Our reference: DOC16/504288-02; EF16/308
Contact: Sharon Peters

Ms Elle Donnelly
Planning Services
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

17 November 2016

Dear Ms Donnelly

Re: Crookwell 3 Wind Farm Addendum Environmental Impact Statement (SSD 6695, MP10_0034)

I refer to your email dated 7 October 2016, requesting comments the NSW Environment Protection Authority (EPA) on an amendment to the development application for Crookwell 3 Wind Farm (SSD 6695). Crookwell Development Pty Ltd ('the Proponent') seeks to amend the development application by reducing the number of wind turbines, relocating turbine A24, realign an access track and increase the turbine envelope to allow for newer turbine models which have the potential for greater energy yields than the current proposed models.

The EPA previously reviewed and commented on the proposed Crookwell 3 Wind Farm in 2013. Our previous comments and recommendations, other than those relating to noise and blasting issues, as detailed in our letters of 13 February 2013 and 11 March 2014 stand. We have provided amended comment and recommended conditions relating to noise and blasting issues in this letter.

We have reviewed the supporting documentation provided, including an Addendum Environmental Impact Statement (Addendum Report) prepared by Mecone and dated 29 September 2016. The Addendum Report includes a revised noise assessment (NIA) undertaken by SLR Consulting Pty Ltd, which addressed cumulative operational noise impacts for both Crookwell 2 and Crookwell 3 wind farm proposals.

The NIA concludes that the proposal can be constructed and operated to achieve compliance with noise limits at all sensitive receptors using a mitigated layout where some wind turbines are operated in Noise Management Mode. Please refer to **Attachment A** for further detail in relation to the EPA's review and comments on the modified application. The EPA advises it could issue an Environment Protection Licence for the operation of the Crookwell 3 wind farm subject to recommended noise limits provided in **Attachment B** to this letter and requests these be formalised as conditions of any approval.

The supporting documentation provided does not specifically identify whether the construction of both projects will occur simultaneously or independent of each other. The traffic/materials delivery route is essentially the same for both projects, however the NIA has not taken into consideration the potential for cumulative noise generated during the construction phase from sources including traffic noise, construction works or any potential blasting activities.

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Large scale wind farms that have a capacity for generating more than 30 megawatts of electricity and/or approved as a major project require an Environment Protection Licence under the *Protection of the Environment Operations Act* 1997 for both the construction and operational phases. The EPA notes that should this development application be approved, the applicant will need to apply for a Licence for the prior to commencement of construction activities.

If you have any queries or wish to discuss this matter further, please contact Julian Thompson on (02) 6229 7002.

Yours sincerely

JULIAN THOMPSON
Unit Head, South East Region
Environment Protection Authority

ATTACHMENT A

NSW EPA comments on Crookwell 3 Wind Farm Project Amendments – November 2016

The EPA notes that the proponent has submitted a concurrent development application to modify the project approval for Crookwell 2 Wind Farm. Given the close proximity of the Crookwell 1, 2, and 3 Wind Farms, the Noise Impact Assessment (NIA) assesses the cumulative operational noise impacts, uses the same input and model data, and the reports themselves are largely identical.

The NIA predicted that some receivers would be impacted, however, found that compliance at all receptors could be achieved using a mitigated layout where some turbines are operated in Noise Management Mode (NMM). The assessment suggested that NMM can be used on selected wind turbines to enable otherwise non-compliant turbine models to meet the noise criteria. It further stated that NMM would mean those turbines always operate in a low noise mode, as opposed to sector management which turns certain turbines off depending on wind directions.

