

**White Rock Wind Farm - Project Approval MP10\_160**

**Modification Application No. 4 - Alternative Grid Connection**

**Appendix 3C**

**Assessment of Offset Requirements,**

**Prepared by Eco Logical, Dec 2016**

White Rock Wind Farm Pty Ltd  
Suite 2, Level 23, 201 Elizabeth Street  
Sydney NSW 2000

ECO LOGICAL AUSTRALIA PTY LTD  
ABN 87 096 512 088  
www.ecoaus.com.au

**Attention: Jeff Bembrick**

Your Ref: MP10\_160

Our Ref: 16SUT-4935

2 December 2016

Dear Mr Bembrick,

**RE: FBA Assessment of White Rock Wind Farm Alternative Grid Connection at 330kV**

Eco Logical Australia (ELA) has been commissioned by White Rock Wind Farm Pty Ltd (WRWFPL) through Goldwind Australia to undertake an indicative Major Project Offset Policy calculations using the Framework for Biodiversity Assessment (FBA) offset credit calculator for a proposed alternative grid connection comprising approximately 13km of 132kV double circuit transmission line from the White Rock Wind Farm (WRWF) to TransGrid's existing 330kV transmission line near Swan Vale (**Figure 1**).

The White Rock Wind Farm was approved on 10 July 2012 with a grid connection at 132kV to the north of the wind farm and Stage 1 construction includes installation of some of the grid connection facilities described in the Project Application. As that connection is constrained and does not allow the full implementation of the approved WRWF project, an alternative grid connection is proposed using a new 13km section of 132kV transmission line that will connect at 330kV. This enables full development of WRWF, reduce electrical losses for the project and has an indirect benefit of facilitating further renewable energy development for the approved Glen Innes Wind Farm.

A supplementary flora and fauna assessment of the proposed alternative route was undertaken by Daniel O'Brien of Environmental Assessments Pty Limited in January 2013 and updated in 2016 (Environmental Assessments 2013; 2016). The flora and fauna assessment report has been referred to for this offset assessment and WRWFPL have advised that it will accompany the Modification Application together with this assessment.

The Environmental Assessments Pty Ltd assessment mapped the vegetation within a 100m corridor within which a 50 metre easement was finalised following recommendations to adjust the route to avoid and minimise impacts to remnant vegetation, which included endangered ecological communities and trees with hollows. The assessment included a targeted threatened flora and fauna survey and an assessment of significance of impacts to all recorded and potential threatened species. The assessment also committed to developing an appropriate offset plan consistent with the conditions of approval for the White Rock Wind Farm.

As the original project was a Major Project and the current offset policy for Major Projects requires the use of the FBA, ELA were commissioned by White Rock Wind Farm to undertake the FBA credit calculations on the final

alternative route and add these offset requirements to the approved Stage 1 Biodiversity Offset Package (BOP) (ELA 2016).

The field work for the Environmental Assessments Pty Limited study was undertaken in July-August of 2012 and 20 and 22 September 2016. These assessments recorded a number of threatened woodland birds, none of which require species credits under the FBA methodology as all are categorised as ecosystem credit species and potential habitat for a range of other threatened fauna. No threatened flora were recorded, however a threatened eucalypt, *Eucalyptus rubida* ssp. *barbigerorum* (Blackbutt Candlebark) had previously been identified in the locality of the powerline route and was provisionally identified as occurring in the study area. Specimens collected as part of this study could not be confirmed by the Royal Botanic Gardens as *Eucalyptus rubida* ssp. *barbigerorum* due to broad variation between Ribbon Gum, Mountain Gum and Blackbutt Candlebark. ELA senior field botanist, Dr Lachlan Copeland, who is familiar with the species did not record any Blackbutt Candlebark's in the study area or any Mountain Gums or Snow Gums. Ribbon Gum (*Eucalyptus viminalis*), was the only 'gum' species recorded.

The Environmental Assessments Pty Ltd vegetation mapping also followed the NSW Scientific Committee listings of the 'White Box – Yellow Box – Blakely's Red Gum grassy woodlands' (Box Gum Woodland or BGW) and the 'Ribbon Gum – Mountain Gum – Snow Gum woodland' EECs. In order to undertake the FBA assessments these vegetation types have been remapped by ELA into the 'best fit' Plant Community Types (PCTs) recognised by the FBA credit calculator tool i.e.

- BR271 Blakely's Red Gum – Yellow Box tall woodland in the Brigalow Belt South and Nandewar bioregions
- BR391 White Box grassy woodland on the Inverell basalts mainly in the Nandewar bioregion
- BR330 Ribbon Gum – Rough-barked Apple – Yellow Box grassy woodlands of the New England Tablelands bioregion

Whilst RPS (2011) and AEP (2016) mapped BR272 Blakely's Red Gum – Yellow Box grassy woodland of the New England Tablelands bioregion as part of the Stage 1 FBA impact assessment, following a floristic analysis and comparison of the plot data to the VIS database, as required by the FBA, ELA are of the opinion that BR271 'Blakely's Red Gum – Yellow Box tall woodland in the Brigalow Belt South and Nandewar bioregions' is a 'better fit' for this vegetation type. It is noted that both are representative of the listed EEC 'White Box – Yellow Box – Blakely's Red Gum grassy woodland' and both are vegetation types within the same Vegetation Formation and are thus interchangeable as offsets under the rules of the FBA. In reality the two vegetation types are the same they have just been assigned to different PCTs by different observers

Similarly, whilst RPS (2011), AEP (2016) and Environmental Assessments Pty Ltd (2013; 2106) all mapped BR329 'Ribbon Gum – Mountain Gum – Snow Gum grassy open forest' in the Wind Farm and powerline route, ELA did not record any Mountain Gum or Snow Gum along the powerline route and are of the opinion that BR330 'Ribbon Gum – Rough-barked Apple – Yellow Box grassy woodlands' is a better description of this vegetation type in the powerline easement.

