NSW GOVERNMENT | Office of Environment & Heritage

DOC16/615962
SSD 13 6277

Mr Mike Young
Director, Resource Assessments
NSW Department of Planning and Environment
320 Pitt Street
SYDNEY NSW 2001

Attention: Nicole Brewer nicole.brewer@planning.nsw.gov.au

Dear Mr Young

Jupiter Wind Farm Environmental Impact Statement (EIS) – OEH review

The Office of Environment and Heritage (OEH) has reviewed the Jupiter Wind Farm Environmental Impact Statement (EIS). We concluded that sections of this project will have a significant impact on important biodiversity values and the EIS does not adequately consider impacts on Aboriginal cultural heritage values.

The impacts, and our recommendations for avoiding, minimising and offsetting these impacts, are summarised in this letter and described in detail in the attached review.

Based on the information provided in the EIS, OEH recommends that:

- Thirteen of the 88 turbines are removed due to unacceptable risk to biodiversity (29, 37, 40, 41, 47, 48, 51, 60, 62, 63, 66, 78 and 81);
- Fourteen turbines are moved to reduce biodiversity impacts (2, 5, 6, 9, 10, 11, 19, 24, 28, 31, 32, 42, 59 and 85);
- The impacts of the other 61 turbines are managed by offsetting alienated habitat within 100m;
- A Bird and Bat Adaptive Management Plan (BBAMP) is prepared in consultation with OEH, including: 12 months pre-construction surveys for birds and bats; adequate monitoring regimes during the operational phase; and clear management protocols in the case of threatened species impacts;
- Further biodiversity surveys are undertaken to adequately address OEH's Director-General's Requirements (DGRs) and the Secretary's Environmental Assessment Requirements (SEARs);
- All areas to be impacted by the project are archaeologically surveyed;
- Subsurface test excavations are undertaken in areas of identified potential archaeological deposit as part of the environmental assessment; and
- The Cultural Heritage Assessment Report is revised to include an adequate archaeological context and predictive model, correct information regarding the Aboriginal consultation process and the results of subsurface test excavations.

PO Box 733 Queanbeyan NSW 2620
11 Farrer Place Queanbeyan NSW 2620
Tel: (02) 6229 7188 Fax: (02) 6229 7001
ABN 30 841 387 271
www.environment.nsw.gov.au

Biodiversity

OEH has three main areas of concern about the project's biodiversity impacts; threatened species, connectivity values and adequacy of impact assessment and offsetting. The EIS does not adequately meet all the requirements provided in OEH's DGRs, and SEARs. Of particular concern is an incomplete assessment of the impacts on the migrating Eastern Bentwing Bat and threatened and migratory waterbirds, the proximity of turbines to important habitat features and the cumulative impacts on raptors and migratory species. We recommend further survey for some species, and the provision of further information on the surveys undertaken to date (Attachment 1).

Detailed recommendations and impacts for each turbine is provided in Attachment 2, and the accompanying maps.

Additional biodiversity information required from the proponent

- A comprehensive map indicating all biodiversity constraints – including all threatened species and their habitat such as hollow-bearing trees (HBT), and Endangered Ecological Communities (EECs). Impacts in areas of high constraint needs to be avoided.
- Further surveys undertaken for:
    - Eastern Bentwing Bat - targeting migration times of Sep-Nov and March and using more detectors;
    - Threatened and migratory waterbirds – to meet OEH's DGRs
    - Newly listed threatened species White bellied Sea Eagle and Dusky Woodswallow.
- Wind turbine generator (WTG) setback analysis and calculation of the area of habitat within 100m of all turbines. The EIS repeatedly states that turbines will cause alienation of adjacent habitat. This alienated habitat needs to be calculated and offset.
- A revised impact calculation for roads using an average width of 15m. The EIS refers to an average width of 8m however this does not adequately allow for cut and fill and the accommodation of over-dimensional vehicles.

Aboriginal cultural heritage

OEH is concerned that the project area (PA) and associated infrastructure have not been adequately surveyed. As a result, we believe that the archaeological resource of the PA has been underestimated and that the project will have greater impacts to Aboriginal cultural heritage values than predicted.

We support the preparation of an Aboriginal Cultural Heritage Management Plan (ACHMP) and the recommendation that areas of potential archaeological deposit (PAD) are tested prior to ground disturbing works. Ideally, the test excavations should be undertaken as part of the environmental assessment in order to adequately assess impacts to Aboriginal cultural heritage values across the area.

Detailed advice on our Aboriginal cultural heritage concerns is provided in Attachment 3.

If you have any queries regarding the issues raised in this letter please do not hesitate to contact Virginia Thomas for biodiversity matters or Christine Gant-Thompson for Aboriginal cultural heritage matters at rog.southeast@environment.nsw.gov.au.

Yours sincerely

14.2.2017

MICHAEL SAXON
Regional Director – South East
Regional Operations Division

Contact officer: Virginia Thomas 6229 7105
cc: Anthony Ko anthony.ko@planning.nsw.gov.au

Attachment 1 –Information on biodiversity impacts of Jupiter Wind Farm

Threatened species and ecosystems

Glossy Black Cockatoo (GBC)

Conservation status in NSW: Vulnerable

The EIS states that the project will have a significant impact on GBC. This is of great concern as this species is very rare in region. We therefore recommend the removal of turbines 41, 48, 51, 78 and 81 to avoid the removal of known foraging and known or potential nest trees (see Map 1). Turbines 13, 43, 52 and 76 could be constructed in this area of habitat, provided the construction of turbines, cables and roads does not result in removal of foraging habitat (*Allocasuarina*) or any trees with hollows greater than 15cm diameter.

Box-Gum Woodland Endangered Ecological Community (EEC)

Conservation status in NSW: Endangered Ecological Community

Commonwealth status: Critically Endangered

The project will also have a significant impact on Commonwealth-listed Box-Gum Woodland Endangered Ecological Community (EEC). 1.6 ha of EPBC Box-Gum woodland EEC will be removed.

OEH recommends removal of turbines 37, 40 and 66 to protect the most significant stands of woodlands (see Map 2). This would have the additional benefit of protecting known Hoary Sunray habitat (see Map 5.6 from EIS Apppendix D Biodiversity Assessment – reproduced here as Map 6). The Hoary Sunray is listed as Endangered under Commonwealth legislation.

Natural Temperate Grasslands (EEC)

Commonwealth status: Critically Endangered Ecological Community

More detail needs to be provided on the classification of the native grassland. A full explanation of the possibility of occurrence of Natural Temperate Grassland must be provided. More detail must be provided about origins of derived grasslands, particularly if derived from one of the EECs.

Eastern Bentwing-bat (EBB)

Conservation status in NSW: Vulnerable

The assessment of the EBB and migratory pathways does not adequately address the Director-General's Requirements (DGRs). The DGRs required the proponent to address the impact of the project, specifically in the rotor sweep area (RSA), on the migrating EBB, with specific consideration of the nearby staging cave at Mount Fairy. Recent research by OEH demonstrated that EBBs fly within the RSA so the proposal presents a substantial risk particularly if the species migrates through the area.

The EIS states that Eastern Bentwing-bats were detected at ground and 50 m above ground level (AGL), yet it states that the EIS claims there is no evidence that a significant proportion of the population passes through the site. We have little confidence in this view as there were few detectors used and the data was collected from only one year. Further surveys targeting the migration times of Sep-Nov and March needs to be done using more detectors.

EBB mitigation measures are inappropriate (p. H13) and need to be revised to provide realistic mitigation.

