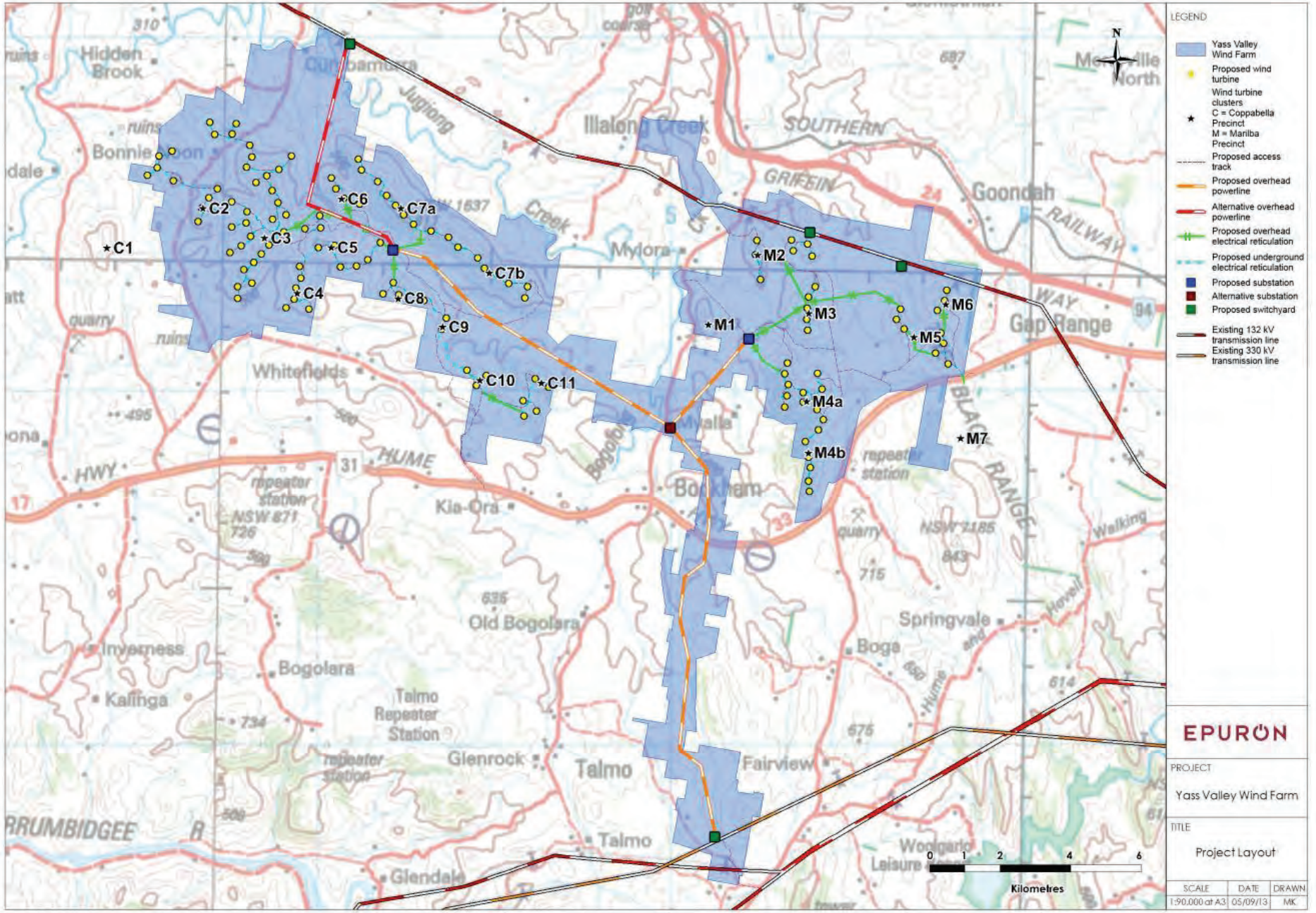
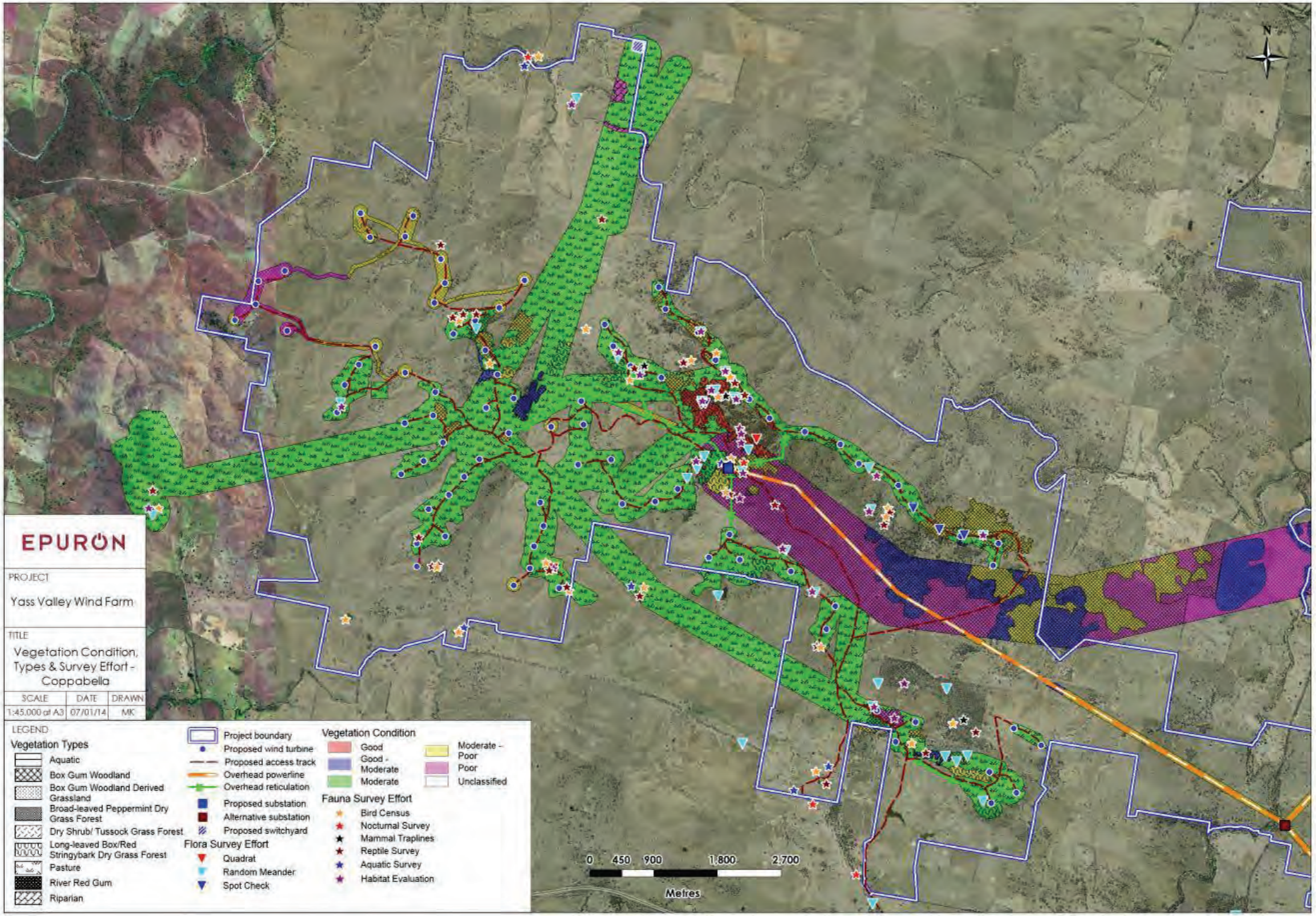
Appendix A – Site layout


LEGEND
Yass Valley Wind Farm
Proposed wind turbine
Wind turbine clusters
C = Coppabella Precinct
M = Mariba Precinct
Proposed access track
Proposed overhead powerline
Alternative overhead powerline
Proposed overhead electrical reticulation
Proposed underground electrical reticulation
Proposed substation
Alternative substation
Proposed switchyard
Existing 132 kV transmission line
Existing 330 kV transmission line
C1
C2
C3
C4
C5
C6
C7a
C7b
C8
C9
C10
C11
M1
M2
M3
M4a
M4b
M5
M6
M7
N
Kilometres
0 1 2 4 6
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Project Layout
SCALE
1:90,000 at A3
DATE
05/09/13
DRAWN
MK

