

Attention: Iwan Davies

Afternoon Iwan

Further to Council's correspondence dated 26 April 2016, concerns are still raised by Council regarding the proposal. They are listed below:

1. Transmission System – Television Services – Proposed turbines 32 and 33 remain in the direct line of the Mt Gray and Wades Hill television transmission line servicing almost all the residences in Crookwell.
2. Woodhouselee Access – Council's preferred position remains with Option 1 – the use of Graywood Siding Road.
3. Turbine Location – Turbine locations within 2km from existing residences and roads should be deleted (as outlined in Section 9.5 Upper Lachlan Development Control Plan 2010).

Regards  
Tina Dodson  
Director Environment and Planning  
**Upper Lachlan Shire Council**

p: 02 4830 1027  
e: [tdodson@upperlachlan.nsw.gov.au](mailto:tdodson@upperlachlan.nsw.gov.au)  
w: [upperlachlan.nsw.gov.au](http://upperlachlan.nsw.gov.au)

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# Upper Lachlan Shire Council

All correspondence addressed to the General Manager, PO Box 42, Gunning NSW 2581

**Crookwell Office:** 44 Spring Street, Crookwell NSW 2583

p: 02 4830 1000 | f: 02 4832 2066 | e: council@upperlachlan.nsw.gov.au | www.upperlachlan.nsw.gov.au

**Gunning Office:** 123 Yass Street, Gunning NSW 2581

p: 02 4845 4100 | f: 02 4845 1426 | e: council@upperlachlan.nsw.gov.au

**Taralga Office:** Taralga Community Service Centre, Orchard Street, Taralga NSW 2580

p: 02 4840 2099 | f: 4840 2296 | e: taralgacsc@ceinternet.com.au

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**Our Ref: F17/126 and CE2018/612**

26 April 2016

Resource Assessment  
Department of Planning and Environment  
GPO Box 39  
SYDNEY NSW 2001

Attention: Iwan Davies

Dear Sir

**RE: RESPONSE TO SUBMISSIONS - CROOKWELL 3 WIND FARM (SSD 6695)**

Reference is made to the invitation to provide a written submission to the Crookwell 3 Wind Farm proposal.

1. The road network in the area is particularly vulnerable to use by heavy vehicles. The roads would need to be upgraded and made suitable for the proposed use before any construction work could commence. The roads are certainly not sound enough to start construction work (without a reconstruction) and repair them at the end of the job. There are gravel quarries located to the north of the site – use of these will require a significant amount of road reconstruction work. If the gravel is to be hauled from quarries south of the site (eg Goulburn), Woodhouselee will require upgrading from Crookwell Rd to the northernmost access to the site.
2. As the internal road network is completely interconnected, there should be only one sound access approved.
3. The drawings show two interconnecting electrical cables across Crookwell Rd (connecting Crookwell 3 south to the substation). Approval should only be granted for one crossing. Council requires that any cables that run parallel to a road, to be under the sealed part of the road or laid on private property.
4. The consultants acting for the proponents (and the proponents) do not appear to have an adequate understanding of the transmission system that is used to provide television services to the Crookwell Community. This is evidenced by the information relating to the number of affected premises that is provided in Table 3 of their report. In Table 3, the consultants advise that there are seven (7) dwellings in Crookwell that might be affected by the possible electromagnetic interference that might be radiated by the windfarm. The correct number is closer to eight hundred and fifty (850). All of these premises would not be involved with the proposed development.

Almost all of the residences in Crookwell (approx. 850) receive their television signals from Upper Lachlan Shire's retransmission facility which is located on Wades Hill (just west of Crookwell). This facility receives its signal terrestrially from Mt Gray near Goulburn and retransmits it into Crookwell.

The signal comes to Mt Gray from Canberra and carries advertising and community information that is relevant to Canberra and the Crookwell area. The re-transmitter was provided by Upper Lachlan Shire Council (ULSC) at a cost of approximately \$300,000 during 2016 using funds provided by the Australian Government.

The work was carried out by the technical staff from Regional Broadcasters Australia utilising extremely high-quality components that were imported from Europe. The majority of the costs were expended at the Wades Hill facility with only additional antennae installed at Mt Gray.