Golden Sun Moth (GSM)

Conservation status in NSW: Endangered Ecological Community

Commonwealth status: Critically Endangered

Standard practice for undertaking surveys for GSM is to do the surveys in the time period when the species is flying. This changes from year to year so known locations of the species (reference sites) are monitored to determine the flying period. However the SIS does not provide sufficient information to determine whether the survey days at Jupiter aligned with active days at the reference sites. This information is required before an assessment can be made on the adequacy of this work. In addition, an estimate of effort for each survey site needs to be provided, i.e. time on-ground and area covered. Some of the surveys were undertaken quite late in the day.

Waterbirds

The EIS does not adequately meet the DGRs related to the assessment of threatened and migratory waterbirds. The DGRs required particular assessment of the impact of the Project on threatened and migratory waterbirds using Lake Bathurst and The Morass wetland areas, as well as any movements between Lake Bathurst and the nearby Lake George or other waterbodies in the region.

Waterbird surveys must be more systematic and repeated, given the importance of regional habitat and the threatened species records on the site. Survey effort was poor at Lake George and Lake Bathurst and searching in farm dams was cursory and opportunistic.

Reptiles

Details need to be provided for the timing and temperature of each tile check. Page 46 states that survey "was typically conducted in the morning" and when the temperature was below 27 degrees, but if sunny, this temperature is too high for finding Striped Legless Lizards. A description must be provided of the ground cover under the tiles, if cleared it could have affected the result.

Tiles may not have been established long enough for Little Whip Snakes.

Bird utility studies (BUS)

More survey should be undertaken, particularly in key interface areas where proposed turbines are close to edge of forest/woodland. More than six locations are required to adequately survey across such a large study area.

Raptors

Further raptor survey should be undertaken. OEH's main concern is that there were no autumn or winter surveys. The survey sites for raptors in the southern cluster were nowhere near the turbine locations, so may not represent true level of raptor activity and risk of turbine strike. There is no data presented on the proportion of total time that raptors were recorded during surveys.

Despite what the EIS says about the flight height of Spotted Harriers, one has been killed by blade-strike at another windfarm in the region. This is an at-risk species.

Owls

Further survey for owls should be undertaken. Survey effort was relatively low. There are known records of Sooty Owl and Powerful Owl within 6km and 10km of the site. The project area therefore occurs within foraging habitat for these species.

Threatened flora surveys

Further surveys for threatened flora and known threatened flora habitat are needed in the southern precinct and the road reserves of Goulburn-Braidwood Road and the Kings Highway.

Surveys were confined to one year and some were likely to be too early for detecting *Diuris aequalis*. We do not recommend relying on pre-clearance surveys as the surveys must be done in a fairly narrow seasonal window which will place considerable limitations on the construction schedule (p188). If it is located in pre-clearance surveys it will impact on the project as this species is difficult to offset.

There is no evidence to support the statement that "The transmission line alignment has been chosen in an area of least disturbance along the road edge immediately adjacent to the hardstand. The alignment has been chosen as the lowest ecological impact achievable". The alignment does not appear to have been surveyed.

The targeted Flora Searches (shown on the maps under sections 4.2.3) appear to just be meanders. If these are the areas identified as the most likely to contain the target species then transects should also be walked in a regular pattern at intervals which reflect the area of visibility according to terrain and vegetation cover.

Hollow-bearing Trees (HBT)

The DGRs required assessment of the proximity of WTG to habitat features including HBT, margins or ecotones of remnant woody vegetation and riparian areas, in particular habitat resources used by birds and bats. All HBT within 200m of turbines must be mapped. HBTs must be offset, including "alienated" ones within 100m. This requirement was poorly met.

Conflicting and unclear numbers are presented in the EIS and associated documents about the number of HBTs to be impacted. Clarification on the number and type of HBT within the development footprint, including all access tracks, transmission lines, and within 100m of all turbines is required.

Page E8 and E9 say only 13 of 249 HBTs recorded are in the development footprint, but this does not include access tracks or alienation within the 100m buffer. Table D6 lists 300 HBTs surveyed. Page E7 says "Micrositing of access tracks and other areas not yet surveyed for HBTs will be undertaken with involvement from an ecologist, and any suitable nesting trees will be avoided, where practicable."

OEH is not supportive of the proposal to use "artificial hollows within adjacent suitable habitat at a suitable replacement ratio to be calculated." (p 187). OEH has strict guidance about hollow replacement and does not recommend nest boxes. Hollow augmentation may be appropriate.

Connectivity values

The wind farm is surrounded by areas of intact forest and woodland vegetation, much of it at higher elevations. Several of the turbines in this proposal are poorly located within the landscape and may result in considerable impacts on birds and bats during operation. OEH recommends that the design layout for this wind farm should aim to maintain habitat connectivity and ensure a buffer distance from intact remnants

OEH is concerned about the ecological implications of locating turbines along both sides of contiguous ridgeline vegetation and in gaps and saddles between remnants where flying animals might be channelled. There is inadequate consideration given to the impact of loss of connectivity and disruption to the fauna movement pathways both north-south and east-west.

Of particular concern are the turbines in the central cluster, along the western and eastern fringes of a forested ridgeline (Map 2). We recommend moving turbines 2, 9, 10, 11, 24, 28, 31 and 59 further back from the vegetation. Turbines 40 and 66 should be removed as they are located in the middle of the N-S remnant. This remnant open forest is in good condition and will provide important habitat for a range of threatened and other species, surrounded as it is by much lower condition vegetation and cleared farmland. Birds and bats utilising the ridgetop forest in this area, will fly from the treetops,

directly into the rotor swept area (RSA) of the adjacent turbines at lower elevations surrounding the forest. RSA height is 47-173m.

Many aerial species will move into or out of this woodland patch periodically, thus needing to move between turbines; being surrounded by turbines will increase their risk of blade strike. Raptors and owls are also likely to be attracted to this area for hunting, and will be at greater risk of blade-strike due to this design.

The EIS suggests habitat alienation around turbines is a positive response that will reduce blade-strike, but is of concern if it also causes adjacent patches to be avoided because of the concentration of turbines along the edges.

OEH considers that the turbines in the southern cluster will have an unacceptable impact on biodiversity values. These turbines are also located in a lower elevation area between forested ridges (100-200m higher), increasing risk of blade-strike (Map 3). Turbine 29 should be removed due to the proximity of threatened species and EEC. Turbines 47, 62 and 63 should be removed as they pose a high risk to birds and bats flying between adjacent forested hills through RSA. 64 and 35 are also likely to be high-risk turbines for threatened and migratory species moving between the surrounding patches of HCV vegetation – especially EBB.

Impact calculation and offsetting

An ecological constraints map which combines all the important ecological features, and designates high constraint areas to be avoided needs to be prepared and presented.

All habitat within 100m of turbines must be offset, including HBT. The WTG setback analysis has not yet been completed by the proponent (p 9-22). This analysis is essential to inform the placement of turbines.

The report cites an outdated reference from 2001 to assert that 10,000 – 40,000 birds and bats are killed annually by blade-strike in USA (p 183). However Smallwood (2013) estimates that there are 888,000 bat and 573,000 bird fatalities/year (including 83,000 raptor fatalities) due to wind farms in the United States.

A BBAMP needs to be prepared in consultation with OEH, including 12 months pre-construction survey of at-risk species, including control sites and transects in woodland areas surrounded by WTG.