Appendix B – Survey effort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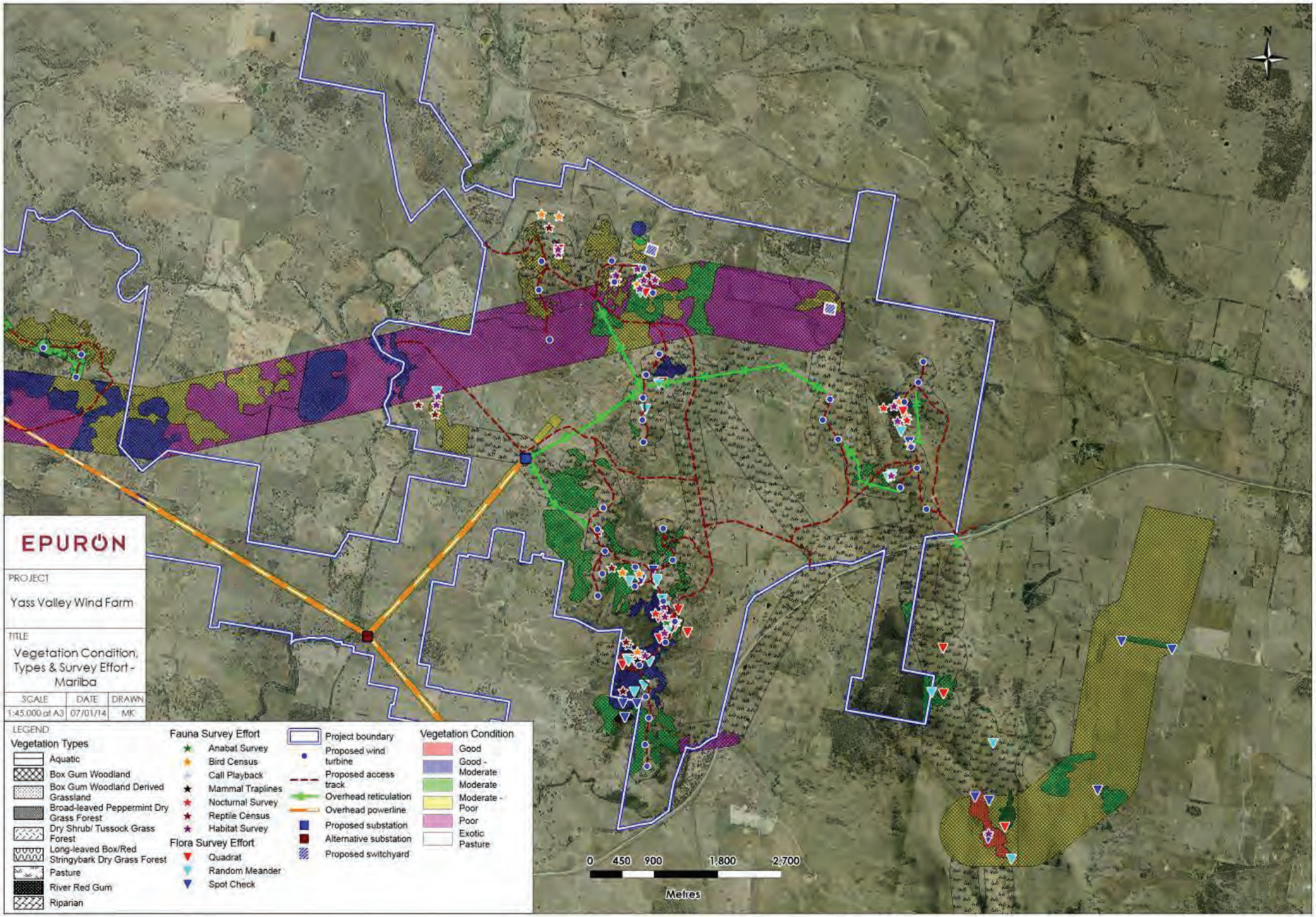
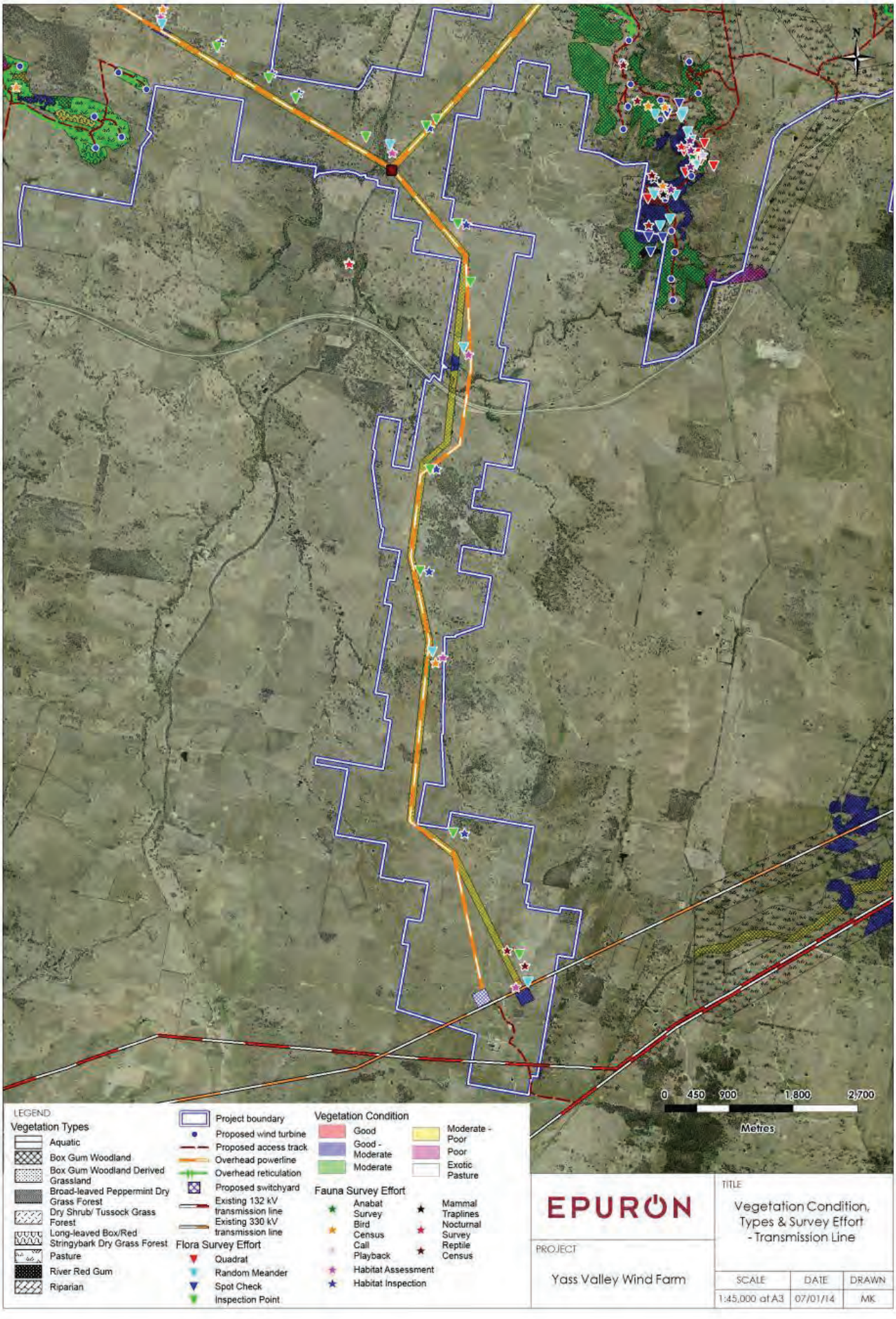
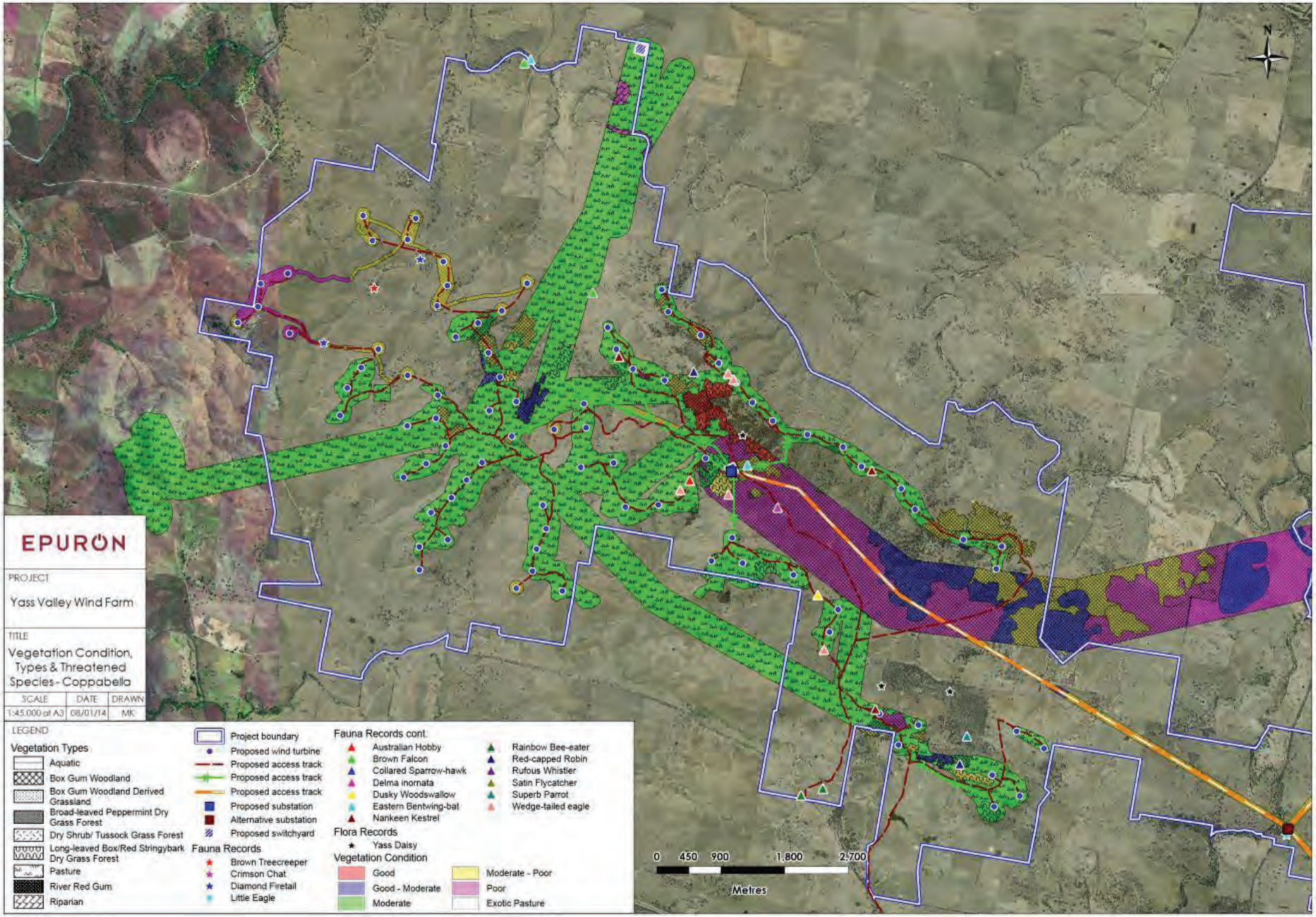
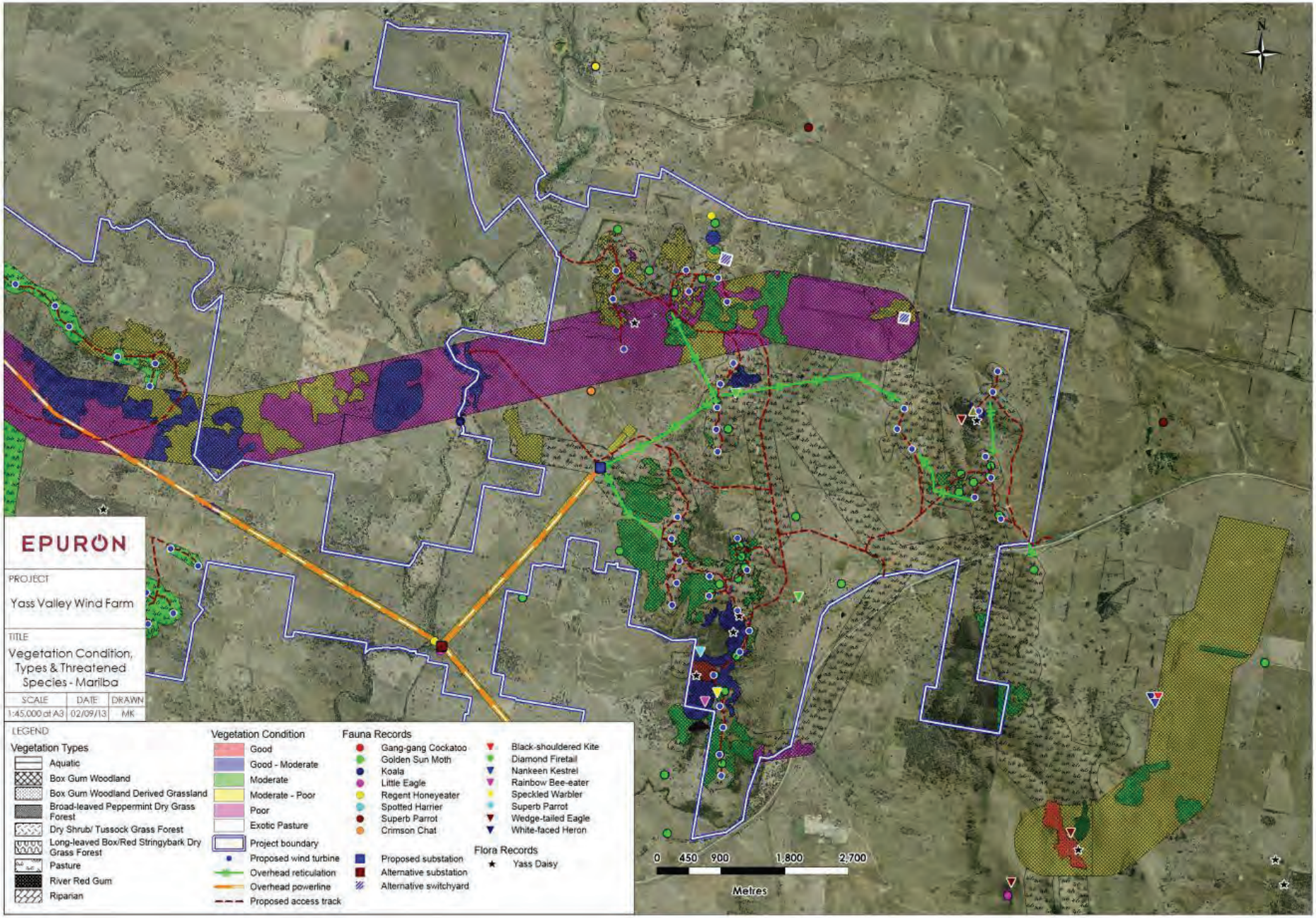
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Vegetation Condition, Types & Survey Effort - Coppabella
SCALE
1:45,000 at A3
DATE
07/01/14
DRAWN
MK
LEGEND
Vegetation Types
Aquatic
Box Gum Woodland
Box Gum Woodland Derived Grassland
Broad-leaved Peppermint Dry Grass Forest
Dry Shrub/ Tussock Grass Forest
Long-leaved Box/Red Stringybark Dry Grass Forest
Pasture
River Red Gum
Riparian
Project boundary
Proposed wind turbine
Proposed access track
Overhead powerline
Overhead reticulation
Proposed substation
Alternative substation
Proposed switchyard
Flora Survey Effort
Quadrat
Random Meander
Spot Check
Vegetation Condition
Good
Good - Moderate
Moderate
Moderate - Poor
Poor
Unclassified
Fauna Survey Effort
Bird Census
Nocturnal Survey
Mammal Traplines
Reptile Survey
Aquatic Survey
Habitat Evaluation
0 450 900 1,800 2,700
Metres

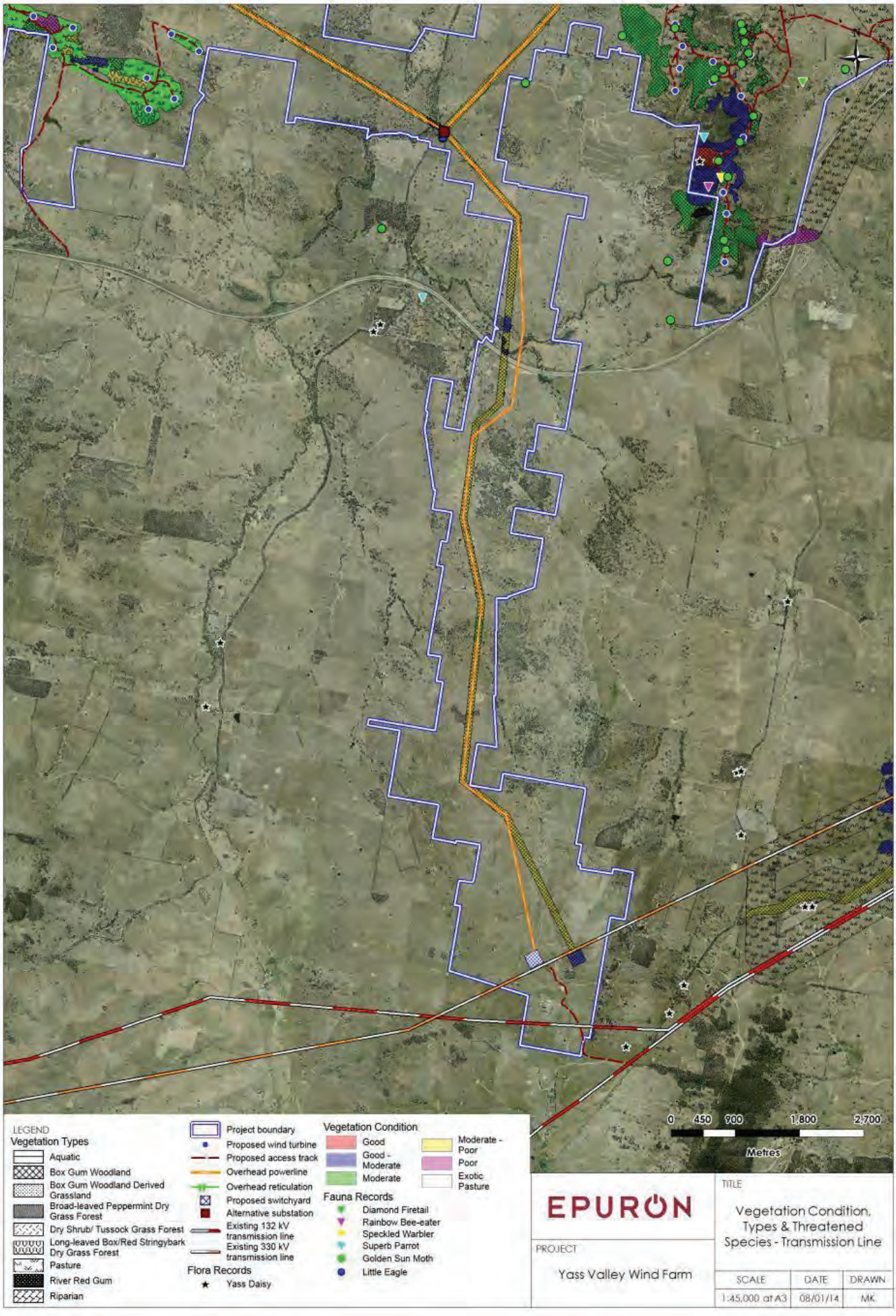

N
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Vegetation Condition, Types & Survey Effort - Marilba
SCALE
1:45,000 at A3
DATE
07/01/14
DRAWN
MK
LEGEND
Vegetation Types
Aquatic
Box Gum Woodland
Box Gum Woodland Derived Grassland
Broad-leaved Peppermint Dry Grass Forest
Dry Shrub/ Tussock Grass Forest
Long-leaved Box/Red Stringybark Dry Grass Forest
Pasture
River Red Gum
Riparian
Fauna Survey Effort
Anabat Survey
Bird Census
Call Playback
Mammal Traplines
Nocturnal Survey
Reptile Census
Habitat Survey
Flora Survey Effort
Quadrat
Random Meander
Spot Check
Project boundary
Proposed wind turbine
Proposed access track
Overhead reticulation
Overhead powerline
Proposed substation
Alternative substation
Proposed switchyard
Vegetation Condition
Good
Good - Moderate
Moderate
Moderate - Poor
Poor
Exotic Pasture
0 450 900 1,800 2,700
Metres