ELA validated, and remapped where required, the native vegetation within the 50m easement into remnant woodland patches, individual trees and areas of derived native grassland (DNG). Seven full floristic biometric plots (BB01 to BB07 at locations shown in **Figure 2**) were collected to allow credit calculations to be undertaken in accordance with the FBA using the linear development model (**Table 1** provides Plot data). ELA has not prepared a full FBA assessment report as this is not a new project but a modification to an existing approved project. Copies of the raw plot data sheets, species lists and GIS files of plot locations, vegetation mapping and landscape assessment can be provided to DPE/OEH if/as required.

**Table 1 – ELA plot data collected from within the 50m easement along the proposed powerline route**

VegZone	Veg Type & condition	PlotName	NPS	NOS	NMS	NGCG	NGCS	NGCO	EPC	NTH	OR	FL
1	BRGYB Woodland	BB01	25	13	2	14	2	8	12.5	0	1	24
4	WB Woodland	BB02	27	13	1	12	2	8	16	0	1	22
3	Ribbon Gum Woodland	BB03	29	10	0	8	0	6	4	2	1	66
2	BRGYB DNG	BB04	20	0	0	14	0	10	18	0	0	13
2	BRGYB DNG	BB05	9	0	0	26	0	2	24	0	0	4
5	WB DNG	BB06	28	0	0	24	0	6	12	0	0	11
5	WB DNG	BB07	21	0	0	24	0	6	16	0	0	0

Environmental Assessments Pty Ltd calculated that up to 2.003 ha of 'Box Gum Woodland' and 0.127 ha of 'Ribbon Gum – Mountain Gum' EEC would be impacted within a 15m wide route corridor within the 50m easement. ELA has however, assessed a worst case scenario that assumes loss of all canopy, canopy regeneration and any hollow bearing trees and mid-story vegetation within a 45m corridor that is within the 50m easement to allow the establishment and ongoing maintenance of the easement (although individual trees will be retained within this corridor where possible (**Figure 3**)).

Based on the above, ELA have:

- Reduced the 'scores' for canopy, canopy regeneration, hollow bearing trees and mid-story vegetation to "0".
- The species richness attribute has also been reduced by one category (i.e. a score of "3" has been reduced to a score of "2") to reflect the loss of several species in the vegetation zone following removal of canopy species.
- No impact to ground cover, or fallen logs within woodland patches has been included in the assessment, as these attributes would not be impacted by the proposed method to remove trees (i.e. chain saws will be used to cut and lower trees in situ with no removal of woody material or disturbance to the soil or ground layer).
- Similarly areas of DNG have not been assessed as impacted as these areas have no tree cover to remove and will be maintained as grassland areas as part of the existing grazing management of these rural properties.

The results of the FBA credit calculations are shown in **Table 2** with a copy of the credit report and trading profile provided as **Attachment A**. The report shows that 209 ecosystem credits are required to offset the impacts to woodland areas and 42 credits for impacts to DNG areas, if these were to be impacted.

**Table 2: FBA impact and credit calculations for loss of tree and mid-story vegetation along alternate 132kv powerline route**

Veg Zone	Plant Community Type	PCT / BVT	Ancillary	Current SV	Area (ha)	Future SV	Credits	Credits/ ha
1	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion	PCT 599 / BVT 271	Woodland	63.93	1.21	22.95	42	34.65
3	Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	PCT 554 / BR330	Woodland	90.62	0.53	27.60	27	50.65
4	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	PCT 590 / BR391	Woodland	63.93	4.06	22.95	140	34.46
					5.8		209	36.03

**Derived Native Grassland Areas – not impacted**

Veg Zone	Plant Community Type	PCT / BVT	Ancillary	Current SV	Area (ha)	Future SV	Credits	Credits/ha
2	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion	PCT 599 / BVT 271	DNG***	32.79	3.72	32.79	14	3.76
5	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	PCT 590 / BR391	DNG***	40.44	7.58	40.44	28	3.69
					11.3		42	3.72

\*\*\*DNG areas will not be impacted as all poles will be positioned to avoid DNG areas.

These credits are available from Area 1 and Area 2 of the Tangari Biobank site that is currently being assessed as part of the approved BOP for the Stage 1 wind farm impacts (**Figures 4, 5 and 6**). The assessment of this biobank site has now been completed with number and types of credits generated provided in the credit report (**Attachment C**). The application for registration of this biobank site will be submitted to the Office of Environment and Heritage (OEH) by the end of December 2016. Credits will be available to retire by around mid 2017, subject to OEHs audit and registration timeframes.

**Table 3** provides a summary of the credits required for the Stage 1 impacts and proposed powerline modification together with the number and types of credits that will be generated by the Biobank site and how these meet the FBA 'credit profiles' for the modification proposal (**Attachment A**) and the Stage 1 impacts (**Attachment B**) as approved in the BOP. The proposed offset area of 183.44 ha will generate 1,816 ecosystem credits across seven PCTs (**Attachment C**), with 837 surplus credits that can be used for Stage 2 impacts. As noted in the BOP, a separate FBA impact assessment will be undertaken for the Stage 2 wind farm development (remaining 49 approved turbines) and the Biobank site will be extended, if required, to other parts of the 645 ha property to generate sufficient offset credits to meet the offset requirements for the WRWF Stage 2 impacts (**Figure 4**). As there are 838 surplus credits generated by the proposed Biobank site for potential Stage 2 impacts, the need to extend the Biobank site is considered unlikely.

