
6 Plai	anted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs				1		RSON
7 Ren	emnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	122			A state of the state	12.4 %	The second second
8 Ren	emnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses			Million I.		5	
9 Ren	emnant Mixed Trees	Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey	1.15		*			
10 Ren	emnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey	P. Part				No. A.	
	amphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland		ê . 1		124 100		
II Sam		Kunzea glabrescens / Adenanthos cygnorum / Jacksonia	Carl States of the					C AL

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Figure C-12



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LEGEND	Vegetation Unit	Description
I	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland
2	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland
3	Flooded Gum Forest over Sedgeland	Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland
4	Flooded Gum Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland over Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs
7	Remnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses
8	Remnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses
9	Remnant Mixed Trees	Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey
10	Remnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey
П	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland
12	Scrub	Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses



LEGEND	Vegetation Unit	Description			
I.	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland			
2	Casuarina obesa Forest	Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland			
3	Flooded Gum Forest over Sedgeland	Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland			
4	Flooded Gum Woodland	Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland.			
5	Melaleuca Closed Forest	Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland			
6	Planted Trees and Shrubs	Planted eucalypts over emergent and planted native shrubs			
7	Remnant Marri	Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses			
8	Remnant Melaleuca preissiana	Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses			
9	Remnant Mixed Trees	Scattered Eucolyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey			
10	Remnant Tuart	Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey			
П	Samphire-dominated Saltmarsh	Tecticornia ? halocnemoides, T. indica subsp. bidens and Cotula coronopifolia Closed Herbland			
12 Scrub		Kunzea glabrescens / Adenanthos cygnorum / Jacksonia furcellata Closed Tall Scrub to Tall Shrubland over a degraded understorey of naturalised alien (weed) herbs and grasses			



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Source: Cadastre - Landgate, 2017 Orthophoto - Landgate, Feb 2017

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	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland				· · · · · · · · · · · · · · · · · · ·		**<
	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland						** *** *
1	Banksia Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii				8	the second s	**< ***
I 2	Banksia Woodland Casuarina obesa Forest	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low						
I 2	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland				8	the second s	
1 2 3	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea				8	R & 7.8	
1 2 3	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Oper					R & 7.8	
1 2 3	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland.					R & 7.8	
1 2 3 4	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria	n			3	R & 7.8	
1 2 3 4	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina abesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vesitia and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and	n r				R & 7.8	
1 2 3 4 5	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shaubs	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove	n rr			8	R & 7.8	
1 2 3 4 5 6	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vesitia and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed SedgelandHerbland Planted eucalypts over emergent and planted native	n r			3	R & 7.8	
1 2 3 4 5 6 7	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina abesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded	n rr				R & 7.8	
1 2 3 4 5 6 7	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astarteo scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses	n rr			8	R & 7.8	
I 2 3 4 5 6 7 8	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vesitia and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia 5p. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses					R & 7.8	
1 2 3 4 5 6 7 8	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana Remnant Mixed Trees	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and "Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey					R & 7.8	
1 2 3 4 5 6 7 8 8	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana Remnant Mixed Trees Remnant Tuart	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vesita and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia 5p. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Corymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey					R & 7.8	
I 2 3 4 5 6 7 8 8 9 10	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Melaleuca preissiana Remnant Mixed Trees Remnant Tuart Samphire-dominated Saltmarsh	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Oper Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and "Watsonia Sp. Closed Sedgeland/Herbland Planted eucalypts over emergent and planted native shrubs Carymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remont trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarina fraseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey Eucalyptus gomphocephala (Tuart) remnant trees over a degraded understorey Tecticornia ? halocnemoides, T. indica subsp. bidens and Catula coronapifolia Closed Herbland					R & 7.8	
I 2 3 4 5 6 7 8 8 9 10 11	Banksia Woodland Casuarina obesa Forest Flooded Gum Forest over Sedgeland Flooded Gum Woodland Melaleuca Closed Forest Planted Trees and Shrubs Remnant Marri Remnant Malaleuca preissiana Remnant Mixed Trees Remnant Tuart Samphire-dominated Saltmarsh	Scattered Eucalyptus marginata (Jarrah) and Corymbia calophylla (Marri) over Banksia menziesii, B. attenuata and B. ilicifolia Low Open Woodland over mixed Shrubland over an exotic Closed Grassland Casuarina obesa Closed Forest over Lepidosperma sp. and Baumea juncea, Gahnia trifida and Juncus krausii Closed Sedgeland Eucalyptus rudis and Melaleuca rhaphiophylla Low Open to Closed Forest over Baumea juncea and Lepidosperma sp. Closed Sedgeland Eucalyptus rudis Low Open Woodland over Jacksonia sternbergiana, J. furcellata and Kunzea glabrescens Tall Shrubland over Grevillea vestita and Regelia inops Shrubland over Grevillea vestita and Regelia inops Shrubland over a mixed Open Sedgeland / Herbland / Grassland. Eucalyptus rudis (Flooded Gum) and Melaleuca rhaphiophylla Closed Forest over Taxandria linearifolia and Astartea scoparia Open Shrubland ove Juncus pallidus, Baumea juncea, Lepidosperma sp. and *Watsonia Sp. Closed Sedgeland/Herbland Planted eucalyptus over emergent and planted native shrubs Carymbia calophylla (Marri) remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Melaleuca preissiana remnant trees over a degraded understorey of naturalised alien (weed) herbs and grasses Scattered Eucalyptus marginata (Jarrah), Corymbia calophylla (Marri), Allocasuarian froseriana (Sheoak), Banksia spp. and Melaleuca preissiana Trees over a degraded understorey Tecticornia ? halocnemoides, T. indica subsp. bidens and					R & 7.8	





Figure C-16

Vegetatio	on Condition S	Scale (Keighery 1994)
Condition		Definition
Р	Pristine	No obvious signs of disturbance
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species
VG	Very Good	Vegetation structure altered; obvious signs of disturbance
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to
		Vegetation structure altered; obvious signs of disturbance
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management
CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').





