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YASS VALLEY WIND FARM

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1 INTRODUCTION

1.1 BACKGROUND AND PRIMARY AIM OF THIS REPORT

Separate biodiversity assessments were undertaken for the Marilba and Coppabella Hills precincts in relation to the development and operation of wind farm infrastructure in 2009. These precincts together constitute the Yass Valley Wind Farm proposal which was submitted to the Department of Planning for validation in August 2009 and placed on public exhibition in November 2009. Up to 66 turbines were proposed for the Marilba precinct and up to 86 turbines were proposed for the Coppabella Hills precinct; a total of 152 turbines.

Post-public exhibition, submissions related to the proposal, including agency and community submissions, were provided to the proponent in December 2009.

Based on a number of considerations, revisions have been made to the proposal since the original lodgement. These include the:

1. Removal of specific turbines and their associated access and electricity transmission infrastructure.
2. Relocation of specific turbines, with minor changes to associated access and electricity transmission line.
3. Addition of specific turbines, access and electricity transmission line easements and substations.

In many cases, the decision to remove or relocate infrastructure (**Points 1 and 2, above**) has been made to avoid or minimise potential biodiversity impacts, in response to agency comments and with reference to the biodiversity constraints mapping contained within the Marilba and Coppabella Hills Biodiversity Assessments (**ngh**environmental 2009a, 2009b). The revised project description is now for 148 turbines; four less than originally proposed.

Table 1-1 Revisions turbine number

Precinct	Marilba	Coppabella	Total
Original lodgement turbine number	66	86	152
Current revised turbine number	61	87	148

1.1.1 Audit of layout

Two audits of the layout were undertaken by **ngh**environmental, to provide advice to Epuron about:

- How well the revised layout addressed the comments provided by the Department of Environment, Climate Change and Water (now Office of Environment and Heritage; OEH) relating to removing or relocating turbines.
- How well the revised layout addressed the constraints mapping for the Marilba and Coppabella precincts, undertaken by **ngh**environmental as part of the biodiversity assessments for these precincts.

The audits were undertaken in September and October 2012. The final audit is provided as Appendix A of this report. The conclusion of this audit was that OEH's comments are generally addressed by the revised layout. In areas where they were not strictly met, there was an argument to be made that infrastructure

placement was consistent with avoiding the areas **ngh**environmental previously classified as high constraint areas (mapped within the Marilba and Coppabella Hills Biodiversity Assessments; **ngh**environmental 2009a, 2009b).

1.1.2 Scope of this report – areas not previously assessed

The primary aim of this Supplementary Ecology Report (SER) is to assess the addition of turbines, access and electricity transmission easements and substations (**Point 3, above**), in areas not previously assessed.

1.1.3 Additional considerations

In addition to assessing new areas proposed for development, this report considers:

- Specific Statements of Commitment (SoCs) included in the Yass Valley Wind Farm proposal that called for further survey; where this work has now been undertaken, the conclusions are provided and the SoCs amended.
- Agency comments, related to further survey; an approach to the further survey has been worded within amended SoCs.
- Offset requirements for the project; an approach has been developed and included within amended SoCs.

1.2 FORMAT OF THIS REPORT

This report is formatted as follows:

Section 1	**Introduction** • Background, scope and format of this report
Section 2	**Assessment of new areas proposed for development** • Describes the field survey undertaken in the new areas, outside areas previously assessed in the Marilba and Coppabella Hills Biodiversity Assessments. • Provides the results of the field survey, including maps of high, moderate and low constraint areas, within the new areas. • Assesses the impacts of the proposed development within the new areas, including impacts anticipated to occur during construction, operation and decommissioning and supported by assessments of significance (as relevant for NSW and Commonwealth listed species respectively). • Provides a summary of the key biodiversity issues, including maps of high, moderate and low constraint areas, within the new areas.
Section 3	**Follow up survey required by Statements of Commitment** • Demonstrates where specific follow up surveys have been undertaken. • Justifies the removal or modification of associated SoCs.
Section 4	**Revised Statements of Commitment** • Provides a revised set of recommendations to mitigate identified impacts.
Section 5	**Conclusion**
Section 6 & 7	**References and glossary**

Appendix A	**Yass Valley Wind Farm Audit (layout revision 2)**
Appendix B	**Approach to addressing DECCW requirements**
Appendix C	**New areas proposed for development – survey effort and results**
Appendix D	**New areas proposed for development – assessments of significance**
Appendix E	**New areas proposed for development – survey effort, results and constraints map sets**
Appendix F	**Revised impact area calculations: Yass Valley Wind Farm**
Appendix G	**Additional surveys**
Appendix H	**Offset strategy**

This report aims to avoid duplication with the existing biodiversity assessments and follow up studies. Where the conclusions of this assessment are consistent with the existing larger reports, this is stated and the relevant sections and reports are referenced rather than duplicated.

Unless otherwise stated, the terminology (including constraints categorisation) is consistent with the existing reports; refer to Section 8, glossary of terms.

2 ASSESSMENT OF NEW AREAS PROPOSED FOR DEVELOPMENT

The new areas assessed in this section are illustrated with reference to earlier assessment areas in Figure 2-1Figure 2-1. Three map sets are provided in Appendix E:

E.1 Survey effort

E.2 Survey results

E.3 Constraints

showing the detailed layout extents (Maps 1-9).

2.1 FLORA METHODS

2.1.1 Database reviews and threatened species evaluations

Database reviews and threatened species evaluation have been completed for earlier assessments undertaken for the Yass Valley wind farm (**ngh**environmental 2009a, 2009b). This work was reviewed and updated as required for the current survey.

Since the original evaluation undertaken in 2008-09, there have been a number of additional threatened plant species and communities listed in NSW which occur in the Murrumbidgee and Lachlan CMA regions, including Pale Grass Lily *Caesia parviflora* var*. minor,* Dwarf bush pea *Pultenaea humilis* and *Bossiaea fragrans*[1] (all in the Upper Slopes sub-region) and the Tablelands Snow Gum Black Sallee, Candlebark and Ribbon Gum Grassy Woodland EEC (Bondo and Murrumbateman sub-regions). However, none of these species or communities are likely to occur at the subject site based on habitat and distribution. The EPBC Act online search tool indicates no new Commonwealth listings in the study area.

2.1.2 General vegetation survey

Survey methods were consistent with earlier assessments conducted at the Yass Valley wind farm site (**ngh**environmental 2009a, 2009b). Relatively homogeneous vegetation units within the survey area were identified and mapped according to community, condition and physical values. Vegetation boundaries, survey sites and significant features were recorded in the field using 12 channel hand-held GPS units set to the GDA datum.

Approximately 21 person hours were spent on the field component of the general vegetation survey and mapping exercise (excluding travel to the site). The general survey comprised 14 random meanders (12 in Box-Gum Woodland, 1 each in River Red Gum Woodland and Broad-leaved Peppermint – Brittle Gum dry forest) and 11 inspection points. Further details regarding survey effort are provided in Appendix C.

[1] No common name.

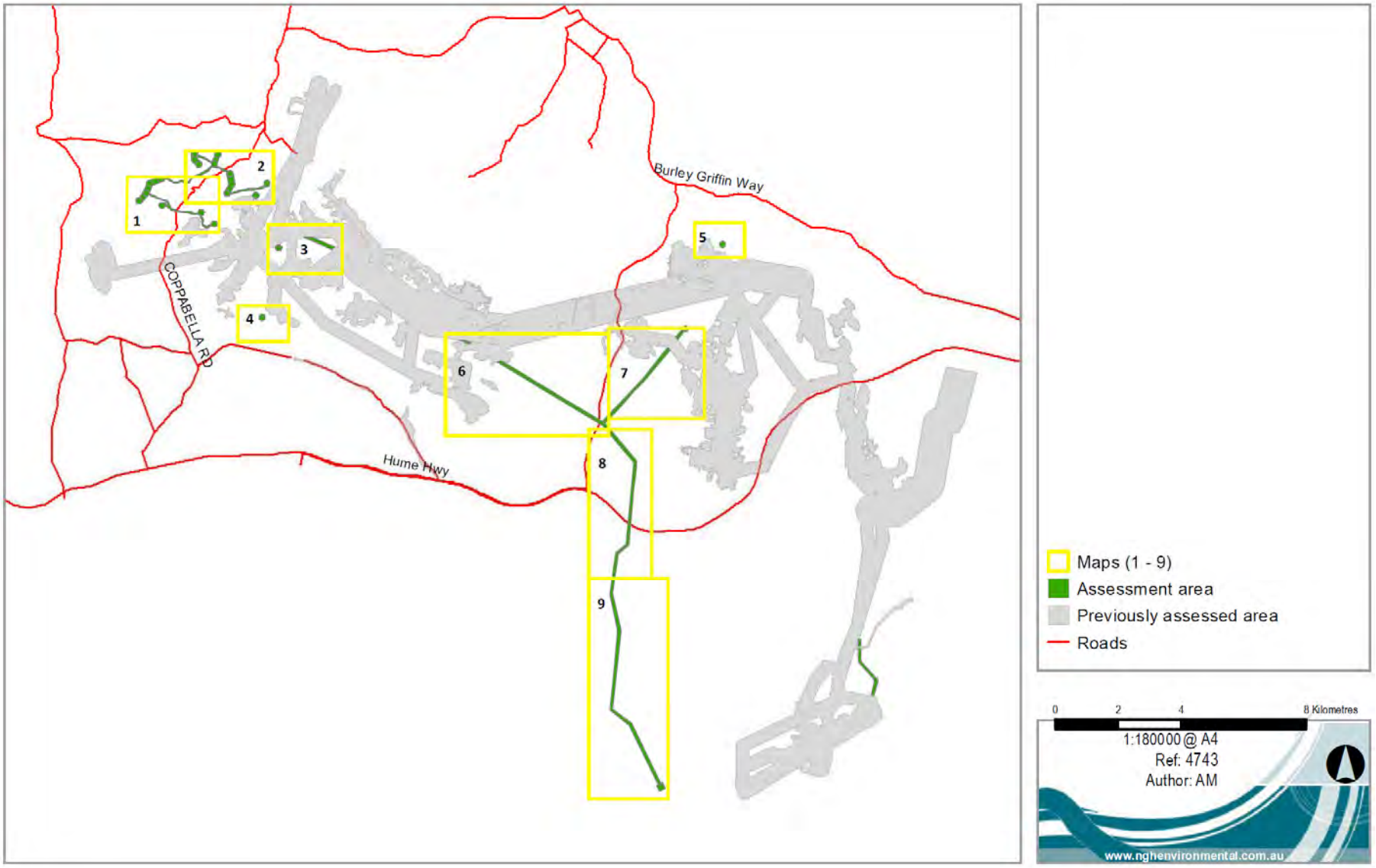

Figure 2-1 New assessment areas

Vegetation units were surveyed using formal random meanders (Cropper 1993) recording all native and introduced vascular species and cover/abundance values. Each random meander was up to 30 minutes in duration and covered an area up to 1 hectare. Random meanders rather than quadrats were used to extend survey coverage and maximise the potential for detecting rare or sparsely distributed species. Representative quadrats for each of the vegetation units were undertaken during earlier surveys at the Yass Valley wind farm site. In the case of lower conservation value vegetation (native pasture), random meanders were supplemented with inspection points, recording simply community and condition.

2.1.3 Condition scoring

Grassy vegetation condition was rated according to the following five-point scale, focusing on floristic integrity in the groundcover layer; refer Table 2-1. These classes are most relevant for naturally diverse grassy ecosystems, such as Box-Gum Woodland.

Table 2-1 Vegetation condition classes used at the site and Box-Gum Woodland EEC/CEEC and Biometric condition relationships

Condition class	Characteristics	CEEC[1]	EEC[2]	Biometric condition[3]
Poor	Groundlayer dominated by exotics (native grasses <50% cover)	No	No	Low
Poor-moderate	Groundlayer dominated by native grasses (>50%), with <5 native non-grass species	No	Yes	Moderate-Good
Moderate	Groundlayer dominated by native grasses (>50%), with 5-11 native non-grass species	No	Yes	Moderate-Good
Moderate-good	Groundlayer dominated by native grasses (>50%), with 12-24 native non-grass species	Yes	Yes	Moderate-Good
Good	Groundlayer dominated by native grasses (>50%), with >25 native non-grass species	Yes	Yes	Moderate-Good

[1] potential Commonwealth CEEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[2] potential NSW EEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[3] potential NSW Biometric condition status when applied to the Box-Gum Woodland community (floristic criteria only)

Condition thresholds were selected for compatibility with Commonwealth and State EEC and State Biometric condition criteria. The relationships between the condition classes, and EEC status and Biometric condition categories are shown in Table 2-1. Small and localised patches of pasture dominated by exotic annuals (such as sheep camps and degraded hill crests) or perennial grass weeds have been mapped according to the surrounding context, most commonly native pasture derived from Box-Gum Woodland.

2.1.4 Targeted threatened species searches

The broad area of occupancy for the Yass Daisy on the 'Ryalda' property in the east of the study area was identified and mapped in October 2009 (**ngh**environmental 2009c). Occurrences within the proposed underground cable route were surveyed using a targeted search within a 30 metre wide and 340 metre long survey area. The search area was traversed using 3-5 metre wide search transects. Isolated individual plants and discrete colonies were recorded and mapped. Plants within 2 metres were recorded as a single colony from a central point (except in the case of record number 9 – refer below). An additional alternative cable route on the north-western side of the main transect was also searched. Two ecologists spent 1.5 hours on this component of the survey.

2.1.5 Limitations

The scale of the development envelope meant that not every part of the new assessment area was able to be surveyed in detail. Candidate areas of low diversity native pasture were surveyed to record general species composition. Better condition vegetation was prioritised and surveyed in more detail. Potential threatened species habitats were subjected to targeted searches. The survey effort map demonstrates the survey coverage and areas that were extrapolated, based on our findings of surveys in adjacent areas.

The mid-spring timing of the survey meant that some late spring or summer flowering species which are inconspicuous or difficult to identify in their vegetative state will not have been recorded. Native species diversity may therefore have been under-estimated in some areas. However, it is considered that sufficient species were detectable to provide a reasonable measure of condition, conservation status and threatened species potential.

The wet spring timing also meant that many of the more degraded sites carried a proliferation of exotic annual forbs and grasses, particularly Subterranean Clover, Scotch Thistle, Bromes and Barley Grass. This reduced visibility and made it difficult to assess the relative cover of native grasses. In these cases a conservative approach was taken, noting surrounding pasture composition. The previous growing season also produced a dense sward of Kangaroo Grass at the Yass Daisy targeted survey site (site 35[2]), which may have obscured some smaller Yass Daisy plants. However, most plants were sufficiently advanced to be visible above the sward, and it is considered likely that at least some plants in each colony will have been recorded.

2.2 FLORA RESULTS

2.2.1 General survey results

The results of the vegetation survey are summarised in Table 2-2 and mapped in Appendix E[3]. Survey effort is summarised in Appendix C.1. Native and introduced species recorded in each vegetation community, and their cover/abundance scores, are listed in Appendix C.2.

The vegetation communities present at the subject site have been described in detail and attributed to vegetation types in the Marilba and Coppabella Precinct Biodiversity Assessments (**ngh**environmental 2009a, 2009b).

Vegetation derived from three natural communities was recorded during the current survey:

- White Box Yellow Box Blakely's Red Gum Woodland (Box-Gum Woodland)
- River Red Gum Woodland
- Broad-leaved Peppermint – Brittle Gum Dry Forest.

The majority of the current survey area carries low diversity native pasture derived from Box-Gum Woodland. Patches of tree cover are present on rocky crests, steeper slopes and along some drainage

[2] Site numbers (1-35), used to describe areas of investigation, are overlaid in yellow on the survey results and constraints mapping, Appendix E. Turbine numbers are overlaid in white on all three map sets (survey effort, results, constraints).

[3] The infrastructure layout underwent several minor changes in response to the survey findings. Survey effort and results map sets show the assessed layout while the constraints map set was redone to show how the adjusted final layout responds to the identified constraints.

lines. Ridgetops and crests are often highly degraded by soil erosion, sheep camping and nutrient accumulation; cover in these areas at the time of the survey was dominated by exotic weeds, particularly annual grasses and thistles. Wetter areas in paddocks are also commonly dominated by exotic grasses such as Yorkshire Fog (**Holcus lanatus*) and Cocksfoot (**Dactylis glomerata*).

Areas with tree cover are generally derived from Box-Gum Woodland, and comprise the trees White Box (*Eucalyptus albens*), Blakely's Red Gum (*E. blakelyi*), Yellow Box (*E. melliodora*) and Red Stringybark (*E. macrorhyncha*). Native shrubs are absent. Tree cover on slopes and saddles may be associated with higher diversity groundcover (for example sites 11 and 25), although this is not always the case. A short section of Coppabella powerline (site 13) and the original southern substation location (site 31) are in lower slope positions with relatively high diversity groundcover patchily dominated by Kangaroo Grass (*Themeda triandra*).

One small area of dry grass forest dominated by Broad-leaved Peppermint (*E. dives*) and Brittle Gum (*E. mannifera*) was included in the survey area (site 33).

Noxious weeds recorded at the subject site are consistent with those recorded during previous assessments in the study area (**ngh**environmental 2009a, 2009b). They include Paterson's Curse (**Echium plantagineum*), Horehound (**Marrubium vulgare*), Scotch Thistle (**Onopordum acanthium*), St John's Wort (**Hypericum perforatum*), Serrated Tussock (**Nassella trichotoma*), African Lovegrass (**Eragrostis curvula*) and Blackberry (**Rubus fruticosus* sp. agg.).

2.2.2 Communities of conservation significance

White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (NSW)

Disturbed vegetation derived from this community is included in the EEC if:

- Tree cover is present in a woodland formation, regardless of groundcover composition (DECC 2008a), including degraded remnants which have few, if any, native species in the understorey (NPWS undated)
- Areas are treeless but retain an 'intact understorey' (NSW Scientific Committee 2002), which is 'predominantly grassy' (NPWS undated). This has been interpreted to mean at least 50% native grass cover, consistent with Biometric criteria for Moderate-Good condition (DECC 2008b).

This broad definition encompasses a wide range of condition classes, including the low diversity native pasture which is widespread in the study area. The actual conservation value of disturbed vegetation is affected by stand condition, ecological function, recovery potential, the presence of significant species, local and regional levels of depletion, fauna habitat values and connectivity with other areas of natural vegetation.

The vast majority of the EEC at the site comprises very low diversity and treeless native pasture which is typical of unimproved grazing land in the district. A few treeless areas retain Kangaroo Grass cover and higher levels of flora diversity (sites 13, 31 and 35). Sites 11, 25 and 28 have tree cover and higher levels of groundcover integrity.

The indicative distribution of the EEC in the study area is illustrated on Appendix E[4]. A calculation of the area of impact to the EEC is provided in Table 2-1311.

[4] As stated previously, survey effort and results map sets show the assessed layout while the constraints map set shows the final layout.

Table 2-2 Yass Valley wind farm vegetation survey results summary

Site no.	Map references	Location	Vegetation unit	Condition[5]	CW CEEC	NSW EEC	Biometric condition	Constraint level
1	637638 6157588	T130, map 2	Box-Gum Woodland (tree cover)	Poor-moderate	No	Yes	Moderate-good	Moderate
2	637560 6157324	T129, map 2	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
3	637259 6157152	T73 - T129, map 2	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
4	638021 6156994	T69, map 2	Box-Gum Woodland (native pasture)	Poor	No	No	Low (localised)	Low
5	638118 6156671	T66, map 2	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
6	637973 6156390	T65, map 2	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
7	635390 6156386	T72, map 1	Box-Gum Woodland (native pasture)	Poor	No	No	Low (localised)	Low
8	635190 6156116	T70, map 1	Box-Gum Woodland (tree cover)	Poor-moderate	No	Yes	Moderate-good	Moderate
9	635896 6156000	T131, map 1	Box-Gum Woodland (native pasture)	Poor	No	No	Low (localised)	Low
10	653736 6155090	Nth of T114, map 5	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
11	653773 6154761	T114, map 5	Box-Gum Woodland (tree cover)	Moderate-good	Yes	Yes	Moderate-good	High
12	653768 6154609	Sth of T114, map 5	Box-Gum Woodland (native pasture)	Moderate	No	Yes	Moderate-good	Moderate
13	646625 6150899	Powerline, map 6	Box-Gum Woodland (grassland)	Moderate-good	Yes	Yes	Moderate-good	High
14	647398 6150580	Powerline, map 6	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
15	648120 6150144	Powerline, map 6	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
16	648495 6149866	Powerline, map 6	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
17	649484 6149319	Powerline, map 6	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
18	649820 6149209	Powerline, map 6	River Red Gum Woodland (tree cover)	Poor-moderate	No	No	Moderate-good	Moderate
19	652580 6152053	Substation, map 7	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
20	652440 6151950	Powerline, map 7	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
21	650464 6149568	Powerline, map 7	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
22	650323 6149471	Powerline, map 7	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
23	650762 6148106	Powerline, map 8	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
24	650944 6147290	Powerline, map 8	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low

[5] Condition categorisation is explained in Table 2-1.

Site no.	Map references	Location	Vegetation unit	Condition[5]	CW CEEC	NSW EEC	Biometric condition	Constraint level
25	650849 6146372	Powerline, map 8	Box-Gum Woodland (tree cover)	Moderate-good	Yes	Yes	Moderate-good	High
26	650374 6144666	Powerline, map 8	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
27	650236 6143250	Powerline, map 9	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
28	650407 6142114	Powerline, map 9	Box-Gum Woodland (tree cover)	Moderate	No	Yes	Moderate-good	Moderate
29	650698 6139578	Powerline, map 9	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
30	651625 6137877	Powerline, map 9	Box-Gum Woodland (native pasture)	Poor-moderate	No	Yes	Moderate-good	Low
31	651751 6137487	Substation, map 9[6]	Box-Gum Woodland (grassland)	Moderate-good	Yes	Yes	Moderate-good	High

[6] Original development site; refer section 2.6.3.

Yellow Box–White Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands Critically Endangered Ecological Community (Commonwealth)

The identification criteria for the Box-Gum Woodland CEEC are more stringent under Commonwealth legislation. Vegetation derived from Box-Gum Woodland forms part of the CEEC if the patch is greater than 0.1 ha, and either:

a) there are 12 or more native non-grass species in the understorey including at least one important species (based on a list issued by the Commonwealth), or

b) the patch is greater than 2 ha with an average of 20 or more mature trees per hectare, or natural regeneration of the dominant overstorey eucalypts.

Areas within the subject site belonging to the Commonwealth CEEC are shown in Appendix E[7].

Four survey sites were identified as CEEC based on the floristic diversity criterion:

Site 11, Turbine 114, map 5

White Box – Blakely's Red Gum woodland with 15 recorded native non-grass species

Site 13, Powerline, map 6

Dry grassland and damp drainage line, with 20 recorded native non-grass species

Site 25, Powerline, map 8

Red Stringybark woodland on steep south-facing slope, with 21 recorded native non-grass species

Site 31, Substation site (original development site – refer section 2.6.3), map 9

Grassland with 19 recorded native non-grass species.

All of these sites have at least one important species listed by the Commonwealth Government. Site 25 and possibly site 11 would also qualify as CEEC based on structural criteria. Previous surveys conducted at the Yass Daisy targeted survey site (site 35) recorded in excess of 30 native non-grass species (**ngh**environmental 2009a, 2009c), and this area would also belong to the CEEC (not within the area assessed by this section).

The indicative distribution of the Commonwealth CEEC is shown in the Appendix E.2 survey results map set. It corresponds to vegetation mapped as Box Gum Woodland (BGW) in moderate to good and good condition. These areas are also mapped as a high constraint (red) in the Appendix E.3 constraints map set. A calculation of the area of impact to the CEEC is provided in Table 2-10.

2.2.3 Species of conservation significance

The likelihood of the presence of threatened species in the study area has been evaluated in previous assessments undertaken for the Yass Valley wind farm (**ngh**environmental 2009a, 2009b). The Yass Daisy (*Ammobium craspedioides*), Hoary Sunray (*Leucochrysum albicans* var *tricolor*), Burrinjuck Spider Orchid (*Caladenia* sp Burrinjuck), Silky Swainson-pea (*Swainsona sericea*), Small Purple-pea (*Cullen parvum*) and Austral Toadflax (*Thesium australe*) have at least moderate potential to be present in the study area, based on known habitat and distribution ranges.

[7] As stated previously, survey effort and results map sets show the assessed layout while the constraints map set shows the final layout.

Searches for threatened woodland species were undertaken at better condition sites (sites 11, 13, 25, 28, 31). A targeted search for the Burrinjuck Spider Orchid was conducted in Broad-leaved Peppermint – Brittle Gum Dry Grass Forest at site 33. With the exception of the known Yass Daisy (*Ammobium craspedioides*) population at site 35, no threatened flora species were recorded at the survey sites. In view of the long term grazing history of the sites, the presence of threatened flora is considered unlikely.

Species recorded at better condition sites which are identified as highly significant 'level 2' species for the assessment of grassy ecosystems in NSW (Rehwinkel 2007) include *Asperula conferta, Bulbine bulbosa, Oreomyrrhis eriopoda, Hypericum gramineum, Hypericum japonicum, Pleurosorus rutifolius, Poranthera microphylla, Sebaea ovata, Thysanotus patersonii* and *Triptilodiscus pygmaeus*.

A range of regionally significant species have been recorded in the vicinity of site 35, including Yam Daisy (*Microseris lanceolata*), Milkmaids (*Burchardia umbellata*), Early Snake Orchid (*Diuris chryseopsis*), Onion Orchid (*Microtis unifolia*), Scaly Buttons (*Leptorhynchos squamatus*) and Billy Buttons (*Craspedia variabilis*) (**ngh**environmental 2006, 2009a, 2009c).

Yass Daisy targeted survey

The Yass Daisy was recorded in the vicinity of site 35 during previous surveys conducted by **ngh**environmental (2006, 2009a, 2009c). This species is listed as Vulnerable under both State and Commonwealth legislation.

a) b)

Figure 2-2 Yass Daisy

Accessed November 2012 from

a) http://www.envcomm.act.gov.au/soe/soe2004/Harden/conservingbiodiversity.htm

b) http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10043

The 1 hectare search area (30 metre x 340 metres) included equal proportions of grassland derived from Box-Gum Woodland and Broad-leaved Peppermint – Brittle Gum dry grass forest. Approximately 325 plants in 14 colonies were recorded in the search area, only in the Box-Gum Woodland-derived grassland in the south-western half of the search area (refer Table 2-3 and Figure 2-32). The record number 9 colony continues out of the search area toward the south; the mapped location represents the northern edge of the colony. The record number 10 colony is sited just north-east (upslope) of the existing access track which bisects the site.

An additional 10 metre wide corridor on the north-western side of the search area was also surveyed to confirm the suitability of a potential alternative cable route. No Yass Daisies were recorded in this additional survey area.

Table 2-3 Yass Daisy records

Record no.	Easting	Northing	No. plants
SW end[8]	658667	6146200	
1	658686	6146214	36
2	658692	6146206	1
3	658693	6146238	4
4	658693	6146243	2
5	658700	6146237	8
6	658706	6146240	11
7	658702	6146244	3
8	658709	6146245	4
9	658713	6146242	200+
10	658712	6146259	33
11	658718	6146262	8
12	658722	6146261	9
13	658734	6146277	4
14	658687	6146243	2
NE end	658867	6146467	

[8] The SW and NE ends define the search area and do not have number of daisies associated with them.

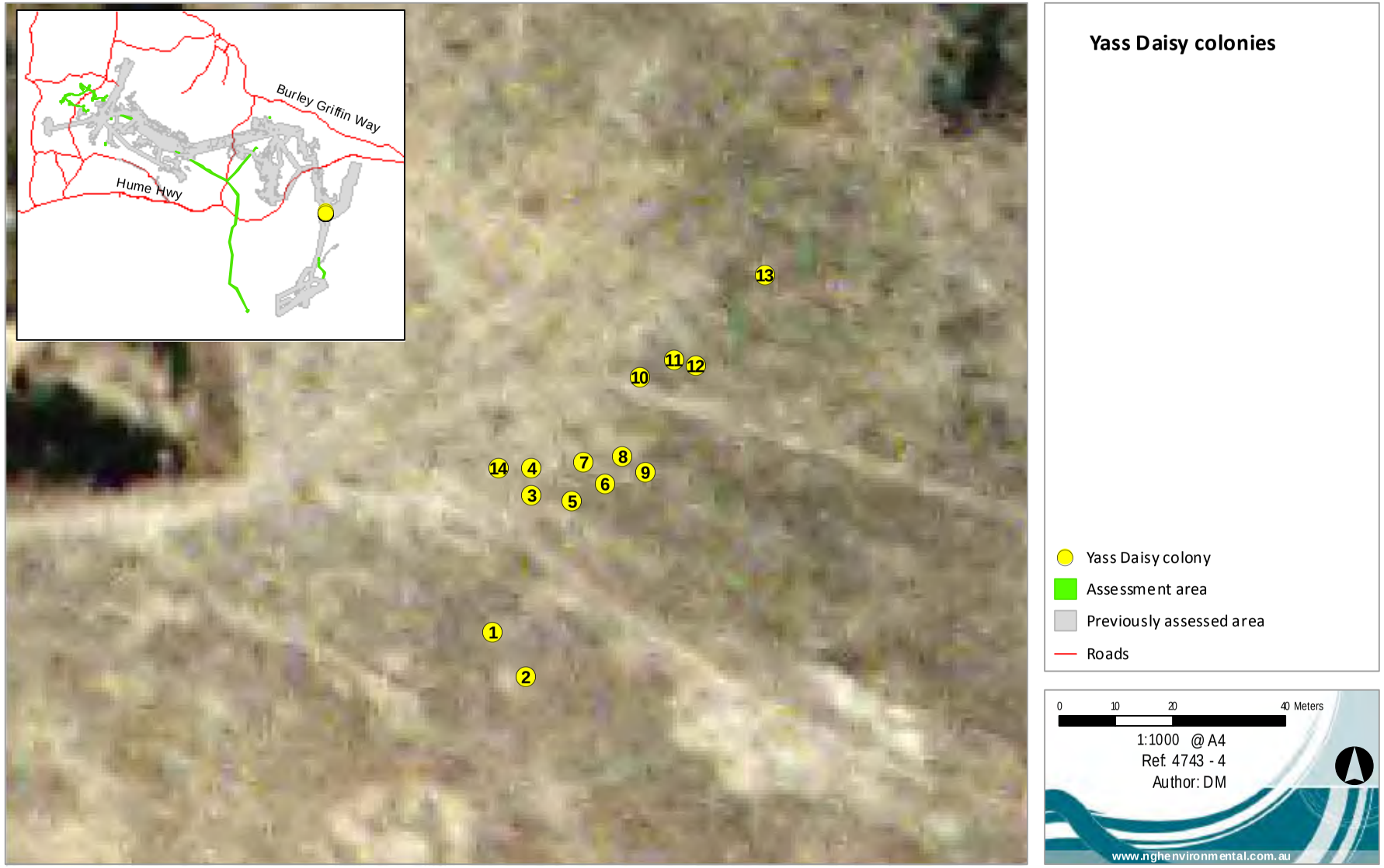

Figure 2-3 Yass daisy colonies (none were located within the new assessment area).

2.3 FAUNA METHODS

2.3.1 General habitat survey

The follow-up fauna survey was primarily by habitat assessment and was undertaken during 15-18 October 2012. Two types of habitat assessments were undertaken:

1. Detailed habitat evaluations (HE) to record habitat type, structure, condition and disturbance and note important habitat features and resources including abundance and quality of hollow-bearing trees. An assessment was made of the suitability of habitat for threatened species.
2. Brief habitat inspections (HI) to record habitat type and condition and note any important habitat features, such as hollow-bearing trees. An assessment was made of the suitability of habitat for threatened species.

Habitat evaluation/inspection sites and significant features were recorded in the field using 12 channel hand-held GPS units set to the GDA datum. The locations of HE and HI survey points is provided in the Appendix E.1 map set.

2.3.2 Targeted searches

Bird and reptile surveys were undertaken opportunistically in better quality habitat areas:

- Twenty minute bird censuses were undertaken as spot surveys and transects in better quality habitat areas to compile a species list.
- Reptile searches were undertaken opportunistically where potential habitat for Striped Legless Lizard *Delma impar* and Pink-tailed Worm-Lizard *Aprasia parapulchella* were identified: scattered loose medium sized rocks on gentle slopes in grassland or grassy Box-Gum Woodland were surveyed by rolling.

All opportunistic records of fauna were recorded including signs of fauna presence such as burrows and scats.

2.3.3 Limitations

Bird and reptile searches were undertaken opportunistically when suitable or better quality habitat was encountered, meaning that the surveys were not taken during ideal weather and time of day conditions. Ideally in warm weather, bird and reptile surveys would be undertaken in the cooler parts of the day in the morning and late afternoon. It is unlikely the full suite of species present would have been encountered during the opportunistic surveys.

2.4 FAUNA RESULTS

2.4.1 Habitat types

The habitat types within the new areas were consistent with those described in earlier assessments undertaken for the Yass Valley wind farm (**ngh**environmental 2009a, 2009b):

- Box-Gum Woodland and Long-leaved Box forest (variable age structure and condition)

- Dry grass forest
- Native pasture (variable diversity and exotic component)
- Wetland and riparian habitats (seepages, creeks, dams and drainage lines)
- Rock outcrops

Box-Gum Woodland

Box-Gum Woodland occurs in a woodland formation as well as scattered trees over pasture and along linear features (such as creeks or tracks). Open woodland is considered here to consist of trees between around 40 and 100 metres apart; scattered trees are where trees are more than 100 metres apart. In this survey, woodland refers to trees spaced between 10 and 40 metres with an approximate crown cover of 20-50%. In one area (site 25, Appendix E.2 Map 8), a regenerating patch of Box-Gum Woodland occurs in a forest formation. Generally, the Box-Gum Woodland habitat surveyed is consistent with the descriptions provided in the *Marilba Biodiversity Assessment*. In terms of habitat values for threatened species, the findings of this survey differ slightly from the *Marilba Biodiversity Assessment,* as described below.