ULSC is responsible for the ongoing maintenance costs and site rental. The site is owned by Broadcast Australia P/L.

Some support for ongoing costs has been provided to ULSC by the owners of the Gullen Range Windfarm. This was to compensate the Crookwell Community for the effects of the interference that is caused by the Gullen Range Windfarm.

The television reception in Crookwell had previously been poor and unreliable (termed fortuitous) before the windfarm was commissioned. No television was reception available in Crookwell at all after it was commissioned. The mapping from the "My Switch" website is out of date (also the My Switch program was totally rejected by the Crookwell Community as it recommended that satellite television be provided (at a large cost) to the community.

Satellite television also removes the benefits of community information that is broadcast from terrestrial transmitters. After the retransmission facility was constructed the vast majority of residences in Crookwell receive excellent television signals.

If the signal from Mt Gray is affected, all of Crookwell will have poor (or no) television reception.

- i) Experience with the design and construction of the Wades Hill facility (and a similar one at Taralga) indicates that a lead time of 8-12 months will apply to the provision of an alternative retransmission facility. Such a delay (with poor or non-existent television services) is unacceptable to ULSC and the Crookwell Community in general.
- ii) There appear to be two turbines in Crookwell 3 and one in Crookwell 2 (refer to Figure 6 of the consultant's report) that have the potential to interfere with the television signal between Mt Gray and Wades Hill. The



impacts from these turbines may also be further affected by the ability of the proponent to microsite the turbines within the project.

ULSC requires the proponents to have a suitable, qualified consultant fully investigate the proposed impacts and (if necessary) design a suitable solution to the problem that must be approved by ULSC before construction of the turbines commences. Such a solution may include (but is not limited to) :-

- a) An additional retransmitter to allow the television signals to by-pass the proposed windfarm and be retransmitted terrestrially to either Wades Hill or Crookwell Township directly.
- b) Removing the turbines that are causing the interference from the project.

The approved solution must be put in place before commissioning of the turbines commences. ULSC will not accept that this work can be carried out post commissioning.

ULSC (and the Crookwell Community) will not accept the remedial proposals shown in consultant's report as those measures relate to individual premises and certainly not to a whole community. ULSC has also found that the remedies shown in the consultant's report are ineffective and provide an unacceptable reduction in the level of service to the community. This is mainly because the remedies are used to improve a weak signal whereas wind turbines tend to scramble the signal which cannot be unscrambled.

The remedial measures shown in the report are also more expensive than the options mentioned above.

Despite much discussion being entered into regarding television reception, the documents fails to provide information regarding this matter. As Crookwell's television signals come from Mt Gray near Goulburn, there is potential for the project to interfere with Crookwell's television reception. As no other terrestrial free to air service is available to Crookwell, it is of paramount importance that the potential impact to Crookwell's television service is assessed and appropriate action taken BEFORE work commences.

For any further information or clarification please contact Council during office hours.

Yours faithfully



Tina Dodson

**Director Environment and Planning**



DOC18/211603  
SSD 6695

Mr Mike Young  
Director Resource Assessments  
NSW Department of Planning and Environment

Attention: Iwan Davies [iwan.davies@planning.nsw.gov.au](mailto:iwan.davies@planning.nsw.gov.au)

Dear Mr Young

### **Crookwell 3 Wind Farm – Response to Submissions – Addendum EIS**

The Office of Environment and Heritage (OEH) has reviewed the Response to Submissions (RTS) for the Crookwell 3 Wind Farm Addendum EIS. We note your request for our advice on any residual biodiversity, threatened species and Aboriginal cultural heritage issues to be addressed prior to approval.

#### Biodiversity and threatened species

The most effective way to manage impacts to birds and bats from operating turbines is by avoiding high-risk locations for turbines. The areas of highest risk are within and adjacent to intact patches of woodland and forest. The cumulative loss, fragmentation and alienation of intact woodland patches across the region will impact on biodiversity, including several threatened birds and bats.