CD

CD



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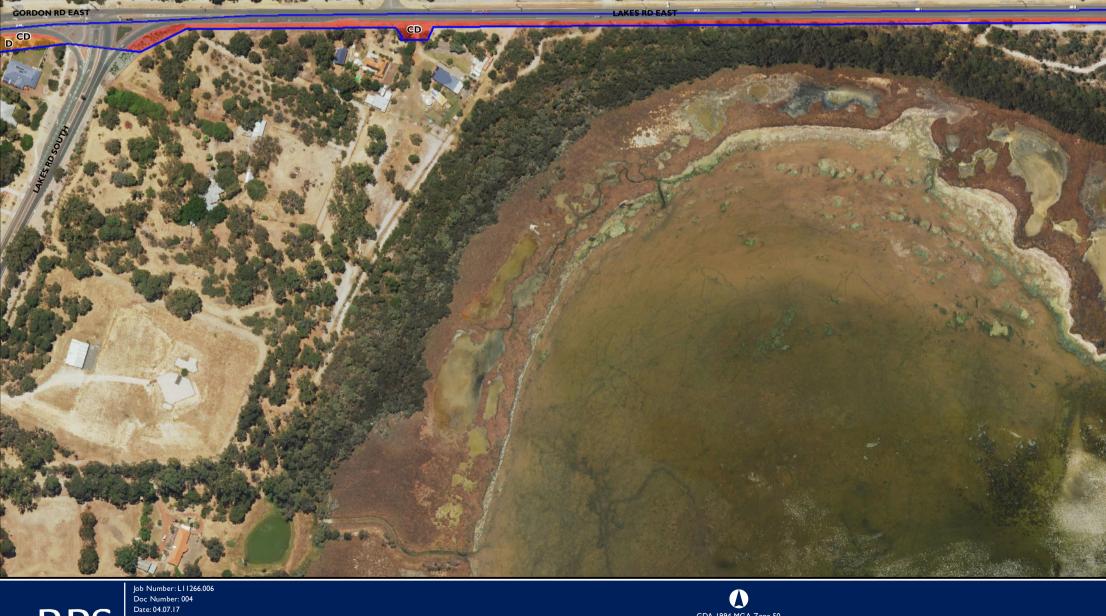


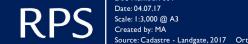
Figure D-I

Vegetation Condition

Vegetation Condition Scale (Keighery 1994)						
Condition		Definition				
Р	Pristine	No obvious signs of disturbance				
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species				
VG	Very Good	Vegetation structure altered; obvious signs of disturbance				
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to				
		Vegetation structure altered; obvious signs of disturbance				
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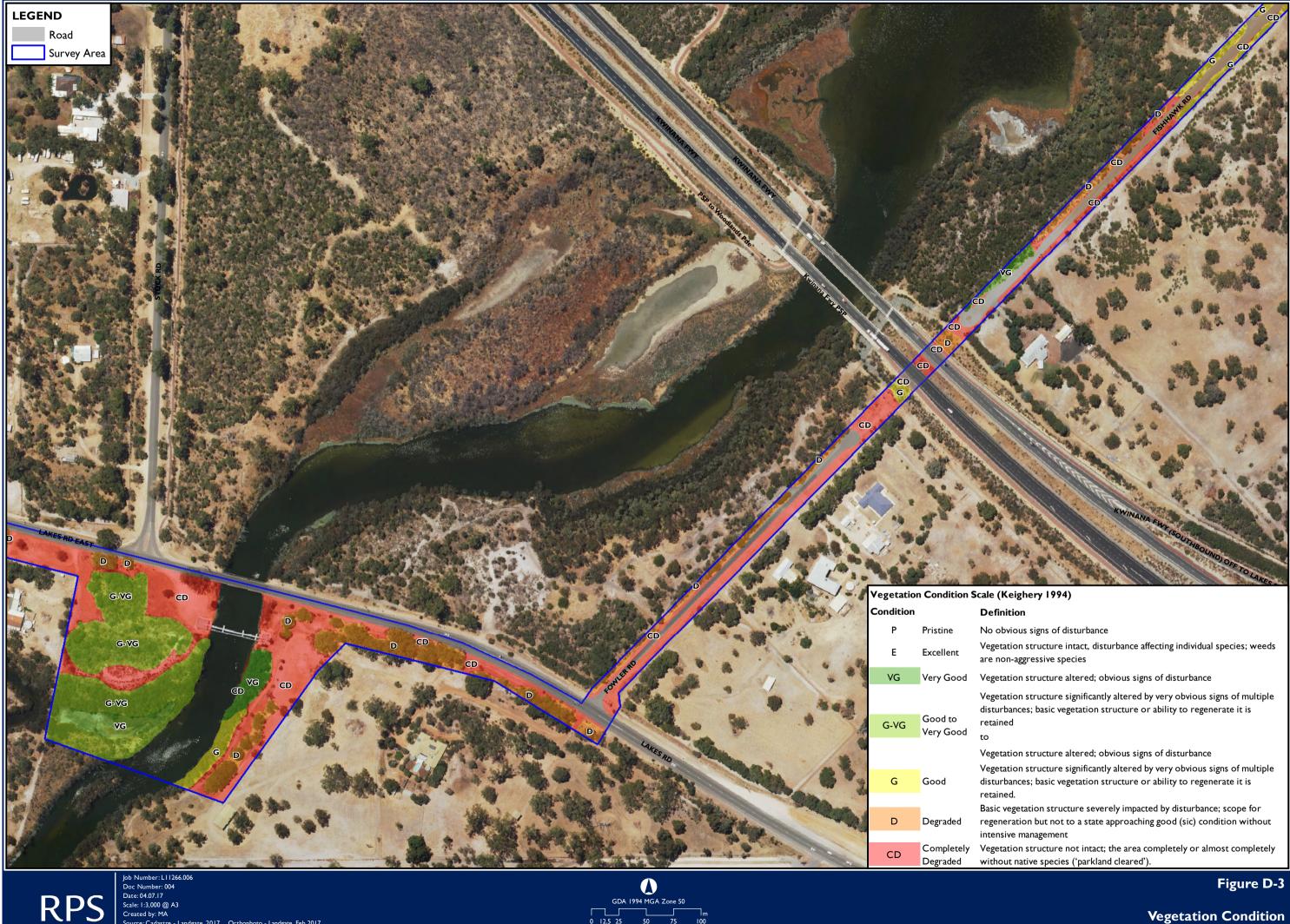