During its review the EPA noted the following inconsistencies in relation to sensitive receiver locations which should be reviewed by the proponent and DPE prior to granting approval. The EPA compared the coordinates given in the Noise Impact Assessment with available aerial and satellite imagery and topographic maps, and noted that some receiver locations appear up to 1500 metres from their 'true' locations, for example:

- R32 which is near a gate, about 250 metres west of the nearest house;
- R38 which is in the middle of a public road;
- R56 "Mathlie", which is actually about 500 metres north, according to Google Maps, SIX Maps (3 November 2016) and the topographic map;
- R77 "Bellevue Park" which is in a public road reserve, about 340 metres east of the house marked "Bellevue" on SIX Maps (3 November 2016) and the topographic map;
- R97 which has the same coordinates as R98;
- R125 which is about 190 metres south east of a house marked "Wulcuru" on SIX Maps (3 November 2016) and the topographic map;
- R133 "Lake Edward" which is about 1500 metres NNW of the homestead marked as "Lake Edward" on SIX Maps (3 November 2016) and the topographic map.

Recommendation: The Proponent check and confirm the exact location of each identified receiver and quantify any resulting change to modelled noise levels.

The EPA is supportive of the approach to use noise management mode in certain turbines to achive noise limits, however, based on the information provided, and prior to granting approval, the EPA recommends DPE should:

- Require the proponent to:
  - check and confirm the exact location of each identified sensitive receiver
  - quantify the impact of any change of location on modelled noise levels in the NIA
- Confirm that sector management, if needed, is a viable (technical and financial) option for noise mitigation for the project should measure noise levels not meet predictions in the NIA.

Recommendation: Department of Planning and Environment should confirm with the proponent that sector management, if needed, is a viable technical and financial option.

ATTACHMENT B

NSW EPA Recommended conditions for noise and blasting – Crookwell 3 Wind Farm

Noise Limit Conditions

L6.1 For wind speeds from cut in to rated power of the wind turbine generators, wind turbine noise generated from the premises must not exceed the greater of:

a) 35 dBA or
b) the existing background noise level plus 5 dBA for each integer wind speed at 10 metres above ground level at the wind farm site

at the nearest non-involved residential receivers.

L6.2 For the purpose of determining compliance with condition L6.1, the locations and noise limits in the table below apply. The locations referred to in the table below are defined in condition L6.4.

Location	**$L_{eq(10minute)}$ NOISE LIMITS (dBA)**									
Integer wind speed (m/s) at hub height	**3 or less**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12 or more**
R1, R8	35	35	35	35	35	35	36	38	41	45
R19	35	35	35	35	35	35	37	38	41	43
R117, R119	35	35	35	35	35	35	36	38	41	43
R58, R59	35	35	35	35	35	36	38	39	41	42
R60, R61, R62	35	35	35	35	35	36	38	40	43	45
R64, R65	35	35	35	35	35	38	41	43	46	48
R66, R67	35	35	35	35	35	35	35	37	39	41
R69, R70	35	35	35	35	35	35	38	40	44	46
R71, R73	35	35	35	35	35	37	40	42	45	48
R63	35	35	35	37	39	41	43	45	47	48
R106	37	38	39	40	42	44	45	47	49	51

L6.3 The noise limits specified in conditions L6.1 and L6.2 do not apply to any sensitive receiver location (residence) where a noise agreement is in place between the licensee and the respective land owner(s) in respect to noise impacts and/or noise limits.

Drafting Note: The Proponent should confirm the names and grid references of all assessed receivers, particularly those marked with superscripts "a" to "c".

L6.4 For the purpose of condition L6.1, locations are defined in the table below. Grid references (eastings and northings) refer to the Map Grid of Australia 1994 (MGA94), zone 55.