Roads

Roads are mapped and impacts calculated at a width of 8m throughout the wind farm. OEH considers that this is an underestimate, in our experience wind farm roads average approximately 15m wide, and slopes requiring cut and fill will result in an even wider road. There are approximately 50km of roads shown in the current layout, resulting in approximately 40ha of impact (some of which is already farm tracks), however if the more realistic width of 15m is used, the impact area of the roads will be approximately 75ha.

Vegetation along rural roads often need to be removed to accommodate over-dimensional vehicles and machinery required to construct the turbines. Roadside vegetation in agricultural areas may provide essential refuges for threatened and non-threatened species. Any vegetation subject to road-widening must be carefully surveyed and managed to avoid impacts to HBT and threatened species. Surveys need to be done in the correct season to determine if habitat occurs, and if so, impacts to threatened species must be avoided or minimised by undertaking work in the appropriate season.

Cumulative impacts

The DGRs required "assessment of the cumulative impact of the Project and other wind farms in the region (currently operating, planned or under construction) particularly on large raptors and migratory species". The purpose of this assessment is to consider the potential added pressure on at-risk

species from this development, including potential barriers to movement for dispersive and migratory species, avoidance or alienation of scarce remnant vegetation, increased risk of blade-strike.

The EIS does not adequately address this requirement:

Table 7.9 (p 209 in the BA - Operational and Proposed Wind Farms near the PA) omitted eight wind farms in the region which may also contribute to the cumulative impacts on migratory, dispersive and wide ranging species. The following wind farms need to be considered in the discussion as they comprise over 500 turbines, on top of the 326 listed in Table 7.9, and the 88 at Jupiter.

Operating:	Crookwell 1	67km N
	Taralga	76km N
Approved:	Collector	35km NW
	Conroys Gap	91km W
	Yass	92km W
Proposed:	Biala	65km NW
	Rye park	71km NW
	Bango	90km NW

There are five wind farms within 50km of Jupiter, and a further 11 within 100km. There are close to 1,000 turbines operating or proposed within 100km, many of which are located on north-south ridgelines, like Jupiter (see Map 7).

OEH agrees that Jupiter and the closest three wind farms will have a combined ecological impact on the region (p 209). Of particular concern is increased risk of blade-strike for wide-ranging species such as Wedge-tailed Eagles (WTE) and other raptors. Anecdotal evidence suggests fledglings and dispersing sub-adult WTE are at greatest risk of blade-strike. OEH recommends that the proposal include a discussion of cumulative impacts on these wide-ranging predators that are highly at risk of blade-strike within a landscape containing such a large number of turbines, as well as possible mitigation measures.

The cumulative clearing and alienation of habitat in the vicinity for threatened and migratory species is also a concern, and needs to be assessed.

Offsetting

We have reviewed the impact assessment which has used the 'Biobanking Assessment Method' (BBAM 2014). There were too few vegetation plots in some of the vegetation zones.

Once the final impact footprint is known (see comments on the true impact footprint of the road network above/below), the required number of vegetation plots will need to be provided and the credit calculations will need to be updated.

OEH is prepared to work with the consultants to resolve the mismatches between BVTs and PCTs that were described in section 2.2.1 to avoid errors in the final calculation of credits. We support the recommendation that the vegetation zones be refined based on the plot data.

References

Smallwood, K. S. (2013). Comparing bird and bat fatality-rate estimates among North American wind-energy projects. Wildlife Society Bulletin, 37: 19–33. doi:10.1002/wsb.260

Attachment 2 – Biodiversity impacts - recommendations for turbines

WTG no	ecological constraint	OEH recommendation / comment	Map
1	OK (has been moved >100m from edge of woodland habitat)	OK	
2 (moved)	turbines are surrounding remnant veg / GBC habitat, woodland birds	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG	2
3		OK - has been moved out of forest. Any remaining forest/woodland habitat within 100m must be offset	
4	close to GBC habitat	OK	
5	Scattered paddock trees	Move >100m from HBT/scattered trees which are important habitat for bats. OEH previously advised that this was likely to be GSM habitat, but no surveys or habitat assessment were done here. At a minimum, woodland habitat within 100m must be offset	5
6	close to GBC habitat and forested ridgeline	Move >100m from edge of intact forest, known to be TS habitat, including foraging for GBC. Adjacent topography increases likelihood of blade-strike. All forest/woodland habitat within 100m must be offset.	4
7		OK	
8	close to *Diuris* habitat	OK provided no impact to *Diuris* and woodland within 100m is offset	
9 (moved)	woodland birds / turbines are surrounding remnant veg	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG (was moved but not enough)	2
10	turbines are surrounding remnant veg	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG	2
11	turbines are surrounding remnant veg	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG	2
12		OK	
13	GBC habitat, woodland birds	OK provided no removal of GBC habitat	
14		OK	
15	EBB (prob), YBSB (prob)	OK	
16		OK	
17	EBB, YBSB (prob), GBNB (prob), EFP (prob)	OK	
18		OK	
19	TSC Snow Gum, koala habitat	Move >100m from edge of EEC woodland / koala habitat	
20	close to Diuris habitat	OK provided no impact to *Diuris* and woodland within 100m is offset	
21		OK	
22		OK - HBT within 100m must be offset	
23		OK	
24	GBC habitat, woodland birds / high-risk landscape position	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG	2
25	SOWL within 6 km, EBB, WBNB, YBSB, EFP (prob)	OK	
26		OK	
27		OK	

WTG no	ecological constraint	OEH recommendation / comment	Map
28	Adjacent to remnant woodland containing GBC habitat, woodland birds / turbines are surrounding remnant veg	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG	2
29	EPBC & TSC BGW, Blue-billed ducks on dam, EBB, woodland birds	Remove. Very high biodiversity constraints and high-risk landscape position, surrounded by forested hills. (#1 priority)	3
30		OK	
31 (moved)	turbines are surrounding remnant veg	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG (was moved but not enough)	
32	EPBC & TSC BGW, adjacent forested ridgeline	Move >100m from BGW EEC and forest edge. Adjacent topography increases likelihood of blade-strike.	4
33	EBB, WBNB, YBSB, EFP	OK	
34		OK	
35	EBB, EFP (prob)	OK - HBT within 100m must be offset	
36		OK - HBT within 100m must be offset	
37 (moved)	EPBC & TSC BGW, *Leucochrysum* habitat	Remove - impacts on EPBC & TSC BGW, *Leucochrysum* (has been moved into high constraint woodland (EEC / TS habitat))	2
38	close to *Diuris* habitat	OK provided no impact to *Diuris* and woodland and HBT within 100m are offset	
39		OK	
40	close to EPBC & TSC BGW and *Leucochrysum* habitat, woodland birds	Remove. High risk to species moving through this N-S linear forest remnant habitat.	2
41	GBC habitat	Remove. Surrounded by Glossy Black Cockatoo breeding habitat. Retain all trees with hollows of suitable size (>15 cm diameter entrance). Retain all foraging habitat. All woodland within 100m must be offset.	1
42	TS - woodland birds	Move >100m from woodland	5
43	GBC habitat	OK provided no impact to GBC habitat. All forest/woodland habitat within 100m must be offset	1
44		OK	
45		OK	
46	EEC within 100m	OK. All HBT and forest/woodland habitat within 100m must be offset	
47	TSC Snow Gum, koala habitat	Remove. High biodiversity constraints and high-risk landscape position, surrounded by forested hills.	3
48	GBC habitat	Remove. Surrounded by Glossy Black Cockatoo breeding habitat. Retain all trees with hollows of suitable size (>15 cm diameter entrance). Retain all foraging habitat. All woodland within 100m must be offset.	1
49		OK	
50		OK	
51	GBC habitat	Remove. Surrounded by Glossy Black Cockatoo breeding habitat. Retain all trees with hollows of suitable size (>15 cm diameter entrance). Retain all foraging habitat. All woodland within 100m must be offset.	1
52	Near GBC habitat, POWL record within 10km	OK provided no impact to GBC habitat. All forest/woodland habitat within 100m must be offset	1
53		OK	
54		OK	
55	YBSB	OK - HBT within 100m must be offset	
56		OK	

