RPS Australia Asia Pacific

Waddi Wind Farm

Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey

November 2013

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Executive Summary

RPS contracted Outback Ecology, a division of MWH Australia Pty Ltd, to undertake a Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey of the proposed Wind Farm. Surveys were undertaken from 29th October to 1st November 2013. The Study Area as illustrated in **Figure 2** is summarised in the table below. The aim of the surveys and assessment is to:

1. Complete the targeted flora surveys required to fulfil Conditon 8 of the Vegetation Clearing Permit provided to Waddi Wind Farm Pty Ltd on 13/02/2012;
2. Update the Targeted Level 1 Flora and Vegetation Assessment prepared in 2010 to include the wind farm substation options 1 and 2, and the grid connection easement/transmission line route from the wind farm substation to the existing Cataby substation and the existing Cataby substation itself;
3. Undertake a significant fauna habitat assessment for the Black Cockatoo in relation to the wind farm substation options 1 and 2 and the grid connection easement/transmission line route and Cataby substation.

	Study Area	**Survey Scope**
1.	Wind turbine locations, access tracks and cable routes - 50 metre corridor	> Search for rare flora listed in the *Wildlife Conservation (Rare Flora) Notice* and P*riority Flora* as identified in the database searches of DPaW within areas of remnant vegetation as indicated by aerial photography.
2.	Wind farm substation option 1 (~5 ha)	> Level 1 Spring Flora Survey > Search for conservation significant flora and vegetation including rare flora listed in the *Wildlife Conservation (Rare Flora) Notice* and *priority flora* and flora and vegetation listed under the EPBC Act > Significant fauna habitat assessment for the Black Cockatoo
3.	Wind farm substation option 2 (<1 ha)	
4.	Grid connection easement/transmission line route from wind farm substation option 1 & 2* to the existing Cataby substation - 85 metre corridor east of the Brand Hwy and 170 metre corridor west of the Brand Hwy	

**An alternative route for the grid connection easement/transmission line to wind farm substation option 2 was drafted and provided to Outback Ecology after the completion of the field survey. This new area has been included in the report based on aerial photography interpretation and extrapolation of vegetation assessed in adjacent areas. No field assessment of the presence of conservation significant flora has been undertaken for this alternative route (Figure 2 – orange shaded polygon).*

No Threatened Flora species as listed under the *EPBC Act 1999*, or Threatened Flora species listed under the *WC Act 1950* (WA) were recorded within the Study Area.

There were six Priority Flora recorded in the Study Area.

- *Anigozanthos humilis* subsp. ? Badgingarra (S.D. Hopper 7114) – Priority 2;
- *Arnocrinum gracillimum* – Priority 2;
- *Conostephium magnum* – Priority 4;
- *Lepidobolus quadratus* – Priority 3;
- *Stylidium aeonioides* – Priority 4; and
- *Tetratheca angulata* – Priority 3.

These Priority Flora should be planned to be avoided until impact on populations in the immediate vicinity and/or subregion is further determined. To determine the impact on the populations of Priority Flora that cannot be avoided; further census of individuals adjacent to the Study Area would be required. The majority of the priority taxa detected in this survey are known from only *single* collections within a further eight kilometres of the Study Area, therefore the data of this survey represents new populations that may extend beyond the boundaries of the Study Area.

Fifteen detailed relevés were established across the Study Area sampling the eight defined Vegetation Units. Vegetation Types included Low Open Woodland of *Eucalyptus todtiana* (two variants), Melaleuca Woodland, Myrtaceous Scrub, Woodland of *Banksia ilicifolia*, Proteaceous Heath (two variants) and one Disturbed Creekline.

Conservation Significant Vegetation within the Study Area includes:

- Vegetation containing Priority Flora records;
- Banksia Woodland - restricted distribution within the Bioregion – northern extent of the Bassendean Dune System; and
- Proteaceous Heath (Kwongan) recognised nationally and internationally as a hotspot for biodiversity.

Avoidance and minimisation of disturbance in the Vegetation Types above is recommended. The project will need to address this strategy to meet the EPA Position Statement 2 (2000). Due to the high clearing in the agricultural areas, the EPA published Position Statement 2 *Environmental Protection of Native Vegetation in Western Australia* which states that *"…the EPA is of the view that it is unreasonable to expect to be able to continue to clear native vegetation from land within the agricultural area other than relatively small areas and where alternative mechanisms for protection biodiversity are addressed".*

The Study Area is within the known distribution of the Carnaby's Black-cockatoo, and within the modelled breeding range (DoE 2013c). However the Study Area lies 140km north of the modelled distribution of Baudin's and Forest Red-tailed Black Cockatoos and these two species were not considered by this assessment. The Black Cockatoo Targeted Habitat Assessment found only limited

breeding habitat throughout the Study Area. Three trees with potential to develop hollows were found in the Study Area where the grid connection easement/transmission line route crosses Mullering Brook (Marri trees with DBH over 500 mm, in the 'Creekline' vegetation unit). The removal of these three trees will not have a significant impact on the habitat and land systems assessment as it is less than 1 ha.

The survey found suitable foraging habitat in the Study Area, with an abundance of proteaceous species in vegetation units generally in good to excellent condition. This foraging habitat is located in the wind farm substation option 1 and the eastern and western portions of the grid connection easement.

The Study Area is within the modelled breeding range of the Carnaby's Black-cockatoo, and contains foraging habitat. This foraging habitat persists at over 30% of its pre-European extent within the Lesueur Subregion. To mitigate potential impacts of the Project on Carnaby's Cockatoo, it is recommended that relatively large trees in the Study Area are preserved wherever possible and that the extent of clearing of foraging habitat is minimised as far as practical.

It is proposed that less than 1 ha of black cockatoo feeding habitat in Proteaceous Heath will be cleared for Wind Farm Substation Option 2 that represents 0.005% of the remaining Beard Vegetation Unit 1031 in the Leseur subregion. The quantity is significantly less than the remaining extent and the 30% remaining threshold. As outlined above, habitat for matters of National Environmental Significance (DoE 2103c) was found onsite (Black Cockatoo species). The actions of undertaking the development are unlikely to trigger the Commonwealth's significant impact criteria, based upon assessment against the Commonwealth's significant impact criteria policy. However, if the client is seeking legal certainty on this point then an EPBC referral is recommended. The Commonwealth Department, DoE would then assess the referral and respond in due course.

Based on the outcome of the habitat assessment and assessment of impacts, it is considered that the project is unlikely to have a significant impact on Black Cockatoo's. However, to obtain legal certainty on this point an EPBC referral is recommended and that the permit holder should ensure that no clearing of more than the proposed 1 ha of suitable breeding habitat is removed

Under Condition 8 of the Vegetation Clearing Permit, with regards to Priority flora specific to the Study Area, the permit holder should ensure that:

- No clearing of identified priority flora occurs (unless approval is granted); and
- No clearing occurs within 30 metres of identified priority flora (unless approval is granted).

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1. INTRODUCTION

Waddi Wind Farm Pty Ltd (Wind Prospect) is proposing to develop a wind farm within the Shire of Dandaragan in Western Australia. **Figure 1** illustrates the Waddi Wind Farm survey area that is 12 km west of Dandaragan. RPS contracted Outback Ecology, a division of MWH Australia Pty Ltd, to undertake a Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey of the proposed Wind Farm including areas for the following components (**Figure 2**).

Table 1: Study Area components and scope

	Study Area	**Survey Scope**
1.	Wind turbine locations, access tracks and cable routes - 50 metre corridor	> Search for rare flora listed in the *Wildlife Conservation (Rare Flora) Notice* and P*riority Flora* as identified in the database searches of DPaW within areas of remnant vegetation as indicated by aerial photography.
2.	Wind farm substation option 1 (~5 ha)	> Level 1 Spring Flora Survey > Search for conservation significant flora and vegetation including rare flora listed in the *Wildlife Conservation (Rare Flora) Notice* and *priority flora* and flora and vegetation listed under the EPBC Act > Significant fauna habitat assessment for the Black Cockatoo
3.	Wind farm substation option 2 (<1 ha)	
4.	Grid connection easement/transmission line route from wind farm substation option 1 & 2* to the existing Cataby substation - 85 metre corridor east of the Brand Hwy and 170 metre corridor west of the Brand Hwy	

**An alternative route for the grid connection easement/transmission line to wind farm substation option 2 was drafted and provided to Outback Ecology after the completion of the field survey. This new area has been included in the report based on aerial photography interpretation and extrapolation of vegetation assessed in adjacent areas. No field assessment of the presence of conservation significant flora has been undertaken for this alternative route (Figure 2 – orange shaded polygon)*.

The proposed construction acitivites within the Study Areea have the potential to impact an area around each wind turbine as well as a corridor for a new road access and underground cabling. Both the Wind Farm Substation Options 1 and 2 would potentially impact the entire footprint of the selected substation area. The Grid Connection easement/transmission line from the wind farm substation to the existing Cataby substation involves potential disturbance to an area around the location of each pole as well as a corridor for any new access track. There are existing access tracks throughout most of the Study Area that contains vegetation, so there is a potential to minimise clearing of vegetation through the use of these tracks.

1.1. Objectives

The aim of the Project is to complete a Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey for the Study Area provided and to complete the targeted flora surveys required to fulfil Condition 8 of the Vegetation Clearing Permit Condition already in existence for parts of the Study Area as outlined in **Table 1.** The aim of the surveys and assessment is to:

1. Complete the targeted flora surveys required to fulfil Condition 8 of the Vegetation Clearing Permit provided to Waddi Wind Farm Pty Ltd on 1302/2012;
2. Update the Targeted Level 1 Flora and Vegetation Assessment prepared in 2010 to include the wind farm substation options 1 and 2, and the grid connection easement/transmission line route from the wind farm substation to the existing Cataby substation and the existing Cataby substation itself;
3. Undertake a significant fauna habitat assessment for the Black Cockatoo in relation to the wind farm substation options 1 and 2 and the grid connection easement/transmission line route and Cataby substation.

The methods adopted for this Project were aligned with the:

- EPA Position Statement No. 3, *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2002);
- EPA Guidance Statement No. 51, *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004);
- EPA *Guidance 56*, *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004);
- DPaW/EPA's *Technical Guide – Terrestrial Vertebrate Fauna Surveys*;
- DEWHA's *Survey Guidelines for Australia's Threatened Birds;* and
- DSEWPaC's *EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species*.

It was proposed to survey the vegetation of the Study Area to Guidance Statement 51 (EPA 1994) standard of 'Level 1'. A Level 1 Survey involves background research or a 'desktop' study and a reconnaissance survey to verify this information with a ''target area visit by suitably qualified personnel to undertake selective low intensity sampling of the flora and vegetation to produce maps of vegetation units and vegetation condition at an appropriate scale".

The objectives of the 'Level 1' or reconnaissance survey of the Study Area were to:

- verify the accuracy of a desktop study (search of literature, data and map based information);
- record all vascular flora species, including introduced species within the Study Area as encountered;
- describe the vegetation communities and vegetation condition;
- undertake targeted searches for flora species and vegetation communities of conservation significance with grid based systematic sampling at appropriate spacing intervals;
- produce maps of vegetation units at an appropriate scale; and

- provide general recommendations regarding any species or communities of conservation significance and weeds recorded in the Study Areas.

The following objectives were to assess the black cockatoo habitat:

- a brief summary of the context of the Study Area with respect to black cockatoo distribution and records;
- the findings of the field survey with respect to the nature and extent of black cockatoo habitat;
- any required maps or figures, as appropriate; and
- a conclusion as to the nature of habitat use in the Study Area by black cockatoos with respect to the EPBC Act referral guidelines (DoE 2013c).

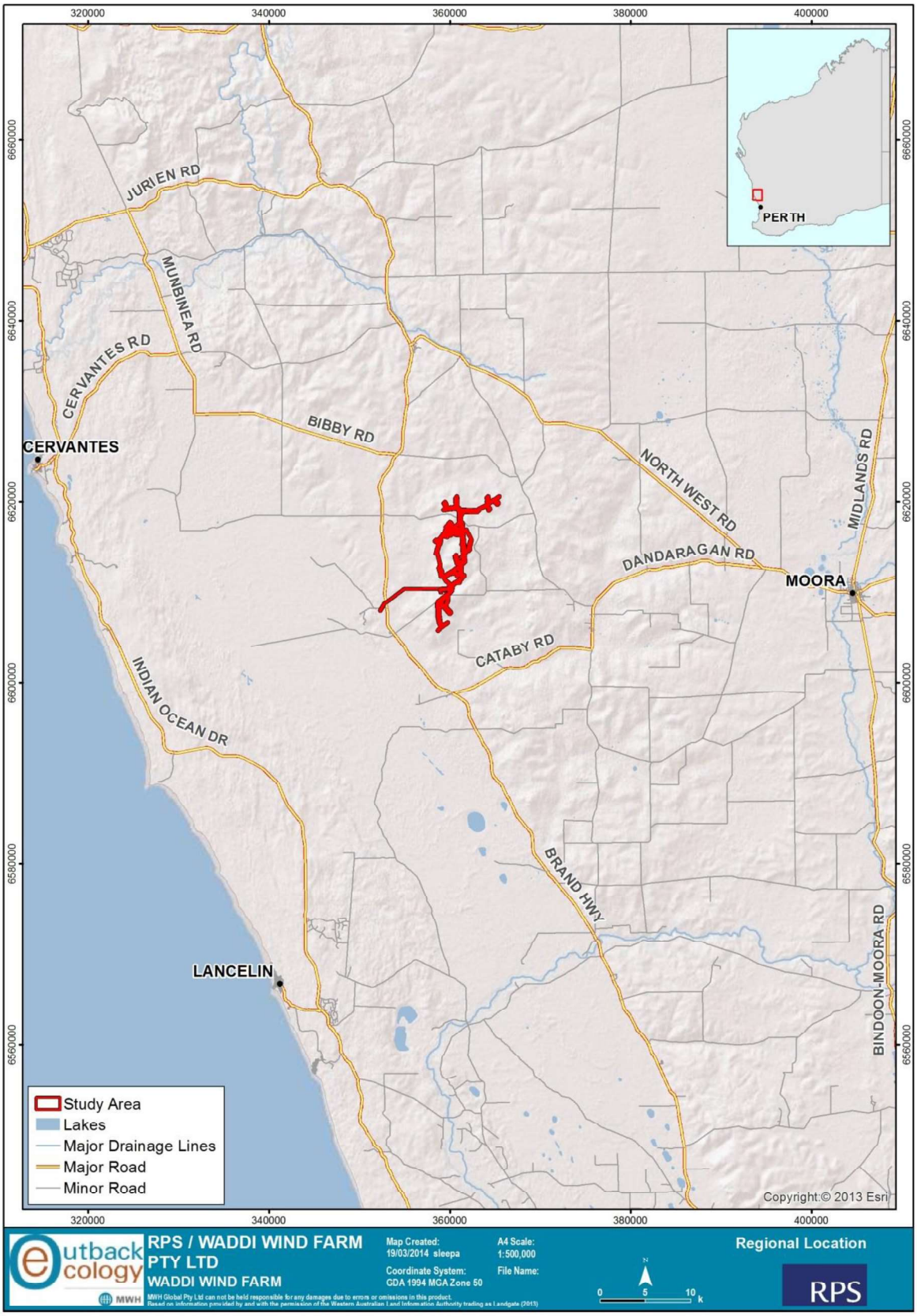

Figure 1: Regional location of the Waddi Wind Farm Study Area

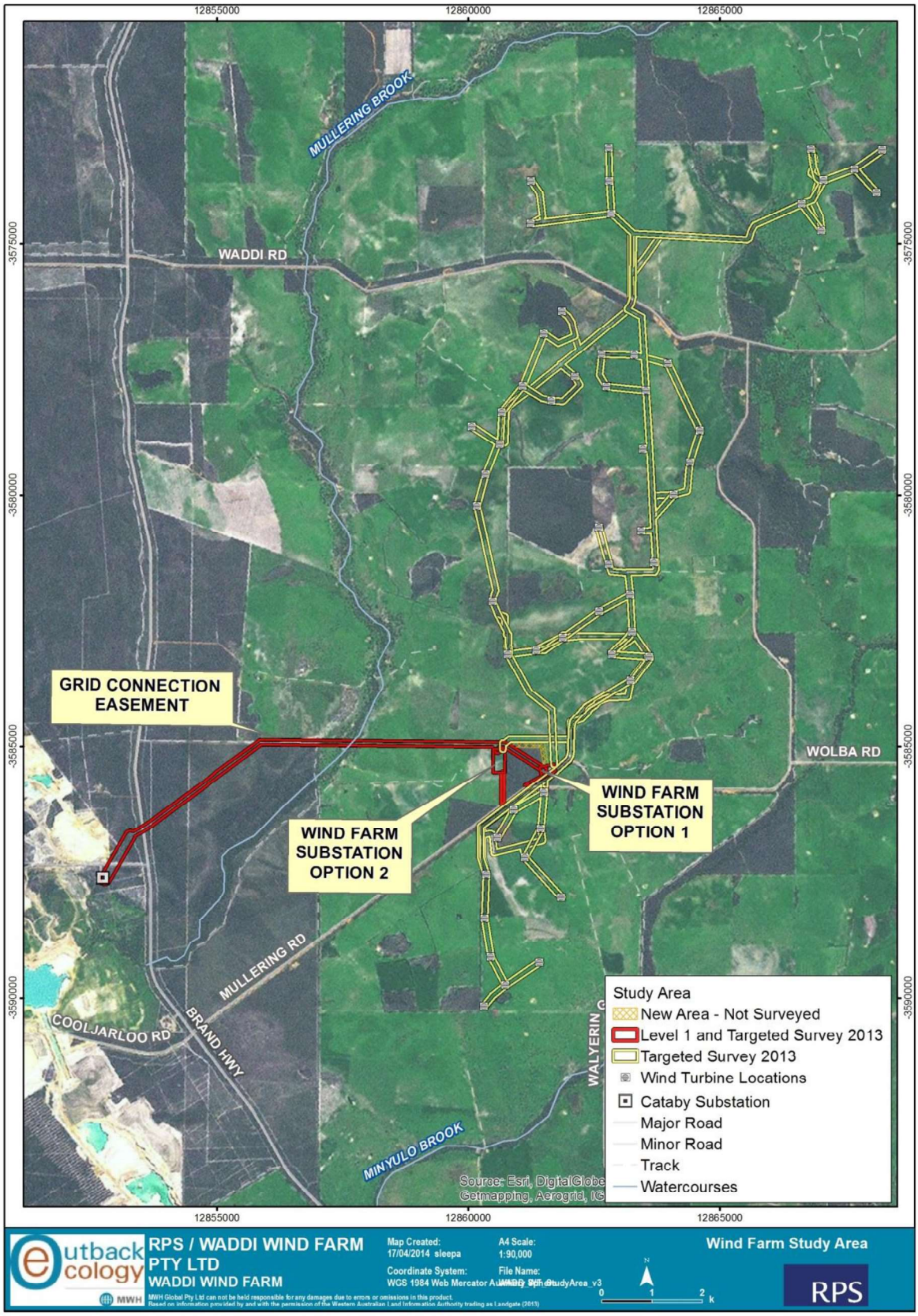

Figure 2: The Waddi Wind Farm Study Area

2. EXISTING ENVIRONMENT

2.1. Biogeographic Region

Thackway and Cresswell (1995) describe a refined system of 85 'biogeographic regions' (bioregions) and 403 biological subregions covering the whole of Australia; resulting from collaboration between all state conservation agencies and coordinated by the Commonwealth Department of Environment (DoE). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna. The Study Area is located in the Geraldton Sandplain Bioregion and the Lesueur Sandplain Subregion (GES03) (Thackway and Cresswell 1995). A small southwestern portion of the Study Area including the Cataby substation occurs in the Swan Coastal Plain Bioregion (**Figure 3**).

The Geraldton Sandplain bioregion is composed mainly of proteaceous scrub-heaths, rich in endemics on the sandy earths of an extensive, undulating lateritic sandplain mantle. The area is known Australia wide and internationally as having particularly high floristic diversity and levels of endemism. Over 250 species of sandplain flora are endemic to this subregion in the heaths and scrub-heaths. The subregion is listed as one of Australia national biodiversity hotspots, the Mount Lesueur-Eneabba hotspot (DoE 2013a).

2.2. Land Uses

The primary land use of the Geraldton Sandplain is dryland agriculture. There are also a number of conservation reserves in the west of the subregion (**Figure 4**).The closest conservation reserve to the Study Area is the Badgingarra National Park, the southern proposed extension of which (Conservation Park 41986) forms part of the Study Area. The Study Area also passes through the Shire Reserve 27216 as shown in **Figure 4.**

2.3. Climate

The Geraldton Sandplain, Lesueur Sandplain subregion has a Mediterranean climate with winter rainfall. The nearest weather station to the Study Area with an extensive history of records is the Badgingarra Research Station (approximately 25 km to the north of the Study Area). The mean average annual rainfall is 544 mm. Data collected from Badgingarra indicates that rainfall mostly falls in the winter months from June to August **(Figure 5)** (BOM 2013). Highest average monthly temperatures for Badgingarra are recorded from November to March, with October starting to warm and the vegetation dry out. Dandaragan West received 276 mm in the three months prior to the planned flora survey, which is 50% over the average for those months; therefore the season was considered good. There was a majority of plants still in flower at the end of October despite the warm temperatures (above 30^{o}C) (**Figure 6**).