#### **Turbine A12**

We continue to have concerns about turbine A12 which is located in the middle of remnant woodland. In a rural landscape, small patches of remnant forest and woodland, along with linear strips of vegetation along roadsides, provide essential habitat for birds and bats, including threatened species. We note that the proponent has previously provided information to support the sensitivity of this area (e.g. 2013 Supplementary Ecology Report), including:

- Two threatened bat species recorded, including the migratory Eastern Bentwing-bat.
- Three threatened bird species recorded around A12 and A18: Scarlet Robin, Varied Sitella and Gang Gang Cockatoo.
- Nine hollow-bearing trees (HBT) mapped within 100m of A12, potentially providing habitat for the following threatened species: Gang-gang Cockatoo, Brown Treecreeper, Greater Broad-nosed Bat and Eastern False Pipistrelle. (Elsewhere 30 hollows in 12 HBT are noted, in close proximity to A12).
- Good condition open woodland which provides potential habitat for other threatened species including: Speckled Warbler, Diamond Firetail and Hooded Robin; and
- Potential habitat for several prey species for owls and raptors, thereby increasing the likelihood that these at-risk species will be regular visitors to the woodland patch.



### **Proximity of turbines to woodland habitat**

OEH recommends that to minimise the risk to birds and bats from operating turbines, turbines should not be located immediately adjacent to woodland remnants. The design and layout of turbines in the landscape should take into consideration topography and the proximity of remnant vegetation. We recommend that the edge of the rotor-swept area (RSA) should be at least 50m from the nearest part of the habitat. This is in line with the published English formula (see Attachment 1) which calculates the distance required between the edge of habitat and the turbine depending on the dimensions of the turbine and blades, and height of vegetation.

At Crookwell 3 Wind Farm, the risk would be minimised by ensuring a distance of at least 82.6m between turbines and remnant woodland. The attached **Map 1** shows that some turbines are too close to woodland, as indicated by buffers of 82.6m (pink) and 87m (black). Buffers correspond to approximate height of the vegetation of 15m and 20m (as described in Attachment 1). There are also ecological implications of locating turbines surrounding remnant vegetation, particularly if the woodland is at a higher elevation. These turbines present the highest risk of collision, as fauna flying out of the canopy on the hilltops will be at RSA.

### **Offsetting**

As BioBanking Agreements are no longer available, OEH recommends that DPE advise the proponent on the most appropriate mechanism for securing an offset to ensure that biodiversity impacts are adequately addressed.

### Aboriginal cultural heritage

We have outlined several recommendations in relation to the archaeological assessment for Crookwell 3 wind farm.

### **Additional areas needing survey**

The section of access track between turbines A27 and A28, and the second access track to turbine A12 were added after the archaeological survey was completed in 2014. These areas need to be surveyed.

### **Landform mapping will help identify areas requiring test excavation**

We recommend mapping landforms within the Crookwell 3 wind farm area to identify focus areas for excavation. Recent monitoring and salvage activities at the adjacent Crookwell 2 wind farm showed the test excavation method used there did not provide a good indication of the artefact densities and significance of sites. In one case the density of artefacts identified through test excavations was 24 artefacts and 1933 artefacts were identified through the monitoring and salvage program (**Attachment 2 Table 1**) These results demonstrated that salvage excavations were vital to accurately identifying artefact densities and site significance. We therefore recommend developing a staged excavation method in consultation with OEH. The method will sample all landforms and known surface sites within the impact areas to ensure high significance sites are identified and salvaged prior to construction. This method would also help to improve predictive modelling in the region.

### **Potential for Aboriginal burials**

OEH recommends the development of a human remains protocol to manage the discovery of burials at all stages of the project. The archaeological predictive model has identified that while rare, Aboriginal burials may be present in the study area. Areas of sensitivity include the alluvial soils near the Wollondilly River. Redesign to avoid burials is the preferred option where possible.

### **Consultation**

The Aboriginal consultation process appears to have lapsed. We recommend commencing a new consultation process consistent with Clause 80C of the *National Parks and Wildlife Regulation 2009*.

### **AHIMS sites cards**

The AHIMS registrar has not received site cards for the Aboriginal sites within the Crookwell 3 wind farm. Sites cards should be re-submitted to AHIMS as soon as possible as this is a legal requirement.