N
0 450 900 1,800 2,700
Metres
LEGEND
Vegetation Types
Aquatic
Box Gum Woodland
Box Gum Woodland Derived Grassland
Broad-leaved Peppermint Dry Grass Forest
Dry Shrub/ Tussock Grass Forest
Long-leaved Box/Red Stringybark Dry Grass Forest
Pasture
River Red Gum
Riparian
Project boundary
Proposed wind turbine
Proposed access track
Overhead powerline
Overhead reticulation
Proposed switchyard
Existing 132 kV transmission line
Existing 330 kV transmission line
Flora Survey Effort
Quadrat
Random Meander
Spot Check
Inspection Point
Vegetation Condition
Good
Good - Moderate
Moderate
Moderate - Poor
Poor
Exotic Pasture
Fauna Survey Effort
Anabat Survey
Bird Census
Call Playback
Habitat Assessment
Habitat Inspection
Mammal Traplines
Nocturnal Survey
Reptile Census
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Vegetation Condition, Types & Survey Effort - Transmission Line
SCALE
1:45,000 at A3
DATE
07/01/14
DRAWN
MK

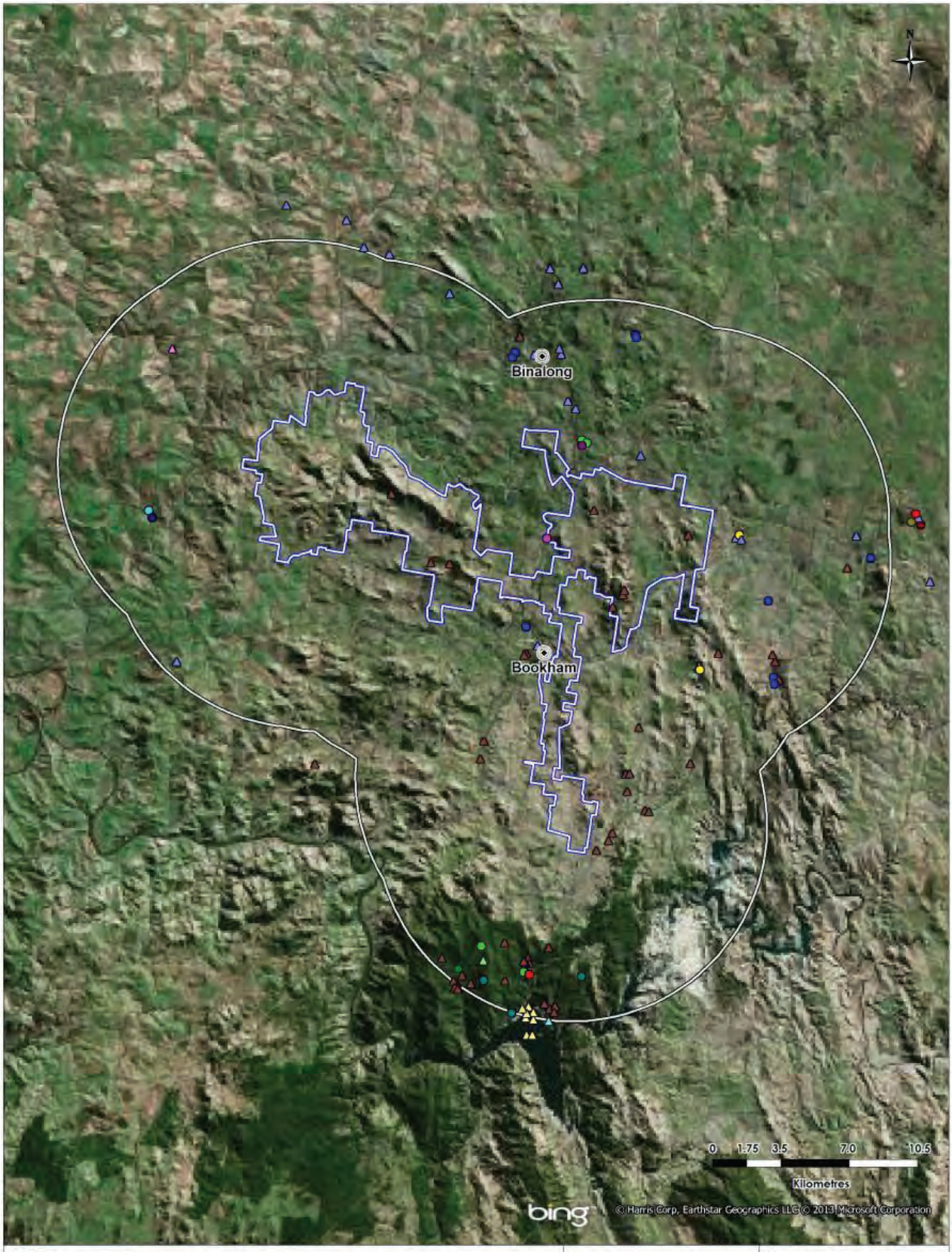
Appendix C – Vegetation types and threatened species records within project site


EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Vegetation Condition, Types & Threatened Species - Coppabella
SCALE
1:45,000 at A3
DATE
08/01/14
DRAWN
MK
LEGEND
Vegetation Types
Aquatic
Box Gum Woodland
Box Gum Woodland Derived Grassland
Broad-leaved Peppermint Dry Grass Forest
Dry Shrub/ Tussock Grass Forest
Long-leaved Box/Red Stringybark Dry Grass Forest
Pasture
River Red Gum
Riparian
Project boundary
Proposed wind turbine
Proposed access track
Proposed access track
Proposed access track
Proposed substation
Alternative substation
Proposed switchyard
Fauna Records
Brown Treecreeper
Crimson Chat
Diamond Firetail
Little Eagle
Fauna Records cont.
Australian Hobby
Brown Falcon
Collared Sparrow-hawk
Delma inornata
Dusky Woodswallow
Eastern Bentwing-bat
Nankeen Kestrel
Rainbow Bee-eater
Red-capped Robin
Rufous Whistler
Satin Flycatcher
Superb Parrot
Wedge-tailed eagle
Flora Records
Yass Daisy
Vegetation Condition
Good
Good - Moderate
Moderate
Moderate - Poor
Poor
Exotic Pasture
0 450 900 1,800 2,700
Metres
N

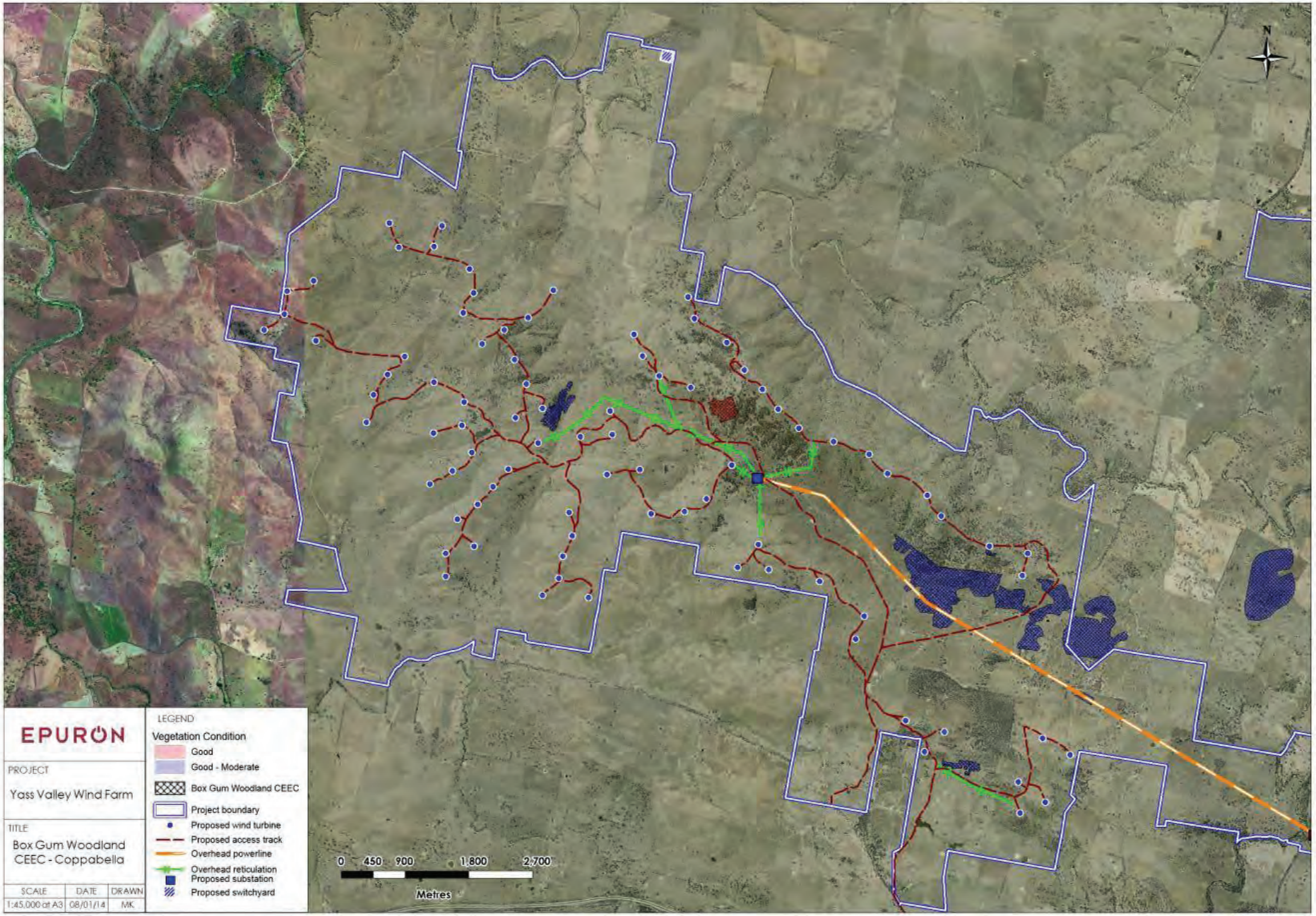

EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Vegetation Condition, Types & Threatened Species - Marilba
SCALE
1:45,000 at A3
DATE
02/09/13
DRAWN
MK
LEGEND
Vegetation Types
Aquatic
Box Gum Woodland
Box Gum Woodland Derived Grassland
Broad-leaved Peppermint Dry Grass Forest
Dry Shrub/ Tussock Grass Forest
Long-leaved Box/Red Stringybark Dry Grass Forest
Pasture
River Red Gum
Riparian
Vegetation Condition
Good
Good - Moderate
Moderate
Moderate - Poor
Poor
Exotic Pasture
Project boundary
Proposed wind turbine
Overhead reticulation
Overhead powerline
Proposed access track
Fauna Records
Gang-gang Cockatoo
Golden Sun Moth
Koala
Little Eagle
Regent Honeyeater
Spotted Harrier
Superb Parrot
Crimson Chat
Proposed substation
Alternative substation
Alternative switchyard
Black-shouldered Kite
Diamond Firetail
Nankeen Kestrel
Rainbow Bee-eater
Speckled Warbler
Superb Parrot
Wedge-tailed Eagle
White-faced Heron
Flora Records
Yass Daisy
N
0 450 900 1,800 2,700
Metres