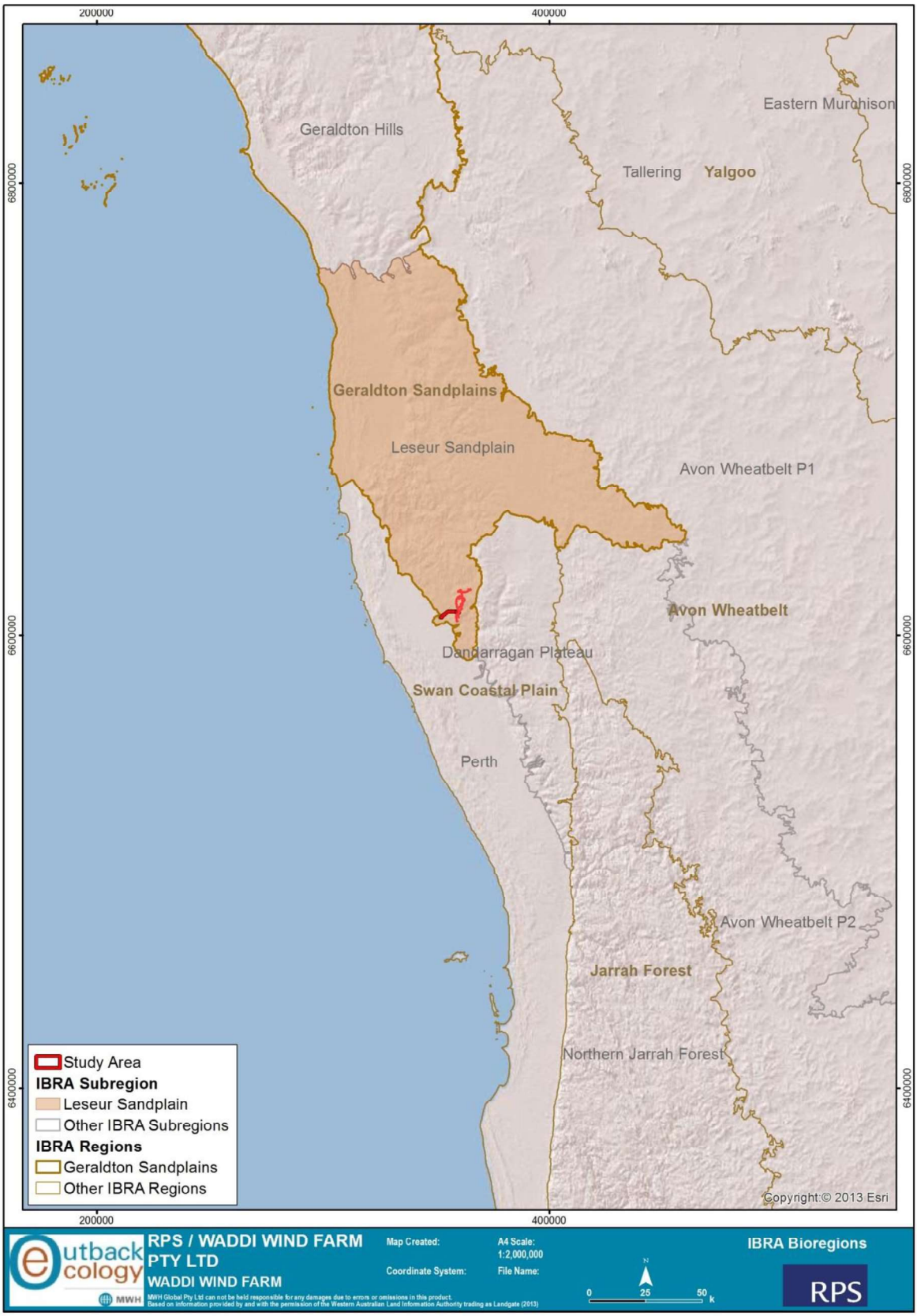

Figure 3: IBRA Bioregions of the Waddi Wind Farm Study Area

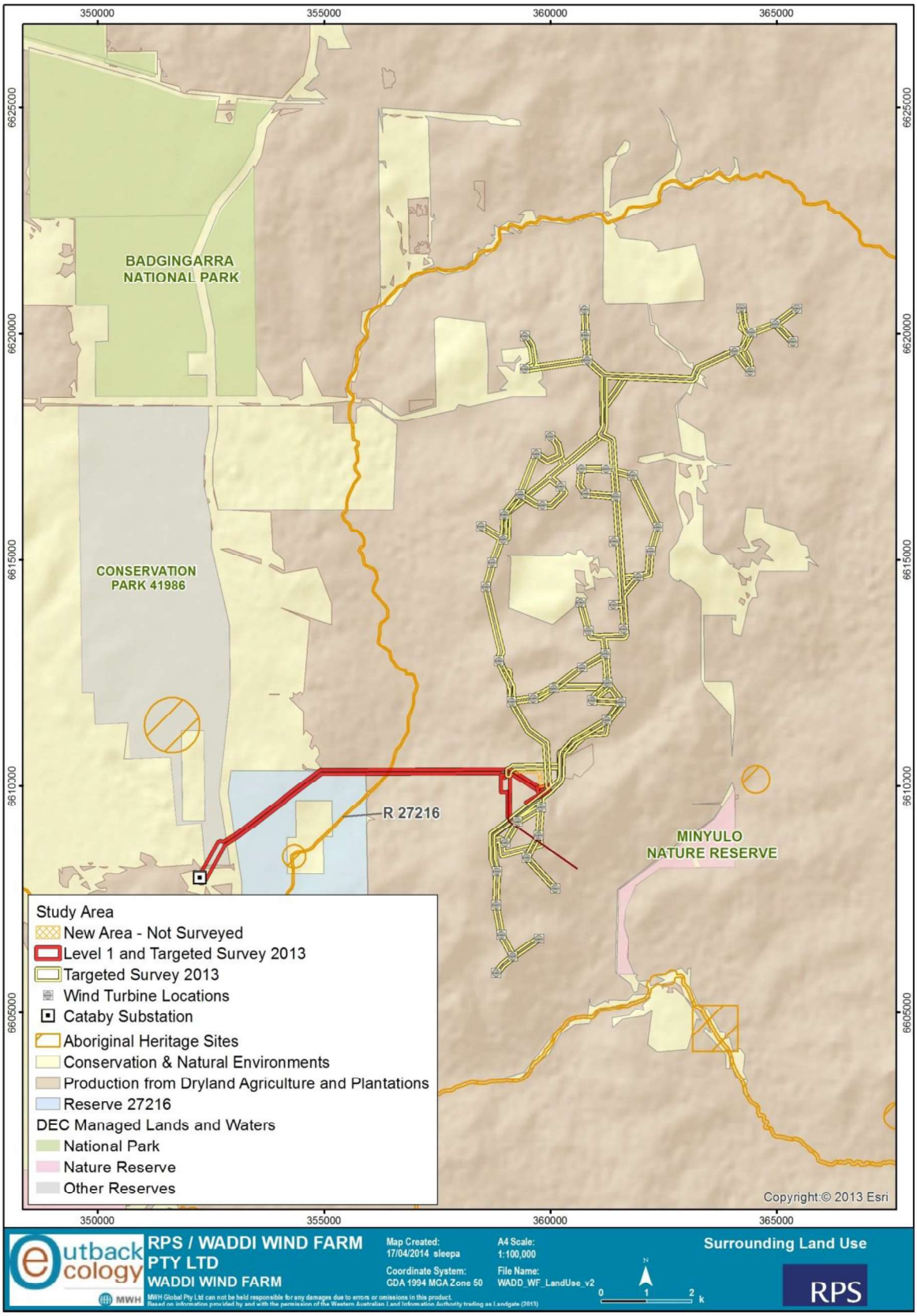

Figure 4: Land uses of the Waddi Wind Farm Study Area

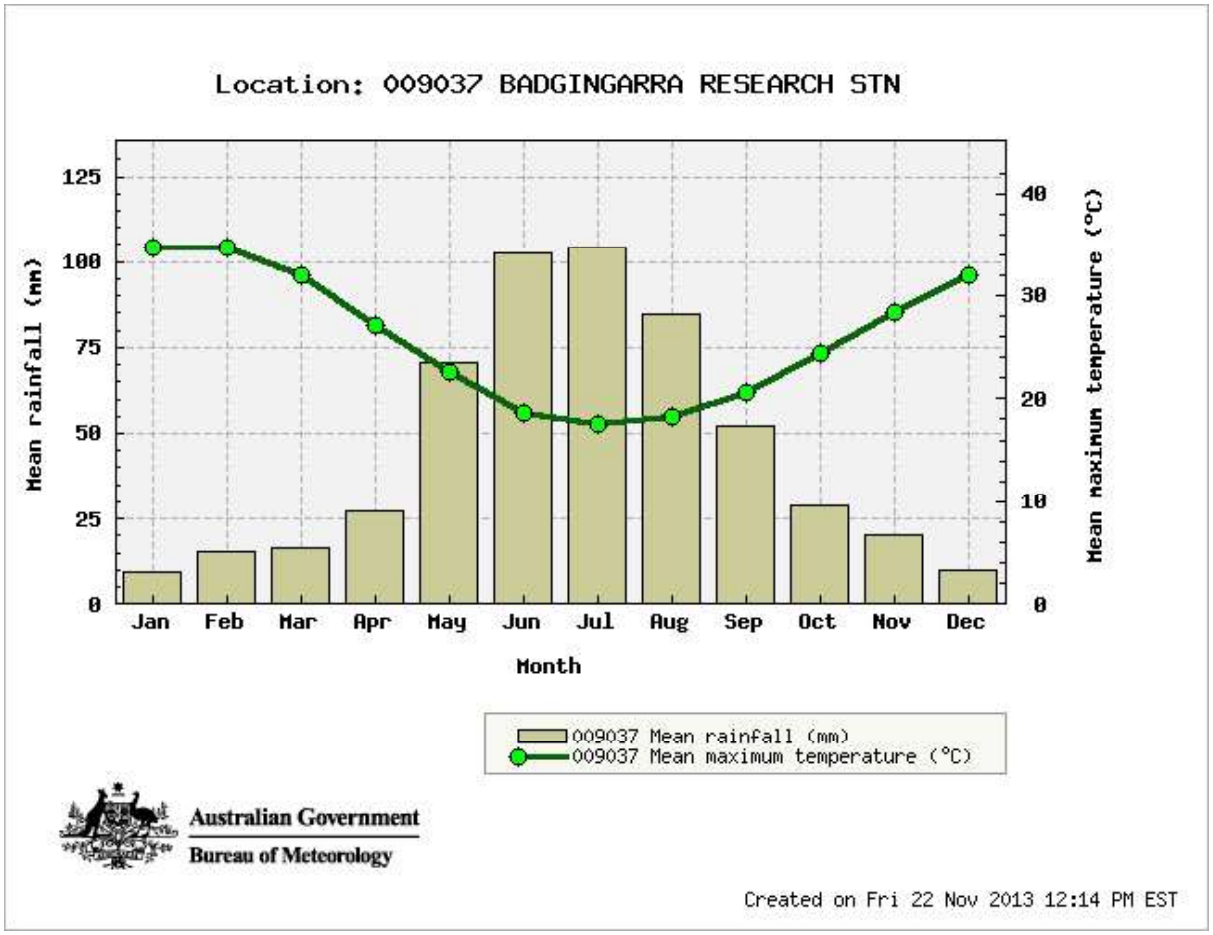

Figure 5: Mean monthly rainfall and temperature for Badgingarra Weather Station.

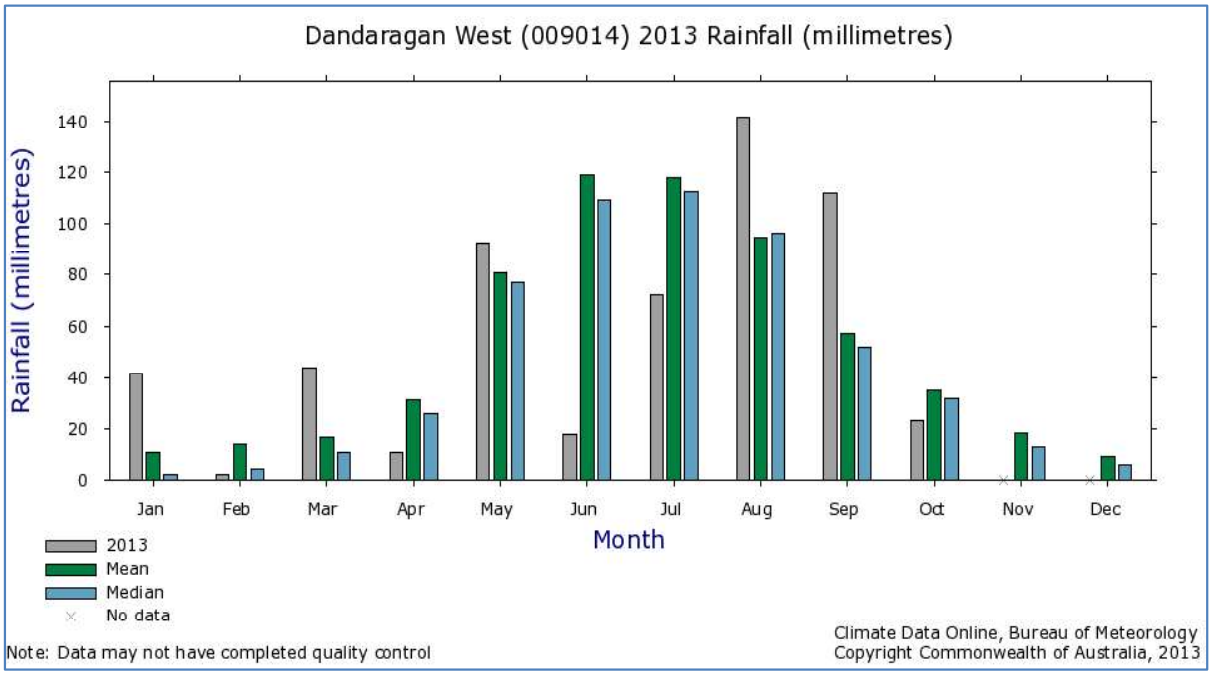

Figure 6: Monthly rainfall data for Dandaragan West

2.4. Land Systems

A land system includes a number of land units and is classified by the recurring pattern of topography, soils and vegetation. These recurring patterns can be seen using aerial photography or other remotely sensed imagery and are typically confirmed with field surveys. Land systems across the Eastern Goldfields have been mapped by the Natural Resources Assessment Group of the Department of Agriculture. There are three land systems present within the Study Area (**Table 2** and **Figure 7**). The majority of the Study Area (86 %) falls within the Yerramullah Land System which is characterised by a dissected lateritic plateau with deep pale sand, supporting *Banksia* woodlands and Heathland. Option 2 distinguishes the land systems associated for the alternative route only, which is the grid connection easement/transmission line to the wind farm substation that was separate to the original survey area.

Table 2: Land systems of the Level 1 Study Area

Land System	Description	Level 1 Study Area Hectares (% of Study Area)	Targeted Study Area Hectares (% of Study Area)	Wind Farm Option 2 variation Hectares (% of Study Area)
Bassendean System	Swan Coastal Plain from Busselton to Jurien. Sand dunes and sandplains with pale deep sand, semi-wet and wet soil. Banksia-paperbark woodlands and mixed heaths.	7.22ha (7.40%)	0	0
Nylagarda System	Alluvial plains and terraces of the Hill River and major creeks of the north coastal plain. Brown deep sands and brown sandy earths predominate, with minor pale deep sand and saline wet soil. Woodlands.	5.56ha (5.70%)	0	0
Yerramullah System	Subdued dissected lateritic plateau, undulating low hills and rises on lateritised weathered sandstone. Pale deep sand, sandy gravels and yellow deep sand. *Banksia* woodlands on lower slopes/depressions, heathlands elsewhere.	84.71ha (86.89%)	569.4ha (91.68%)	7.82ha (100%)
Boothendarra System	Subdued stripped lateritic plateau, undulating and gently undulating rises; Sandy duplexes, pale deep sand, sandy and loamy gravels and minor clays	0	51.65ha (8.31%)	0

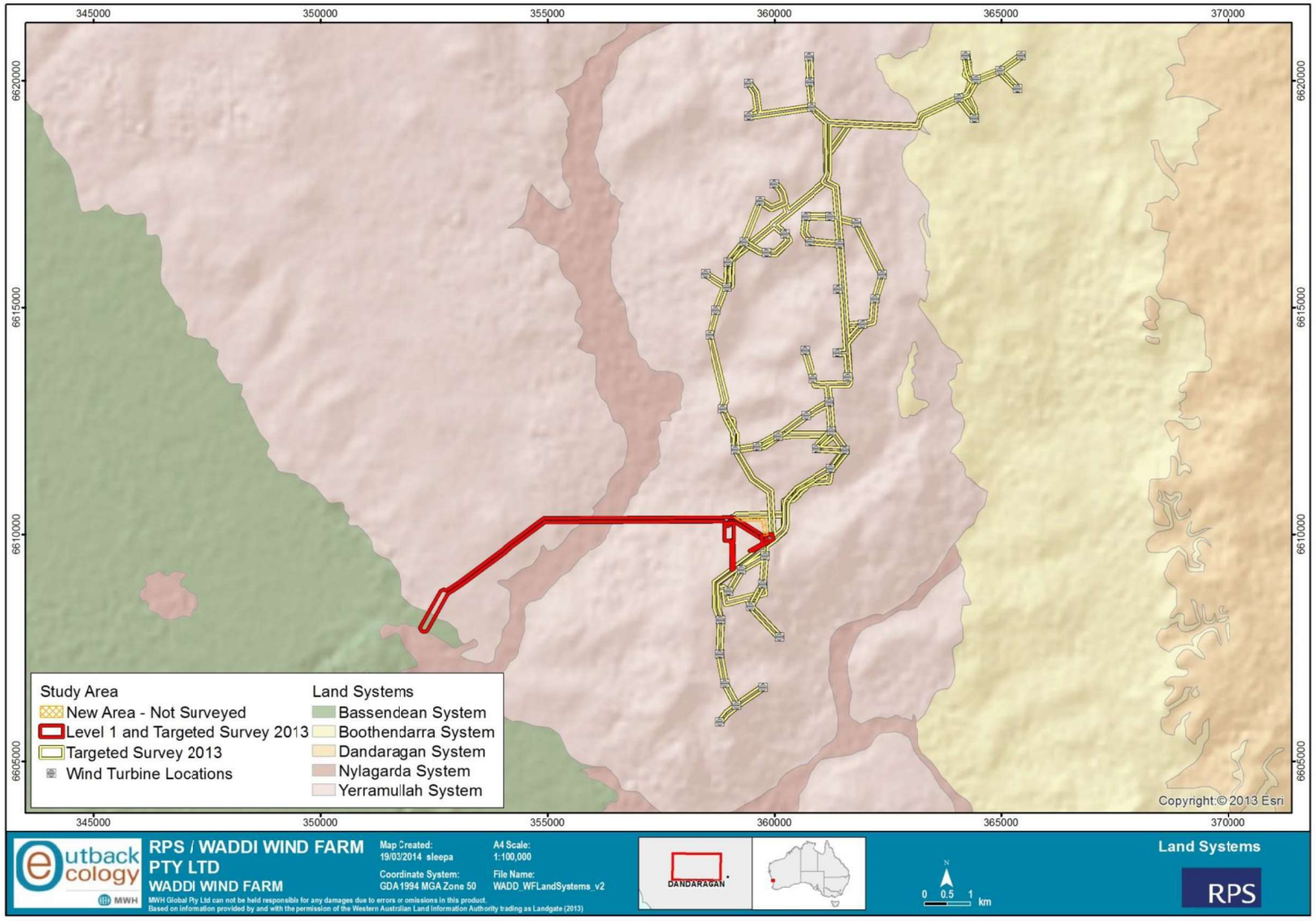

Figure 7: Land Systems of the Waddi Wind Farm Study Area

2.5. Beard Vegetation Mapping

Beard mapped the vegetation of Western Australia at a scale of 1:1,000,000 and 1: 250, 000 (Beard 1972, 1975). This Pre-European vegetation mapping of the Study Area was sourced from the Department of Agriculture (2005), using the original mapping of Beard (1972). The Study Area is mapped as:

- Vegetation Association 7 Medium Woodland of York Gum (*Eucalyptus loxophleba*) and Wandoo;
- Vegetation Association 1030 – Low Woodland of *Banksia attenuata* and *Banksia menziesii;* and
- Vegetation Association 1031 – Mosaic of Shrublands; *Hakea* Scrub-Heath and *Dryandra* (*Banksia*) Heath (**Figure 8**).

The current extent of these Vegetation Associations in the subregion is all less than 40% (Government of Western Australia 2013), however there are no Vegetation Associations below the threshold for biodiversity conservation of 30% remaining (EPA Position Statement 2, 2000) (Table 3). It is important to note that "Vegetation Associations" may contain complexes or groupings of different floristic communities of which more detailed representation and reservation is not known. The condition of the vegetation throughout the extent of each vegetation complex is also not taken into consideration in these reported figures.

Vegetation Association 7 has a high reservation priority in the biodiversity audit of Lesueur subregion due to only 3% of the vegetation type currently occurring in DPaW managed reserves and the restricted distribution and amount of the Vegetation Association 7 across all subregions (Desmond and Chant 2001).

Table 3: Beard Vegetation Associations mapped within the Study Area and their extent within the Lesueur subregion.

Beard Vegetation Association	Current extent (hectares) in all subregions	Level 1 Study Area (hectares) [%]	Targeted Study Area (hectares) [%]	New Study Area (hectares) [%]	Lesueur Subregion		
					Current extent (hectares)	Percentage of pre-European extent still extant (2009)	Percentage of pre-European extent in DPaW managed lands
7	25,536.87	16.79ha 17.22%	8.52ha 1.37%	0	1504.84	36.38	3.11
1030	86,095.99	11.89ha 12.19%	0	0	538.61	34.6	4.86
1031	89,577.17	67.68ha 70.57%	612.54ha 98.62%	7.83ha 100%	73,768.82	32.82	12.35

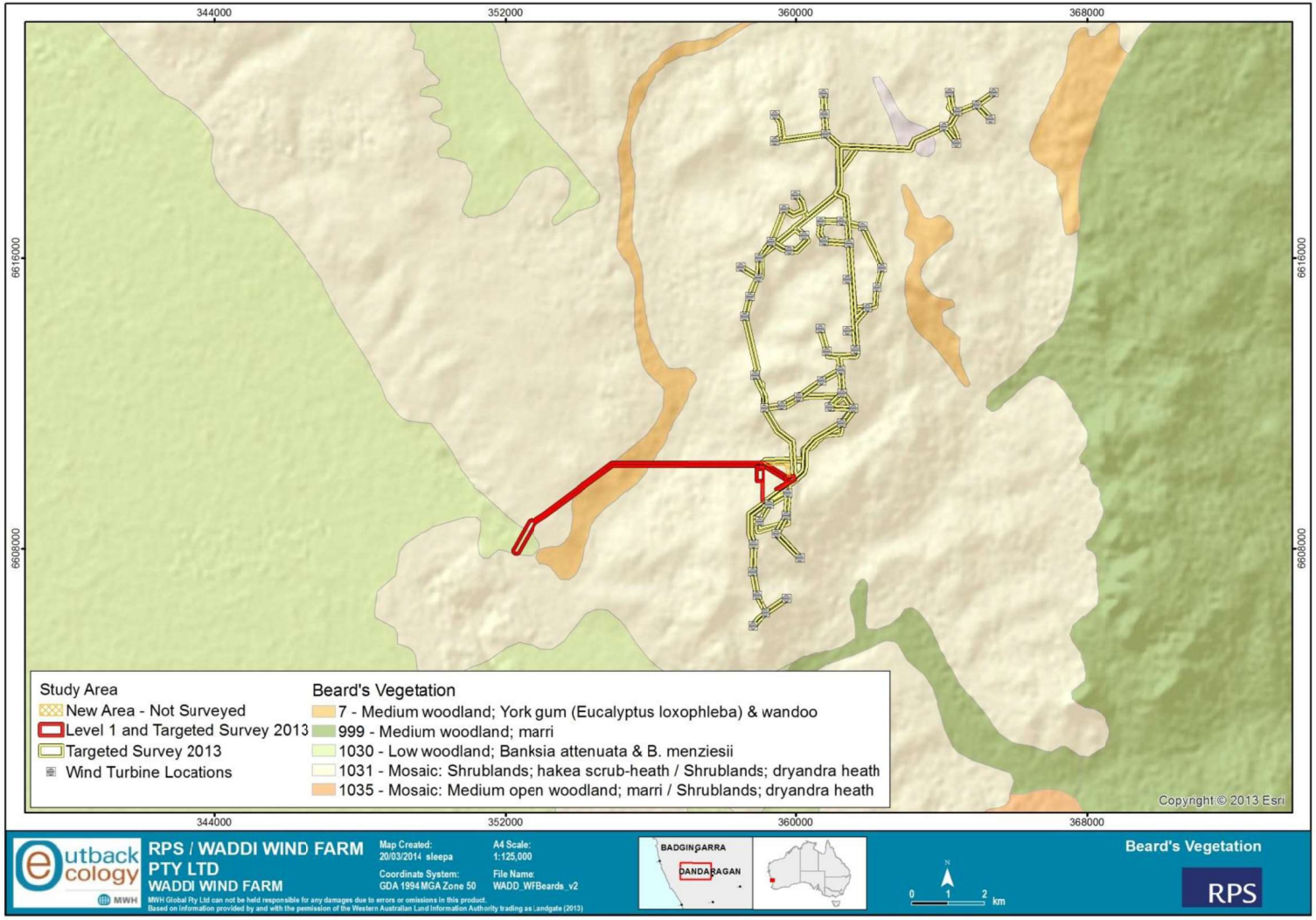

Figure 8: Beard Vegetation Associations of the Waddi Wind Farm Study Area

2.6. Conservation Significant Flora

The following sources were searched for records of conservation significant flora. The central coordinate -30.646565 (Lat) and 115.521346 (Long) was used for any database searches:

- EPBC Protected Matters (DoE 2013b) (15km radius);
- DPaW Priority and Threatened Flora (DPaW 2013b) (8km radius); and
- DPaW Threatened and Priority Ecological Communities (DPaW 2013c) 15km radius Ref:79-1013FL; and
- Previous Report – Waddi Wind Farm. Targeted Level 1 Vegetation and Flora Assessment (Outback Ecology Nov 2008 and Jan 2009). Unpublished Report for RPS Australia for the Waddi Wind Farm Project.

The Department of Parks and Wildlife (DPAW) definitions for flora of conservation significance (Threatened and Priority Flora) are provided in **Appendix A** (DPaW 2010, 2013a).

The database review identified 86 species of Conservation Significance that had previously been recorded within up to 15 km of the Study Area (**Figure 9** and **Figure 10**). This includes 27 Threatened species also listed as Endangered under the *EPBC Act.* 43 of the 86 species have been previously recorded within 10 km of the Study Area (**Table 4**). This also includes two species that have been previously recorded within the Study Area during the previous survey work undertaken by Outback Ecology and RPS for the Targeted Level 1 Vegetation and Flora Assessment (Outback Ecology 2010) with previous surveys undertaken in Nov 2008 and Jan 2009:

- *Conostephium magnum* (**Priority 4**).