Although many of the paddock trees still appear stressed, the above average rainfall received over the years since the 2008 and 2009 surveys has greatly improved conditions for vegetation. Consequently, the majority of trees appear healthy and there was evidence of flowering and fruiting. The better quality stands encountered during this survey provide habitat for woodland birds including the threatened Little Eagle *Hieraaetus morphnoides* and Brown Treecreeper *Climacteris picumnus*. Generally, woodland areas surveyed had a simple habitat structure, with little fallen dead timber and litter to provide suitable microhabitat for species such as Hooded Robin *Melanodryas cucullata*. Mistletoe was present in most locations. Although hollow-bearing trees are present, the absence of a midstorey and shrubby understorey makes the habitat unlikely to be suitable for mammals such as Squirrel Glider *Petaurus norfolcensis*.

An example of low condition woodland habitat which contributes to landscape connectivity and provides threatened species habitat (site 1, Appendix E.2 Map 2 – Turbine 130).

An example of good condition woodland habitat (site 28, Appendix E.2 Map 9) along the powerline.

Figure 2-4 Examples of woodland habitat

Dry grass forest

Only one area of dry grass forest was encountered along the powerline route on the Kaveney property; site 33 (HI12), outside of the new assessment areas. This was a regenerating area of forest in a saddle with few hollow-bearing trees and simplified habitat structure. The forest contributes to landscape connectivity, provides habitat for woodland birds and microbats but does not provide a discreet habitat area for threatened forest marsupials. The habitat is likely to be insufficiently complex or mature to provide habitat for Rosenberg's Goanna *Varanus rosenbergi* (requires termite mounds, hollow logs, burrows and crevices and large areas of habitat).

Native pasture

The description and habitat values of native pasture habitat given in the *Marilba Biodiversity Assessment* are consistent with the habitat surveyed in the new areas, although dead stumps and logs were not frequently encountered along ridge crests.

Dams, wetlands and riparian habitats

In the latest development envelope, (ephemeral) wetland and riparian habitats were more prevalent and in better condition than when surveyed during the drought impacted years of 2008 and early 2009. Intermittent watercourses and soaks were vegetated predominately with grasses and sedges, and provided habitat for common frogs and shallow-water water birds such as White-necked Heron *Ardea pacifica* and White-faced Heron *Egretta novaehollandiae*. The habitat is unlikely to be sufficiently complex to provide habitat for more cryptic water birds such as bitterns. Intermittent watercourses and boggy grassland areas, extensive throughout the site, may also provide habitat for the threatened Sloane's Froglet *Crinia sloanei.*

Dam at site 19, Appendix E.2 Map 7 (HE06) adjacent to the proposed substation.

A typical boggy grassy flat at the head of an ephemeral waterway, at site 13, Appendix E.2 Map 6 (HE08) at the proposed substation location.

Figure 2-5 Typical wet habitat types in the development envelope

Rock outcrops

The extent, description and habitat values of rock outcrops portrayed in the *Marilba Biodiversity Assessment* are generally consistent with the habitat surveyed in this current survey, with a few exceptions. The majority of ridge-crest rock outcrops consisted of large deeply embedded boulders.

Single rocks, deeply embedded boulders and solid rock outcropping as well as areas with only a few scattered loose surface stones are not considered to provide potential habitat for the threatened reptiles Pink-tailed Worm-lizard *Aprasia parapulchella* and Striped Legless Lizard *Delma impar* (Osborne 2009). Several slopes provided potential low quality habitat for Pink-tailed Worm-lizard consisting of well-drained sites with a cover of partially embedded rocks within native dominant but heavily disturbed grassland or sparse Box-Gum Woodland habitat. One area (near site 29 substation and powerline) provided potential moderate quality habitat (for Pink-tailed Worm-lizard and Striped Legless Lizard) with loose and partially embedded surface rock scattered through Kangaroo Grass dominant native grassland along the flats and lower slopes.

Site 31, Appendix E.2 Map 9 (HE09) – Westerly slope with native grassland and scattered partially embedded and loose rock

Site 31, Appendix E.2 Map 9 (HE09) – rock habitat

Site 10, Appendix E.2 Map 5 (HE04) scattered partially embedded and loose rock habitat in exotic grassland

Site 6, Appendix E.2 Map 2 (HI16, Turbine 65) scattered partially embedded and loose rock habitat in native dominated grassland

Figure 2-6 Areas of rock habitat suitable for threatened reptiles Pink-tailed Worm-lizard, Striped Legless Lizard and Little Whip Snake *Suta flagellum*

Rare or limiting habitat features

CONNECTIVITY LINKAGES

Several areas surveyed do not represent high quality habitat of themselves, but it is clear that they contribute to landscape connectivity. Examples are site 1, Appendix E.2 Map 2 (HE03, Turbine 130) and site 11, Appendix E.2 Map 5 (HE05, Turbine 114). In these areas, the habitat varies from weedy pasture

with scattered trees to regenerating woodland. But a range of birds were observed to move across the landscape via these sites, including Brown Treecreeper.

HOLLOW-BEARING TREES

Mature trees with Diameter at Breast height (DBH) greater than 60 centimetres are more prevalent within the new assessment areas than at those surveyed in the original *Marilba Biodiversity Assessment.* This may be because the majority of the additional development envelope consists of electricity transmission line and these are located across a range of landscape positions, not just focused on ridge lines and hilltops, as for turbines. Generally, one or more hollow-bearing tree was present at most survey sites. At site 19 and 13 (Appendix E.2 Maps 7 and 6; HE06 and HE08), the mean DBH was around 90 centimetres while at site 8 (Appendix E.2 Map 1; HE12) the mean DBH was 80 centimetres. At these sites, trees with hollows bore multiple hollows at a range of sizes.

Where present, abundance of hollow-bearing trees generally occurred at a range of between 0.2 to three hollow-bearing trees per hectare. In this survey, two or more hollow-bearing trees per hectare is considered a high abundance of hollows; one per hectare a moderate abundance; and less than one a low abundance. High hollow abundance was recorded at site 25 (Appendix E.2 Map 8; HE11) near where the transmission line crosses the Hume Highway (~3 hollow-bearing trees / hectare), site 1 (Appendix E.2 Map 2; HE03) at Turbine 130 (~2.6 hollow-bearing trees / hectare) and site 3 (Appendix E.2 Map 1; HE02) along the proposed track between Turbine 129 and Turbine 73 (~2.5 hollow-bearing trees / hectare). Average abundance was 2.2 hollow-bearing trees per hectare in woodland areas and 0.6 hollow-bearing trees per hectare in pasture with scattered trees.

Table 2-4 Density of hollow-bearing trees at habitat evaluation and inspection sites

Note Heading column 1: Site no. refers to the site numbers given in the survey results maps, Appendix E.2. HE/HI refers to the habitat evaluation (HE) or habitat inspection (HI) sites, shown on effort maps, Appendix E.1. This allows cross-correlation with field data forms and GIS files.

Site no. (HE form)	Location	Hollow-bearing trees / hectare
	Woodland	
Site 9 (HE01)	Turbine 131	2
Site 3 (HE02)	Proposed track to Turbine 129	2.5
Site 11 (HE05)	Turbine 114	1
Site 19 (HE06)	Substation	2
Site 28 (HE10)	Powerline	2
Site 25 (HE11)	Powerline	3
Site 8 (HE12)	Turbine 70	1
Site 27 (HI10)	Powerline	3
	Average for woodland	*2.1*
	Pasture with scattered trees	
Site 1 (HE03)	Turbine 130	2.6
Site 10 (HE04)	North of Turbine 114	0
Site 18 (HE07)	Powerline where crosses Illalong Creek	0
Site 13 (HE08)	Substation	1
Site 4 (HI02)	Turbine 69	0

Site no. (HE form)	Location	Hollow-bearing trees / hectare
Site 29 (HI07)	Powerline	0.25
Site 22 (HI08)	Powerline	0.2
	Average for scattered trees	*0.6*

Typical paddock tree with multiple hollows (this one at site 29 – Appendix E.2 map 9 HI07, along the powerline

Figure 2-7 Example of hollow-bearing scattered tree

2.4.2 Species recorded

Seventy-four species of fauna were observed during the recent survey; 59 of which were bird species. A species list is given in Appendix C. Eleven species of bird additional to those recorded during 2008 and 2009 surveys were observed (Table 2-5). Three threatened bird species were observed on site: Brown Treecreeper, Diamond Firetail *Stagonopleura guttata* and Little Eagle (all 'Vulnerable' under the TSC Act). One bird species listed as 'Migratory' under the EPBC Act was recorded: Rainbow Bee-eater *Merops ornatus.* Five raptor species were recorded: Black-shouldered Kite *Elanus axillaris,* Brown Falcon *Falco berigora,* Little Eagle, Nankeen Kestrel *Falco cenchroides,* and Wedge-tailed Eagle *Aquila audax.* One regionally rare species was recorded: Crimson Chat *Epthianura tricolor.*

Brown Treecreeper and Diamond Firetail were recorded in the north-west of the site along Coppabella Road. Brown Treecreeper was recorded again at Turbine 130. These records were from both treed and

poor condition sparsely treed areas. Little Eagle was recorded on two separate occasions foraging over vegetation along Illalong Creek where the proposed powerline would cross.

Table 2-5 Additional bird species recorded in this survey (November 2012)

Species name	Common name
Climacteris picumnus	Brown Treecreeper
Cacomantis variolosus	Brush Cuckoo
Epthianura tricolor	Crimson Chat
Myiagra rubecula	Leaden Flycatcher
Phalacrocorax sulcirostris	Little Black Cormorant
Todiramphus sanctus	Sacred Kingfisher
Aphelocephala leucopsis	Southern Whiteface
Gerygone fusca	Western Gerygone
Artamus superciliosus	White-browed Woodswallow
Ardea pacifica	White-necked Heron
Lalage sueurii	White-winged Triller

2.4.3 Species of conservation significance

Threatened species evaluations from previous assessments in the study area (**ngh**environmental 2009a, 2009b) were reviewed following this survey. The new assessment areas provide similar habitat to that in the original development envelope and the threatened species with potential to occur are similar. As discussed in Section 2.4.1, the habitat types are consistent although some difference in the value of this habitat has been noted. With reference to species of conservation significance, no additional habitat areas were identified for Hooded Robin *Melanodryas cucullata*, Koala *Phascolarctos cinereus*, Squirrel Glider *Petaurus norfolcensis* or Brush-tailed Phascogale *Phascogale tapoatafa*).

There have been a suite of species added to threatened species listings under the TSC or EPBC Acts since the Biodiversity Assessments. Newly listed species with potential to occur are shown in the table below together with their likelihood of occurrence.

Table 2-6 Threatened and migratory fauna species with potential to occur (Note: this does not include species that were recorded in this survey or in previous surveys, as they are known to occur)

Species and status	Potential to occur	Location of potential habitat	Risk of impact
Raptors			
Spotted Harrier *Circus assimilis* V TSC	Moderate – more likely to inhabit the lowland parts of the DE such as powerline corridor and substation.	Throughout – wide ranging species.	Low
Woodland			
Varied Sittella *Daphoenositta chrysoptera* V TSC	High – suitable habitat throughout woodland and pasture with scattered tree habitat.	Throughout woodland and pasture with scattered trees where hollow-bearing trees and/or older trees with dead limbs occur.	Moderate
Little Lorikeet	Moderate – suitable habitat in	Throughout woodland and	Low

Species and status	Potential to occur	Location of potential habitat	Risk of impact
Glossopsitta pusilla V TSC	woodland with hollow-bearing trees.	pasture with scattered trees	
Bush Stone-curlew *Burhinus grallarius* E TSC	Low – very few records in area (based on ALA, Bionet and Birdata searches), suitable microhabitat not present (open woodland with short, sparse grasses scattered fallen timber, leaf litter and bare ground).	Not applicable.	Not applicable.
Grassland / pasture with scattered trees			
White-fronted Chat *Epthianura albifrons* V TSC	High – known to occur in the area and microhabitat requirements consistent with habitat present.	Grassland - substation on Armour & Nils Taube properties.	Moderate
Sloane's Froglet *Crinia sloanei* V TSC	Moderate – habitat generalist.	Pasture with scattered trees and grassland in lower elevation areas.	Low

2.5 CONSTRAINTS

The biodiversity constraints categorisation for the new areas is similar to previous assessments (**ngh**environmental 2009a, 2009b) and is restated below.

Table 2-7 'Traffic light' constraint classes and description

Level of constraint	Colour	Description
High constraint	Red	Impacts in these areas may be significant and should be avoided. Impacts cannot be offset or may be very costly to offset. Further assessment may be required to inform impact significance.
Moderate constraint	Orange	Impacts to these areas should be minimised and / or will require specific measures to manage impacts. Residual impacts should be offset.
Low constraint	Green	No specific mitigation measures required – development most appropriately located in these areas.

Biodiversity values that constrain the proposed development in the new areas assessed include:

- Vegetation of conservation significance in good condition
- Presence (or high likelihood of presence) of threatened flora and fauna and their habitat
- Rare or limiting habitat features
- Likely movement corridors for birds and bats

With reference to the new assessment areas, these are summarised below and illustrated in the Appendix E, Constraint Map Set[9].

Table 2-8 Key biodiversity constraints within the development envelope

Biodiversity feature	Location	Constraint class
Flora		
Box-Gum Woodland EEC/CEEC **Poor-moderate and moderate condition areas**	Mapped Appendix E.2 Results Map Set and Appendix E.3 Constraints.	Moderate.
Box-Gum Woodland EEC/CEEC **Moderate-Good and Good condition areas**	Mapped Appendix E.2 Results Map Set and Appendix E.3 Constraints.	High – avoidance.
Yass Daisy	Mapped Figure 2-32. (outside the new assessment areas, hence not provided in Appendix E).	High – avoidance.
Fauna		
Threatened species habitat **Includes pasture with scattered trees and woodland**	Coppabella Road, Illalong Creek and Turbine 130.	Moderate.
Hollow-bearing trees and mature paddock trees	Woodland and pasture with scattered trees – refer to Table 2-4.	Moderate - (pre-clearance surveys recommended in these areas).
Scattered rock in native dominant pasture	Site 10, (Appendix E.2 Results Map 5), site 6 (Appendix E.2 Results Map 2 and site 31 (Appendix E.2 Results Map 9 - powerline corridor).	Moderate - (pre-clearance surveys recommended in these areas).
Movement corridors	Includes pasture with scattered trees and woodland through the site.	Generally, high in woodland/forest and moderate in open woodland and scattered trees. The constraints mapping for this issue is consistent with the Box-Gum Woodland EEC/CEEC above.

[9] As stated previously, survey effort and results map sets show the assessed layout while the constraints map set shows the final layout.

2.6 IMPACT ASSESSMENT

2.6.1 Impact types

The impact types relevant to the development of wind turbines (including footings, laydown and hardstand areas), access tracks, underground and overhead electricity transmission infrastructure, substations, control buildings, concrete batching and construction compounds for the proposal are consistent with those described in the previous assessments conducted by **ngh**environmental (2009a, 2009c). Primarily, these include:

Construction impacts: Loss and modification of habitat (direct vegetation and habitat removal but also effects from compaction, noise, weed and soil and water pollution risks).

A certain level of minimisation of impact is assumed, where cabling can be located in track verges and footings can be located to minimise tree removal. Rapid stabilisation and revegetation of disturbed areas is assumed.

Operational impacts: Minor impacts associated with maintenance vehicle access (noise, weed and soil and water pollution risks), collision risks and avoidance of habitat due to operational turbines (relevant to specific bird and bat species).

The operational risk assessment was reviewed for this assessment in light of new information and the risk assessment was revised for two bird and two microbat species (Table 2-99).

Table 2-9 Updated risk assessment for operational impacts

Note: values given in brackets are from the original assessment.

Species	Risk to individuals at site	Risk to populations
Wedge-tailed Eagle *Aquila audax*	Moderate – high (moderate)	Low - moderate (moderate-high)
White-throated Needletail *Hirundapus caudacutus*	Moderate – high (low-moderate)	Low (low)
Gould's Wattled Bat *Chalinolobus gouldii*	Moderate – high (low)	Low – moderate (low)
White-striped Freetail Bat *Tadarida australis*	High (moderate)	Low-moderate

2.6.2 Impact areas

Revised impact area calculations were undertaken in order to:

- Provide one combined impact area estimate for the previously assessed areas at Coppabella and Marilba as well as the new assessment areas covered by this supplementary report.
- Address OEH comments regarding the calculation of permanent and temporary impacts areas. Specifically,
    - Clearing and routine maintenance of transmission easements in Box Gum Woodland (with trees) is considered permanent habitat loss.

- Clearing and routine maintenance of transmission easements in Box Gum Woodland (pasture) is considered temporary habitat loss.
- Areas to be rehabilitated only after decommissioning are considered permanent habitat loss.

With reference to the new assessment areas, several layout revisions were made to further reduce impacts in higher constraint areas, based on the recommendations from the site assessment. These changes have been endorsed by the onsite ecologist (pers. comm. Paul McPherson 7 November 2012) and are detailed in Section 2.6.3. The constraints map set in Appendix E shows how the adjusted final layout responds to the identified constraints.

Table 2-10 Impact area calculations for the new assessment areas only.

Yass Wind Farm											
Infrastructure		**Exotic Pasture**	**Native Pasture**	**BGW pasture**	**BGW trees**	**BGBPF**	**DSTF**	**LBDGF**	**RRG**	**BGWke**	**Total of all veg types**
Turbine footing [a]		0.000	0.000	1.088	0.038	0.000	0.000	0.000	0.000	0.000	**1.125**
Crane hardstand [b]		0.000	0.000	1.584	0.000	0.000	0.000	0.000	0.000	0.000	**1.584**
Tracks [a]		0.000	0.000	5.364	0.365	0.000	0.000	0.000	0.000	0.000	**5.729**
Underground powerlines onsite [b]		0.000	0.000	1.015	0.098	0.000	0.000	0.000	0.000	0.000	**1.113**
Overhead 33kV powerline cabling / easement [a *]		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
Overhead 33kV power pole footings [a]		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline [a *]	0.000	0.000	0.000	3.795	0.000	0.000	0.000	0.597	0.000	**4.392**
	Overhead power pole footings [a]	0.000	0.000	0.006	0.001	0.000	0.000	0.000	0.0002	0.000	**0.007**
	Substation and control bldg [a]	0.000	0.000	4.500	0.000	0.000	0.000	0.000	0.000	0.000	**4.500**
Concrete batch plant [b]		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
Construction compound, staging and storage [b]		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.000**
		0.000	**0.000**	**13.556**	**4.297**	**0.000**	**0.000**	**0.000**	**0.597**	**0.000**	**18.450**
Breakdown by impact type:											
a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)		0.000	0.000	10.958	4.199	0.000	0.000	0.000	0.597	0.000	**15.753**
b Temporary habitat loss (areas that can be rehabilitated post construction)		0.000	0.000	2.599	0.098	0.000	0.000	0.000	0.000	0.000	**2.697**

BGW: Box Gum Woodland, BGBPF: Brittle Gum – Broad-leaved Peppermint Forest, DSTF: Dry Shrub – Tussock Grass Forest, LBDGF: Long-leaved Box Dry Grass Forest, BGWke: Box-Gum Woodland – Kunzea ericoides, RRG: River Red Gum Woodland.

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

Table 2-11 Impact area calculations for the revised proposal; Coppabella, Marilba, and new assessment areas.

Yass Wind Farm		Impact areas				Vegetation types									
Infrastructure		**Quantity**	**Width (m)**	**Length (m)**	**Total Footprint (ha)**	**Exotic Pasture**	**Native Pasture**	**BGW pasture**	**BGW trees**	**BGBPF**	**DSTF**	**LBDGF**	**RRG**	**BGWke**	**Total of all veg types**
Turbine footing [a]		148	25	25	9.250	0.000	7.681	1.000	0.500	0.063	0.000	0.006	0.000	0.000	**9.250**
Crane hardstand [b]		148	22	40	13.024	0.088	10.340	2.552	0.088	0.000	0.000	0.044	0.000	0.000	**13.112**
Tracks [a]		1	8	110,800	88.640	6.400	60.352	15.648	5.968	0.159	0.000	0.000	0.040	0.000	**88.567**
Underground powerlines onsite [b]		1	2	64,630	12.926	0.789	9.862	2.018	0.158	0.066	0.000	0.037	0.000	0.000	**12.931**
Overhead 33kV powerline cabling / easement [a*]		1	14	15,480	21.672	0.000	0.000	0.000	0.840	0.000	0.000	0.522	0.000	0.000	**1.362**
Overhead 33kV power pole footings [a]		62	1	1	0.006	0.001	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	**0.007**
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline [a*]	1	16	25,510	40.816	0.000	0.000	0.000	5.290	0.000	0.000	0.000	0.947	0.000	**6.237**
	Overhead power pole footings [a]	103	1	1	0.010	0.001	0.000	0.010	0.001	0.000	0.000	0.000	0.0003	0.000	**0.012**
	Substation and control bldg [a]	3	150	150	6.750	0.000	0.000	6.300	0.000	0.000	0.000	0.450	0.000	0.000	**6.750**
Concrete batch plant [b]		2	75	100	1.500	0.000	0.750	1.500	0.000	0.000	0.000	0.000	0.000	0.000	**2.250**
Construction compound, staging and storage [b]		2	300	100	6.000	0.000	3.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	**6.000**
					200.595	**7.278**	**91.989**	**32.030**	**12.846**	**0.288**	**0.000**	**1.060**	**0.988**	**0.000**	**146.478**
Breakdown by impact type:															
a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)						6.402	68.037	22.960	12.599	0.222	0.000	0.979	0.988	0.000	**112.185**
b Temporary habitat loss (areas that can be rehabilitated post construction)						0.877	23.952	9.070	0.246	0.066	0.000	0.081	0.000	0.000	**34.293**

BGW: Box Gum Woodland, BGBPF: Brittle Gum – Broad-leaved Peppermint Forest, DSTF: Dry Shrub – Tussock Grass Forest, LBDGF: Long-leaved Box Dry Grass Forest, BGWke: Box-Gum Woodland – Kunzea ericoides, RRG: River Red Gum Woodland.

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

Based on these estimates, the proposed works would permanently remove up to 106ha of native vegetation.

Impact areas within vegetation of conservation significance are broken down further by condition class in the tables below for permanent and temporary habitat loss. Using the broad Biometric condition categories, approximately 23.2ha of Box Gum Woodland in moderate to good condition would be permanently removed.

Table 2-12 Maximum impact areas on Box Gum Woodland EEC vegetation for the new assessment areas only

Vegetation condition		Poor	Poor-Mod	Mod	Mod-Good	Good	Total
CEEC 1		no			yes		
EEC 2		no	yes				
BIOMETRIC CONDITION 3		low	mod - good				
Turbine footing [a]		0.313	0.813	0.000	0.000	0.000	**1.125**
Crane hardstand [b]		0.440	1.144	0.000	0.000	0.000	**1.584**
Tracks [a]		2.062	3.608	0.000	0.000	0.000	**5.670**
Underground powerlines onsite [b]		0.327	0.812	0.000	0.000	0.000	**1.139**
Overhead 33kV powerline cabling		0.000	0.000	0.000	0.000	0.000	**0.000**
Overhead 33kV power pole		0.000	0.000	0.000	0.000	0.000	**0.000**
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline [a *]	0.000	3.333	0.560	0.435	0.000	**4.328**
	Overhead power pole footings [a]	0.000	0.007	0.000	0.000	0.000	**0.007**
	Substation and control bldg [a]	0.000	2.250	0.000	2.250	0.000	**4.500**
Concrete batch plant [b]		0.000	0.000	0.000	0.000	0.000	**0.000**
Construction compound, staging		0.000	0.000	0.000	0.000	0.000	**0.000**
		3.141	**11.966**	**0.560**	**2.685**	**0.000**	**18.353**
Breakdown by impact type:							
a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)		2.374	10.010	0.560	2.685	0.000	**15.630**
b Temporary habitat loss (areas that can be rehabilitated post construction)		0.767	1.956	0.000	0.000	0.000	**2.723**

[1] potential Commonwealth CEEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[2] potential NSW EEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[3] potential NSW Biometric condition status when applied to the Box-Gum Woodland community (floristic criteria only)

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

Table 2-13 Revised maximum impact areas on Box Gum Woodland EEC vegetation; Coppabella, Marilba, and new assessment areas

Vegetation condition		Poor	Poor-Mod	Mod	Mod-Good	Good	Total
CEEC 1		no			yes		
EEC 2		no	yes				
BIOMETRIC CONDITION 3		low	mod - good				
Turbine footing [a]		0.313	1.125	0.063	0.000	0.000	**1.500**
Crane hardstand [b]		0.616	1.936	0.044	0.044	0.000	**2.640**
Tracks [a]		10.208	9.549	1.305	0.271	0.278	**21.611**
Underground powerlines onsite [b]		0.369	1.410	0.340	0.036	0.006	**2.162**
Overhead 33kV powerline cabling		0.000	0.717	0.122	0.000	0.000	**0.839**
Overhead 33kV power pole		0.001	0.001	0.000	0.000	0.000	**0.002**
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline [a *]	0.000	3.333	0.560	1.397	0.000	**5.290**
	Overhead power pole footings [a]	0.001	0.007	0.000	0.000	0.000	**0.009**
	Substation and control bldg [a]	4.050	2.250	0.000	2.250	0.000	**8.550**
Concrete batch plant [b]		0.750	0.750	0.000	0.000	0.000	**1.500**
Construction compound, staging		0.000	3.000	0.000	0.000	0.000	**3.000**
		16.308	**24.077**	**2.434**	**3.998**	**0.284**	**47.102**
Breakdown by impact type:							
a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)		14.573	16.981	2.049	3.918	0.278	**37.800**
b Temporary habitat loss (areas that can be rehabilitated post construction)		1.735	7.096	0.384	0.080	0.006	**9.302**

[1] potential Commonwealth CEEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[2] potential NSW EEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[3] potential NSW Biometric condition status when applied to the Box-Gum Woodland community (floristic criteria only)

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

2.6.3 Impact significance

Box-Gum Woodland EEC/CEEC

POOR-MODERATE AND MODERATE CONDITION AREAS

The EEC over the vast majority of the subject site is characterised by low diversity native pasture in poor-moderate condition. This vegetation is widespread in farmland throughout the region. The long history of grazing, fertiliser use and weed invasion means that the potential for natural regeneration is likely to be very low. The ridge crest turbine sites generally have high levels of weed cover and high nutrient loads, particularly in the north-west of the site. 12.56 ha of this vegetation (12.0 ha of poor-moderate and 0.56 ha of moderate condition native pasture and woodland) would be affected by the proposal.

Given the low conservation value of this vegetation, its abundance in the district and the highly localised and limited impacts associated with the proposal, impacts to poor-moderate and moderate condition grassland derived from Box-Gum Woodland are not expected to be significant.

MODERATE-GOOD AND GOOD CONDITION AREAS

Turbine 114 (site 11, map 5) and a proposed powerline (site 25, map 8) are located in patches of Box-Gum Woodland with tree cover in moderate-good condition. Two proposed substation sites are located on grassland derived from Box-Gum Woodland in moderate-good condition; site 13 (map 6) and site 31 (map 9). The proposed cable route at site 35 passes through grassland derived from Box-Gum Woodland in good condition. These areas belong to the Commonwealth Box-Gum Woodland CEEC and have been mapped as high constraint.

The layout has been further modified since the site assessment, as follows *(comments in italics)*:

Turbine 114 (site 11, map 5)

Investigate the potential to move this turbine out of the woodland with tree cover, such as into lower quality to the south of the site. *This turbine has been moved out of the high constraint area into an area of moderate constraint, to the north, reducing the significance of impacts.*

Powerline (site 25, map 8)

Investigate the potential to shift the powerline route to the east to reduce clearing and fragmentation impacts to the CEEC. *The line has been moved east and now traverses a less densely treed area. This reduces clearing and fragmentation impacts.*

Powerline (site 13, map 6)

The powerline crosses an area of moderate-good condition grassland derived from Box-Gum Woodland, which is likely to be relatively rare in the locality (within approximately 5km of the site). No alternatives suggested. *No change; a small area of high constraint is still impacted by the development. A commitment has been made (SoC 12 - amendment) to ensure the impacts of the powerline would be minimised and any associated access tracks would avoid the CEEC area.*

Substation (site 31 - map 9)

This facility is located on moderate-good condition grassland derived from Box-Gum Woodland, which is likely to be relatively rare in the locality. The site appears to have extensive areas of poorer condition grassland located close by. Quality grassland could be avoided by shifting the substation to the flat to the north-west, to around 651608 6137651, which is largely dominated by the exotic perennial grass Yorkshire Fog. *At site 31, the substation has been shifted to the north-west, reducing the significance of impacts.*

On this basis, impacts to moderate-good and good condition areas of the EEC/CEEC are not expected to be significant (refer Assessments of Significance, Appendix D).

Yass Daisy

Based on the targeted search results and mapping, the proposed cable route at site 35 (not within the new assessment areas and so not shown in Appendix E – refer to Figure 2-32) can avoid direct impacts to the Yass Daisy population. The Yass Daisy population would be identified and protected during the construction and operation phases, and special rehabilitation measures would be applied for works in the vicinity of the population. Subject to the implementation of these measures, the proposal is not likely to significantly impact this species (refer Assessments of Significance Appendix D).

Threatened fauna

The significance of impacts was considered by reviewing previous assessments (assumptions, regional context, Assessments of Significance, manageability of impacts and proposed mitigation). The proposal is not likely to significantly impact threatened fauna species. Apart from undertaking further survey work to inform the offset requirement, in accordance with SoC 23, no additional measures are required.

Cumulative impacts

The significance of impacts was considered for the revised proposal in its entirety. The new assessment areas are not considered to produce unacceptable cumulative impacts that would alter the conclusions of earlier assessments undertaken for the Yass Valley wind farm (**ngh**environmental 2009a, 2009b).

With the implementation of the revised project Statements of Commitment, Section 1, impacts are assessed to be acceptable and unlikely to pose a significant impact for any NSW or Commonwealth listed species, population or community.

2.7 SUMMARY

The new assessment areas were subject to site assessments by a botanist and zoologist in October and November 2012. Impact types remain consistent with those described in earlier assessments undertaken for the Yass Valley wind farm (**ngh**environmental 2009a, 2009b). Impact extent has been revised to include the new assessment areas. The significance of impacts has been considered by reviewing previous assessments (assumptions, regional context, Assessments of Significance, manageability of impacts, proposed mitigation). New high constraint areas have been mapped and would be avoided or impacts acceptably minimised (refer to new Statements of Commitment 12 and 15) by the development. On this basis, the new assessment areas are not considered to produce unacceptable cumulative impacts that would alter the conclusions of earlier assessments undertaken for the Yass Valley wind farm (**ngh**environmental 2009a, 2009b).

With the implementation of the revised project Statements of Commitment, Section 4, impacts are assessed to be acceptable and unlikely to pose a significant impact for any NSW or Commonwealth listed species, population or community.

Specific to the potential for significant impacts on NSW and Commonwealth listed species and communities, referral to NSW OEH or Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) is not considered to be required.

3 FOLLOW UP SURVEY REQUIRED BY STATEMENTS OF COMMITMENT

Several Statements of Commitment (SoCs) provided in the publically exhibited Environmental Assessment for the Yass Valley Wind Farm (**ngh**environmental November 2009) required follow up survey to be undertaken. Some of these have now been addressed, as described below.

SoCs relating to these issues have been amended in the revised SoC table, Section 4.

3.1 SOC 11

Original commitment: *All infrastructure would be sited entirely within the development envelope assessed in the Biodiversity Assessments. Where this is not possible, additional assessment would be undertaken and the appropriate approval would be sought (ie. variation to Conditions of Approval).*

Section 2 addresses new areas being included in the revised project description.

This SoC is retained, to address any future changes that may be required prior to construction, pending project approval.

3.2 SOC 15

Original commitment: *Works should be sited outside known Yass Daisy population areas and Commonwealth-listed CEEC areas identified in Appendix 3.1 Coppabella Hills Precinct Biodiversity Assessment (Figure 5.6), Appendix 3.2 and Marilba Hills Precinct Biodiversity Assessment (Map set 2).*

Additional Yass Daisy surveys were conducted as part this November 2012 survey (reported in Section 2.2.3 of this SER), to search new areas proposed for development and quantify numbers in areas previously assessed.

No Yass Daisies were identified in the new areas proposed for development. The location of existing populations and the number of individuals is displayed in Table 2-3 and Figure 2-32. The extent of Yass Daisy populations have been nominated as a high constraint. These areas would be avoided, in accordance with SoC 12: *'All infrastructure would be sited to avoid high constraint areas...' and SoC 15 'Works should be sited outside known Yass Daisy population areas....'.* Additional management prescriptions regarding works near these populations have also been included in SoC 15.

3.3 SOC 18 (PARTIAL)

Note: This SoC contains several other items. Only those stated below are addressed.

Original commitment: Marilba Hills

- *Burrinjuck Spider Orchid, undertaken in mid-October, where the dry forest remnant in the far south of Cluster 7 would be impacted by the proposed works.*
- *Threatened grassy woodland species, undertaken in Spring, if the secondary grassland on the south-western side of Cluster 7 would be substantially impacted.*

The results of this survey work are presented in Appendix G. These commitments have now been removed from the revised Statements of Commitments, Section 4.