### **Aboriginal Heritage Management Plan**

We recommend an Aboriginal Heritage Management Plan (AHMP) be developed in consultation with OEH and all Registered Aboriginal Parties. The AHMP will ensure ongoing protection and management of all Aboriginal sites within the Crookwell 3 area throughout the life of the project.

If you have any queries regarding the issues raised in this letter please do not hesitate to contact us at [rog.southeast@environment.nsw.gov.au](mailto:rog.southeast@environment.nsw.gov.au).

Yours sincerely



**MICHAEL SAXON**  
**Director, South East**  
**Regional Operations Division**

1/6/2018

Contact officer: Virginia Thomas - 6229 7105

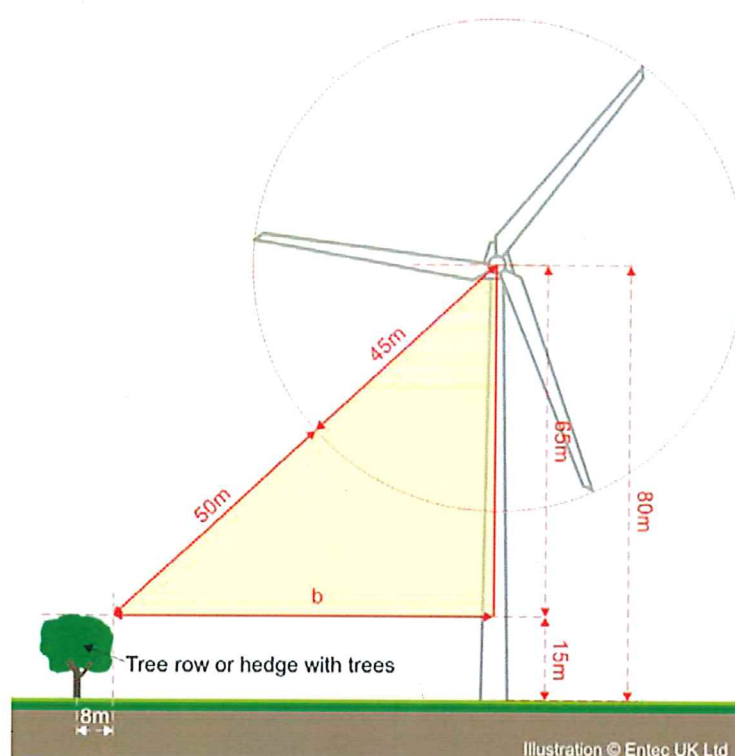
## ATTACHMENT 1 – additional information on micro-siting and high-risk turbines at Crookwell 3 wind farm

As previously advised, OEH recommends that to minimise the risk to birds and bats from operating turbines, the edge of the rotor-swept area (RSA) needs to be at least 50m from the nearest part of the habitat feature. This is in line with the published English model:

Natural England 2014. Technical Information Note TIN051 *Bats and onshore wind turbines Interim guidance*. 2014. ISBN: 978-1-78354-095-2 (TIN051).

The TIN051 model calculates the distance between the edge of habitat and the turbine by feeding tower height and blade length into a formula. This formula calculates a buffer distance between the turbine and the vegetation to achieve a 50m distance from blade-tip to habitat feature.

The formula is:  $b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$



At Crookwell 3:

bl (blade length) = 65m

hh (hub height) = 95m

If we assume the height of the remnant forest vegetation is approximately 15m:

fh (feature height) = 15m

Therefore, the distance between the edge of the habitat feature and the tower should be **82.6m**, if the tree canopy is at 15m.

If the canopy (fh) is 20m, the distance should be **87.2m**.