WTG no	ecological constraint	OEH recommendation / comment	Map
57		OK. All HBT and forest/woodland habitat within 100m must be offset	
58		OK	
59	turbines are surrounding remnant veg	Move away from edge of vegetated hills. High risk of alienation of habitat or blade-strike, especially in combination with other WTG. Farm dam within 100m high risk for waterbirds	
60	TSC Snow Gum, koala habitat, 100 WTNeedletails, GBC	Remove - too many ecological constraints: TSC Snow Gum, koala habitat, 100 WTNeedletails, GBC	
61		OK	
62	TSC Snow Gum, koala habitat	Remove. High biodiversity constraints and high-risk landscape position, surrounded by forested hills.	3
63	TSC Snow Gum, koala habitat	Remove. High biodiversity constraints and high-risk landscape position, surrounded by forested hills.	3
64 (moved)		OK - HBT within 100m must be offset	
65		OK - HBT within 100m must be offset	
66	EPBC & TSC BGW, *Leucochrysum* habitat, EBB, YBSB (prob), EFP (prob)	Remove - impacts on EPBC & TSC BGW, *Leucochrysum*. Has been moved but still problematic, design concern and high risk to species moving through this N-S remnant veg.	2
67	turbines are surrounding remnant veg	OK	
68	turbines are surrounding remnant veg	OK	
69	EPBC & TSC BGW, *Leucochrysum* habitat	OK - has been moved but still within 100m of EEC/TS habitat which must be offset	
70	YBSB, HBT	OK provided no impact to *Diuris* and woodland and HBT within 100m are offset	
71		OK provided no impact to *Diuris* and woodland and HBT within 100m are offset	
72	close to *Diuris* habitat	OK provided no impact to *Diuris* and woodland and HBT within 100m are offset	
73		OK	
74		OK	
75		OK	
76	Near GBC habitat, woodland birds	OK provided no impact to GBC habitat. All forest/woodland habitat within 100m must be offset	1
77	EBB, WBNB, YBSB, EFP	OK	
78	GBC habitat, woodland birds	Remove. Surrounded by Glossy Black Cockatoo breeding habitat. Retain all trees with hollows of suitable size (>15 cm diameter entrance). Retain all foraging habitat. All woodland within 100m must be offset.	1
79		OK	
80		OK	
81	GBC habitat, woodland birds	Remove. Surrounded by Glossy Black Cockatoo breeding habitat. Retain all trees with hollows of suitable size (>15 cm diameter entrance). Retain all foraging habitat. All woodland within 100m must be offset.	1
82		OK but all woodland within 100m must be offset	
83		OK but all woodland within 100m must be offset	
84		OK but all woodland within 100m must be offset	
85	EPBC & TSC BGW	Move >100m from BGW EEC and forest edge	
86		OK	
87		OK	
88		OK	

Table legend

OK	61
move	14
remove	13
total	88

EBB - Eastern Bentwing Bat; GBNB - Greater Broad-nosed Bat;
WBNB - Western Broad-nosed Bat; SM - Southern Myotis;
YBSB - Yellow-bellied Sheathtail Bat; EFP - Eastern False Pipistrelle
BGW – Box Gum Woodland; POWL – Powerful Owl SOWL – Sooty Owl

Attachment 3– Information on Aboriginal cultural heritage impacts of Jupiter Wind Farm

OEH has reviewed the Jupiter Wind Farm Cultural Heritage Assessment Report (CHAR), prepared by ERM and dated October 2016, and have the following concerns about the assessment of Aboriginal cultural heritage values.

Inadequate research into archaeological background of PA

A copy of the Aboriginal Heritage Information Management System (AHIMS) search conducted by ERM has not been included in the CHAR. OEH requests that either the AHIMS client search number or a copy of the search results are included in the CHAR.

A previously recorded Aboriginal Site "EGP 2-81: Manar Creek" (AHIMS #59-3-0262) is located within the PA and consists of between 50 and 100 surface artefacts. This site has not been described in the archaeological background of the CHAR. Considering the size of the artefact scatter and its location within the PA, this site must be considered as part of the archaeological resource of the PA. The archaeological report associated with this AHIMS record must also be reviewed.

Within the Southern Tablelands there has been significant archaeological research into subsurface deposits within landforms impacted by agricultural practices such as ploughing. This has shown that the surface expression of artefact assemblages is not an accurate reflection of what is below the surface. OEH is concerned that this type of research has not been considered as part of the background and that the archaeological resource of the PA has been underestimated.

OEH notes that there are a number of reports summarised in the CHAR that are not listed in the references section. OEH queries the addition of some reports, i.e. Silcox 1988 in Table 5.1. The location of this study area is incorrectly referenced as 10 km east of the PA however Chatsbury is located to the north of Goulburn over 80 km away. The CHAR needs to be amended to adequately reference all reports.

Underestimation of archaeological resource

While two areas of potential archaeological deposit (PAD) were recorded in the PA (JWF PAD1 and JWF PAD2), OEH is concerned that there are many other areas within similar landforms that will be impacted by the current design. OEH recommends that these areas are resurveyed to determine whether they also have potential or justification provided as to why they are not PADs. Our areas of concern are the creeklines within the following survey units: SU1, SU7, SU9-SU9, SU12, SU17, SU19 and SU27. It should be noted that in some areas the survey units and proposed impacts may not be aligned. In these cases, our area of concern is not the creekline within the survey unit, but the adjacent impact area.

The CHAR (ERM 2016: 37) describes that burials may be present in the "alluvial soils that make up the PAs flood plain, creek and river terraces or found in crests and hill tops". OEH is concerned that the potential for burials to occur in theses landforms across the project area has not been considered.

Inadequate survey effort

As predicted in the CHAR (see above), artefacts are likely to be found on "hill tops, crests or upper flats". Based on the maps provided showing survey units, many of these landforms have not been surveyed. Given the likelihood that these landforms are likely to contain artefacts all impact areas need to be assessed in the field.

There is no map in the CHAR to support the described landforms. OEH requires that, when compiling the description, the landscape and landform units used for the study (at the different levels of landscape, landscape unit, landform, topographic unit) must be described and mapped.

The CHAR itself states that not all of the amended project areas have been surveyed. OEH advises that all areas proposed to be impacted must be surveyed in order to assess and consider the full impact on Aboriginal cultural heritage values by the Project.

Previously recorded Aboriginal sites

The CHAR identifies that three previously recorded AHIMS sites were located within the PA. During our background research, OEH noted that sites DL14 (AHIMS #62-6-0248) and DL15 (AHIMS # 62-6-0247) were plotting in the wrong location. On reading the Aboriginal site recording forms, it was clear that the coordinates were entered incorrectly into AHIMS. These sites are actually located about 100km south of the PA. It is therefore not surprising that these two sites were not able to be re-located. As a result of reviewing the Aboriginal site recording forms, OEH has corrected the coordinates in AHIMS.