3.4 SOC 23

Original commitment: *A Biodiversity Management Plan would be prepared within the CEMP to document the implementation of biodiversity measures, sourcing the Biodiversity Assessments prepared for each precinct for area specific measures. This would include construction and operational activities.*

To address agency concerns regarding additional targeted threatened species surveys, this SOC has been revised to include the following text:

> *The plan would include specific additional survey work which would be used to microsite infrastructure, where practical, and offset impacts, where they cannot be avoided. The target features / species include:*
>
> - *Hollow bearing trees*
> - *Bush Stone-curlew*
> - *Barking Owl*
> - *Squirrel Glider*
> - *Striped Legless Lizard*
> - *Eastern Bentwing Bat*
>
> *Survey approach would be developed in consultation with OEH.*

It is noted that some of this additional work has been undertaken; specifically, targeting Bush Stone-curlew, Barking Owl and Squirrel Glider and hollow bearing tree resources at the Coppabella precinct. The results of this survey work are presented in Appendix G. The '*specific additional survey work'* proposed in the SOC above would supplement this work. As stipulated in the revised SoC and in the Offset Strategy, Appendix H, OEH would be consulted regarding the surveys and any assumptions made. That is, where the survey effort is not considered adequate to make a reasonably confident assessment, the precautionary approach will be employed and the area will be assumed to qualify as threatened species habitat.

4 REVISED STATEMENTS OF COMMITMENT

In consideration of the additional biodiversity investigations referred to in this report, the following table updates the mitigation measures required to manage impacts for the Marilba and Coppabella precinct of the Yass Valley Wind Farm. This table now contains all measures considered to be required to manage the biodiversity impacts of the project to an acceptable level.

Where commitments have been revised, the revisions are in **bold** and have been justified [in brackets] where required. One SoC would be removed (SoC 13) and sections of another have been deleted (SoC 18). Deleted SoCs are shown in *grey italics*.

With the effective implementation of these measures it is considered that a significant impact on NSW and Commonwealth listed entities can be avoided.

By fulfilling the offset requirement outlined in SoC 21, it is considered that an 'improve or maintain environmental outcome' for the project can be achieved.

Table 4-1 Revised statements of commitment: Yass Valley Wind Farm

SoC	IMPACT	OBJECTIVE	MITIGATION TASKS	PROJECT PHASE	AUDITING[10]
11	Loss or modification of habitat	Avoid, minimise, offset	All infrastructure would be sited entirely within the development envelope assessed in the Biodiversity Assessments. Where this is not possible, additional assessment would be undertaken and the appropriate approval would be sought (ie. variation to Conditions of Approval).	Detailed design of infrastructure layout	CEMP
12	Loss or modification of habitat	Avoid, minimise, offset	All infrastructure would be sited to avoid high constraint areas (including high constraint habitat features) and minimise impacts in moderate constraint areas. These areas are identified within Appendix 3.1 of the Coppabella Hills Precinct Biodiversity Assessment (Figure 7.1), Appendix 3.2 of the Marilba Hills Precinct Biodiversity Assessment (Map set 4) **and Appendix E of the SER.** **[Note: this now includes areas of moderate-good and good condition EEC/CEEC areas identified in the new assessment areas; site 11, site 25, site 31 and site 35].** **The exception to this will be site 13 of the newly assessed areas where powerline infrastructure will be microsited with input from an ecologist to minimise impacts on CEEC. Associated access tracks in this area will be located to avoid the high constraint CEEC.**	Detailed design of infrastructure layout	CEMP
13	*Loss or modification of habitat*	*Avoid, minimise, offset*	*Where high constraint areas cannot be avoided, micrositing of infrastructure would be undertaken with input from an ecologist, to minimise impacts (includes road widening and transmission easement).* **THIS SOC HAS BEEN DELETED – all high constraint areas would be avoided, in accordance with SoC 12.**	*Detailed design of infrastructure layout*	*CEMP*

[10] The Construction and Operation Environmental Management Plans (CEMP and OEMP) are documents submitted to Dept. Planning prior to construction and operation. Incorporation of these commitments within these management plans allows each commitment to be auditable.

SoC	IMPACT	OBJECTIVE	MITIGATION TASKS	PROJECT PHASE	AUDITING[10]
14	Loss or modification of habitat	Avoid, minimise, offset	Where hollow-bearing trees cannot be avoided, nest boxes would be installed to replace this resource. This measure is considered supplementary to offsets that would also take into account the removal of hollows. **[Note: this is now stipulated in the Offset Strategy].**	Detailed design of infrastructure layout	CEMP
15	Loss or modification of habitat	Avoid, minimise, offset	Works should be sited outside known Yass Daisy population areas and Commonwealth-listed CEEC areas identified in Appendix 3.1 Coppabella Hills Precinct Biodiversity Assessment (Figure 5.6), Appendix 3.2 Marilba Hills Precinct Biodiversity Assessment (Map set 2) **and the SER (Figure 2-32) .** **[Note: this includes the proposed cable route at site 35].** **The proposed cable route would be located to avoid direct or indirect impacts to all recorded plants and colonies, with a minimum 2 metre buffer. The Yass Daisy population would be identified and protected during the construction and operation phases. Special rehabilitation measures would be used for works in the vicinity of the population, including topsoil removal, storage and replacement, whole sod removal and replacement if practicable and effective weed control at all stages. Exposed areas along the trench line would be revegetated with local native grasses (*Microlaena stipoides* and/or *Themeda triandra*).** **If works are proposed outside of the targeted survey area within the area of occupancy for the Yass Daisy mapped in nghenvironmental (2009c), further survey or micrositing by an ecologist would be undertaken to ensure that the works avoid Yass Daisy plants and colonies.**	Detailed design of infrastructure layout	CEMP
16	Loss or modification of habitat	Avoid, minimise, offset	Where rocks and boulders cannot be avoided, they would be placed directly adjacent to the works area to preserve the availability of refuge.	Construction	CEMP
17	Loss or modification of habitat	Avoid, minimise, offset	Should dams be required to be removed during site development, alternative watering points would be established to compensate for their loss, where practical and with the agreement of the landowner.	Construction	CEMP

SoC	IMPACT	OBJECTIVE	MITIGATION TASKS	PROJECT PHASE	AUDITING[10]
18	Loss or modification of habitat	Avoid, minimise, offset	Additional targeted surveys would be undertaken, if the identified areas would be impacted by the proposal. These areas include: **Coppabella Hills** • Hollow-bearing trees targeted for removal. **Marilba Hills** • Hollow-bearing trees targeted for removal. • *Burrinjuck Spider Orchid, undertaken in mid-October, where the dry forest remnant in the far south of Cluster 7 would be impacted by the proposed works.* **THIS HAS BEEN DELETED.** • *Threatened grassy woodland species, undertaken in Spring, if the secondary grassland on the south-western side of Cluster 7 would be substantially impacted.* **THIS HAS BEEN DELETED.** **[Refer to Appendix G for evidence that these surveys have been completed].**	Detailed design of infrastructure layout	CEMP
19	Loss or modification of habitat	Avoid, minimise, offset	Contractors and staff would be made aware of the significance and sensitivity of the constraints identified in the Biodiversity Assessment constraint map set for each precinct during the site induction process.	Construction	CEMP
20	Loss or modification of habitat	Avoid, minimise, offset	A buffer twice the distance of the tree drip-line would be established in sensitive areas identified in the Biodiversity Assessment constraint map set for each precinct to ensure indirect impacts (such as compaction, noise and dust) are minimised where practical.	Construction	CEMP

SoC	IMPACT	OBJECTIVE	MITIGATION TASKS	PROJECT PHASE	AUDITING[10]
21	Loss or modification of habitat	Avoid, minimise, offset	The Proponent would commit to preparing and implementing an Offset Plan, to offset the quantum and condition of native vegetation to be removed, in order to achieve a positive net environmental outcome for the proposal. Offset areas would reflect the actual footprint of the development (ie footing areas and new tracks) not the maximum impact areas. The Offset Plan would be prepared in consultation with OEH, prior to construction. **The Offset plan would be prepared in accordance with the offset strategy included as Appendix H of the SER.** **[Note: the offset strategy sets out the method to calculate, manage and secure appropriate offsets].**	Prior to construction	CEMP
22	Loss or modification of habitat	Avoid, minimise, offset	An adaptive Bird and Bat Monitoring Program would be developed prior to construction and would include the collection of baseline (pre-operation) as well as operational monitoring data.	Prior to construction	CEMP, OEMP
23	Loss or modification of habitat	Avoid, minimise, offset	A Biodiversity Management Plan would be prepared within the CEMP to document the implementation of biodiversity measures, sourcing the Biodiversity Assessments prepared for each precinct for area specific measures. This would include construction and operational activities. **The plan would include specific additional survey work which would be used to microsite infrastructure, where practical, and offset impacts, where they cannot be avoided. The target features / species include:** • **Hollow bearing trees** • **Bush Stone-curlew** • **Barking Owl** • **Squirrel Glider** • **Striped Legless Lizard** • **Eastern Bentwing Bat** **Survey approach would be developed in consultation with OEH.**	Prior to construction	CEMP

SoC	IMPACT	OBJECTIVE	MITIGATION TASKS	PROJECT PHASE	AUDITING[10]
24	*Loss or modification of habitat*	*Avoid, minimise, offset*	*An EPBC referral would be submitted to determine whether the proposal constitutes a 'controlled action' under the meaning of the Environment Protection and Biodiversity Conservation Act 1999.* **THIS HAS BEEN DELETED.** **[Note: On biodiversity grounds, a referral is not considered to be required; refer to Section 2 of the SER. The previous SoC relates to obtaining certainty for the proponent but is considered a project management decision and is not being recommended on the basis of biodiversity impact. Impacts to Commonwealth listed entities are not considered to be significant and would be offset].**	*Detailed design of infrastructure layout*	*CEMP*
25	Loss or modification of habitat	Avoid, minimise, offset	A flora and fauna assessment would be undertaken prior to decommissioning to identify biodiversity constraints and develop specific impact mitigation measures.	Decommissioning	OEMP

5 CONCLUSION

This document collates the findings of a number of investigations and provides supplementary recommendations to ensure that the new and original areas proposed to be developed as part of the Yass Valley Wind Farm:

- Have been adequately surveyed and assessed
- Have appropriate commitments to ensure that impacts are:
    - Avoided where required
    - Minimised and managed where appropriate and
    - Offset, in accordance with NSW guidelines

The surveys and assessment and management framework have been formulated to addresses agency comments.

With the implementation of the revised project Statements of Commitment, Section 4, impacts are assessed to be acceptable and unlikely to pose a significant impact for any NSW or Commonwealth listed species, population or community.

Specific to the potential for significant impacts on NSW and Commonwealth listed species and communities, referral to NSW OEH or Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) is not considered to be required.

With the implementation of the offset package, which would include management of areas for biodiversity improvement in perpetuity, an overall maintain or improve outcome would be achieved.

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7 GLOSSARY

AWS	Automatic weather station
BOM	Australian Bureau of Meteorology
BVSC	Bega Valley Shire Council
CEMP	Construction Environmental Management Plan
Cwth	Commonwealth
DECCW	Refer to OEH
DP&I	(NSW) Department of Planning and Infrastructure
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EA	Environmental Assessment
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
ha	hectares
km	kilometres
m	Metres
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
SER	Supplementary Ecology Report
SEWPAC	(Cwth) Department of Sustainability, Environment, Water, Population and Communities
SoC	Statement of Commitment
TSC Act	*Threatened Species Conservation Act 1995* (NSW)

APPENDIX A AUDIT

YASS VALLEY WIND FARM AUDIT (LAYOUT REVISION 2)

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3 October 2012

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Dear Andrew,

RE – Step 1. Yass Valley & Conroys Gap Wind Farm Audit – 4743 (layout revision 2)

This advice addresses *Step 1 Consideration of revised layout (audit against OEH comments)* of our proposal dated 28 August 2012.

We have reviewed the final infrastructure layout (05/09/2012), and considered the ability of the layout to meet the intention of the OEH comments regarding avoiding infrastructure in high conservation areas (**refer Table 1**). This was done with reference to existing information (biodiversity assessments for the Marilba and Coppabella precincts and existing map layers; vegetation type and condition).

In summary, we consider that the OEH's comments are generally addressed by the revised layout. In areas where they are not met, there is an argument to be made that infrastructure now avoids the areas nghenvironmental previously classified as high constraint areas.

We recommend that the revised layout be sent to OEH to demonstrate that changes have been made to reduce biodiversity impacts.

Yours sincerely,

Brooke Marshall | Manager, South Coast & Snowy Mountains
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AUDIT

Table 1. Audit of revised layout against OEH comments

Column 2 rates the degree to which the revised layout meets intention of the OEH comments:

1 does not meet intention

2 goes some way to meet intention

3 fully meets intention

Column three notes which precinct the comment is relevant to: Marilab (M), Coppabella (C) or Conroys Gap (CG)

OEH comments	Precinct (M, C, CG)	Meets intention (1-3)	Comment
1. Turbines and associated infrastructure in White Box Yellow Box Blakely's Red Gum Woodland (BGW) to be reduced or realigned to decrease impact in this community, particlarly in areas of 'moderate to good condition'	M	2	There is no change in the total number of turbines proposed. Turbines 94, 95, 109, 110, 112, 115 and 117 are within moderate condition White Box Yellow Box Blakely's Red Gum Woodland (BGW) community. The majority of turbines located within BGW are located within moderate condition BGW or derived grassland. Turbine number 97 is located in close proximity to an area of high conservation value BGW.
2. Impacts in clusters 10 and 7b are considered significant. Turbines and infrastructure in these areas that intersect high conservation value areas should be withdrawn.	C	3	The three turbines in cluster 10, Turbines 79, 80and 81 have been relocated away from high and moderate conservation areas. The three turbines intersecting high conservation value Box-gum Woodland at cluster 7b have been relocated, Turbine 12 and 13 have been moved west and Turbine 15 has been removed. It is noted that the access track along the ridge is required to access other turbines.
3. The access track between cluster 10 and 11 should be withdrawn and an alternative identified.	C	3	The track has been relocated to the south to avoid the area of high conservation value.
4. Turbines within or close to woodland will increase risk of bat strike. The proposal should reduce turbines in these highly constrained areas.	C	2	This comment applies to Coppabella precinct generally. The majority of turbines are located away from woodland areas, with turbines moved away from high risk areas. There are additional turbines located at the western end of the Coppabella precinct; these occur in relatively open grassland with the exception of turbine number 70 which is adjacent to a patch of woodland. Similarly there are a number of other turbine locations that are located adjacent to woodland areas and potential bat habitat. These locations include; Turbine number 4, 10, 58, 60 and 78.

OEH comments	Precinct (M, C, CG)	Meets intention (1-3)	Comment
5. Impacts in cluster 4a are considered significant. Turbines and infrastructure in these areas that intersect high conservation value areas should be withdrawn. Further, turbines within or close to woodland will increase risk of bat strike. The proposal should reduce turbines in these highly constrained areas.	M	2	Turbine 94 and 95 have been relocated out of a area of high constraint, these turbines are located in areas adjacent to the high constraint woodland. There have been no changes to the other turbines in this area with regard to high value areas.

APPENDIX B APPROACH TO ADDRESSING AGENCY REQUIREMENTS

B.1 SUMMARY APPROACH

As part of the agency submissions on the publicly exhibited Yass Valley Wind Farm Environmental Assessment, DECCW (now OEH) provided detailed comments to the Department of Planning (11 December, 2009).

The comments could be grouped into two broad categories:

1. Recommendations for avoidance - i.e. areas where the Department would not support the placement of infrastructure.

   These comments were addressed by way of an audit; summarised in Section 1.1.1 of this SER and presented in full in Appendix A.

2. Requirements for additional assessment / additional survey

   The '*additional assessment*' referred to the transmission easement between Coppabella and Marilba precincts. The assessment of this area has now been undertaken and is documented in full in Section 2 of this SER.

   The *'additional survey'* requirements largely inferred that the survey could be undertaken as a condition of consent (ie. post-approval) and that the results of these surveys should inform the offset requirements for the project, if approved. These requirements have been included in a revision of SOC 23 but it is noted (and demonstrated in Appendix G) that some of this survey has already been undertaken.

The proposed approach to each specific agency comment is provided overleaf.

B.2 DETAILED APPROACH

OEH comments	Response / approach
Calculation of impact areas and offsets	
Due to the need for clearing and routine vegetation maintenance, transmission easements are considered to be a permanent habitat loss in Box Gum Woodland, and do not met the criteria of "maintain or improve". The proponent states that 12 hectares of BGW will be permanently impacted by the proposal, however DECCW considers transmission easements proposed in BGW (with trees) to be a permanent loss, not a modification as reported. Transmission easements require total tree removal and regular maintenance and therefore a complete loss of arboreal habitat. Taking this into consideration, the proponent is advised to re-calculate the permanent loss of BGW.	Calculation of impact areas in Section 2.6.2 now includes this provision.
Transition easements that traverse Box Gum Woodland derived grassland are likely to met the criteria of "maintain and improve" (with management), and therefore may not be considered as an area with permanent habitat loss.	Calculation of impact areas in Section 2.6.2 now includes this provision.
The EA inappropriately quantifies the revegetation of BGW after decommissioning (30 years) as a "zero" net loss in BGW. DECCW does not agree with this philosophy, because of the high potential to lose genetic diversity, limited rehabilitation success and that the time taken to reproduce current vales from seed will be far greater then 30 years. Also, there is a possibility the wind farm will be recommissioned rather then decommissioned after the current 30 year cycle. DECCW considers the area set out for revegetation after decommissioning to be a direct loss of BGW.	Calculation of impact areas in Section 2.6.2 now includes this provision.
DECCW has concerns that the EA does not quantify the BGW condition in accordance with the existing government endorsed tools (PVP Developer and Biobanking Credit Calculator). Low-condition vegetation is where the native over-storey percentage of foliage cover is less than 25% of the lower value of over-storey percentage of foliage cover benchmark for that vegetation type, and less than 50% of ground cover vegetation is indigenous species, or more than 90% of ground cover vegetation is cleared. Vegetation that does not meet Low-condition is considered to be Moderate-Good. It is likely that a high percentage of BGW within the DE meets moderate-good standard and that pasture meets Low-condition BGW. If the proposal seeks to offset the impact to BGW, the vegetation data should comply with endorsed methodology. The vegetation benchmark database and relevant offset material is available under the Biobanking assessment tools at www.environment.nsw.gov.au.	Clarified in Table 2-1 of the SER and incorporated into Offset Strategy, Appendix H.
DECCW requests DoP issue a condition of consent for the proponent to classify permanent loss of BGW in accordance with the above advice and that the community is classified as per the two DECCW recognised tools (listed above) prior to submitting an offset proposal.	As above

OEH comments	Response / approach
DECCW acknowledges the offsets will be based on the net loss of existing habitat caused by the proposal, for example; turbine footings, new roads, widening existing roads, and transmission easements. DECCW staff will be happy to review the appropriateness of any offset proposals that Epuron develop, prior to submitting a final tender.	As above
Additional survey and commitments to survey	
Hollow Bearing Trees (HBTs) on site potentially provide suitable habitat for the species listed above. DECCW recognise that HBTs have been generally mapped however, the EA does not map HBTs according to hollow size within the proposed development envelope. It is recommended that the HBTs, especially those to be removed, are quantified for the potential habitat they may provide for the above threatened entities and stag-watched, for a period consistent with the DECCW Threatened Species Assessment Guidelines.	Included as a statement of commitment, to assist micrositing and offsetting. Some of this work has been completed, refer to Appendix G.
HBT's have not been mapped within the proposed transmission easement linking Copperbella and Marilba Hills precincts. DECCW requires an assessment of HBTs through this easement. The assessment should be quantified as explained above and be submitted to DECCW prior to submitting an offset tender so any previously unidentified threatened species matters can be considered.	Included as a statement of commitment, to assist micrositing and offsetting. Some of this work has been completed, refer to Appendix G.
The EA does not map vegetation type, survey locations, hollow bearing trees or constraints for the transmission easement between Copperbella and Marilba Hills. Without this data the environmental impact of the proposal cannot be assessed, nor can offsets be determined. The environmental impact through this area is considered inadequate and needs to be address in the SOC.	New assessment area have been assessed in this SER, Section 2.
Bush Stone-Curlew This species inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber in a variety of locations across the state. A high number of inland records exist within BGW situated along or within close proximity to dry creek beds and drainage lines. This species was recently recorded within the Burrinjuck area. The subject site is within its known distribution and therefore, DECCW considers both precincts to contain suitable habitat for this species. DECCW requests a SOC to undertake addition nocturnal call playback surveys and diurnal searches of habitat for this species immediately prior to clearing. The species protection and mitigation measures during the construction phase are to be implemented via the CEMP.	Included as a statement of commitment, to assist micrositing and offsetting. Some of this work has been completed, refer to Appendix G.
DECCW considers that the wording of some of the Statement of Commitments to be inadequate for the protection of biodiversity values during construction and operation of the wind farm;	Rewording of SoCs (12, 13, 21) and avoidance of key areas (verified in audit – Step 1).

OEH comments	Response / approach
• SOC – 18. The proposal can not avoid areas of potential habitat for species listed in soc 18 nor will it avoid removing habitat trees within the two precincts, therefore additional survey will be required.	HBT survey is included as a statement of commitment, to assist micrositing and offsetting. Some of this work has been completed, refer to Appendix G. Additional surveys have been undertaken to remove the requirement to survey Burrinjuck Spider Orchid and Threatened grassy woodland species. Refer to Appendix G.
Squirrel Glider *(Petaurus norfolcensis)*	Included as a statement of commitment, to assist micrositing and offsetting. Some of this work has been completed, refer to Appendix G.
Barking Owl (*Ninox connivens*)	Included as a statement of commitment, to assist micrositing and offsetting. Some of this work has been completed, refer to Appendix G.
Striped Legless Lizard (*Delma impar*) DECCW acknowledges that the majority of impacts on fossorial or semi-fossorial reptiles will occur during the construction phase of the project. If the proponent accepts the potential for the species to be present within the development envelope, then the species could be addressed through suitable entries in the statement of commitments. DECCW would expect that such a statement would include a search of habitat immediately prior to clearing, management of open trenches with regular reptile recovery and a plan of what to do with any individuals recovered.	Included as a statement of commitment, to assist micrositing and offsetting.
Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) DECCW request a consent condition to undertake monitoring surveys during the maternity period to record the presence of the Eastern Bentwing Bat. Surveys be undertaken prior to and during construction and should form part of the ongoing monitoring surveys during the operational phase of the proposal. It is also requested that the proposed survey methodology is discussed with DECCW prior to surveys.	Included as a statement of commitment, to assist micrositing and offsetting.
Burrinjuck Orchid Surveys undertaken for this species during September and November are considered inadequate because they are likely to have missed the known flowering period in October. DECCW agrees with the EA in that, further survey within the DE (Development Envelope) is required during October.	Additional surveys have been undertaken to remove the requirement to survey for this species. Refer to Appendix G.

OEH comments	Response / approach
Yass Daisy The Yass Daisy is as a State and Commonwealth listed threatened species. Any loss of threatened species and/or their habitat needs to be assessed against the criteria of improve or maintain as detailed in the DGEARs. DECCW has therefore assessed the development in areas known to contain Yass Daisy populations and concluded that the assessment is inadequate because the proposed access track and underground cabling within cluster 4b does not meet the "improve" or "maintain" test as applied in NSW. DECCW considers the data within the EA inadequate, as the number of individual plants to be removed during construction is not stated. DECCW requires this specific survey data to accurately assess the proposed impacts to individual threatened species. DECCW does not support the proposed disturbance that crosses through core habitat for this species.	Additional survey and assessment has been undertaken for this species. Refer to Section 2.2.3.

APPENDIX C NEW AREAS PROPOSED FOR DEVELOPMENT – SURVEY EFFORT AND RESULTS

C.1 SURVEY EFFORT

Site no.	Map references	Location	Survey type	Vegetation unit
1	637638 6157588	T130, map 2	Random meander	Box-Gum Woodland (tree cover)
2	637560 6157324	T129, map 2	Inspection point	Box-Gum Woodland (native pasture)
3	637259 6157152	T73 - T129, map 2	Random meander	Box-Gum Woodland (native pasture)
4	638021 6156994	T69, map 2	Inspection point	Box-Gum Woodland (native pasture)
5	638118 6156671	T66, map 2	Inspection point	Box-Gum Woodland (native pasture)
6	637973 6156390	T65, map 2	Inspection point	Box-Gum Woodland (native pasture)
7	635390 6156386	T72, map 1	Inspection point	Box-Gum Woodland (native pasture)
8	635190 6156116	T70, map 1	Random meander	Box-Gum Woodland (tree cover)
9	635896 6156000	T131, map 1	Random meander	Box-Gum Woodland (native pasture)
10	653736 6155090	Nth of T114, map 5	Random meander	Box-Gum Woodland (native pasture)
11	653773 6154761	T114, map 5	Random meander	Box-Gum Woodland (tree cover)
12	653768 6154609	Sth of T114, map 5	Random meander	Box-Gum Woodland (native pasture)
13	646625 6150899	Substation, map 6	Random meander and targeted search	Box-Gum Woodland (grassland)
14	647398 6150580	Powerline, map 6	Inspection point	Box-Gum Woodland (native pasture)
15	648120 6150144	Powerline, map 6	Inspection point	Box-Gum Woodland (native pasture)
16	648495 6149866	Powerline, map 6	Inspection point	Box-Gum Woodland (native pasture)
17	649484 6149319	Powerline, map 6	Inspection point	Box-Gum Woodland (native pasture)
18	649820 6149209	Powerline, map 6	Random meander	River Red Gum Woodland (tree cover)
19	652580 6152053	Substation, map 7	Random meander	Box-Gum Woodland (native pasture)
20	652440 6151950	Powerline, map 7	Inspection point	Box-Gum Woodland (native pasture)
21	650464 6149568	Powerline, map 7	Inspection point	Box-Gum Woodland (native pasture)
22	650323 6149471	Powerline, map 7	Inspection point	Box-Gum Woodland (native pasture)
23	650762 6148106	Powerline, map 8	Inspection point	Box-Gum Woodland (native pasture)
24	650944 6147290	Powerline, map 8	Inspection point	Box-Gum Woodland (native pasture)
25	650849 6146372	Powerline, map 8	Random meander and targeted search	Box-Gum Woodland (tree cover)
26	650374 6144666	Powerline, map 8	Inspection point	Box-Gum Woodland (native pasture)
27	650236 6143250	Powerline, map 9	Inspection point	Box-Gum Woodland (native pasture)
28	650407 6142114	Powerline, map 9	Random meander	Box-Gum Woodland (tree cover)
29	650698 6139578	Powerline, map 9	Inspection point	Box-Gum Woodland (native pasture)
30	651625 6137877	Powerline, map 9	Inspection point	Box-Gum Woodland (native pasture)
31	651751 6137487	Substation, map 9	Random meander and targeted search	Box-Gum Woodland (grassland)
35	658758 6146340	Targeted search map	Targeted search (Yass Daisy)	Box-Gum Woodland (grassland)

C.2 SURVEY RESULTS

Flora survey results

All vascular plant species were recorded at random meander survey sites. Records are divided into three vegetation communities. The list does not include floristic survey results from site 35, which was restricted to a targeted survey for the threatened Yass Daisy.

Cover/abundance assessments are based on visual estimates of foliage cover (after Carnahan 1997), scored using a modified Braun-Blanquet 6-point scale:

1 1 to a few individuals present, less than 5% cover

2 many individuals present, but still less than 5% cover

3 5 - <25% cover

4 25 - <50% cover

5 50 - <75% cover

6 75 - 100% cover.

Where the cover/abundance of a particular species varies markedly over the random meander survey area, a range of values is provided. In these cases, abundance is based on a standard 20 metre x 20 metre quadrat scale.

Introduced species are denoted by an asterisk. Where uncertainty exists due to the unavailability of mature reproductive material, the taxon is preceded by a question mark, or plants are identified to genus level only. Botanical nomenclature follows Harden (ed) (1990-2002) and the Sydney Royal Botanic Gardens' PlantNet website. The family classification follows Angiosperm Phylogeny Group III (2009).

Vegetation communities are summarised as follows:

BGW Box-Gum Woodland and derived grassland

RRG River Red Gum Woodland

DGF Brittle Gum – Broad-leaved Peppermint dry grass forest.

Scientific name	Common name	Family	Abundance		
			BGW	RRG	DGF
TREES					
Acacia dealbata	Silver Wattle	Fabaceae		1	
Allocasuarina verticillata	Dryland Drooping Sheoak	Casuarinaceae	0-1		
Brachychiton populneus	Kurrajong	Malvacceae	0-1		
Eucalyptus albens	White Box	Myrtaceae	0-3		
Eucalyptus blakelyi	Blakely's Red Gum	Myrtaceae	0-3		1
Eucalyptus bridgesiana	Apple Box	Myrtaceae	0-1	1	
Eucalyptus camaldulensis	River Red Gum	Myrtaceae		3	
Eucalyptus dives	Broad-leaved Peppermint	Myrtaceae			3
Eucalyptus goniocalyx	Bundy, Long-leaved Box	Myrtaceae	0-1		
Eucalyptus macrorhyncha	Red Stringybark	Myrtaceae	0-3		3
Eucalyptus mannifera	Brittle Gum	Myrtaceae			3
Eucalyptus melliodora	Yellow Box	Myrtaceae	0-1	1	
Eucalyptus polyanthemos ssp *polyanthemos*	Red Box	Myrtaceae	0-1		
Exocarpos cupressiformis	Native Cherry	Santalaceae		0-3	1

Scientific name	Common name	Family	Abundance		
			BGW	RRG	DGF
**Salix* sp	Willow	Salicaceae		0-3	
SHRUBS, SUB-SHRUBS					
Acacia paradoxa	Kangaroo Thorn	Fabaceae			0-3
Amyema sp	Mistletoe	Loranthaceae	0-1		
Callistemon sieberi	River Bottlebrush	Myrtaceae		0-3	
**Crataegeus monogyna*	Hawthorn	Malaceae		0-5	
Hibbertia obtusifolia	Guinea Flower	Dilleniaceae			2
Kunzea ericoides	Burgan	Myrtaceae		0-3	
**Rubus fruticosus* sp. agg.	blackberry	Rosaceae		0-5	2
FORBS					
Acaena echinata		Rosaceae	0-1		
Acaena sp	Sheep Burr	Rosaceae		1	
**Acetosella vulgaris*	Sheep Sorrel	Polygonaceae	0-2		2
**Anagallis arvensis*	Scarlet Pimpernel	Myrsinaceae		1	
**Arctotheca calendula*	Capeweed	Asteraceae	0-2		1
Arthopodium minus	Small Vanilla Lily	Asparagaceae	0-1		
**Arenaria serpyllifolia*	Thyme-leaved Sandwort	Caryophyllaceae	0-1		
Asperula conferta	Common Woodruff	Rubiaceae	0-1		
Bulbine bulbosa	Bulbine Lily	Asphodelaceae	0-1		
**Capsella bursa-pastoris*	Shepherd's Purse	Brassicaceae	0-1		
**Carduus tenuiflorus*	Winged Slender Thistle	Asteraceae			0-2
**Carthamus lanatus*	Saffron Thistle	Asteraceae	0-2		
**Centaurium erythraea*	Centaury	Gentianaceae	0-1		
**Cerastium glomeratum*	Mouse-ear Chickweed	Caryophyllaceae	0-2		0-2
Chamaescyce drummondii	Caustic Weed	Euphorbiaceae	0-1		
Chenopodium ?erosum	Papery Goosefoot	Chenopodiaceae	0-1		
**Chondrilla juncea*	Skeleton Weed	Asteraceae	0-1		
**Cicendia quadralangularis*		Gentianaceae	0-2		
**Cirsium vulgare*	Black or Spear Thistle	Asteraceae	0-1	1	
**Conyza* sp	Fleabane	Asteraceae	0-1	1	
Cotula australis	Carrot Weed	Apiaceae	0-2		
Crassula sieberiana	Australian Stonecrop	Crassulaceae	0-2		
Daucus glochidiatus	native carrot	Apiaceae	0-1		
Dichondra repens	Kidney Weed	Convolvulaceae	0-2		1
Drosera peltata ssp *peltata*	Sundew	Droseraceae	0-2		
**Echium plantagineum*	Paterson's Curse	Boraginaceae	0-2	0-2	
Einadia nutans	Climbing Saltbush	Chenopodiaceae	0-1		
**Erodium cicutarium*	Common Storksbill	Geraniaceae	1-2		
Erodium crinitum	Blue Storksbill	Geraniaceae	0-1		
**Erodium moschatum*	Musky Storksbill	Geraniaceae	0-2		
Euchiton gymnocephalus	slender cudweed	Asteraceae	0-2		
**Galium aparine*	Cleavers	Rubiaceae		0-2	1
**Geranium molle*	Cranesbill Geranium	Geraniaceae	0-2		
Geranium solanderi	Native Geranium	Geraniaceae	0-2	1	1
Gonocarpus tetragynus	Raspwort	Haloragaceae	0-2		0-2
Haloragis heterophylla	Rough Raspwort	Haloragaceae	0-3		
Hydrocotyle laxiflora	Stinking Pennywort	Araliaceae	0-2		2
Hydrocotyle peduncularis	Shining Pennywort	Araliaceae	0-2		
Hydrocotyle tripartita	Pennywort	Araliaceae	0-2		