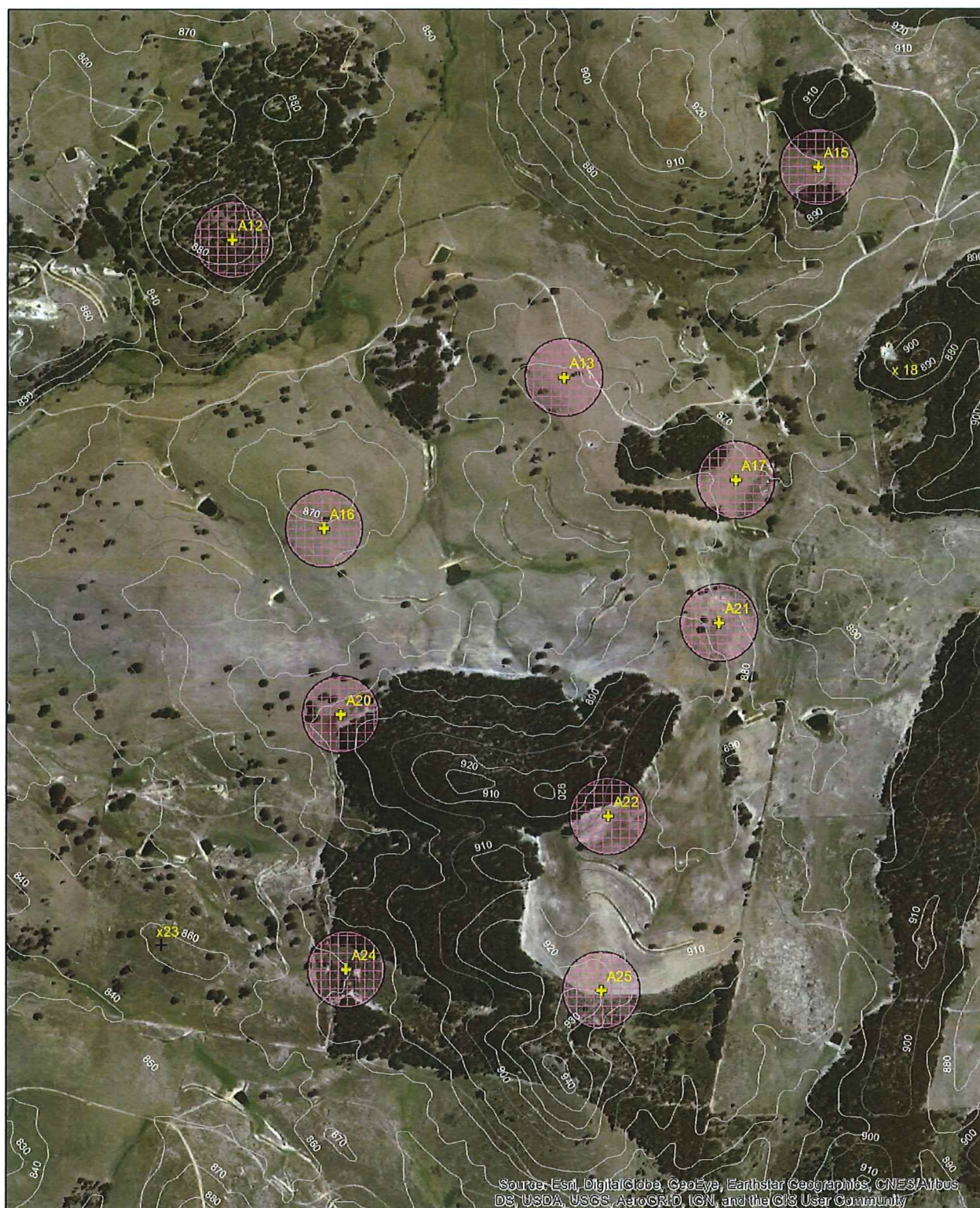
The attached **Map 1** shows the location of some of the turbines at Crookwell 3 Wind Farm, with buffers of 82.6m (pink) and 87m (black) – corresponding to approximate height of the vegetation of 15m and 20m (as above). Clearly several turbines are much closer than the recommended distance from remnant woodland edges. These areas present a high risk of collision for birds and bats.

The turbines to be used at Crookwell 3 have blades of 65m or a RSA diameter of 130m. The location of turbines A20, A22, A24 and A25 surrounding remnant hilltop forest increase the risk to birds and bats. Fauna flying out of the canopy on the hilltops will be at RSA. Map 1 shows the 10m contour lines to clarify this. Turbine A15 is also located at a low point between two small remnant patches of forest, posing a high risk to birds and bats. It is possible that the collision risk could be reduced by micro-siting turbines A15, A17, A20, A22, A24, A25 further from the vegetation and adhering to the recommended buffer distance.

