

8 May 2014

WM Project Number: 14201  
Our Ref: [Click here to insert]  
Email: jeff.parnell@planning.nsw.gov.au

Mr Jeff Parnell  
NSW Department of Planning & Environment  
GPO Box 39  
SYDNEY NSW 2001

Dear Jeff

**Re: Gullen Range Wind Farm - Modification of the Project Approval - Technical Review**

The Department of Planning and Environment (DPE) has requested that Wilkinson Murray Pty Ltd (WMPL) provide expert noise advice with respect to the Gullen Range Wind Farm, Modification of the Project Approval.

The Gullen Range Wind Farm was approved by the NSW Land and Environment Court (L&EC) on the 4th of August, 2010, following assessment under Part 3A of the NSW Environment Planning and Assessment Act 1979 (EP&A Act).

The proponent of the Gullen Range Wind Farm is proposing to relocate some of their wind turbines from the original environmental assessment layout to maximise wind yield and wake loss; localised engineering and topographic constraints; avoidance of visual impacts; and avoidance of localised flora and fauna impacts. This detail design process of relocating wind turbines to optimum positions is generally referred to as micro-siting.

The proponent of the Gullen Range Wind Farm has requested a modification of the Project Approval to allow a new turbine layout. A modification consistency report with supporting documentation has been provided to DPE to request the modification of the Project Approval.

WMPL was provided the following documents:

- 1) Consistency Review, Changes to Turbine Layout: Gullen Range Wind Farm, ngh Environmental, 17 December 2013;

A consistency review examining the environmental issues that could be affected as a result of the changes to the turbine layout, with reference to L&EC conditions and the Environmental Assessment and supporting documents.

- 2) Gullen Range Wind Farm Revised Noise Impact Assessment Marshall Day Acoustics (MDA) (Rp 002 R03 2012154SY, 25 September 2013);

A detailed noise impact assessment for the Final Design Layout is documented in Marshall Day report Rp002 r03 2012154SY Gullen Range Wind Farm Revised Noise Impact Assessment dated 25 September 2013. The noise assessment concludes that predicted noise from the wind farm achieves compliance with the relevant noise limits at all of the assessed receivers.

- 3) Gullen Range Wind Farm Modification of the Project Approval MDA (RP 003 2012154SY, 25 March 2014).

A noise assessment reviewing the difference in predicted noise levels between the approved layout and the final design layout, to support the modification application.

- 4) Review of Noise Impact Assessment Documents – Gullen Range Wind Farm Modification 1 (Jeff Parnell, 7 May 2014).

The DPE's review of noise impacts from the modification of the turbine layout conducted by their noise specialist, Jeff Parnell.

### THE PROPOSED PROJECT MODIFICATION

The Gullen Range Wind Farm consists of 73 turbines. There are 47 identified non-associated receivers within 2 kilometres of the wind turbines. The turbines are a combination of Goldwind GW82 and GW100 turbines. It is proposed that 69 of the wind turbines be relocated. Of the 69 wind turbines that are proposed to be relocated, 17 are proposed to move less than or equal to 10 metres and 22 were moved more than 50 metres. The largest movement in a wind turbine is 187m for turbine BAN\_08.

### NOISE ASPECTS WITH REGARD TO THE MODIFICATION

Wilkinson Murray has reviewed all the documentation described above. The MDA noise assessment to support the modification has provided the difference in predicted noise levels, between the approved layout and the proposed modified layout, at each of the 47 identified non-associated receivers for a range of hub height wind speeds between 3m/s to 12m/s. A summary of the difference in predicted noise levels for 9m/s hub height speed is presented in Table 1, below. 9m/s hub height noise predictions are typically the worst case noise predictions.

**Table 1 MDA Noise level difference between approved turbine layout and the proposed modified layout (Hub height wind speed of 9m/s).**

ID	MDA Difference	ID	MDA Difference
K1	0	B31	0.1
K14	-0.1	B32	0.1
K18	0	B5	0
K19	0.1	B54	0.1
K2	0.1	B55	0.3
K20	0.1	B7	0
K3	0	B77	0.4
K4	0.2	PW29	-0.1
B10	0	PW34	0.1
B11	0	PW4	0
B12	-0.1	PW8	0
B124	0.1	PW9	0
B13	0	G26	0
B14	0	G28	0
B17	0	G31	-0.1
B19	0	G32	0.1

ID	MDA Difference	ID	MDA Difference
B21	0	G33	0.1
B22	0	G35	0.1
B23	0	G36	0
B24	0	G38	0
B26	-0.1	G39	0
B28	0.2	G40	0
B29	0.3	G43	0.1
B30	0.1		

The MDA report concludes "*In the context of the difference in layouts reviewed, changes in predicted noise level of this magnitude are not considered to be significant*".

Wilkinson Murray has conducted noise modelling using the CADNA A model for the approved and proposed turbine layout using the information in the reports presented above to verify the presented difference noise levels. Table 2 presents the results of the MDA difference noise levels and those predicted by WMPL. It is noted that it was possible to conduct this independent review based on publicly available information presented in the MDA report without the need for any other external requests or external information.

**Table 2 Comparison of MDA noise level differences and WMPL noise level differences (Hub height wind speed of 9m/s).**

ID	MDA Difference	WMPL Difference
K1	0	-0.1
K14	-0.1	-0.1
K18	0	0
K19	0.1	0
K2	0.1	0
K20	0.1	0
K3	0	-0.1
K4	0.2	0.3
B10	0	0
B11	0	0
B12	-0.1	-0.2
B124	0.1	0.1
B13	0	-0.1
B14	0	-0.1
B17	0	0
B19	0	0
B21	0	0
B22	0	0
B23	0	0
B24	0	0
B26	-0.1	-0.1
B28	0.2	0.2
B29	0.3	0.3
B30	0.1	0.1
B31	0.1	0.1

ID	MDA Difference	WMPL Difference
B32	0.1	0.1
B5	0	0
B54	0.1	0
B55	0.3	0.2
B7	0	0
B77	0.4	0.3
PW29	-0.1	-0.1
PW34	0.1	0.2
PW4	0	0
PW8	0	0
PW9	0	0
G26	0	0
G28	0	0
G31	-0.1	-0.1
G32	0.1	0.1
G33	0.1	0
G35	0.1	0
G36	0	0.1
G38	0	0
G39	0	0
G40	0	0.1
G43	0.1	0

The noise level difference predictions conducted by MDA and WMPL are very similar. Of the 47 receivers assessed, 25 receivers were exactly the same. All receivers were within 0.1 dB indicating a very good correlation.

It is WMPL's opinion that the proposed relocation of the wind turbines result in an insignificant increase in noise level and that the wind turbine noise from the Gullen Range Wind Farm would be capable of meeting the noise criteria in the Approval.

#### **REVIEW OF NOISE IMPACT ASSESSMENT DOCUMENTS – GULLEN RANGE WIND FARM MODIFICATION 1 (JEFF PARNELL, 7 MAY 2014)**

The DPE's review of noise impacts from the modification of the turbine layout conducted by their noise specialist, Jeff Parnell concludes *"that compliance with approved criteria is achievable at all non-associated residential properties and based on information supplied, there is no reason to believe that the project is not capable of meeting the noise goals established by the approval."*

WMPL supports the conclusion of the DPE review and the reasons that support the conclusions.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully

**WILKINSON MURRAY**

A handwritten signature in black ink, appearing to read "J Wassermann". The signature is written in a cursive style with a large initial "J".

**John Wassermann**

Director