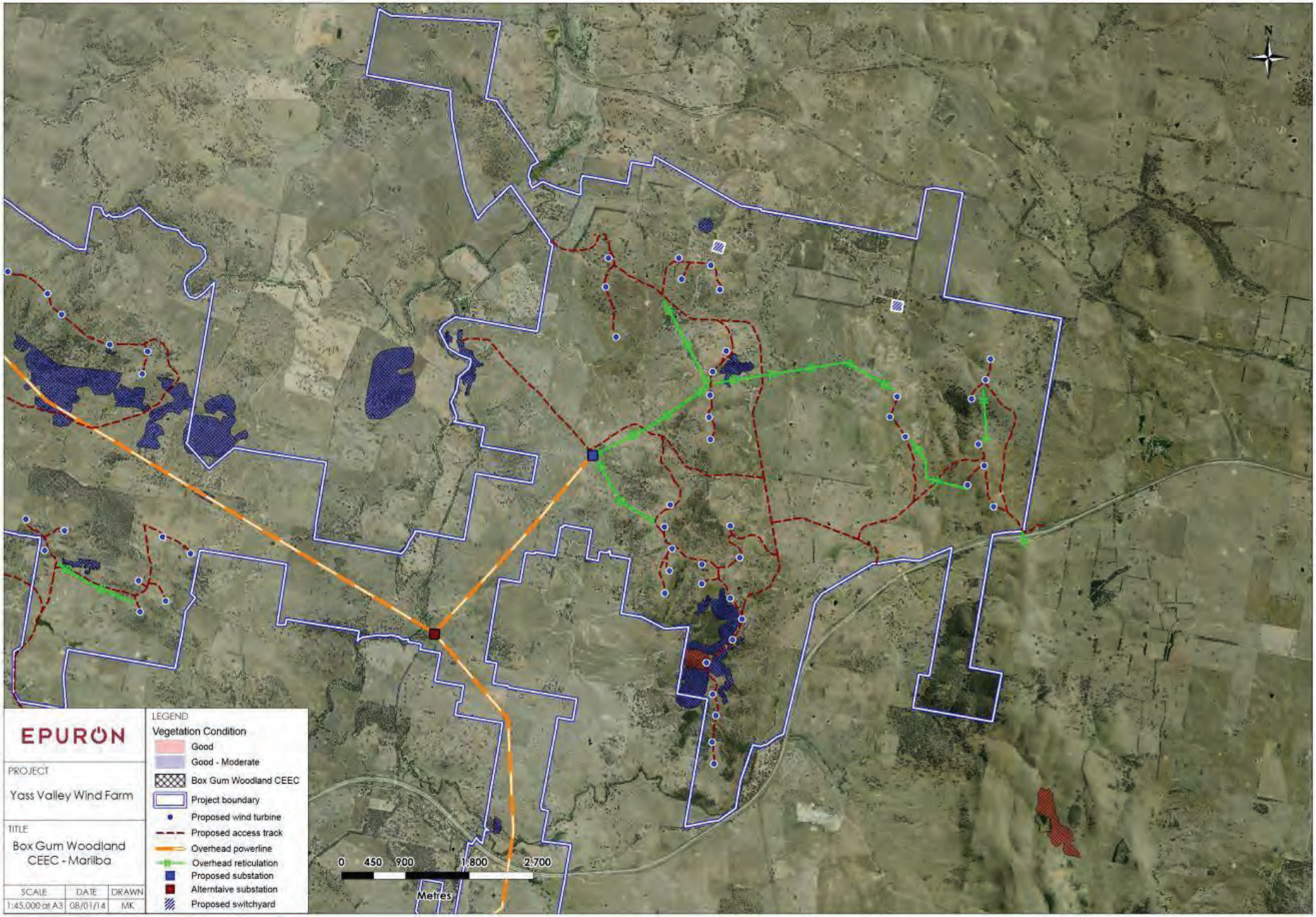

LEGEND
Vegetation Types
Aquatic
Box Gum Woodland
Box Gum Woodland Derived Grassland
Broad-leaved Peppermint Dry Grass Forest
Dry Shrub/ Tussock Grass Forest
Long-leaved Box/Red Stringybark Dry Grass Forest
Pasture
River Red Gum
Riparian
Project boundary
Proposed wind turbine
Proposed access track
Overhead powerline
Overhead reticulation
Proposed switchyard
Alternative substation
Existing 132 kV transmission line
Existing 330 kV transmission line
Flora Records
Yass Daisy
Vegetation Condition
Good
Good - Moderate
Moderate
Moderate - Poor
Poor
Exotic Pasture
Fauna Records
Diamond Firetail
Rainbow Bee-eater
Speckled Warbler
Superb Parrot
Golden Sun Moth
Little Eagle
0 450 900 1,800 2,700
Metres
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Vegetation Condition, Types & Threatened Species - Transmission Line
SCALE
1:45,000 at A3
DATE
08/01/14
DRAWN
MK

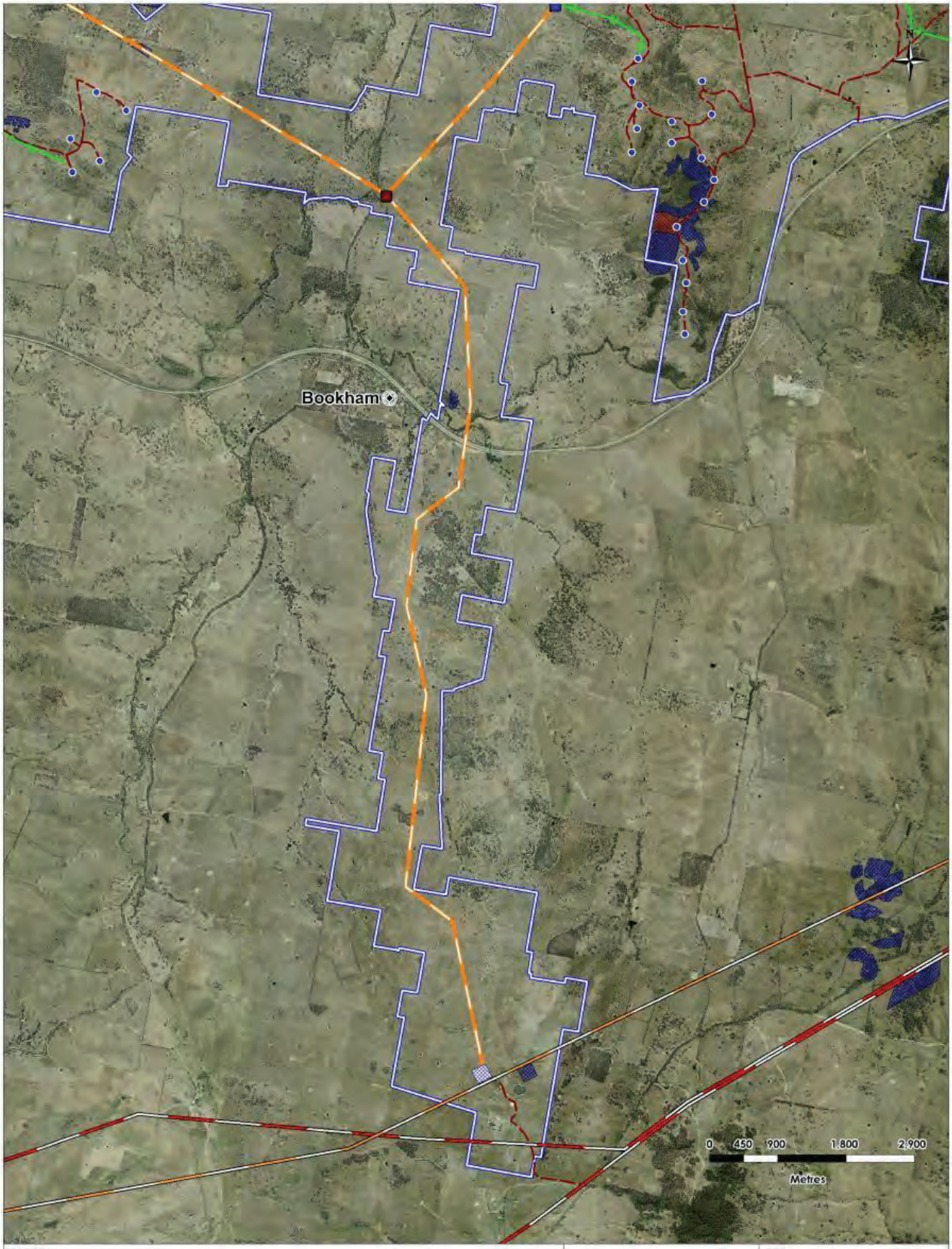
Appendix D – Threatened species within the locality (10 km)


N
Binalong
Bookham
0 1.75 3.5 7.0 10.5
Kilometres
bing
© Harris Corp, Earthstar Geographics LLC © 2013 Microsoft Corporation
LEGEND
Flame Robin
Gang-gang Cockatoo
Golden Sun Moth
Koala
Little Eagle
Little Lorikeet
Little Pied Bat
Powerful Owl
Rainbow Bee-eater
Regent Honeyeater
Satin Flycatcher
Scarlet Robin
Spotted Harrier
Spotted-tailed Quoll
Superb Parrot
Swift Parrot
Wee Jasper Grevillea
White-bellied Sea-Eagle
Yass Daisy
Yass Valley Wind Farm
10 km wind turbine buffer
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
CMA Flora & Fauna within 10 km of the Yass Valley Wind Farm
SCALE
1:175,000 at A3
DATE
02/09/13
DRAWN
MK

Appendix E - Location of box gum CEEC within the project site


N
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Box Gum Woodland CEEC - Coppabella
SCALE
1:45,000 at A3
DATE
08/01/14
DRAWN
MK
LEGEND
Vegetation Condition
Good
Good - Moderate
Box Gum Woodland CEEC
Project boundary
Proposed wind turbine
Proposed access track
Overhead powerline
Overhead reticulation
Proposed substation
Proposed switchyard
0 450 900 1,800 2,700
Metres


N
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Box Gum Woodland CEEC - Marilba
SCALE
1:45,000 at A3
DATE
08/01/14
DRAWN
MK
LEGEND
Vegetation Condition
Good
Good - Moderate
Box Gum Woodland CEEC
Project boundary
Proposed wind turbine
Proposed access track
Overhead powerline
Overhead reticulation
Proposed substation
Alterntaive substation
Proposed switchyard
0 450 900 1,800 2,700
Metres

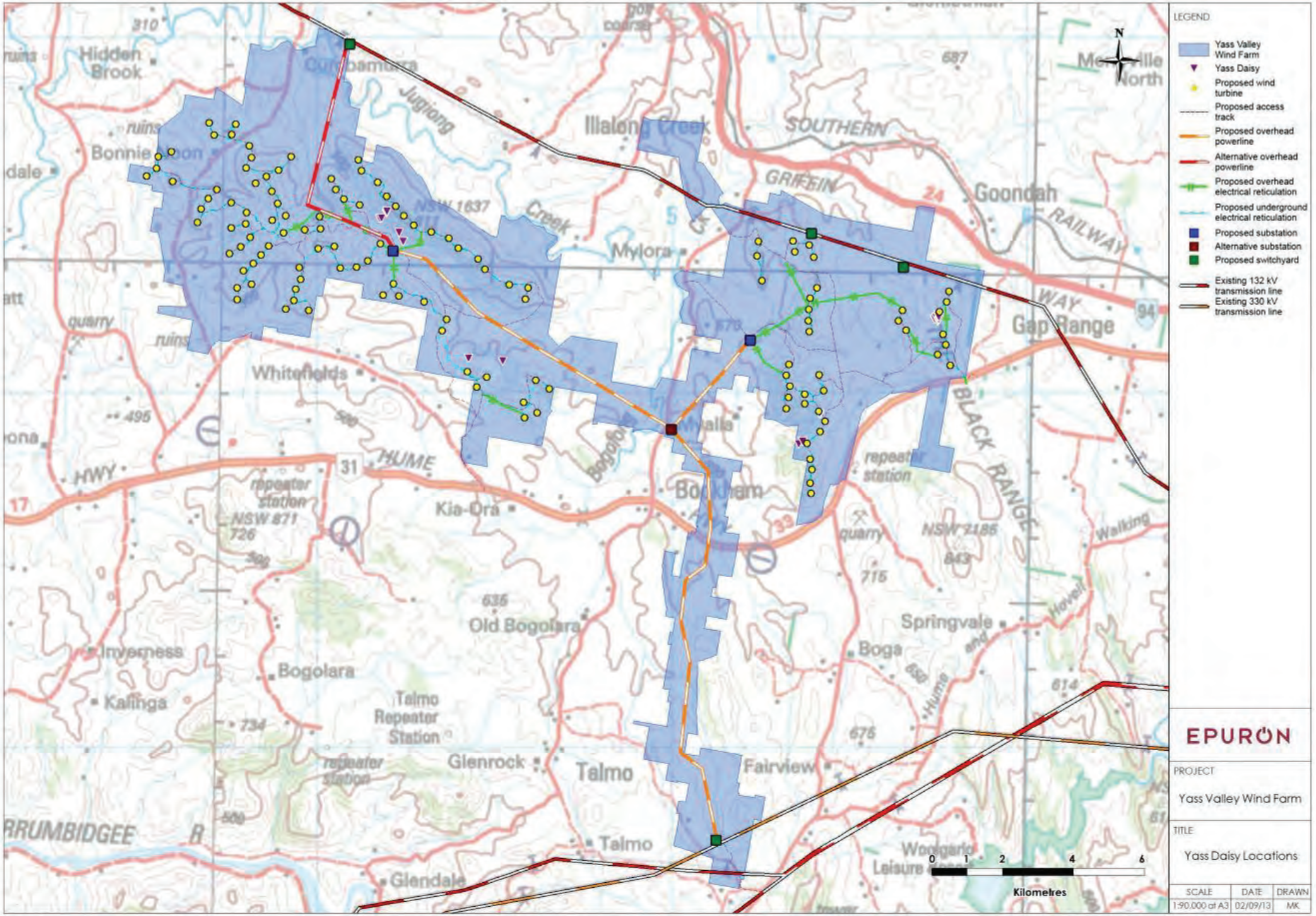

Bookham
N
0 450 900 1,800 2,900
Metres
LEGEND
Vegetation Condition
Good
Good - Moderate
Box Gum Woodland CEEC
Project boundary
Proposed wind turbine
Proposed access track
Overhead powerline
Overhead reticulation
Existing 132 kV transmission line
Existing 330 kV transmission line
Proposed substation
Alternative substation
Proposed switchyard
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Box Gum Woodland CEEC - Transmission Line
SCALE
1:45,000 at A3
DATE
08/01/14
DRAWN
MK