One individual of *Conostephium magnum* was previously recorded along the existing transmission line easement approximately 980 m north east of the point where the Brand Highway crosses the Study Area (**Figure 9**).

- *Acacia plicata* (**Priority 3**).

One individual *Acacia plicata* was recorded within the shire reserve along the grid connection easement/transmission line route approximately 500m west of Mullering Brook (**Figure 9**).

Habitat information for each of the Priority Flora species was obtained from *FloraBase* (Western Australian Herbarium 2013) to determine the likelihood of their occurrence within the Study Area (**Figure 9** and **Figure 10**), (**Table 4**). Aerial photographs were interpreted to assess the types of landforms and soil types within the Study Area. It was concluded that potential suitable habitat occurs in the Study Area for 43 species and these species were rated as 'likely' to occur (**Table 4**).

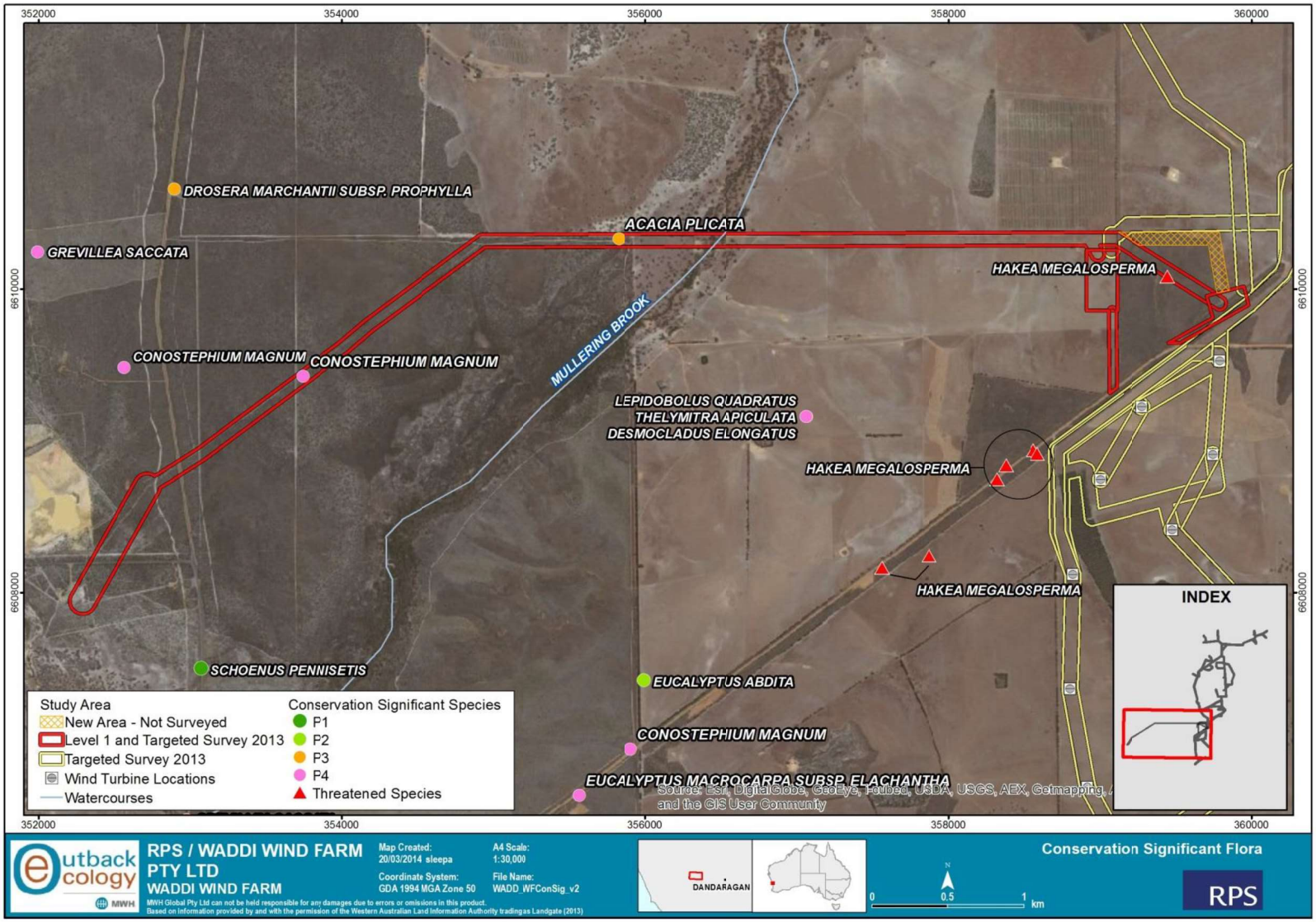

Figure 9: Conservation Significant Flora known from the vicinity of the Waddi Wind Farm Study Area

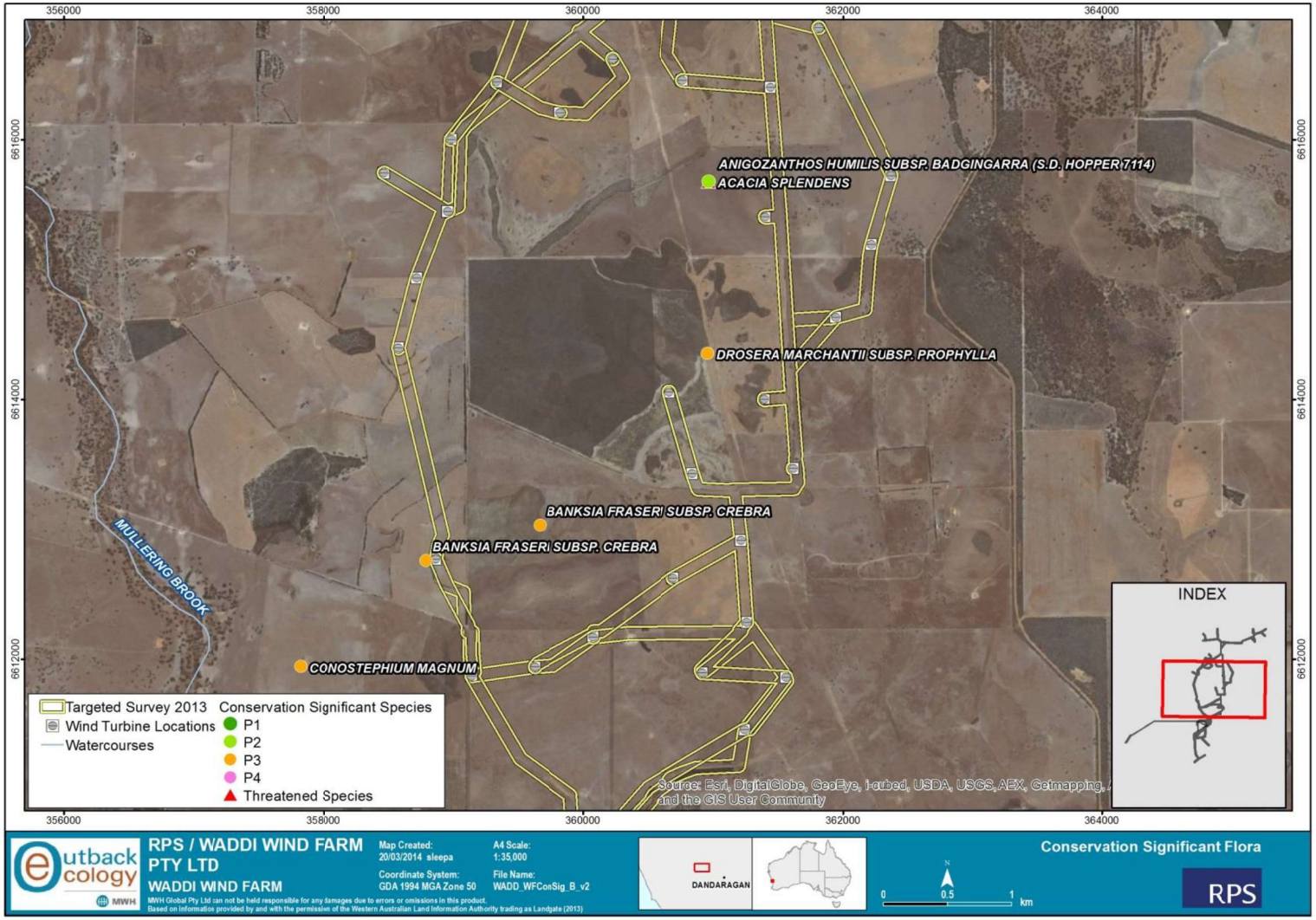

Figure 10: Conservation Significant Flora known from the vicinity of the Waddi Wind Farm Study Area

Table 4: Potential Conservation Significant Flora Species of the Waddi Wind Farm Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Acacia cochlocarpa subsp. *cochlocarpa*	T (CR)	EN	+			Glabrous, sprawling shrub, 0.3-0.7(-1.5) m high. Fl. yellow. Clayey, sandy, often gravelly soils.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Acacia cummingiana	3			+		Sprawling, straggly, rush-like shrub, 0.3-0.5 m high. Fl. yellow May to Jun or Aug. Grey or yellow sand, lateritic gravel. Sandplains, lateritic breakaways.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Acacia epacantha	3			+		Dense, bushy, spiny shrub, 0.2-0.5(-0.7) m high. Fl. yellow, Jul to Aug. Lateritic gravelly loam or clay.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Acacia forrestiana	T (VU)	VU	+	+		Erect, open, prickly shrub, 0.4-1 m high. Fl. yellow, Nov to Dec. Lateritic gravelly soils, clay loam over sandstone. Gullies, hills, breakaways.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Acacia plicata	3			+	+	Erect shrub, (0.3-) 0.9-2 m high. Fl. yellow, Aug to Oct. Loamy & clayey soils, often over sandstone or siltstone. Along drainage lines.	Likely to Occur - Previously recorded within the Study Area.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Acacia splendens	T (CR)	EN	+	+		Tree or shrub, to 8 m high, bark dark grey; phylodes acuminate, glaucous. Fl. yellow May. White sand over clay, pale brown loam, cracked brown soil, gravel, laterite, ironstone. Slopes of breakaways, especially southern slopes, hills.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Allocasuarina ramosissima	3			+		Dioecious, somewhat divaricate shrub, 0.3-1.2 m high. Lateritic soils, gravel.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Andersonia gracilis	T (VU)	EN	+	+		Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple, Sep to Nov. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Anigozanthos humilis subsp. Badgingarra (S.D. Hopper 7114)	2			+		Erect, hirsute rhizomatous, herb, to 0.9 m high. Grey-white sand, rich brown sandy loam, sandy clay, alluvial soils. Low plains, river-banks, winter-wet swamps.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Anigozanthos viridis subsp. *terraspectans*	T (VU)	VU	+	+		Rhizomatous, perennial, herb, 0.05-0.2 m high. Fl. green/yellow-green, Aug to Sep. Grey sand, clay loam. Winter-wet depressions.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Arnocrinum gracillimum	2			+		Rhizomatous, perennial, herb, 0.2-0.4 m high. Fl. purple, Oct to Nov. White, grey, yellow or lateritic sand.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Asterolasia drummondii	4			+		Slender erect shrub, 0.2-0.5 m high. Fl. white, Jul to Sep. Lateritic gravel & sand or loam. Lateritic hills & sandplains, breakaways.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Banksia fraseri var. crebra	3				+	Low spreading shrub to 0.4 m. Fl. Yellow. Lateritic hill, white sand, sandplains.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Banksia prionophylla	1			+		Lignotuberous, branching shrub, to 0.6 m high. Fl. yellow, Jul. Dry grey sand over laterite with surface boulders. Rises.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Banksia pteridifolia subsp. *vernalis*	3			+		Prostrate, lignotuberous shrub, to 0.4 m high. Fl. cream-white/yellow, Sep to Oct. White/grey sand over laterite.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Banksia serratuloides subsp. *perissa*	T (CR)	CR	+			Bushy, lignotuberous shrub, to 1 m high. Fl. yellow, Aug to Sep. Gravelly lateritic soils.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Beaufortia bicolor	3			+		Dense shrub, 0.3-1 m high. Fl. red & yellow & orange, Nov to Dec. White sand over laterite. Sandplains.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Beaufortia eriocephala	3			+		Dense shrub, 0.3-1 m high. Fl. red & yellow & orange, Nov to Dec. White sand over laterite. Sandplains	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Boronia tenuis	4			+		Procumbent or erect & slender shrub, 0.1-0.5 m high. Fl. blue/pink-white, Aug to Nov. Laterite, stony soils, granite	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Caladenia huegelii	T (CR)	EN	+			Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. Grey or brown sand, clay loam.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Centrolepis caespitosa	4	EN	+			Tufted annual, herb (forming a rounded cushion up to 25 mm across). Fl. Oct to Dec. White sand, clay. Salt flats, wet areas.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Chamelaucium sp Gingin (N.G. Marchant 6)	T (VU)	EN	+			Erect open branching shrub with white flowers. White/grey sand, undulating yellow sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Chamelaucium sp. Cataby (G.J. Keighery 11009)	T (VU)	VU	+	+		Low rounded shrub to 0.4 m. White/pink flowers. Laterite breakaways, yellow and grey sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Chordifex reseminans	1			+		Rhizomatous, erect, tufted, dioecious herb, 0.6-0.9 m high. Fl. Mar to May. Dry sand. Heath.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Comesperma rhadinocarpum	2			+		Perennial, herb. Fl. blue, Oct to Nov. Sandy soils.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Conospermum densiflorum subsp. *unicephalatum*	T (EN)	EN	+			Erect, much-branched shrub, 0.3-0.6 m high, inflorescence a spike. Fl. cream/white & blue, Sep to Nov. Clay soils. Low-lying areas	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Conospermum scaposum	3			+		Erect shrub, 0.2-0.45(-0.75) m high. Fl. blue, Oct to Dec or Jan to Feb. White-grey sand, sandy clay. Low swampy areas, road verges.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Conostephium magnum	4			+	+	Erect, compact, many-stemmed shrub, to 2 m high. Fl. pink-purple, Jul to Sep. White-grey sands sometimes associated with laterite gravels. Sand dunes, swampland, disturbed roadside, drainage channels, open woodland.	Likely to Occur - Previously recorded within Study Area.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Dampiera tephrea	2			+		Ascending to erect perennial, herb or shrub, 0.3-0.6 m high, with grey or yellowish hairs on abaxial surface of leaves. Fl. blue, Jul. Sand, gravelly loam.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Darwinia foetida	T (EN)	CR	+			Low spreading shrub to 0.6 m. Winter wet flats, grey sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Desmocladus elongatus	4			+		Rhizomatous, perennial, herb (sedge-like), 0.25-0.5 m high. Fl. Aug to Dec. White or grey sand. Dry kwongan.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Drakaea elastica	T (CR)	EN	+			Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow, Oct to Nov. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Drosera marchantii subsp. *prophylla*	3			+		Erect tuberous, perennial, herb, 0.1-0.3 m high. Fl. white, Jun to Jul. Laterite-silica sand soils. Hilltops.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Eleocharis keigheryi	T (VU)	VU	+	+		Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 m high. Fl. green, Aug to Nov. Clay, sandy loam. Emergent in freshwater: creeks, claypans.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Eucalyptus abdita	2			+		Mallee or shrub, 2-3 m high, barks smooth, grey. Laterite, sandy clay with gravel over laterite. Slopes, breakaways.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Eucalyptus absita	T (CR)	EN	+			Mallee or tree, 2.3-10 m high, rough, fibrous bark. Fl. white, Apr to Jul. White lateritic sand. Paddocks.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Eucalyptus balanites	T (CR)	EN	+			Mallee to 5 m high, bark rough, flaky. Fl. white, Oct to Dec or Jan to Feb. Sandy soils with lateritic gravel.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Eucalyptus dolorosa	T (CR)	EN	+	+		Mallee, 1.5-3 m high, bark rough, flaky. Fl. yellow, Feb to Mar. Laterite. Hillsides.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Eucalyptus impensa	T (CR)	EN	+			Straggly mallee to 1.5 m high, bark smooth. Fl. pink, Jun to Jul. Yellow sand. Lateritic hills.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Eucalyptus leprophloia	T (EN)	EN	+			Mallee, 2-5(-8) m high, bark rough loose & flaky to 1 m. Fl. cream-white, Aug to Oct. White or grey sand over laterite. Valley slopes	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Eucalyptus macrocarpa subsp. *elachantha*	4			+	+	Spreading or sprawling mallee, 0.8-4 m high, bark smooth, grey over salmon pink. Fl. red-pink, Aug to Sep or Nov to Dec. White or grey sand over laterite. Hillslopes, ridges, sandplains.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Eucalyptus x carnabyi	4			+		Mallee, 1.5-6 m high, bark smooth, grey over cream. Fl. pink-cream, Oct to Nov. Grey sand, sandy loam. Lateritic ridges.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Gastrolobium nudum	2			+		Spreading, twiggy shrub, to 0.8 m high. Fl. Orange and red, Feb. Red-brown clay, brown loam, gravel, laterite, granite. Flats, slopes, hilltops, ridges, valleys, breakaways.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Gompholobium gairdnerianum	3			+		Erect, slender, multi-stemmed shrub, to 0.5 m high. Fl. yellow, Sep to Nov. White, cream or brown sandy clay, white sand over sandstone, brown or grey sand over laterite, gravel. Hill summits and slopes, ridges.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Grevillea batrachioides	T (CR)	EN	+			Shrub, 0.5-1.5 m high. Fl. orange-red, Oct. Sandy loam. Sandstone outcrops.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Grevillea calliantha	T (CR)	EN	+	+		Spreading, flat-topped shrub, 0.9-2.5 m high. Fl. red-brown, Apr or Jun or Aug. Grey or yellow sand over laterite, with gravel.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Grevillea florida	3			+		Erect shrub, to 0.9 m high. Fl. cream-yellow, Jul to Sep. Sand, sandy clay, gravel, laterite. Sandplain, slopes, road verges.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Grevillea saccata	4			+	+	Diffuse scrambling or trailing shrub, 0.25-0.5 m high, 1-2 m wide. Fl. red, Apr or Jun to Nov. Yellow or brown sand, often with lateritic gravel.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Grevillea synapheae subsp. *minyulo*	1			+		Spreading to sprawling, lignotuberous shrub, 0.2-0.5 m high. Fl. white-cream-yellow, Aug to Sep. Gravel, laterite.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Grevillea tenuiloba	3			+		Low spreading shrub, 0.4-0.6 m high, up to 3 m wide. Fl. orange-brown, Apr or Jul to Oct. Sand, clay loam. Granite outcrops.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Grevillea thelemanniana subsp. Cooljarloo (B.J. Keighery 28 B)	1			+		Sprawling, singled stemmed shrub to 0.5 m. Flowers red-pink. Winter wet flats, grey sand, creekline, red brown clay loam.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Grevillea thyrsoides subsp. *thyrsoides*	3			+		Spreading or procumbent shrub, 0.3-0.7 m high, up to 1.5 m wide. Fl. red-pink, Feb or Aug to Sep. Sand or sandy lateritic gravel	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Guichenotia alba	3			+		Slender, lax, few-branched shrub, 0.1-0.45 m high. Fl. white, Jul to Aug. Sandy & gravelly soils. Low-lying flats, depressions.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Hakea megalosperma	T (VU)	VU	+	+		Spreading, lignotuberous shrub, 1-2 m high. Fl. white-cream/pink, May to Jun. Grey sand, loam. Lateritic hills & rocks.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Hemiandra gardneri	T (CR)	EN	+			Prostrate, pungent shrub, 0.1-0.2 m high, to 1 m wide. Fl. red/pink-red, Aug to Oct. Grey or yellow sand, clayey sand. Sandplains.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Hemigenia curvifolia	2			+		Shrub, 0.2-0.7 m high. Fl. blue, Sep to Oct. Sandy soils.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Hibbertia helianthemoides	4			+		Spreading to erect, low or prostrate shrub, to 0.3 m high. Fl. yellow, Jul or Sep to Oct. Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Hibbertia spicata subsp. *leptotheca*	3			+		Erect or spreading shrub, 0.2-0.5 m high. Fl. yellow, Jul to Oct. Sand. Near-coastal limestone ridges, outcrops & cliffs.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Hypocalymma linifolium	1			+		Low spreading shrub, to 0.6 m high. Sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Hypocalymma serrulatum	3			+		Erect shrub, 0.45-1.7 m high. Fl. white-pink, Apr to May. Grey or white sand. Along drainage lines.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Hypocalymma sp. Cataby (G.J. Keighery 5151)	2			+	+	Erect, spreading shrub, 0.5-1 m high, to 1 m wide. Fl. white, Aug. Grey sand.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Hypocalymma sp. Dandaragan (C.A. Gardner 9014)	1			+		Multi-stemmed shrub to 0.3 m. Yellow flowers. Grey sand with lateritic pebbles.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Hypocalymma tetrapterum	3			+		Shrub, 0.4-0.9 m high. Fl. white, Aug. Grey sand, loam, lateritic gravel. Riverbanks, breakaways.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Hypolaena robusta	4			+		Dioecious rhizomatous, perennial, herb, ca 0.5 m high. Fl. Sep to Oct. White sand. Sandplains.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Isopogon drummondii	3			+		Erect, lignotuberous shrub, 0.4-1 m high. Fl. yellow/cream-yellow, Feb to Jun. White, grey or yellow sand, often over laterite.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Isopogon panduratus subsp. *palustris*	2			+		Erect shrub to 1.8 m, flowers pale pink. Winter wet flat pale yellow sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Lechenaultia galactites	3			+		Erect, robust shrub (sub-shrub), to 0.6 m high. Fl. blue-white, Jun to Oct. Yellow sand, clay, gravel, laterite. Sandplains.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Lepidobolus quadratus	3			+		Rhizomatous, caespitose perennial, herb (sedge-like), 0.15-0.3 m high. Fl. brown/red, Aug to Sep. Lateritic gravel, grey/white sand. Dry kwongan.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Leucopogon obtectus	T (EN)	EN	+			Erect shrub, 0.5-1.7 m high. Fl. cream-yellow, Aug to Oct. Grey sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Lyginia excelsa	1			+		Dioecious rhizomatous, erect, tufted herb, 0.6-1.5 m high, rhizomes on surface. Fl. Mar to Nov. Sand. Dry heath & *Banksia* woodland.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Macarthuria keigheryi	T (EN)	EN	+	+		Erect or spreading perennial, herb or shrub, 0.2-0.4 m high, 0.3-0.6 m wide. Fl. Sep to Dec or Feb to Mar. White or grey sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Malleostemon sp. Cooljarloo (B. Backhouse s.n. 16/11/88)	1			+		Erect shrub, ca 0.4 m high. Fl. pink, Nov. Sand. Low-lying areas.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Meionectes tenuifolia	3			+		Prostrate aquatic/semi-aquatic herb, red/green, trifid and linear leaves. Granite flats, shallow soil at margins.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Onychosepalum microcarpum	2			+		Rhizomatous, tufted perennial, herb, 0.07-0.15 m high. Fl. Aug to Oct. White or yellow sand. Dry heath, low woodland.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Onychosepalum nodatum	3			+		Caespitose grass-like or herb, forming small, many-culmed tussocks. Sand.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Ptychosema pusillum	T (VU)	VU		+		Perennial, herb, mostly 0.05-0.1 m high. Fl. red & brown & yellow, Aug to Oct. Sand. Rises.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Regelia megacephala	4				+	Shrub, 2-5 m high. Fl. purple-red, Oct to Dec. Red sand. Quartzite hills	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Schoenus griffinianus	3			+		Small, tufted perennial, grass-like or herb (sedge), to 0.1 m high. Fl. Sep to Oct. White sand.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Schoenus pennisetis	1			+		Tufted annual, grass-like or herb (sedge), 0.05-0.15 m high. Fl. purple-black, Aug to Sep. Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Stylidium aeonioides	4			+		Rosetted perennial, herb, 0.05-0.4 m high, Leaves adpressed to soil, oblanceolate, 0.7-3 cm long, 1.5-5 mm wide, apex subacute, margin hyaline, glabrous. Scape glabrous. Inflorescence paniculate. Fl. cream-yellow, Sep to Nov. Sandy clay loam over laterite. Hillsides and breakaways. Low heath, open woodland.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Stylidium hymenocraspedum	2			+		Rosetted perennial, herb, 0.27-0.7 m high, Leaves adpressed to soil, spathulate, 1.5-7 cm long, 6-13 mm wide, apex subacute, margin hyaline, glabrous. Scape mostly glabrous, sparingly glandular near bract and pedicel axils. Inflorescence racemose. Fl. yellow, Sep to Oct. Sand over laterite. Hillslopes. Heath, *Banksia* and *Eucalyptus* low open woodland.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Synaphea endothrix	2			+		Erect, clumped shrub, to 0.6 m high. Fl. yellow, Aug to Sep. Gravelly loam, sand. Lateritic rises.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Tetratheca angulata	3			+	+	Lax to erect, slender shrub (subshrub), 0.2-0.3 m high. Sandy to gravelly laterite soils. Low hill crests, breakaways with massive laterite boulders.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.
Thelymitra apiculata	4			+		Tuberous, perennial, herb, 0.2-0.35 m high. Fl. purple & yellow May to Jul. Grey sand, lateritic gravel.	May Occur - Previously recorded within 10 km of Study Area, habitat likely to be suitable.

