

Coopers Gap Draft Updated Acoustic Report

Rhys Brown

July, 2012

AECOM

Agenda

- Discuss the CID process to date and the Noise and Vibration assessment
- Highlight feedback received on the Noise and Vibration Chapter
- Discuss the changes to the Noise and Vibration assessment contained in the Draft Updated Acoustic Report
- Questions and Discussion

Coopers Gap July 20, 2012 Page 2

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Agenda

The Community Infrastructure Designation Process

- 1** Prepare initial assessment report.
- 2 First public submission period**
Comment on the initial assessment report was invited from 24 March – 21 April 2011.
- 3 WE ARE HERE**
AGL to address submissions and prepare Revised Assessment Report.
- 4 Second public submission period**
Revised assessment report available for public comment, dates to be confirmed.
- 5** AGL to address submissions and prepare final assessment report.
- 6** Final assessment report forwarded to Minister for decision on designation.

Coopers Gap July 20, 2012 Page 3

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Draft Updated Acoustic Report

- The Initial Assessment Report (IAR) was issued 24 March 2011. Chapter 14 contained the Noise and Vibration Assessment
- Following the comments received on the IAR additional work has been undertaken on the Acoustic Report
- On 6 June 2012 a Draft Updated Acoustic Report was issued for comments and discussion
- This presentation is a summary of some of the key updates

Coopers Gap July 20, 2012 Page 4

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Submissions Received

- As part of the CID process, submissions were received on the IAR from a number of parties:
 - Community members
 - Local councils
 - Agency reference groups, such as DERM
- 31 submissions received
- 8 from State and Local Government Agencies or representatives
- 20 of the 31 submissions made a comment on noise

Coopers Gap July 20, 2012 Page 5

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Summary of submissions received

- As part of the process a number of submissions were received relating to noise and vibration

Community	Local Councils	DERM
The project should comply with Queensland noise legislation	The area should be reviewed for the purposes of setting noise criteria	Report to demonstrate compliance with QLD legislation during construction and operational phases
Infrasound will cause issues	More representative locations of background noise monitoring should have been chosen	Describe environmental values affected by noise and vibration from the project
Base criterion of 40 dB(A) is too high	Liaison with DERM should be undertaken to determine appropriate noise conditions	Discuss background noise calculation methodology
The area should be considered as 'rural living' or 'high amenity' for the purposes of setting noise criteria	The project should look to comply with EPP(Noise)	SPP 5/10 Air Noise and Hazardous Materials
More locations of background noise monitoring should be taken		Noise impacts to Conservation Estate
Noise modelling needs to be accurate		

Coopers Gap July 20, 2012 Page 6

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Summary of report updates

- The following slides outline a summary of the key report updates in response to the submissions received
- A summary of the submission(s) are shown in *italics* at the top of some slides
- It is noted that this report is a Draft Updated Acoustic Report - It has been issued for information at this stage of the project
- The report has been prepared in accordance with AECOM's Quality Management System
- As part of the CID process, further opportunity exists to provide formal comment

Description of Environmental Values (Section 2.1)

Describe environmental values affected by noise and vibration from the project

- The updated IAR has included additional information on the existing environmental values potentially affected by noise and vibration from the wind farm
- Additional background noise measurements have since been undertaken during the winter period to obtain more data points
- Bunya Mountains National Park has been included as a sensitive receiver and included in the noise forecasts

Operational Noise Assessment (Section 2.2)

Report to show compliance with QLD legislation during construction and operational phases

- Queensland does not yet have specific legislation or guidelines related to wind farm noise
- The assessment and associated criteria proposed in the Draft Updated Acoustic Report is based on the South Australian EPA *Wind farms environmental noise guidelines* (SA 2009), additional information has been provided on the application of the guideline
- The SA2009 wind farm guidelines are the most developed in Australia and one of the only States with a completed guideline. They are based on World Health Organization guidelines

Operational Noise Assessment (Section 2.2)

Consider the possibility of tonal emissions from the wind farm

- A section has been added proposing a penalty for tonality to be included in the conditions should audible tones be detected during the operation of the wind farm
- This is based on a tonal audibility of zero, which has been proposed by the SA EPA. This criteria for tonality is more stringent than that applied in NZS6808

Queensland Legislation and Guidelines (Section 2.2.2)

Report to show compliance with QLD legislation during construction and operational phases