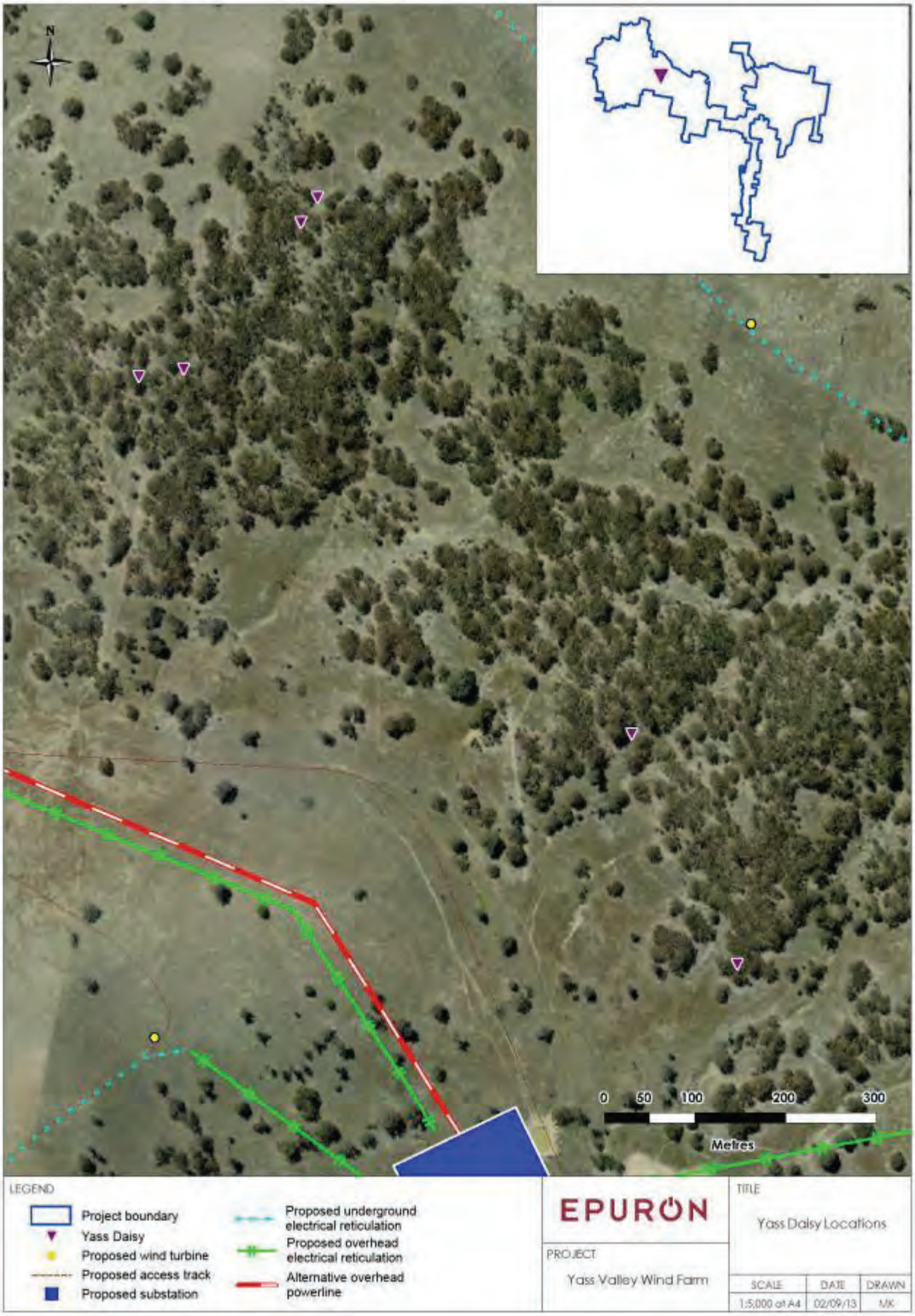
Appendix F – Yass daisy locations within the project site

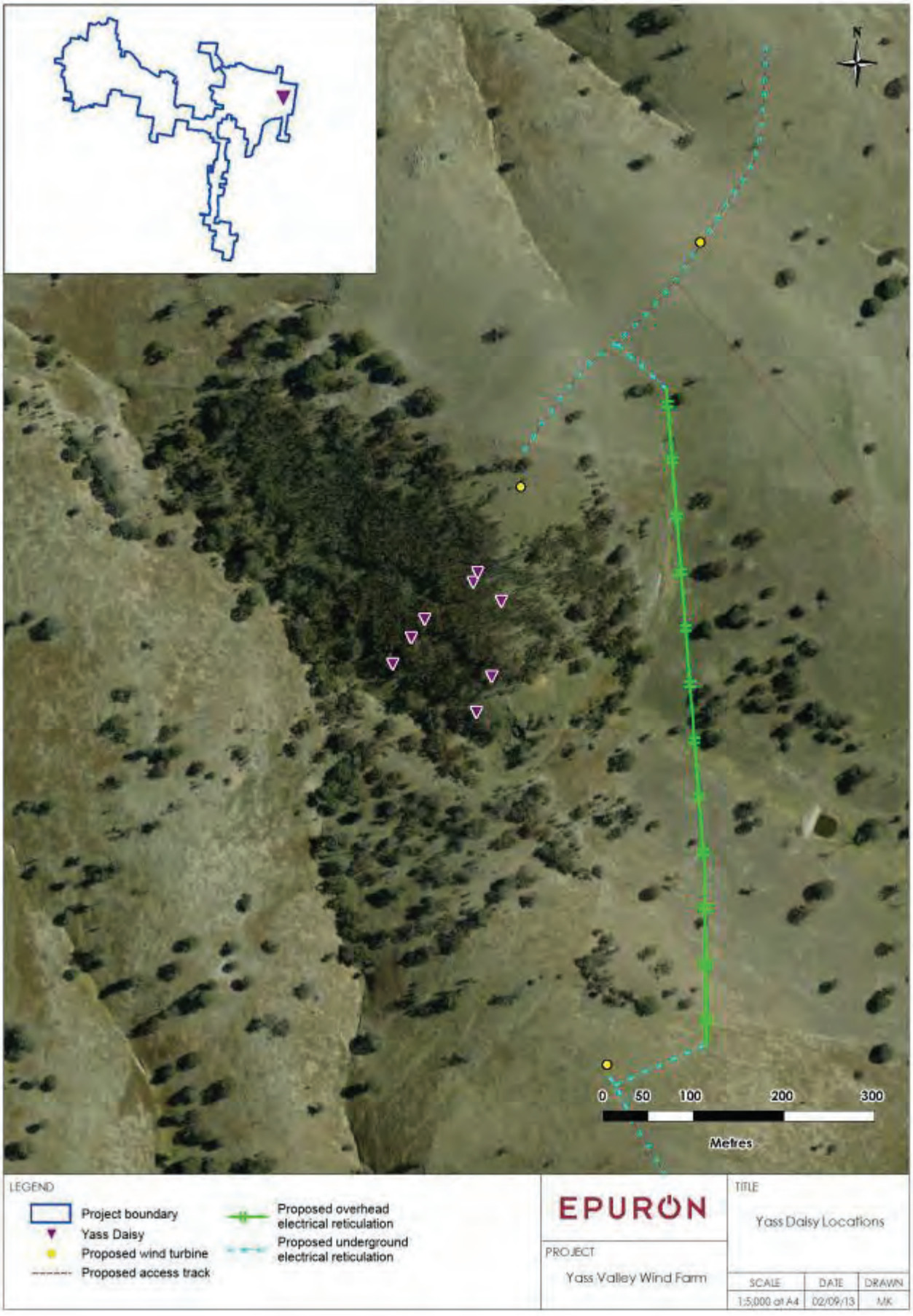
Yass Daisy habitat equates to confirmed records buffered by 5m. This totals:

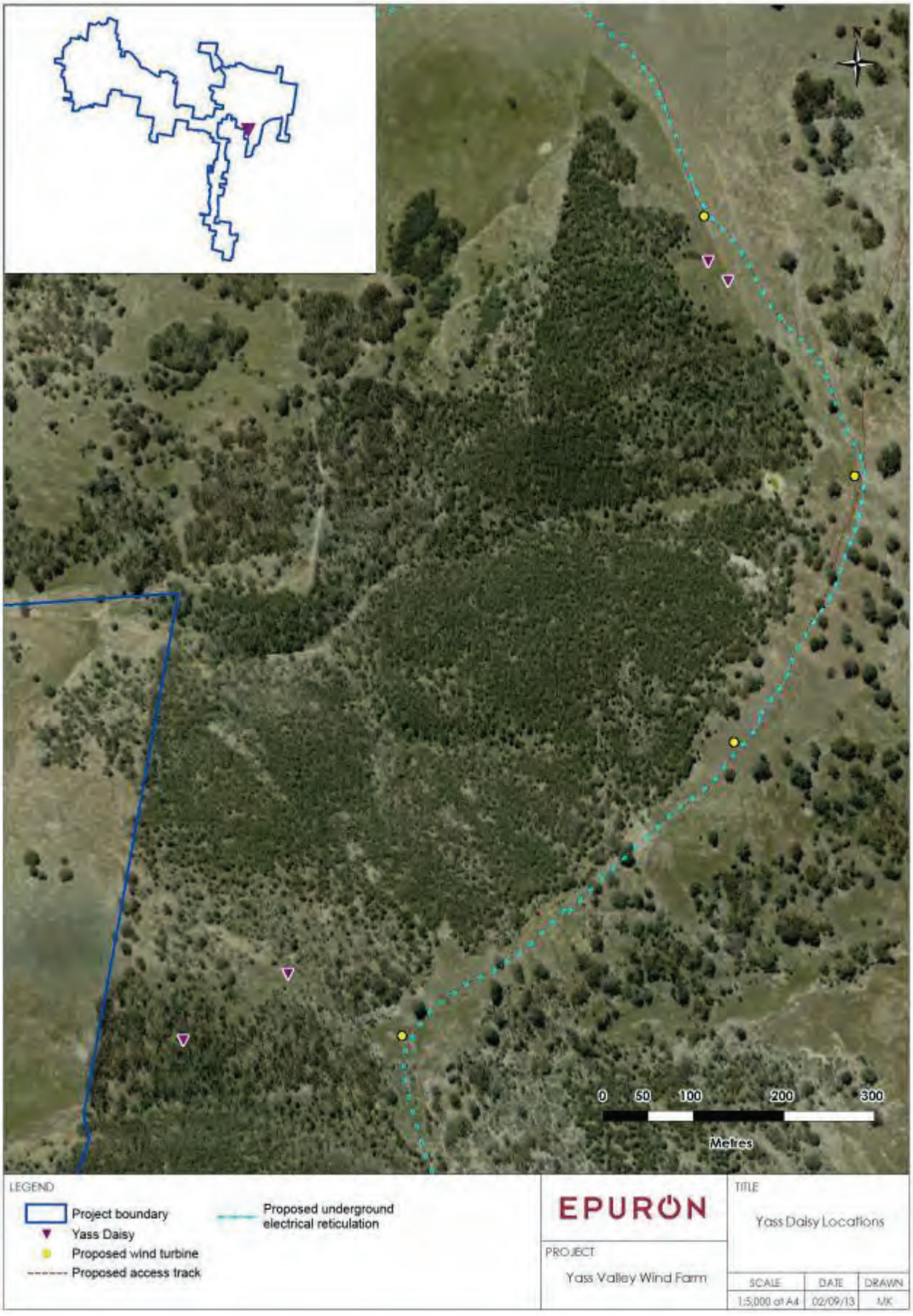
a. Area within the project boundaries = 0.16 ha

b. Area within 500m of a turbine = 0.13 ha


LEGEND
Yass Valley Wind Farm
Yass Daisy
Proposed wind turbine
Proposed access track
Proposed overhead powerline
Alternative overhead powerline
Proposed overhead electrical reticulation
Proposed underground electrical reticulation
Proposed substation
Alternative substation
Proposed switchyard
Existing 132 kV transmission line
Existing 330 kV transmission line
N
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Yass Daisy Locations
SCALE
1:90,000 at A3
DATE
02/09/13
DRAWN
MK
0 1 2 4 6
Kilometres
Hidden Brook
Bonnie Doon
Jugiong
Illalong Creek
SOUTHERN
GRIFFITH
Goondah
RAILWAY
Mylora
Gap Range
WAY
Whitefields
HUME
HWY
Kia-Ora
Bookham
BLACK RANGE
Springvale
Boga
Old Bogolara
Inverness
Bogolara
Kalinga
Talmo Repeater Station
Glenrock
Talmo
Fairview
Glendale
repeater station
quarry
ruins
NSW 1637
NSW 871
NSW 2185
Hovell
Hume


N
0 50 100 200 300
Metres
LEGEND
Project boundary
Yass Daisy
Proposed wind turbine
Proposed access track
Proposed substation
Proposed underground electrical reticulation
Proposed overhead electrical reticulation
Alternative overhead powerline
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Yass Daisy Locations
SCALE
1:5,000 at A4
DATE
02/09/13
DRAWN
MK


N
0 50 100 200 300
Metres
LEGEND
Project boundary
Yass Daisy
Proposed wind turbine
Proposed access track
Proposed overhead electrical reticulation
Proposed underground electrical reticulation
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Yass Daisy Locations
SCALE
1:5,000 at A4
DATE
02/09/13
DRAWN
MK


0 50 100 200 300
Metres
LEGEND
Project boundary
Yass Daisy
Proposed wind turbine
Proposed access track
Proposed underground electrical reticulation
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Yass Daisy Locations
SCALE
1:5,000 at A4
DATE
02/09/13
DRAWN
MK

Appendix G – Offset strategy & map of proposed offset sites

1 Offset Strategy

1.1 Introduction

While measures have been taken to avoid and minimise impacts (such as avoiding high constraints areas and requiring a management plan minimise impacts in other areas), residual impacts including habitat loss remain and therefore an Offset Package is considered to be required.

The following commitments are made by the proponent to address this requirement:

The proponent shall prepare an offset plan, to the satisfaction of the Director-General, to offset losses of and impacts to native vegetation including hollow-bearing trees on the site. The offset plan is to be developed in consultation with OEH, Murrumbidgee CMA, and Yass Valley Council. The proponent shall submit the offset plan for approval prior to the commencement of construction.

Details of the offset package shall be submitted for the approval of the Director-General prior to the commencement of construction. The package shall:

> *a) Describe how the offset will be guaranteed and monitored in perpetuity.*
>
> *b) Ensure that the vegetation communities, hollow-bearing trees and threatened species subject to loss of native vegetation are represented in the offset area.*
>
> *c) Demonstrate how the offset ratio determined improves habitat or maintains biodiversity values.*
>
> *d) Include requirements for post-construction review to confirm the extent of clearing was commensurate with and not greater than predicted. If clearing is greater, then the package shall demonstrate how the offset was modified and increased to the value of the actual biodiversity loss.*

The key aim of the provision of this information is to demonstrate, prior to project approval that the offsets required can be achieved and will be acceptable to the impact proposed. Furthermore, it sets out a clear pathway to implementation of the offsets, to provide certainty regarding the outcomes for all parties involved. It is based on similar strategies undertaken in consultation with OEH for renewable energy projects in NSW.