**Commitments**

WRWF will:-

1. Purchase and retire the number of ecosystem credits shown in **Table 2** impacts to woodland patches from its Tangari Biobank site once credits are available, where practicable, prior to impacts occurring,
2. Avoid impacts to individual trees, especially those with hollows, within the 45m corridor where ever possible (as per Condition C3 and C5 of approval that relates to micro siting of turbines).
3. All cleared material to be left in situ to provide wildlife habitat (as per Condition C2 of approval)
4. Will ensure that all poles required for the powerline route avoid areas of mapped DNG
5. Ensure that contractors clearing trees do so in a manner that minimises impacts and follows the White Rock wind farm Construction Environment Management Plan (CEMP) in terms of 'weed free' vehicle/equipment hygiene protocols and potential spread of Chilean Needle Grass
6. An ecologist is present during the establishment/clearing phase of the powerline route, i.e. tree clearing, and follows the tree clearing protocol established for WRWF Stage 1, in regards to any displaced hollow dependant fauna.

*Robert Humphries*

Robert Humphries

**Eco Logical Australia**

**Attachments:**

Table 3: Area of each Plant Community Type (PCT) mapped in the Tangari Biobank Offset Areas 1 and 2 and the number of Credits required for impacts of WRWF Stage 1 and alternate grid connection facilities.

Figure 1 – Landscape view of approved and alternative powerline route

Figure 2 – Vegetation mapping and location of biometric plots (BB01 to BB07) along alternate powerline route

Figure 3 – Example of further refinement of alternative powerline route and avoidance of impacts to remnant woodland

Figure 4 – Plant Community Types mapped in the proposed Biobank Offset Areas 1, 2 and 3 of the Tangari property by Eco Logical, Australia, March, September and October 2016.

Figure 5 – Vegetation zones and plots in the Tangari Biobank Site (Area 1)

Figure 6 – Vegetation Zones and plots in the Tangari Biobank Site (Area 2)

Attachment A: FBA credit calculator credit report for grid connection modification

Attachment B: FBA credit calculator credit report for Stage 1 impacts (Anderson Ecology)

Attachment C: Biobanking credit report for Tangari Biobank site

**References**

AEP (2016) White Rock Wind Farm Stage 1 Draft Biodiversity Offset Package March 2016

ELA (2016) Final Offset package – White Rock Wind Farm – Letter to Department of Planning and Environment, 11 July 2016.

Environmental Assessments Pty Limited (2013) Supplementary Biodiversity (Flora and Fauna) Assessment for the alternative 132kv powerline for the White Rock Wind Farm Pty Limited. Report prepared by Daniel O'Brien for White Rock Wind Farm Pty Limited, January 2013.

Environmental Assessments Pty Limited (2016) Supplementary Biodiversity (Flora and Fauna) Assessment for the Alternative Grid Connection at 330kV for the White Rock Wind Farm Pty Limited. Report prepared by Daniel O'Brien for White Rock Wind Farm Pty Limited, November 2016

Epuron (2012) White Rock Wind Farm Request to modify a Major Project: Supporting Document, September 2012

RPS (2011) Ecological Assessment Report – White Rock Wind Farm, near Glen Innes, NSW. Report to Epuron Pty Ltd, March 2011.

Table 3: Area of each Plant Community Type (PCT) mapped in the Tangari Biobank Offset Areas 1 and 2 and the number of credits required for impacts of WRWF Stage 1 and alternative grid connection.

PCT/BVT	Vegetation	EEC	Vegetation Formation / Class	% Cleared	Impacts			Offset Areas				Surplus / deficit credits	Surplus / deficit matching credits*
					Credits Required Stage 1 Impacts	Credits required alternative Powerline	Total Credits required	Are 1 (Figure 5)	Area 2 (Figure 6)	Total Area (ha)	No. Credits generated		
PCT590 / BR391	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	White Box - Yellow Box - Blakely's Red Gum grassy woodland	Western Slopes Grassy Woodland	85%	0	140	140	0.00	24.48	24.48	272	132	132
PCT 508 / BR270	Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tablelands Bioregion		Northern Tablelands Dry Sclerophyll Forest	60%	0	0	0	0.00	8.07	8.07	78	78	78
PCT599/ BR271	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion		Western Slopes Grassy Woodland	30%	0	42	42	6.01	0.00	6.01	59	17	545
PCT 510 / BR 272	Blakely's Red Gum - Yellow Box grassy woodland of the New England Tablelands Bioregion		New England Grassy Woodland	80%	120	0	120	0.00	0.00	0	0	-120	
PCT571 / BR330	Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland/open forest of the New England Tableland Bioregion and NSW North Coast Bioregion		New England Grassy Woodlands	80%	0	27	27	123.77	0.00	123.77	1,178	1,151	
PCT 554 / BR329	Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion	Ribbon Gum - Mountain Gum - Snow Gum grassy open forest/woodland of the New England Tableland Bioregion	Tableland Clay Grassy Woodland	80%	647	0	647	0.00	12.89	12.89	144	-503	
PCT 564 / BR	White Cypress Pine - Silver-leaved Stringybark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tablelands Bioregion				0	0	0	7.63		7.63	75	75	75
PCT84 / BR194	River Oak - Rough-barked Apple - Red Gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion				0	0	0	0.00	0.59	0.59	10	10	10
	Cleared (Dams/easements/tracks)						0			3.77			
	Total				767	209	976	137.41	46.03	187.21	1,816	840	840

\*The credit surplus/deficit is based on the “like for like” offsets allowed in the credit profiles (Appendix A and B) and the FBA credit trading rules that allow offsets to be met by vegetation types that represent the same EECs.