The RSA extends down to 27m above the ground, posing a collision risk to lower flying birds and bats. The original turbine dimensions had a ground clearance of 46m (2016 Addendum Ecology Report). This lower clearance will potentially impact many more species.



Map 1



Crookwell 3 turbines

+ turbines

+ deleted

82.6m buffer

87m buffer

### Crookwell 3 Wind Farm proximity of turbines to remnant vegetation

0 200 400 metres



Office of  
Environment  
& Heritage



## ATTACHMENT 2 – summary of archaeological research at Crookwell 2 wind farm

The 2017 program of monitoring and salvage excavation at the adjacent Crookwell 2 wind farm provided important information about the location and significance of Aboriginal sites within this landscape. It also demonstrated that the test excavation method used in 2005 needs to be modified for future studies because it was too broad to accurately characterise the nature and significance of sites. Also, while some landforms were identified to be archaeologically sensitive, the monitoring and salvage program was still unable to identify why parts of some landforms had more significant sites than others.

In summary, research to date in the Crookwell area has established that:

- Ridge crests, lower, mid and upper slopes all have high archaeological potential;
- Surface artefacts do not reflect the subsurface potential of an area;
- 20m spacing of 50cm x 50cm test pits is too wide to identify significant sites;
- A low density of artefacts in a 50cm x 50cm test pit does not provide a good indication of the true density of artefacts at a site, or the significance of a site (Table 1).

| Site | Landform            | Artefact density using test excavation | Artefact density using monitoring and salvage |
|------|---------------------|----------------------------------------|-----------------------------------------------|
| PJ42 | Mid to lower slopes | 10                                     | 140                                           |
| PJ45 | Mid slopes          | 24                                     | 1933                                          |
| PJ49 | Ridge crest         | 16                                     | 160                                           |

*Table 1: Artefact densities identified through test excavations compared to monitoring and salvage excavations at Crookwell 2 wind farm.*

The results of archaeological investigations at Crookwell 2 wind farm have informed our recommendations for future excavations at Crookwell 3:

- A 2-staged excavation approach should be used to identify areas containing subsurface artefacts. These areas should then be subject to a program of salvage excavation to accurately characterise artefact density and site significance.
- Excavations should target landform types as well as locations of known sites. Research at Crookwell 2 focused on areas of moderate and high potential. Several areas predicted to be of moderate archaeological potential from test excavation were found to be high potential during monitoring and salvage. This demonstrates that the predictive model needs refining. An important part of this work will be to confirm through test and salvage excavation that areas predicted to be of low subsurface potential are in fact low potential.



## Department of Industry

OUT18/3424

Mr Iwan Davies  
Resource and Energy Assessments  
NSW Department of Planning and Environment

[iwan.davies@planning.nsw.gov.au](mailto:iwan.davies@planning.nsw.gov.au)

Dear Mr Davies

### **Crookwell 3 Wind Farm (SSD 6695) Comment on the Response to Submissions**

I refer to your email of 23 February 2018 to the Department of Industry in respect to the above matter. Comment has been sought from relevant branches of Lands & Water and Department of Primary Industries.

Any further referrals to Department of Industry can be sent by email to [landuse.enquiries@dpi.nsw.gov.au](mailto:landuse.enquiries@dpi.nsw.gov.au).

The department has reviewed the response to submissions and provides the following comments for consideration in assessment of the proposal.

#### **Water**

The RTS has not adequately addressed Lands & Water's recommendation to revise the project water demands and to confirm adequate water entitlements can be obtained for the project. This represents a commercial risk to the project. Additional approvals will be required under the *Water Management Act 2000* where new water supply works have not been assessed under this project approval or where existing works are not appropriately licensed.

#### **Crown land**

As well as consultation regarding the use of Crown roads the proponent will need to liaise with DoI Lands to authorise the power lines to the substation that traverse the Crown reserves.