Scientific name	Common name	Family	Abundance		
			BGW	RRG	DGF
Hypericum gramineum	Grassy St Johns Wort	Hypericaceae	0-2		
Hypericum japonicum	Small St John's Wort	Hypericaceae	0-1		
**Hypericum perforatum*	St John's Wort	Hypericaceae		1	1
**Hypochaeris glabra*	Smooth Catsear	Asteraceae	0-3	0-2	2
**Hypochaeris radicata*	Catsear, Flatweed	Asteraceae	2-4	2	0-2
**Linaria pelisseriana*	Pelisser's Toadflax	Plantaginaceae	0-1		
Lythrum hyssopifolia	Hyssop Loosestrife	Lythraceae	0-1		
**Malva parviflora*	Small-flowered Mallow	Malvaceae	0-2		
**Marrubium vulgare*	Horehound	Lamiaceae	0-3		
**Medicago arabica*	Spotted Burr-medic	Fabaceae	0-2	0-2	
**Modiola caroliniana*	Red-flowered Mallow	Malvaceae		1	
**Moenchia erecta*	Erect Chickweed	Caryophyllaceae	0-2		
Montia fontana ssp *amporitana*	Fountain Miner's Lettuce	Portulacaceae	0-1		
**Myosotis discolor*	Forget-me-not	Boraginaceae		1	
**Onopordum acanthium*	Scotch Thistle	Asteraceae	0-5		
Oreomyrrhis eriopoda	Australian Carraway	Apiaceae	0-1		
**Orobanche minor*	Broomrape	Orobanchaceae	0-2		
Oxalis perennans	Oxalis	Oxalidaceae	0-1	1	1
**Parentucellia latifolia*	Red Bartsia	Scrophulariaceae	0-2		
**Petrorhagia nanteuilii*	Proliferous Pink	Caryophyllaceae	0-1		2
**Phytolacca octandra*	Inkweed	Phytolaccaceae	0-1		
**Plantago lanceolata*	Plantain	Plantaginaceae		1	
**Polycarpon tetraphyllum*	Four-leaved All-seed	Caryophyllaceae	0-1		
Poranthera microphylla		Phyllanthaceae			1
Pseudognaphalium luteoalbum	Jersey Cudweed	Asteraceae	0-1		
**Romelea rosea*	Onion Weed	Iridaceae	0-2	1	
Rumex brownii	Native Dock	Polygonaceae	0-2	0-2	
**Sanguisorba minor*	Sheep's Burnet	Rosaceae		1	1
Sebaea ovata	Yellow Centaury	Gentianaceae	0-1		
Senecio tenuiflorus		Asteraceae			1
**Sherardia arvensis*	Field Madder	Rubiaceae	0-2		
**Silybum marianum*	Variegated Thistle	Asteraceae	0-3		
**Sisymbrium officinale*	Hedge Mustard	Brassicaceae	0-1		
**Sisyrinchium sp. A*	Scourweed	Iridaceae	0-1		
Solenogyne dominii	Smooth Solenogyne	Asteraceae	0-1		
**Soliva* sp	Bindyi, Jojo	Asteraceae	0-1		
**Sonchus asper*	Prickly Sow Thistle	Asteraceae		1	
**Stellaria media*	common chickweed	Caryophyllaceae	0-1		0-2
Stellaria pungens	prickly starwort	Caryophyllaceae	0-2		
Stuartina muelleri	Spoon Cudweed	Asteraceae	0-1		
**Taraxacum officinale*	Dandelion	Asteraceae	0-1	0-2	
Thysanotus patersonii	Twining Fringe-lily	Anthericaceae	0-1		
**Tolpis barbata*	Yellow Hawkweed	Asteraceae	0-1		
**Trifolium angustifolium*	Narrow-leaved Clover	Fabaceae	0-1		
**Trifolium arvense*	Hare's Foot Clover	Fabaceae	0-2	2	
**Trifolium campestre*	Hop Clover	Fabaceae	0-2	0-2	
**Trifolium dubium*	Yellow Suckling Clover	Fabaceae	0-2		0-2
**Trifolium glomeratum*	Clustered Clover	Fabaceae	0-3		
**Trifolium repens*	White Clover	Fabaceae	0-3		

Scientific name	Common name	Family	Abundance		
			BGW	RRG	DGF
**Trifolium subterraneum*	Sub Clover	Fabaceae	0-5		0-2
**Trifolium* sp.	Clover	Fabaceae	1-4		
Triptilodiscus pygmaeus	Austral Sunray	Asteraceae	0-2		
Urtica incisa	Stinging Nettle	Urticaceae			0-3
**Urtica urens*	Small Nettle	Urticaceae	0-2		
**Verbascum virgatum*	Twiggy Mullein	Scrophulariaceae		1	
**Vicia* sp	Vetch	Fabaceae		0-2	
Wahlenbergia gracilis	Sprawling Bluebell	Campanulaceae	0-1		
Wahlenbergia stricta	Tall Bluebell	Campanulaceae	0-2		
Wurmbea latifolia	Early Nancy	Colchicaceae	0-2		
GRASSES					
**Aira caryophyllea*	Silvery Hair-grass	Poaceae	0-2	1	0-2
**Anthoxanthum odoratum*	Sweet Vernal Grass	Poaceae	0-3	2	
Aristida ramosa var. *ramosa*	Wiregrass	Poaceae	0-4	0-2	0-2
Austrostipa bigeniculata		Poaceae	0-2		
Austrostipa densiflora	Dense Spear-grass	Poaceae	0-3		
Austrostipa scabra ssp *falcata*	Corkscrew Grass	Poaceae	0-4		0-2
**Avena* sp.	Wild Oats	Poaceae	0-2	1	
Bothriochloa macra	Red Grass	Poaceae	0-3		
**Briza minor*	Shivery Grass	Poaceae	0-2	1	0-2
**Bromus catharticus*	Prairie Grass	Poaceae		1	
**Bromus diandrus*	Giant Brome	Poaceae	0-3	0-3	0-3
**Bromus racemosus*	Smooth Brome	Poaceae	0-5	0-3	
**Bromus rubens*	Red Brome	Poaceae	0-2		0-3
Chloris truncata	Windmill Grass	Poaceae	0-1		
**Dactylis glomerata*	Cocksfoot	Poaceae		0-3	
Elymus scaber	Common Wheat Grass	Poaceae	0-3		
Eragrostis sp		Poaceae	0-1		
**Holcus lanatus*	Yorkshire Fog	Poaceae	0-5	0-2	0-2
**Hordeum leporinum*	Barley Grass	Poaceae	0-5		
**Lolium perenne*	Perennial Ryegrass	Poaceae	0-2		
Microlaena stipoides	Weeping Grass	Poaceae	0-5		2-3
Panicum effusum	Hairy Panic	Poaceae	0-2		1
Phragmites australis	Common Reed	Poaceae		0-2	
**Poa annua*	Winter Grass	Poaceae	0-2		1
Poa labillardieri	River Tussock	Poaceae		0-2	
Poa sieberiana var. *sieberiana*		Poaceae	0-2	0-3	
Rytidosperma auriculata	Wallaby Grass	Poaceae	0-4		
Rytidosperma carphoides	Wallaby Grass	Poaceae	0-3		
Rytidosperma eriantha	Wallaby Grass	Poaceae	0-3		
Rytidosperma laevis	Wallaby Grass	Poaceae	0-3		
Rytidosperma racemosa	Wallaby Grass	Poaceae	0-3		
Rytidosperma sp.	Wallaby Grass	Poaceae	0-3		
Themeda triandra	Kangaroo Grass	Poaceae	0-4	0-4	
**Vulpia bromoides*	Squirrel-Tail Fescue	Poaceae	0-4	2	0-3
**Vulpia myuros*	Rat's Tail Fescue	Poaceae	0-2		
SEDGES AND RUSHES					
Carex appressa	Tall Sedge	Cyperaceae	0-3	0-2	
Carex ?chlorantha		Cyperaceae		0-2	

Scientific name	Common name	Family	Abundance		
			BGW	RRG	DGF
Carex inversa	Knob Sedge	Cyperaceae	0-2		
**Cyperus eragrostis*	Umbrella Sedge	Cyperaceae		1	
Isolepis sp.		Cyperaceae	0-2		
**Juncus acutus*	Sharp Rush	Juncaceae		0-3	
**Juncus articulatus*	Jointed Rush	Juncaceae		0-2	
Juncus bufonius	Toadrush	Juncaceae	0-2	0-2	
Juncus sp.		Juncaceae	0-2		
Lomandra filiformis ssp *coriacea*	Wattle Mat-rush	Asparagaceae	0-2	1	
Lomandra filiformis ssp *filiformis*	Wattle Mat-rush	Asparagaceae	0-2		
Lomandra longifolia	spiny matrush	Asparagaceae		0-3	
Lomandra multiflora	many-flowered matrush	Asparagaceae	0-1		
Luzula densiflora	Woodrush	Juncaceae	0-2		1
Schoenus apogon	Bog Sedge	Cyperaceae	0-3	0-2	
FERNS					
Cheilanthes austrotenuifolia		Sinopteridaceae	0-1		
Cheilanthes sieberi	Rock or Mulga Fern	Sinopteridaceae	0-2		
Pleurosorus rutifolius	Blanket Fern	Aspleniaceae	0-1		

APPENDIX D NEW AREAS PROPOSED FOR DEVELOPMENT – ASSESSMENTS OF SIGNIFICANCE

D.1 THREATENED SPECIES CONSERVATION ACT SEVEN-PART TEST

Section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) specifies seven factors to be taken into account in deciding whether a development is likely to significantly affect threatened species, populations or ecological communities, or their habitats, listed at the state level under the *Threatened Species Conservation Act 1995*.

This Seven-part Test characterises the significance of likely impacts associated with the proposal on the:

- Yass Daisy (*Ammobium craspedioides*) – Vulnerable
- White Box Yellow Box Blakely's Red Gum Woodland ('Box-Gum Woodland') Endangered Ecological Community.
- Varied Sittella (*Daphoenositta chrysoptera*) – Vulnerable
- White-fronted Chat (*Epthianura albifrons)* – Vulnerable.

Flora and ecological communities

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Yass Daisy (*Ammobium craspedioides*)

The Yass Daisy is a rare perennial herb inhabiting sclerophyll woodland, forest and roadsides (Harden 1992). It bears yellow button-like flowers in spring, and early summer in wet years. The Yass district is the centre of distribution for this species (Fallding 2002), and most records are confined to the district. Other records are from near Crookwell (DEC 2005) and Wagga Wagga (Burrows 1999).

The proposed cable route at site 35 would disturb a small area of secondary grassland likely to be derived from Box-Gum Woodland, which represents potential habitat for this species. The Yass Daisy has been recorded in the vicinity of the site during previous surveys (**ngh**environmental 2006, 2009, 2009c). A targeted survey was carried out at the site on 18 October 2012, and the locations of individual plants and discrete colonies were mapped (refer Figure 2-2). All plant records were located at or south-east of the point 658687 6146243. The proposed cable route would be located to avoid direct or indirect impacts to all of these plants, with a minimum 2 metre buffer. The cable trenching operation would involve the removal and timely replacement of whole sods, topsoil stockpiling and replacement, revegetation with native grasses and weed control before and after the works. The recorded Yass Daisy colonies would be protected during the works by fencing.

If works are proposed outside of the targeted survey area within the area of occupancy for the Yass Daisy mapped in **ngh**environmental (2009c), further survey or micrositing by an ecologist would be undertaken to

ensure that the works avoid Yass Daisy plants and colonies.

The works are not considered likely to adversely affect the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

NA

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Box-Gum Woodland EEC

i. Box-Gum Woodland is the dominant vegetation type in the study area, most commonly as cleared farmland. The majority of the clearing required for the proposal would involve poor-moderate condition native pasture, which is very abundant in the study area and has relatively low floristic diversity and conservation value. In this context, the loss of 12.56 ha of this vegetation (12.0 ha of poor-moderate and 0.56 ha of moderate condition native pasture and woodland) is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence would be placed at risk of extinction.

The moderate-good and good condition grassland, and moderate-good condition woodland recorded during the survey (sites 11, 13, 25, 31 and 35) is more significant because of the rarity of higher quality stands in the region. These areas are mapped as high constraint. The proponent has committed to avoiding impacts to high constraint areas (SoC 12). Infrastructure would not be sited within these areas and the areas would be protected from direct and indirect impacts during the construction and operation phases. A powerline in the Coppabella precinct would pass over moderate-good condition Box-Gum Woodland secondary grassland (site 13), however any access tracks would be sited outside this area and powerline footings would be excluded or minimised.

ii. The proposal would involve permanent clearing for infrastructure and tree removal within powerline corridors. Best practice weed control and erosion and sedimentation control would be used during and following construction. Impacts are expected to be highly localised. It is considered unlikely that the proposal would substantially and adversely modify the composition of the community such that its local occurrence is likely to be placed at risk of extinction.

d) In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of

habitat as a result of the proposed action, and

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Yass Daisy (*Ammobium craspedioides*)

i. The proposed cable route at site 35 would disturb approximately 340 square metres of secondary grassland which represents potential habitat for this species. Based on targeted survey results, the proposed cable route can be located to avoid direct impacts to this species although potential grassland habitat would be affected. This area is mapped as high constraint and the proponent has committed to avoiding impacts to high constraint areas (SoC 12). The preferred route for the cable would be located outside the paddocks containing the area of occupancy for this species (refer **ngh**environmental 2009c, Appendix G). On this basis the works are not expected to significantly affect the Yass Daisy population at the site.

ii. The cable trenching operation would involve the removal and timely replacement of whole sods, topsoil stockpiling and replacement and weed control before and after the works. Exposed areas along the trench line would be revegetated with local native grasses (*Themeda triandra* and/or *Microlaena stipoides*). The disturbance to soils may stimulate the growth of weeds; perennial weeds would be controlled as required and annual weeds are expected to decline as the native perennial grass cover is restored. The recorded Yass Daisy colonies would be protected during the works by fencing. The works corridor would be 2 metres wide. The Yass Daisy is likely to be dispersed by wind and pollinated by insects. The works are not expected to result in any fragmentation impacts to this species.

iii. The northern part of the local area of occupancy of the Yass Daisy has been mapped by **ngh**environmental (2009c) (refer Appendix G), and amounts to around 50 hectares. The full area of occupancy continues south of this area. The works would not disturb potential habitat for this species and would not significantly affect the survival of this species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

NA

f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan.

Yass Daisy (*Ammobium craspedioides*)

OEH has identified the following priority recovery actions for the Yass Daisy:

- Identify population changes and link to management regimes.
- Provide a list of known high priority sites to Lachlan CMA for investment.
- Negotiate, develop and implement conservation management agreements for known high priority sites.
- Negotiate and implement habitat protection measures with land managers.
- Hawthorn control at Binalong.

- Prepare and distribute EIA guidelines.
- Prepare management plans for Bowning and Bookham cemeteries and roadside populations.
- Prepare management plans for populations on LHPA land.

The proposed works would not conflict with these recovery actions.

Box-Gum Woodland EEC

The Draft National Recovery Plan for the Box-Gum Woodland community (DECCW 2010) has the following specific objective:

- Achieving no net loss in extent and condition of the ecological community throughout its geographic distribution;
- Increasing protection of sites in good condition;
- Increasing landscape functionality of the ecological community through management and restoration of degraded sites;
- Increasing transitional areas around remnants and linkages between remnants; and
- Bringing about enduring changes in participating land manager attitudes and behaviours towards environmental protection and sustainable land management practices to increase extent, integrity and function of Box-Gum Grassy Woodland.

The loss of degraded native pasture resulting from the proposal is not considered likely to significantly affect the achievement of this objective.

OEH has identified 29 actions to assist the recovery of the Box-Gum Woodland community in NSW. The proposal would not interfere with any of these measures.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Clearing of native vegetation

Clearing can lead to direct habitat loss, habitat fragmentation and associated genetic impacts, habitat degradation, loss of the leaf litter layer increased habitat for invasive species and off-site impacts such as downstream sedimentation. The proposal would not contribute significantly to the operation of clearing as a threatening process at the local or regional level, since the bulk of the subject site is already cleared. Groundlayer vegetation is generally low diversity native pasture that is common in the region. Tree removal would be minimised by siting infrastructure to avoid woodland wherever practicable.

Invasion of native vegetation by exotic perennial grasses

The Box-Gum Woodland EEC is vulnerable to the introduction and spread of perennial grasses such as African Lovegrass, Serrated Tussock and Yorkshire Fog. These species are present in the study area. Best practice weed hygiene and control, and the avoidance of unnecessary disturbance in areas adjacent to the works should ensure that the proposal does not significantly add to these pressures at the subject site.

Conclusion

This assessment concludes that the proposal would involve the loss of vegetation belonging to the Box-Gum Woodland EEC, but that these losses would not be significant, based on the condition of most areas affected and the very limited scale and nature of impacts to better condition vegetation.

While the proposal would be located in the vicinity of a Yass Daisy population, impacts to Yass Daisy plants and potential habitat would be avoided and the site would be rehabilitated so that no long term impacts to habitat values are anticipated.

Specifically, the proposal would not be likely to:

- Reduce the long-term viability of a local population of threatened species, populations or ecological communities;
- Accelerate the extinction of the species, population or ecological community or place it at risk of extinction; or
- Adversely affect critical habitat.

Fauna – Varied Sittella and White-fronted Chat

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Varied Sittella inhabits eucalypt forests and woodlands, especially in areas where there is standing dead timber and rough bark (OEH 2012). Varied Sittella was not recorded in the study area although there are numerous Bionet records in the locality and region. Suitable habitat in the study area is mostly associated with Box-Gum Woodland, where patches include sufficient dead timber for the species. Such areas include the sites where Brown Treecreeper was recorded along Coppabella road and near Turbine 130.

White-fronted Chat is usually found foraging on bare or grassy ground in wetland areas, singly or in pairs (OEH 2012). The White-fronted Chat was not detected in the study area and there are no Bionet records within ~70km of the town of Yass. However, suitable habitat may occur in the study area. Intermittent watercourses and soaks were found in lower elevation areas and vegetated predominately with grasses and sedges. A typical boggy grassy flat at the head of an ephemeral waterway occurs at the proposed substation on the Nils Taube property. Other potential habitat areas are along the proposed powerline route.

The proposal would remove some potential habitat of these species (refer to point d below, for a break-down of impact extent). Over the large extent of the study area however, clearing areas are minor and are generally focused on poorer quality sites. Given the disturbed condition of these areas, and the large extent of similar and higher quality habitat nearby, the removal of habitat is not likely to affect the lifecycle of these species to the extent that a viable local population may be put at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

NA

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable (refer to assessment for Box-Gum Woodland, above).

d) In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term

survival of the species, population or ecological community in the locality.

i. Varied Sittella: 12.5 hectares of Box-Gum Woodland with trees would be removed as result of the proposed action. White-fronted Chat: Approximately 74 hectares of pasture would be removed although the majority of this would not be suitable habitat – only relatively small areas in gully flats provide suitable habitat. This is likely to represent less than 10% of pasture in the subject site, or around 7.5 hectares of potential habitat.

ii. The study area consists of highly fragmented remnant and regrowth woodland and forest. The proposed development would not further fragment woodland habitats as works would impact only isolated patches and copses of trees or the edges of larger woodland remnants.

iii. Neither species was recorded on site, so the habitat cannot be said to be of high importance. However, the Varied Sittella is relatively common in the local area and has genuine potential to occur. The species may use the study area to access connectivity across the landscape if not actually as a habitat area. Therefore the habitat is considered of moderate importance to the Varied Sittella. The White-fronted Chat appears not to occur locally and therefore the habitat in the study area is considered of low importance to this species.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

NA

f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan.

There are not recovery plans in place for either species. No priority actions have been identified to aid in the recovery of Varied Sittella or White-fronted Chat (OEH 2012). Threats to the species include: Varied Sittella – land clearing, habitat degradation and simplification; White-fronted Chat – predation, habitat size and quality. No threat abatement plans have been developed for these threats (OEH 2012).

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Clearing of native vegetation

Both Varied Sittella and White-fronted Chat would be affected by the clearing of native vegetation. Potential Impacts of clearing include fragmentation, destruction of habitat, riparian zone degradation, loss of leaf litter layer and increased habitat for invasive species (OEH 2012). Given the disturbed condition of the areas to be cleared (including their existing fragmented state), and the large extent of similar and higher quality habitat nearby the proposal is unlikely to exacerbate the effects of this existing key threatening process.

Removal of dead wood and dead trees

Varied Sittella would be affected by the removal of dead wood and dead trees, even where whole-of-habitat impacts are minimal (i.e. where tracks are constructed through 'pasture with scattered tree' habitat and clearing is of a small number of individual trees). The proposed works may exacerbate this process, already functioning within the landscape due to land use such as agriculture. Statements of Commitment include micro-siting infrastructure to avoid hollow-bearing trees where possible – this would also avoid trees with dead branches. This commitment would retain habitat features important to Varied Sitella.

Conclusion

The proposal would involve the clearing of native vegetation and the loss of potential habitat for the Varied Sittella and White-fronted Chat. This assessment concludes that these losses would not be significant based on the already fragmented and disturbed condition of the habitat in the study area. Further clearing would be of a limited scale with potential for minimising impacts by micro-siting of infrastructure to avoid features such as hollow-bearing trees (given as a Statement of Commitment) where possible.

Specifically, the proposal would not be likely to:

- Reduce the long-term viability of a local population of threatened species
- Accelerate the extinction of the species or population or place it at risk of extinction
- Conflict with recovery objectives for the species assessed.

D.2 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT PRINCIPAL SIGNIFICANT IMPACT ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act* 1999 specifies factors to be taken into account in deciding whether a development is likely to significantly affect Endangered Ecological Communities, threatened species and migratory species, listed at the Commonwealth level. The following assessment assesses the significance of the likely impacts associated with the proposed works on:

- Yass Daisy (*Ammobium craspedioides*) – Vulnerable
- Yellow Box–White Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands Critically Endangered Ecological Community ('Box-Gum Woodland CEEC').

Yass Daisy

a) Will the action lead to a long-term decrease in the size of a population of a species?

The proposed works would avoid direct and indirect impact to the Yass Daisy population and potential habitat and would not lead to a long term decrease in the size of the population. Refer also TSC Act seven part test a).

b) Will the action reduce the area of occupancy of the species?

The proposed works would temporarily disturb around 340 square metres of the at least 50 hectare area of occupancy of the Yass Daisy at the site. The disturbed area would be rehabilitated to continue to provide potential habitat for the species. Refer also TSC Act seven part test a) and d).

c) Will the action fragment and existing population into two or more populations?

The works would not represent a barrier to the dispersal or pollination for this species. Refer also TSC Act seven part test a), c) and d).

d) Will the action adversely affect habitat critical to the survival of a species?

The small area of disturbance would not be critical to the survival of the species at the site, or in the wider landscape. Refer also TSC Act seven part test c) and d).

e) Will the action disrupt the breeding cycle of a population?

The works would not affect individual plants or colonies of this species, and would not be likely to disrupt pollinator activity or seed dispersal opportunities at the site. Refer also TSC Act seven part test c) and d).

f) Will the action modify, destroy, remove or isolate of decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposal works would temporarily disturb around 340 square metres of the at least 50 hectare area of occupancy of the Yass Daisy at the site. The works area would be restored using sod replacement, revegetation using native grasses and high level weed control, and is expected to continue to provide potential habitat following the works.

g) Will the action result in invasive species that are harmful to a critically endangered or endangered/vulnerable species becoming established in the endangered / critically endangered /vulnerable species habitat?

The disturbance to soils may stimulate the growth of weeds; perennial weeds would be controlled as required and annual weeds are expected to decline as the native perennial grass cover is restored. High level weed hygiene would ensure that no new weeds are introduced to the site, and existing weeds are not spread around the site.

The works area would be restored using sod replacement, revegetation using native grasses and high level weed control, and is expected to continue to provide potential habitat following the works. Resilience against weed invasion is expected to increase over time to pre-works levels.

h) Will the action interfere with the recovery of the species?

The works would not affect the recovery of the species at the site or in the region. The offsetting process may provide an opportunity to enhance the protection of the species in the study area.

Box-Gum Woodland CEEC

a) Will the action reduce the extent of an ecological community?

The proposal would avoid impacts to the CEEC, mapped as moderate-good condition grassland and high constraint vegetation. The project has been specifically revised to avoid and minimise development in these areas (refer section 2.6.3).

Box-Gum Woodland is the dominant vegetation type in the study area, most commonly as cleared farmland. The area of Box-Gum Woodland CEEC in the locality in condition comparable to the affected sites is not known.

A powerline in the Coppabella precinct would pass over moderate-good condition Box-Gum Woodland secondary grassland belonging to the CEEC (site 13), however any access tracks would be sited outside this area and powerline footings would be excluded or minimised.

b) Will the action fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines?

The proposal would not significantly add to existing fragmentation in the study area. The powerline passing through site 25 would be located near the end of a small woodland patch, with low tree density, and is not expected to add significantly to an already highly fragmented landscape.

c) Will the action adversely affect habitat critical to the survival of an ecological community?

The proposed works would avoid impacts to the CEEC; the project has been specifically revised to avoid and minimise development in these areas (refer section 2.6.3). The great majority of the works would be undertaken in poor-moderate condition native pasture, which no longer belongs to the CEEC and represents highly degraded and modified habitat.

d) **Will the action modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns?**

The proposed works would avoid impacts to the CEEC; the project has been specifically revised to avoid and minimise development in these areas (refer section 2.6.3). The minor impacts to secondary grassland resulting from the proposed powerline at site 13 would not modify or destroy abiotic factors or local hydrology. The works will require site levelling and drainage which would affect soils, hydrology and ecological functions outside the CEEC. However, these impacts are expected to be highly localised, and are not expected to significantly affect the CEEC beyond the works boundaries.

e) **Will the action cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting?**

The vegetation impacts will generally be confined to the works areas and would not affect any CEEC areas located nearby. Weed control, fire prevention protocols and soil and water protection measures should ensure that impacts beyond the works sites are not significant, and do not cause a substantial change in species composition in the CEEC outside the site.

f) Will the action cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

-- assisting invasive species, that are harmful to the listed ecological community, to become established, or

-- causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community?

The proposed works would involve soil disturbance in non-EEC areas which may stimulate the germination of weed seed present in the soil, and provide opportunities for the establishment of invasive weed species. This risk is considered to be manageable using best practice weed hygiene and the control of invasive weeds before and following the construction phase. Best practice would also be used to ensure that pollution risks during construction are reduced to acceptable levels.

The risk of pollution from a spill of transformer oil used in substations would be mitigated by ensuring that bunding around the facilities has a capacity exceeding the volume of the transformer oil to contain the oil in the event of a major leak or fire. The facilities would be regularly inspected and maintained to ensure the bunded area is clear (including removing any rainwater).

g) Will the action interfere with the recovery of an ecological community?

The Draft National Recovery Plan for the Box-Gum Woodland community (DECCW 2010) has the following specific objective:

- achieving no net loss in extent and condition of the ecological community throughout its geographic distribution;

- increasing protection of sites in good condition;
- increasing landscape functionality of the ecological community through management and restoration of degraded sites;
- increasing transitional areas around remnants and linkages between remnants; and
- bringing about enduring changes in participating land manager attitudes and behaviours towards environmental protection and sustainable land management practices to increase extent, integrity and function of Box-Gum Grassy Woodland.

Conclusion

Under the EPBC Act an action will require Commonwealth approval if the action will have, or is likely to have, a significant impact on a matter of national environmental significance. A 'significant impact' is defined as 'important, notable, or of consequence, having regard to its context or intensity'. To be 'likely' to cause a significant impact requires only a real or not remote chance or possibility (DEWHA 2009).

FLORA AND ECOLOGICAL COMMUNITIES

Yass Daisy

Impacts to Yass Daisy plants and colonies would be avoided and the disturbance area would be rehabilitated to ensure no long term impacts to habitat values. The proposal is not considered likely to have a significant impact on the Yass Daisy. Specifically, it is not considered that the proposed works would:

- Lead to a long-term decrease in the size of an important population of the species
- Reduce the area of occupancy of an important population
- Fragment an existing important population into two or more populations.

Box-Gum Woodland CEEC

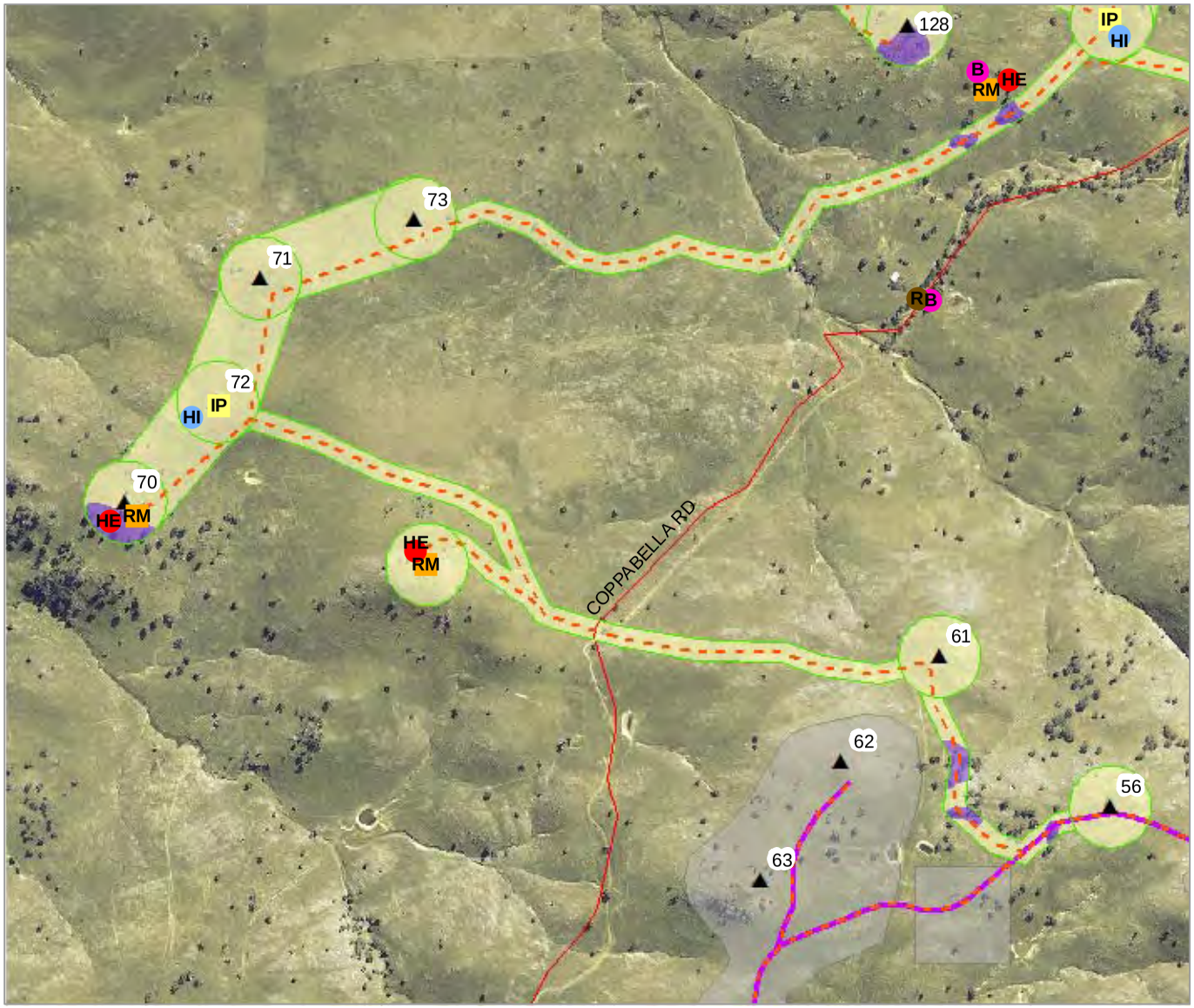
An action is likely to have a significant impact on a critically endangered ecological community if, among other things, there is a real chance or possibility that it will fragment or reduce the extent of an ecological community (DEWHA 2009). The proposal would avoid this vegetation and therefore would not reduce the extent of the Box-Gum Woodland CEEC, and would not be likely to have a significant impact on the CEEC. A referral to the Commonwealth Environment Minister is not considered to be required.