Further it is noted that BR271 and BR272 are effectively the same impacted vegetation type and BR153 and BR330 are the same PCT.



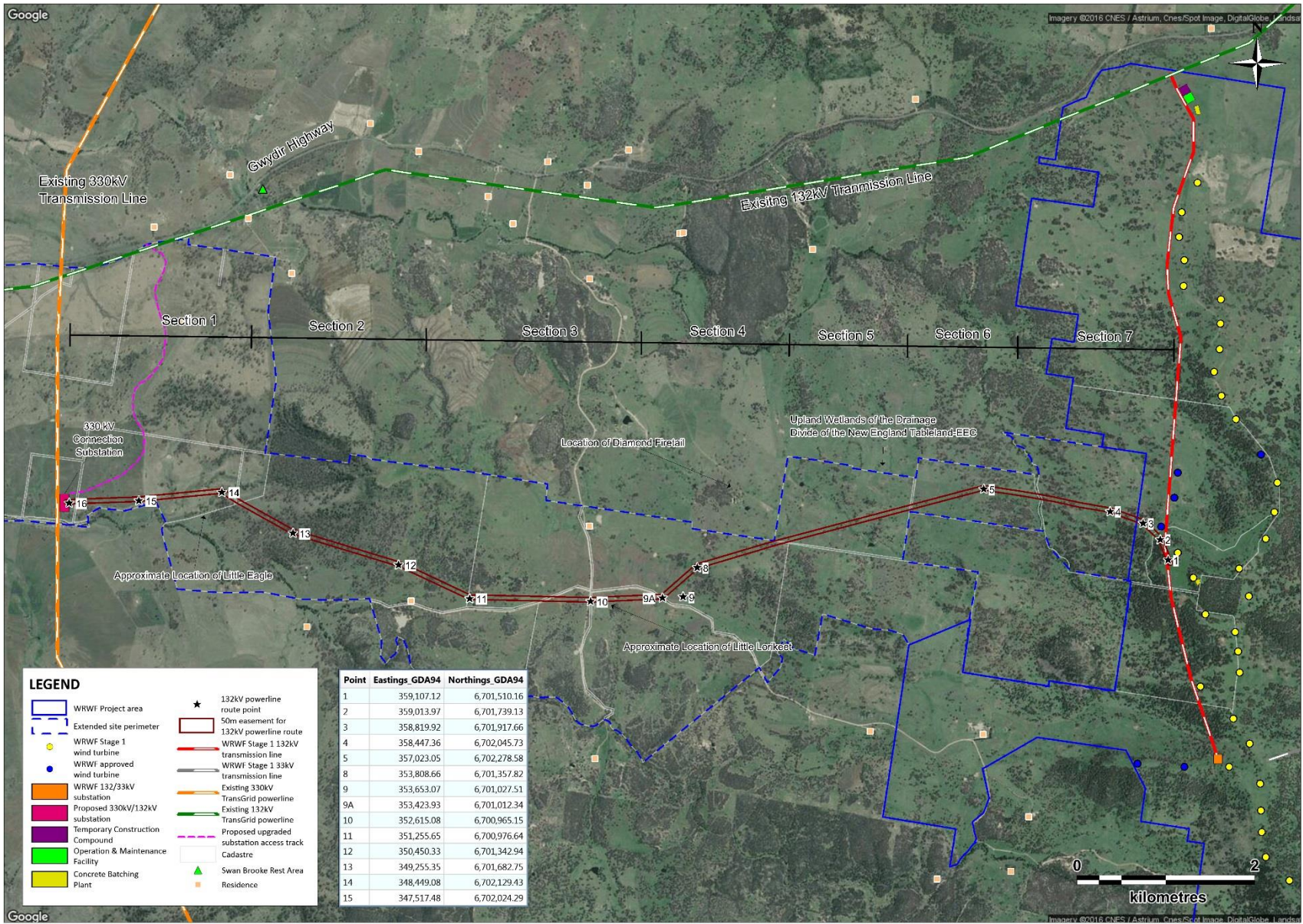


Figure 1 – Landscape view of approved and alternative powerline route



### Powerline Route Overview



Figure 2 – Vegetation mapping and location of biometric plots (BB01 to BB07) along alternate powerline route