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Figure D-2

Vegetation Condition



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Vegetation Condition

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Indition Definition P Pristine No obvious signs of disturbance E Excellent Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species VG Very Good Vegetation structure altered; obvious signs of disturbance G-VG Good to Vegetation structure altered; obvious signs of disturbance retained Vegetation structure altered; obvious signs of multiple disturbance VG Very Good Good to Vegetation structure altered; obvious signs of multiple disturbance: vegetation structure altered; obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained. G Good Vegetation structure significantly altered by very obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained. D Degraded Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management CD Completely Vegetation structure not intact; the area completely or almost completely					Star Star	· · · · · · · · · · · · · · · · · · ·			and the state
Indition Definition P Pristine No obvious signs of disturbance E Excellent Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species VG Very Good Vegetation structure altered; obvious signs of disturbance G-VG Good to Vegetation structure altered; obvious signs of disturbance retained Vegetation structure altered; obvious signs of multiple disturbance VG Very Good Good to Vegetation structure altered; obvious signs of multiple disturbance: vegetation structure altered; obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained. G Good Vegetation structure significantly altered by very obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained. D Degraded Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management CD Completely Vegetation structure not intact; the area completely or almost completely		Stapp et	1218.97.9		CD				*
Indition Definition P Pristine No obvious signs of disturbance E Excellent Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species VG Very Good Vegetation structure altered; obvious signs of disturbance G-VG Good to Vegetation structure altered; obvious signs of disturbance retained Vegetation structure altered; obvious signs of multiple disturbance VG Very Good Good to Vegetation structure altered; obvious signs of multiple disturbance: vegetation structure altered; obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained. G Good Vegetation structure significantly altered by very obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained. D Degraded Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management CD Completely Vegetation structure not intact; the area completely or almost completely			And allowed	G	A Stranger	2		. 48	
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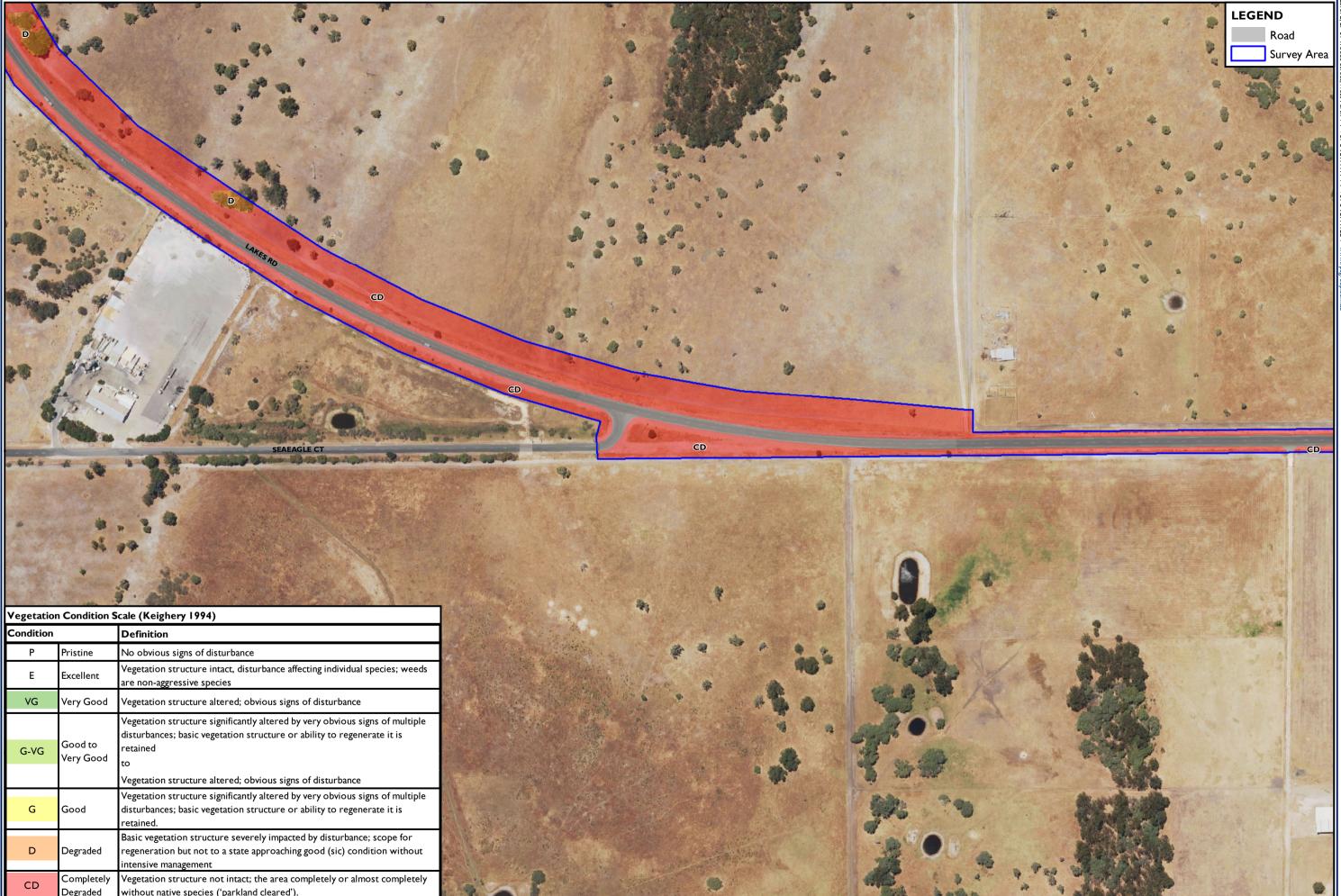
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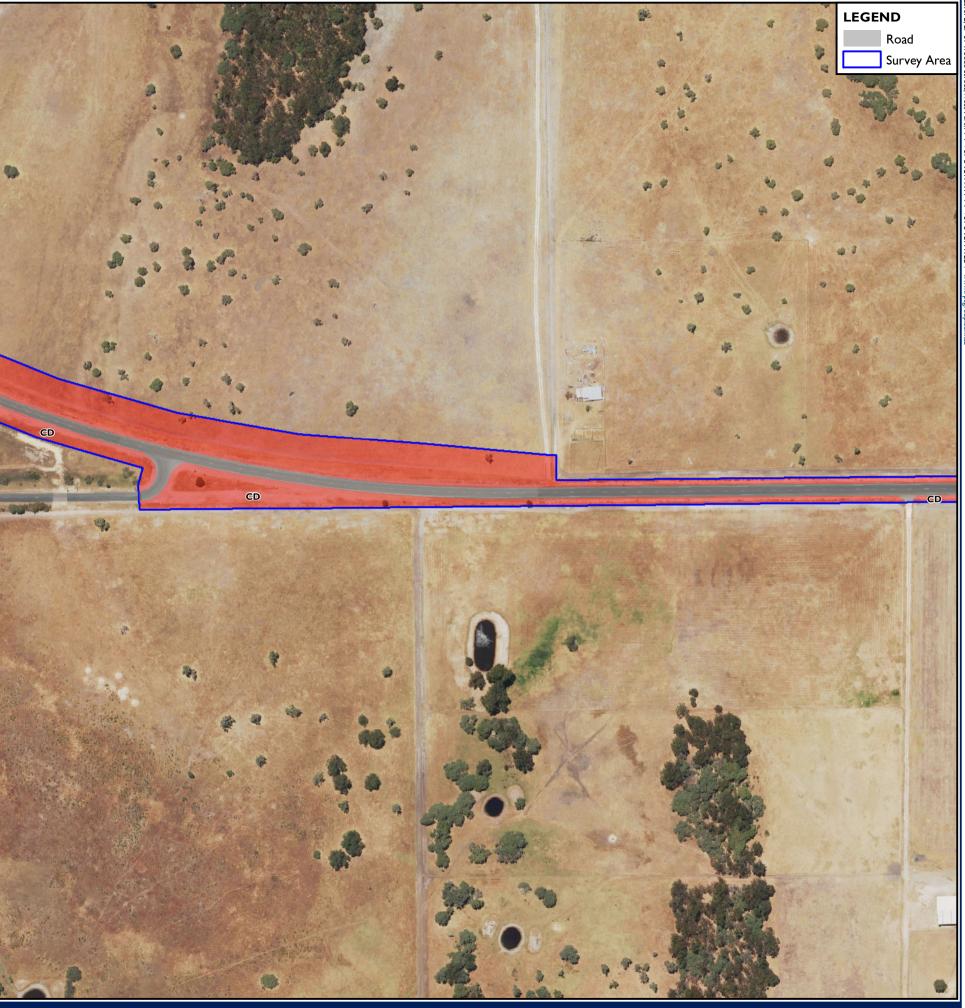
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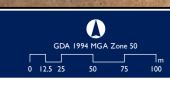