The CHAR states that these two AHIMS sites were also used to develop the predictive of Aboriginal cultural heritage values in areas not surveyed. As these sites are not located with the PA, OEH is concerned about the adequacy of the model used to predict heritage values within the PA.

The CHAR provides no detail of the third AHIMS site that is reported to occur within the PA. A description of this site as recorded in the field needs to be a provided and a new site card submitted to AHIMS updating the site condition.

None of the known AHIMS sites are mapped as Aboriginal sites/ heritage sites within Figures 7.1, 7.2, 7.3 or 7.4. These sites must be included on the figures.

Addition of newly recorded Aboriginal sites to the AHIMS database

OEH notes that Aboriginal site recording forms have not been submitted to AHIMS for JWF1, JWF2 and JWF3, JWF PAD1 or JWF PAD2. Given these sites were recorded as part of surveys in 2014-2015, we require that Aboriginal site recording forms are submitted as soon as possible. Submission of Aboriginal site recording forms is a legal requirement under section 89A of the *National Parks and Wildlife Act 1974*.

Aboriginal community consultation process

The Aboriginal community consultation log included in Annex A contains incorrect details of stakeholders and dates under the Stage 1.4 Lists. These details must be reviewed and the CHAR amended to reflect the correct details.

We are concerned that the latest CHAR, dated October 2016, may not have been sent to the Registered Aboriginal Parties (RAPs) seeking their comments. We acknowledge that RAPs were informed of changes to the project footprint in September 2015, however as further changes occurred in April 2016, we are concerned that RAPs have not been given adequate opportunity to consider and comment on these changes.

OEH requests that copies of all correspondence between ERM and the RAPs is included in Annex A of the report.

Recommendations of CHAR

<u>Subsurface testing of PADs</u>

OEH notes the recommendation for subsurface testing of PADs, prior to ground disturbance activities commencing, where disturbance to these areas cannot be avoided.

OEH considers any subsurface testing should occur at the environmental assessment stage to ensure an adequate understanding of the Aboriginal heritage values prior to Project approval. It also allows for appropriate management measures to be considered before the Project design is

completed. If significant deposits are located post approval it will be highly problematic for the proponent.

This recommendation for subsurface testing outlines that any "significant archaeological deposit" may be subject to salvage excavation. A quantifiable definition of what is considered a "significant archaeological deposit" needs to be provided. Given that only a total of four stone artefacts from three locations have been recorded in the PA, it could be argued that anything over four artefacts is significant. We would also not support any recommendations for salvage excavation until the results of testing are provided.

Aboriginal Cultural Heritage Management Plan (ACHMP)

We support the preparation of an Aboriginal Cultural Heritage Management Plan (ACHMP). This needs to be prepared by a qualified archaeologist in consultation with OEH and the RAPs. OEH recommends that the ACHMP is prepared sooner rather than later to assist with the management and mitigation measures for the PA.

The plan must include but not be limited to:

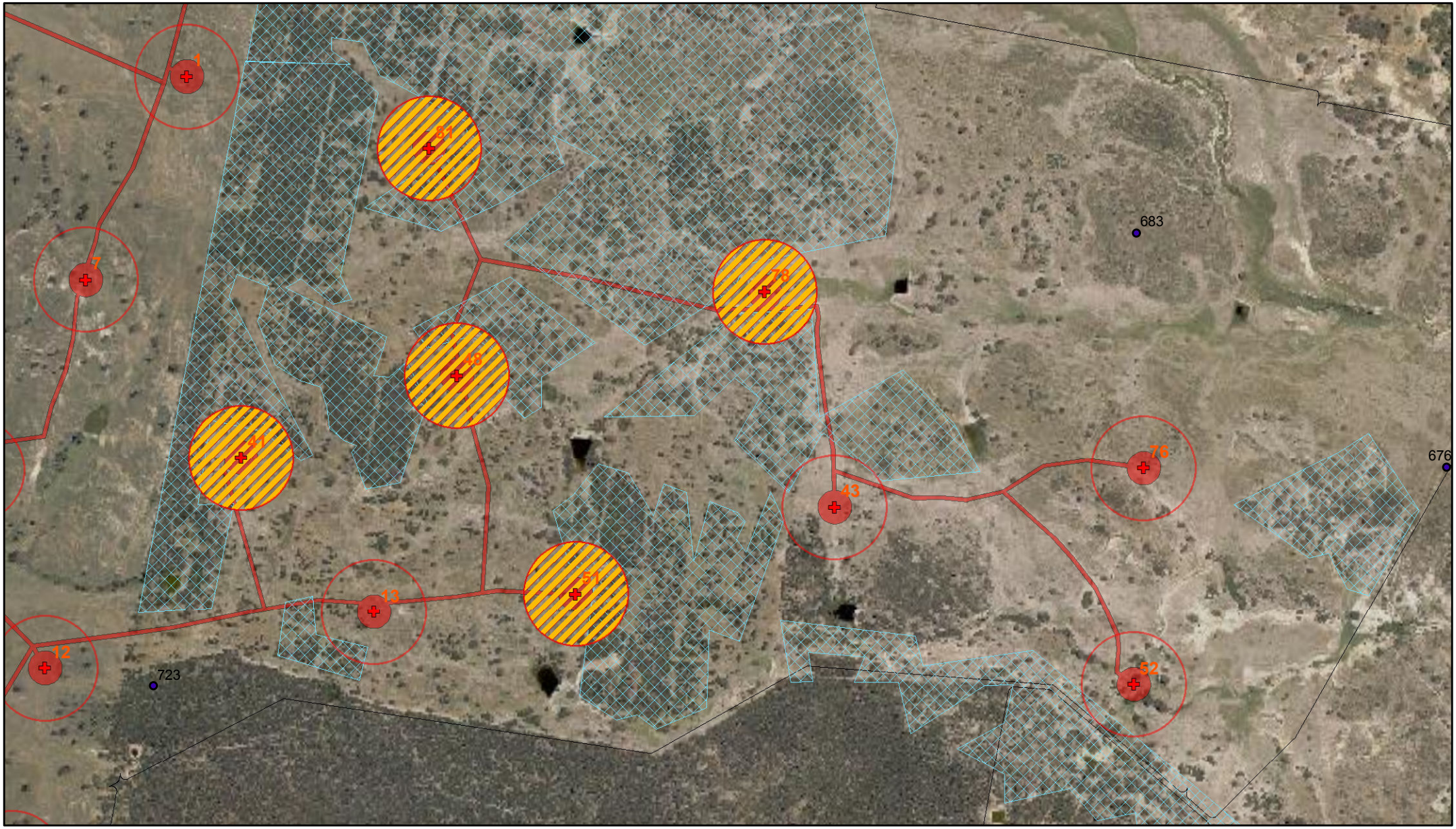
a) Identifying and mapping the known Aboriginal objects or sites within the project area.
b) describing the procedures of how known Aboriginal sites will be managed during the life of the Project including,
    - an outline of the management measures to avoid and protect sites that will not be impacted by the project activities through fencing and signage,
    - an outline of the mitigation measures for test excavations of PADs that will be impacted by the project,
    - details on the long term management of any excavated or salvaged objects.
c) describing the procedures that would be implemented if any new Aboriginal objects are found at any stage during the life of the project,
d) describing a contingency plan and reporting procedure should damage to Aboriginal objects or sites occur outside of the approved disturbance areas of the project area,
e) detailing the procedures to be followed if any Aboriginal skeletal material is uncovered during the project and allow for the development of appropriate management measures, and
f) outlining the process that will be followed for continuing consultation with the RAPs and OEH as required.