Species	Conservation Significance		Source			Description. Source: Florabase (DPaW, 2013)	Likelihood of Occurrence in Study Area
	WA	EPBC Act 1999	Protected Matters Database	DPaW Database	OES (2009)		
Thelymitra dedmaniarum	T (CR)	EN	+			Tuberous, perennial, herb, to 0.8 m high. Fl. yellow, Nov to Dec or Jan. Granite.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area
Thelymitra stellata	T (EN)	EN	+			Tuberous, perennial, herb, 0.15-0.25 m high. Fl. yellow & brown, Oct to Nov. Sand, gravel, lateritic loam.	Unlikely to Occur - No previous recorded populations within 10 km of Study Area

2.7. Conservation Significant Vegetation

The following sources were searched for records of conservation significant vegetation. The central coordinate -30.646565 (Lat) and 115.521346 (Long) was used for any database searches:

- EPBC Protected Matters (DSEWPC 2013) (15km radius);
- DPaW Threatened and Priority Ecological Communities (DPaW 2013c) 15km radius; and
- Previous Report – Waddi Wind Farm. Targeted Level 1 Vegetation and Flora Assessment (Outback Ecology 2010). Unpublished Report for RPS Australia for the Waddi Wind Farm Project. Previous field surveys undertaken in Nov 2008 and Jan 2009.

A search of the DPaW Threatened Ecological Communities Database was requested on Monday 28th October 2013 Ref: 04-0513EC for the Study Area and a 15 km buffer. No Threatened Ecological Communities or Priority Ecological Communities were identified in the DPaW Database search. No Threatened or Ecological Communities were identified in the EPBC Protected Matters Database Search (DoE 2013b).

The previous survey work undertaken by Outback Ecology and RPS for the Targeted Level 1 Vegetation and Flora Assessment (Outback Ecology 2010) identified a vegetation type consistent with the description for the TEC SCP20a *Banksia attenuata* woodland over species rich dense shrublands. This vegetation type was mapped as SH2: Open Shrubland of *Banksia attenuata* over Low Closed Shrubland of *Xanthorrhoea preissii* and mixed Proteaceae spp.

2.8. Black Cockatoo Habitat

One threatened species of black cockatoo is likely to occur within the Study Area:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*), which is listed as Endangered (EPBC Act) and Schedule 1 (WC Act).

The Study Area lies approximately 140 km north of the modelled distribution of Baudin's and Forest Red-tailed Black Cockatoo. It lies on the northern margin of the known breeding range and non-breeding range of Carnaby's (DSEWPaC 2012). Consequently, the Study Area may contain habitat that is important for breeding, night roosting and foraging by Carnaby's Cockatoos, and it may provide important connectivity between other areas of suitable habitat.

Carnaby's Cockatoo utilise a variety of woodland and forest habitats in south-western Western Australia. Their distribution is generally limited by the availability of large Eucalypt trees that contain large hollows for nesting. Comprehensive information about Carnaby's Cockatoo is available on the Australian Government's Species Profile and Threats Database (DSEWPaC 2013) and in the EPBC Act referral guidelines for the three species of black cockatoo (DSEWPaC 2012).

Overall, populations of Carnaby's Cockatoo are in decline and this is largely due to habitat loss and alteration through large-scale clearing. Carnaby's Cockatoos are primarily threatened by habitat loss

and a shortage of nest hollows resulting from habitat degradation and competition from other species. They are also impacted by illegal shooting, illegal trade and fire. Due to a relatively late breeding age and low fecundity, Carnaby's Cockatoos have limited capacity to recover from the effects of these threatening processes.

3. FIELD METHODOLOGY

3.1. Level 1 Vegetation Survey

On the 30th October to the 1st of November, totalling 2.5 days or 28 hours were spent on site by two Outback Ecology botanists; Vanessa Yeomans (SOPP License SL010736) and Alex Sleep (SOPP License Sl010658).

Any intact native vegetation throughout the Study Area was sampled using relevés (unbounded floristic sampling) and the vegetation type and condition was mapped on foot. Whilst traversing the remnant vegetation of the Study Area, the botanists undertook subsampling for targeted conservation significant flora species with the potential to be found in the Study Area (**Table 4**).

For each relevé, the following information was recorded:

- GPS Location (recorded in GDA94 UTM 50K);
- a photograph taken of the vegetation;
- habitat type;
- vegetation condition, using the Keighery Scale (Keighery 1994) (**Appendix B**);
- vegetation description, based on the vegetation structural table of Keighery (1994) (**Appendix B**);
- dominant species present;
- topographic position;
- slope and aspect;
- soil type;
- presence of outcropping and exposed rock type;
- bare ground and litter percentages;
- estimated time since fire; and
- disturbance level and description.

An alternative route for the grid connection easement/transmission line to Wind Farm Substation Option 2 was drafted and provide to Outback Ecology in March 2014 after the completion of the field survey in November 2013. This new area has been included in the report based on aerial photo interpretation and extrapolation of vegetation assessed in adjacent areas. No field assessment of the presence of conservation significant flora has been undertaken for this alternative route (Figure 2 – orange shaded polygon).

3.2. Targeted Flora Survey of Wind Turbines and Access Tracks

The latest aerial imagery of the Study Area was examined for the presence of vegetation other than crops intersecting with the wind turbines, access tracks or planned underground cables. These locations were visited, where photos and general vegetation descriptions were taken along with a targeted search on foot by the botanists for any species of conservation significance (Section 2.6) as appropriate.

3.3. Black Cockatoo Targeted Habitat Assessment

As stated in the referral guidelines, habitat assessment is the primary technique used to inform decisions on significant impact for black cockatoos (DSEWPac 2012, DoE 2013c). These assessments detail the extent, type and quality of plant species and vegetation known to be used by Carnaby's Cockatoos (DSEWPaC 2012). Surveys should especially aim to identify the presence of large tree hollows or the habitat potential for large hollows to form. Searches for indirect evidence of species presence, such as feeding debris, droppings and feathers, should also be conducted.

Carnaby's Cockatoos are known to breed from July/August in the semi-arid to the sub-humid arid interior, or 'wheatbelt' and from September/October in some locations along the south and west coasts (DSEWPaC 2012). Carnaby's Cockatoos are most likely to occur within the vicinity of the Study Area during January – June (non-breeding season).

The Study Area was assessed for potential for significant breeding, night roosting, and foraging habitat. Habitat assessments were conducted by qualified botanists. The locations of hollow-bearing trees were recorded and the presence of potential food-bearing flora species was noted. While not forming the core of the assessment, searches for evidence of black cockatoo presence were conducted around trees that potentially act as foraging or roost trees.

3.4. Constraints and Limitations

A number of factors can influence the design and intensity of a flora survey. All flora surveys are limited to some degree by time and seasonal factors, and ideally a number of surveys should be undertaken over a number of years and appropriately timed with the flowering seasons. Possible survey constraints as identified by the EPA were addressed **(Table 5)** and no significant constraints were identified for the Survey as undertaken.

Table 5: Summary of Survey Constraints and Limitations

Aspect	Constraint	Comment regarding the flora and vegetation survey
Competency/experience of consultants	No	Members of the survey team were flora specialists employed by Outback Ecology, and have many years' experience undertaking flora surveys of this kind within WA.
Scope	No	The scope was clearly defined.
Proportion of flora identified	No	Of the 191 taxa detected during this survey, 8 species (4%) could not be identified with confidence, due to inadequate specimen material (sterile). Unidentified specimens were compared to known conservation significant species to ensure conservation significant species were identified.
Information sources (e.g. historic or recent)	No	Limited regional studies have been carried out. Available data was reviewed prior to commencement of the survey.
Completeness	No	The survey entailed sub sampling the vegetation types (as anticipated from aerial photo interpretation) at opportune points.
Timing / weather / season / cycle	No	The survey was undertaken with approximately 4 weeks after the seasonal rainfall in August-Sept. Ephemeral flora and flowering of plant taxa would be expected.
Disturbances	No	No
Intensity	No	The survey satisfies a Level 1 Survey according to Guidance Statement 51 (EPA, 2004).
Resources	No	WA Herbarium specimens, taxonomic guides, DPaW database searches and the *Florabase* database were all used to prepare for the survey and used for the confirmation of any species where their identification was uncertain.
Remoteness / access problems	No	All parts of the Study Area were able to be accessed
Availability of contextual information	No	Information was available for the Interim Biogeographic Regionalisation for Australia (IBRA) Lesueur subregion of the Geraldton Sandplains Bioregion, from FloraBase, DPaW and BoM.

4. RESULTS

4.1. Flora

Flora recorded in the current field effort included 191 plant taxa from 98 different genera and 38 families. Of the 190 plant taxa recorded 8 specimens could not be completely identified due to inadequate material (sterile) for identification purposes (4% of specimens). The species list for the survey of the Waddi Wind Farm Study Area is found in **Appendix C.**

The most common Genera in the Study Area were *Banksia* (12 taxa), *Hakea* (10 taxa), *Melaleuca* (8 taxa) and *Stylidium* (8 taxa). This is a floristic composition typical of proteaceous (Kwongan) heath of the Western Midlands (Western Australian Herbarium 2013).

4.2. Flora of Conservation Significance

No Threatened Flora species as listed under the *EPBC Act 1999*, or Threatened Flora species listed under the *WC Act 1950* (WA) were recorded within the Study Area. Six Priority flora species were recorded from within the Study Area as shown in (**Figure 11**). This included:

- *Anigozanthos humilis* subsp. ?Badgingarra (S.D. Hopper 7114) – Priority 2;
- *Arnocrinum gracillimum* – Priority 2;
- *Conostephium magnum* – Priority 4;
- *Lepidobolus quadratus* – Priority 3;
- *Stylidium aeonioides* – Priority 4; and
- *Tetratheca angulata* – Priority 3.

4.2.1. *Anigozanthos humilis* subsp. ?Badgingarra (S.D. Hopper 7114) – Priority 2

It was considered possible that *Anigozanthos humilis* subsp. Badgingarra would occur in the Study Area given the information on habitat and proximity obtained during the desktop assessment (Section 2.6). Three individuals of *A. humilis* subsp. ?Badgingarra was recorded at a location along the cable-layout route Study Area (**Figure 12**), it was recorded approximately 1.5 km south of a previously recorded location (TPFL Database circa 1988, (**Figure 10**). The specimens collected during the course of this survey are considered very likely to be the Priority subsp. of *Anigozanthos humilis* and have been submitted to the Western Australian Herbarium for final determination confirmation according to DPaW SOPP Botanical License Conditions (**Plate 1**).

There are 18 records of *Anigozanthos humilis* subsp. Badgingarra (S.D. Hopper 7114) housed at the WA Herbarium. Within the eight kilometre database search radius, there are 12 records of *A. humilis* subsp. Badgingarra (S.D. Hopper 7114) from the WA Herbarium database, recorded in 1988 south of Old Badgingarra on an alluvial flat of powdery loam. There are records of two populations of approximately 50 individuals in the DPaW threatened and priority flora database that were recorded south of the Windfarm substation Option 2, however this area falls within a cleared paddock. This area was observed during the survey to have been cleared since the populations were recorded in 1991.

4.2.2. *Arnocrinum gracillimum* – Priority 2

It was considered possible that *Arnocrinum gracillimum* would occur in the Study Area given the information on habitat and proximity obtained during the desktop assessment (Section 2.6). Seven individuals of *A. gracillimum* were recorded from within the Study Area and one additional individual recorded from just outside the Study Area. One was recorded from within Conservation Park 41986, with the remaining six (plus one just outside) were recorded within the road reserve area for Brand Highway (**Figure 11**). All *A. gracillimum* were recorded within the vegetation unit – Proteaceous Heath (2) (**Plate 2** and **Plate 3**).

There are 15 records of *Arnocrinum gracillimum* housed at the WA Herbarium. Within the eight kilometre database search radius there is one record of this species (obtained from the WA Herbarium database) in rehabilitation areas at the Cooljarloo Mineral Sands Mine which was recorded in 2004.

Plate 1: *Anigozanthos humilis* subsp *?Badgingarra*

Plate 2: *Arnocrinum gracillimum*

Plate 3: *Arnocrinum gracillimum* – close up of flower

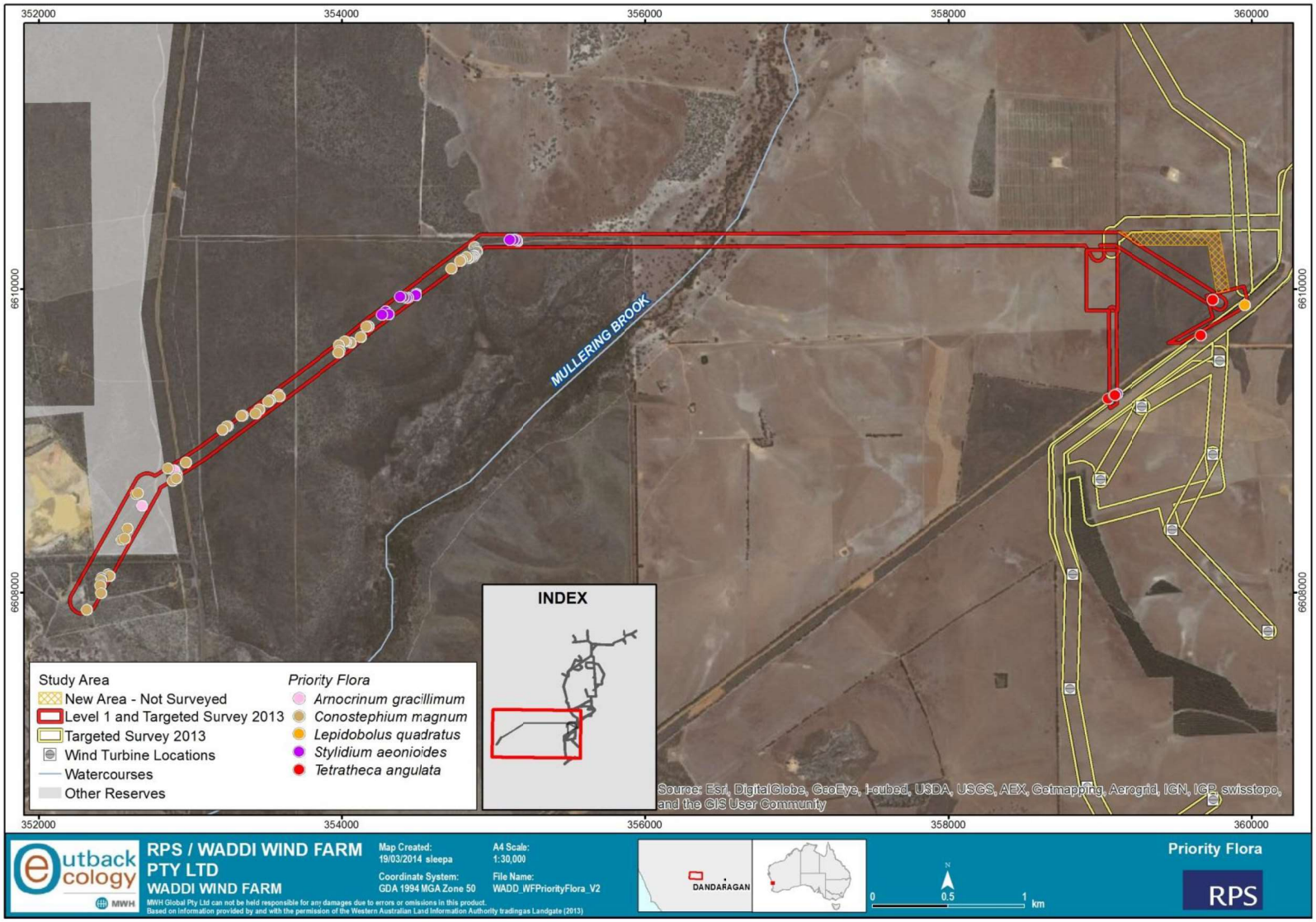

Figure 11: Priority Flora recorded in the Waddi Wind Farm Study Area October 2013

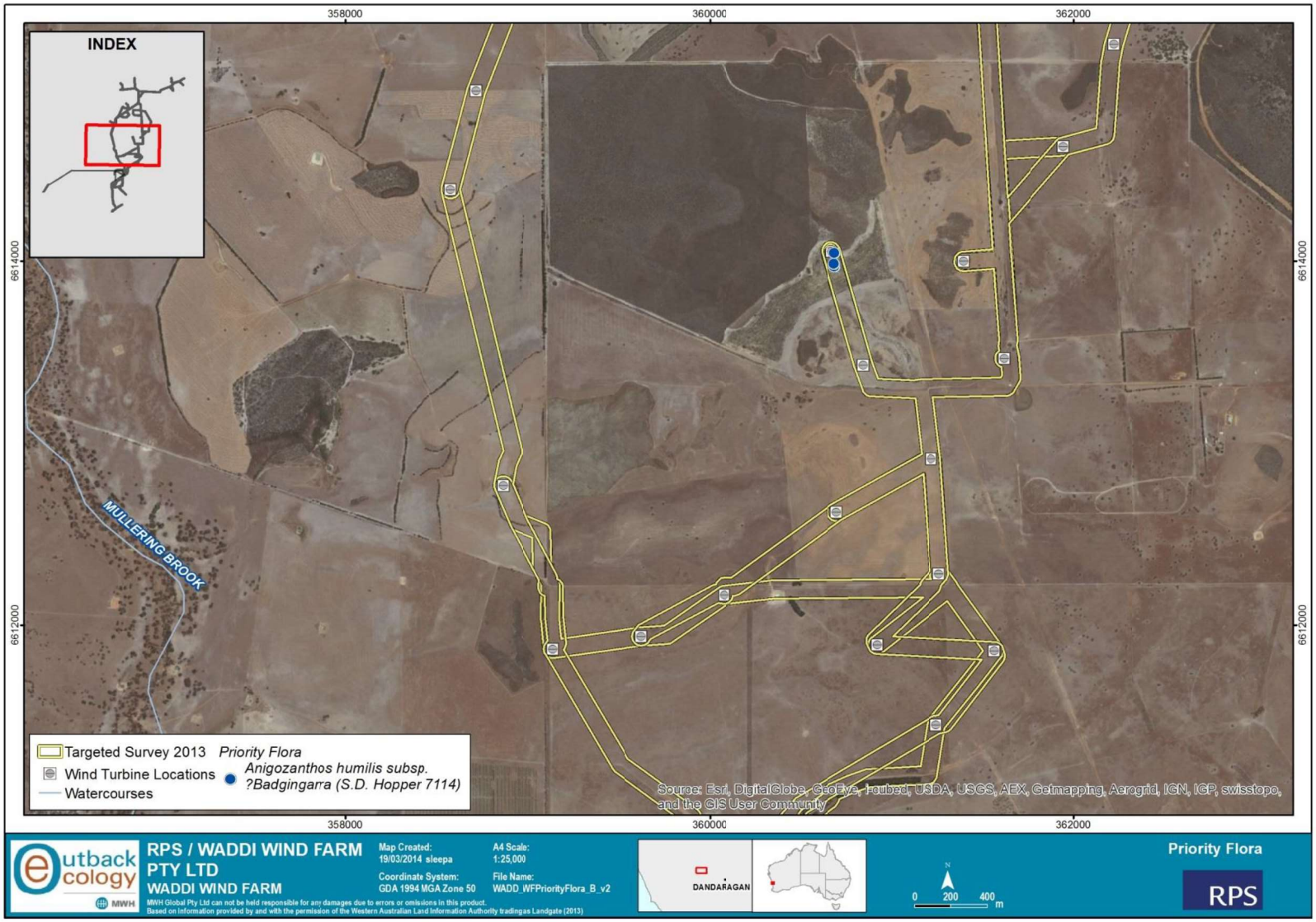

Figure 12: Priority Flora recorded in the Waddi Wind Farm Study Area October 2013

4.2.3. *Conostephium magnum* – Priority 4

Conostephium magnum was considered likely to occur in the Study Area given the information on habitat, and that it has been previously recorded within the Study Area (OES, 2009) (Section 2.6). A total of 124 individuals of *C. magnum* were recorded from within the Study Area (with an additional 6 recorded just outside the Study Area). They occurred along the existing powerline easement with individuals recorded from the mineral sands minesite in the south west, to 500 m west of Mullering Brook (**Figure 11**). The flower and habit of *C. magnum in situ* is shown in **Plate 4 and Plate 5**. *C. magnum* was recorded across five differing vegetation units:

- Open Woodland of *Banksia illicifolia;*
- Proteaceous Heath (1);
- Proteaceous Heath (2);
- Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/Proteaceous Heathland; and
- Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* Woodland over Tall Shrubland of *Adenanthos*.

There are 26 records of *Conostephium magnum* housed at the WA Herbarium. Within the eight kilometre database search radius there are seven records of this species (from the WA Herbarium database) with an additional four recorded by Outback Ecology/RPS in 2009.

Plate 4: *Conostephium magnum*

Plate 5: *Conostephium magnum* - habitat

4.2.4. *Lepidobolus quadratus* – Priority 3

It was considered possible that *Lepidobolus quadratus* would occur in the Study Area given the information on habitat and proximity obtained during the desktop assessment (Section 2.6). One individual *L. quadratus* was recorded from the eastern part of the Study Area, within the Windfarm substation Option 2 and within vegetation unit – Proteaceous Heath 1 (**Figure 11**, **Plate 6**).

There are 43 records of *Lepidobolus quadratus* housed at the WA Herbarium. Within the eight kilometre database search radius there is one record of this species (from the WA Herbarium database) along Mullering Road in 1992.

Plate 6: *Lepidobolus quadratus*

4.2.5. *Stylidium aeonioides* – Priority 4

It was considered possible that *Stylidium aeonioides* would occur in the Study Area given the information on habitat and proximity obtained during the desktop assessment (Section 2.6). A total of 49 individuals of *S. aeonioides* were recorded from within the Study Area (**Figure 11**). All recorded locations of *S. aeonioides* were within vegetation unit Proteaceous Heath 1 on rocky laterite slopes and hilltops. The flower and habit of *Stylidium aeonioides* is shown in **Plate 7** and **Plate 8**.

There are 29 records of *Stylidium aeonioides* housed at the WA Herbarium Within the eight kilometre database search radius there is one record of this species (from the WA Herbarium database) recorded along Mullering road in 1988.

Plate 7: *Stylidium aeonioides* - habitat

Plate 8: *Stylidium aeonioides*

Plate 9: *Tetratheca angulata*

4.2.6. *Tetratheca angulata* – Priority 3

It was considered possible that *Tetratheca angulata* would occur in the Study Area given the information on habitat and proximity obtained during the desktop assessment (Section 2.6). One individual of *Tetratheca angulata* was recorded from within the Study Area within the Windfarm substation Option 2, within Proteaceous Heath (1) (**Figure 11**) (**Plate 9**).

There are 12 records of *Tetratheca angulata* housed at the WA Herbarium. Within the eight kilometre search radius there is one record of this species (from the WA Herbarium database) recorded from the verge of Walyering Road in 2002.

4.2.7. *Acacia plicata* - Priority 3

Despite an exhaustive search at the previously recorded location (**Figure 9**), neither the original individual nor any other individuals in the immediate vicinity were located in the field. *Acacia* species are short lived and are often colonising species that are not permanent components of vegetation communities.