Specific to key components of this outline, it is noted that, in advance of project approval, allowances have to be made for changes in the infrastructure layout. The movement of infrastructure within the development envelope is termed 'micro-siting'. Limits are placed on micro-siting by the draft standard conditions for wind farms developed by the NSW Department of Planning and Infrastructure (a location allowance of 100 metres radius for development components as long as impacts remain consistent with that assessed - http://www.planning.nsw.gov.au/standard-and-model-conditions). These changes may also affect the landowners involved in the project and therefore the ability to use suitable areas of their property in the Offset Package. In response to this issue, a 'criteria approach' has been adopted in the development of this offset outline. The criteria and methods set out below are intended to guide the finalisation of the Offset Package whilst allowing the project the flexibility it requires to be developed.

1.2 Implementation overview

The following stages of implementing the Offset Package are proposed:

Stage	*Timing*
1. Offset Strategy (this document)	Draft Strategy supplied pre project approval.
a. Estimation of loss of habitat (including hollows) required for the project.	
b. Calculation of the required offsets, using predetermined offset ratios.	
c. Outline of the implementation (including management and security)	
d. Identification of potential offset sites	
2. Offset Plan	Prior to any impact.
a. Consultation and endorsement of CMA and OEH to finalise the Offset Strategy (including finalisation of offset ratios).	
b. Selection of offset sites	
c. For each offset site:	
○ Establishment of baseline data.	
○ Documentation of key biodiversity risks, opportunities and relevant local initiatives.	
○ Refinement of management actions specific to the site (with input from the landowner), including monitoring regime and reporting requirements.	
○ Consultation and endorsement of CMA and OEH to finalise the Offset Plan (could be documented separately for each site or in one combined document).	
3. Verification of the actual area of native vegetation clearing of the constructed wind farm and transmission line.	After construction.
4. Formalisation of the offset on the title of each involved property by way of a CPVP, including the inclusion of the management plan and its required management actions and land use restrictions.	After construction.
5. Monitoring in order to demonstrate maintain or improve and adapt management as required.	During operation.

These stages are detailed further in the sections below.

1.3 Estimation of Loss of Habitat

This response document estimates the impact area for the proposal through calculation of permanent habitat loss on a worst case scenario.

1.4 Calculation of Required Offsets

The proponent commits to determining an offset ratio with reference to:

- The conservation status of the vegetation (EECs would be offset at a higher ratio than common vegetation types)
- The condition of the vegetation (a standard metric has been used to collect condition data and would be used to ensure vegetation in better condition is offset at a higher ratio than degraded vegetation[10])
- Habitat values (important habitat elements or verified threatened species habitat would be offset at a higher ratio)

The offset ratios are proposed to be via negotiated agreement with OEH, rather than using the Biometric Assessment Methodology. A large amount of biodiversity survey work has been undertaken onsite. The intention is to supplement rather than redo this survey work in the calculation of offset areas. Using the Biometric Assessment Methodology at this time would duplicate survey effort.

The proposed ratios below have been developed based on **ngh**environmental's experience with the Biobanking calculator in similar vegetation types as well as in negotiations with OEH for similar renewable energy projects. They are proposed as a starting point for a negotiated agreement. They have the benefit of being transparent to the proponent and the consent authority, facilitating an upfront understanding of the offset requirements for the project in advance of impacts occurring. Where multiple factors apply and their ratios are contradictory (i.e. threatened species habitat and low condition vegetation) it is proposed that the highest offset ratio would apply. Hollow bearing tree requirements (HBT) are supplementary to area offsets. While the Biometric Assessment Methodology has the advantage of being more clear cut, we propose a negotiated agreement that is flexible to achieving an overall beneficial outcome is better suited to the many individual sites that are likely to be included in the final offset plan.

Proposed offset ratios

Condition class	*Biometric condition3*	*Vegetation NOT OF conservation significance*	*Vegetation OF conservation significance*	*Threatened species habitat*
Poor	Low	1 : 1	1 : 2	1 : 2
Poor-moderate	Moderate- Good	1 : 1	1 : 2	1 : 2
Moderate	Moderate- Good	1 : 1	1 : 5	1 : 5
Moderate-good	Moderate- Good	1 : 1	1 : 10	1 : 10
Good	Moderate- Good	1 : 1	1 : 10	1 : 10

Justification of these ratios is based on the following:

- In a recent project with Dubbo OEH office, a 1:5 ratio was endorsed by OEH for all native vegetation to be impacted; that being the ratio for the Grey –Crowned Babbler, considered to be the key significant species to be impacted. The ratios above are lower than this for degraded vegetation and higher than this for vegetation in moderate to good quality, achieving a comparative offset.
- In a recent project with Queanbeyan OEH office, a 1:10 ratio was suggested by OEH for Box Gum Woodland EEC with tree cover and 1: 5 ratio for EEC derived pasture. The ratios above are lower

[10] This is a five class condition categorization, documented within the BA and able to be easily related to the Biometric two-class condition categories.

than this for degraded vegetation and higher than this for vegetation in good quality, achieving a comparative offset.

- In a recent project with South West OEH office, a 1:1 ratio was endorsed by OEH for a common vegetation type. The offset site included better habitat values than the development site. The ratios above include 1:1 for common vegetation types and higher ratios for threatened species habitat values, achieving a comparative offset.
- In several Biobanking Assessments undertaken using the BioBanking calculator, EECs in moderate to good biometric condition have returned ratios averaging 1:6. This can be verified as required.
- The Part 3A Transitional Project Biobanking Guidance for Offset Ratios allow a Tier 2 'no net loss' option rather than an 'maintain or improve' option, whereby lesser ratios are accepted if 'maintain or improve' cannot be achieved. This pathway must consider whether feasible alternatives to the clearing exist and the value of the resource (in this case wind energy). It is considered that the location of turbines and associated infrastructure is restricted by sites with suitable wind speed and that a lesser goal of 'no net loss' may be applicable to this project.

Based on the impact areas provided in Section 2 of this document, although over-estimated, around 180ha of Box Gum woodland derived grassland would be required to be offset. Around 25 ha of vegetation of other types would be required to be offset, including Box Gum woodland with tree cover (around 21 ha).

Most high conservation value areas have been avoided by the development and would therefore not require offsets at the highest ratios proposed. Most of the Box Gum woodland to be impacted is in a degraded condition and an average of 1:3 offset is considered likely, based on this. This would result in an offset site totalling approximately 600 ha. A preliminary identification of potential offset sites has identified around 650 ha of high conservation value areas (quality EEC and threatened species, dense areas of hollow-bearing trees) suitable for offsets. It is noted that, prior to detailed validation, condition of degraded areas has been overestimated in the impact calculations but that substantial areas are exotic dominated and lack tree cover. A detailed and appropriately timed survey has been proposed to ensure an accurate offset requirement is determined as part of the Offset Plan. By specifying up front ratios, the development is limited in its clearing by what can be offset, providing certainty regarding clearing amounts.

Hollows

Based on the estimates set out in Section 3 of this response, to offset the loss of hollow-bearing trees to be removed at a ratio of 1:10, around 1000 trees would need to be confirmed as being present in the offset area. Considering that offset lands are proposed in the high constraint areas (where more hollows are found), an offset of less than 1:10 in area is likely to be able to achieve this figure.

1.5 Identification of Potential Offset Sites

1.5.1 Criteria

The proponent would establish offsets within the private land holdings of the project site. This is an area of over 14,600 hectares.

Epuron have lease agreements with all involved landholders (where infrastructure is proposed to be located). These contracts stipulate that the land may be considered for biodiversity offsets. The intention is to select offset lands from within the project boundary. Broad scale mapping for the site identifies that the vegetation is representative of that that would be cleared and therefore allows a like for like offset criteria to be targeted. Additional criteria that would be used to select offset sites that will together make up the Offset Package include:

- Of sufficient combined size to achieve the set ratios above (or as negotiated with OEH)
- Complying with *Principles for the use of biodiversity offsets in NSW* guidance document (refer below for explicit reference to these principles)
- Will include provisions for offsetting Commonwealth listed EEC to demonstrate compliance with the Commonwealth offset policy.

- Selected to minimize:
    - Edge area
    - Number of land holdings
- Selected to maximize:
    - Landscape connectivity
    - Preservation of declining habitat types and resources
- Located no closer than 100m from a wind turbine (to minimise any indirect impacts of the wind farm)

Any areas of ambiguity will be clearly stated so that a decision can be made about the overall suitability of the site. For example, it may be that exact ratios and types are not achieved but the overall package is still considered to achieve an overall neutral or beneficial outcome. If so, this will be identified and justified.

While specific sites have yet to be identified, there are large amounts of land of suitable type and condition within the project boundaries to demonstrate that offsets are achievable. In principle agreements with landholders are in place.

1.5.2 Potential offset sites

Several areas able to meet the criteria above have been identified. It is likely that the final 'package' will comprise a number of sites. Areas of high constraint (to avoid), where these occur further than 100m from a turbine (in order to reduce indirect impact of turbines on these areas), are the most likely candidates. Where they can be secured in relatively continuous areas, they would represent the least ongoing management cost as they are already in good condition.

These include areas of EEC in better quality, habitat for Superb Parrot, where they occur in lower landscape positions, and would offset habitat loss for turbine construction, where they occur in higher landscape positions. They include areas of more intact woodland, providing hollow-bearing trees for a number of other threatened birds. They include areas where Yass Daisy occurs. Additionally, an area outside the development envelope has been identified as having high numbers of Golden Sun Moth (Nov-Dec 2013 surveys). This area would provide offsets for areas of impact to Golden Sun Moth habitat.

In total, sourced from the text of the biodiversity assessments, candidate areas include:

- Coppabella precinct
    - Box gum woodland EEC in moderate, moderate-good and good condition - Clusters 10, north west and central; 8, 6 slope and small areas on 5; southern edge of Cluster 7; 3 north and central north. Gullies between Clusters 6 and 3, 6 and 7a, and between 5 and 7a; 3 east and north. Adjacent to Whitefields Road
    - Threatened species habitat - Clusters 3 and 10, small areas on 7, between Clusters 6 and 7a, and on the eastern slope of 3.
    - Hollow-bearing trees and mature paddock trees: Clusters 10, 3 north and 6; in paddock trees in low lying areas within transmission envelopes; and also adjacent to Whitefields Road.
    - Yass Daisy – Cluster 7a, south; Cluster 8, north; Cluster 10, north.
- Marilba precinct
    - Box gum woodland EEC in moderate, moderate-good and good condition - Cluster 7
    - Threatened bird species habitat (Speckled Warbler, Diamond Firetail, and Superb Parrot) Clusters 3, 4, 6 and 7.
    - Yass Daisy - Clusters 4, 6 and 7
    - Golden Sun Moth – Cluster 2, north
- New areas (transmission easement and peripheral areas, covered in the SER)

- Box-Gum Woodland EEC/CEEC
- Moderate-Good and Good condition areas Yass Daisy
- Movement corridors

1.5.3 Summary

Some of the larger and more connected areas cited above have been mapped to indicate a potential offset package. The total area mapped totals around 650 ha. Without breaking down the specific offset requirements, this generally achieves a 1: 3 ha offset. On this basis, the security of offsets for the project is considered to be highly feasible.

1.6 For Each Offset Site

As part of the development of the Offset Plan, the following information would be documented.

1.6.1 Baseline data

Desktop assessment

Evaluation of potential for threatened species to occur onsite, with reference to prior to field work and data base searches, below:

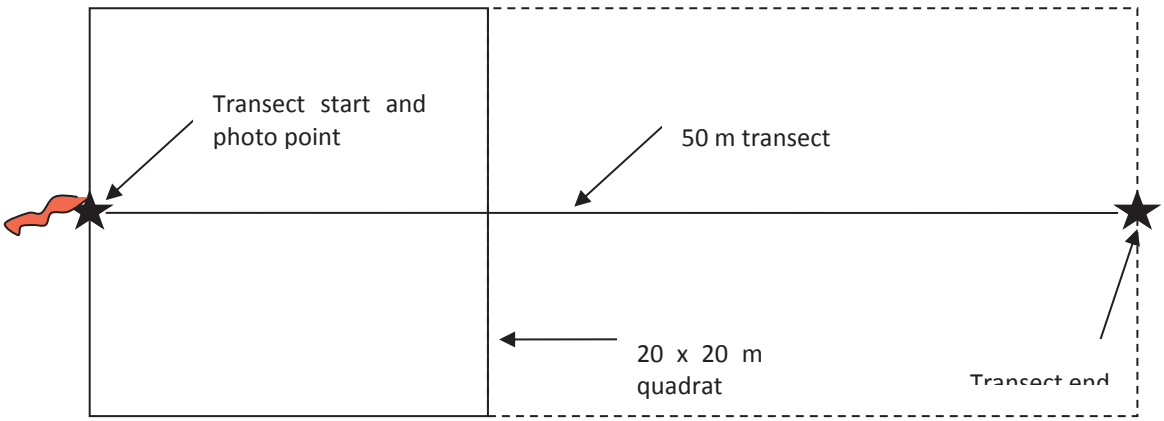
- The OEH threatened species database to identify species listed as threatened under the NSW *Threatened Species Conservation Act 1995* (TSC Act).
- The DSEWPC protected matters search tool to identify species listed as threatened or migratory under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act).

Field survey

A field survey would be undertaken by an ecologist. This would include:

- Mapping of vegetation types and condition
- Establishment of monitoring plots
- Onground validation / assessment of habitats for threatened species with the potential to occur at the site

BioBanking plots would be established in accordance with the BioBanking Assessment Methodology (BBAM, DECC 2009) to collect baseline data on vegetation structure and quality. The location of the plots would be marked using 1650mm star pickets to facilitate the replication of the plots. The ends of the star pickets would be painted white to enable easy identification in the field. Star pickets would be placed at the start and end of the 50 metre transect required by the BBAM and their co-ordinates recorded. To delineate the start point of transects, orange flagging tape would be tied to the top of the appropriate picket. The 20 x 20 metre quadrat required by the BBAM would be conducted within an area bounded by the first 20 metres of the transect and extending 10 metres either side as shown below. Photo points would be established at each of the start points of the transects, with views along the length of the transect.