APPENDIX E NEW AREAS PROPOSED FOR DEVELOPMENT – MAP SETS

E.1 SURVEY EFFORT

E.2 SURVEY RESULTS

E.3 CONSTRAINTS



Survey Effort: Map 1 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Flora Survey Effort

- IP — Inspection point
- RM — Random meander

Fauna Survey Effort

- B — Bird census
- HE — Habitat evaluation
- HI — Habitat inspection
- R — Reptile survey

Infrastructure

- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

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Ref: 4743 - 1/1
Author: AM

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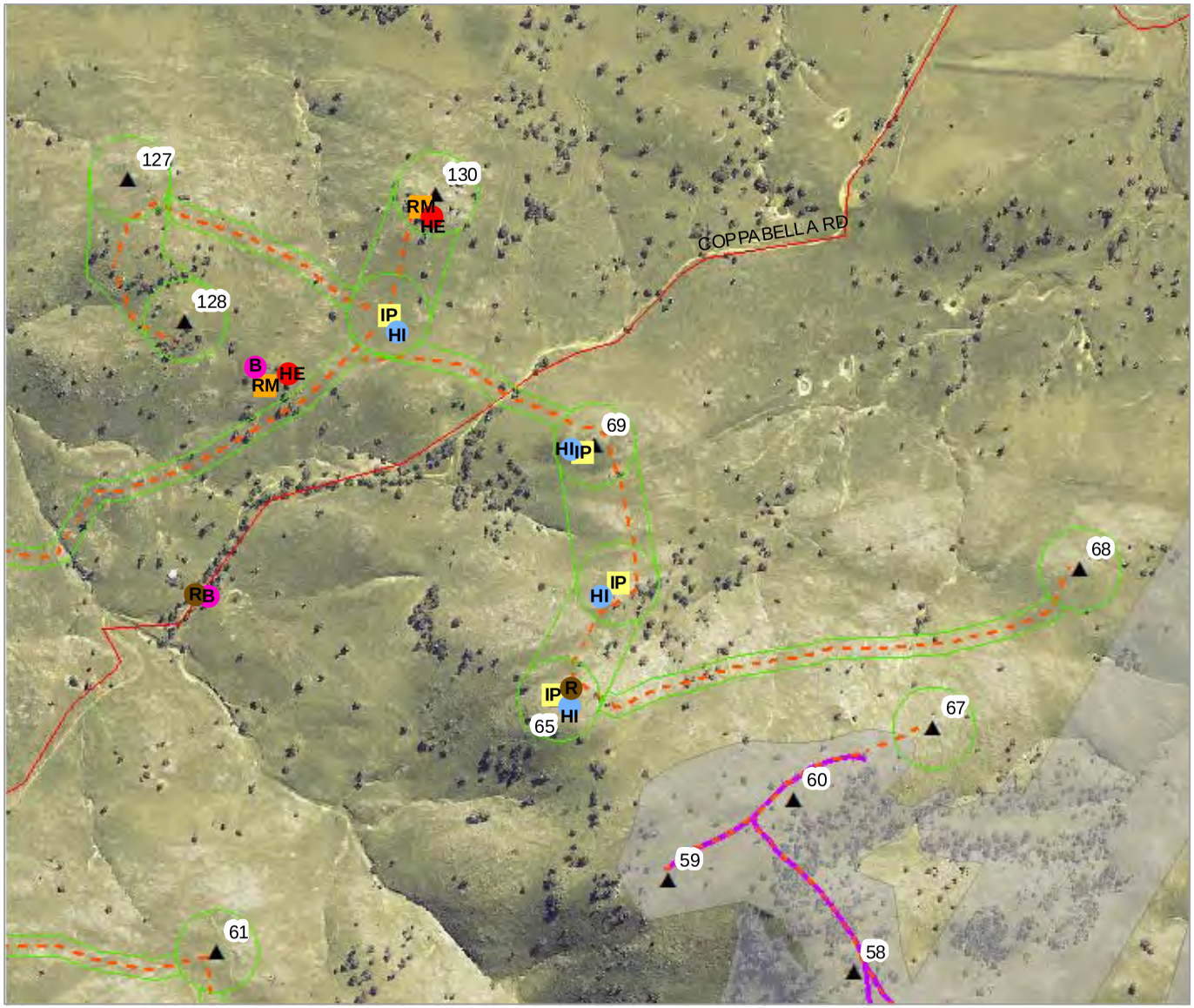

Survey Effort: Map 2 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Flora Survey Effort

- IP Inspection point
- RM Random meander

Fauna Survey Effort

- B Bird census
- HE Habitat evaluation
- HI Habitat inspection
- R Reptile survey

Infrastructure

- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:16000 @ A4
Ref: 4743 - 1/2
Author: AM

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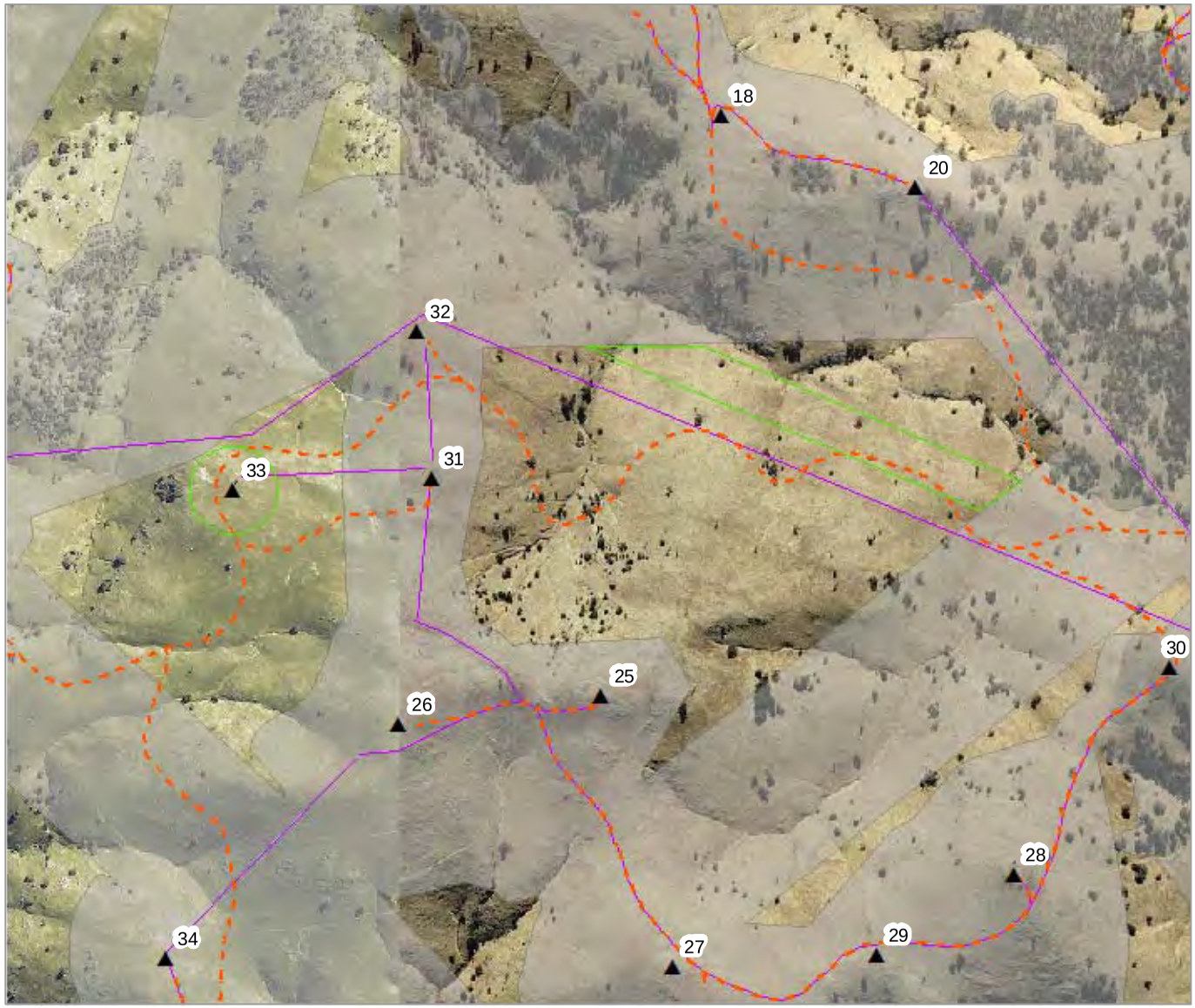

Survey Effort: Map 3 of 9

Vegetation Type

- BGW (Native Pasture)

Infrastructure

- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Powerline Easement (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:15000 @ A4
Ref: 4743 - 1/3
Author: AM

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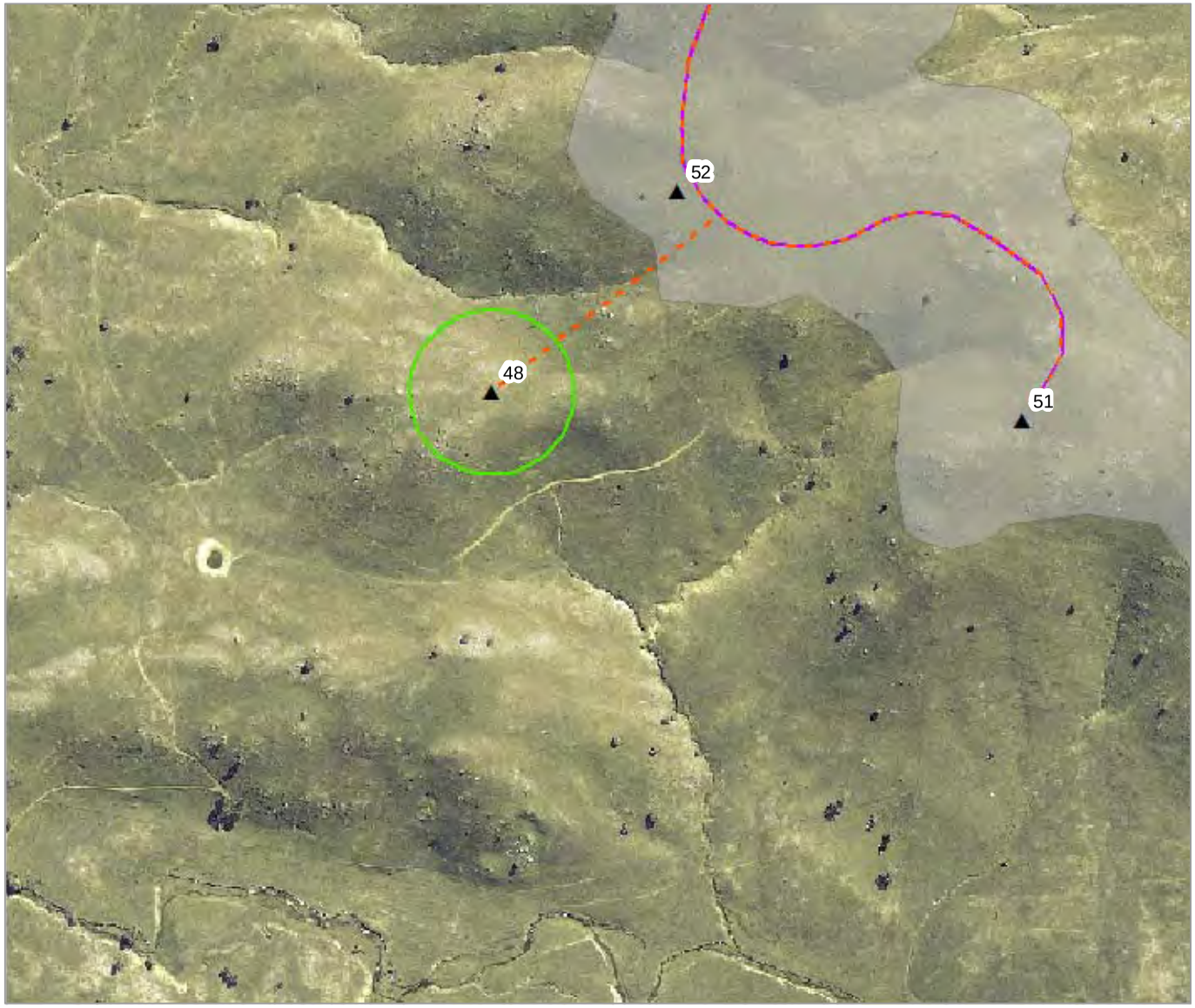

Survey Effort: Map 4 of 9

Vegetation Type

BGW (Native Pasture)

Infrastructure

Latest Development Envelope

Turbines (270912)

Access Tracks (270912)

Electrical Reticulation (050912)

Previously assessed area

0 0.1 0.2 0.4 Km

1:8000 @ A4

Ref: 4743 - 1/4

Author: AM

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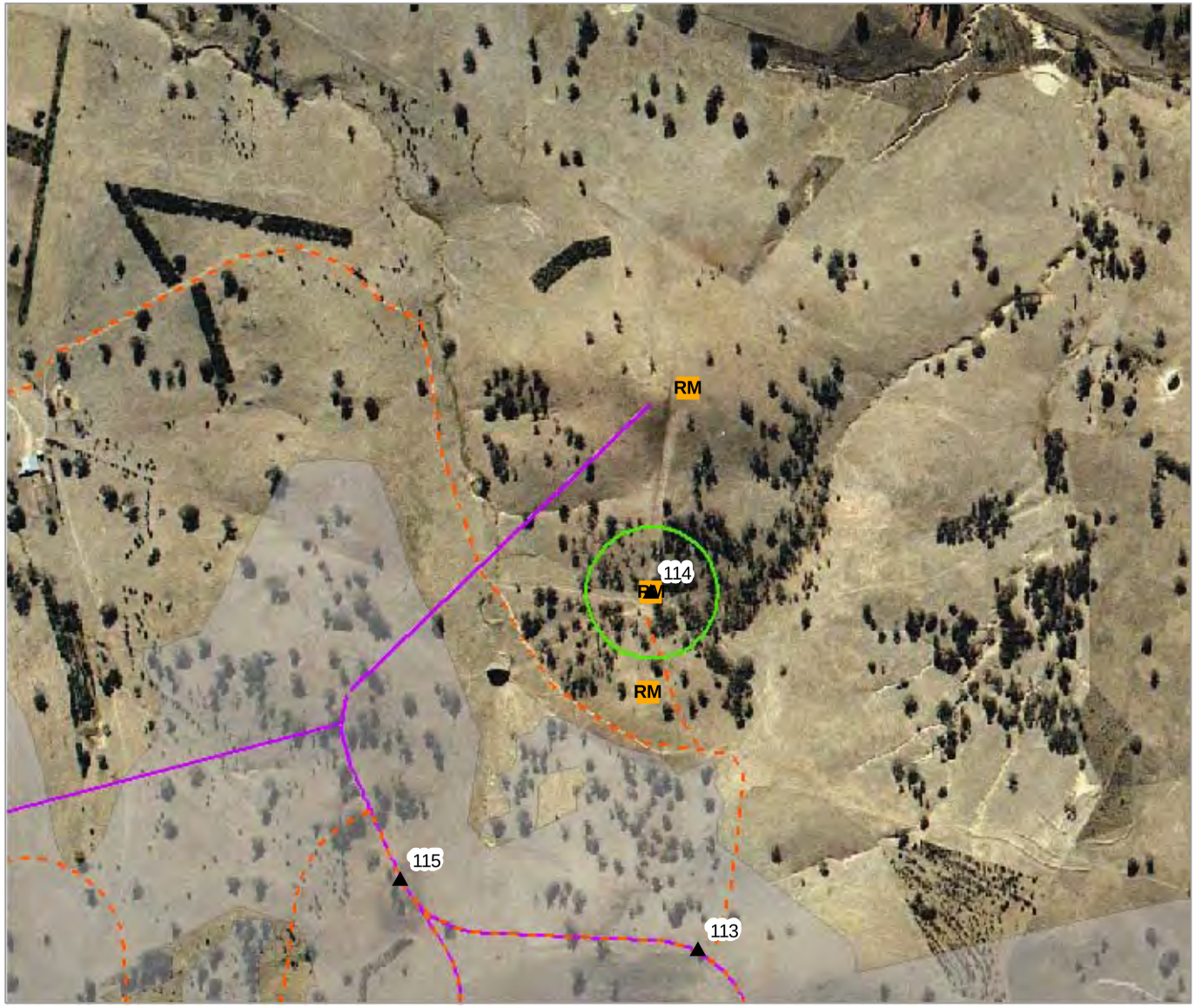

Survey Effort: Map 5 of 9

Vegetation Type

- BGW (Tree Cover)

Flora Survey Effort

- IP Inspection point
- RM Random meander

Fauna Survey Effort

- B Bird census
- HE Habitat evaluation
- HI Habitat inspection
- R Reptile survey

Infrastructure

- Turbines (270912)
- Latest Development Envelope
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref: 4743 - 1/5
Author: AM

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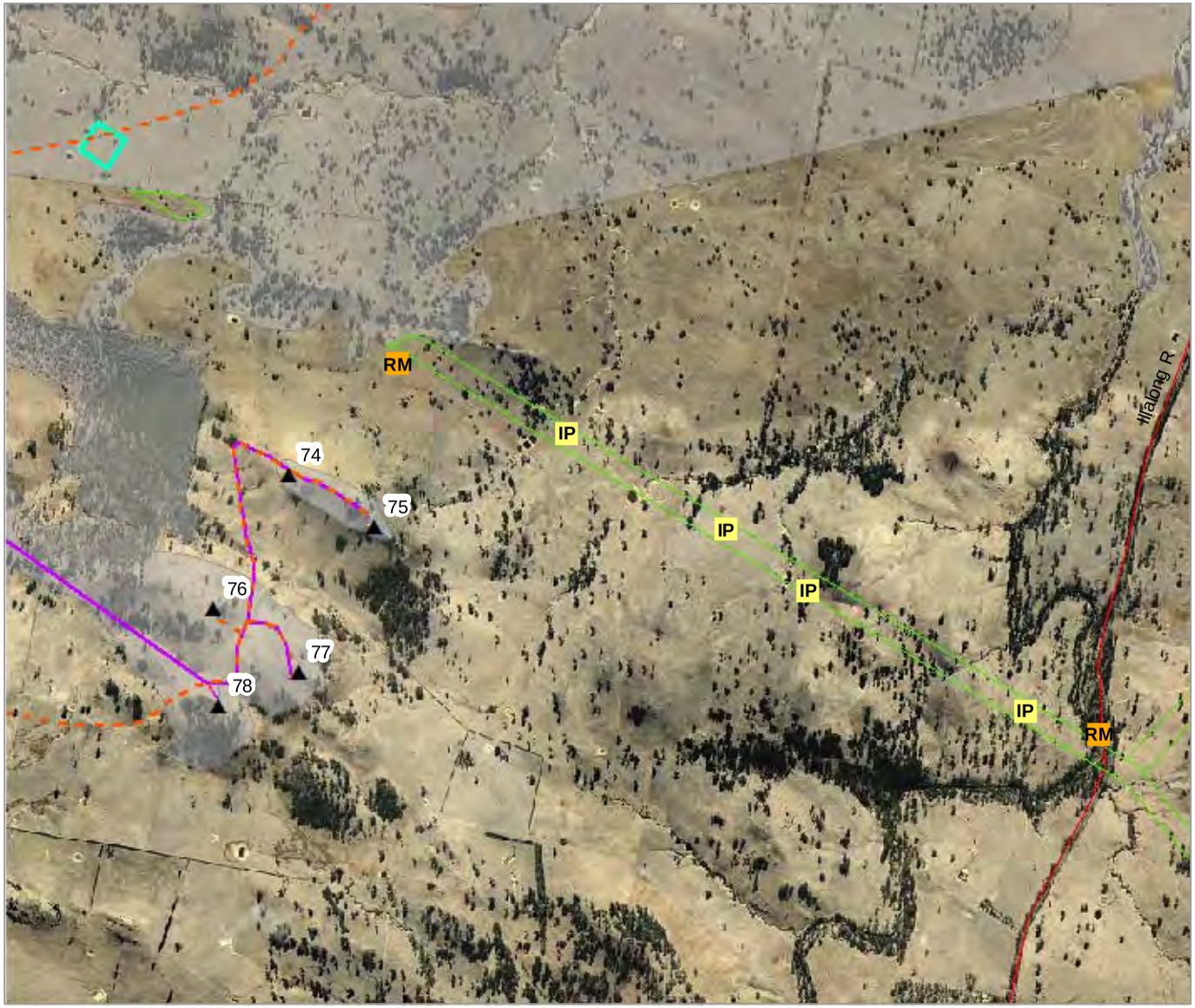

Survey Effort: Map 6 of 9

Vegetation Type

- BGW (Grassland)
- BGW (Native Pasture)
- BGW (Tree Cover)
- RRG (Tree Cover)

Flora Survey Effort

- IP Inspection point
- RM Random meander

Fauna Survey Effort

- B Bird census
- HE Habitat evaluation
- HI Habitat inspection

Infrastructure

- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Powerline Easement (050912)
- Substations (180912)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:30000 @ A4
Ref: 4743 - 1/6
Author: AM

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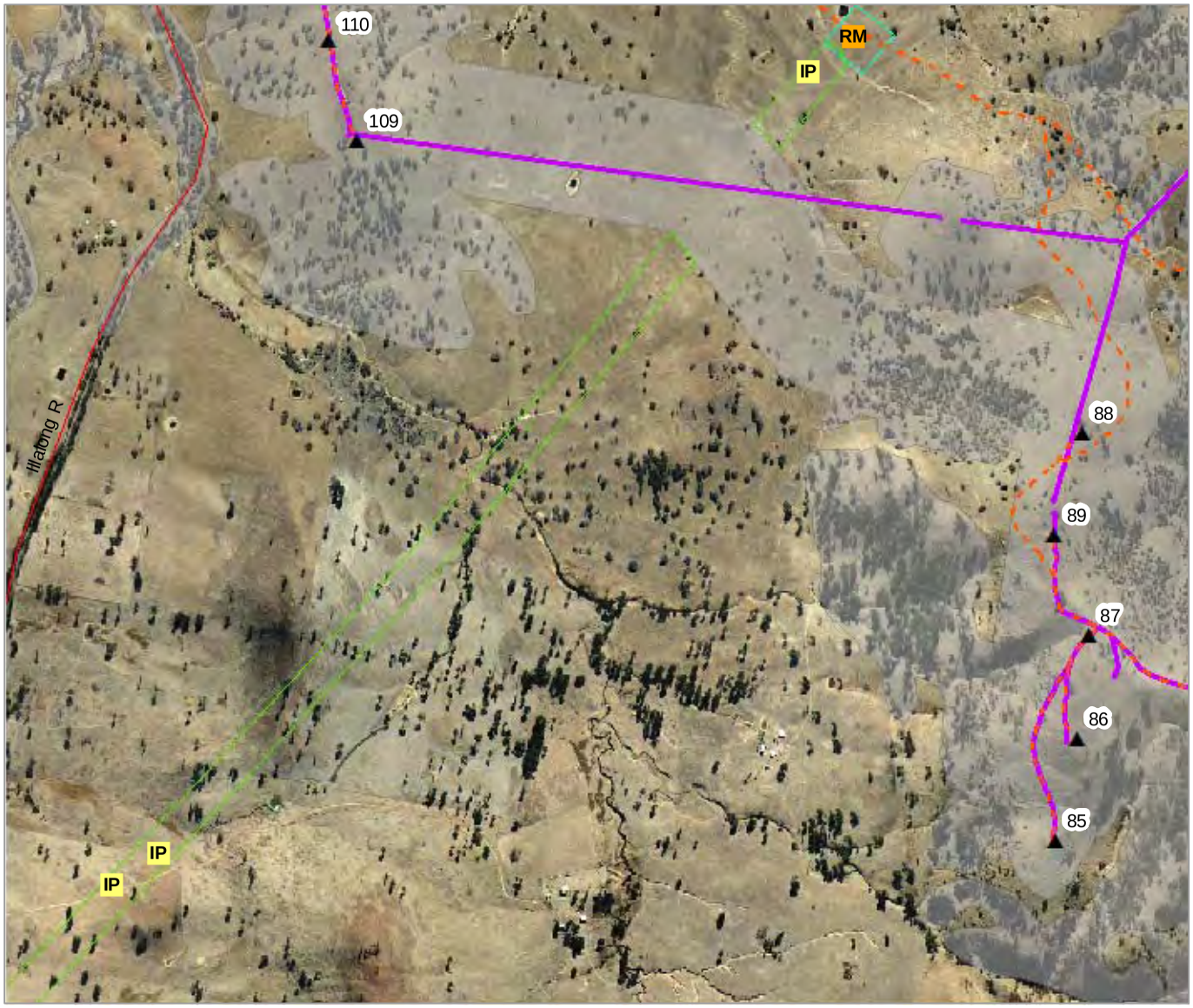

Survey Effort: Map 7 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Flora Survey Effort

- IP Inspection point
- RM Random meander

Fauna Survey Effort

- HE Habitat evaluation
- HI Habitat inspection

Infrastructure

- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Powerline Easement (050912)
- Substations (180912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:20000 @ A4
Ref: 4743 - 1/7
Author: AM

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Survey Effort: Map 8 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)
- RRG (Tree Cover)

Flora Survey Effort

- IP Inspection point
- RM Random meander

Fauna Survey Effort

- B Bird census
- HE Habitat evaluation
- HI Habitat inspection

Infrastructure

- Latest Development Envelope
- Powerline Easement (050912)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:35000 @ A4
Ref: 4743 - 1/8
Author: AM

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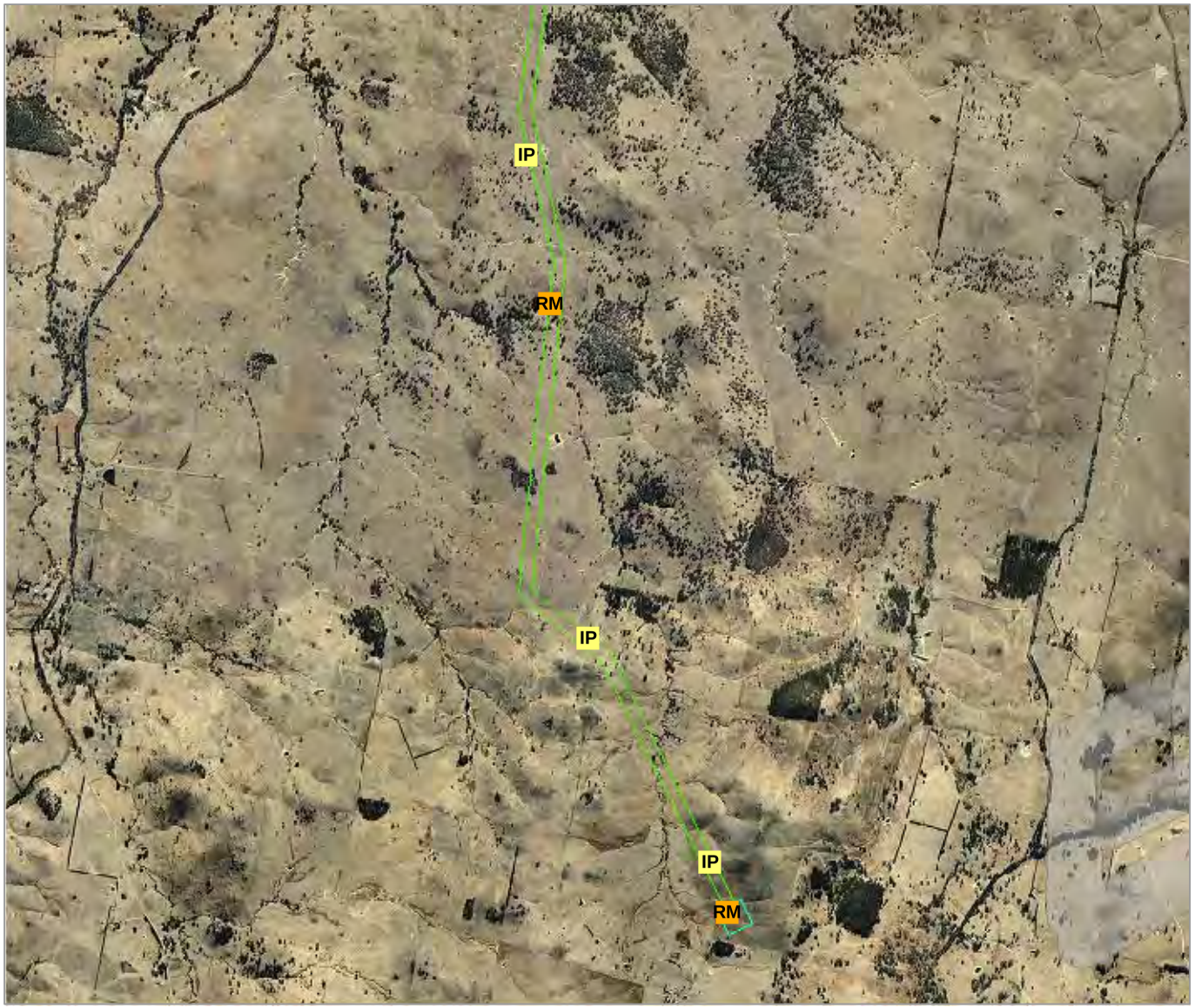

Survey Effort: Map 9 of 9

Vegetation Type

- BGW (Grassland)
- BGW (Native Pasture)
- BGW (Tree Cover)

Flora Survey Effort

- IP Inspection point
- RM Random meander

Fauna Survey Effort

- B Bird census
- HE Habitat evaluation
- HI Habitat inspection
- R Reptile survey

Infrastructure

- Substations (180912)
- Latest Development Envelope
- Powerline Easement (050912)
- Previously assessed area

0 0.5 1 2 Km

1:50000 @ A4
Ref: 4743 - 1/9
Author: AM

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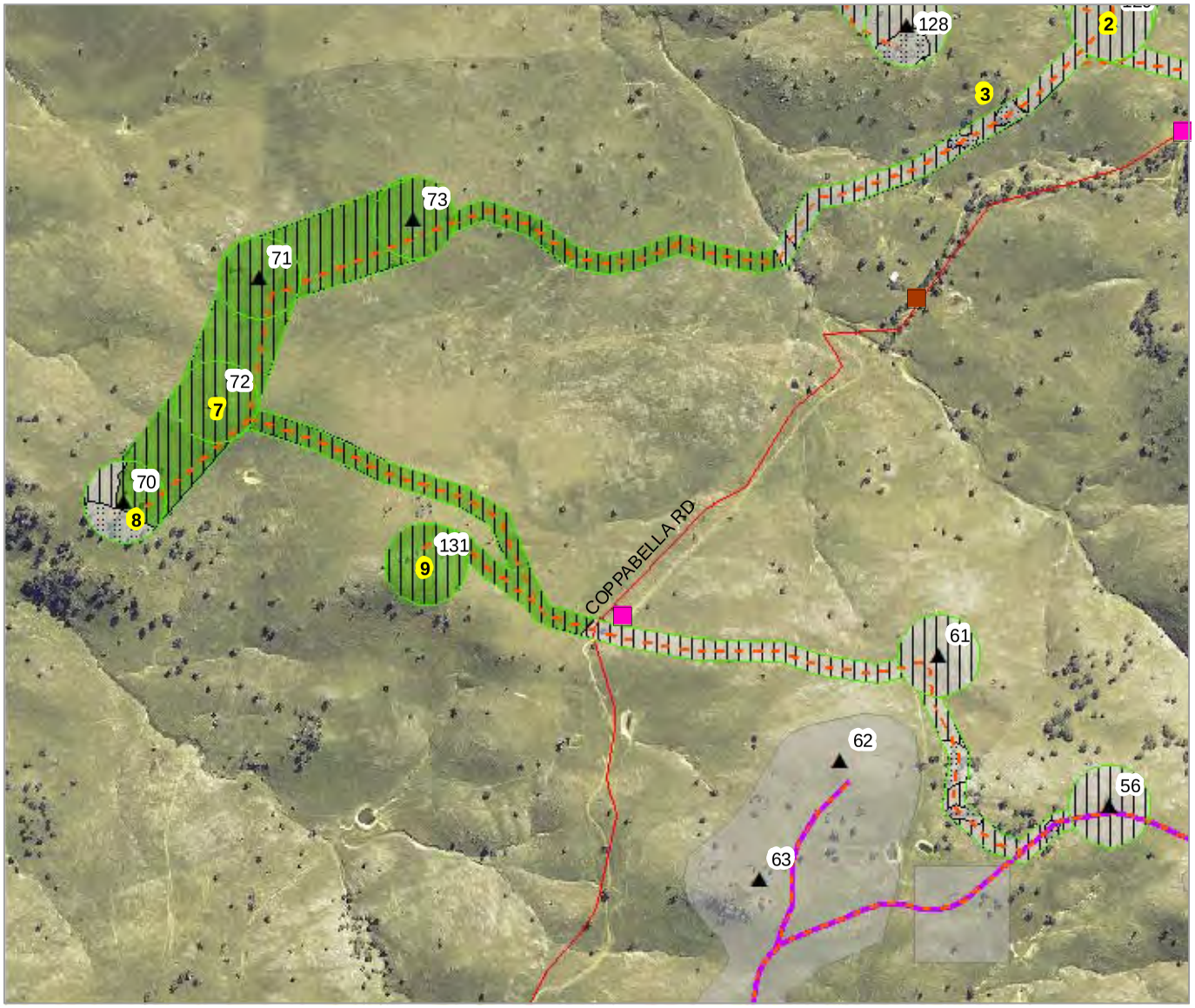

Results: Map 1 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Vegetation Condition

- Poor
- Poor-moderate

Fauna Results

- Brown Treecreeper
- Diamond Firetail

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:16000 @ A4
Ref. 4743 - 2/1
Author: AM

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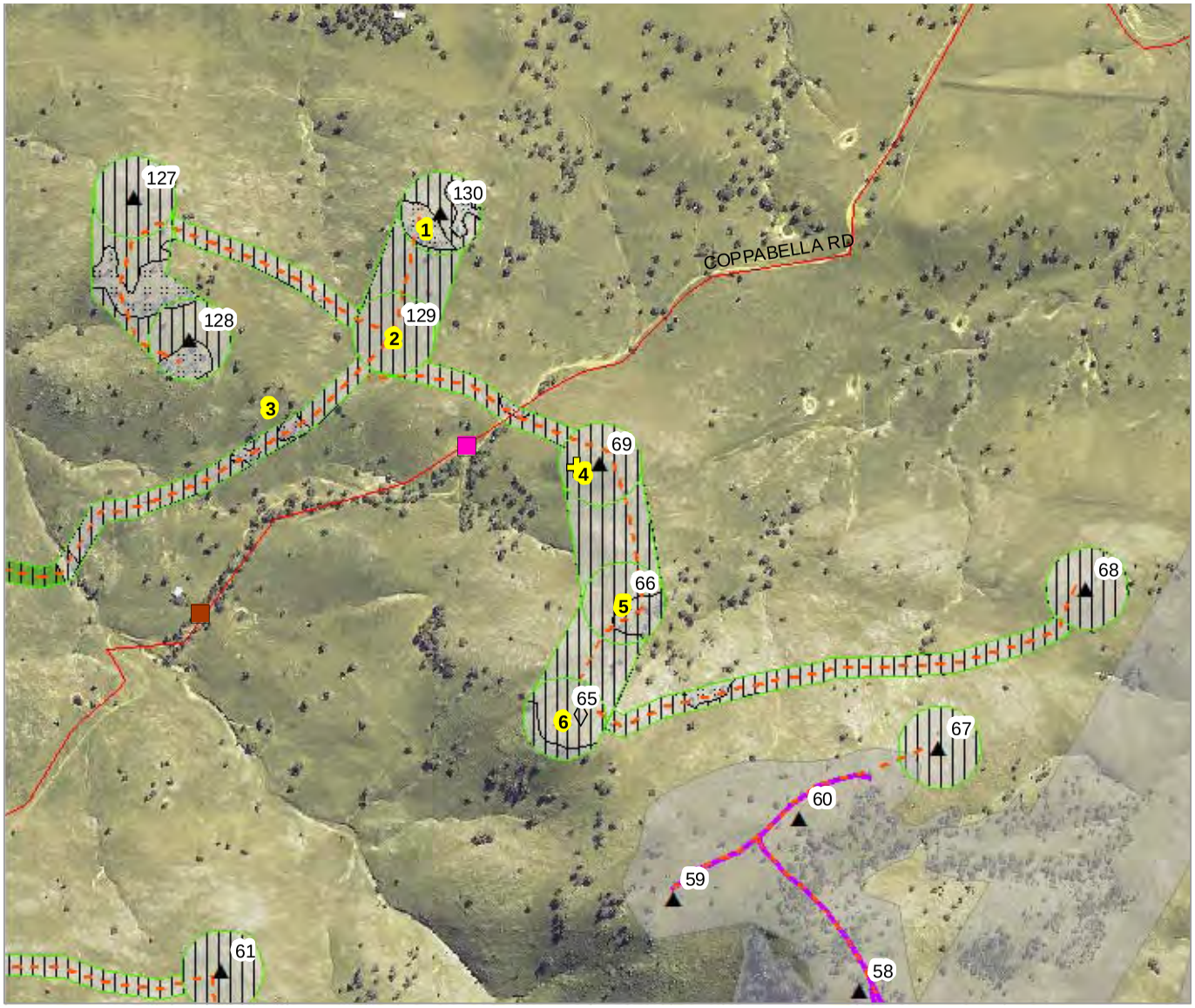