4.3. Weeds

Eight weeds were recorded in the vegetation mapping of the Study Area. The locations of weeds recorded in the Study Area are listed for the sites below (**Table 6, Figure 13**). These are common agricultural weeds. No other weeds or infestations were recorded. No Declared Pests were recorded as listed under the *Biosecurity and Agriculture Management Act 2007.*

Table 6: Weed Species of the Study Area

Species	Common Name	Notes (*Florabase*)	Sites
Briza maxima	Blowfly Grass		S-01
Ehrharta calycina	Perennial Veldt Grass	Commonly invades disturbed ecosystems. Also capable of invading undisturbed ecosystems. It represents a threat to the conservation value of *Banksia* woodland on sandy soils north and south of Perth. Has high growth rates, seed germinates rapidly leading to early dominance, capable of altering nutrient cycles.	D-01
Lolium sp.	Ryegrass	Found on a range of soil types from sandy loams to heavy clays. Hybridisation between *Lolium* species can make identification difficult. Allepothatic sets prolific seed.	D-01
Lotus subbiflorus		Annual herb, a weed of swamps, creeks, disturbed sites and road verges.	D-01
Ornithopus compressus	Yellow Serradella	Cultivated as forage for livestock. Deep rooted annual adapted to regions with a Mediterranean type climate.	D-01
Polypogon monspeliensis	Annual Beardgrass	Annual grass, a weed of most areas (often saline), creeks, rivers and swamps.	D-01
Sonchus oleraceus	Common Sowthistle	Annual (occasionally biennial) herb. A weed of waste places and disturbed ground. A single plant may produce up to 8,000 seeds and able to germinate all year round.	C-04
Ursinia anthemoides	Ursinia	Slender annual herb, a weed of roadsides and waste places. Fruits have both pappus and hairs, so are easily dispersed by wind. Can be abundant immediately post-fire in *Banksia* woodland, and then declines over time.	D-01 S-01 S-03 S-05 S-07

4.4. Vegetation Units

Fifteen detailed relevés were established across the Study Area sampling the eight defined Vegetation Units. Vegetation Units included Low Open Woodland of *Eucalyptus todtiana* (two variants), Melaleuca Woodland, Myrtaceous Scrub, Woodland of *Banksia ilicifolia*, Proteaceous Heath (two variants) and one Disturbed Creekline as detailed in (**Table 7**) are shown in (**Figure 13**). A species list per Vegetation Unit is presented in **Appendix D.** Relevé data is provided in Appendix **E.**

The vegetation located proximate to the wind turbines and access tracks is shown in **Figure 14** and **Figure 15**. A photographic record and short vegetation description is provided.

The Vegetation Units Proteaceous Heath 1 and Myrtaceous Scrub of Swales and Drainage lines has been extrapolated for the vegetated area of the alternative Wind Farm Substation Option 2 transmission line as shown in **Figure 13**.

4.5. Vegetation Condition

Intact vegetation of the grid connection easement/transmission line to the Cataby Substation was all in Very Good to Excellent condition as shown in **Figure 16**. Vegetation in the lesser condition of 'Good to Very Good Condition' was recorded near the Cataby substation, due to mine activities (tracks) and disturbance along with the presence of Dieback.

4.6. Plant Disease

A formal assessment for plant disease in the form of dieback (*Phytophthora cinnamomi*) was not undertaken during the field survey; however field botanists noted that there were no physical signs of dieback present within the Study Area.

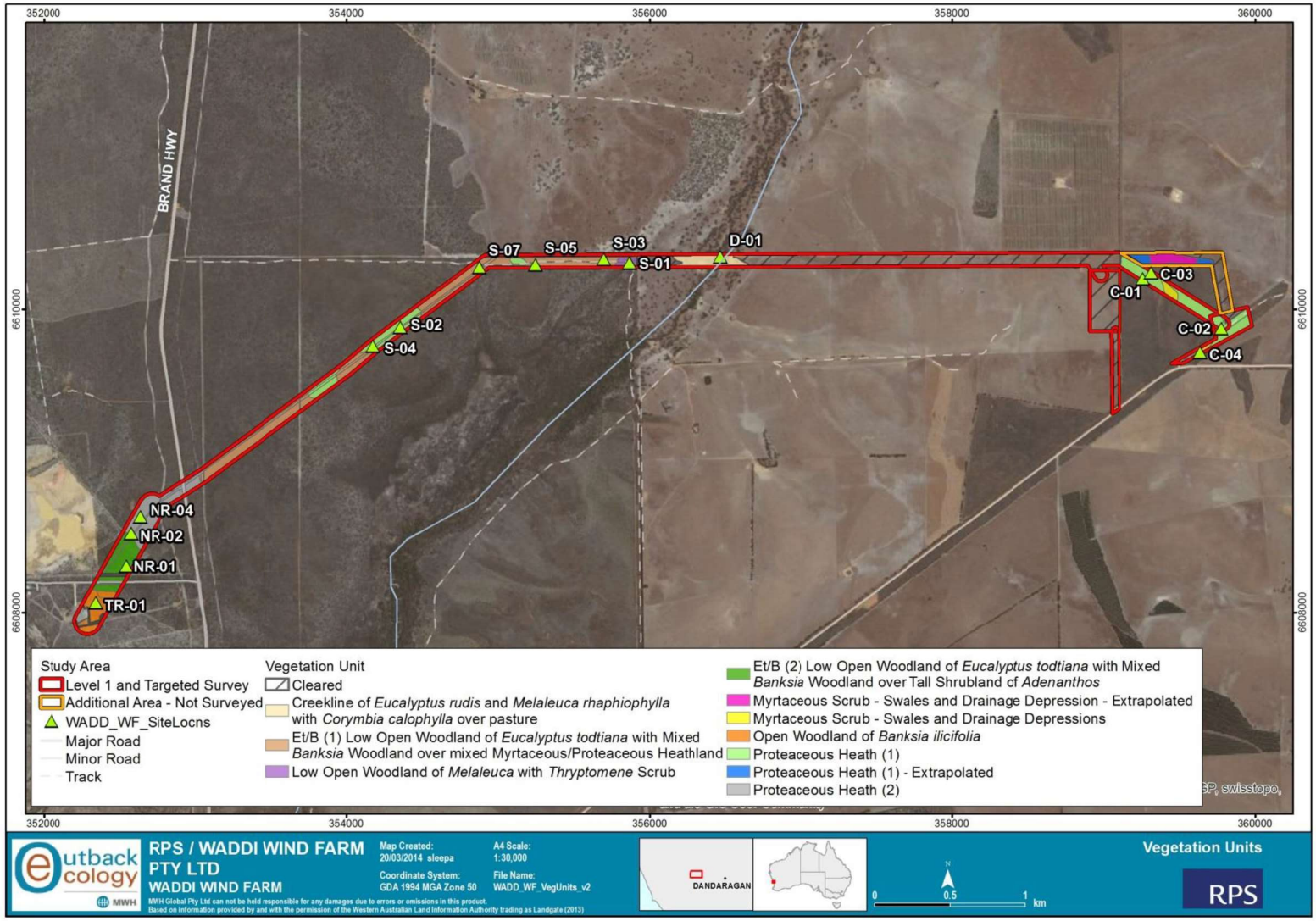

Figure 13: Vegetation Units of the Waddi Wind Farm Study Area

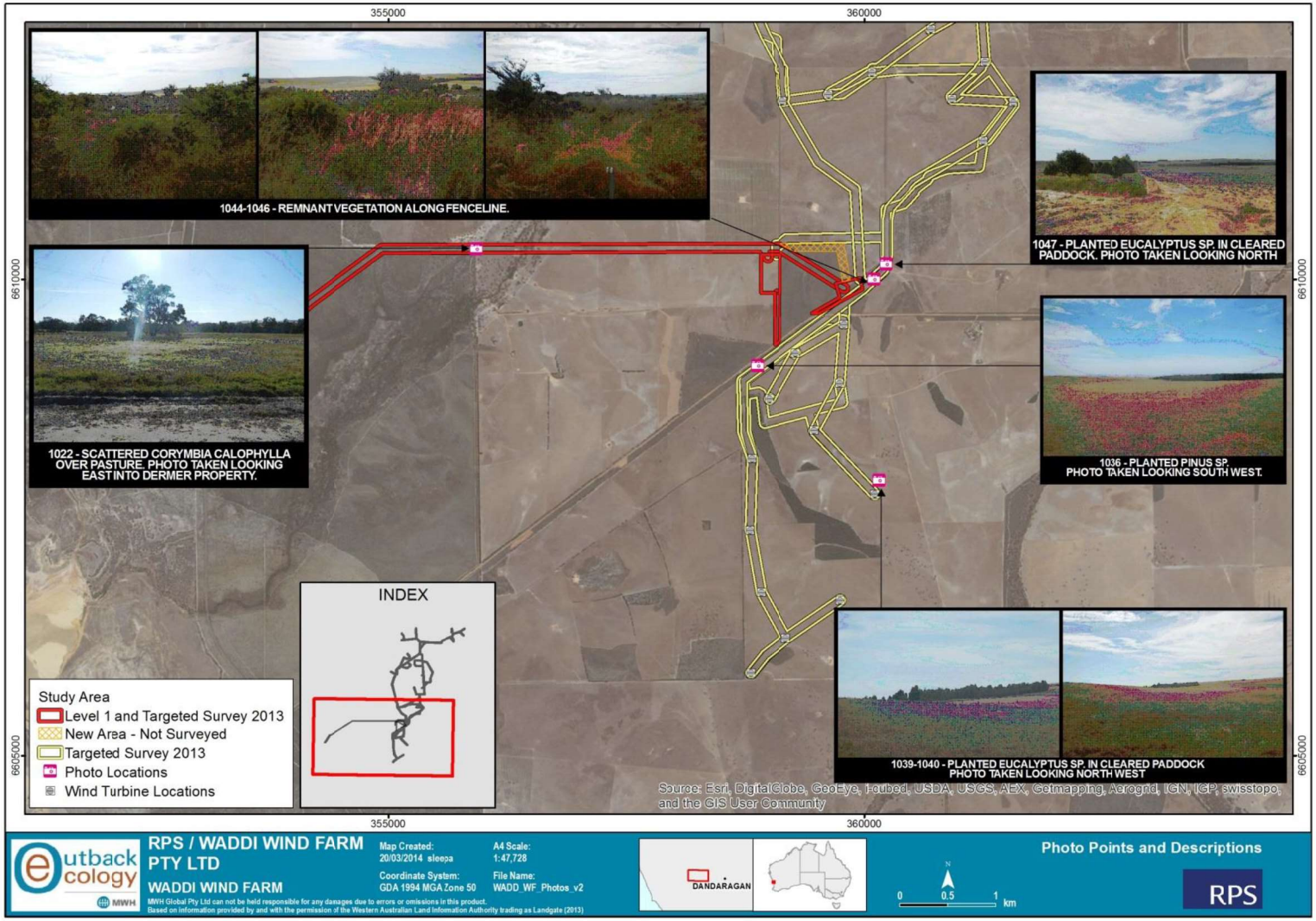

Figure 14: Targeted Flora Survey of the Study Area

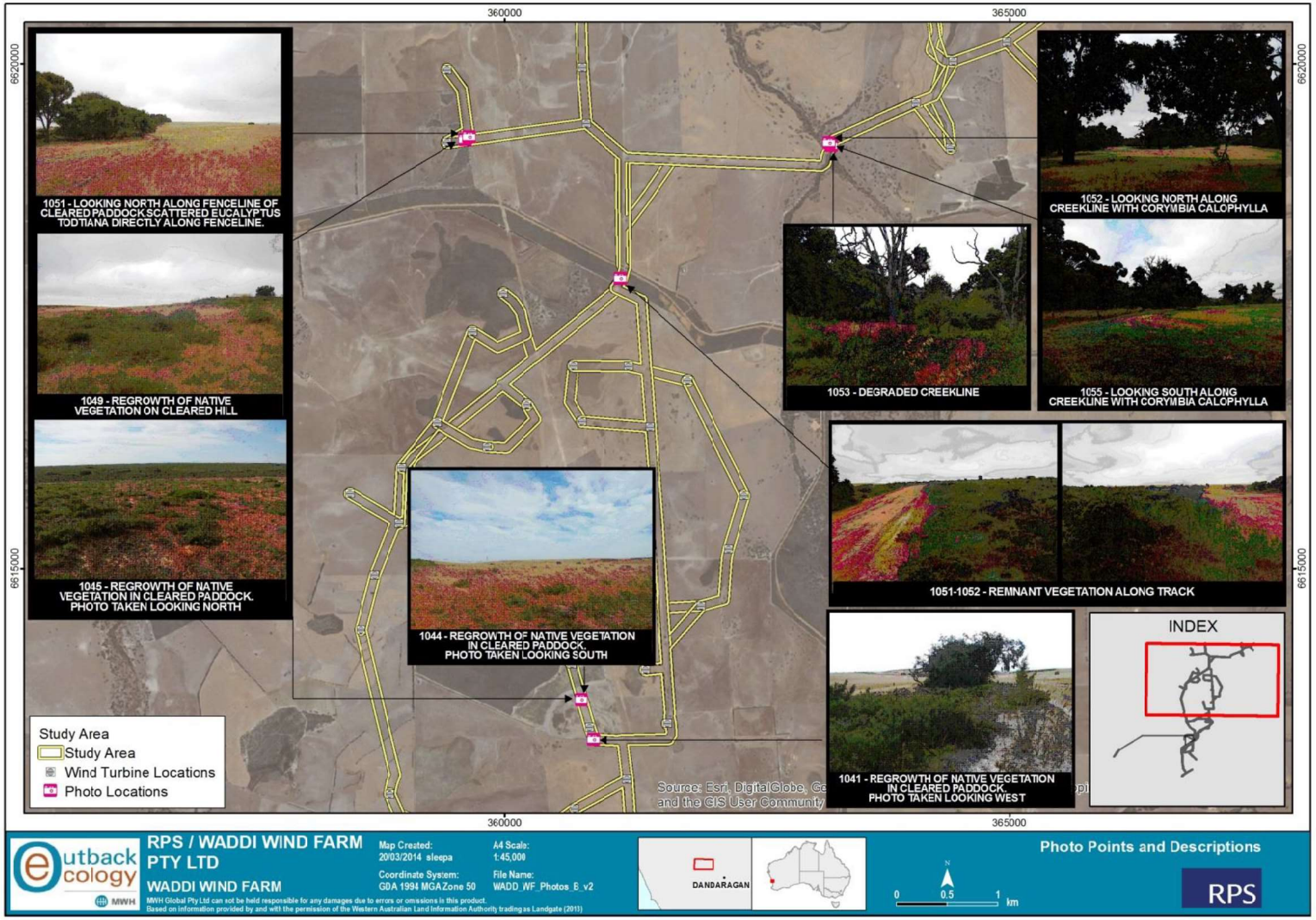

Figure 15: Targeted Flora Survey of the Study Area

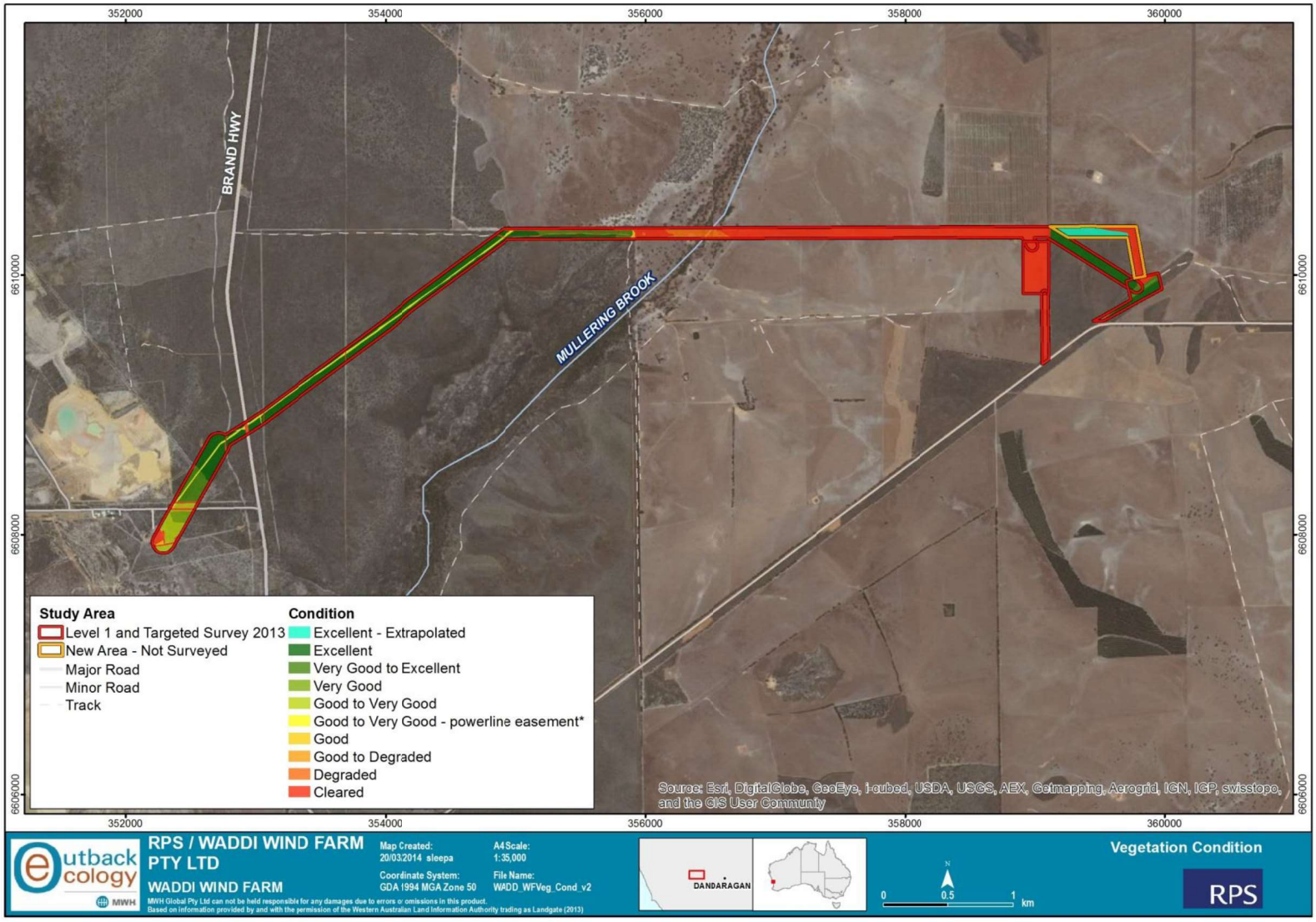

Figure 16: Vegetation Condition of the Waddi Wind Farm Study Area October 2013

Table 7: Vegetation Units of the Study Area

Unit	Relevé Sites (Figure 13)	Description	Photo
Et/B (1) Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* Woodland over mixed Myrtaceous/Proteaceous Heathland	S-07, S-04, S-03	Low Open Woodland of *Eucalyptus todtiana* with *Banksia attenuata* and *B. menziesii* and/or *B. prionotes* over a mixed Myrtaceous and Proteaceous Heath including *Allocasuarina humilis, Hakea costata, Melaleuca* spp., *Eremaea pauciflora Conospermum stoechadis* and *Hibbertia hypericoides* over an Open Sedgeland/Herbland including *Dasypogon obliquifolius, Mesomelaena pseudostygia Lepidobolus preissianus* and/or *Conostylis juncea* on pale grey sandy flats.	
Et/B (2) Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* Woodland over Tall Shrubland of *Adenanthos*	NR-01, NR-02	Low Open Woodland of *Eucalyptus todtiana* with Low Open Forest of *Banksia attenuata, Banksia prionotes* and/or *Banksia attenuata* over patches of Tall Open Shrubland of *Adenanthos cygnorum* over Open Heath of *Eremaea pauciflora* var. *pauciflora, Conospermum stoechadis* subsp. *sclerophyllum* or *Conospermum crassinervium* over Low Open Shrubland/Sedgeland of *Hibbertia hypericoides, Calytrix angulata, Dasypogon obliquifolius, Patersonia occidentalis* and *Mesomelaena pseudostygia*on pale grey sandy flats.	

Unit	Relevé Sites (Figure 13)	Description	Photo
Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	S-01	Low Open Woodland of *Melaleuca preissiana* and *Eucalyptus todtiana* over Tall Shrubs to Tall Open Scrub of *Thryptomene mucronulata* over an Open heath to Shrubland of *Calothamnus quadrifidus* and *Xanthorrhoea preissii* over *Jacksonia furcellata* and *Verticordia densiflora* var. *densiflora* over a herbland of *Drosera gigantea*, *Hyalosperma cotula* and *Ursinia anthemoides* on grey sandy loam	
Myrtaceous Scrub in Swales and Drainage Depressions	C-03, C-04	Scattered *Nuytsia floribunda, Eucalyptus todtiana* and *Kunzea glabrescens* with Low Open Woodland of *Banksia attenuata* with Tall Open Scrub of *Pericalymma erubescens* over Shrubland of *Hakea trifurcata, Conospermum stoechadis* subsp. s*clerophyllum*, (or just an Open Heath of:) *Calothamnus quadrifidus* subsp. *quadrifidus* over Low Open Shrubland of *Hibbertia hypericoides* with Open Sedgeland of *Mesomelaena pseudostygia*, *Ecdeiocolea monostachya* and *Schoenus brevisetis* in pale brown sand in drainage lines	

Unit	Relevé Sites (Figure 13)	Description	Photo
Open Woodland of *Banksia ilicifolia*	TR-01	Low Open Woodland of *Banksia attenuata and B. menziesii* with occasional emergent *Banksia illicifolia* over a Tall Open Shrubland to Shrubland of *Adenanthos cygnorum* subsp. *cygnorum* over a Shrubland of *Xanthorrhoea preissii* and *Leptospermum erubescens* over a Low Open Shrubland of *Hibbertia subvaginata*, *Stirlingia latifolia* and *Conospermum crassinervium*, with occasional dominance by *Patersonia occidentalis* and *Phlebocarya ciliata* in small depressions on lower slopes of pale grey sand	
Proteaceous Heath (1)	C-01, C-02, S-02	Scattered *Nuytsia floribunda* with Open Shrubland of *Xanthorrhoea ?drummondii* and *Allocasuarina humilis* over closed Proteaceous Heath including species such as *Petrophile shuttleworthiana, Banksia sphaerocarpa* var. *sphaerocarpa*, *Calothamnus hirsutus, Eremaea pauciflora* var. *ionchophylla, Banksia glaucifolia, Beaufortia bracteosa, Banksia shuttleworthiana, Hakea conchifolia, Hakea incrassata, Melaleuca clavifolia, Melaleuca trichophylla* and *Lambertia multiflora* var. *multiflora* over Open Low Heath of *Hibbertia hypericoides*, *Gastrolobium oxylobioides, Daviesia*	

Unit	Relevé Sites (Figure 13)	Description	Photo
		nudiflora over Sedgeland/Herbland of species including *Tetraria octandra, Conostylis teretifolia* subsp. *teretifolia*, *Chordifex sinuosus*, *Mesomelaena pseudostygia* and *Schoenus clandestinu*s with *Austrostipa compressa/hemipogon* on lateritic sandy hilltops	
Proteaceous Heath (2)	NR-04	Open Heath of *Banksia candolleana* and *Allocasuarina humilis* over Closed Heathland of *Lambertia multiflora* var. *multiflora*, *Petrophila macrostachya, Hakea spathulata, Hakea incrassata, Xanthorrhoea drummondii*, *Calothamnus hirsutus* over Open Low Heath of *Gastrolobium oxylobioides, Patersonia occidentalis* over Open Sedgeland of *Mesomelaena pseudostygia* and *Schoenus clandestinus*.	

Unit	Relevé Sites (Figure 13)	Description	Photo
Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	D-01	Open Woodland of *Corymbia calophylla* with *Eucalyptus rudis* (in creekline) over tall shrubs of *Melaleuca rhaphiophylla* (in creek line) over a disturbed understorey.	

4.7. Vegetation of Conservation Significance

There are no known Threatened or Priority Ecological Community types known from within 15 km of the Study Area. Two Vegetation Units of the Waddi Wind Farm Study Area that support a Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* Woodland over Myrtaceous/Proteaceous Heathland, (Et/B (1) and Et/B (2), have affinities with TEC SCP20a "*Banksia attenuata woodland over species-rich dense shrublands*". The previous Outback Ecology survey (2009) reported that this TEC was known from within 50km of the Study Area (Outback Ecology 1990).