Figure D-4



Condition		Definition		
Р	Pristine	No obvious signs of disturbance		
Е	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species		
VG	Very Good	Vegetation structure altered; obvious signs of disturbance		
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to		
		Vegetation structure altered; obvious signs of disturbance		
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.		
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management		
CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').		
Γ	DC	Job Number: L11266.006 Doc Number: 004 Date: 04.07.17 Scale: 1:3.000 @ A3		





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Figure D-5

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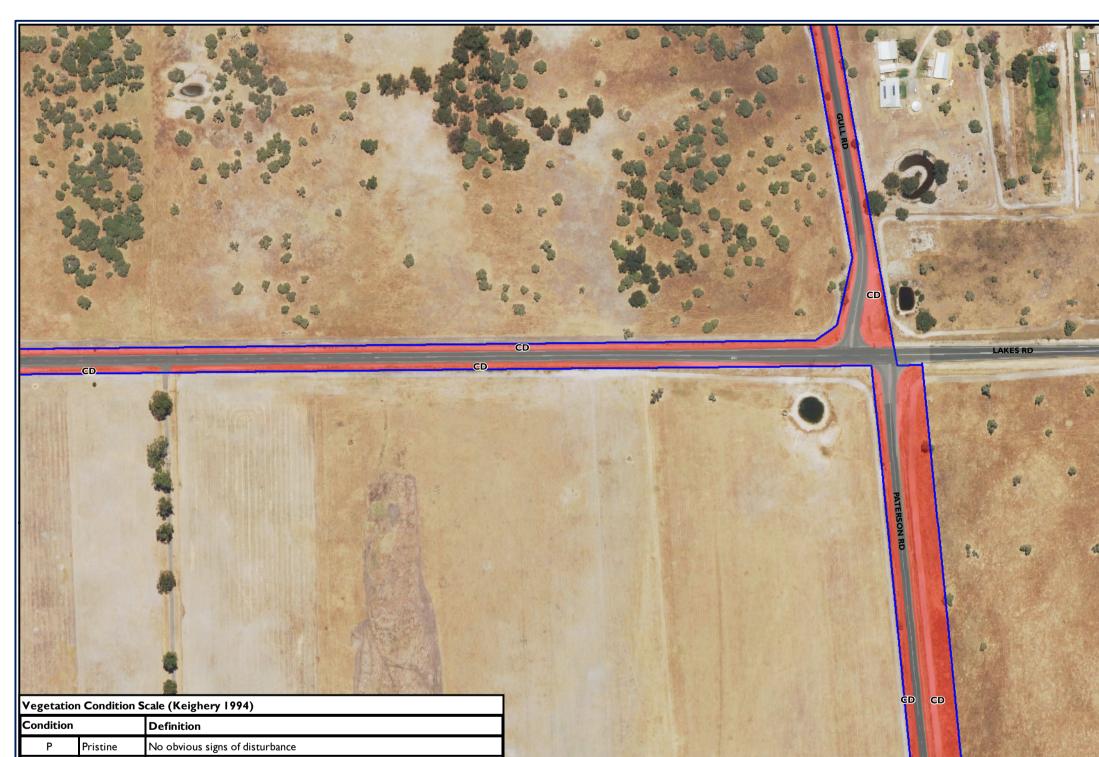
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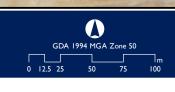
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Condition		Definition
Р	Pristine	No obvious signs of disturbance
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species
VG	Very Good	Vegetation structure altered; obvious signs of disturbance
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained
		to Vegetation structure altered; obvious signs of disturbance
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management
CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').
С	DC	job Number: L11266.006 Doc Number: 004 Date: 04.07.17 Scale: 1:3,000 @ A3



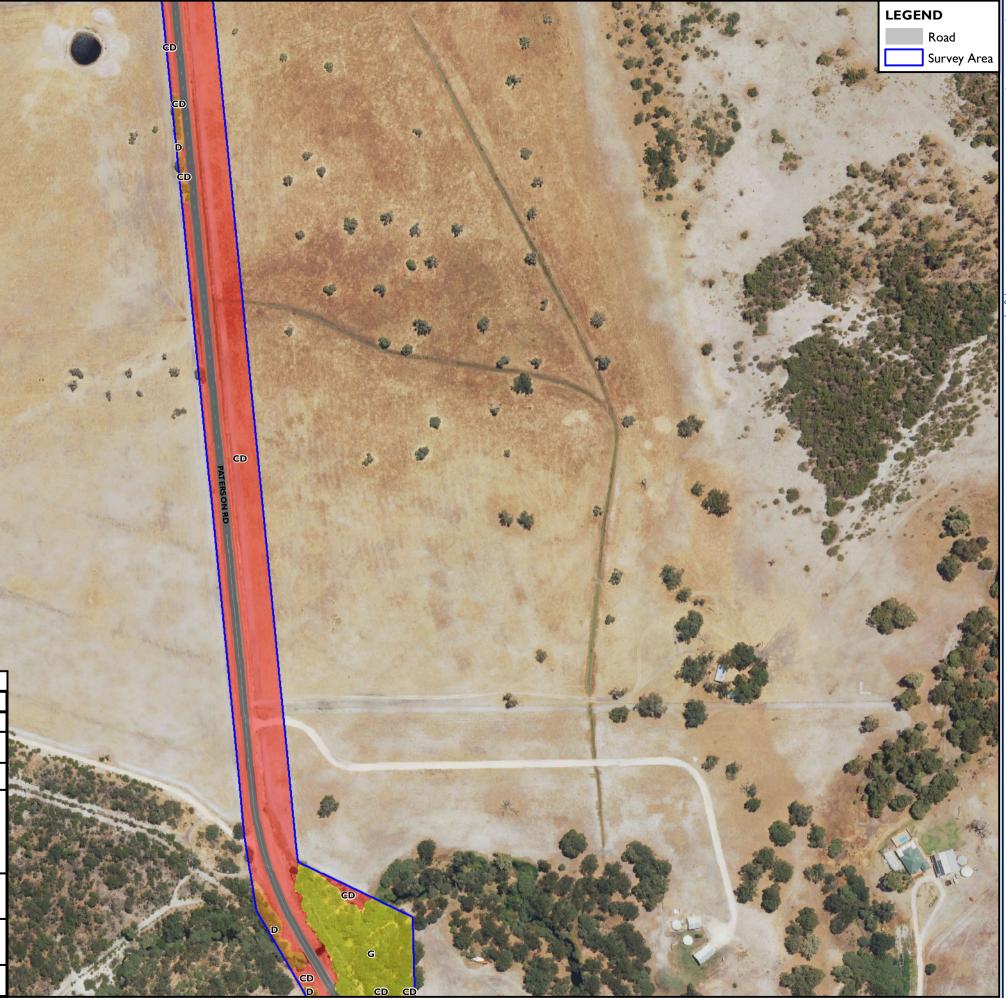
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Figure D-8