Location	**Name**	**Easting (m)**	**Northing (m)**
R1[a]	Evermore	731647	6172983
R8	Narangi	733838	6172296
R19	Wombat Hollow	735698	6171835
R58		741473	6171450
R59	Glenyarren[b]	741415	6171733
R60	Pejar Park	740389	6172231
R61	Wallaroobie	741369	6171908
R62	Cottonwood	741337	6172055
R63	Rocky Corner	741181	6173622
R64	Valarnam Hill[c]	740395	6174100
R65[d]	Windalee	740315	6174217

Location	Name	Easting (m)	Northing (m)
R66	Little Vale 1	743524	6174343
R67	Little Vale 2	743724	6174675
R69	Atholvale	740191	6175752
R70	Snowgum	739339	6175736
R71	Lynross	739396	6176926
R73	Highlands	739184	6177867
R106	Rosedale	742598	6176726
R117	Rainmore House DA1	735603	6172925
R119	Rainmore House DA3	734950	6172706

a. EPA could not verify these locations. The coordinates given in the noise impact assessment were more than 20 metres from the nearest house in EPA aerial imagery.
b. This house was not named in the noise impact assessment, but was named on the topographic map.
c. This name was taken from the topographic map, and is different to the name in the noise impact assessment.

L6.5 For the purpose of condition L6.1, noise must be determined in accordance with the methodology in the *Environmental Noise Guidelines: Wind Farms* (SA EPA, 2003). The modification factors in Section 4 of those guidelines must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L6.6 For the purpose of condition L6.5, the presence of excessive tonality (a special noise characteristic) must be determined in accordance with ISO 1996.2:2007 *Acoustics - Description, measurement and assessment of environmental noise - Determination of environmental noise levels*.

If tonality is found to be a repeated characteristic of the wind turbine noise, 5 dBA should be added to measured noise level from the wind farm. If tonality is only identified for certain wind directions and speeds, the penalty is only applicable under these conditions.

The tonal characteristic penalty applies only if the tone from the wind turbine is audible at the relevant receiver. Absence of tone in noise emissions measured at an intermediate location is sufficient proof that the tone at the receiver is not associated with the wind farm's operation.

The assessment for tonality should only be made for frequencies of concern from 25 Hz to 10 kHz and for sound pressure levels above the threshold of hearing (as defined in ISO 389.7:2005 *Acoustics - Reference zero for the calibration of audiometric equipment - Part 7: Reference threshold of hearing under free-field and diffuse-field listening conditions*.

The maximum penalty to be added to the measured noise level from the wind farm for any special noise characteristic individually or cumulatively is 5 dB(A).

L6.7 For the purposes of conditions L6.1 and L6.2, wind speed is to be measured directly in accordance with a method nominated by the proponent and at a location nominated by the proponent, consistent with the method and location used to determine the background noise regression curves in the Noise Impact Assessment.

Drafting Note: The Proponent should nominate the location and method for wind speed monitoring in condition L6.7.

L6.8 To determine compliance:

a) with the $L_{eq(10\ minute)}$ noise limits in conditions L6.1 and L6.2, the noise measurement equipment must be located:
    - approximately on the property boundary, where any dwelling is situated 20 metres or less from the property boundary closest to the premises; or

- within 20 metres of a dwelling façade, but not closer than 5m, where any dwelling on the property is situated more than 20 metres from the property boundary closest to the premises.

b) with the noise limits in conditions L6.1 and L6.2, the noise measurement equipment must be located:
   - at the most affected point at a location where there is no dwelling at the location; or
   - at the most affected point within an area at a location prescribed by condition L6.8(a).

L6.9 A non-compliance with conditions L6.1 or L6.2 will still occur where noise generated from the premises in excess of the appropriate noise limit is measured:

- at a location other than an area prescribed by conditions L6.1 (a) and L6.2(b); and/or
- at a point other than the most affected point at a location.

Blasting Conditions

L7.1 The airblast overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L7.2 The airblast overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L7.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L7.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L7.5 Blasting at the premises may only take place between 9:00am-5:00pm Monday to Friday. Blasting is not permitted on public holidays.

L7.6 Blasting outside of the hours specified in L7.5 can only take place with the written approval of the EPA.

L7.7 The airblast overpressure and ground vibration levels in conditions L7.1 to L7.4 do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

Additions to definition of terms

- Noise - sound pressure levels' for the purposes of conditions L6.1 to L6.7.
- "Noise sensitive locations" includes buildings used as a residence, hospital, school, child care centre, places of public worship and nursing homes. A noise sensitive location includes the land within 30 metres of the building.