Further discussion with the Threatened Species and Communities Branch of DPaW (V. English *pers comm* November 2013) explained that the physical disjunct (more than 50 km, across bioregions) between this community and the community with which it has affinities TEC SCP20a (recorded on uplands centred on Bassendean Dunes and the Dandaragan Plateau (Gibson *et al.,* 1994)) suggests that a meaningful floristic comparison and determination of status cannot be made.

It is recognised however that *Banksia* Low Woodlands such as those typical of the Bassendean dunes/Dandaragan Plateau, only occupy a small portion of the Lesueur subregion. A small area of Bassendean Land System (Section 2.4) occurs within the vicinity of the Study Area (Griffin and Hopkins 1990). Therefore *Banksia* woodland within the Study Area has conservation value due to its restricted distribution in the bioregion (Griffin and Hopkins 1990), whereas there are extensive areas of the low heath typical of the colluvium sands and gravels of the adjacent Peron Slopes, including shallow sands, where *Banksia candolleana* is dominant (Griffin and Hopkins 1990).

Further detail on Vegetation Types of the area is not available. The only regional survey, conducted by Griffin (1994) was based on sparse sampling, with only 70 quadrats across the subregion. Therefore Floristic Community Type and reservation status has not been adequately defined to make meaningful comparisons.

The Kwongan (Proteaceous Heath) of the Study Area is recognised nationally and internationally of biodiversity conservation significance with high levels of endemism and richness (Section 2.1).

4.8. Black Cockatoo Targeted Habitat Assessment

4.8.1. Black Cockatoo Occurrence

The Study Area lies approximately 140 km north of the modelled distribution of Baudin's and Forest Red-tailed Black Cockatoo. It lies on the northern margin of the known breeding range and non-breeding range of Carnaby's Cockatoo. Carnaby's Cockatoos have been recorded within a 50 km radius of the Study Area (**Figure 17**), suggesting that they could potentially be present in the Study Area at appropriate times of year (between the months of January and June). As the survey took place in October and November, direct observation of the species was unlikely to be found during the surveys. In accordance with the Commonwealth referral guidelines, the emphasis of the survey was on habitat assessment. No observations of Carnaby's Cockatoo were made during the habitat assessment, and no signs of foraging or roosting activity were recorded.

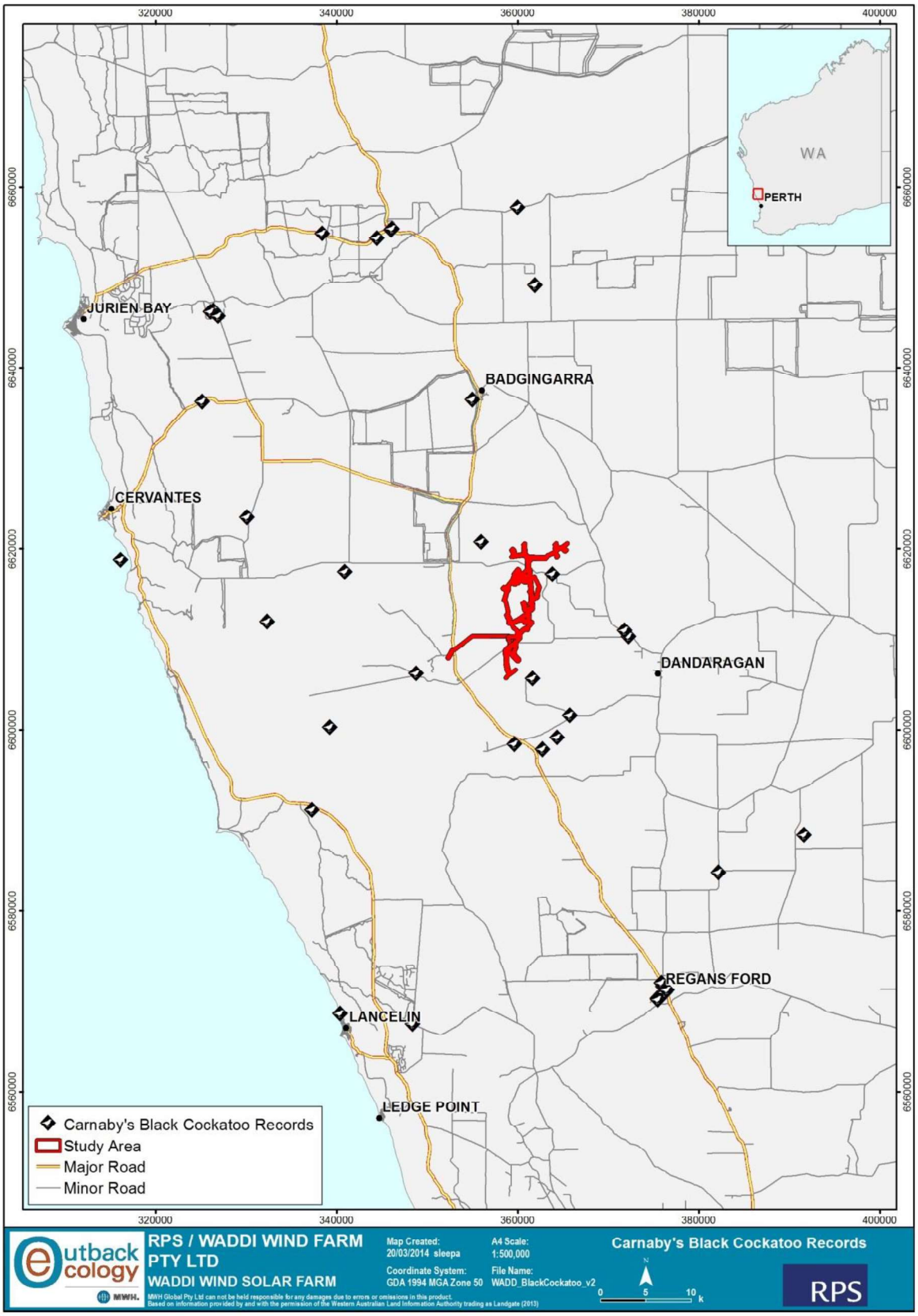

Figure 17: Previous records of Carnaby's Cockatoos surrounding the Study Area

4.8.2. Carnaby's Cockatoo Habitat

No hollow-bearing trees with sufficiently large hollows were observed during the survey. There were several Marri (*Corymbia calophylla*) trees with a diameter at breast height (DBH) of greater than 500 mm present in the Study Area and in the vicinity of Mullering Brook (**Figures 13 & 18**). Of these potential breeding habitat trees, only three are within the proposed clearing area. These trees are considered significant under the EPBC Act referral guidelines for black cockatoos (DSEWPaC 2012), due to their potential to develop tree hollows. In the Study Area, these trees exist as scattered individuals in the otherwise cleared or degraded areas in the drainage line (**Figures 13 & 18**). Current or potential breeding habitat was not present in other parts of the Study Area.

In the western section of the Study Area, the upper storey was dominated by *Eucalyptus todtiana* and the middle storey was comprised of Myrtaceous scrub (under *Eucalyptus todtiana*; collectively representing an 'Open Woodland' habitat) and Proteaceous heaths 1 and 2 (collectively representing a 'Proteaceous Heath' habitat) (**Figure 18**). Trees commonly used for nesting, such as Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) were absent and more generally, trees over 500 mm DBH were absent. The eastern section of the Study Area, separated from the western and central sections of the Study Area by a large, cleared expanse (**Figure 18**), was similarly vegetated and is not considered to represent current or potential breeding habitat for Carnaby's Cockatoos.

Flora species with potential to be used by Carnaby's Cockatoos as a source of food were present in the Study Area and included Marri, *Eucalyptus* spp., *Banksia spp*. and *Hakea* spp. These flora species were scattered, in the case of Marri, and abundant, in the case of *Banksia* and *Hakea* spp, in the Open Woodland and Proteaceous Heath habitat types identified in the Study Area (**Figure 18**). The condition of the vegetation units in these habitat types was largely good to excellent (**Figure 16**, **Figure 18**). The overall quality of the vegetation units, presence of a diversity of known foraging species and general abundance of these species suggests that the Carnaby's Cockatoo habitats in the Study Area represent areas of quality foraging habitat as defined by the EPBC Act referral guidelines for black cockatoos (DSEWPaC 2012). Further, although not confirmed or assessed as part of this survey, it is possible that the Marri trees within the 'Creekline' vegetation unit may represent night roosting habitat for Carnaby's Cockatoo (**Figure 13**).

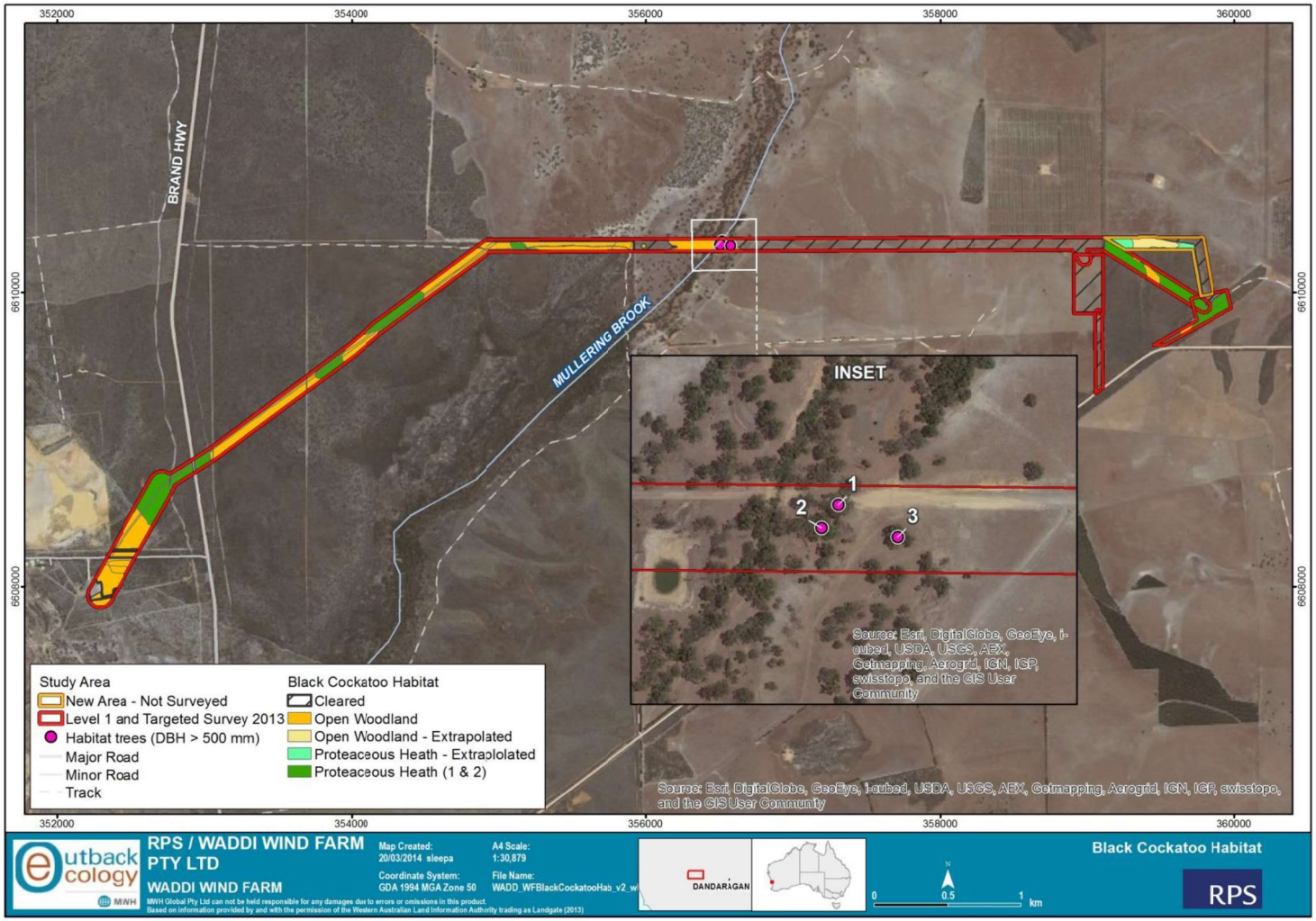

Figure 18: Broad habitats potentially used by Carnaby's Cockatoos as a source of food

The Open Woodland habitat contains an upper storey of Eucalyptus over Myrtaceous and Proteaceous heath; the Proteaceous Heath habitat is characterised by dominance of Proteaceous species; Proteaceous species are recognised as foraging resources for Carnaby's Cockatoos

5. DISCUSSION AND RECOMMENDATIONS

The proposed construction acitivites within the Study Areea have the potential to impact an area around each wind turbine as well as a corridor for a new road access and underground cabling. Both the Wind Farm Substation Options 1 and 2 would potentially impact the entire footprint of the selected substation area. The Grid Connection easement/transmission line from the wind farm substation to the existing Cataby substation involves potential disturbance to an area around the location of each pole as well as a corridor for any new access track. There are existing access tracks throughout most of the Study Area that contains vegetation, so there is a potential to minimise clearing of vegetation through the use of these tracks. The following discusses the key findings from a Level 1 flora and fauna assessment with any associated impacts.

5.1. Flora

The six Priority Flora species recorded in the Study Area are shown in (**Figure 11**). These Priority Flora should be planned to be avoided until impact on populations in the immediate vicinity and/or subregion is further determined. To determine the impact on the populations of Priority Flora that cannot be avoided; further census of individuals adjacent to the Study Area would be required. The majority of the priority taxa detected in this survey are known from only *single* collections within a further eight kilometres of the Study Area, therefore the data of this survey represents new populations that may extend beyond the boundaries of the Study Area.

A survey of the newly proposed alternative route to the Wind Farm Substation – Option 1, for species of conservation significance would be required to ascertain the presence and population extent of any potential conservation significant flora.

5.2. Vegetation

Conservation Significant Vegetation of the Study Area includes:

- Vegetation containing Priority Flora records as shown in **Figure 11**;
- *Banksia* Woodland - restricted distribution within the Bioregion – northern extent of the Bassendean Dune System; and
- Proteaceous Heath (Kwongan) recognised nationally and internationally as a hotspot for biodiversity.

Avoidance and minimisation of disturbance in the Vegetation Types above is recommended. The project will need to address this strategy to meet the EPA Position Statement 2 (2000). Due to the high clearing in the agricultural areas, the EPA published Position Statement 2 *Environmental Protection of Native Vegetation in Western Australia* which states that *"…the EPA is of the view that it is unreasonable to expect to be able to continue to clear native vegetation from land within the agricultural area other than relatively small areas and where alternative mechanisms for protection biodiversity are addressed."*

The Wind Farm Substation Option 2 becomes the preferred option with regards to ecological considerations as it is situated on cleared agricultural land as opposed to the conservation significant

vegetation types listed above. The indicative clearing requirements for the Waddi Wind Farm substations and grid connection easement/transmission line options are shown in **Table 8.** Clearing of vegetation for Wind Farm Substation Option 1 (4ha of Proteaceous Heath) would still be only 0.005% of the remaining Beard Vegetation Unit 1031 in the Leseur subregion and would not bring the remaining extent below the 30% remaining threshold.

Under Condition 8 of the Vegetation Clearing Permit, with regards to Priority Flora, the permit holder should ensure that:

- no clearing of identified priority flora occurs (unless approval is granted); and
- no clearing occurs within 30 metres of identified priority flora (unless approval is granted).

5.3. Carnaby's Cockatoo Habitat

No current breeding habitat for Carnaby's Cockatoos was recorded in the Study Area; however, significant trees, i.e. trees with potential to develop hollows, were recorded in the central portion of the Study Area. Foraging habitat was recorded in the Study Area in the form of *Eucalyptus spp*., *Banksia spp*. and *Hakea spp*. in the Open Woodland and Proteaceous Heath habitat types. This habitat was found to be of high quality and in good condition. The Study Area is within the modelled breeding range of the Carnaby's Black Cockatoo, contains potential breeding habitat and contains quality foraging habitat. There are nearby records of the species, and it should be assumed that the species is present and using the site for foraging purposes. The proposed footprint for the project will have limited impact on current or future breeding habitat, as only three trees with the potential to form hollows are currently proposed to be cleared as part of the development. Foraging habitat, however, is likely to be impacted by the proposal, through direct habitat loss, degradation and fragmentation.

As mentioned in previous sections, habitat for matters of National Environmental Significance (DoE 2103c) was found onsite (Black Cockatoo species). The actions of undertaking the development are unlikely to trigger the Commonwealth's significant impact criteria, based upon assessment against the Commonwealth's significant impact criteria policy and the small quantity of habitat removal in association with the land systems. However, if the client is seeking legal certainty on this point then an EPBC referral is recommended. The Commonwealth Department, DoE would then assess the referral and respond in due course.

Based on the outcome of the habitat assessment and assessment of impacts, it is considered that the project is unlikely to have a significant impact on Black Cockatoo's. However, to obtain legal certainty on this point an EPBC referral is recommended, and the permit holder should ensure that no clearing of more than the proposed 1 ha of suitable breeding habitat be removed.

Table 8: Indicative clearing requirements (provided by Wind Prospect)

Vegetation	Windfarm Substation Option 1	Windfarm Substation Option 2	Crown Land Reserve 27216	Crown Land Cons.Park 41986	KMCC Option 1	KMCC Option 2	Distribution Line Mullering Rd Reserve	Substation Option 2 Transmission Line
Et/B (1) Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* Woodland over mixed Myrtaceous/Proteaceous Heathland			0.038					
Et/B (1) Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* Woodland over Tall Shrubland of *Adenanthos*				0.004	0.0027	0.025		
Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub			0.018					
Myrtaceous Scrub in Swales and Drainage Depressions		0.37						
Open Woodland of *Banksia ilicifolia*					0.025	0.051		
Proteaceous Heath (1)		4.004	0.007				0.02	
Proteaceous Heath (2)			0.006	0.006				
Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	0.179							
Unsurveyed Vegetation								0.04
Totals (ha)	**0.179**	**4.374**	**0.069**	**0.01**	**0.052**	**0.076**	**0.02**	**0.04**

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APPENDIX A

Definitions of codes and terms used to describe Conservation Significance of Flora and Vegetation

Definitions of Codes and Terms used to Describe Conservation Significance of Flora

Status	Code	Description
Schedule 1 of the Wildlife Conservation (Rare Flora) Notice under the Wildlife Conservation Act 1950		
Threatened	T	Taxa which 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 2 of the Wildlife Conservation (Rare Flora) Notice under the Wildlife Conservation Act 1950		
Presumed Extinct Flora	X	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
Threatened Flora (Schedule 1) are further ranked by DPaW according to their level of threat using IUCN Red List criteria:		
Critically Endangered	CR	considered to be facing an extremely high risk of extinction in the wild
Endangered	EN	considered to be facing a very high risk of extinction in the wild
Vulnerable	VU	considered to be facing a high risk of extinction in the wild.
DPAW Priority List		
Priority One (Poorly known taxa)	P1	Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
Priority Two (Poorly known taxa)	P2	Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
Priority Three (Poorly known taxa)	P3	Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.

Status	Code	Description
Priority Four (Near threatened or other taxa in need of monitoring)	P4	1. Rare. Taxa 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 taxa are usually represented on conservation lands. 2. Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. 3.Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Priority Five (Conservation dependent taxa)	P5	Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years.

Definitions for Threatened Ecological Communities (TEC)

TECs are indirectly protected under the Western Australian *Environmental Protection Act 1986* and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Presumed Totally Destroyed (PD)

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. 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 or B):

A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or

B) All occurrences recorded within the last 50 years have since been destroyed

Critically Endangered (CR)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. 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, 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 90% and either or both of the following apply (i or ii):

i) 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 10 years);

ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 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):

i) 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 10 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 10 years).

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. 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 geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):

i) the estimated 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 future (within approximately 20 years);

ii) modification throughout its range is continuing such that in the short term future (within approximately 20 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):

i) 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 20 years);

ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;

iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.

C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

Vulnerable (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. 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 or significant modification 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 that are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community may already be modified 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 be still 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.

Definitions for Priority Ecological Communities (PEC)

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities that are known from very few occurrences with a very restricted distribution (generally =5 occurrences or a total area of = 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities

Communities that are known from few occurrences with a restricted distribution (generally =10 occurrences or a total area of =200ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four:

i. ***Rare*****.** Ecological communities known from few occurrences 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 communities are usually represented on conservation lands.

(ii) ***Near Threatened****.* Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.

(iii) ***Ecological communities that have been removed from the list of threatened communities during the past five years***.

These communities require regular monitoring.

Priority Five: Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

APPENDIX B
Vegetation Condition Scale

Vegetation Condition Scale (Keighery 1994)

Code	Description
Pristine	Pristine or nearly so. No obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

APPENDIX C

Vegetation Structural Scale

Vegetation Structure Classification (Keighery 1994)

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

APPENDIX D

Flora Species List By Family

Family	I	Name	Common Name
Amaranthaceae		*Ptilotus polystachyus*	Prince of Wales Feather
Anarthriaceae		*Anarthria laevis*	
Apiaceae		*Actinotus leucocephalus*	Flannel Flower
Araliaceae		*Trachymene pilosa*	Native Parsnip
Asparagaceae		*Laxmannia sessiliflora*	Nodding Lily
		Thysanotus arenarius	
		Thysanotus patersonii	
Asteraceae		*Hyalosperma cotula*	
		Siloxerus humifusus	Procumbent Siloxerus
	*	*Sonchus oleraceus*	Common Sowthistle
	*	*Ursinia anthemoides*	Ursinia
		Waitzia acuminata var. *albicans*	
Casuarinaceae		*Allocasuarina humilis*	Dwarf Sheoak
Celastraceae		*Tripterococcus brunonis*	Winged Stackhousia
Colchicaceae		*Burchardia congesta*	
Cyperaceae		*Caustis dioica*	
		Mesomelaena preissii	
		Mesomelaena pseudostygia	
		Schoenus brevisetis	
		Schoenus clandestinus	
		Schoenus sp. A3 Ciliate Sheaths (K.R. Newbey 9402)	
		Tetraria octandra	
Dasypogonaceae		*Dasypogon obliquifolius*	
Dilleniaceae		*Hibbertia huegelii*	
		Hibbertia hypericoides	Yellow Buttercups
		Hibbertia sericosepala	
		Hibbertia subvaginata	
Droseraceae		*Drosera gigantea* subsp. *gigantea*	Giant Sundew
		Drosera parvula	Small Sundew
		Drosera sp.	
Ecdeiocoleaceae		*Ecdeiocolea monostachya*	
Elaeocarpaceae		*Tetratheca angulata* – Priority 3	
		Tetratheca confertifolia	
Ericaceae		*Andersonia heterophylla*	
		Astroloma xerophyllum	
		Conostephium magnum – Priority 4	
		Leucopogon sp. Cataby (F. Hort 1638)	
		Lysinema pentapetalum	
Fabaceae		*Acacia pulchella*	Prickly Moses
		Acacia pulchella var. *glaberrima*	
		Acacia scirpifolia	
		Acacia sphacelata subsp. *sphacelata*	
		Bossiaea eriocarpa	Common Brown Pea

Family	I	Name	Common Name
Fabaceae		*Daviesia epiphyllum*	
		Daviesia incrassata subsp. *incrassata*	
		Daviesia nudiflora	
		Daviesia podophylla	
		Daviesia polyphylla	
		Gastrolobium oxylobioides	Champion Bay Poison
		Gastrolobium polystachyum	Horned Poison
		Gastrolobium spinosum	Prickly Poison
		Gompholobium knightianum	
		Gompholobium polymorphum	
		Gompholobium tomentosum	Hairy Yellow Pea
		Jacksonia floribunda	Holly Pea
		Jacksonia furcellata	Grey Stinkwood
	*	*Lotus subbiflorus*	
	*	*Ornithopus compressus*	Yellow Serradella
Goodeniaceae		*Dampiera linearis*	Common Dampiera
		Dampiera spicigera	Spiked Dampiera
		Goodenia coerulea	
		Lechenaultia floribunda	Free-flowering Leschenaultia
		Scaevola glandulifera	Viscid Hand-flower
		Velleia trinervis	
		Verreauxia reinwardtii	Common Verreauxia
Haemodoraceae		*Anigozanthos humilis* subsp. ?Badgingarra – Priority 3	
		Conostylis androstemma	Trumpets
		Conostylis aurea	Golden Conostylis
		Conostylis juncea	
		Conostylis teretifolia subsp. *teretifolia*	
		Haemodorum venosum	
		Macropidia fuliginosa	Black Kangaroo Paw
		Phlebocarya ciliata	
Haloragaceae		*Glischrocaryon aureum*	Common Popflower
Hemerocallidaceae		*Arnocrinum gracillimum* – Priority 2	
		Johnsonia pubescens	Pipe Lily
		Johnsonia pubescens subsp. *pubescens*	
		Tricoryne elatior	Yellow Autumn Lily
Iridaceae		*Patersonia juncea*	Rush Leaved Patersonia
		Patersonia occidentalis	Purple Flag
Lamiaceae		*Hemiandra linearis*	Speckled Snakebush
		Hemigenia barbata	
		Hemiphora bartlingii	Woolly Dragon
Loganiaceae		*Logania campanulata*	Bell Flowered Logania
Loranthaceae		*Nuytsia floribunda*	Christmas Tree
Malvaceae		*Lasiopetalum lineare*	