Results: Map 2 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Vegetation Condition

- Poor
- Poor-moderate

Fauna Results

- Brown Treecreeper
- Diamond Firetail
- Grassland reptile habitat
- No hollows present

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

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Ref: 4743 - 2/2
Author: AM

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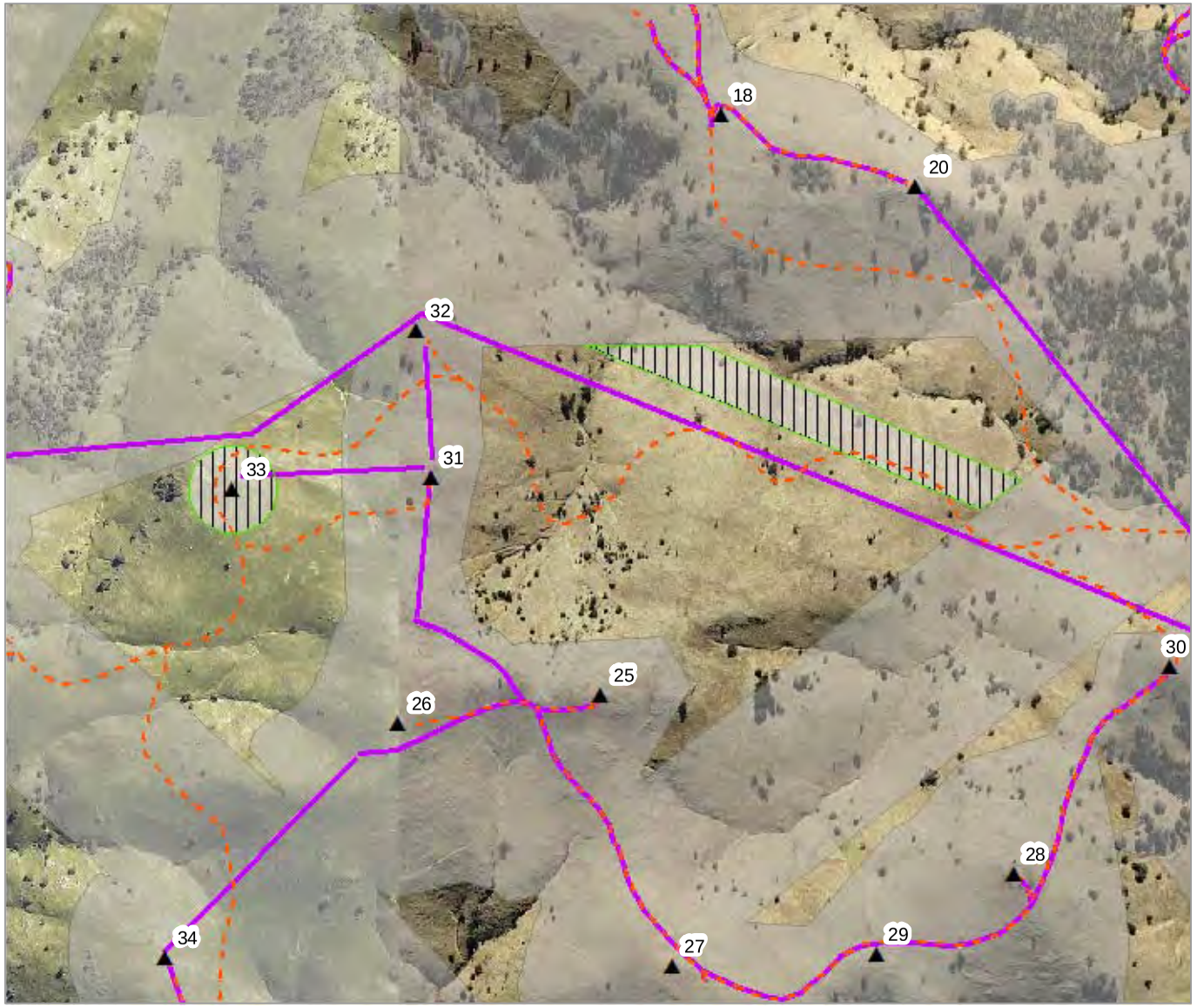

Results: Map 3 of 9

Vegetation Type

BGW (Native Pasture)

Vegetation Condition

Poor-moderate

Infrastructure

1 Site Numbers

Latest Development Envelope

Turbines (270912)

Access Tracks (270912)

Electrical Reticulation (050912)

Roads

Previously assessed area

0 0.125 0.25 0.5 Km

1:15000 @ A4

Ref: 4743 - 2/3

Author: AM

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Results: Map 4 of 9

Vegetation Type

BGW (Native Pasture)

Vegetation Condition

Poor-moderate

Infrastructure

1 Site Numbers

Latest Development Envelope

Turbines (270912)

Access Tracks (270912)

Electrical Reticulation (050912)

Roads

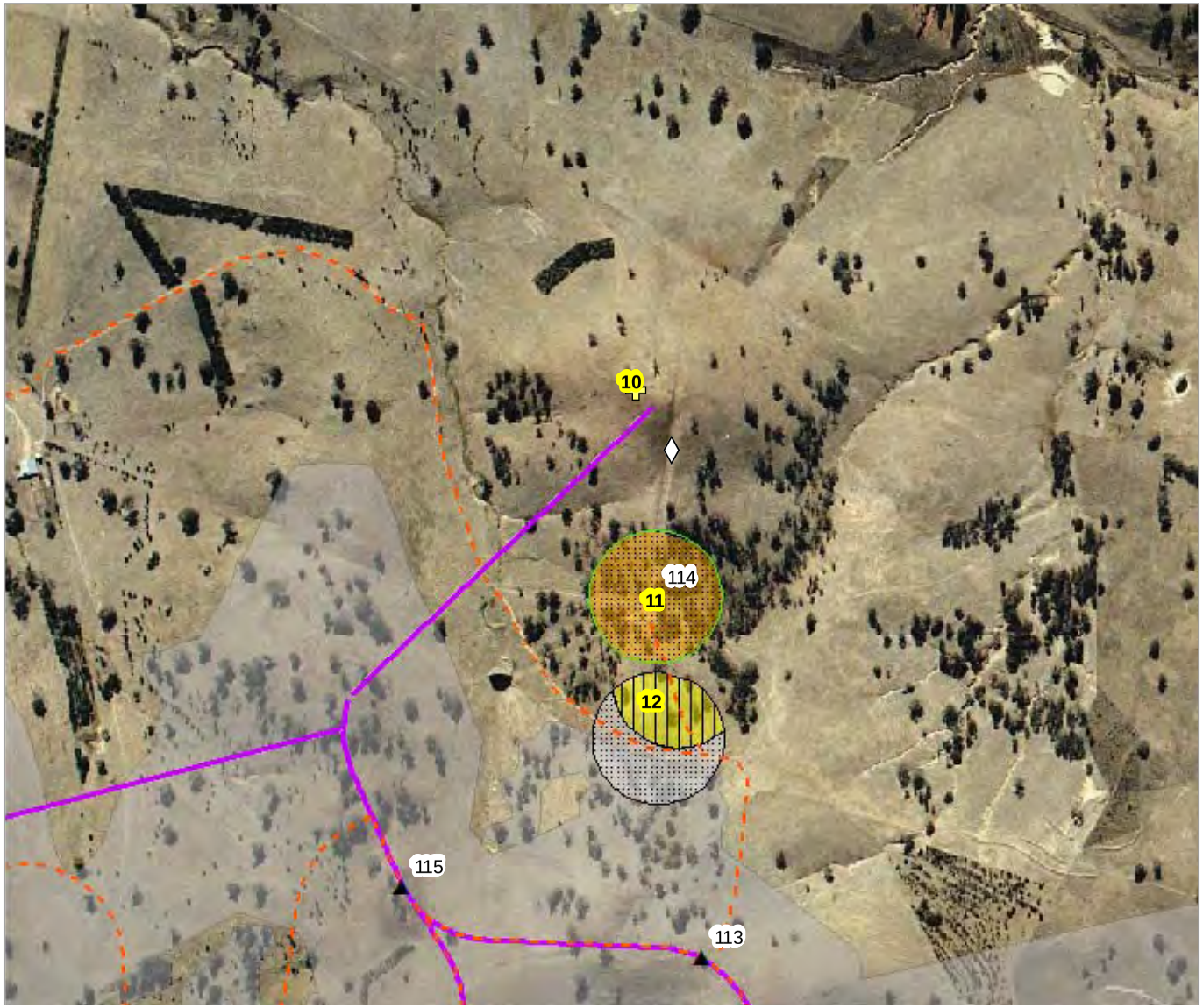
Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4

Ref: 4743 - 2/4

Author: AM



Results: Map 5 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Vegetation Condition

- Moderate
- Moderate-good
- Poor-moderate

Fauna Results

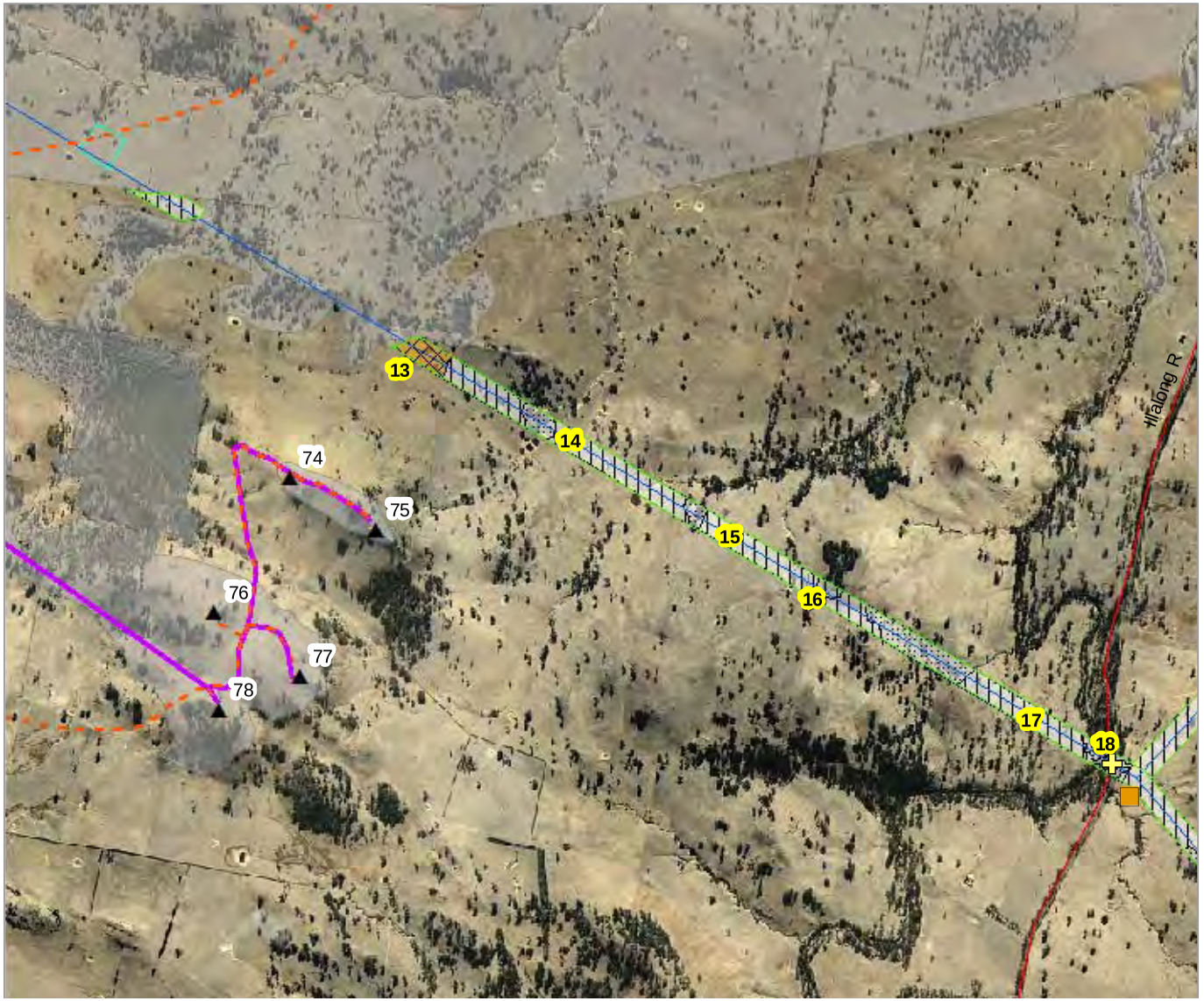
- Grassland reptile habitat
- No hollows present

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref. 4743 - 2/5
Author: AM



Results: Map 6 of 9

Vegetation Type

- BGW (Grassland)
- BGW (Native Pasture)
- BGW (Tree Cover)
- RRG (Tree Cover)

Vegetation Condition

- Moderate-good
- Poor-moderate

Fauna Results

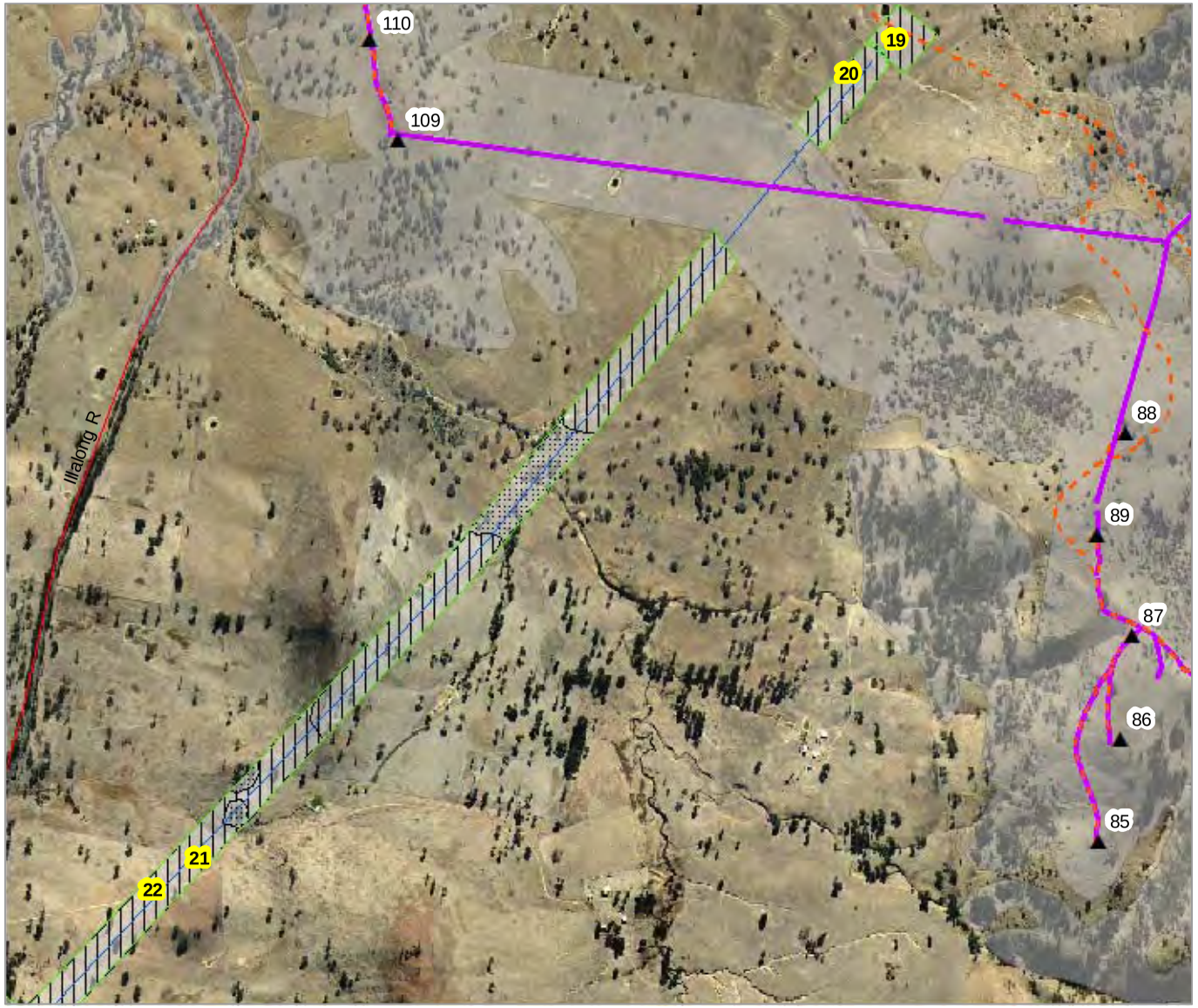
- Little Eagle
- No hollows present

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Substations (180912)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:30000 @ A4
Ref: 4743 - 2/6
Author: AM



Results: Map 7 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)

Vegetation Condition

- Poor-moderate

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (270912)
- Access Tracks (270912)
- Electrical Reticulation (050912)
- Powerline Easement (050912)
- Substations (180912)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:20000 @ A4
Ref: 4743 - 2/7
Author: AM

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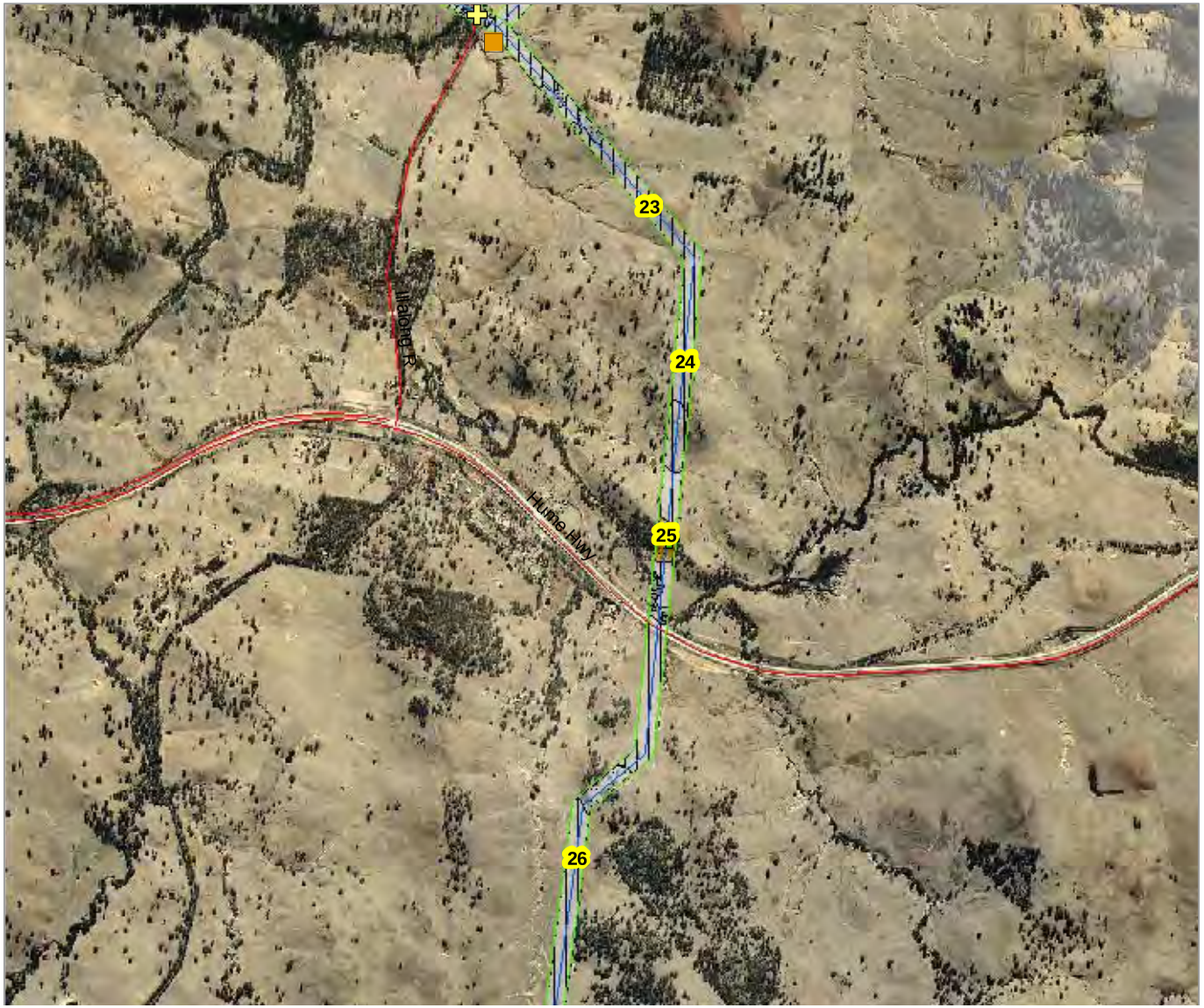

Results: Map 8 of 9

Vegetation Type

- BGW (Native Pasture)
- BGW (Tree Cover)
- RRG (Tree Cover)

Vegetation Condition

- Moderate-good
- Poor-moderate

Fauna results

- Little Eagle
- No hollows present
- High density hollow-bearing trees

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Powerline Easement (050912)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:35000 @ A4
Ref: 4743 - 2/8
Author: DM

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Results: Map 9 of 9

Vegetation Type

- BGW (Grassland)
- BGW (Native Pasture)
- BGW (Tree Cover)

Vegetation Condition

- Moderate
- Moderate-good
- Poor-moderate

Fauna Results

- Grassland reptile habitat
- High density hollow-bearing trees

Infrastructure

- 1 Site Numbers
- Substations (180912)
- Latest Development Envelope
- Powerline Easement (050912)
- Previously assessed area

0 0.25 0.5 1 Km

1:50000 @ A4
Ref: 4743 - 2/9
Author: DM

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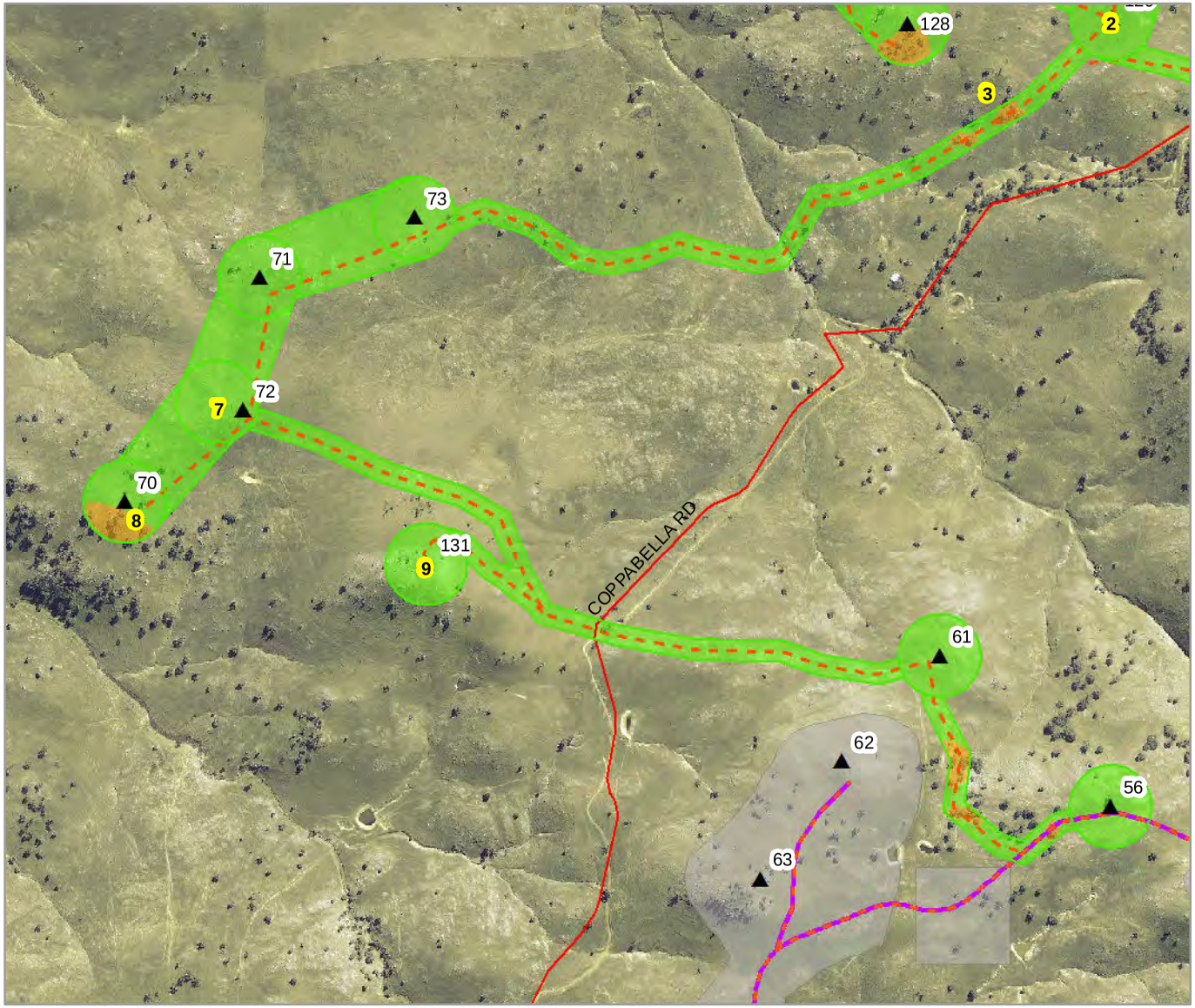

Constraints: Map 1 of 9

Constraints

- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Reticulation (060912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:16000 @ A4
Ref: 4743 - 3/1
Author: AM

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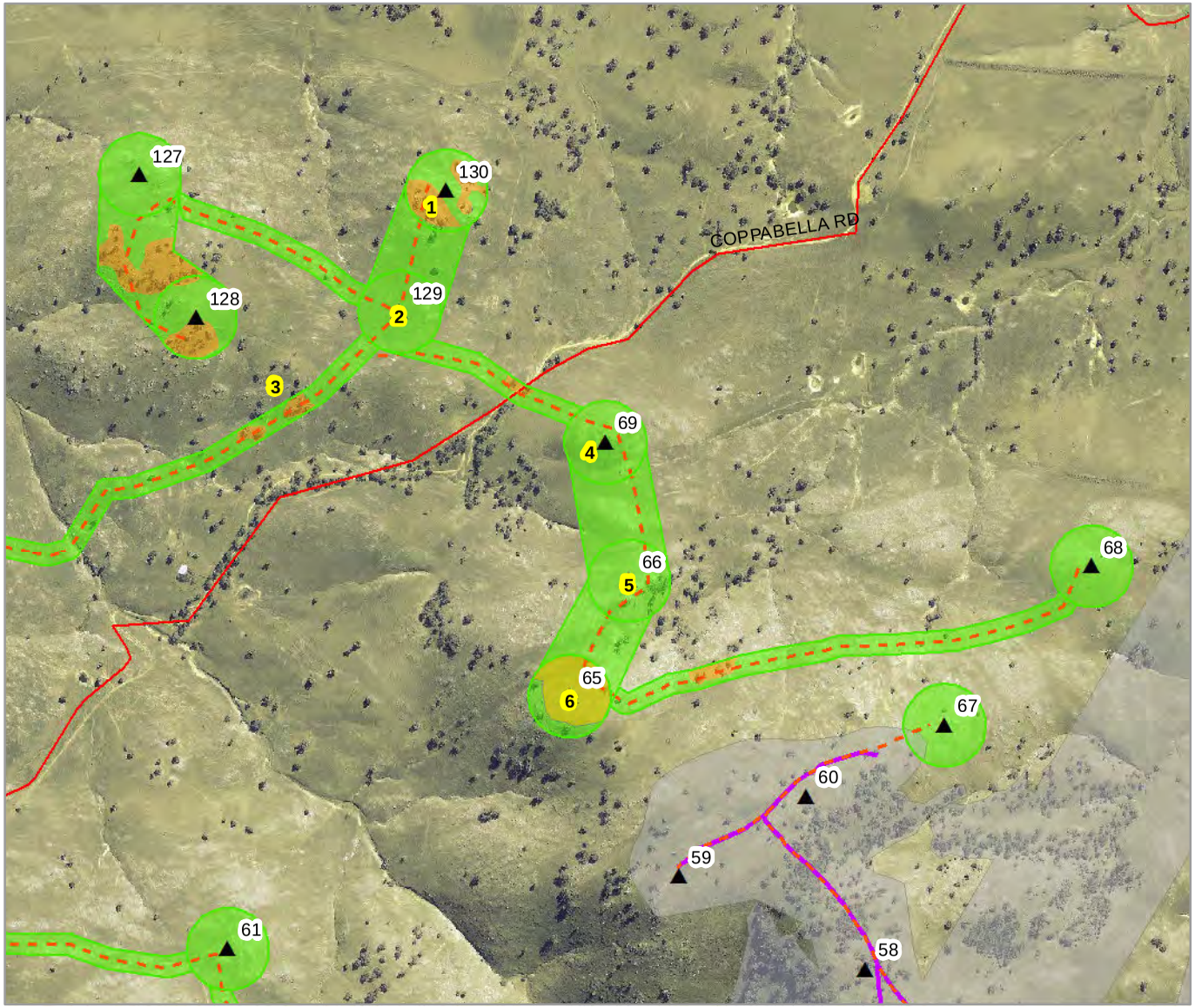

Constraints: Map 2 of 9

Constraints

- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Reticulation (080912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:16000 @ A4
Ref: 4743 - 3/2
Author: AM

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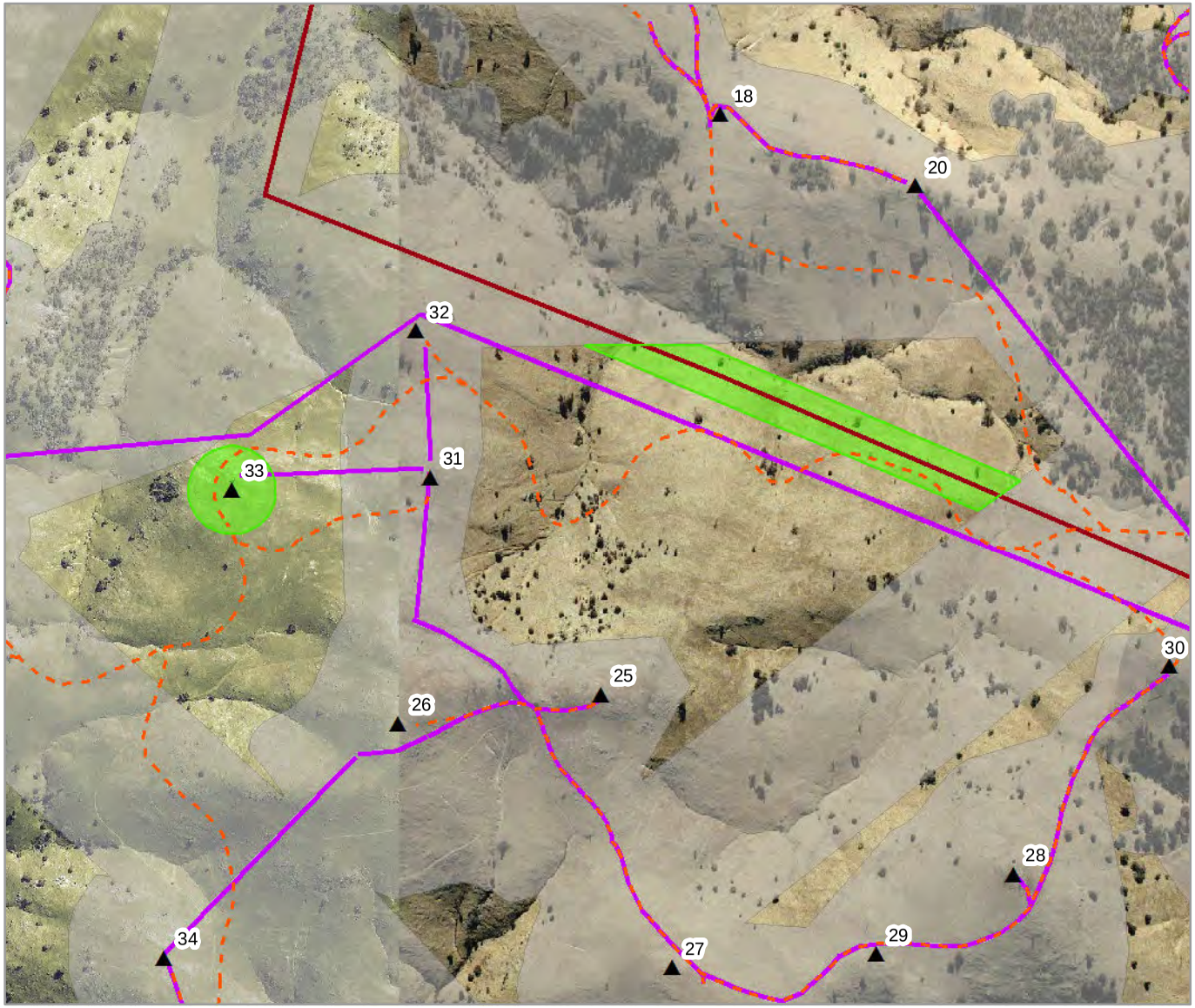