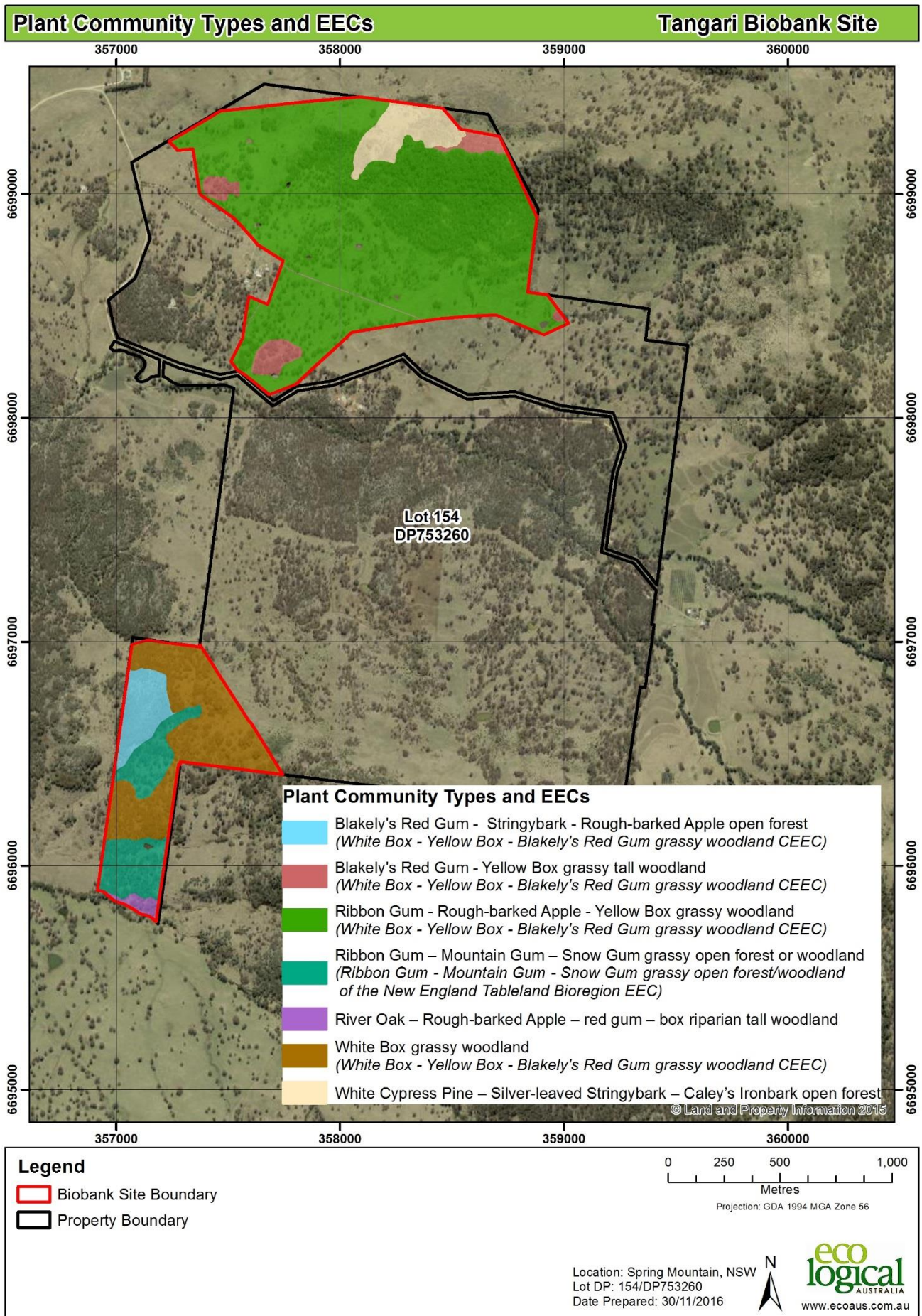


## Powerline Route Zoom



Figure 3 – Example of further refinement of alternative powerline route and avoidance of impacts to remnant woodland