- The following QLD legislation and guidelines are discussed in the Draft Updated Acoustic Report and guidance is taken from them:
 - Queensland Environmental Protection (Noise) Policy 2008 (EPP (Noise)) under the Environment Protection Act 1994
 - The DERM Guideline *Planning for noise control (PFNC)*
 - The Draft DERM Guideline *ECOACCESS Guideline for the Assessment of Low Frequency Noise*

Queensland Legislation and Guidelines (Section 2.2.2)

Report to show compliance with QLD legislation during construction and operational phases

- Section 2.2.2 of the report provides a detailed comparison with the previous documents:
 - Highlights consistencies with the sections of legislation and guideline documents listed above (e.g. base noise criteria)
 - Outlines areas where parts of the QLD documents are not applicable (e.g. measurement of background noise levels)
 - Shows that the assessment does not contradict the current methods of the assessment of industrial noise in Queensland.

Environmental Protection (Noise) Policy 2008

Sensitive Receptor	Time of Day	Acoustic Quality Objectives (measured at the receptor, dB(A))			Environmental Value
		Day, at night	Even, at night	Night, at night	
Dwelling (Outdoors)	Daytime and Evening	50	35	45	Health and wellbeing
	Daytime and Evening	35	40	45	Health and wellbeing
Dwelling (Indoors)	Night	30	35	40	Health, wellbeing, sleep

The "Explanatory Notes for SL 2008 No. 442" for the Environmental Protection (Noise) Policy 2008 states that:

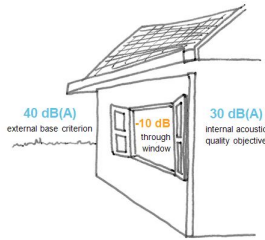
The acoustic quality objectives are not point source noise levels but rather inform what the point source noise level as a condition of approval for a particular activity at a site may be.

Environmental Protection (Noise) Policy 2008

QLD EPP(Noise) - Acoustic quality objectives	SA2009 Base Criterion	Comparison
Daytime – 50dB(A) for outdoors	40 dB(A) outdoors	Quality objective achieved by 40 dB(A) base criterion
Evening – 35dB(A) for indoors	40 dB(A) outdoors	Internal quality objective achieved when applying a typical reduction of 10 dB across a facade containing an open or partially open window
Night time – 30dB(A) for indoors	40 dB(A) outdoors	Internal quality objective achieved when applying a typical reduction of 10 dB across a facade containing an open or partially open window

Noise reduction of a façade with open windows

- When sound hits a façade, the energy is either transmitted into the house, absorbed by the building or reflected back towards the source
- The World Health Organization provides an estimate of a 15dB reduction from outside to inside with a partly open window



Noise reduction of a façade with open windows

- Undertook a detailed literature review of studies into the noise reduction of a façade with open windows
- Consistently showed that the assumption of a 10 dB(A) reduction for an open or partially open window is an appropriate assumption for a majority of dwellings
- A recent study by a Brisbane acoustic consultancy showed that:
 - For all dwellings tested with an open area of 10% of the façade or less, the reduction was greater than 10 dB(A)
 - There was no correlation between dwelling construction and noise reduction
- Appendix I discusses façade reduction further

Planning for Noise Control

- The methods and procedures described in the guideline are typically used for setting conditions relating to steady-state (constant) noise emitted from industrial premises
- Stead-state refers to industry that can operate 24-hours a day under all weather conditions
- Specific Noise Level based on background noise. Method of background noise monitoring in Planning for Noise Control excludes measurements above 10 kilometres per hour and does not consider different background noise under different wind conditions

Planning for Noise Control

- Maximum Planning Noise Levels defined for the setting of long term criteria
- The category that best defines the area surrounding Coopers Gap is the Z2 noise area category in Table 3 of PFNC described as 'Negligible transportation. Less than 80 vehicles an hour'

Noise area category	Description of neighbourhood	Maximum hourly sound pressure level, $L_{Aeq,1hr}$ (PNL)		
		Day	Evening	Night
Z2	Medium density transportation (less than 80 vehicles an hour) or some commerce or industry.	50	45	40

Extract of Z2 category description and noise levels taken from Planning for Noise Control

SPP 5/10 Air Noise and Hazardous Materials

Report to show compliance with QLD legislation during construction and operational phases