Condition		Definition		
Р	Pristine	No obvious signs of disturbance		
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species		
VG	Very Good	Vegetation structure altered; obvious signs of disturbance		
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to		
		Vegetation structure altered; obvious signs of disturbance		
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.		
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management		
CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').		
	Degraded	without native species ('parkland cleared'). Job Number: L11266.006 Doc Number: 004 Date: 04.07.17 Scale: 13.000 @ A3		





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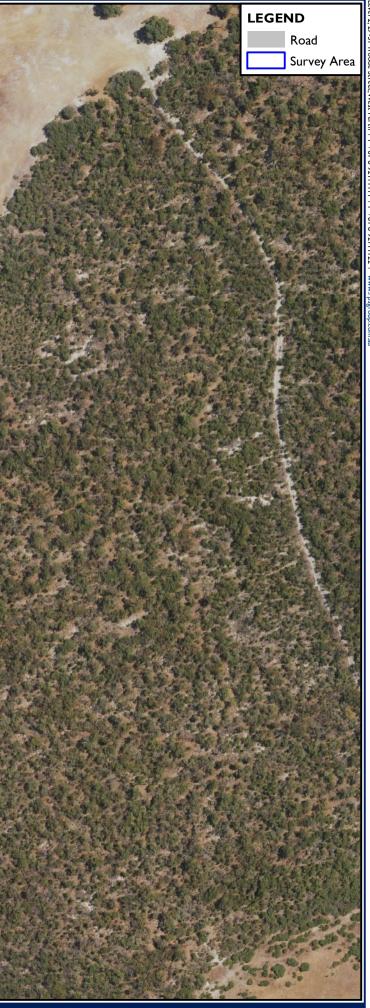
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E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species	
/G	Very Good	Vegetation structure altered; obvious signs of disturbance	
	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to	
G-VG	1	Vegetation structure altered; obvious signs of disturbance	
G G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is	
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	Degraded Completely	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained. Basic vegetation structure severely impacted by disturbance; scope for	

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E			
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VG		Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is	
	Very Good Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained	
VG	Good to	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is	
VG G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to Vegetation structure altered; obvious signs of disturbance Vegetation structure significantly altered by very obvious signs of multiple	
VG	Good to	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to Vegetation structure altered; obvious signs of disturbance Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.	
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VG G-VG G	Good to Very Good Good Degraded	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to Vegetation structure altered; obvious signs of disturbance Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained. Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').	
VG G-VG G D	Good to Very Good Good Degraded Completely Degraded	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to Vegetation structure altered; obvious signs of disturbance Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained. Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared'). Job Number: L11266.006 Doc Number: 04	
VG G-VG G D	Good to Very Good Good Degraded Completely	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to Vegetation structure altered; obvious signs of disturbance Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained. Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared'). Job Number:L11266.006	

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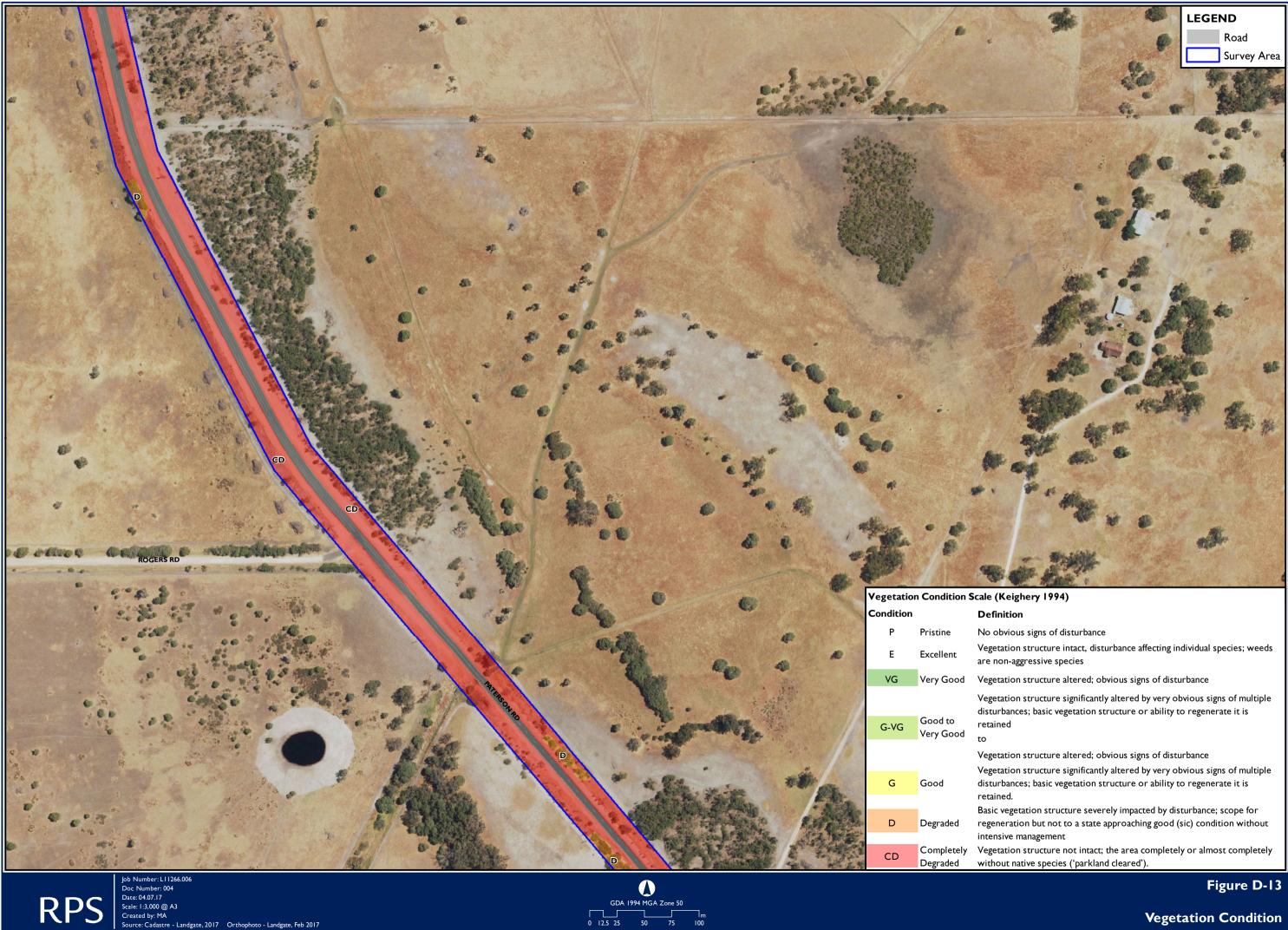
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		Scale (Keighery 1994)	
Condition P	Pristine	Definition No obvious signs of disturbance	
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species	
VG	Very Good	Vegetation structure altered; obvious signs of disturbance	
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to Vegetation structure altered; obvious signs of disturbance	Non-
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.	
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management	
CD	Completely	Vegetation structure not intact; the area completely or almost completely	
	Pegraded	without native species ('parkland cleared'). Job Number: L11266.006 Doc Number: 004 Date: 04.07.17 Scale: 1:3,000 @ A3 Created by: MA Source: Cadastre - Landgate, 2017 Orthophoto - Landgate, Feb 2017 LandGore - Numberland Industrial Extend Simon L1266.006 - G. 004 FirD, L16 Voo	GDA 1994 MGA Zone 50 0 12.5 25 50 75 100