**Figure 4: Plant Community Types mapped in the Tangari Biobank Site (Areas 1 and 2)**



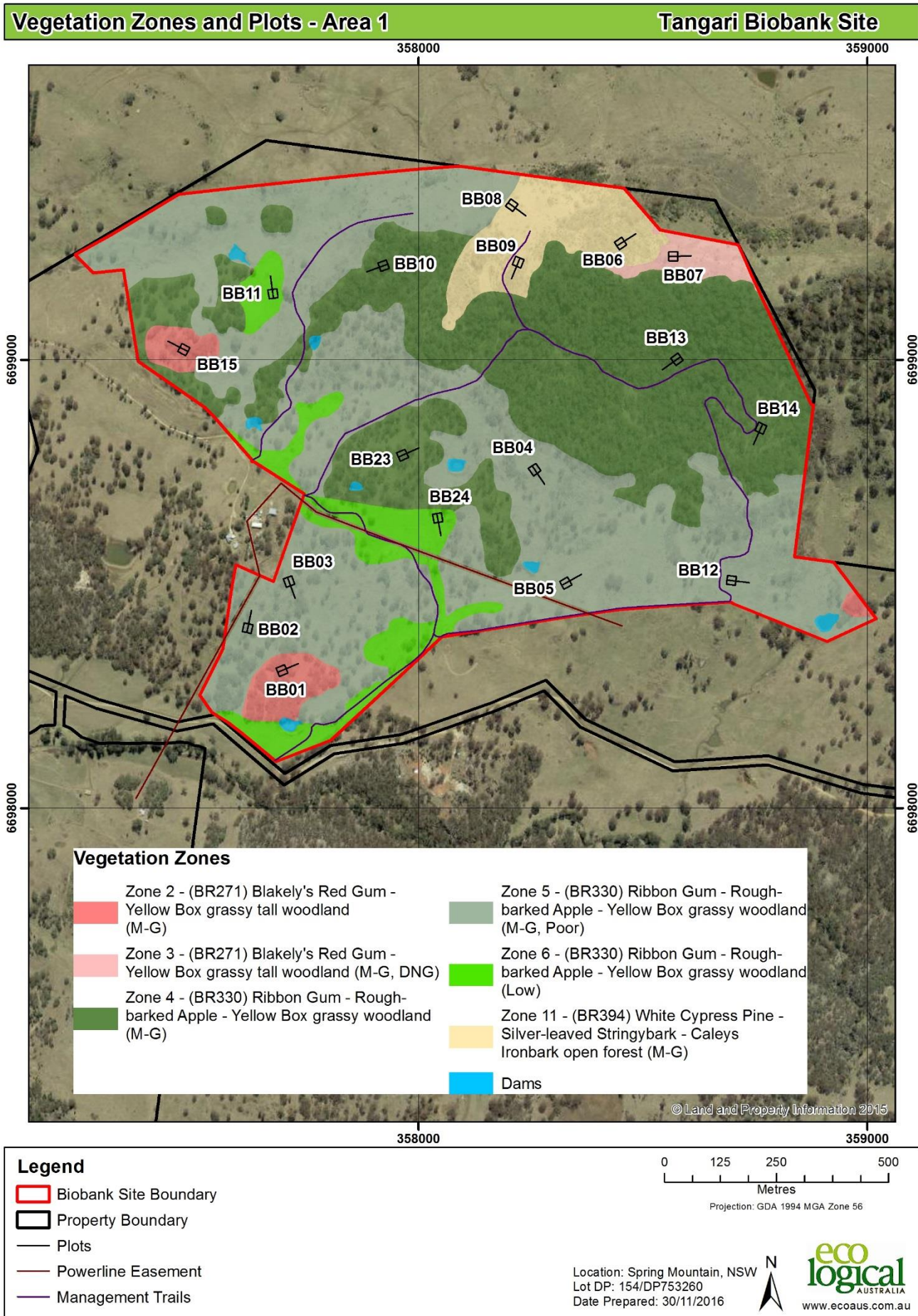


Figure 5: Vegetation Zones and plots in the Tangari Biobank Site (Area 1)



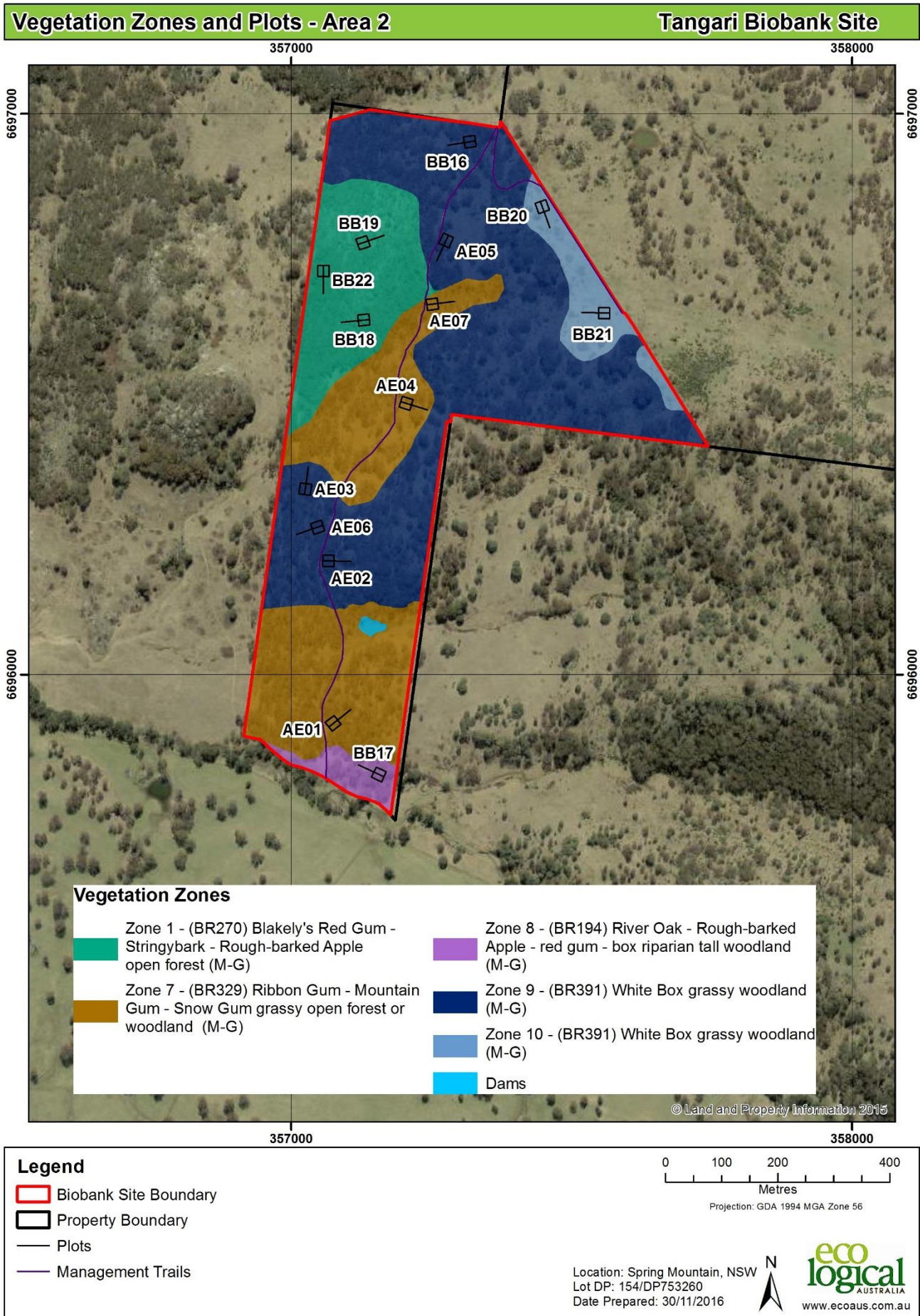


Figure 6: Vegetation Zones and plots in the Tangari Biobank Site (Area 2)



# Biodiversity credit report



This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 31/10/2016

Time: 1:14:35PM

Calculator version: v4.0

## Major Project details

<b>Proposal ID:</b>	110/2016/3964MP
<b>Proposal name:</b>	White Rock Powerline
<b>Proposal address:</b>	Not applicable Glen Innes NSW 2370
<b>Proponent name:</b>	White Rock Wind Farm Pty Ltd
<b>Proponent address:</b>	Suite 2, Level 23 201 Elizabeth St Sydney NSW 2000
<b>Proponent phone:</b>	90081705
<b>Assessor name:</b>	Greg Steenbeeke
<b>Assessor address:</b>	PO Box 12 Sutherland NSW 1499
<b>Assessor phone:</b>	02 8536 8626
<b>Assessor accreditation:</b>	110