Yours sincerely

Alison Collaros  
**A/Manager, Assessment Advice**  
14 March 2018



16 March 2018

Iwan Davies  
Senior Planner – Resource & Energy Assessment  
Department of Planning & Environment  
GPO Box 39  
SYDNEY NSW 2001

Emailed: Iwan.Davies@planning.nsw.gov.au

Your Reference: SSD 6695  
Our Reference: OUT18/4174

Dear Mr Davies

**Re: Crookwell 3 Wind Farm – SSD 6695 – Response To Submissions**

Thank you for the opportunity to provide advice on the above matter. This is a response from the NSW Department of Planning & Environment – Division of Resources & Geoscience (DRG), Geological Survey of New South Wales (GSNSW).

GSNSW has reviewed the Response to Submissions (RTS) dated 14 February 2018 for the Crookwell 3 Wind Farm (SSD 6695) and has no resource sterilisation concerns at this stage of the project.

GSNSW requests to be consulted in relation to the proposed location of any biodiversity offset areas (both on and off site) or any supplementary biodiversity measures to ensure there is no consequent reduction in access to prospective land for mineral exploration, or potential for sterilisation of mineral resources.

Should the project be approved, GSNSW request to be consulted in relation to any proposed Conditions of Consent.

**Geoscience Information Services**

The GSNSW has a range of online data related to mineral exploration, land use and general geoscience topics:

<http://www.resources.nsw.gov.au/geological/online-services>

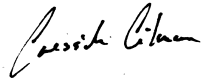
The location of current exploration and mining titles in NSW, explanations of mining and production titles and the roles of community and government in the decision making process for mining/resource projects may be accessed by the general public using the following online utilities:

<http://commonground.nsw.gov.au>

<https://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/geoscience-information/services/online-services/minview>

Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the GSNSW Land Use team at [landuse.minerals@industry.nsw.gov.au](mailto:landuse.minerals@industry.nsw.gov.au).

Yours sincerely

A handwritten signature in black ink, appearing to read 'Cressida Gilmore', written in a cursive style.

Cressida Gilmore  
Manager - Land Use





Goulburn Mulwaree Council  
Locked Bag 22  
Goulburn NSW 2580

Civic Centre  
184 - 194 Bourke Street  
Goulburn NSW 2580  
t (02) 4823 4444  
e [council@goulburn.nsw.gov.au](mailto:council@goulburn.nsw.gov.au)  
[www.goulburn.nsw.gov.au](http://www.goulburn.nsw.gov.au)

3 May 2018

Your Ref: SSD 6695

Iwan Davies  
Senior Environmental Assessment Officer  
Resource and Energy Assessments  
Department of Planning and Environment  
GPO Box 39  
SYDNEY NSW 2001

Dear Iwan

**Subject: Submission to Crookwell 3 Wind Farm (Your Ref: SSD 6695)**

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In response to correspondence received by email on 3 May 2018, please be advised that Goulburn Mulwaree Council does not object to the use of the approved heavy transport corridor on state roads for heavy haulage traffic or the use of the alternate route previously supported by Council for over-dimensional vehicles.

Use of other local roads for the construction of heavy vehicle movement such as gravel and concrete haulage for the project should be subject to a condition assessment prior to works commencing and any repairs undertaken at the completion of construction works.

I can be contacted on (02) 48 234 480 if you would like to discuss further.

Yours sincerely

A handwritten signature in blue ink, appearing to read "S.M.", is placed below the "Yours sincerely" text.

Scott Martin  
**Acting Director, Growth Strategy & Culture**

Hi Iwan,

I refer to your request for an Airservices assessment of the Crookwell 3 Wind Farm in NSW.

**Airspace Procedures**

With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Document 9905, at a maximum height of 1090m (3577ft) AHD the Crookwell 3 Wind Farm will not affect any sector or circling altitude, nor any instrument approach or departure procedure at Goulburn Airport.

Note that procedures not designed by Airservices at Goulburn Airport were not considered in this assessment.

**Communications/Navigation/Surveillance (CNS) Facilities**

This proposal for a wind farm as detailed in the AIS will not adversely impact the performance of any Airservices Precision/Non-Precision Nav Aids, Anemometers, HF/VHF/UHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links

Regards,

**Tony Aiezza**

**Senior Advisor Airport Development**

Airservices Australia

Tower Road, Melbourne Airport

Tullamarine VIC 3043

t 02 6268 4331 | m 0409 143 120