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Figure D-12

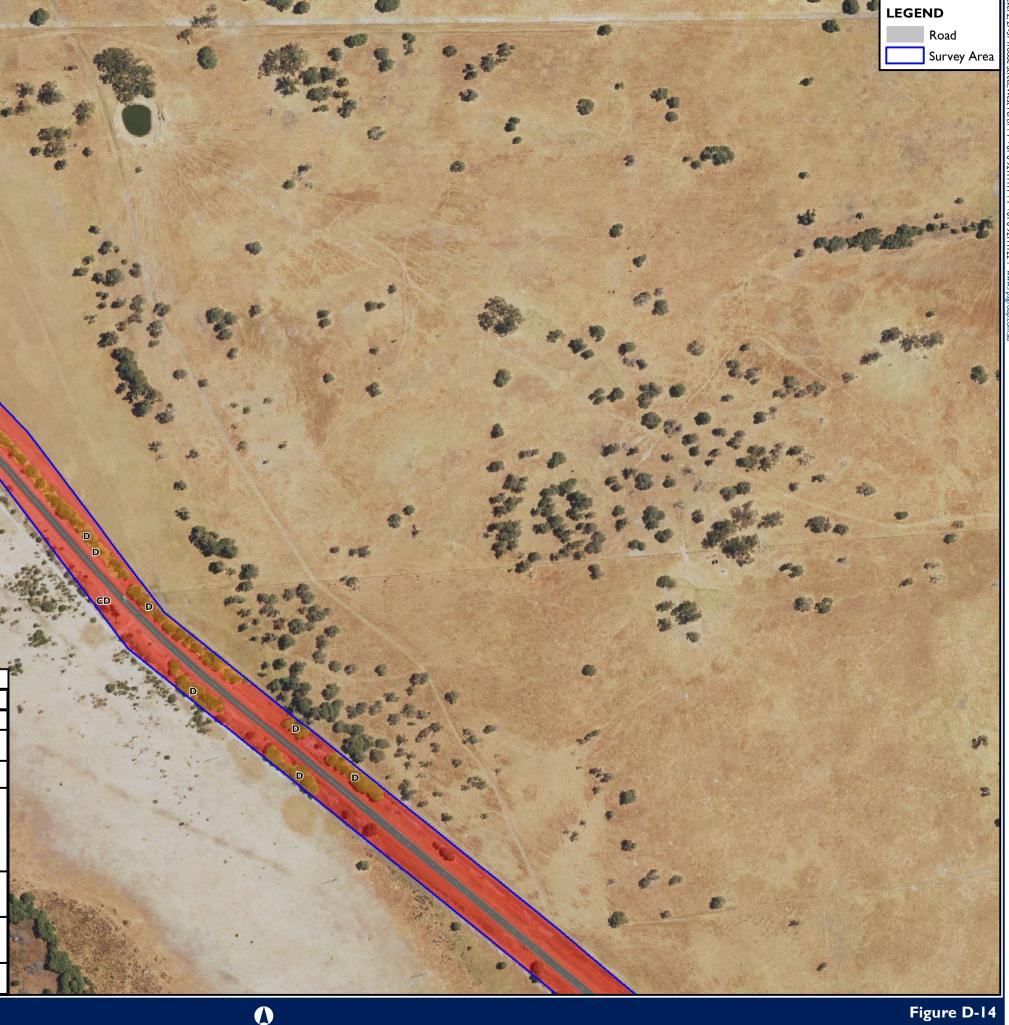


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Condition		Definition		
Р	Pristine	No obvious signs of disturbance		
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species		
VG	Very Good	Vegetation structure altered; obvious signs of disturbance		
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to		
		Vegetation structure altered; obvious signs of disturbance		
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.		
D Degraded		Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management		
CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').		
D	Degraded Completely	retained. Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management Vegetation structure not intact; the area completely or almost complete		





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Condition		Definition				-	
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VG V	/ery Good	Vegetation structure altered; obvious signs of disturbance	Stop The	64/10	Line of		the loss
	Good to /ery Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained to	19 3 m		-	D	
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		Vegetation structure not intact; the area completely or almost completely		Contraction of the	CEL SA	1/1.5.000	and the stand
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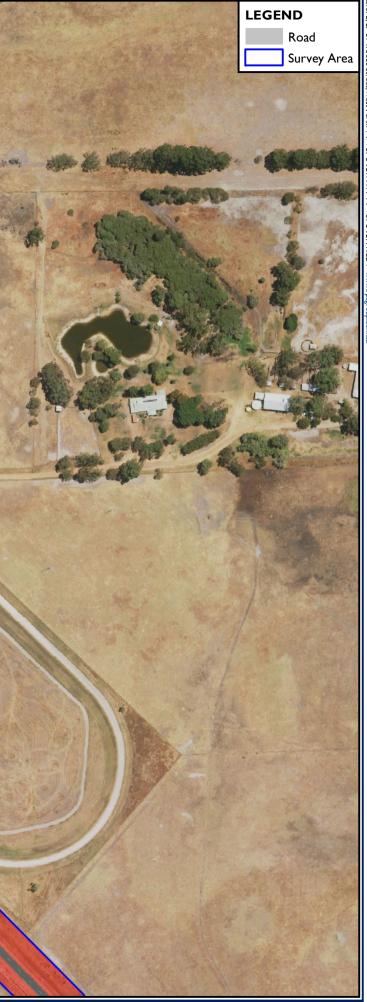


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Condition		Definition	
Р	Pristine	No obvious signs of disturbance	
E	Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species	
VG	Very Good	Vegetation structure altered; obvious signs of disturbance	
G-VG	Good to Very Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained	
Very Good		to Vegetation structure altered; obvious signs of disturbance	
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances; basic vegetation structure or ability to regenerate it is retained.	
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management	
CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').	
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Figure D-16



Appendix A Definitions

EEL11266.006 | Road Reserve Reconnaissance Flora and Vegetation Survey | Peel Business Park Trunk Infrastructure Extension | April 2018



Appendix A Definitions

Table A-1 Conservation Codes for Western Australian Flora (WAH 2017)

Category Definition

Т	Threatened Flora (Extant)
	Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 of the Wildlife Conservation (Rare Flora) Notice under the <i>Wildlife Conservation Act 1950</i>). Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN
	Red List criteria:
	CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild
	EN: Endangered – considered to be facing a very high risk of extinction in the wild
	VU: Vulnerable – considered to be facing a high risk of extinction in the wild.
Х	Presumed Extinct Flora
	Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 of the Wildlife Conservation (Rare Flora) Notice under the <i>Wildlife Conservation Act 1950</i>).
P1	Priority One: Poorly-known Taxa
	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey
P2	Priority Two: Poorly-known Taxa
	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	Priority Three: Poorly-known Taxa
	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	Priority Four: Rare, Near Threatened and Other Taxa in Need of Monitoring
	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.