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	4.93	56.00
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	0.53	27.04
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	11.64	168.44
Total	17.10	251

Credit profiles

**1. Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion, (BR330)**

Number of ecosystem credits created	27
IBRA sub-region	Glen Innes-Guyra Basalts

Offset options - Plant Community types	Offset options - IBRA sub-regions
<p>Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion, (BR330)</p> <p>Broad-leaved Stringybark - Blakely's Red Gum grassy woodlands of the New England Tableland Bioregion, (BR121)</p> <p>Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion, (BR272)</p> <p>Rough-barked Apple - Cabbage Gum grassy woodland of the New England Tableland Bioregion, (BR334)</p>	<p>Glen Innes-Guyra Basalts</p> <p>and any IBRA subregion that adjoins the IBRA subregion in which the development occurs</p>

## 2. White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion, (BR391)

Number of ecosystem credits created

168

IBRA sub-region

Glen Innes-Guyra Basalts

Offset options - Plant Community types	Offset options - IBRA sub-regions
<p>White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion, (BR391)</p> <p>Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion, (BR141)</p> <p>Grey Box - Blakely's Red Gum - Yellow Box grassy open forest of the Nandewar Bioregion and New England Tableland Bioregion, (BR144)</p> <p>White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR240)</p> <p>White Cypress Pine - Silver-leaved Ironbark grassy woodland of the Nandewar Bioregion, (BR244)</p> <p>Carbeen - White Box +/- Silver-leaved Ironbark grassy tall woodland on basalt hills, Brigalow Belt South Bioregion, (BR280)</p> <p>Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion, (BR350)</p> <p>Grey Box grassy woodland or open forest of the Nandewar Bioregion and New England Tableland Bioregion, (BR296)</p> <p>White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion, (BR388)</p>	<p>Glen Innes-Guyra Basalts</p> <p>and any IBRA subregion that adjoins the IBRA subregion in which the development occurs</p>

### 3. Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion, (BR271)

Number of ecosystem credits created

56

IBRA sub-region

Glen Innes-Guyra Basalts

Offset options - Plant Community types	Offset options - IBRA sub-regions
<p>Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion, (BR271)</p> <p>Blakely's Red Gum - White Cypress Pine - Rough-barked Apple grassy open forest of drainage lines of the northern Nandewar Bioregion and New England Tableland Bioregion, (BR115)</p> <p>Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion, (BR141)</p> <p>Grey Box - Blakely's Red Gum - Yellow Box grassy open forest of the Nandewar Bioregion and New England Tableland Bioregion, (BR144)</p> <p>White Box grassy woodland of the Nandewar Bioregion and Brigalow Belt South Bioregion, (BR240)</p> <p>White Cypress Pine - Silver-leaved Ironbark grassy woodland of the Nandewar Bioregion, (BR244)</p> <p>Yellow Box - Blakely's Red Gum grassy woodland of the Nandewar Bioregion, (BR252)</p> <p>Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion, (BR335)</p> <p>Yellow Box - White Cypress Pine alluvial terrace flats grassy woodland in the Pilliga forests and surrounds, Brigalow Belt South Bioregion, (BR400)</p> <p>Yellow Box grassy woodland on lower hillslopes and valley flats in the southern NSW Brigalow Belt South Bioregion, (BR401)</p> <p>Carbeen - White Box +/- Silver-leaved Ironbark grassy tall woodland on basalt hills, Brigalow Belt South Bioregion, (BR280)</p> <p>Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion, (BR350)</p> <p>Grey Box grassy woodland or open forest of the Nandewar Bioregion and New England Tableland Bioregion, (BR296)</p> <p>Rough-barked Apple - White Cypress Pine - Blakely's Red Gum riparian open forest / woodland of the Nandewar Bioregion and New England Tableland Bioregion, (BR337)</p> <p>White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion, (BR388)</p> <p>White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion, (BR391)</p>	<p>Glen Innes-Guyra Basalts</p> <p>and any IBRA subregion that adjoins the IBRA subregion in which the development occurs</p>



## Summary of species credits required

# Biodiversity credit report



This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 21/03/2016

Time: 11:15:29AM

Calculator version: v4.0

## Major Project details

<b>Proposal ID:</b>	0150/2015/2201MP
<b>Proposal name:</b>	White Rock Wind Farm Linear
<b>Proposal address:</b>	Graham Valley Road Gwydir Highway Glen Innes NSW 2370
<b>Proponent name:</b>	Goldwind Australia
<b>Proponent address:</b>	Level 23 201 Elizabeth Street Sydney NSW 2000
<b>Proponent phone:</b>	1300 854 167
<b>Assessor name:</b>	Craig Anderson
<b>Assessor address:</b>	Anderson St Newcastle NSW 2300
<b>Assessor phone:</b>	0418681581
<b>Assessor accreditation:</b>	0150

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion	4.74	120.23
Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion	22.50	647.79
Total	27.24	768

Credit profiles

1. Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion, (BR272)

Number of ecosystem credits created	120
IBRA sub-region	Glen Innes-Guyra Basalts

Offset options - Plant Community types	Offset options - IBRA sub-regions
Blakely's Red Gum - Yellow Box grassy woodland of the New England Tableland Bioregion, (BR272)  Broad-leaved Stringybark - Blakely's Red Gum grassy woodlands of the New England Tableland Bioregion, (BR121)  Rough-barked Apple - Cabbage Gum grassy woodland of the New England Tableland Bioregion, (BR334)  Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion, (BR330)	Glen Innes-Guyra Basalts and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