Monitoring plot layout

Data evaluation

Data recorded from the BioBanking monitoring plots were compared with the benchmark data for the vegetation type as provided in the BioBanking vegetation types benchmark database (DECC 2008). Monitoring plot data would also be entered into the BioBanking Credit Calculator (BBCC) version 2 to obtain a baseline site value score for dominant vegetation formations at each site.

1.6.2 Key biodiversity risks, opportunities and relevant local initiatives

As a background to the development of appropriate management actions for the site, key biodiversity risks, opportunities and relevant local initiatives for each site would be documented.

1.6.3 Site specific management actions

Offset site management measures are required to be specific to each area in question. These measures aim to result in an improvement in the biodiversity values of the site and are designed to be adaptive (informed by a monitoring regime). These management measures would be incorporated into a detailed management plan for each offset site (one plan per landowner).

Management measures would be developed with reference to the Biobanking Management Plan template and with input from the CMA. Examples of likely measures are included below.

Example offset site management measures

Management measure	*Objective*	*Justification*	*Action*	*Timing*
Exclusion of stock	To prevent overgrazing and encourage regeneration of native vegetation	Grazing would be likely to degrade habitat.	▸ Install stock proof fencing around the perimeter of the Offset Site.	▸ At establishment of the Offset Site. ▸ Ongoing repairs as required.
Weed control	To minimise the occurrence of weeds within the Offset Site particularly Weeds of National Significance (WoNS) and listed noxious weeds.	Weeds compete with native species and degrade habitats.	▸ Survey to identify target locations for weed control. ▸ Weed control using appropriate methodologies considering target species and landscape context.	▸ At establishment of the Offset Site. ▸ Ongoing as required.
Rabbit control	To minimise the risk of the Offset Site becoming a refuge for rabbits.	Increased rabbit numbers can reduce native regeneration and support higher numbers of pest animals such as cats and foxes.	▸ Monitor for presence of rabbits. ▸ Conduct baiting or controlled grazing to reduce the ability of the site to act as a refuge to rabbits. ▸ Where possible, coordinate baiting with adjacent landowners to maximise effects	▸ Consideration given to action on the basis of monitoring results.

1.7 Verification of the Actual Area of Native Vegetation Clearing

Verification of the actual area of impact of the constructed wind farm and transmission line is required to be verified, prior to finalising the CPVPs. This provides an incentive throughout construction to minimise impacts and thereby reduce the offset requirement for the project. It also verifies that the actual amount and type of clearing undertaken is offset, as required.

It is expected that a detailed Biodiversity Management Plan would be prepared to guide construction. This would contain updated vegetation mapping specific to the final infrastructure layout (refer to note on micrositing above). Verification of the actual area of native vegetation clearing can be undertaken as an audit after construction. (Incentives to minimize clearing would be an appropriate stipulation in EPC contracts).

1.8 Formalisation of Individual CPVPs & Funding Arrangements

Offsets would be governed by conservation mechanisms to ensure long-term protection and management of the site, including funding arrangements.

A Conservation Property Vegetation Plan (CPVP) would be implemented on each involved private land holding. The process would be driven by Epuron, with input from each landholder. The CPVP would include management actions associated with the offset area that would apply in perpetuity.

To ensure that the CPVP is binding on successors in title, an abstract of the CPVP would be registered with the Land and Property Management Authority under the *Real Property Act 1900.* The CPVP would be a legally binding agreement under both the *Native Vegetation Act 2003* and the *Threatened Species Conservation Act 1995*. The terms of the CPVP would not be affected by any changes to local or state planning rules or new listings of threatened species. A CPVP can be varied at the landholder's request, provided the variation would still improve or maintain environmental outcomes.

As the CPVP is attached to the land title, the landowner is ultimately responsible for funding the management actions required at the Offset Site and monitoring the effectiveness of their implementation. However the Proponent would take responsibility for management and would ensure the landowner has sufficient resources and information to implement the management actions for the operational life of the project, as management of offsets would form a condition of the project's consent.

Even though a CPVP is binding in perpetuity, it is acknowledged that there is less incentive to manage the offset site after the decommissioning of the wind farm. Therefore, it is proposed that the bulk of the management actions be focused in the early years of the project. Monitoring and reporting, as outlined above, would demonstrate whether this is being satisfactorily achieved and allow a point for the consent authority to intervene.

1.9 Requirement to Monitor the Offset Site

In order to ensure that biodiversity improvement is occurring within the offset sites (and therefore that a 'maintain or improve outcome' can be met over time), monitoring is required.

Monitoring is recommended to be repeated initially, every two years. As a part of monitoring surveys, a report would be prepared to document the success or otherwise of management and adaptations required to obtain better results.

Reporting is proposed every two years to the Department of Planning and Infrastructure, until such time as this is deemed acceptable to cease. The reports would also be submitted to OEH for comment.

A decision to reduce or continue bi-annual reporting may also be made by DPI or OEH following submission of each report. A final report should be prepared prior to decommissioning of the project, to verify that a 'maintain or improve' outcome is being met and that residual management actions can largely coincide with routine agricultural land management.

1.10 Maintain or Improve

With the effective implementation of the stages outlined above, a 'maintain or improve' outcome would be achieved for the project. By the coordinated selection of offset sites over such a large area, and their management for biodiversity improvement, a regional scale beneficial biodiversity impact is anticipated. Benefits are expected to include:

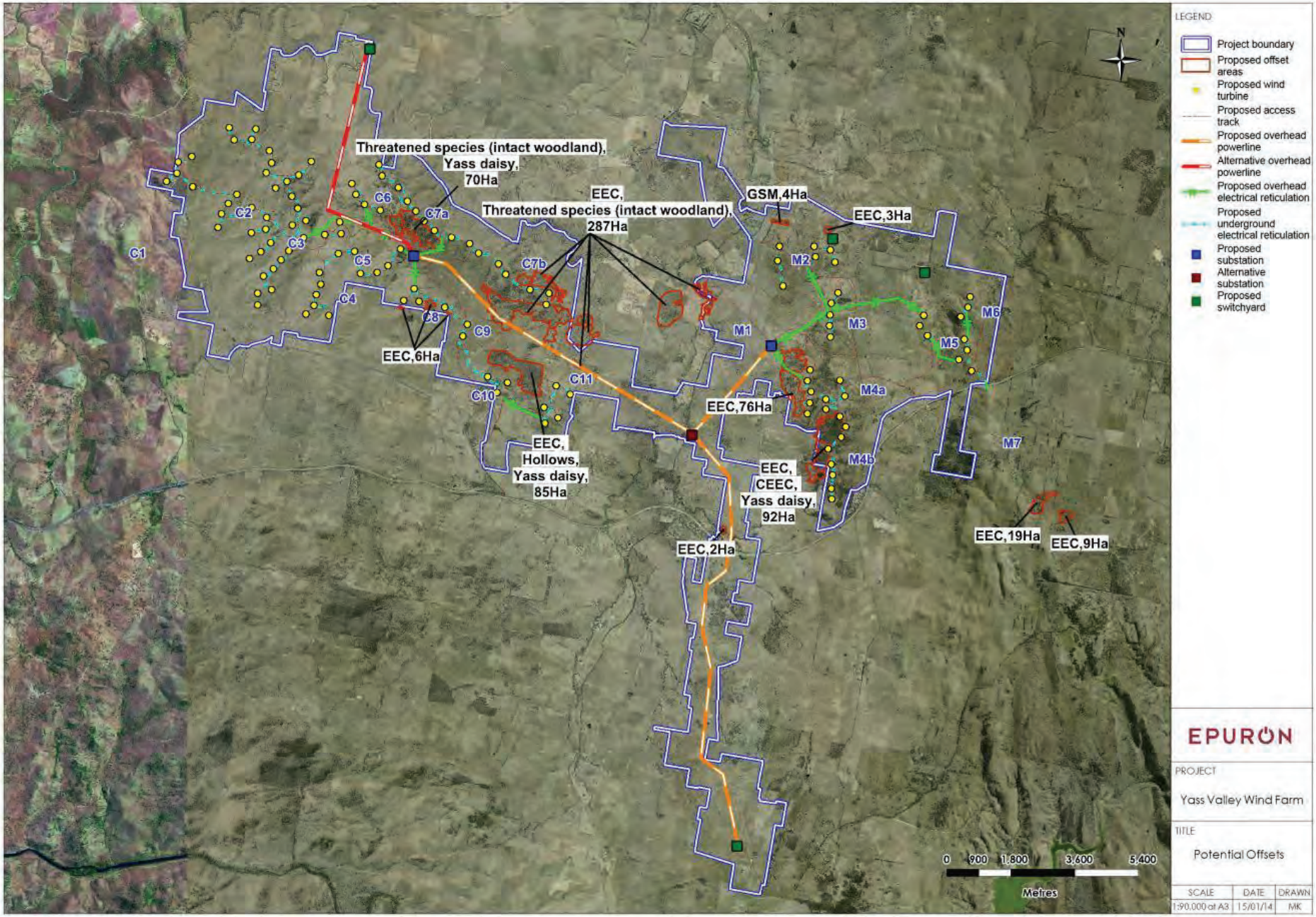
- Incentive to minimize clearing during the detailed design and construction phases of the wind farm project
- Targeted and coordinated weed and feral animal management, informed by ecologists working with landowners
- Retention of declining habitat resources including hollows, fallen timber and logs, riparian habitats
- Protection of specific habitat linkages and wildlife corridors
- Improved infrastructure to assist management including fencing and access

1.11 Principles for Biodiversity Offsets in NSW

The biodiversity offset principles developed by the former DECCW (now OEH) would guide the selection and management of the offset site, namely:

Impacts must be avoided first by using prevention and mitigation measures.	*The BA sets out mitigation measure to minimse impacts. The aim of the offset package is to ensure that where impacts cannot be avoided, or sufficiently minimised, the residual impact would be offset in perpetuity.*
All regulatory requirements must be met.	*Offset land is required as part of the approval conditions for the project. The proposed offsets would not be used to satisfy approvals or assessments under other legislation.*
Offsets must never reward ongoing poor performance.	*Monitoring would be required as part of the implementation of management actions for the offset site.*
Offsets will complement other government programs.	*The Offset Package would be finalized in consultation with OEH and the CMA, allowing any local programs or initiatives to be considered and included.*
Offsets must be underpinned by sound ecological principles.	*Selection criteria have been developed to ensure the location of offset sites is appropriate. Management measures have been outlined by an ecologist. Specific management plans would accompany each CPVP, developed in consultation with the CMA and the proponent.*
Offsets should aim to result in a net improvement in biodiversity over time.	*Management actions would be developed specific to each offset site (one per private property).*
Offsets must be enduring - they must offset the impact of the development for the period that the impact occurs.	*Native vegetation clearing impacts are deemed permanent and therefore the offset sites would be preserved and managed in perpetuity.*
Offsets should be agreed prior to the impact occurring.	*The offset criteria set out in this document form part of the proposal. If approved, the commitment is carried over as a condition of consent. The commitment includes consultation with OEH and the CMA to ensure the final offset package is acceptable, prior to construction impacts.*
Offsets must be quantifiable - the impacts and	*An estimation of impact has been provided based on GIS mapping. Criteria have been proposed that provide clear*

benefits must be reliably estimated.	*quantification of offsets, based on the actual area cleared.*
Offsets must be targeted.	*Refer to selection criteria.*
Offsets must be located appropriately.	*Refer to selection criteria.*
Offsets must be supplementary.	*Offsets would be comprised of private land not currently under any form of biodiversity conservation protection. In this way the land would be additional to government reserves and programs. Refer to selection criteria.*
Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.	*A CPVP would be attached to the title of the offset land (one per landowner). To ensure that the CPVP is binding on successors in title, an abstract of the CPVP would be registered with the Land and Property Management Authority under the Real Property Act 1900. The CPVP would be a legally binding agreement under both the Native Vegetation Act 2003 and the Threatened Species Conservation Act 1995. The terms of the CPVP would not be affected by any changes to local or state planning rules or new listings of threatened species. A CPVP can be varied at the landholder's request, provided the variation would still improve or maintain environmental outcomes.*


Threatened species (intact woodland), Yass daisy, 70Ha
EEC, Threatened species (intact woodland), 287Ha
GSM,4Ha
EEC,3Ha
EEC,6Ha
EEC,76Ha
EEC, Hollows, Yass daisy, 85Ha
EEC, CEEC, Yass daisy, 92Ha
EEC,2Ha
EEC,19Ha
EEC,9Ha
C1
C2
C3
C4
C5
C6
C7a
C7b
C8
C9
C10
C11
M1
M2
M3
M4a
M4b
M5
M6
M7
LEGEND
Project boundary
Proposed offset areas
Proposed wind turbine
Proposed access track
Proposed overhead powerline
Alternative overhead powerline
Proposed overhead electrical reticulation
Proposed underground electrical reticulation
Proposed substation
Alternative substation
Proposed switchyard
N
0 900 1,800 3,600 5,400
Metres
EPURON
PROJECT
Yass Valley Wind Farm
TITLE
Potential Offsets
SCALE 1:90,000 at A3
DATE 15/01/14
DRAWN MK

Appendix H – Golden Sun Moth Survey Report & Locations and Potential Habitat Maps

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16 December 2013

Ref: 1410

Dear Brooke,

Re: Golden Sun Moth *Synemon plana* surveys – Yass Valley Wind Farm

The following provides a brief account of the methods and results of a series of opportunistic surveys conducted for Golden Sun Moth *Synemon plana* in the south western slopes of NSW (north-west of Yass) during late November early December 2013.

The study area was defined as areas where infrastructure for the Yass Valley Wind Farm may be located. This comprised two precincts: Copabella Hills to the west and Marilba to the east.