Table A-2 EPBC Act Conservation Codes (IUCN Red List 2017)

Category	Definition			
EX	Extinct			
	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.			
EW	Extinct in the Wild			
	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.			
CR	Critically Endangered			
	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.			
EN	Endangered			
	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.			
VU	Vulnerable			
	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.			
NT	Near Threatened			
	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.			
LC	Least Concern			
	A taxon is Least Concern when it has been evaluated against the criteria and it does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.			
DD	Data Deficient			
	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases, great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period has elapsed since the last record of the taxon, threatened status may well be justified.			
NE	Not Evaluated			
	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.			



Reservation Status	Description	
Well Reserved	Known from two or more A class National Parks or Nature Reserves	
Poorly Reserved	Known from a single A class National Park or Nature Reserve	
Unreserved	Not known to occur in any A class National Park or Nature Reserve.	

Table A-3 FCT Reservation Status Categories (Gibson et al. 1994)

Table A-4 FCT Conservation Status Categories (Gibson et al. 1994)

Conservation Status	Description		
Presumed Destroyed	A community that is totally destroyed or so extensively modified that it is unlikely to re- establish ecosystem processes in the foreseeable future.		
Critical	A community with most or all of its known occurrences facing severe modification or destruction in the immediate future.		
Endangered	A community in danger of severe modification or destruction throughout its range, if causal factors continue operating.		
Vulnerable	A community likely to move into the endangered category in the near future if the causal factors continue operating.		
Susceptible	A community of concern because there is evidence that it can be modified or destroyed by human activities or would be vulnerable to new threatening process.		
Low Risk	A community that does not qualify for one of the above categories		
Insufficiently Known	A community for which there is inadequate data to assign to one of the above categories.		

Table A-5 Threatened Ecological Communities Category of Threat (English and Blyth 1997)

Category	Definition
Presumed Totally Destroyed (PD)	An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies:
	a. Records within the last 50 years have not been confirmed despite thorough searches or known or likely habitats or.
	b. All occurrences recorded within the last 50 years have since been destroyed.
Critically Endangered (CR)	An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria:
	a. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply:
	 Geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately five years).



Category	Definition
	 Modification throughout its range is continuing such that in the immediate future (within approximately five years) the community is unlikely to be capable of being substantially rehabilitated.
	b. Current distribution is limited, and one or more of the following apply (i, ii or iii):
	 Geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes, which are likely to result in total destruction throughout its range in the immediate future (within approximately five years).
	ii. There are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes.
	iii. There may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
	c. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately five years).
Endangered (EN)	An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):
	a. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 70% and either or both of the following apply (i or ii)
	 Geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term (within approximately 10 years).
	 Modification throughout its range is continuing such that in the short-term future (within approximately 10 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
	b. Current distribution is limited, and one or more of the following apply (i, ii or iii):
	 Geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 10 years).
	 There are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes.
	 iii. There may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
	c. The ecological community exists only as highly modified occurrences, which may be capable of being rehabilitated if such work begins in the short-term future (within approximately 10 years).
Vulnerable (VU)	An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction in the medium to long term future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):
	a. The ecological community exists largely as modified occurrences, which are likely to be capable of being substantially restored or rehabilitated.
	b. The ecological community can be modified or destroyed and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
	c. The ecological community may still be widespread but is believed likely to move into a category of higher threat in the medium to long-term future because of existing or impending threatening processes.



Category Definition	
Data Deficient (DD)	An ecological community, which has not been adequately evaluated with respect to status or where there is currently insufficient information to assign it to a particular category. (An ecological community with poorly known distribution or biology that is suspected to belong to any of the above categories. These ecological communities have a high priority for survey and/or research).
Lower Risk (LR) An ecological community that has been adequately surveyed and does not qualify for a above categories of threat and appears unlikely to be under threat of significant modified destruction in the short to medium term future.	

Table A-6 Vegetation Structure Classes (WAPC 2000)

Life Form/	Canopy Cover (Percentage)				
Height Class	100% – 70%	70% – 30%	30% – 10%	10% – 2%	
Trees 10–30 m	Closed Forest	Open Forest	Woodland	Open Woodland	
Trees <10 m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland	
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Scrub Mallee	
Shrubs >2 m	Closed Tall Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland	
Shrubs 1–2 m	Closed Heath	Open Heath	Shrubland	Open Shrubland	
Shrubs <1 m	Closed Low Heath	Open Low Heath	Low Shrubland	Low Open Shrubland	
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland	
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland	
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland	

(Source: Western Australian Planning Commission 2000)

Table A-7 Vegetation Condition Scale (adapted from Keighery 1994 and Trudgen 1988)

Condition		Definition	
Р	Pristine	No obvious signs of disturbance.	
E	Excellent	Vegetation structure intact, disturbance affecting individual species ; weeds are non-aggressive species	
V	Very Good	Vegetation structure altered; obvious signs of disturbance	
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained	
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management	
С	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ("parkland cleared").	

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Table A-8Wetland Management Categories and Objectives Applied to the Swan Coastal Plain
(Adapted from Environmental Protection Authority 2004)

Management Category	General Description	Management Objectives
Conservation	Wetlands which support	Highest priority wetlands.
	a high level of attributes and functions.	Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including:
		• reservation in national parks, Crown reserves and state owned land
		 protection under Environmental Protection Policies
		wetland covenanting by landowners.
		No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource	Wetlands which may	Priority wetlands
Enhancement	have been partially modified but still support substantial ecological attributes and functions	Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity. Protection is recommended through a number of mechanisms.
Multiple Use	Wetlands with few remaining important attributes and functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through land care.



Appendix B Flora Inventory

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Appendix B Flora Inventory

Family	Weed	Species
ARACEAE	*	Zantedeschia aethiopica
ASPARAGACEAE		Sowerbaea laxiflora
ASPHODELACEAE	*	Trachyandra divaricata
ASTERACEAE	*	Arctotheca calendula
		Cotula coronopifolia
	*	Ursinia anthemoides
CASUARINACEAE		Allocasuarina fraseriana
		Casuarina obesa
CHENOPODIACEAE	*	Chenopodium album
CHENOPODIACEAE		Tecticornia ? halocnemoides
CHENOPODIACEAE		Tecticornia indica subsp. bidens
CYPERACEAE		Baumea juncea
		Cyathochaeta avenacea
		Gahnia trifida
		Lepidosperma longitudinale
		Lepidosperma sp.
		Tetraria octandra
DASYPOGONACEAE		Dasypogon bromelliifolius
		Kingia australis
DILLENIACEAE		Hibbertia hypericoides
EUPHORBIACEAE	*	Euphorbia terracina
FABACEAE		Acacia pulchella
		Acacia saligna
		Hardenbergia comptoniana
		Jacksonia floribunda
		Jacksonia furcellata
		Jacksonia sternbergiana
HAEMODORACEAE		Conostylis aculeata
HEMEROCALLIDACEAE		Corynotheca micrantha
		Dianella revoluta
IRIDACEAE		Patersonia occidentalis
		Watsonia sp.