**2. Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion, (BR329)**

Number of ecosystem credits created	648
IBRA sub-region	Glen Innes-Guyra Basalts

Offset options - Plant Community types	Offset options - IBRA sub-regions
<p>Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion, (BR329)</p> <p>Black Sallee grassy woodland of the New England Tableland Bioregion, (BR112)</p> <p>Manna Gum - Rough-barked Apple - Yellow Box grassy woodland/open forest of the New England Tableland Bioregion and NSW North Coast Bioregion, (BR153)</p> <p>Snow Gum - Black Sallee grassy woodland of the New England Tableland Bioregion, (BR218)</p> <p>Snow Gum - New England Peppermint grassy open forest of the New England Tableland Bioregion, (BR220)</p> <p>Black Sallee - Snow Gum grassy woodland of the New England Tableland Bioregion, (BR269)</p> <p>Candlebark - Ribbon Gum grassy woodland of the New England Tableland Bioregion, (BR279)</p> <p>New England Peppermint grassy woodland on sedimentary or basaltic substrates of the New England Tableland Bioregion, (BR319)</p> <p>Mountain Gum - Ribbon Gum open forest of drainage lines of the southern New England Tableland Bioregion, (BR307)</p>	<p>Glen Innes-Guyra Basalts and any IBRA subregion that adjoins the IBRA subregion in which the development occurs</p>



# BioBanking credit report



Office of  
Environment  
& Heritage

This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 5/12/2016

Time: 2:01:03PM

Calculator version: v4.0

## Biobank details

**Proposal ID:** 110/2016/4098B

**Proposal name:** Tangari

**Proposal address:** 1117 Spring Mountain Road Spring Mountain NSW 2360

**Proponent name:** Goldwind Australia Pty Ltd

**Proponent address:** Suite 2, Level 23 201 Elizabeth St Sydney NSW 2000

**Proponent phone:** 0290081705

**Assessor name:** Greg Steenbeeke

**Assessor address:** PO Box 12 Sutherland NSW 1499

**Assessor phone:** 02 8536 8626

**Assessor accreditation:** 110

## Additional information required for approval:

- ☐ Use of local benchmark
- ☐ Expert report...
- ☐ Request for additional gain in site value

## Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion	6.61	78.00
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	5.84	59.00
Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion	12.49	144.00
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	121.41	1,178.00
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	1.12	10.00
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	25.30	272.00
White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion	7.76	75.00
<b>Total</b>	<b>180.53</b>	<b>1,816</b>

## Credit profiles

**1. Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion, (BR329)**

Number of ecosystem credits created	144
IBRA sub-region	Glen Innes-Guyra Basalts

**2. Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion, (BR330)**

Number of ecosystem credits created	1,083
IBRA sub-region	Glen Innes-Guyra Basalts

**3. Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion, (BR330)**

Number of ecosystem credits created	95
IBRA sub-region	Glen Innes-Guyra Basalts

**4. White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion, (BR391)**

Number of ecosystem credits created	272
IBRA sub-region	Glen Innes-Guyra Basalts

**5. Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion, (BR271)**

Number of ecosystem credits created	59
IBRA sub-region	Glen Innes-Guyra Basalts

**6. White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion, (BR394)**

Number of ecosystem credits created	75
IBRA sub-region	Glen Innes-Guyra Basalts

**7. Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion, (BR270)**

Number of ecosystem credits created	78
IBRA sub-region	Glen Innes-Guyra Basalts

**8. River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion, (BR194)**

Number of ecosystem credits created	10
IBRA sub-region	Glen Innes-Guyra Basalts

## Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Austral Toadflax	Thesium australe	75.00	532
McKie's Stringybark	Eucalyptus mckieana	20.00	142

## Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Austral Toadflax	Control of feral pigs
Austral Toadflax	Feral and/or over-abundant native herbivore control
Austral Toadflax	Slashing
Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion	Exclude commercial apiaries
Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion	Exclude miscellaneous feral species
Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion	Feral and/or over-abundant native herbivore control
Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion	Fox control
Blakely's Red Gum - Stringybark - Rough-barked Apple open forest of the Nandewar Bioregion and western New England Tableland Bioregion	Slashing
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Exclude commercial apiaries
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Exclude miscellaneous feral species
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Feral and/or over-abundant native herbivore control
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Fox control
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Slashing
McKie's Stringybark	Feral and/or over-abundant native herbivore control

Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion

Exclude miscellaneous feral species

Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion	Feral and/or over-abundant native herbivore control
Ribbon Gum - Mountain Gum - Snow Gum grassy open forest or woodland of the New England Tableland Bioregion	Fox control
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	Exclude commercial apiaries
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	Exclude miscellaneous feral species
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	Feral and/or over-abundant native herbivore control
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	Fox control
Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	Slashing
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Exclude commercial apiaries
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Exclude miscellaneous feral species
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Feral and/or over-abundant native herbivore control
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Fox control
River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion	Slashing
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	Exclude commercial apiaries
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	Exclude miscellaneous feral species
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	Feral and/or over-abundant native herbivore control
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	Fox control
White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	Slashing
White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion	Exclude commercial apiaries

White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion

Exclude miscellaneous feral species



White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion	Feral and/or over-abundant native herbivore control
White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion	Fox control
White Cypress Pine - Silver-leaved Ironbark - Caley's Ironbark open forest of the central Nandewar Bioregion and western New England Tableland Bioregion	Slashing