Family	I	Name	Common Name
Myrtaceae		*Baeckea grandiflora*	Large-flowered Baeckea
		Beaufortia aestiva	
		Beaufortia bracteosa	
		Calothamnus hirsutus	
		Calothamnus quadrifidus subsp. *quadrifidus*	One-sided Bottlebrush
		Calytrix angulata	Yellow Starflower
		Calytrix depressa	
		Calytrix leschenaultii	
		Conothamnus trinervis	
		Corymbia calophylla	Marri
		Darwinia neildiana	Fringed Bell
		Darwinia sanguinea	
		Eremaea asterocarpa subsp. *asterocarpa*	
		Eremaea pauciflora var. *lonchophylla*	
		Eremaea pauciflora var. *pauciflora*	
		Eucalyptus rudis	Flooded Gum
		Eucalyptus todtiana	Coastal Blackbutt
		Hypocalymma angustifolium	White Myrtle
		Hypocalymma sp.	
		Kunzea glabrescens	Spearwood
		Leptospermum erubescens	Roadside Teatree
		Leptospermum spinescens	
		Melaleuca ?amydra	
		Melaleuca ciliosa	
		Melaleuca clavifolia	
		Melaleuca pauciflora	
		Melaleuca preissiana	Moonah
		Melaleuca psammophila	
		Melaleuca rhaphiophylla	Swamp Paperbark
		Melaleuca trichophylla	
		Thryptomene mucronulata	
		Verticordia densiflora var. *densiflora*	Compacted Featherflower
		Verticordia grandiflora	Claw Featherflower
		Verticordia ovalifolia	
		Verticordia pennigera	
Poaceae		*Austrostipa compressa*	
		Austrostipa elegantissima	
		Austrostipa hemipogon	
		Austrostipa variabilis	
	*	*Briza maxima*	Blowfly Grass
	*	*Ehrharta calycina*	Perennial Veldt Grass
	*	*Lolium* sp.	
		Neurachne alopecuroidea	Foxtail Mulga Grass

Family	I	Name	Common Name
Poaceae	*	*Polypogon monspeliensis*	Annual Beardgrass
Polygalaceae		*Comesperma acerosum*	
		Comesperma calymega	Blue-spike Milkwort
Proteaceae		*Adenanthos cygnorum*	Common Woollybush
		Adenanthos cygnorum subsp. *cygnorum*	Common Woollybush
		Banksia attenuata	Slender Banksia
		Banksia bipinnatifida subsp. *bipinnatifida*	
		Banksia candolleana	Propeller Banksia
		Banksia carlinoides	Pink Dryandra
		Banksia dallanneyi var. dallanneyi	Couch Honeypot
		Banksia glaucifolia	
		Banksia ilicifolia	Holly-leaved Banksia
		Banksia menziesii	Firewood Banksia
		Banksia prionotes	Acorn Banksia
		Banksia shuttleworthiana	Bearded Dryandra
		Banksia sphaerocarpa var. sphaerocarpa	Fox Banksia
		Banksia tortifolia	
		Conospermum acerosum subsp. acerosum	Needle-leaved Smokebush
		Conospermum crassinervium	Summer Smokebush
		Conospermum nervosum	
		Conospermum stoechadis subsp. sclerophyllum	Common Smokebush
		Hakea auriculata var. spathulata	
		Hakea conchifolia	Shell-leaved Hakea
		Hakea costata	Ribbed Hakea
		Hakea flabellifolia	Fan-leaved Hakea
		Hakea incrassata	Marble Hakea
		Hakea obliqua subsp. parviflora	Needles and Corks
		Hakea ruscifolia	Candle Hakea
		Hakea spathulata	
		Hakea stenocarpa	Narrow-fruited Hakea
		Hakea trifurcata	Two-leaf Hakea
		Isopogon sp.	
		Lambertia multiflora var. multiflora	Many-flowered Honeysuckle
		Petrophile brevifolia	
		Petrophile linearis	Pixie Mops
		Petrophile macrostachya	
		Petrophile ?shuttleworthiana	
		Petrophile striata	
		Stirlingia latifolia	Blueboy
		Synaphea spinulosa	
		Synaphea spinulosa subsp. spinulosa	
Restionaceae		*Chordifex sinuosus*	
		Desmocladus castaneus	

Family	I	Name	Common Name
Restionaceae		*Lepidobolus preissianus*	
		Lepidobolus quadratus – Priority 3	
Rhamnaceae		*Stenanthemum notiale subsp. chamelum*	
Rubiaceae		*Opercularia vaginata*	Dog Weed
Rutaceae		*Philotheca spicata*	Pepper and Salt
Stylidiaceae		*Stylidium aeonioides – Priority 4*	
		Stylidium crossocephalum	Posy Triggerplant
		Stylidium cygnorum	
		Stylidium eriopodum	
		Stylidium maitlandianum	Fountain Triggerplant
		Stylidium piliferum	Common Butterfly Triggerplant
		Stylidium purpureum	
		Stylidium rigidulum	
Thymelaeaceae		*Pimelea gilgiana*	
		Pimelea imbricata var. piligera	
		Pimelea sp.	
Xanthorrhoeaceae		*Xanthorrhoea ?drummondii*	
		Xanthorrhoea preissii	Grass Tree
Zamiaceae		*Macrozamia fraseri*	

APPENDIX E

Flora species list by Vegetation Unit

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Acacia pulchella				+			+	
Acacia pulchella var. *glaberrima*		+						
Acacia scirpifolia								+
Acacia sphacelata subsp. *sphacelata*						+		
Actinotus leucocephalus							+	
Adenanthos cygnorum							+	
Adenanthos cygnorum subsp. *cygnorum*	+			+				+
Allocasuarina humilis	+	+			+		+	
Anarthria laevis						+		
Andersonia heterophylla	+			+				
Anigozanthos humilis subsp. *humilis*	+						+	
Arnocrinum gracillimum					+			
Astroloma xerophyllum				+			+	
Austrostipa compressa	+					+		
Austrostipa elegantissima	+							
Austrostipa hemipogon	+	+					+	
Austrostipa variabilis			+					
Baeckea grandiflora	+	+			+		+	
Banksia attenuata		+		+			+	+
Banksia bipinnatifida subsp. *bipinnatifida*	+							
Banksia candolleana					+		+	
Banksia carlinoides	+				+		+	
Banksia dallanneyi var. *dallanneyi*	+							
Banksia glaucifolia	+							
Banksia ilicifolia							+	+
Banksia menziesii				+			+	+

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Banksia prionotes			+	+			+	
Banksia shuttleworthiana	+							
Banksia sphaerocarpa var. *sphaerocarpa*	+				+			
Banksia tortifolia							+	
Beaufortia aestiva	+			+				
Beaufortia bracteosa	+							
Bossiaea eriocarpa	+			+			+	
Briza maxima						+		
Burchardia congesta				+			+	
Calothamnus hirsutus	+	+			+		+	
Calothamnus quadrifidus subsp. *quadrifidus*		+				+	+	
Calytrix angulata				+			+	
Calytrix depressa								+
Calytrix leschenaultii							+	
Caustis dioica	+				+			
Chordifex sinuosus	+							
Comesperma acerosum	+	+		+			+	
Comesperma calymega	+						+	
Conospermum acerosum subsp. *acerosum*							+	
Conospermum crassinervium				+			+	+
Conospermum nervosum	+							
Conospermum stoechadis subsp. *sclerophyllum*	+	+		+			+	
Conostephium magnum	+			+	+		+	
Conostylis androstemma	+							

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Conostylis aurea		+		+			+	
Conostylis juncea				+			+	
Conostylis teretifolia subsp. *teretifolia*	+						+	
Conothamnus trinervis	+							
Corymbia calophylla			+				+	
Dampiera linearis							+	
Dampiera spicigera	+							
Darwinia neildiana	+							
Darwinia sanguinea	+							
Dasypogon obliquifolius				+			+	
Daviesia epiphyllum	+							
Daviesia incrassata subsp. i*ncrassata*	+						+	
Daviesia nudiflora	+						+	
Daviesia podophylla							+	
Daviesia polyphylla				+				
Desmocladus castaneus						+		
Drosera gigantea subsp. *gigantea*						+		
Drosera parvula								+
Drosera sp.				+				
Ecdeiocolea monostachya		+						
Ehrharta calycina			+					
Eremaea asterocarpa subsp. *asterocarpa*	+	+		+			+	
Eremaea pauciflora var. *lonchophylla*	+	+		+		+	+	
Eremaea pauciflora var. *pauciflora*				+			+	
Eucalyptus rudis			+					
Eucalyptus todtiana		+		+		+	+	+

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Gastrolobium oxylobioides	+	+			+		+	
Gastrolobium polystachyum						+		
Gastrolobium spinosum	+							
Glischrocaryon aureum	+				+		+	
Gompholobium knightianum							+	
Gompholobium polymorphum	+							
Gompholobium tomentosum				+			+	+
Goodenia coerulea	+							
Haemodorum venosum	+							
Hakea auriculata var. *spathulata*	+				+			
Hakea conchifolia	+	+			+		+	
Hakea costata				+			+	
Hakea flabellifolia							+	
Hakea incrassata	+	+			+		+	
Hakea obliqua subsp. *parviflora*							+	
Hakea ruscifolia	+				+			
Hakea spathulata	+							
Hakea stenocarpa	+							
Hakea trifurcata		+					+	
Hemiandra linearis	+							
Hemigenia barbata	+							
Hemiphora bartlingii	+			+			+	
Hibbertia huegelii	+						+	
Hibbertia hypericoides	+	+		+			+	
Hibbertia sericosepala								+
Hibbertia sp.	+	+						

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Hibbertia subvaginata				+		+	+	+
Hyalosperma cotula						+		
Hypocalymma angustifolium				+				+
Hypocalymma sp.	+							
Isopogon sp.							+	
Jacksonia floribunda	+			+			+	
Jacksonia furcellata		+		+		+	+	
Johnsonia pubescens	+							
Johnsonia pubescens subsp. *pubescens*	+			+				
Kunzea glabrescens		+						+
Lambertia multiflora var. *multiflora*	+				+		+	
Lasiopetalum lineare					+		+	
Laxmannia sessiliflora							+	
Lechenaultia floribunda	+							
Lepidobolus preissianus							+	
Leptospermum erubescens	+	+		+			+	+
Leptospermum spinescens	+	+					+	
Leucopogon sp. Cataby (F. Hort 1638)	+							
Logania campanulata	+	+					+	
Lolium sp.			+					
Lotus subbiflorus			+					
Lysinema pentapetalum							+	
Macropidia fuliginosa					+			
Macrozamia riedlei							+	
Melaleuca ?amydra							+	
Melaleuca ciliosa	+						+	

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Melaleuca clavifolia	+					+	+	+
Melaleuca pauciflora					+			
Melaleuca preissiana						+		
Melaleuca psammophila				+			+	+
Melaleuca rhaphiophylla			+					
Melaleuca trichophylla	+			+				
Mesomelaena preissii		+						
Mesomelaena pseudostygia	+	+		+			+	
Neurachne alopecuroidea	+	+		+		+	+	
Nuytsia floribunda	+	+					+	+
Opercularia vaginata	+						+	
Ornithopus compressus			+					
Patersonia juncea	+							
Patersonia occidentalis	+			+		+	+	+
Petrophile brevifolia	+				+		+	
Petrophile linearis	+			+			+	+
Petrophile macrostachya	+			+		+		
Petrophile ?shuttleworthiana	+							
Petrophile striata	+							
Philotheca spicata							+	
Phlebocarya ciliata								+
Pimelea gilgiana	+							
Pimelea imbricata var. *piligera*							+	
Pimelea sp.	+							
Polypogon monspeliensis			+					
Ptilotus polystachyus			+					

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Scaevola glandulifera	+							
Schoenus brevisetis		+						
Schoenus clandestinus	+	+			+		+	
Schoenus sp. A3 Ciliate Sheaths (K.R. Newbey 9402)							+	
Siloxerus humifusus						+		
Sonchus oleraceus		+						
Stenanthemum notiale subsp. *chamelum*	+							
Stirlingia latifolia	+	+		+			+	+
Stylidium aeonioides	+							
Stylidium crossocephalum					+			
Stylidium cygnorum	+						+	
Stylidium eriopodum	+							
Stylidium maitlandianum					+			
Stylidium piliferum		+						
Stylidium purpureum							+	
Stylidium rigidulum						+		
Synaphea spinulosa					+		+	
Synaphea spinulosa subsp. *spinulosa*						+		
Tetraria octandra	+						+	
Tetratheca angulata								
Tetratheca confertifolia	+							
Thryptomene mucronulata						+		
Thysanotus arenarius							+	
Thysanotus patersonii						+		
Trachymene pilosa	+	+					+	

NAME	Proteaceous Heath (1)	Myrtaceous Scrub in Swales and Drainage Depressions	Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos*	Proteaceous Heath (2)	Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub	Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* over mixed Myrtaceous/ Proteaceous Heathland	Open Woodland of *Banksia ilicifolia*
Tricoryne elatior	+							
Tripterococcus brunonis							+	
Ursinia anthemoides	+		+			+	+	
Velleia trinervis	+							
Verreauxia reinwardtii	+							
Verticordia densiflora var. *densiflora*	+					+	+	+
Verticordia grandiflora	+			+			+	
Verticordia ovalifolia					+		+	
Verticordia pennigera	+				+			
Waitzia acuminata var. *albicans*							+	
Xanthorrhoea ?drummondii	+				+			
Xanthorrhoea preissii	+			+		+	+	+

APPENDIX F
Relevé Data

WADDI Wind Farm Level 1 **Site** C-01

Described by AS **Date** 30/10/2013 **Type** Relevé

Season Good

Location Grid Connection Easement

MGA Zone 50 359260 **mE** 6610205 **mN** 115.531440 **E** -30.632403 **S**

Habitat Midslope

Soil Pale brown sand with lateritic gravel

Unit **Proteaceous Heath (1)**

Vegetation Open Heath of *Petrophile shuttleworthiana* and *Xanthorrhoea ?drummondii* with *Lambertia multiflora* var. *multiflora* over a very diverse Closed Heath dominated by *Hibbertia hypericoides*, *Daviesia epiphyllum, Hakea conchifolia* and *Adenanthos cygnorum* subsp. *cygnorum* on midslopes of pale brown gravelly sand.

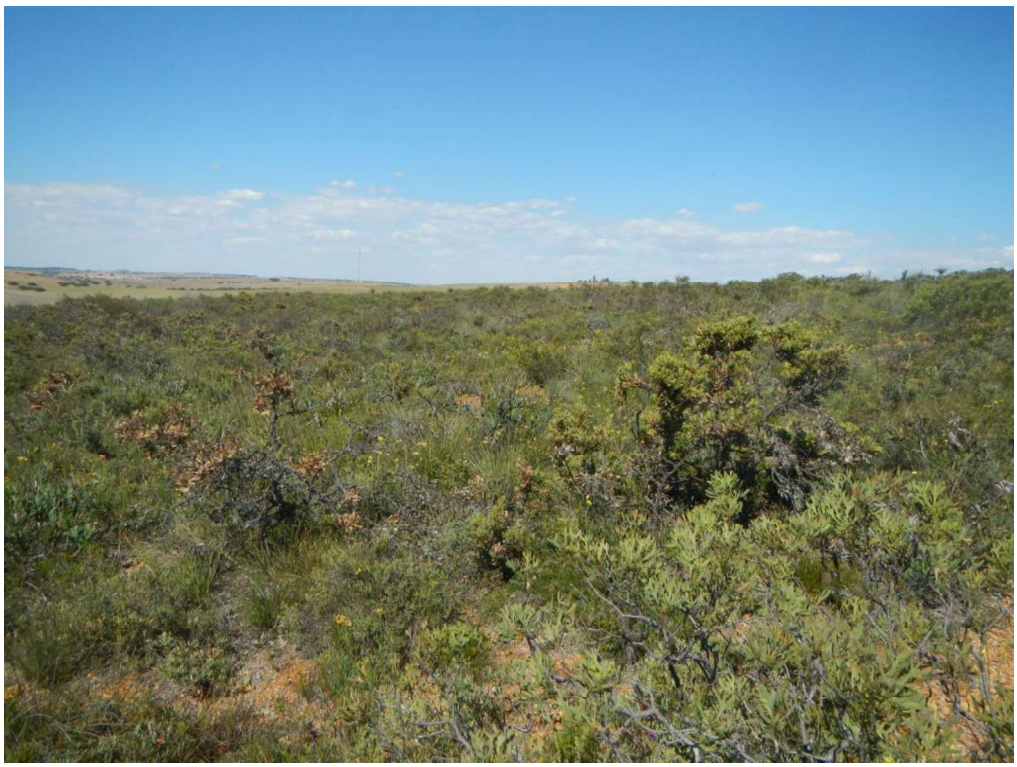
Veg Condition Excellent

SPECIES LIST:

Adenanthos cygnorum subsp. cygnorum	*Hakea conchifolia*	*Tetraria octandra*
Banksia bipinnatifida subsp. bipinnatifida	*Hakea stenocarpa*	*Trachymene pilosa*
Banksia carlinoides	*Hibbertia hypericoides*	*Velleia trinervis*
Banksia shuttleworthiana	*Hypocalymma sp.*	*Verticordia densiflora var. densiflora*
Beaufortia bracteosa	*Lambertia multiflora var. multiflora*	*Verticordia pennigera*
Calothamnus hirsutus	*Leucopogon sp. Cataby (F. Hort 1638)*	*Xanthorrhoea ?drummondii*
Caustis dioica	*Melaleuca trichophylla*	
Comesperma calymega	*Mesomelaena pseudostygia*	
Conostylis androstemma	*Neurachne alopecuroidea*	
Conothamnus trinervis	*Petrophile shuttleworthiana*	
Daviesia epiphyllum	*Pimelea gilgiana*	
Gastrolobium oxylobioides	*Scaevola glandulifera*	
Gastrolobium spinosum	*Schoenus clandestinus*	
Glischrocaryon aureum	*Stylidium eriopodum*	
Gompholobium polymorphum	*Tetraria octandra*	

WADDI Wind Farm Level 1 **Site** C-02
Described by VY **Date** 30/10/2013 **Type** Relevé
Location Windfarm Substation Option 1
MGA Zone 359775 **mE** 6609876 **mN** 115.536 **E** -30.6355 **S**

Habitat Undulating Hills
Soil Pale Brown Sand
Rock Type Laterite Outcroppping
Unit **Proteaceous Heath (1)**
Vegetation Scattered *Allocasuarina humilis* with closed Shrubland of *Petrophile shuttleworthiana, Banksia sphaerocarpa* var. *sphaerocarpa, Calothamnus hirsutus*, *Eremaea pauciflora* var. l*onchophylla, Banksia glaucifolia, Beaufortia bracteosa, Banksia shuttleworthiana* and *Lambertia multiflora* var. *multiflora* over Open Low Heath of *Hibbertia hypericoides, Gastrolobium oxylobioides*, *Daviesia nudiflora* over *Tetraria octandra, Conostylis teretifolia* subsp. *teretifolia* and *Chordifex sinuosus.*
Veg Condition Excellent



SPECIES LIST:

Allocasuarina humilis	*Calothamnus hirsutus*	*Glischrocaryon aureum*
Austrostipa compressa	*Caustis dioica*	*Goodenia coerulea*
Austrostipa elegantissima	*Chordifex sinuosus*	*Haemodorum venosum*
Banksia bipinnatifida subsp. *bipinnatifida*	*Conospermum nervosum*	*Hakea auriculata* var. *spathulata*
Banksia carlinoides	*Conospermum stoechadis* subsp. *sclerophyllum*	*Hakea conchifolia*
Banksia dallanneyi var. *dallanneyi*	*Conostylis teretifolia* subsp. *teretifolia*	*Hakea incrassata*
Banksia glaucifolia	*Darwinia neildiana*	*Hakea stenocarpa*
Banksia shuttleworthiana	*Daviesia epiphyllum*	*Hemiandra linearis*
Banksia sphaerocarpa var. *sphaerocarpa*	*Daviesia nudiflora*	*Hemigenia barbata*
Beaufortia bracteosa	*Eremaea pauciflora* var. *lonchophylla*	*Hibbertia hypericoides*
Bossiaea eriocarpa	*Gastrolobium oxylobioides*	*Johnsonia pubescens*

Lambertia multiflora var. *multiflora*
Lechenaultia floribunda
Leucopogon sp. Cataby (F. Hort 1638)
Logania campanulata
Melaleuca ciliosa
Mesomelaena pseudostygia
Neurachne alopecuroidea
Patersonia juncea
Patersonia occidentalis
Petrophile linearis
Petrophile shuttleworthiana
Pimelea sp.
Schoenus clandestinus
Stenanthemum notiale subsp. *chamelum*
Stirlingia latifolia
Stylidium cygnorum
Tetraria octandra
Tetratheca confertifolia
Verreauxia reinwardtii
Verticordia pennigera
Xanthorrhoea drummondii

WADDI Wind Farm Level 1 **Site** C-03

Described by AS **Date** 30/10/2013 **Type** Relevé

Season Good

Location Grid Connection Easement

MGA Zone 50 359312 **mE** 6610240 **mN** 115.531987 **E** -30.632093 **S**

Habitat Drainage Depression

Soil Pale Brown Sand

Unit **Myrtaceous Scrub in Swales and Drainage Depressions**

Vegetation Open Heath of *Calothamnus quadrifidus* subsp. *quadrifidus* (with occasional Tall Shrubs of *Banksia attenuata* and *Leptospermum erubescens*) with scattered *Hakea incrassata* over a Closed Sedgeland of *Ecdeiocolea monostachya* and *Mesomelaena pseudostygia* in pale brown sand in swale between low sand hills.

Veg Condition Excellent

SPECIES LIST:

Allocasuarina humilis
Banksia attenuata
Calothamnus quadrifidus subsp. *quadrifidus*
Conospermum stoechadis subsp. *sclerophyllum*
Ecdeiocolea monostachya
Gastrolobium oxylobioides
Hakea incrassata
Leptospermum erubescens
Logania campanulata
Mesomelaena preissii
Mesomelaena pseudostygia
Neurachne alopecuroidea
Schoenus clandestinus
Stylidium piliferum

WADDI Wind Farm Level 1 **Site** C-04

Described by VY **Date** 30/10/2013 **Type** Relevé

Season **Uniformity**

Location Wind Farm Substation Option 1

MGA Zone 359634.5 **mE** 6609719 **mN** 115.535279 **E** -30.6369**S**

Habitat A small swale/ drainage depression in amongst sloping laterite hills

Soil White Sand

Rock Type Laterite

Unit **Myrtaceous Scrub in Swales and Drainage Depressions**

Vegetation Scattered *Nuytsia floribunda*, *Eucalyptus todtiana* and *Kunzea glabrescens* with Low Open Woodland of *Banksia attenuata* with Tall Open Scrub of *Pericalymma erubescens* over Shrubland of *Hakea trifurcata, Conospermum stoechadis* subsp. *sclerophyllum*, Calothamnus quadrifidus subsp. *quadrifidus* over Low Open Shrubland of *Hibbertia hypericoides* with Open Sedgeland of *Mesomelaena pseudostygia, Ecdeiocolea monostachya* and *Schoenus brevisetis*

Veg Condition Excellent

SPECIES LIST:

Acacia pulchella var. *glaberrima*	*Eremaea pauciflora* var. *lonchophylla*	*Mesomelaena pseudostygia*
Allocasuarina humilis	*Eucalyptus todtiana*	*Nuytsia floribunda*
Austrostipa hemipogon	*Hakea conchifolia*	*Schoenus brevisetis*
Baeckea grandiflora	*Hakea conchifolia*	*Sonchus oleraceus*
Banksia attenuata	*Hakea trifurcata*	*Stirlingia latifolia*
Calothamnus hirsutus	*Hibbertia hypericoides*	*Trachymene pilosa*
Calothamnus quadrifidus subsp. *quadrifidus*	*Hibbertia* sp.	
Comesperma acerosum	*Jacksonia furcellata*	
Conostylis aurea	*Kunzea glabrescens*	
Ecdeiocolea monostachya	*Leptospermum erubescens*	
Eremaea asterocarpa subsp. *asterocarpa*	*Leptospermum spinescens*	

WADDI Wind Farm Level 1 **Site** D-01

Described by AS **Date** 30/10/2013 **Type** Relevé

Season **Uniformity**

Location Mullering Brook - Disturbed drainage line and associated trees in Grid connection easement

MGA Zone 50 356467 **mE** 6610348 **mN** 115.502325 **E** -30.630781 **S**

Habitat There are a number of Large *Corymbia calophylla* in this area (some would be >40cm dbh) also noted Corellas in the vicinity.