OTHER RECOMMENDED CONDITIONS

Pre-commissioning validation monitoring

If any wind turbine is operated before the project is commissioned, then the proponent must perform a type test on each one of those turbines within three months of it coming in to operation. The type test must be performed in accordance with the IEC 61400-11 standard.

Mode checking

Before using sector management or a noise management mode for any operational wind turbine, the proponent must provide a method by which the Department of Planning and Environment, EPA and community can easily verify that each wind turbine is operating in the correct mode at any time.

Revised NIA

The proponent must prepare a revised noise impact assessment, for the final chosen turbine model and layout, prior to commissioning the wind turbines. The revised assessment must demonstrate, through appropriate modelling and in accordance with the *Environmental Noise Guidelines: Wind Farms* (SA EPA, 2003), that the final turbine model and layout can meet the limits in this approval.

Noise Management Plan

Prior to commissioning of the wind turbines, the proponent must prepare and implement a Noise Management Plan to manage noise emissions from the operation of the project. Such as plan must include, but need not be limited to:

a) Noise compliance monitoring within one year of commissioning, in accordance with the *Environmental Noise Guidelines: Wind Farms* (SA EPA, 2003)
b) procedures to certify noise
c) identification and implementation of best practice management techniques for minimisation of noise emissions where reasonable and feasible
d) measures to be undertaken to rectify annoying noise characteristics resulting from the operation of the project such as infrasound, tonality or adverse mechanical noise from component failure
e) procedures and corrective actions to be undertaken if non-compliance with noise limits is detected.

Recommended Construction Hours

Construction must only take place within the hours of 7:00am to 6:00pm Monday to Friday, 8:00am to 1:00pm Saturday. No construction may take place on Sundays or Public Holidays.

Exceptions to construction hours

The following activities may be carried out outside the recommended construction hours:

a) construction that causes $L_{Aeq(15minute)}$ noise levels that are:
    i. no more than 5dB above Rating Background Level at any residence in accordance with the *Interim Construction Noise Guideline* (DECC, 2009); and
    ii. no more than the Noise Management Levels specified in Table 3 of the *Interim Construction Noise Guideline* (DECC, 2009) at other sensitive land uses; or
b) for the delivery of materials required by the police or other authorities for safety reasons; or
c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
d) as approved through a process outlined in any project approval.

Variation of construction hours

The hours of construction may be varied with the prior written approval from the EPA. Any request to alter the hours of construction shall be:

a) considered on a case-by-case or activity-specific basis
b) accompanied by details of the nature and justification for activities to be conducted during the varied construction hours
c) accompanied by written evidence that appropriate consultation with potentially affected sensitive receivers and notification of relevant Council(s) (and other relevant agencies) has been and will be undertaken
d) all feasible and reasonable noise mitigation measures have been put in place
e) accompanied by a noise impact assessment consistent with the requirements of the *Interim Construction Noise Guideline* (DECCW, 2009).

Construction Noise Management Plan

The proponent must prepare and implement a detailed construction noise management plan, prior to commencement of construction activities, including but not necessarily limited to:

a) identification of each work area, site compound and access route (both private and public)
b) identification of the specific activities that will be carried out and associated noise sources at the premises and access routes
c) identification of all potentially affected sensitive receivers
d) the construction noise and vibration objectives identified in accordance with the *Interim Construction Noise Guideline* and *Assessing Vibration: A Technical Guideline*
e) assessment of potential noise and vibration from the proposed construction methods (including noise from construction traffic) against the objectives identified in (d)
f) where the objectives are predicted to be exceeded an analysis of feasible and reasonable noise mitigation measures that can be implemented to reduce construction noise impacts
g) description of management methods and procedures and specific noise mitigation treatments that will be implemented to control noise and vibration during construction, including the early erection of operational noise control barriers.