Interpretive Strategy

OEH seeks clarification on what is the proposed interpretive strategy.

Site specific recommendations

OEH questions the proposed collection of Aboriginal sites if they are not to be impacted. Sites JWF1 and JWF3 do not appear to be close to any proposed impacts. We note there is a discrepancy between the recommendation within section 7.2.6 and Table 10.1 in relation to site management recommendations regarding site collection.



Jupiter wind turbines
100m buffer around WTG
Remove turbine
GBC foraging habitat (approx)
Development footprint
Jupiter Project Area

Glossy Black Cockatoo foraging habitat and turbine recommendations Jupiter Wind Farm

Map 1

Datum/Projection: GCS GDA 1994

0 50 100 200 300 400 Meters

N

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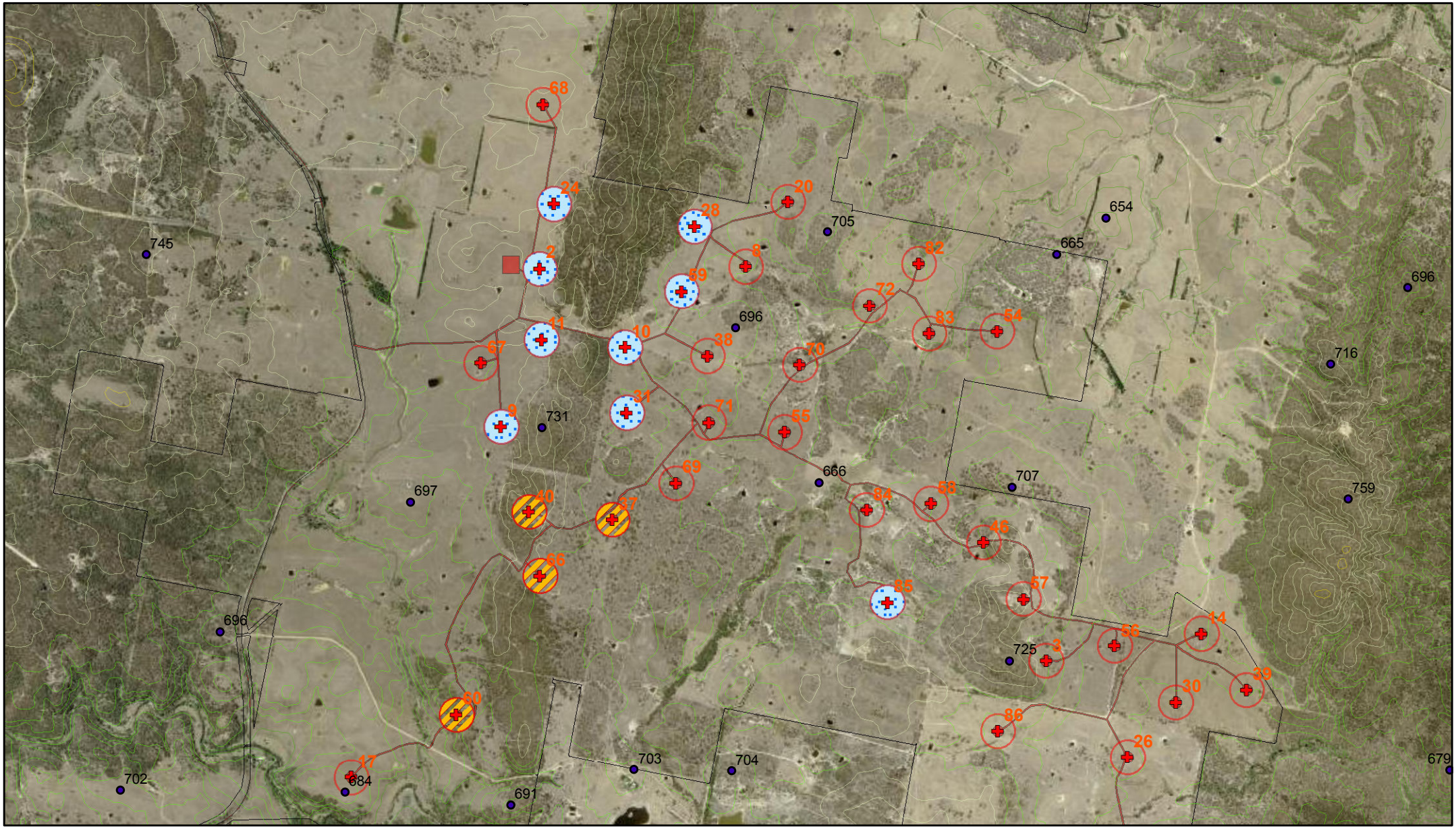

Jupiter wind turbines
100m buffer around WTG
Move turbine
Remove turbine
Development footprint
Jupiter Project Area

Elevation - contour lines

610-650
660-700
710-750
760-800
810-850
860-900
910-950

Landscape, topography and turbine recommendations Jupiter Wind Farm (central cluster)

Map 2

Datum/Projection: GCS GDA 1994

0 0.5 1 2 Kilometers

N

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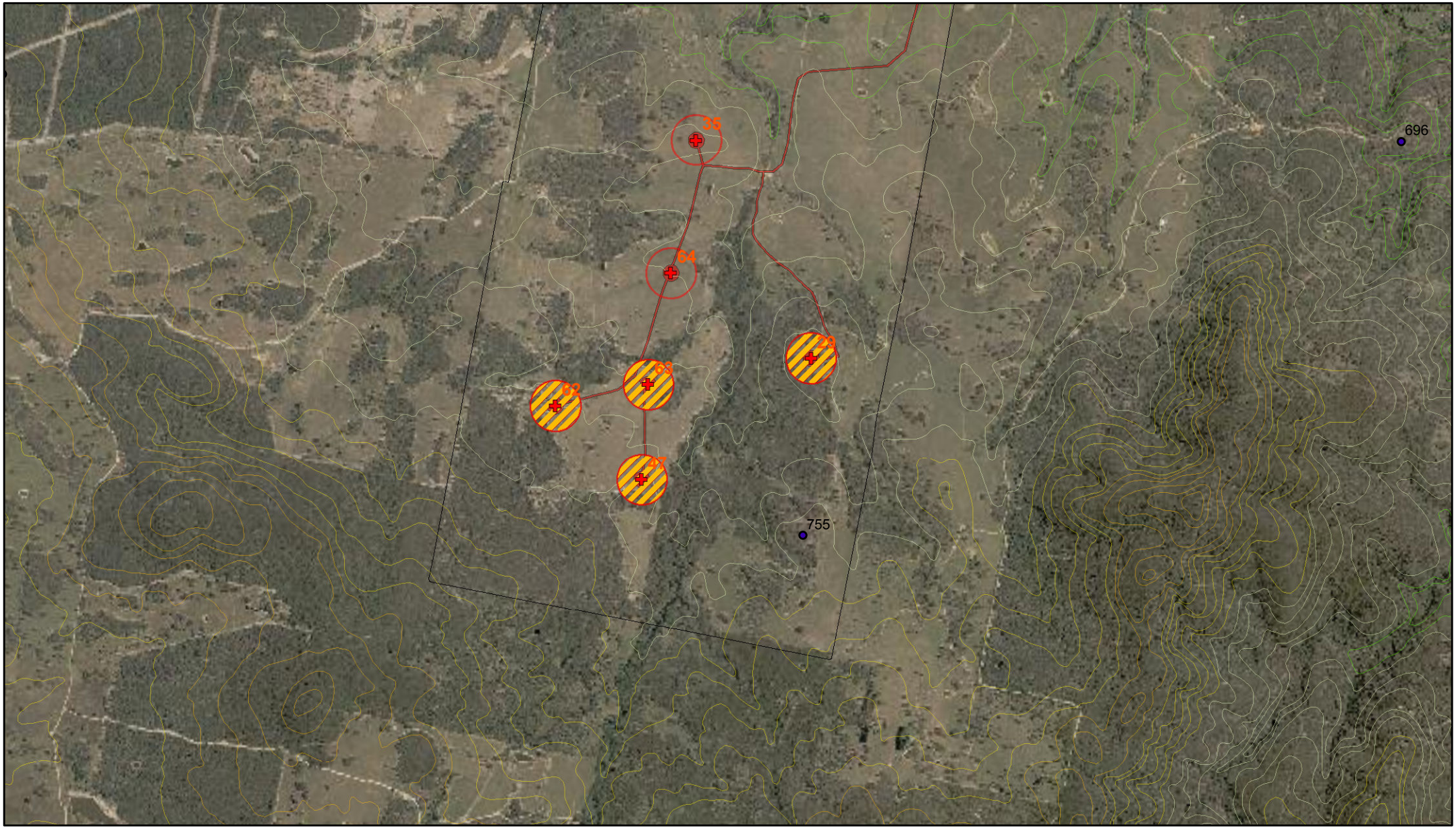