1. BACKGROUND

1.1 Status

Golden Sun Moth (GSM) is listed as 'critically endangered' under Section 179 of the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999; 'endangered' under the NSW *Threatened Species Conservation Act* 1995 and ACT *Nature Conservation Act* 1980 and 'threatened' under the Victorian *Flora and Fauna Guarantee Act* 1988.

1.2 Habitat & Diet

Adult moths have no functional mouth-parts and as such have no ability to feed during their short (1-2 day) life stage. All food in-take is undertaken during the two to three year larval stage. Although recent studies have been conducted on the gut contents of GSM larvae there are no known published data.

The current view on larval diet is based on observations of oviposition sites and the presence of cast pupae cases.

Previous studies by O'Dwyer & Attiwill (1999) regard Wallaby Grass *Rytidosperma* (syn. *Austrodanthonia*) spp. as the preferred larval food for GSM and suggest the density of *Rytidosperma* may be a contributing factor affecting GSM distribution. In the ACT, the putative larval food for GSM is considered to be *Rytidosperma carphoides* (Edwards 1990 & 1993 in Braby & Dunford 2006) although the selection of other food sources (including other *Rytidosperma* sp.; Spear Grass *Austrostipa* spp. and Red-leg Grass *Bothriochloa macra*) is suspected and GSM may also have the capacity to supplement, or switch, to exotic Chilean Needle Grass *Nassella neesiana* when other native grasses have been significantly depleted (Braby & Dunford 2006). This behaviour is also discussed in Richter *et al.* (2009), whom suggest that until the relationship between GSM and *N. nessiana* is better known grasslands containing both *N. nessiana* and large populations of GSM should be maintained. Nevertheless, GSM is still considered to be an ecological specialist dependent on a narrow range of larval food species (Braby & Dunford 2006).

1.3 Geographic Distribution

Golden Sun Moth was previously widespread throughout south-eastern Australia, but due to the loss and fragmentation of its preferred habitat (natural temperate grasslands and grassland/woodland mosaics) the species is now largely restricted to isolated sub-populations across disparate habitat fragments in Victoria, NSW and ACT, which as at 2009 amounted to 45, 48 and 32 known sites, respectively (DEWHA, 2009). While the number of known sites is likely to have risen since that time the limiting habitat conditions are unlikely to have changed.

1.4 Genetic Distribution

Genetic samples taken from 1,500 GSM individuals from 46 populations throughout the species' known geographic range were analysed (Clarke 2001; Clarke & Whyte 2003) and resulted in the grouping of GSM into five major genetic clusters, these are:

- Group 1 (Victorian populations);
- Group 2 (NSW - Washpen Creek and Grace's Flat);
- Group 3 (NSW - between Yass and Boorowa);
- Group 4 (NSW - Murrumbateman); and,
- Group 5 (ACT and immediate environs).

1.5 Optimal Weather Conditions for Survey

Surveys for GSM should coincide with the peak breeding periods (indicated by flying adult male moths), which, usually occurs between late October and early January.

Optimal weather conditions for observing GSM are:

- warm to hot day (above 20°C by 10am);
- warmest part of the day (between 10am and 2pm);
- clear or mostly cloudless sky;
- still or relatively still wind conditions; and,
- at least two days since rain.

2. METHODS

2.1 Survey Techniques

Golden Sun Moth surveys were conducted over a 5-day period (20, 25 and 26 November 2013 and 2 and 3 December 2013) at 100 proposed turbine sites. Another 48 turbine sites were not visited due to either time constraints or restricted/limited access.

All sites were surveyed using either a random meander or point count method in accordance with prescribed survey techniques outlined in *Survey Guidelines for Golden Sun Moth* (Conservation, Planning and Research, ACT Government, November 2010). The exception being that multiple site visits were not undertaken.

Locations of GSM were recorded on a hand-held Garmin ™ 60 GPS.

2.2 Vegetation

Descriptions of dominant herbaceous groundcover were noted at each turbine site and at other locations where moths were observed (see Table 1).

Additional survey time was allocated to areas of native grassland/pasture or grassy woodland that were either dominated by or contained a significant proportion of Wallaby Grass *Rytidosperma* species.

2.3 Weather Conditions

Weather conditions during the survey were variable ranging from cool to hot and occasionally with strong wind. Maximum temperatures ranged from 18^0 C on 25 November to over 30^0 C on 2 and 3 December. Wind speeds were greatest during the 25 and 26 November with gusts estimated at +40km/hr. Rain was not recorded during or immediately prior to any session. Details of weather conditions during each site visit are included in Table 1.

Conditions were consistent with the recommended GSM survey guidelines on 20 November and 2 and 3 December. However, temperatures were below the minimum requirement on 25 November and wind gusts exceeded the recommended guideline on 25 and 26 November. Despite these sub-optimal conditions moths were observed free flying, in large numbers, at some locations.

The Copabella Hills precinct was surveyed on 2 and 3 December, during ideal conditions.

3. RESULTS

Survey results and site details are provided in Table 1.

3.1 Vegetation

Vegetation at proposed turbine sites ranged from native pasture of variable diversity, non-native pasture and weed dominated areas, often associated with sheep camps. Surrounding vegetation comprised dry grassy woodland/forest, grassy woodland, rocky outcrop shrubland/herbfield, secondary grassland and pastures in various states.

3.2 GSM Surveys

244 male and one female GSM were recorded at 34 separate locations during the survey period. All observations were reported within the Marilba precinct. Despite the presence of suitable habitat no GSM were recorded in the Copabella Hills precinct.

Golden Sun Moth was recorded at ten proposed turbine sites with the remaining observations either between turbine sites or in surrounding lowland areas. Moths were widely distributed in the Marilba precinct with the majority of sightings in the western half of the precinct. Moth densities ranged from low (a few individuals) at waypoints GSMYASS 4 and GSMYASS 16 to moderate (GSMYASS 11) and high (GSMYASS 23). The highest recorded moth density was at waypoint GSMYASS 23 (situated in the north-western portion of the precinct) where many 100s of male GSM were observed in 7-8 ha paddock during a 15-minute period (Plate 1). No other observation of GSM came close to this figure. Relative moth densities at other sites were: between 20-30 moths at two locations (GSMYASS 9 and GSMYASS 11); between 10-19 moths at three locations (GSMYASS 22, 24 and 31); and fewer than 10 moths at the remaining 28 sites.

A single female GSM was observed at GSMYASS 18, which was the only female observed during the survey.

At least twelve turbine sites in the Marilba precinct and eight in the Copabella Hills precinct contained suitable grassland habitat though no GSM were recorded. Previous vegetation assessments suggest that eleven sites in the south-eastern portion of the Marilba precinct (sites 138 to 148) also contain suitable grassland habitat, but could not be accessed during the current survey.

Extensive areas of native pasture were also observed on a number of properties during the course of the survey and may provided suitable habitat for GSM.

Plate 1: Paddock (GSMYASS 23) in which many 100s of GSM were observed. Vegetation comprised native pasture of low to moderate diversity.

4. DISCUSSION

All GSM were recorded within the Marilba precinct in the east portion of the study area. The highest densities were recorded at GSMYASS 23 on 26 November between 11:30 and 11:45 during sub-optimal weather conditions.

All GSM observations correlated with grassland that was either dominated or comprised a high proportion of Wallaby Grass *Rytidosperma* spp., although not all such grasslands were observed to contain moths. As follow up surveys were not undertaken the presence of GSM at these sites could not be discounted.

Moths were observed in a variety of topographic situations including broad grassy valleys, low rolling grassy hills - some partially timbered - mid slopes and rocky hill tops.

Yours sincerely

Tom O'Sullivan

Bluegum Ecological Consulting

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Table 1. Field data provided by Blue Gum Ecological has been summarised by nghenvironmental to show only those locations where GSMs were detected. Results cover the Yass Valley Wind Farm proposal site as well as the Conroys Gap proposal site.

Turbine Site ID	Site Description	Altitude	Easting	Northing	No. of individuals	Vegetation description
	Lowland paddock	469	652498	6155096	56.5	Native pasture: *Rytiosperma spp., Austrostipa sp., Vulpia sp., Microlaena stipoides, Elymus scaber* dominant, low incidence of exotics
Between 83-92	Saddle	715	653863	6149904	30	Mixed grassland *Rytiosperma spp., Bromus sp., Vulpia sp., Aira sp., Microlaena stipoides, Lolium perenne, Hypochaeris radicata*
91	Hill top	657	654116	6150543	20	*Rytidosperma spp, Austrostipa scabra, Vulpia sp., Lolium sp., Brome sp.*
	Mid slope E. aspect				18	As above
	Hill top	688	653897	6147380	10	*Rytiosperma spp., Austrostipa scabra., Avena sp., Echium sp., Convolvulus erubescens, Microlaena stipoides, Bromus sp.*
	Valley	524	653125	6146395	10	Mixed pasture: Rytidosperma spp., Austrostipa spp., Vulpia sp., Bromus sp.
	Upper slope W. aspect	716	657436	6151337	8	*Rytiosperma spp., Austrostipa scabra, Bromus sp.*
	Mid slope S. aspect	633	654095	6148891	8	*Rytiosperma spp., Austrostipa sp., Elymus scaber, Bothriochloa macra, Briza maxima, Convulvulus erubescens, Enneapogon nigricans, Anthoxanthum odoratum?*
	Lowland	511	651090	6149714	7	Mixed pasture *Avena sp., Rytidosperma spp.*
	Mid slope	617	653983	6152087	7	Mixed grassland *Avena sp., Bromus sp., Rytiosperma spp., Microlaena stipoides, Bothriochloa macra.*
Between Site 91-94	Mid slope	685	654167	6150287	7	Mixed grassland *Rytiosperma spp., Austrostipa scabra, Bromus sp., Austrostipa scabra, Microlaena stipoides, Vulpia sp., Avena sp.*
	Mid slope	661	654142	6150442	6	*Rytidosperma spp., Bothriochloa macra, Avena sp., Briza maxima, Vulpia sp., Carthamus lanatus, Echium sp.*
104	Mid slope, saddle	703	657662	6151411	5	*Rytiosperma spp., Austrostipa scabra, Bothriochloa macra, Briza sp., Elymus scaber, Vuplia sp., Enneapogon nigricans*
136-131	Mid slope to hill top	723	658286	6150107	4	*Rytidosperma spp. Austrostipa spp., Avena sp.*
	Lowland paddock	559	655575	6149910	4	Mixed grassland *Brome sp., Rytiosperma spp., Hordeum sp.,* Also paddock trees.
	Low lying flat	564	654934	6150856	4	*Mixed pasture Rytiosperma spp., Microlaena stipoides, Lolium perenne, Bromus sp.*
	Saddle	587	653612	6154201	4	*Rytiosperma spp., Austrostipa scabra, Bromus sp., Vulpia sp., Carthamus lanatus, Microlaena stipoides, Elymus scaber*
	Hill top	643	653816	6152487	3	Mixed grassland *Avena sp., Bromus sp., Rytiosperma spp., Microlaena stipoides,*

Turbine Site ID	Site Description	Altitude	Easting	Northing	No. of individuals	Vegetation description
						Bothriochloa macra.
92	Hill top	719	653739	6149780	3	Mixed grassland *Rytiosperma spp., Austrostipa scabra, Brome sp., Hypochaeris radicata, Avena sp., Echium sp.*
Between Site 103-104					3	*Rytidosperma spp* dominant, *Austrostipa scabra, Bothriochola macra, Elymus scaber, Enneapogon nigricans, Bromus sp., Avena sp., Microlaena stipoides*
	Mid to lower slope W. aspect	665	657263	6151453	3	*Rytidosperma spp, Austrostipa sp.*
	Valley	522	652873	6154317	3	Native pasture: *Rytiosperma spp., Austrostipa sp., Bothriochloa macra, Microlaena stipoides* dominant, low incidence of exotics
93	Mid slope	643	654285	6149255	3	*Rytiosperma spp., Bothriochloa macra, Austrostipa sp., Vulpia sp., Enneapogon nigricans, Hypochaeris radicata, Echium sp., Carthamus lanatus, Elymus scaber, Anthoxanthum odoratum*
94	Hill top	697	654218	6150135	2	*Bromus sp., Lolium sp., Austrostipa scabra, Rytidosperma sp., Hordeum sp.,*
	Mid slope	703	654122	6149983	2	Mixed grassland *Rytiosperma spp., Austrostipa scabra, Bromus sp., Vulpia sp., Avena sp., Echium sp.*
106	Hill top	723	657799	6150875	2	*Rytiosperma spp., Austrostipa scabra, Vulpia sp.*
	Rocky mid slope	689	657236	6151196	2	*Rytiosperma spp., Austrostipa scabra, Vuplia sp., Bromus sp., Echium sp.*
96	Hill top	683	653870	6147515	2	Native pasture: *Rytiosperma spp., Austrostipa sp., Vulpia sp., Microlaena stipoides, Elymus scaber* dominant, low incidence of exotics
	Lower slope to flat	513	653088	6147220	2	Native pasture: *Rytiosperma spp., Austrostipa sp., Avena sp., Vulpia sp., Bromus sp., Hypochaeris radicata, Hypericum perforatum*
	Mid slope N aspect	673	653929	6148400	2	*Rytiosperma spp., Bothriochloa macra, Microlaena stipoides, Avena sp., Vulpia sp., Bromus sp., Hypericum perforatum, Elymus scaber*
89	Mid slope S-W aspect	650	653795	6148627	2	*Rytiosperma spp., Austrostipa sp., Elymus scaber, Bothriochloa macra, Briza maxima, Vulpia sp., Bromus sp., Hypocharis radicata, Enneapogon nigricans, Hypericum perforatum, Leptorhynchos squamatus, Anthoxanthum odoratum*
Between Site 86-88	Hill top	706	653190	6150488	1	*Mixed composition variegated thistle, Avena sp., Rytidosperma sp.*
	Lowland	506	652450	6150374	1	Mixed pasture Rytidosperma spp. and variety of exotic grasses.
131			658286	6150107	1	*Rytidosperma spp. Austrostipa scabra, Elymus scaber, Enneapogon nigricans, Avena sp., Bromus sp., Dactylis glomerata*

Golden Sun Moth Survey Effort and Records