Constraints: Map 3 of 9

Constraints

- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Reticulation (050912)
- Powerline Easement Option (011112)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:15000 @ A4
Ref: 4743 - 3/3
Author: AM

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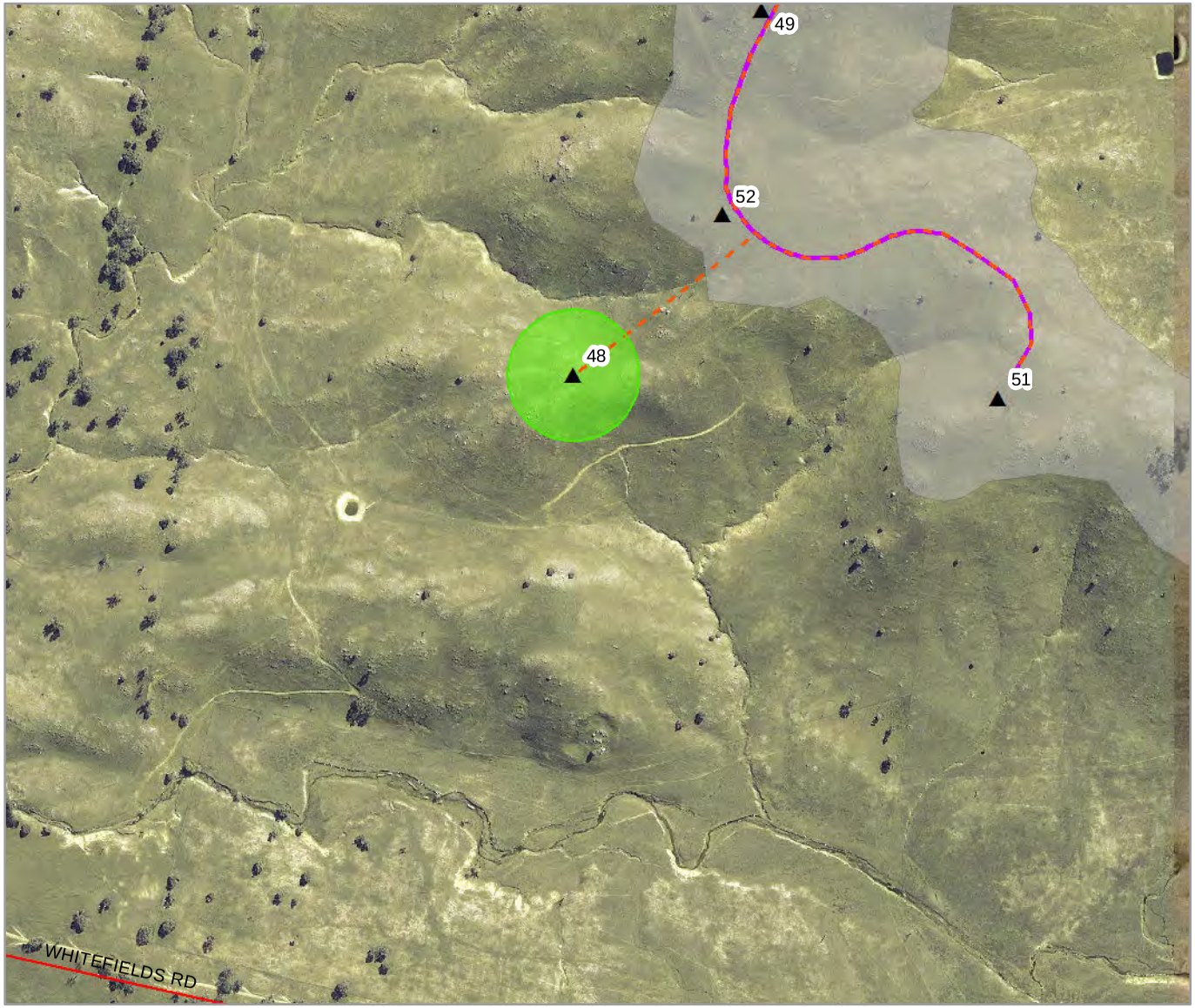

Constraints: Map 4 of 9

Constraints

- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Reticulation (060912)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref: 4743 - 2/4
Author: AM

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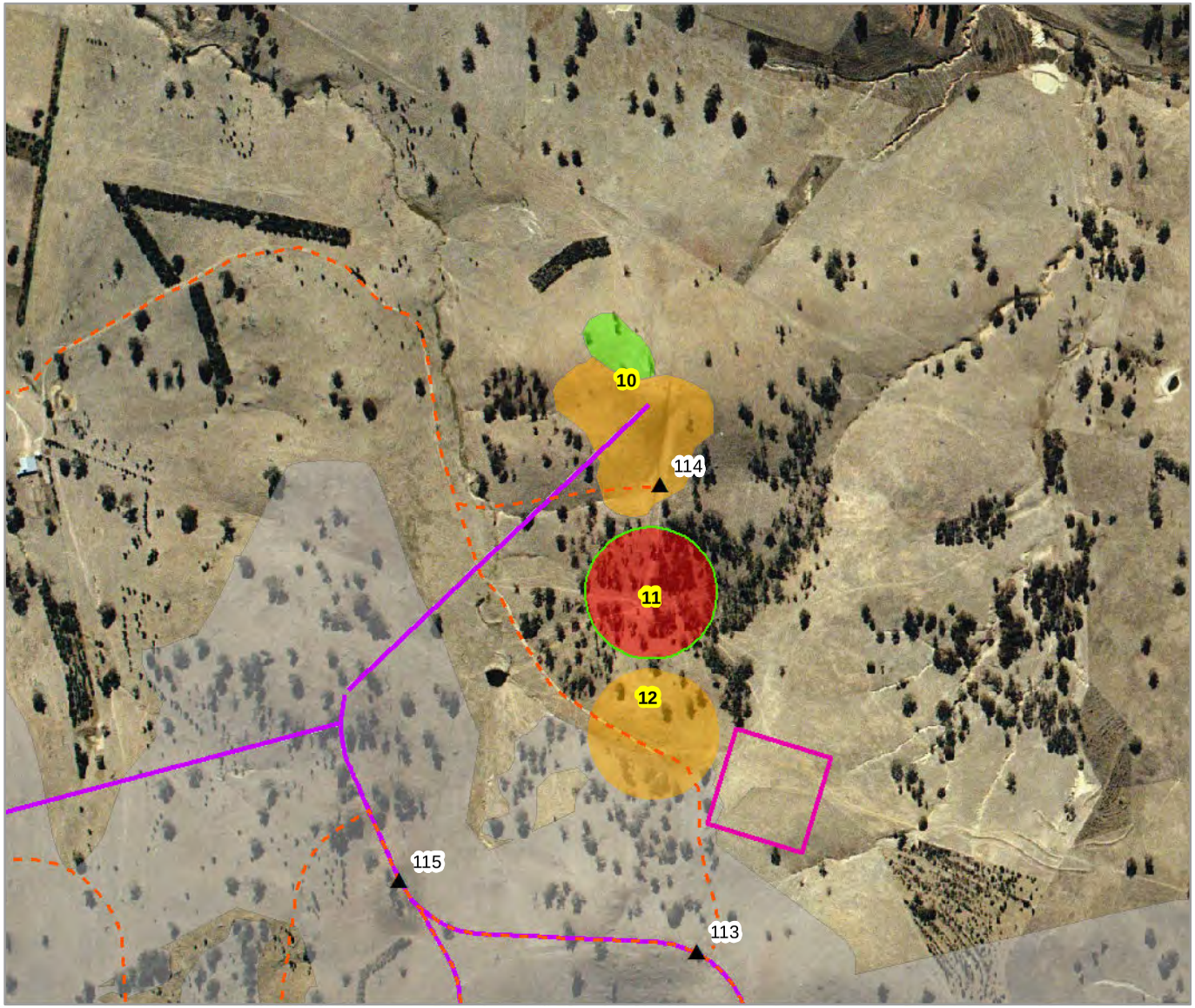

Constraints: Map 5 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Reticulation (060912)
- Yass Substation Locations (011112)
- Roads
- Previously assessed area

0 0.125 0.25 0.5 Km

1:10000 @ A4
Ref: 4743 - 3/5
Author: AM

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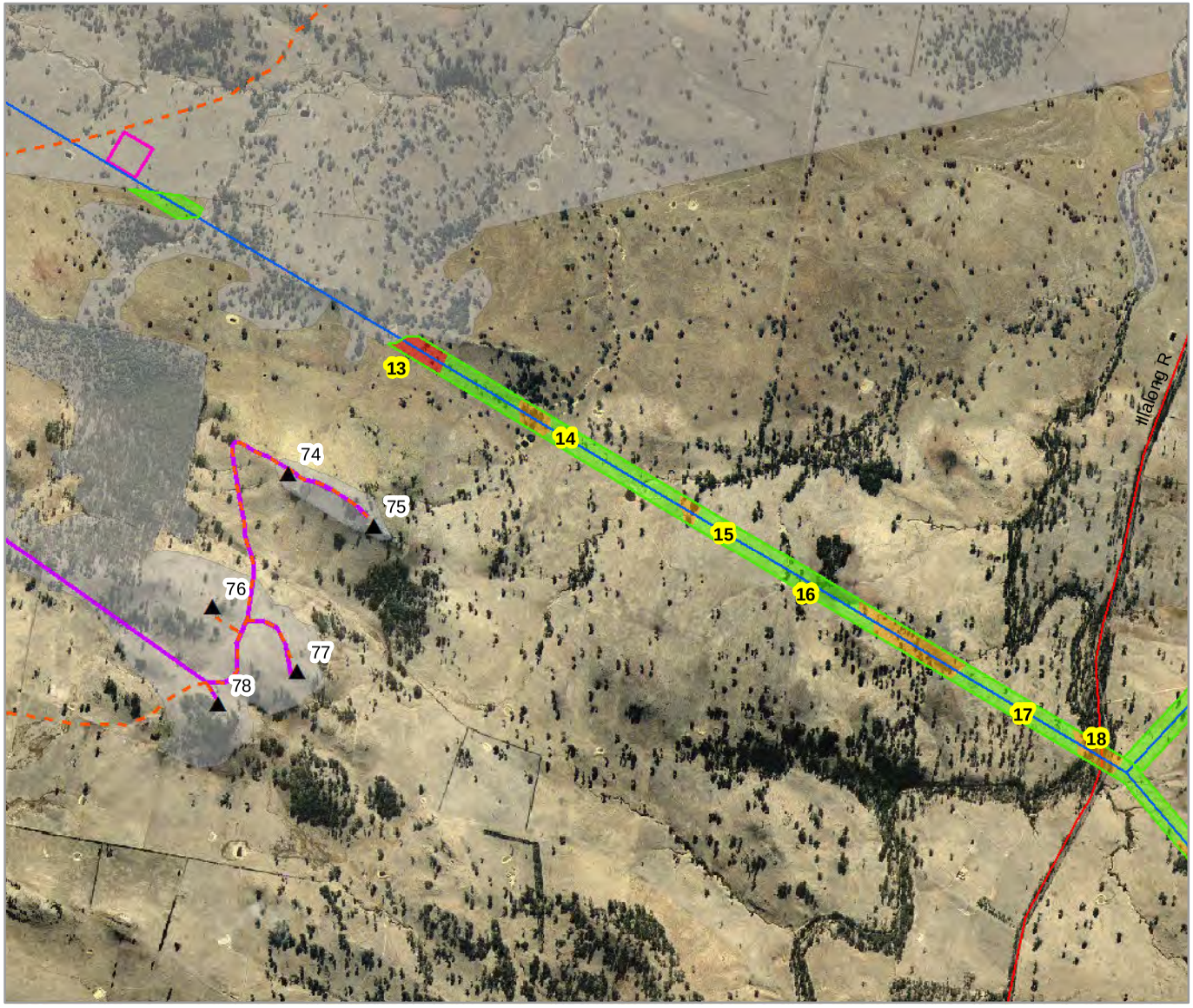

Constraints: Map 6 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Retoul æon (0912)
- Powerline Easement (011112)
- Yass Substatons Locaaons (01112)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:30000 @ A4
Ref: 4743 - 3/6
Author: AM

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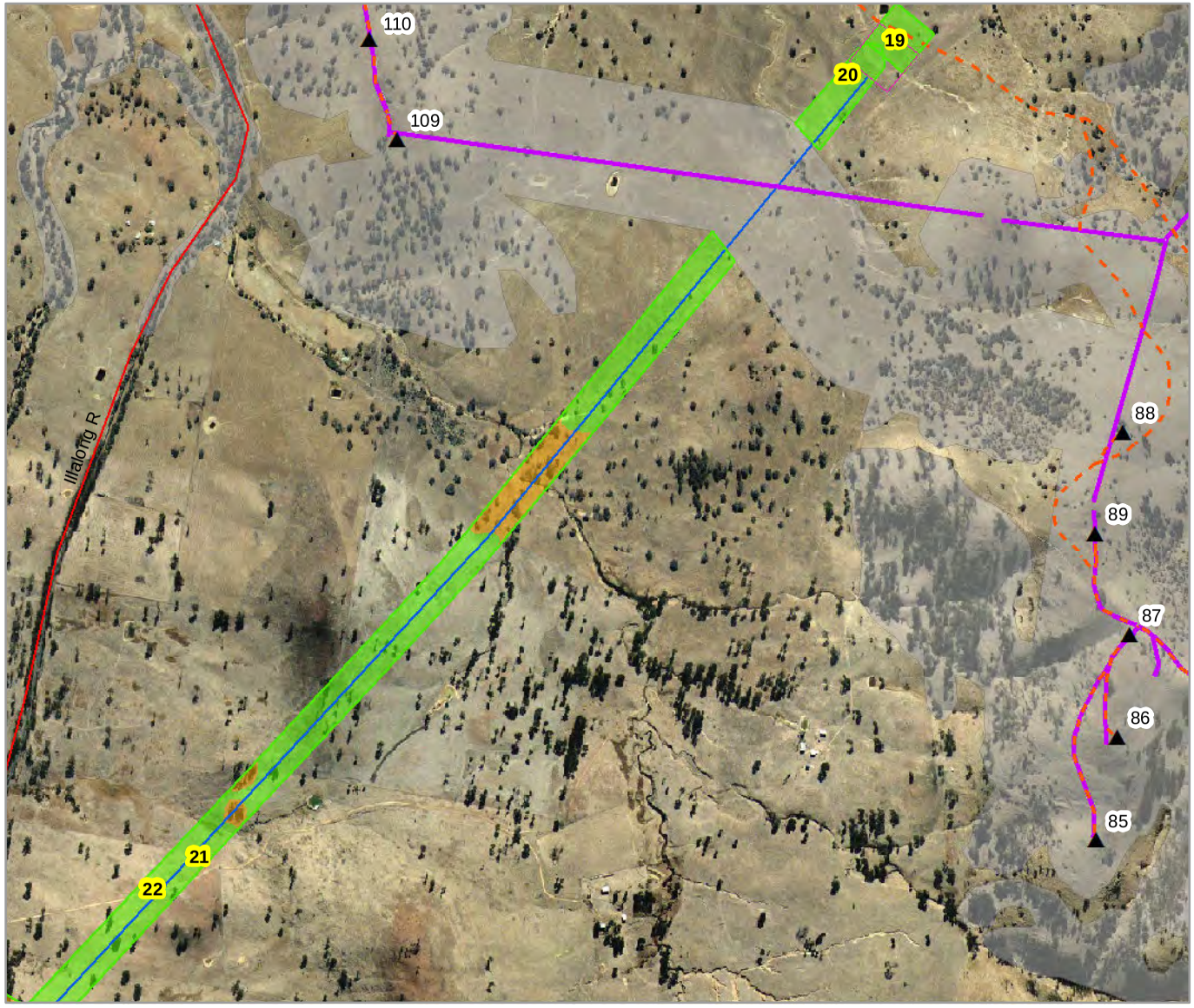

Constraints: Map 7 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Yass Substation Location (011112)
- Latest Development Envelope
- Turbines (011112)
- Access Tracks (011112)
- Electrical Reticulation (080912)
- Powerline Easement (011112)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:20000 @ A4
Ref: 4743 - 3/7
Author: AM

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Constraints: Map 8 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Latest Development Envelope
- Powerline Easement (011112)
- Roads
- Previously assessed area

0 0.25 0.5 1 Km

1:35000 @ A4
Ref: 4743 - 3/8
Author: AM

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Constraints: Map 9 of 9

Constraints

- High
- Moderate
- Low

Infrastructure

- 1 Site Numbers
- Powerline Easement (011112)
- Latest Development Envelope
- Yass Substaton Locaaons (011112)
- Previously assessed area

0 0.25 0.5 1 Km

1:50000 @ A4
Ref: 4743 - 3/9
Author: AM

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APPENDIX F REVISED IMPACT AREA CALCULATIONS

Revised impact area calculations for the entire Yass Valley Wind Farm

Table 7-1 Impact area calculations for the revised proposal; Coppabella, Marilba, and new assessment areas.

Yass Wind Farm		Impact areas				Vegetation types									
Infrastructure		**Quantity**	**Width (m)**	**Length (m)**	**Total Footprint (ha)**	**Exotic Pasture**	**Native Pasture**	**BGW pasture**	**BGW trees**	**BGBPF**	**DSTF**	**LBDGF**	**RRG**	**BGWke**	**Total of all veg types**
Turbine footing [a]		148	25	25	9.250	0.000	7.681	1.000	0.500	0.063	0.000	0.006	0.000	0.000	**9.250**
Crane hardstand [b]		148	22	40	13.024	0.088	10.340	2.552	0.088	0.000	0.000	0.044	0.000	0.000	**13.112**
Tracks [a]		1	8	110,800	88.640	6.400	60.352	15.648	5.968	0.159	0.000	0.000	0.040	0.000	**88.567**
Underground powerlines onsite [b]		1	2	64,630	12.926	0.789	9.862	2.018	0.158	0.066	0.000	0.037	0.000	0.000	**12.931**
Overhead 33kV powerline cabling / easement [a *]		1	14	15,480	21.672	0.000	0.000	0.000	0.840	0.000	0.000	0.522	0.000	0.000	**1.362**
Overhead 33kV power pole footings [a]		62	1	1	0.006	0.001	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	**0.007**
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline [a *]	1	16	25,510	40.816	0.000	0.000	0.000	5.290	0.000	0.000	0.000	0.947	0.000	**6.237**
	Overhead power pole footings [a]	103	1	1	0.010	0.001	0.000	0.010	0.001	0.000	0.000	0.000	0.0003	0.000	**0.012**
	Substation and control bldg [a]	3	150	150	6.750	0.000	0.000	6.300	0.000	0.000	0.000	0.450	0.000	0.000	**6.750**
Concrete batch plant [b]		2	75	100	1.500	0.000	0.750	1.500	0.000	0.000	0.000	0.000	0.000	0.000	**2.250**
Construction compound, staging and storage [b]		2	300	100	6.000	0.000	3.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	**6.000**
					200.595	**7.278**	**91.989**	**32.030**	**12.846**	**0.288**	**0.000**	**1.060**	**0.988**	**0.000**	**146.478**
Breakdown by impact type:															
a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)						6.402	68.037	22.960	12.599	0.222	0.000	0.979	0.988	0.000	**112.185**
b Temporary habitat loss (areas that can be rehabilitated post construction)						0.877	23.952	9.070	0.246	0.066	0.000	0.081	0.000	0.000	**34.293**

Yass Wind Farm		Impact areas				Vegetation types									
Infrastructure		Quantity	Width (m)	Length (m)	Total Footprint (ha)	Exotic Pasture	Native Pasture	BGW pasture	BGW trees	BGBPF	DSTF	LBDGF	RRG	BGWke	Total of all veg types
Option 2 Electrical Connection to 132kV Line	Overhead 132kV powerline cabling / easement [a *]	1	15	19096	28.644	0.000	0.000	0.000	3.053	0.000	0.000	0.960	0.000	0.000	**4.013**
	Overhead 132kV power pole footings [a]	77	1	1	0.008	0.000	0.005	0.002	0.0009	0.000	0.000	0.0003	0.0000	0.000	**0.008**
	Substation and control bldg [a]	4	150	150	9.000	0.000	0.000	7.875	0.675	0.000	0.000	0.450	0.000	0.000	**9.000**

BGW: Box Gum Woodland, BGBPF: Brittle Gum – Broad-leaved Peppermint Forest, DSTF: Dry Shrub – Tussock Grass Forest, LBDGF: Long-leaved Box Dry Grass Forest, BGWke: Box-Gum Woodland – Kunzea ericoides, RRG: River Red Gum Woodland.

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

Table 7-2 Revised maximum impact areas on Box Gum Woodland EEC vegetation; Coppabella, Marilba, and new assessment areas

Vegetation condition		Poor	Poor-Mod	Mod	Mod-Good	Good	Total
CEEC 1		no			yes		
EEC 2		no	yes				
BIOMETRIC CONDITION 3		low	mod - good				
Turbine footing [a]		0.313	1.125	0.063	0.000	0.000	**1.500**
Crane hardstand [b]		0.616	1.936	0.044	0.044	0.000	**2.640**
Tracks [a]		10.208	9.549	1.305	0.271	0.278	**21.611**
Underground powerlines onsite [b]		0.369	1.410	0.340	0.036	0.006	**2.162**
Overhead 33kV powerline cabling		0.000	0.717	0.122	0.000	0.000	**0.839**
Overhead 33kV power pole		0.001	0.001	0.000	0.000	0.000	**0.002**
Preferred Electrical Connection to TransGrid 330kV	Overhead powerline [a *]	0.000	3.333	0.560	1.397	0.000	**5.290**
	Overhead power pole footings [a]	0.001	0.007	0.000	0.000	0.000	**0.009**
	Substation and control bldg [a]	4.050	2.250	0.000	2.250	0.000	**8.550**
Concrete batch plant [b]		0.750	0.750	0.000	0.000	0.000	**1.500**
Construction compound, staging		0.000	3.000	0.000	0.000	0.000	**3.000**
		16.308	**24.077**	**2.434**	**3.998**	**0.284**	**47.102**
Breakdown by impact type:							
a Permanent habitat loss (includes all footings and tracks as well as overhead powerlines where they occur in treed areas)		14.573	16.981	2.049	3.918	0.278	**37.800**
b Temporary habitat loss (areas that can be rehabilitated post construction)		1.735	7.096	0.384	0.080	0.006	**9.302**

[1] potential Commonwealth CEEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[2] potential NSW EEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[3] potential NSW Biometric condition status when applied to the Box-Gum Woodland community (floristic criteria only)

* Overhead cabling has no permanent impact on pasture and other vegetation < 4.5m in height

nghenvironmental provided shape files from surveys to Epuron, who undertook the calculations.

APPENDIX G ADDITIONAL SURVEYS

G.1 SOC 18: FLORA

Note, the following report references the *Draft* Statement of Commitment which was previously numbered SOC 19.

ngh environmental

planning • assessment • ems • auditing

18 November 2009

Julian Kasby
Epuron

Dear Julian

RE: Further vegetation survey work at Yass Valley: Marilba Hills.

Additional survey work was identified as being required in the Draft Statements of Commitment (specifically SoC 19) for the Yass Valley Wind Farm to cover off on vegetation constraints. SoC 19 of the Yass Valley Wind Farm Environmental Assessment (EA) July 2009 states:

> *Additional targeted surveys would be undertaken, if the identified areas would be impacted by the proposal. These areas include:*
>
> ***Marilba Hills***
>
> - *Burrinjuck Spider Orchid, undertaken in mid-October, where the dry forest remnant in the far south of Cluster 7 would be impacted by the proposed works.*
> - *Threatened grassy woodland species, undertaken in Spring, if the secondary grassland on the south-western side of Cluster 7 would be substantially impacted*

Mid-October marked the appropriate time to survey for these species. The work was undertaken by a botanist and technical assistant on the 15th October 2009.

The findings of these surveys are provided in a brief report attached to this letter. Survey methodology, results and recommendations are discussed.

If you have any further questions regarding the report, please do not hesitate to contact me.

Kind regards,

Dave Maynard

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Burrinjuck Spider Orchid (*Caladenia* sp. Burrinjuck) targeted survey

Methods

The forest fragment identified as potential habitat for the Burrinjuck Spider Orchid (Figure 1) was searched systematically by two botanists over a 1.5 hour period. The entire forest fragment was searched, employing north-south running transects each spaced 5-10m apart.

This survey satisfies the first component of SoC 19.

Results

The orchid was not detected during the search. This result, combined with the results of the survey conducted in September 2008, indicates that the species is not present at the site. No further surveys are considered to be warranted. We consider that the proposal as set out in the Yass Valley Wind Farm Environmental Assessment (July, 2009) would **not** be likely to significantly affect the Burrinjuck Spider Orchid at this site.

As discussed in the Biodiversity Assessment, the district is heavily cleared and impacts to the forest remnant should be minimised. Specifically, Statements of Commitment 11, 12, 19 and 23 in the EA address measures to reduce impacts on forest fragments.

Targeted survey for threatened grassy woodland species within the diverse secondary grassland

Methods

The area of diverse secondary grassland to the south-west of cluster seven was surveyed utilising the random meander technique described by Cropper (1993). The survey had the aim of identifying the approximate extent of this diverse secondary grassland and associated Yass Daisy population in the vicinity of the proposed substation and access road (Figure 1). Two botanists spent approximately 3 hours on this aspect of the survey.

During the survey, the site was also searched for threatened species previously identified as potentially present, including *Swainsona sericea, Cullen parvum* and *Thesium australe,* utilising the random meander technique described by Cropper (1993). Road crossing points that would minimise impacts to threatened and regionally significant species were also identified.

The second component of SoC 19 has been satisfied by this survey.

Results

The Yass Daisy (*Ammobium craspedioides*) listed as Vulnerable under the *Environment Protection and Biodiversity Conservation Act*, *1999* (EPBC Act) and the *Threatened Species Conservation Act,* 1995 (TSC Act), was identified within the search area and its extent marked by hand held GPS. Its distribution in this area has been mapped on Figure 1 (red polygon – area corresponds with high diversity native grassland discussed below). This species had been previously identified on the subject site south of cluster seven. No other threatened species were recorded during the survey.

The site carries Box Gum Woodland understorey dominated by Kangaroo Grass (*Themeda triandra*) and Wallaby Grasses (*Austrodanthonia* spp.) with relatively high floristic diversity. Drier areas support Kangaroo Grass and abundant Yass Daisy plants. Linear wet areas beside drainage lines do not carry these species, but have a range of regionally significant species such as Yam Daisy (*Microseris lanceolata*) and the Early Snake Orchid (*Diuris chryseopsis*).

On the basis of understorey diversity, the vegetation belongs to the Box Gum Woodland Endangered Ecological Community (EEC) listed under the TSC Act, despite being almost treeless. The grassland patch has at least 30 non-grass species and easily qualifies as a Critically Endangered Ecological Community (CEEC) under the EPBC Act. In addition to the threatened Yass Daisy, 11 Box Gum Woodland species listed as important by the Commonwealth are present, including the Early Snake Orchid and the daisies Billy Buttons (*Craspedia variabilis*), Scaly Buttons (*Leptorhynchos squamatus*), Yam Daisy, Smooth Solenogyne (*Solenogyne dominii*), Spoon Cudweed (*Stuartina muelleri*) and Austral Sunray (*Triptilodiscus pygmaeus)*. Other woodland species present such as Tadgell's Bluebell (*Wahlenbergia multicaulis*) and Slender Tick-trefoil (*Desmodium varians*) are likely to be uncommon or declining in the region.

Figures 1, 2 and 3 clearly show the native grassland vegetation within the affected paddocks, contrasting with the greener low diversity native pasture in surrounding paddocks. The red polygon in Figure 1 shows the approximate extent of the diverse grassland and Yass Daisy population boundary. Remnant woodlands and native pastures dominated by Kangaroo Grass with a high diversity of native forbs are very uncommon in the region and have high conservation value. Kangaroo Grass is a keystone species in this community and its loss is generally associated with a drastic reduction in stand diversity.

Recommendations

It is recommended that the proposal aim to minimise the area of disturbance caused by the construction of the access road and substation. Further it is recommended that the access road be placed to avoid the core Yass Daisy population north of the proposed substation site. Route 1 that is detailed below would achieve this objective..

Figure 1 identifies potential road crossing points (as indicated by the dotted yellow lines) to minimise impacts to the diverse grassland and Yass Daisy population. In order of preference these options are:

- **Route 1 is the preferred option since it avoids the diverse grassland paddock and Yass Daisy population altogether.**
- Route 2 passes through the proposed substation site. This site is already disturbed and of lower conservation value however it is not certain if the area can accommodate the substation as well as the access road.
- Route 3 passes south of the substation site. There are few Yass Daisy plants within 5-10 metres of the existing woodlot boundary. Some Yass Daisy plants and *Themeda* grassland would be disturbed along the western boundary of the property. This route would cross a moist drainage line.
- Route 4 passes through a 10 metre wide corridor alongside a drainage line. This area has no Kangaroo Grass or Yass Daisy but does support a range of regionally significant species. The corridor is within a seepage zone associated with the drainage line to the immediate north.

The assessments of significance conducted as part of the original EA included both the Yass Daisy and Box-Gum Woodland however, it assumed that the area of diverse grassland west of Cluster 7 would not be impacted. **All of the above options, excluding option 1 will result in some level of impact to the Yass Daisy population and/or Box-Gum Woodland EEC within the diverse grassland and revised assessments of significance would be required.**

The diverse grassland paddocks have potential for management as offset sites.

Figure 1: Forest remnant containing suitable habitat for the Burrinjuck Spider Orchid (green line) and approximate extent of the diverse secondary grassland (EEC) and Yass Daisy population (red line). Recommended routes for the road crossing are indicated by the dotted yellow lines (aerial image: Google Earth).

Figure 2: View from north-east of diverse grassland site looking south

Figure 3: View of grassland looking north showing Kangaroo Grass patches (Yass Daisy habitat)

Staff members undertaking surveys

Paul McPherson Dip. (Env. Cont.), B. Sc. (Nat. Res.)	Since commencing at **ngh**environmental in 1996, Paul has undertaken environmental assessments and prepared EIA reports for a wide range of proposals located in the Far South Coast, South Coast, Kosciuszko and Southern Tablelands regions. Flora work has included detailed flora surveys in association with the above EIA projects, surveys undertaken for the broadscale mapping of the vegetation of the Far South Coast region and property scale vegetation management planning. Prior to **ngh**environmental, Paul worked in the Commonwealth Environment Department. He co-drafted the Commonwealth policy papers on the Regional Forest Agreement process and forest reserve criteria, and wrote numerous Ministerial speeches and parliamentary statements on forest issues.
Dave Maynard BSc Biological Ecology (Hons1)	Since joining nghenvironmental Dave has undertaken a number of botanical assessments, and has worked on Biodiversity Assessments, Biodiversity Constraints Analysis, Reviews of Environmental Factors and reviews of external Flora and Fauna Assessments. Prior to commencing on project work with nghenvironmental, Dave was employed at the Alice Springs Herbarium (NT) as a Botanist to develop the MacFlora interactive flora key project.

G.2 SOC 23: FAUNA

ADDENDUM:

Additional survey at Coppabella Hills

Targeting Barking Owl, Squirrel Glider and Bush Stone Curlew

October 2009

Document Verification

Job title: ADDENDUM:

Additional survey at Coppabella Hills

Targeting Barking Owl, Squirrel Glider and Bush Stone Curlew

October 2009

Document Title		Addendum					
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Revision	Date	Prepared by		Checked by		Approved by	
Draft	161109	name	Amy Curry	name	Brooke Marshall	name	Nick Graham-Higgs
		name		name		name	

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Contents

1 INTRODUCTION

In September 2008, a Flora and Fauna Assessment was undertaken to determine the likely biodiversity values and impacts associated with a proposed wind farm site at “Coppabella Hills” near Yass on the Southern Tablelands in NSW. The Coppabella proposal forms part of a larger project, the proposed Yass Valley Wind Farm.

The Flora and Fauna Assessment included a constraints map showing, among other constraints, areas containing multiple hollow-bearing trees – deemed a high constraint due to the habitat they provide.

This report documents the methods and results of further survey effort required to target hollow-bearing trees which may be removed in three areas of the Coppabella Hills site. The study area incorporated three areas of the Coppabella Hills site where hollow bearing trees were present within close proximity to identified indicative turbine locations. The purpose of this additional survey was to determine the importance of the habitat provided by these hollow bearing trees on threatened species that are known or likely to occur within the study area. Threatened species that were targeted specifically during this additional fieldwork included the:

- Squirrel Glider
- Barking Owl

Additionally, the Bush Stone Curlew was targeted in woodland in and around the same study area, during the survey.