Jupiter wind turbines
100m buffer around WTG
Remove turbine
Development footprint
Jupiter Project Area

Elevation - contour lines
610-650
660-700
710-750
760-800
810-850
860-900
910-950

Landscape, topography and turbine recommendations Jupiter Wind Farm (southern cluster)

Datum/Projection: GCS GDA 1994

Map 3

0 0.25 0.5 1 Kilometers

N

NSW GOVERNMENT Office of Environment & Heritage

Jupiter wind turbines
100m buffer around WTG
Remove turbine
Move turbine
Box Gum Woodland EEC (approx)
Development footprint
Jupiter Project Area
Electricity Transmission Line

Elevation - contour lines
610-650
660-700
710-750
760-800
810-850
860-900
910-950

Landscape, topography and turbine recommendations Jupiter Wind Farm (northern cluster)

Datum/Projection: GCS GDA 1994

Map 4

0 0.125 0.25 0.5 Kilometers

N

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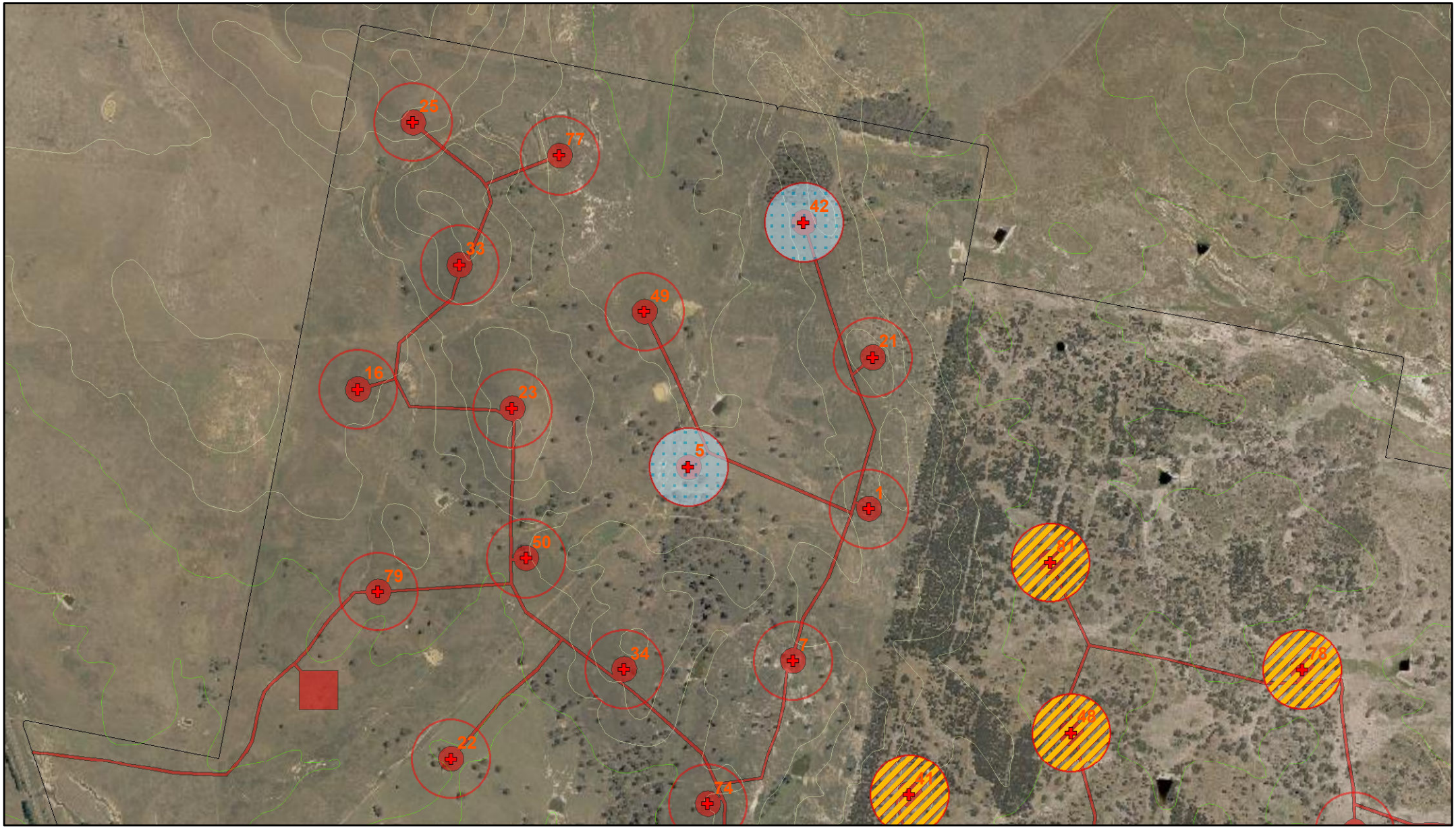

Jupiter wind turbines
100m buffer around WTG
Remove turbine
Move turbine
Development footprint
Jupiter Project Area

Elevation - contour lines
610-650
660-700
710-750
760-800
810-850
860-900
910-950

Landscape, topography and turbine recommendations Jupiter Wind Farm (northern cluster)