APPENDIX



Family	Weed	Species	
JUNCACEAE		Juncus kraussii	
		Juncus pallidus	
LAMIACEAE		Hemiandra pungens	
LAURACEAE		Cassytha sp.	
CAMPANULACEAE		Lobelia anceps	
MYRTACEAE		Agonis flexuosa	
		Astartea scoparia	
		Calothamnus sp.	
		Chamelaucium uncinatum	
		Corymbia calophylla	
		Eucalyptus gomphocephala	
		Eucalyptus marginata subsp. marginata	
		Eucalyptus rudis subsp. rudis	
		Kunzea glabrescens	
	*	Leptospermum laevigatum	
		Melaleuca preissiana	
		Melaleuca rhaphiophylla	
		Regelia inops	
		Taxandria linearifolia	
ORCHIDACEAE		Microtis media	
POACEAE	*	Briza maxima	
	*	Bromus diandrus	
	*	Cynodon dactylon	
	*	Ehrharta calycina	
	*	Ehrharta longiflora	
	*	Eragrostis curvula	
	*	Lolium perenne	
PROTEACEAE		Adenanthos cygnorum	
		Banksia attenuata	
		Banksia grandis	
		Banksia ilicifolia	
		Banksia menziesii	
		Grevillea vestita	
RESTIONACEAE		Leptocarpus sp.	
		Lyginia barbata	
XANTHORRHOEACEAE		Xanthorrhoea preissii	
ZAMIACEAE		Macrozamia riedlei	

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Appendix C Black Cockatoo Habitat Tree Data

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Appendix C Black Cockatoo Habitat Tree Data

Species	Alive/Dead/Hollows	Latitude	Longitude
Eucalyptus gomphocephala	Alive no hollows	-32.51077	115.760232
Eucalyptus gomphocephala	Alive no hollows	-32.51072	115.760116
Eucalyptus gomphocephala	Alive no hollows	-32.51068	115.760348
Eucalyptus gomphocephala	Alive no hollows	-32.5107	115.760518
Eucalyptus gomphocephala	Alive no hollows	-32.51077	115.760541
Eucalyptus gomphocephala	Alive no hollows	-32.51075	115.760601
Eucalyptus gomphocephala	Alive no hollows	-32.51069	115.760648
Eucalyptus gomphocephala	Alive no hollows	-32.51068	115.761203
Eucalyptus gomphocephala	Alive no hollows	-32.51063	115.761588
Eucalyptus gomphocephala	Alive no hollows	-32.50798	115.781606
Eucalyptus gomphocephala	Alive no hollows	-32.50816	115.782119
Eucalyptus gomphocephala	Alive no hollows	-32.50816	115.782414
Eucalyptus gomphocephala	Alive no hollows	-32.50824	115.782573
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50838	115.783577
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50839	115.783684
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50843	115.783871
Eucalyptus gomphocephala	Alive no hollows	-32.50855	115.784473
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50889	115.785572
Eucalyptus gomphocephala	Alive no hollows	-32.50909	115.785749
Eucalyptus gomphocephala	Alive no hollows	-32.50898	115.786082
Eucalyptus gomphocephala	Alive no hollows	-32.5091	115.786076
Eucalyptus gomphocephala	Alive no hollows	-32.50919	115.786195
Eucalyptus gomphocephala	Alive no hollows	-32.50921	115.786435
Eucalyptus gomphocephala	Alive no hollows	-32.50909	115.786529
Eucalyptus gomphocephala	Alive no hollows	-32.50917	115.786762
Eucalyptus gomphocephala	Alive no hollows	-32.50921	115.786888
Eucalyptus gomphocephala	Alive no hollows	-32.50923	115.786979
Corymbia calophylla	Alive no hollows	-32.50967	115.787892
Corymbia calophylla	Alive no hollows	-32.50967	115.787856
Corymbia calophylla	Alive no hollows	-32.50977	115.788026
Corymbia calophylla	Alive no hollows	-32.50738	115.790764
Eucalyptus marginata subsp. marginata	Dead with hollows	-32.50198	115.797381
Eucalyptus marginata subsp. marginata	Alive no hollows	-32.5013	115.797924
Eucalyptus marginata subsp. marginata	Alive no hollows	-32.50675	115.803786
Eucalyptus marginata subsp. marginata	Alive no hollows	-32.50673	115.803813

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Species	Alive/Dead/Hollows	Latitude	Longitude
Eucalyptus marginata subsp. marginata	Alive no hollows	-32.50677	115.803854
Eucalyptus marginata subsp. marginata	Alive no hollows	-32.50693	115.803873
Corymbia calophylla	Alive no hollows	-32.50761	115.804221
Corymbia calophylla	Alive no hollows	-32.50765	115.804237
Corymbia calophylla	Dead no hollows	-32.50766	115.80425
Corymbia calophylla	Alive no hollows	-32.50776	115.80431
Corymbia calophylla	Alive no hollows	-32.50783	115.804357
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50944	115.806735
Corymbia calophylla	Alive no hollows	-32.50914	115.80622
Corymbia calophylla	Alive no hollows	-32.5091	115.806145
Corymbia calophylla	Alive no hollows	-32.50908	115.806085
Corymbia calophylla	Dead no hollows	-32.50904	115.806044
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.54954	115.839416
Eucalyptus marginata subsp. marginata	Alive no hollows	-32.5333	115.832262
Eucalyptus marginata subsp. marginata	Dead with hollows	-32.53184	115.832094
Eucalyptus marginata subsp. marginata	Dead with hollows	-32.52975	115.830823
Corymbia calophylla	Dead with hollows	-32.52284	115.825998
Corymbia calophylla	Alive no hollows	-32.52276	115.826171
Corymbia calophylla	Alive no hollows	-32.52261	115.826157
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.52265	115.826024
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.52252	115.826006
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.52246	115.826087
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.52235	115.826061
Corymbia calophylla	Alive no hollows	-32.52288	115.826057
Corymbia calophylla	Alive no hollows	-32.5231	115.826056
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50922	115.784503
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50933	115.78433
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50938	115.783184
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50905	115.783363
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50873	115.783649
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.5087	115.783579
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50969	115.784889
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50974	115.785099
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.5098	115.785073
Eucalyptus rudis subsp. rudis	Alive no hollows	-32.50987	115.784996
Planted Non-endemic Eucalypt	Alive no hollows	-32.51002	115.784909
Planted Non-endemic Eucalypt	Alive no hollows	-32.51014	115.784774
Planted Non-endemic Eucalypt	Alive no hollows	-32.51019	115.784737
Planted Non-endemic Eucalypt	Alive no hollows	-32.51021	115.784701

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