Refer to study area,

Figure **1-1**.

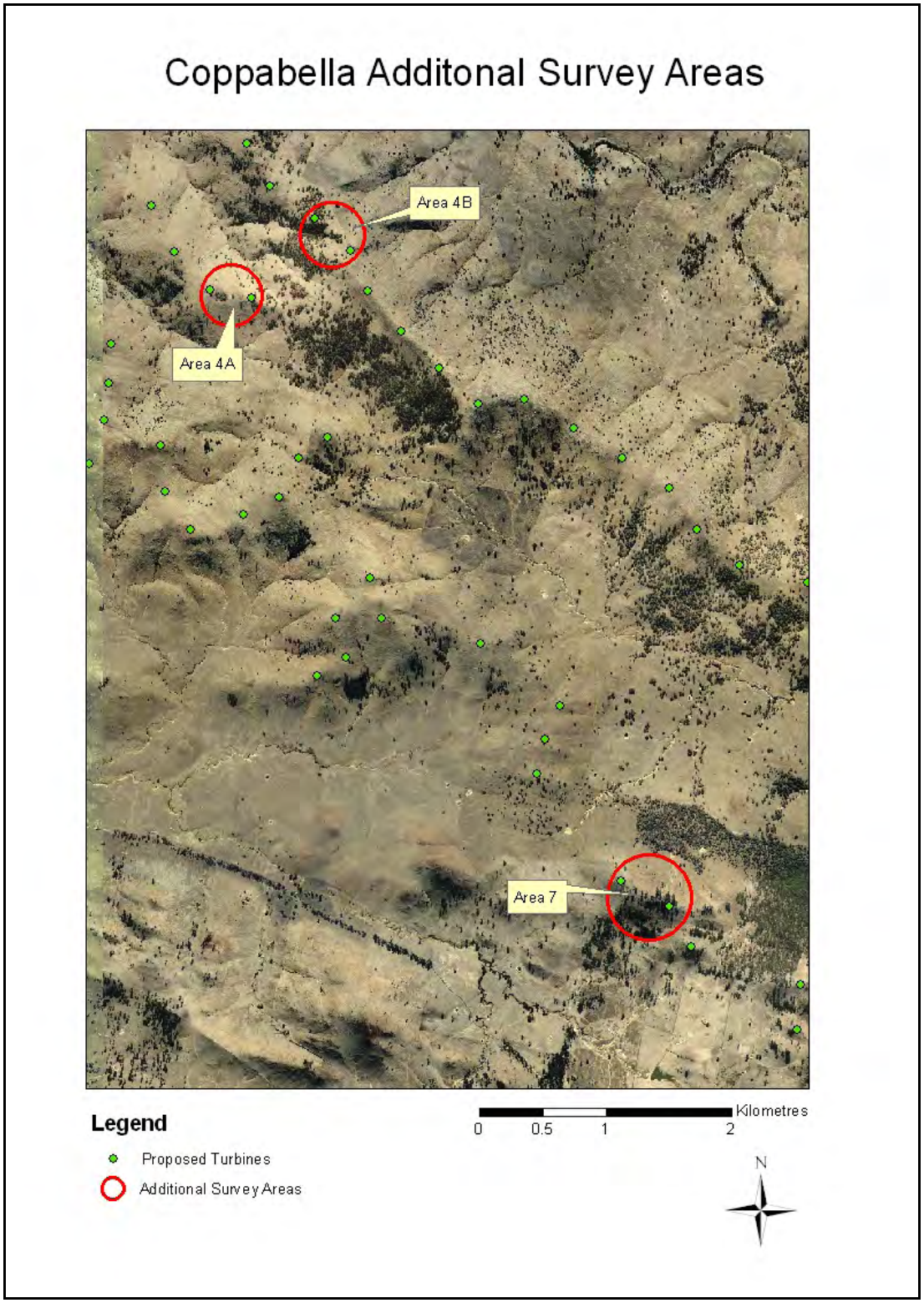


Figure 1-1: Coppabella Hills additional survey locations. Area names are consistent with the Flora and Fauna Assessment report.

2 METHODS

2.1 FIELD INVESTIGATIONS

Field investigations were undertaken over a four day period from the 13th October to 16th October 2009. The survey team consisted of one biodiversity project officer (Amy Currey, **ngh**environmental) and one technical assistant (Peter Milenkovic, Epuron). An additional technical assistant (Julian Kasby, Epuron) also assisted for one night and the last day of field investigations.

Weather conditions varied over the four day survey period from overcast cool days to cold, windy days. The following table represents weather conditions over the four day survey period.

Table 2-1: Weather Conditions

Date	Minimum Temp	Maximum Temp	Rainfall (mm)	Wind Speed (km/h)
Tuesday 13th October	7.4°C	16.1°C	6.8mm	31 km/h
Wednesday 14th October	8.4°C	14.0°C	4.0mm	24km/h
Thursday 15th October	7.4°C	13.7°C	1.4mm	30km/h
Friday 16th October	3.8°C	14.5°C	4.0mm	19km/h

(Source: Weatherzone, 2009)

2.1.1 Targeted Squirrel Glider Survey Works

Live trapping using specially designed cage traps were used to survey for Squirrel Gliders at two of the three sites (Area 4B was inaccessible by vehicle). This method was considered more effective than spotlighting or hair-tube analysis as differentiation of hairs from Squirrel Gliders and Sugar Gliders is problematic (Lobert *et al*. 2001), while spotlighting can repeatedly fail to detect the presence of Squirrel Gliders due to their small stature, poor reflective eye shine and quiet behaviour (Van Der Ree 2003), unlike Sugar Gliders, Squirrel Gliders rarely vocalise – calling rates may only be one per night, and not all nights (Goldingay pers. comm.).

Specially designed wire cage traps (30 in total) were positioned across the two sites using an aluminium extension ladder to nail each trap onto selected tree trunks at a height of 3-5 m off the ground. Each trap was covered with plastic and fitted with a piece of poly pipe to assist in providing some protection from wind and rain. Traps were placed approximately 50-100 m apart to maximise the area covered and to accommodate for home ranges and territories of Squirrel Gliders.

Each cage trap was baited with a mixture of honey, rolled oats and peanut butter to attract the Squirrel Glider, while a trail of diluted honey water was sprayed above the trap to a height of 5 – 10 m each morning. The location of each tree trap was marked with a GPS unit. The following table represents the survey effort.

Table 2-2: Number of Squirrel Gliders traps at each site.

Survey Period	Area 4 A	Area 4 B	Area 7	Total trap nights
13th – 16th October 2009	6 traps	Nil – due to access issues	8 traps	42

Each traps was set for three nights, set at dusk and checked from dawn the following morning.

2.1.2 Targeted Barking Owl Survey Works

The field investigations were undertaken to coincide with the breeding season of the Barking Owl (documented as July through October) when individual are more vocal and evidence of nesting would be detectable. Spotlighting was conducted over two consecutive nights using two hand held 12v 50w spotlights. Spotlighting was undertaken with call playback to maximise detectability rates.

At each site, spotlighting was undertaken by two people for a maximum of 15 minutes at 5 minute intervals, with call playback being undertaken in between these intervals for 5 minutes. In total, 50 minutes were spent at each site undertaking spotlighting and call playback surveys for the threatened Barking Owl.

Due to access restrictions and safety, spotlighting and call playback survey efforts were undertaken approximately 300 m north of Area 7 and approximately 1 km north-west of sites 4A and 4B. This survey effort is considered to be adequate as the home range of the Barking owl is estimated to be between 30-200 ha with breeding pairs occupying areas at less than 1km to 10 km apart. They have been observed to forage reasonably close to their nesting sites (1-2kms). The Barking Owl is a sedentary species, likely to remain in the same territories all year round.

2.1.3 Bush Stone Curlew Survey Works

At each of the three sites, searches of evidence of Bush Stone Curlews inhabiting the area was undertaken. This species inhabits areas of open forests and woodlands with a sparse grassy understorey with fallen timber present. As this species is largely nocturnal, call playback and spotlighting were undertaken on two consecutive nights by two people for a maximum of 10 minutes at 5 minute intervals, with call playback being undertaken in between these intervals for 5 minutes. In total, 30 minutes were spent at each site, undertaking spotlighting and call playback surveys for the Bush Stone Curlew.

2.1.4 Detailed Hollow Bearing Tree Register

A detailed hollow bearing tree assessment was undertaken at each of the three sites, all of which had two proposed turbine envelopes that could potentially impact on hollow bearing trees. All hollow-bearing trees located within a 50 m radius of each indicative turbine location were recorded with the following details:

- Each tree was recorded using a GPS system
- Photo taken
- Tree species type
- Description of the size and estimation of hollows present in each tree
- Recording DBH (diameter at breast height)

2.2 LIMITATIONS

Several limitations were encountered during the field investigations, including:

- Medium and long term climatic conditions including the current drought has influenced the presence of annual ground cover species
- Past clearing regimes and heavy grazing by sheep across the sites has resulted in a lack of abundance of native and annual species
- Surveys were conducted over brief periods of time to obtain an indicative assessment of the three identified sites, survey results may vary during different seasons and where they are conducted over longer periods of time
- Together with access difficulties and continued wet conditions, access was restricted in some areas, which were traversed on foot, limiting trapping and nocturnal survey work at Area 4B

3 RESULTS

3.1 TARGETED SQUIRREL GLIDER SURVEY WORKS

No Squirrel Gliders were captured at either Area 4A or Area 7 during the trapping survey. All cage traps were inspected each morning with no evidence of animals being caught or consuming the bait mixture. One trap at Area 7 was found closed during each inspection, with nothing caught and the bait still present. This may be due to the strong wind patterns at the site or a malfunction of this cage trap.

Although Area 4A, Area 4B and Area 7 all comprise of a variety of ideal hollows supporting potential roosting and breeding habitat for the Squirrel Glider, the understorey and ground cover species have greatly been modified due to past clearing regimes and the constant ongoing grazing pressures of sheep across the sites. None of the sites contain a shrub layer and none of the eucalypt species were flowering during the time of the field investigations, greatly reducing foraging habitat for this species across the three sites.

3.2 TARGETED BARKING OWL SURVEY WORKS

No Barking Owls were detected during the spotlighting and call playback surveys at each of the two survey locations. This species is unlikely to roost or breed at Area 4A as no large hollows were detected at this site that could provide roosting habitat for this species. At Area 4B, Turbine 2 and Area 7, Turbine 2 a number of large hollows were recorded that could support potential roosting and breeding habitat for this species, however these trees were located outside a 50 m radius of the turbine envelopes.

This species is highly flight mobile with a large home range that can traverse vast tracks of land. Suitable habitat to the north and east of Area 7 is present in flat eucalypt woodland that has no proposed turbine envelopes intended for construction.

At Area 4A, suitable habitat for this species is present in a woodland area approximately 900 m south-east of the site that may support suitable roosting and breeding habitat for this species as no large hollows were evident at Area 4A.

At Area 4B, Turbine 2 is located adjacent woodland area that consists of a number of large hollow bearing trees that may support suitable roosting and breeding habitat for this species. Approximately 16 hollow bearing trees are located within a 50 m radius of this turbine envelope, however the majority of them are too small to provide roosting or breeding habitat for the Barking Owl.

3.3 BUSH STONE CURLEW SURVEY WORKS

Both Area 7 and 4A are highly degraded sites with little fallen timber present. Area 4A is dominated by stinging nettle (*Utrica sp*.) providing minimal if any suitable habitat for the Bush Stone Curlew. At Area 7, the constant degradation of sheep grazing along the ridges has diminished the ground cover species greatly. Sheep faeces are scattered across the entire site with exotic species dominating areas.

Spotlighting and call playback of this species was undertaken on two consecutive nights, however this species was not detected at either Area 7 or Area 4A as the habitat at these two sites is highly degraded providing no coverage, roosting or breeding habitat for this species.

Area 4B did provide some areas of ideal fallen timber across the woodland area to the south. These areas were assessed in detail on foot for presence of the Bush Stone Curlew. The ground cover species were mostly dominated by exotic species, and the site has been constantly degraded by sheep grazing in the area.

3.4 DETAILED HOLLOW BEARING TREE REGISTER

A detailed hollow bearing tree register was undertaken at each of the three sites near the identified turbine envelopes that would potentially impact on hollow resources. The following table represents the results of all hollow bearing trees recorded within a 50 m radius of these turbine envelopes.

Table 3-1: Hollow Bearing Tree Register

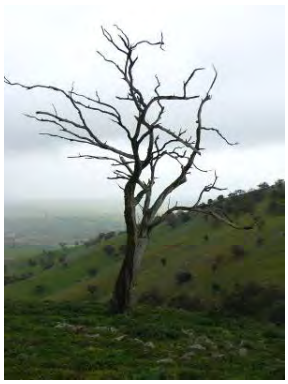
Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
1	Red Stringybark *Eucalyptus macrorhyncha*	100	8	1	0	1	2	640846 E 6155425 N	
2	Blakely's Red Gum *Eucalyptus blakelyi*	130	15	>5	2	1	8	640855 E 6155392 N	
3	White Box *Eucalyptus microcarpa*	70	10	>5	2	0	7	640888 E 6155371 N	

Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
4	White Box *Eucalyptus microcarpa*	50	8	1	0	0	1	640898 E 6155366 N	
5	White Box *Eucalyptus microcarpa*	40	8	4	0	0	4	640898 E 6155363 N	
6	White Box *Eucalyptus microcarpa*	50	7	4	1	0	5	640898 E 6155362 N	

Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
7	White Box *Eucalyptus microcarpa*	70	8	3	4	0	7	640902 E 6155371 N	
8	Stag	50	6	4	0	0	4	640907 E 6155377 N	
9	White Box *Eucalyptus microcarpa*	30	6	3	2	1	6	640908 E 6155375 N	

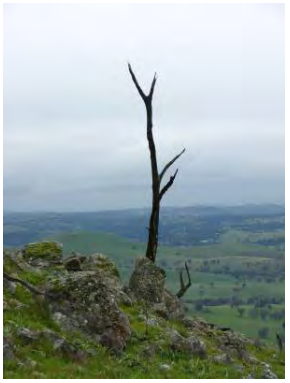
Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
10	Stag	60	8	>5	3	0	8	640915 E 6155396 N	
11	White Box *Eucalyptus microcarpa*	1 x 60 1 x 30	6	4	2	0	6	640913 E 6155395 N	
12	White Box *Eucalyptus microcarpa*	60	5	3	1	0	4	640910 E 6155396 N	

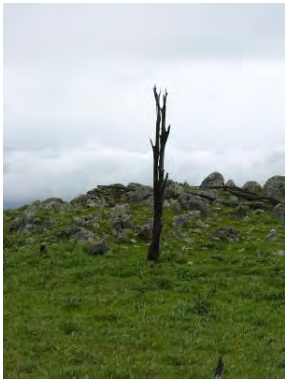
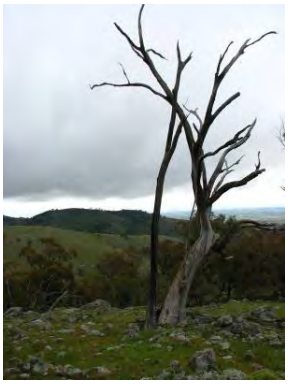
Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
13	White Box *Eucalyptus microcarpa*	2 x 60	8	3	0	0	3	640898 E 6155401 N	
14	White Box *Eucalyptus microcarpa*	50	6	1	0	0	1	640901 E 6155400 N	
15	Half Stag	80	10	2	3	0	5	640912 E 6155319 N	

Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
16	Dead Stag	80	15	>15	6	1	22	640921 E 6155403 N	
17	White Box *Eucalyptus microcarpa*	100	12	>5	0	0	5	641026 E 6155373 N	
18	Dead Stag	80	6	>10	1	0	11	641073 E 6155398 N	

Area 4A									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
19	White Box *Eucalyptus microcarpa*	70	5	>10	0	0	10	641118 E 6155353 N	
20	White Box *Eucalyptus microcarpa*	100	15	>8	3	0	11	641112 E 6155365 N	
21	White Box *Eucalyptus microcarpa*	50	4	>5	1	1	7	641110 E 6155373 N	

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
1	Stag	1 x 30 4 x 20	7	>10	0	0	10	641986 E 6155696 N	
2	Stag	30	3	<10	0	0	10	641961 E 6155704 N	
3	Stag	20	4	5	0	0	5	642001 E 6155748 N	

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
4	Stag	20 x 10	3	3	0	0	3	641982 E 6155748 N	
5	White Box *Eucalyptus microcarpa*	5 x 20-60	8	<3	0	0	3	641655 E 6155947 N	
6	Stag	50	6	>10	2	0	12	641647 E 6155969 N	

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
7	Stag	70	7	>10	0	0	10	641654 E 6155972 N	
8	White Box *Eucalyptus microcarpa*	80	8	2	0	0	2	641638 E 61155983 N	
9	White Box *Eucalyptus microcarpa*	70	7	4	1	0	5	641630 E 6155985 N	

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
10	Stag	40	5	<10	2	1	13	641664 E 6155993 N	
11	White Box *Eucalyptus microcarpa*	100	15	7	0	0	7	641678 E 6156005 N	
12	White Box *Eucalyptus microcarpa*	90	12	6	2	0	8	641709 E 6156008 N	

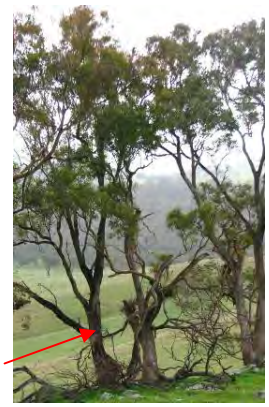
Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
13	White Box *Eucalyptus microcarpa*	100	15	3	1	0	4	641718 E 6155989 N	
14	White Box *Eucalyptus microcarpa*	95	15	2	2	0	4	641720 E 6155982 N	
15	White Box *Eucalyptus microcarpa*	80	12	3	0	0	3	641724 E 6155978 N	

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
16	White Box *Eucalyptus microcarpa*	85	12	2	0	0	2	641734 E 6155975 N	
17	White Box *Eucalyptus microcarpa*	200	15	>20	<10	4	35	641719 E 6155948 N	
18	White Box *Eucalyptus microcarpa*	100	10	<5	2	0	7	641718 E 6155930 N	
19	Stag	5 X 50	10	<10	0	0	10	641685 E 6155965 N	

Area 4B									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
20	White Box *Eucalyptus microcarpa*	80	8	<10	0	0	10	641676 E 6155961 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
1	White Box *Eucalyptus microcarpa*	30	12	1	0	0	1	644513 E 6150562 N	
2	White Box *Eucalyptus microcarpa*	80	13	2	1	0	3	644487 E 6150528 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
3	White Box *Eucalyptus microcarpa*	70	10	2	0	0	2	644508 E 6150532 N	
4	White Box *Eucalyptus microcarpa*	60	12	2	0	0	2	644518 E 6150541 N	
5	White Box *Eucalyptus microcarpa*	80	12	3	1	0	4	641521 E 6150542 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
6	White Box *Eucalyptus microcarpa*	80	12	2	2	0	4	644531 E 6150543 N	
7	White Box *Eucalyptus microcarpa*	30	12	2	3	0	5	644532 E 6150543 N	
8	White Box *Eucalyptus microcarpa*	50	12	4	2	1	6	644538 E 6150539 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
9	White Box *Eucalyptus microcarpa*	40	15	3	2	0	5	644538 E 6150524 N	
10	Stag	60	10	>10	0	0	10	644544 E 6150519 N	
11	White Box *Eucalyptus microcarpa*	50	10	4	2	2	8	64495 E 6150508 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
12	Red Stringybark *Eucalyptus macrorhyncha*	80	18	>10	1	0	11	644493 E 6150510 N	
13	Red Stringybark *Eucalyptus macrorhyncha*	80	20	4	2	0	6	644489 E 6150511 N	
14	White Box *Eucalyptus microcarpa*	4 x 60	15	>15	3	2	20	644468 E 6150518 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
15	White Box *Eucalyptus microcarpa*	30	8	1	0	0	1	644465 E 6150541 N	
16	White Box *Eucalyptus microcarpa*	70	10	5	1	0	6	644463 E 6150545 N	
17	Stag	60	8	3	0	0	3	644461 E 6150544 N	

Area 7									
No.	**Tree Species**	**D.B.H**	**Tree Height**	**Small < 10 cm**	**Medium 10 – 20 cm**	**Large > 20 cm**	**Total of Hollows**	**GPS Co-ordinates**	**Photo**
18	White Box *Eucalyptus microcarpa*	1 x 100 2 x 10 1 x 60	10	5	2	0	7	644441 E 6150535 N	

4 CONCLUSION

Additional survey was undertaken for the Squirrel Glider, Barking Owl and Bush Stone Curlew, in areas identified as containing abundant hollow-bearing trees within close proximity of indicative turbine locations. Survey limitations included cool to cold weather, rain and access difficulties.

These species were not recorded during the survey. The areas contain an array of mature trees containing hollows of diverse sizes. However, the vegetation structure, specifically the under and mid story, have been radically modified.

The results confirmed the assumptions of previous work, those being that the degree of modification from past clearing and heavy grazing have reduced the habitat quality and the likelihood that the sites provide important resources for the subject species.

It is recommended however, that any hollow removed during site development be offset. This could involve mounting removed hollows or installing nest boxes at a safe distance from the final turbine location (for example 100m). This will retain the level of resources currently found onsite for other hollow-dependant species. It will also retain the opportunity that the site could provide better quality habitat, under less intensive land use in the future.

5 REFERENCES

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6 PHOTOS

Photo 1: Anabat Detection Unit set up at Area 4A.

Photo 2: Trap set up in large tree at Area 4A.

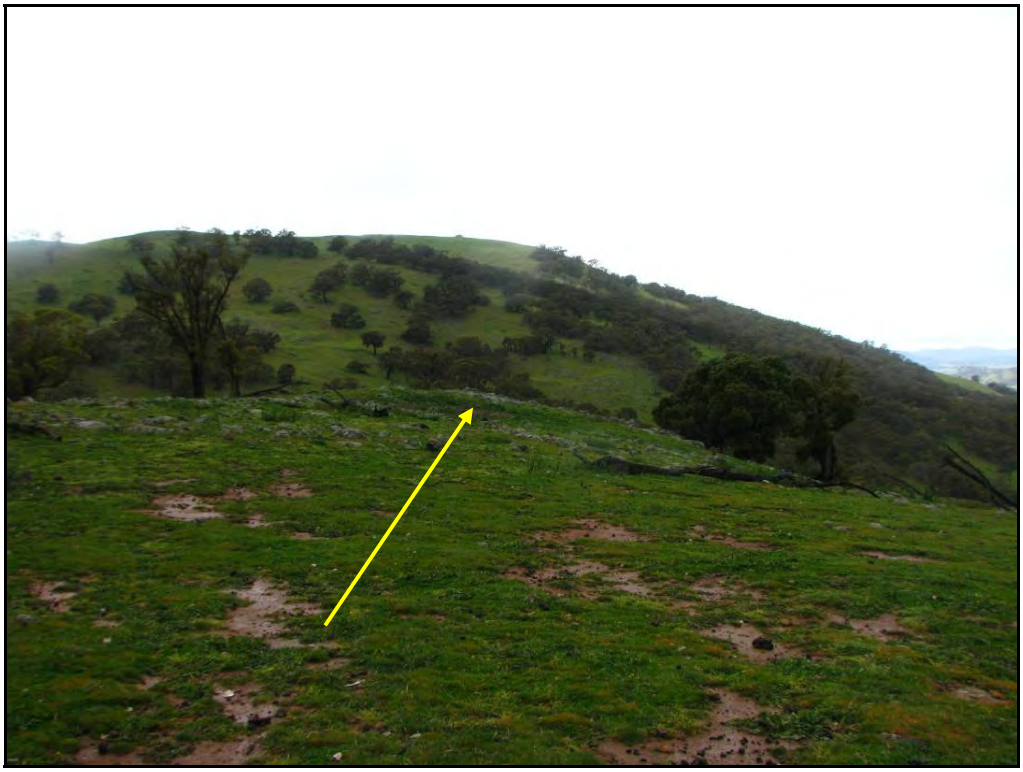
Photo 3: Hollows found at Area 4B .

Photo 4: Trap set up in dead stag at Area 7.

Area 4 A Turbine Locations

Turbine 1

Turbine 2



Area 4 B Turbine Locations

Turbine 1

Turbine 2

Area 7 Turbine Locations

Turbine 1

Turbine 2

APPENDIX H OFFSET STRATEGY

H.1 REQUIREMENT TO OFFSET

The publically exhibited Yass Valley Wind Farm proposal included as a Statement of Commitment (SoC 21) as follows:

> *The Proponent would commit to preparing and implementing an Offset Plan, to offset the quantum and condition of native vegetation to be removed, in order to achieve a positive net environmental outcome for the proposal. Offset areas would reflect the actual footprint of the development (ie footing areas and new tracks) not the maximum impact areas included in Table 7.7 and 7.9 (which include easements and existing tracks). The Offset Plan would be prepared in consultation with DECC, prior to construction.*

As part of this revised submission, the following text has been added to SoC 21:

> *The Offset plan would be prepared in accordance with the offset strategy included as Appendix H of the SER.*

The purpose of this appendix is to outline the offset strategy, providing more certainty around:

- How offsets will be identified
- How offsets will be secured
- How offsets will be managed

H.2 PROPOSED METHODOLOGY

The key components of the methodology are:

a) Calculating the areas to be impacted
b) Determining a suitable offset ratio
c) Selecting the offset site

The proposed methodology for each of these components is detailed below.

H.2.1 Calculating the areas to be impacted (areas requiring offsets)

As part of the biodiversity assessment for the Yass Valley Wind Farm proposal, the impact area for the proposal has been estimated to both assess the impacts of the habitat loss and habitat modification associated with construction, but also to inform the commitment to offset that impact. In response to agency comments, the method for calculating permanent impact areas has been revised. The new calculation format is shown in Table 2-10 of this SER. Particularly:

a) Permanent habitat loss includes all footings and tracks as well as easements where they occur in treed areas
b) Habitat modification includes transmission easements where they occurs in pasture only
c) Temporary habitat loss applies to any areas that can be rehabilitated post construction (not decommissioning).

The proponent commits to offset a) only, that is, permanent habitat loss.

This area has been estimated for the revised proposal (Appendix F) however, the proponent commits to offset actual not estimated impact. Therefore, a post-construction audit of vegetation impact would be undertaken to finalise the boundaries of the offset site. In this way, there is a mechanism to ensure the actual amount of clearing is offset and an incentive throughout construction to minimise impacts and thereby reduce the offset requirement for the project.

H.2.2 Determining a suitable offset ratio

Agency requirements

In response to agency comments (Appendix B), a condition comparison table has been provided in Table 2-2 of the SER to demonstrate how the 5-class condition categorisation method used in the biodiversity surveys relates to the Biometric Assessment Guideline definitions. This is restated below:

Table D.1 Vegetation condition classes used at the site and Box-Gum Woodland EEC/CEEC and Biometric condition relationships

Condition class	Characteristics	CEEC[1]	EEC[2]	Biometric condition[3]
Poor	Groundlayer dominated by exotics (native grasses <50% cover)	No	No	Low
Poor-moderate	Groundlayer dominated by native grasses (>50%), with <5 native non-grass species	No	Yes	Moderate-Good
Moderate	Groundlayer dominated by native grasses (>50%), with 5-11 native non-grass species	No	Yes	Moderate-Good
Moderate-good	Groundlayer dominated by native grasses (>50%), with 12-24 native non-grass species	Yes	Yes	Moderate-Good
Good	Groundlayer dominated by native grasses (>50%), with >25 native non-grass species	Yes	Yes	Moderate-Good

[1] potential Commonwealth CEEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[2] potential NSW EEC status when applied to the Box-Gum Woodland community (floristic criteria only)
[3] potential NSW Biometric condition status when applied to the Box-Gum Woodland community (floristic criteria only)

Agency comments (Appendix B) also require a series of additional threatened species and hollow-bearing tree surveys, to inform the offset site. These surveys have been committed to in the revised SoC 23).

Proposed methodology

Using the information currently available for the site and additional survey data that will be collected, the proponent commits to determining an offset ratio with reference to:

- The conservation status of the vegetation
- The condition of the vegetation
- Whether the habitat provides actual (not potential) threatened species habitat

Regarding the latter point, additional surveys will be undertaken in consultation with OEH (as per SoC 23) in areas of habitat to be removed. These will inform whether the habitat is used by threatened species, increasing the offset ratio where threatened species habitat would be removed. Where the survey effort is not considered adequate to make a reasonably confident assessment, the precautionary approach will be employed and the area will be assumed to qualify as threatened species habitat.

Proposed ratios

For a number of reasons, we propose not to calculate ratios using the Biometric Assessment Methodology, but rather to set ratios in advance, based on vegetation type, condition and habitat value. A large amount of biodiversity survey work has been undertaken onsite, as part of several layout revisions to reduce biodiversity impacts. This has included sampling several seasons over several years, providing a substantial baseline from which to propose offsets. The work has been targeted to the specific nature of wind farm impacts – with a focus on birds and bats and to allow the development of management prescriptions to avoid and minimise impacts in specific areas, such as micrositing tracks and transmission infrastructure to avoid impacts on high conservation value areas. The intention is to supplement rather than redo this survey work. Using the Biometric Assessment Methodology at this time would duplicate survey effort.

The proposed ratios below have been developed based on our experience with the Biobanking calculator in similar vegetation types. They are a simplification but have the benefit of being transparent to the proponent and the consent authority. Where multiple factors apply and their ratios are contradictory (ie 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. The ratios apply only to areas of moderate and low constraint, as all high constraint areas would be excluded from impact (as per SoC 12).

Table 7-3 Proposed offset ratios for native vegetation to be permanently removed

Condition class	Biometric condition[3]	Vegetation NOT OF conservation significance	Vegetation OF conservation significance	Threatened species habitat	HBT removed: nest box
Poor	Low	1 : 1	1 : 2	1 : 2	1 : 1
Poor-moderate	Moderate- Good	1 : 1	1 : 2	1 : 2	1 : 1
Moderate	Moderate- Good	1 : 1	1 : 5	1 : 5	1 : 1
Moderate-good	Moderate- Good	1 : 1	1 : 10	1 : 10	1 : 1
Good	Moderate- Good	1 : 1	1 : 20	1 : 20	1 : 1

Based on the preferred layout (tabulated in Table 2-11 and illustrated over the constraints map set, Appendix H), the proposed offset ratios would result in the following areas being secured in perpetuity, for the purpose of biodiversity improvement, totalling approximately 211 hectares. The extent of threatened species habitat (to be determined by supplementary surveys) may increase this ratio, where it is found to coincide with vegetation NOT of conservation significance.

Table 7-4 Proposed offset areas

Condition class	Biometric condition[3]	Vegetation NOT OF conservation significance	Vegetation OF conservation significance	Threatened species habitat	HBT removed: nest box	
Poor	Low	70.22	29.15	tbd	tbd	
Poor-moderate	Moderate-Good		33.96	tbd	tbd	
Moderate	Moderate-Good		10.25	tbd	tbd	
Moderate-good	Moderate-Good		39.18	tbd	tbd	
Good	Moderate-Good		5.57	tbd	tbd	
Total (hectares)		**70.22**	**118.11**	tbd	tbd	**188.33**

H.2.3 Selecting the offset site

When selecting the offset site (or sites) able to meet the ratios set out above, the proponent will ensure the selected offset site is:

- Of sufficient size to achieve the set ratios above
- Of appropriate type to achieve a 'like for like' or 'like for better' offset
- Complying with *Principles for the use of biodiversity offsets in NSW* guidance document

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.

A specific site has yet to be identified however, there are large amounts of land of suitable type and condition within the project boundaries to demonstrate that offsets are achievable. The proponent has identified several sites with a total area in excess of 500 hectares, sufficient to offset the estimation provided in the table above.

The publically exhibited Environmental Assessment for the Yass Valley Wind Farm (**ngh**environmental November 2009) demonstrates that these areas include vegetation types that would be impacted by the proposal (both common vegetation types and those of conservation significance) and contains habitat for threatened fauna, particularly woodland birds. Furthermore, within the originally assessed 'development envelope' there are approximately 792 hectares of high constraint EEC (Coppabella and Marilba combined). This is the highest value vegetation that would be impacted by the proposal and therefore a 'like for better' offset is highly feasible for this project.

H.3 SECURING AND MANAGING THE OFFSET SITE

It is proposed that the wind farm operator (which may be different to the proponent) would be responsible for the management of the offset site, during the operational life of the wind farm. The operator is likely to finance the landowner of the site to undertake management actions (such as fencing and weed control) but would retain responsibility for the management of the site. This provides surety that the actions will be undertaken, as the requirement to offset would be a condition of the wind farm operator's consent.

At the decommissioning stage, the ongoing management would be the responsibility of the landowner. It is expected that by this time the majority of the required management actions would have been undertaken and ongoing management tasks will largely coincide with routine agricultural activities. Land use restrictions will remain in place on the offset site so that any activities undertaken on the offset site must be compatible with the site's overall function: to improve biodiversity values.

The proponent commits to securing a formal vehicle to manage the offset site in perpetuity. A Property Vegetation Plan is proposed, attached to the land title. The agreement will specify management actions and restrictions on land use, in accordance with the finalised offset plan for the site.

H.4 CONCLUSION

This Offset Strategy sets out a methodology to calculate, manage and secure an offset site to offset the impacts of the construction of the proposed Yass Valley Wind Farm. A site has yet to be identified, but there is ample land of suitable type within the project boundaries to demonstrate that offsets are achievable. Further, the plan provides clear incentives, in the form of pre-set ratios that relate to existing mapping, for the proponent to further minimise impacts and thereby reduce the offset requirement for the proposal.