Datum/Projection: GCS GDA 1994

Map 5

0 0.125 0.25 0.5 Kilometers

N

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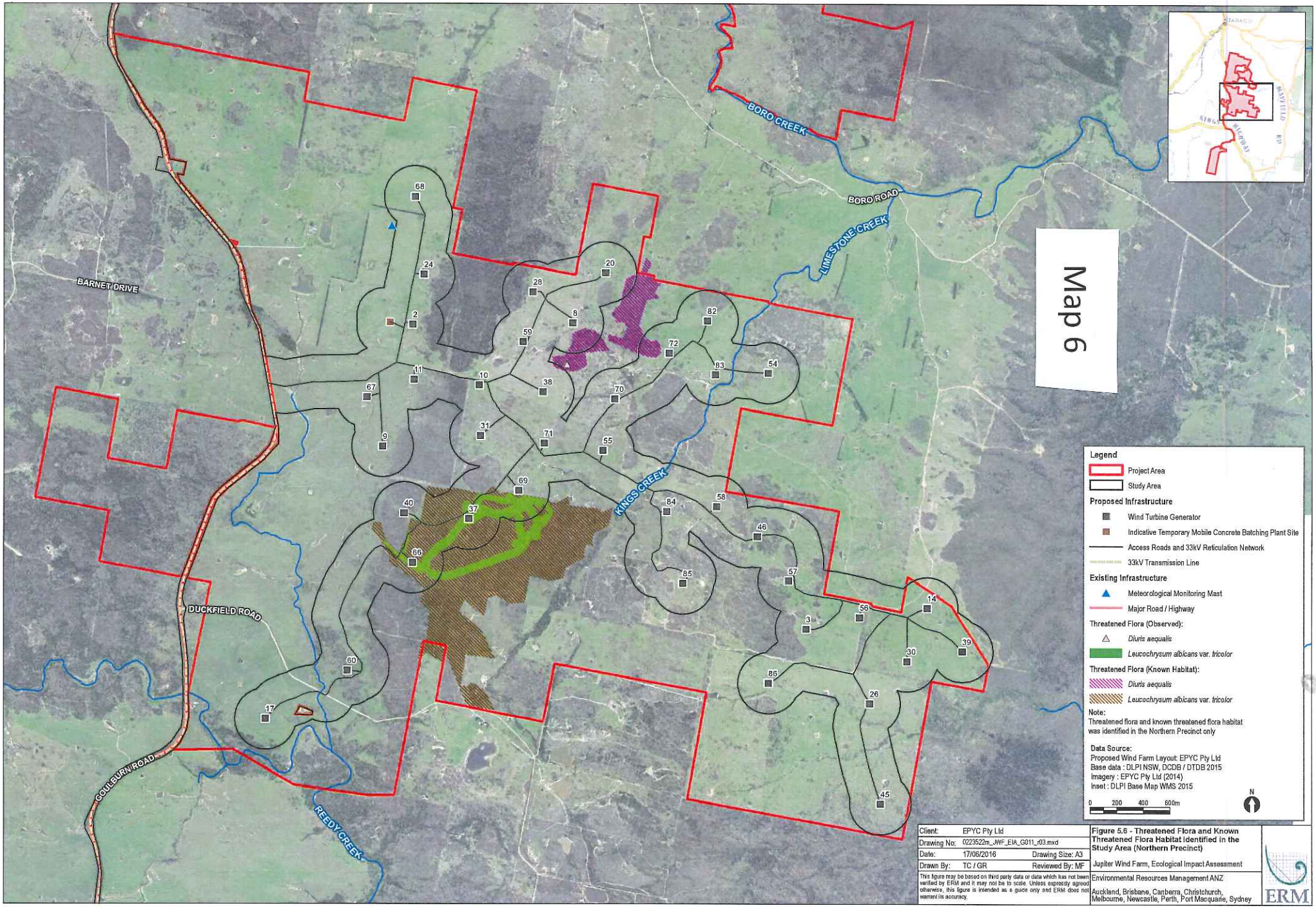

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Drawn By:	TC / GR	Reviewed By: MF	

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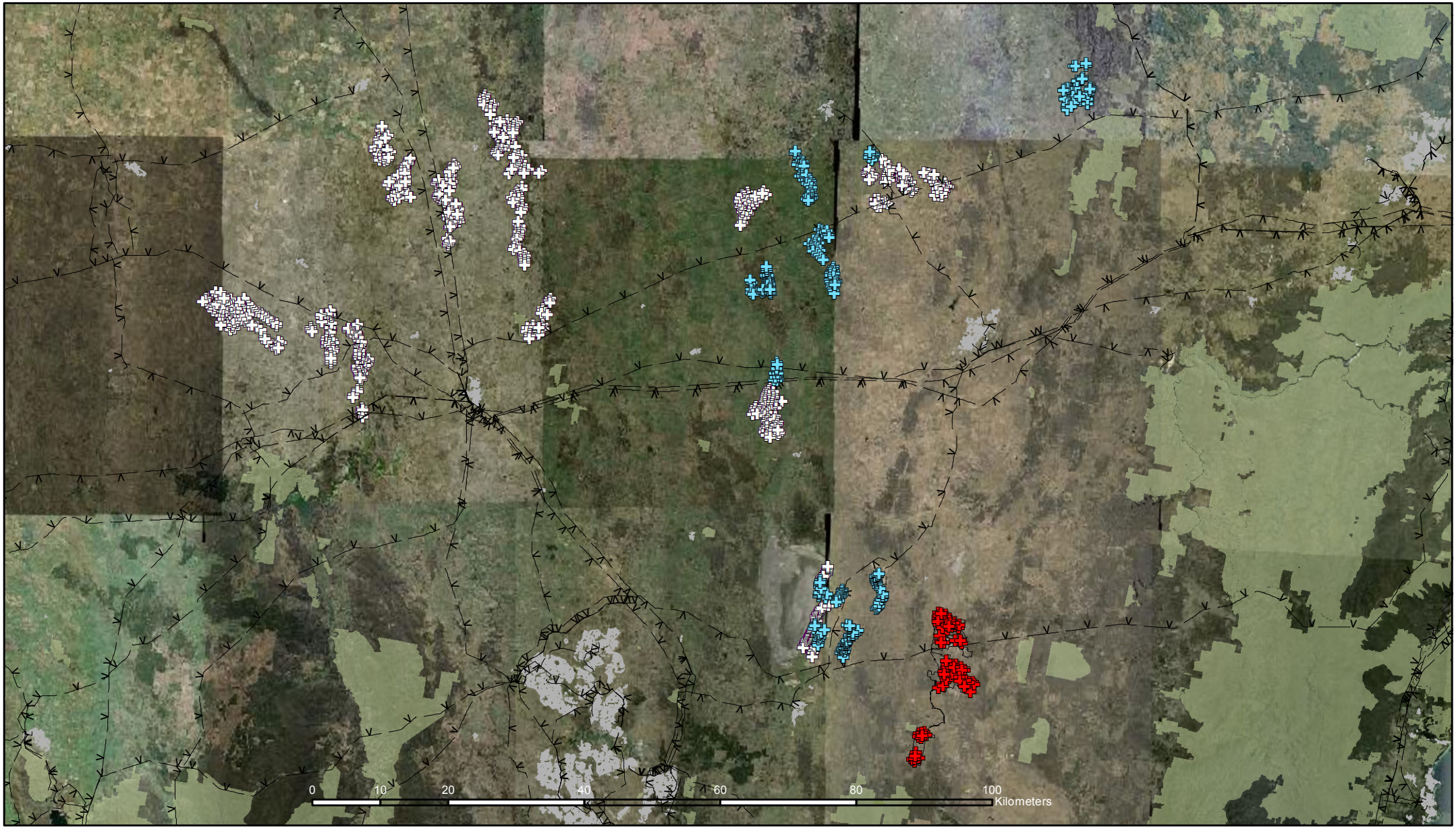
Figure 5.6 - Threatened Flora and Known Threatened Flora Habitat Identified in the Study Area (Northern Precinct)

Jupiter Wind Farm, Ecological Impact Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM



- Jupiter wind turbines
- Jupiter Project Area
- Electricity Transmission Line
- Operating wind turbines
- Approved/proposed turbines
- NPWS Estate
- Builtup Areas

Jupiter Wind Farm and other wind farms in the region

Map 7

Datum/Projection: GCS GDA 1994

N

NSW GOVERNMENT Office of Environment & Heritage