Soil Light Brown Sandy Loam

Unit **Creekline of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* with *Corymbia calophylla* over pasture**

Vegetation Open Woodland of *Corymbia calophylla* with *Eucalyptus rudis* (in creekline) over tall shrubs of *Melaleuca rhaphiophylla* (in creek line) over a disturbed understorey.

Veg Condition Degraded

Fire Age ?

Notes Disturbance - scattered overstorey species present only.

SPECIES LIST:

Austrostipa variabilis
Banksia prionotes
Corymbia calophylla
Ehrharta calycina
Eucalyptus rudis
Lolium sp.
Lotus subbiflorus
Melaleuca rhaphiophylla
Ornithopus compressus
Polypogon monspeliensis
Ptilotus polystachyus
Ursinia anthemoides

WADDI Wind Farm Level 1 Site NR-01

Described by AS **Date** 1/11/2013 **Type** Relevé

Location Nature Reserve

MGA Zone 50 352545 **mE** 6608308 **mN** 115.461122 **E** -30.648705 **S**

Habitat Gentle slope

Soil Pale Grey Sand

Unit **Low Open Woodland of *Eucalyptus todtiana* with Mixed Banksia Woodland over Tall Shrubland of *Adenanthos***

Vegetation Low Woodland of Banksia attenuata and *Banksia menziesii* with occasional *Eucalyptus todtiana* over a Tall Open Shrubland of *Adenanthos cygnorum* var. *cygnorum* over an Open Heath of *Calytrix angulata, Hibbertia hypericoides*, *Andersonia heterophylla* and *Eremaea asterocarpa* subsp. asterocarpa with scattered *Conospermum crassinervium* on gentle slope of pale grey sand.

Veg Condition Very Good to Excellent

Notes Disturbance – possible dieback present (unconfirmed), lower diversity than some sites, fire <5 yrs

SPECIES LIST:

Acacia pulchella	*Conospermum stoechadis* subsp. *sclerophyllum*	*Hibbertia subvaginata*
Adenanthos cygnorum subsp. *cygnorum*	*Conostephium magnum*	*Jacksonia floribunda*
Andersonia heterophylla	*Conostylis juncea*	*Melaleuca psammophila*
Astroloma xerophyllum	*Dasypogon obliquifolius*	*Melaleuca trichophylla*
Banksia attenuata	*Drosera* sp.	*Mesomelaena pseudostygia*
Banksia menziesii	*Eremaea asterocarpa* subsp. *asterocarpa*	*Patersonia occidentalis*
Beaufortia aestiva	*Eremaea pauciflora* var. *lonchophylla*	*Petrophile linearis*
Bossiaea eriocarpa	*Eucalyptus todtiana*	*Stirlingia latifolia*
Burchardia umbellata	*Gompholobium tomentosum*	*Verticordia grandiflora*
Calytrix angulata	*Hemiphora bartlingii*	*Xanthorrhoea preissii*
Conospermum crassinervium	*Hibbertia hypericoides*	

WADDI Wind Farm Level 1 **Site** NR-02
Described by VY **Date** 1/11/2013 **Type** Relevé
Season Good
Location Nature Reserve West of Brand Highway - Powerline Easement
MGA Zone VY1035 352576.3 **mE** 6608522 **mN** 115.461477 **E** -30.6469 **S**

Habitat Undulating sandy rises
Soil Grey Sand
Unit **Low Open Woodland of *Eucalyptus todtiana* with Mixed *Banksia* woodland over Tall Shrubland of *Adenanthos***
Vegetation Low Open Woodland of *Eucalyptus todtiana* with Low Open Forest of *Banksia attenuata, Banksia prionotes*, and/or *Banksia attenuata*, over Tall Open Shrubland of *Adenanthos cygnorum* over Open Heath of *Eremaea pauciflora* var. *pauciflora, Conospermum stoechadis* subsp. *sclerophyllum* or *Conospermum crassinervium,* over Low Open Shrubland of *Hibbertia hypericoides, Calytrix angulata, Dasypogon obliquifolius*, *Patersonia occidentalis* and *Mesomelaena pseudostygia*
Veg Condition Excellent

SPECIES LIST:

Adenanthos cygnorum subsp. *cygnorum*	*Hypocalymma angustifolium*
Banksia attenuata	*Jacksonia floribunda*
Banksia prionotes	*Jacksonia furcellata*
Comesperma acerosum	*Johnsonia pubescens* subsp. *pubescens*
Conostylis aurea	*Leptospermum erubescens*
Dasypogon obliquifolius	*Neurachne alopecuroidea*
Daviesia polyphylla	*Patersonia occidentalis*
Eremaea pauciflora var. *pauciflora*	*Petrophile macrostachya*
Eucalyptus todtiana	*Stirlingia latifolia*
Hakea costata	
Hibbertia hypericoides	
Hibbertia subvaginata	

WADDI Wind Farm Level 1 **Site** NR-04
Described by VY **Date** 1/11/2013 **Type** Relevé
Season **Uniformity**
Location Nature Reserve West of Brand Highway
MGA Zone VY 1036 352576.3 **mE** 6608522 **mN** 115.461477 **E** -30.6469 **S**

Habitat Laterite rise
Soil Grey sand
Rock Type Laterite
Unit **Proteaceous Heath (2)**
Vegetation Open Heath of *Banksia candolleana* and *Allocasuarina humilis* over Closed Heathland of *Lambertia multiflora* var. *multiflora, Petrophila macrostachya, Hakea spathulata, Hakea incrassata, Xanthorrhoea drummondii, Calothamnus hirsutus* over Open Low Heath of *Gastrolobium oxylobioides, Patersonia occidentalis* over Open Sedgeland of *Mesomelaena pseudostygia* and *Schoenus clandestinus.*
Veg Condition Excellent

SPECIES LIST:

Allocasuarina humilis	*Hakea auriculata* var. *spathulata*	*Stylidium maitlandianum*
Arnocrinum gracillimum	*Hakea conchifolia*	*Synaphea spinulosa*
Baeckea grandiflora	*Hakea incrassata*	*Verticordia ovalifolia*
Banksia candolleana	*Hakea ruscifolia*	*Verticordia pennigera*
Banksia carlinoides	*Lambertia multiflora* var. *multiflora*	*Xanthorrhoea drummondii*
Banksia sphaerocarpa var. *sphaerocarpa*	*Lasiopetalum lineare*	
Calothamnus hirsutus	*Macropidia fuliginosa*	
Caustis dioica	*Melaleuca leptoclada*	
Conostephium magnum	*Petrophile brevifolia*	
Daviesia polyphylla	*Petrophile macrostachya*	
Gastrolobium oxylobioides	*Schoenus clandestinus*	
Glischrocaryon aureum	*Stylidium crossocephalum*	

WADDI Wind Farm Level 1 **Site** S-01

Described by AS **Date** 31/10/2013 **Type** Relevé

Season Good

Location Shire Reserve

MGA Zone 50 355868 **mE** 6610309 **mN** 115.496071 **E** -30.631060 **S**

Habitat Low point in landscape - near drainage

Soil Grey Sandy Loam

Unit **Low Open Woodland of *Melaleuca* with *Thryptomene* Scrub**

Vegetation Low Open Woodland of *Melaleuca preissiana* and *Eucalyptus todtiana* over Tall Shrubs to Tall Open Scrub of *Thryptomene mucronulata* over an Open heath to Shrubland of *Calothamnus quadrifidus* and *Xanthorrhoea preissii* over *Jacksonia furcellata* and *Verticordia densiflora* var. *densiflora* over a herbland of *Drosera gigantea, Hyalosperma cotula* and *Ursinia anthemoides* on grey sandy loam.

Veg Condition Very Good

Notes Disturbance - tracks, near cleared paddock, kangaroos

SPECIES LIST:

Acacia sphacelata subsp. *sphacelata*	*Melaleuca clavifolia*
Anarthria laevis	*Melaleuca preissiana*
Austrostipa compressa	*Neurachne alopecuroidea*
Briza maxima	*Patersonia occidentalis*
Calothamnus quadrifidus subsp. *quadrifidus*	*Petrophile macrostachya*
Desmocladus castaneus	*Siloxerus humifusus*
Drosera gigantea subsp. *gigantea*	*Stylidium rigidulum*
Eremaea pauciflora var. *lonchophylla*	*Synaphea spinulosa* subsp. *spinulosa*
Eucalyptus todtiana	*Thryptomene mucronulata*
Gastrolobium polystachyum	*Thysanotus patersonii*
Hibbertia subvaginata	*Ursinia anthemoides*
Hyalosperma cotula	*Verticordia densiflora* var. *densiflora*
Jacksonia furcellata	*Xanthorrhoea preissii*

WADDI Wind Farm Level 1 **Site** S-02
Described by VY **Date** 31/10/2013 **Type** Relevé
Season Good
Location Shire Reserve Powerline Easement
MGA Zone 354353.3 **mE** 6609883 **mN** 115.480209 **E** -30.6348 **S**

Habitat Hill Slopes
Soil Grey Sand with lateritic gravel on undulating slopes.
Unit **Proteaceous Heath (1)**
Vegetation Scattered *Nuytsia floribunda* with Open shrubland of *Xanthorrhoea drummondii* over mixed Proteaceous Heath of *Lambertia multiflora* subsp. *multiflora, Petrophile shuttleworthiana, Allocasuarina humilis* and *Calothamnus hirsutus* with *Melaleuca trichophylla* over Low Shrubland of *Hibbertia hypericoides, Gastrolobium oxylobioides*, *Glischrocaryon aureum* over Open Sedgeland of *Mesomelaena pseudostygia* and *Schoenus clandestinus.*
Veg Condition Excellent

SPECIES LIST:

Allocasuarina humilis	*Glischrocaryon aureum*	*Melaleuca ciliosa*
Andersonia heterophylla	*Haemodorum venosum*	*Melaleuca clavifolia*
Anigozanthos humilis subsp. *humilis*	*Hakea conchifolia*	*Melaleuca trichophylla*
Baeckea grandiflora	*Hakea incrassata*	*Mesomelaena pseudostygia*
Banksia bipinnatifida subsp. *bipinnatifida*	*Hakea spathulata*	*Neurachne alopecuroidea*
Banksia shuttleworthiana	*Hibbertia hypericoides*	*Nuytsia floribunda*
Calothamnus hirsutus	*Hibbertia sp.*	*Petrophile brevifolia*
Comesperma acerosum	*Jacksonia floribunda*	*Petrophile linearis*
Conostephium magnum	*Johnsonia pubescens* subsp. *pubescens*	*Petrophile linearis*
Conostylis teretifolia subsp. *teretifolia*	*Lambertia multiflora* var. *multiflora*	*Petrophile macrostachya*
Darwinia sanguinea	*Leptospermum erubescens*	*Petrophile shuttleworthiana*
Daviesia epiphyllum	*Leptospermum spinescens*	*Schoenus clandestinus*
Gastrolobium oxylobioides	*Leucopogon* sp. Cataby (F. Hort 1638)	*Stylidium aeonioides*

Verreauxia reinwardtii
Verticordia grandiflora
Xanthorrhoea drummondii

WADDI Wind Farm Level 1 Site S-03

Described by AS **Date** 31/10/2013 **Type** Relevé

Location Shire Reserve

MGA Zone 50 355700 **mE** 6610332 **mN** 115.494321 **E** -30.630833 **S**

Habitat Sand Flats

Soil Light Grey Sand

Unit **Low Open Woodland of Eucalyptus todtiana with Mixed Banksia over mixed Myrtaceous/Proteaceous Heathland.**

Vegetation Low Woodland of *Eucalyptus todtiana* with *Banksia attenuata* and *B. menziesii* over a Closed Heath of *Eremaea pauciflora* var. *lonchifolia*, *E. asterocarpa* subsp. *asterocarpa* and *Melaleuca clavifolia* with mixed Myrtaceous and Proteaceous species as listed below, over an Open Sedgeland of *Mesomelaena pseudostygia* and *Conostylis juncea* on pale grey sand.

Veg Condition Very Good to Excellent

Notes Disturbance = tracks

SPECIES LIST:

Acacia pulchella	*Daviesia podophylla*	*Mesomelaena pseudostygia*
Adenanthos cygnorum	*Eremaea asterocarpa* subsp. *asterocarpa*	*Neurachne alopecuroidea*
Allocasuarina humilis	*Eremaea pauciflora* var. *lonchophylla*	*Opercularia vaginata*
Astroloma xerophyllum	*Eucalyptus todtiana*	*Patersonia occidentalis*
Baeckea grandiflora	*Gompholobium knightianum*	*Philotheca spicata*
Banksia attenuata	*Gompholobium tomentosum*	*Pimelea imbricata* var. *piligera*
Banksia menziesii	*Hibbertia hypericoides*	*Schoenus clandestinus*
Calytrix angulata	*Hibbertia subvaginata*	*Stirlingia latifolia*
Conospermum crassinervium	*Jacksonia furcellata*	*Stylidium cygnorum*
Conospermum stoechadis subsp. *sclerophyllum*	*Laxmannia sessiliflora*	*Stylidium purpureum*
Conostephium magnum	*Leptospermum erubescens*	*Ursinia anthemoides*
Conostylis juncea	*Macrozamia fraseri*	*Verticordia grandiflora*
Corymbia calophylla	*Melaleuca clavifolia*	*Xanthorrhoea preissii*
Dampiera linearis	*Melaleuca psammophila*	

WADDI Wind Farm Level 1 **Site** S-04

Described by VY **Date** 31/10/2013 **Type** Relevé
Location Shire Reserve Powerline Easement
MGA Zone 354173.4 **mE** 6609760 **mN** 115.478315 **E** -30.6359 **S**

Habitat Undulating Low Sandy Hills
Soil Grey Sand
Unit **Low Open Woodland of Eucalyptus todtiana with Mixed Banksia Woodland over mixed Myrtaceous/Proteaceous Heathland**
Vegetation Open Shrubland of *Banksia attenuata, Banksia menziesii* and/or *Banksia prionotes* over Shrubland of *Allocasuarina, Jacksonia furcellata, Hakea costata* and *Leptospermum erubescens* over Mixed Heath of *Melaleuca clavifolia, Melaleuca costata*, and *Eremaea pauciflora* var. *pauciflora, Conospermum stoechadis* subsp. *sclerophyllum* and *Conospermum crassinervium*, *Daviesia nudiflora,* over Open Sedgeland of *Dasypogon obliquifolius, Lepidobolus preissianus, Mesomelaena pseudostygia*
Veg Condition Excellent

SPECIES LIST:

Acacia pulchella var. glaberrima	Bossiaea eriocarpa	Conostylis teretifolia subsp. teretifolia
Allocasuarina humilis	Calothamnus quadrifidus subsp. quadrifidus	Dasypogon obliquifolius
Anigozanthos humilis subsp. humilis	Calytrix angulata	Daviesia nudiflora
Adenanthos cygnorum var. cygnorum	Calytrix leschenaultii	Daviesia podophylla
Astroloma xerophyllum	Comesperma calymega	Eremaea asterocarpa subsp. asterocarpa
Austrostipa hemipogon	Conospermum acerosum subsp. acerosum	Eremaea pauciflora var. pauciflora
Baeckea grandiflora	Conospermum crassinervium	Eucalyptus todtiana
Banksia attenuata	Conospermum stoechadis subsp. sclerophyllum	Hakea costata
Banksia candolleana	Conostephium magnum	Hakea flabellifolia
Banksia menziesii	Conostephium pendulum	Hakea incrassata
Banksia prionotes	Conostylis aurea	Hakea obliqua subsp. parviflora
Banksia tortifolia		Hakea trifurcata

Hibbertia huegelii
Hibbertia hypericoides
Hibbertia subvaginata
Jacksonia floribunda
Jacksonia furcellata
Lasiopetalum lineare
Lepidobolus preissianus
Leptospermum erubescens
Leptospermum spinescens
Logania campanulata
Lysinema pentapetalum
Melaleuca amydra
Melaleuca clavifolia
Mesomelaena pseudostygia
Nuytsia floribunda
Patersonia occidentalis
Petrophile brevifolia
Petrophile linearis
Stirlingia latifolia
Stylidium cygnorum
Synaphea spinulosa
Tetraria octandra
Verticordia densiflora var. densiflora
Verticordia ovalifolia
Waitzia acuminata var. albicans

WADDI Wind Farm Level 1 **Site** S-05

Described by AS **Date** 31/10/2013 **Type** Relevé

Season **Uniformity**

Location Shire Reserve

MGA Zone 355247.5 **mE** 6610296 **mN** 115.489595 **E** -30.6312 **S**

Habitat Hilltop - upper slope

Soil very pale brown-grey sand

Unit **Proteaceous Heath (1)**

Vegetation Tall Open Shrubland of *Xanthorrhoea drummondii* over Tall Shrubs *of Allocasuarina humilis* and *Lambertia multiflora* var. *multiflora* over an Open Heath of Myrtaceous and Proteaceous Shrubs with dominance by *Hakea conchifolia, Eremaea pauciflora* var. *lonchophylla, Melaleuca clavifolia* and *Hakea incrassata*, also *Gastrolobium oxylobioides* and *Hibbertia hypericoides* on Sandy Hilltop.

Veg Condition Excellent

Notes Disturbance = tracks/Powerline Easement, large amount of kangaroo activity

SPECIES LIST:

Allocasuarina humilis	*Gastrolobium oxylobioides*	*Mesomelaena pseudostygia*
Austrostipa hemipogon	*Glischrocaryon aureum*	*Neurachne alopecuroidea*
Baeckea grandiflora	*Hakea conchifolia*	*Nuytsia floribunda*
Banksia carlinoides	*Hakea incrassata*	*Opercularia vaginata*
Banksia shuttleworthiana	*Hakea ruscifolia*	*Petrophile shuttleworthiana*
Beaufortia aestiva	*Hakea stenocarpa*	*Petrophile striata*
Calothamnus hirsutus	*Hemiphora bartlingii*	*Stirlingia latifolia*
Conospermum stoechadis subsp. *sclerophyllum*	*Hibbertia huegelii*	*Stylidium aeonioides*
Dampiera spicigera	*Hibbertia hypericoides*	*Tetratheca confertifolia*
Daviesia incrassata subsp. *incrassata*	*Lambertia multiflora* var. *multiflora*	*Tricoryne elatior*
Eremaea asterocarpa subsp. *asterocarpa*	*Melaleuca ciliosa*	*Ursinia anthemoides*
Eremaea pauciflora var. *lonchophylla*	*Melaleuca clavifolia*	*Xanthorrhoea drummondii*

WADDI Wind Farm Level 1 Site S-07

Described by AS **Date** 31/10/2013 **Type** Relevé

Location Shire Reserve

MGA Zone 50 354877 **mE** 6610281 **mN** 115.485729 **E** -30.631193 **S**

Habitat Banksia attenuata / Eucalyptus todtiana woodland

Soil Pale Grey-Brown Sand

Unit **Low Open Woodland of *Eucalyptus todtiana* with Mixed Banksia Woodland over mixed Myrtaceous/Proteaceous Heathland**

Vegetation Low Woodland of *Banksia attenuata* and *Eucalyptus todtiana* with occasional *Banksia menziesii*, over a mixed Myrtaceous and Proteaceous heath mostly dominated by *Melaleuca clavifolia*, M. *psammophila, Banksia carlinoides*, *Isopogon* spp. with *Hibbertia hypericoides, Stirlingia latifolia* and *Dasypogon obliquifolius* with *Xanthorrhoea preissii* and *Gastrolobium oxylobioides* becoming dominant upslope on pale grey brown sand.

Veg Condition Excellent

SPECIES LIST:

Acacia pulchella	*Conostephium magnum*	*Isopogon* sp.
Actinotus leucocephalus	*Conostylis juncea*	*Jacksonia furcellata*
Allocasuarina humilis	*Conostylis teretifolia* subsp. *teretifolia*	*Lambertia multiflora* var. *multiflora*
Austrostipa hemipogon	*Dasypogon obliquifolius*	*Leptospermum spinescens*
Banksia carlinoides	*Daviesia incrassata* subsp. *incrassata*	*Melaleuca ciliosa*
Banksia ilicifolia	*Eremaea pauciflora* var. *lonchophylla*	*Melaleuca clavifolia*
Banksia menziesii	*Eucalyptus todtiana*	*Melaleuca psammophila*
Burchardia umbellata	*Gastrolobium oxylobioides*	*Mesomelaena pseudostygia*
Calothamnus hirsutus	*Glischrocaryon aureum*	*Neurachne alopecuroidea*
Calothamnus quadrifidus subsp. *quadrifidus*	*Hakea conchifolia*	*Patersonia occidentalis*
Calytrix leschenaultii	*Hakea incrassata*	*Petrophile linearis*
Comesperma acerosum	*Hakea trifurcata*	*Schoenus* sp. A3 Ciliate Sheaths (K.R. Newbey 9402)
Comesperma calymega	*Hemiphora bartlingii*	*Stirlingia latifolia*
Conospermum stoechadis subsp. *sclerophyllum*	*Hibbertia hypericoides*	*Stylidium purpureum*

Thysanotus arenarius
Trachymene pilosa
Tripterococcus brunonis
Ursinia anthemoides
Verticordia densiflora var. *densiflora*
Waitzia acuminata var. *albicans*
Xanthorrhoea preissii

WADDI Wind Farm Level 1 **Site** TR-01

Described by AS **Date** 1/11/2013 **Type** Relevé

Season Good

Location Tronox Site

MGA Zone 50 352344 **mE** 6608069 **mN** 115.458991 **E** -30.650836 **S**

Habitat Lower slopes. Dampland indicator species occur with lower slopes

Soil Pale grey sand

Unit **Open Woodland of *Banksia ilicifolia***

Vegetation Low Open Woodland of *Banksia attenuata* and *B. menziesii* with occasional emergent *Banksia illicifolia* over a Tall Open Shrubland to Shrubland of *Adenanthos cygnorum* subsp. *cygnorum* over a Shrubland of *Xanthorrhoea preissii* and *Leptospermum erubescens* over a Low Open Shrubland of *Hibbertia subvaginata, Stirlingia latifolia* and *Conospermum crassinervium*, with occasional dominance by *Patersonia occidentalis* and *Phlebocarya ciliata* in small depressions on lower slopes of pale grey sand.

Veg Condition Good to Very Good

Notes Areas of localised disturbance and clearing around tracks, powerstation and transmission lines.

SPECIES LIST:

Acacia scirpifolia	*Hibbertia sericosepala*	*Phlebocarya ciliata*
Adenanthos cygnorum subsp. *cygnorum*	*Hibbertia subvaginata*	*Stirlingia latifolia*
Banksia attenuata	*Hypocalymma angustifolium*	*Verticordia densiflora* var. *densiflora*
Banksia ilicifolia	*Kunzea glabrescens*	*Xanthorrhoea preissii*
Banksia menziesii	*Leptospermum erubescens*	
Calytrix depressa	*Melaleuca clavifolia*	
Conospermum crassinervium	*Melaleuca psammophila*	
Drosera parvula	*Nuytsia floribunda*	
Eucalyptus todtiana	*Patersonia occidentalis*	
Gompholobium tomentosum	*Petrophile linearis*	