- SPP 5/10 is applicable for assessing the impacts of sensitive land uses (like houses) that encroach on industrial land uses
- Discussion on SPP 5/10 and its applicability and guidance provided has been added to the criteria section (Section 2.2.2)
- References EPP(Noise) which is consistent with what has been undertaken for the noise assessment

Conservation Estates and National Parks (Section 2.3)

- Report updated to include Bunya Mountains National Park as a sensitive receiver
- Recommended outdoor background noise level for Passive recreation area taken from Planning for Noise Control and adopted as criteria for the National Park and added to the report

Low Frequency Noise (Section 2.4)

Report to discuss Low Frequency Noise and Infrasound

- The SA2009 Wind Farms Environmental Noise Guidelines do not require specific assessment of low frequency noise
- Table 5 in the Draft Updated Acoustic Report shows a summary of Low Frequency Requirements of various states of Australia for wind farms
- Only Tasmania requires specific assessment of low frequency noise

Low Frequency Noise (Section 2.4)

Report to discuss Low Frequency Noise and Infrasound

- The following guidelines were reviewed:
 - National Wind Farm Development Guidelines Draft (July 2010)
 - Australian Standard AS4959-2010
 - SA EPA Windfarms Environmental Noise Guidelines
 - Victoria (New Zealand Standard)
- None require specific assessment of Low Frequency Noise as this is already considered in the assessment of overall noise

Low Frequency Noise (Section 2.4)

Report to discuss Low Frequency Noise and Infrasound

- In the Draft Updated Acoustic Report, we have proposed for low frequency criteria used recently by DERM to condition Coal Seam Gas operations
- The Draft NSW Wind Farm Planning Guidelines also recommend 60 dB(C) at night-time as an appropriate Low Frequency Noise limit

Infrasound (Section 2.4)

- Criteria for infrasound proposed for Coopers Gap is based on a range of studies which have recommended this criterion

Receiver	Infrasound Criteria dB(G)		
	Day	Evening	Night
Dwellings and commercial places	65	65	65

Infrastructure associated with the wind farm (Section 2.5)

- Infrasound associated with the wind farm required to be assessed separately for environmental noise emission and comply with relevant criteria
- Additional work required at that stage to assess cumulative noise levels from both the turbines and the associated infrastructure

Background Noise Assessment (Section 3.0)

- Additional background noise monitoring has been undertaken since the issue of the IAR
- This monitoring was used to determine background noise level compared with wind speed
- Results have been provided in the Draft Updated Acoustic Report
- The results have been used to both set criteria and to achieve the number of data points required to undertake compliance measurements at these locations

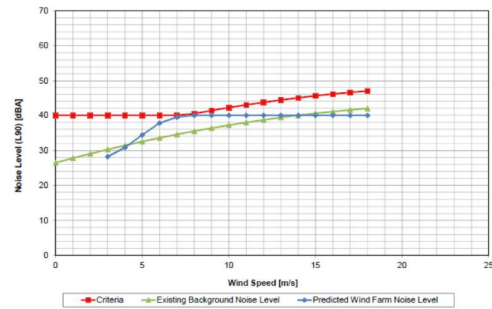
Noise model overview (Section 4.1)

Noise modelling needs to be more accurate

- Additional discussion provided regarding the modelling methodology. The methodology used has been shown to typically be conservative through measurements at Australian wind farms and results were published in two technical papers.
- A section added discussion noise emission of turbines as a function of wind speed and discusses rated power.
- Turbine manufacturers enter into agreements to supply turbines for a wind farm development. These agreements typically contain guaranteed sound power levels over a range of wind speeds, including above 10m/s.

REF: Evans, T and Cooper, J "Comparison of predicted and measured wind farm noise levels and implications for assessments of new wind farms" Paper Number 30, Proceedings of Acoustics 2011.

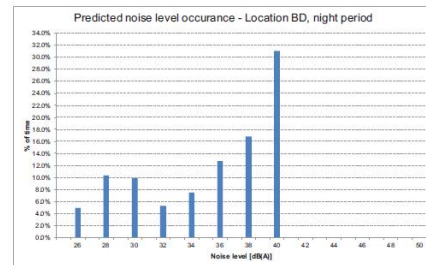
Predicted noise levels (Section 4.2)



Wind Frequency Analysis (Section 4.4)

- Forecast noise levels have been presented for when the wind is blowing from the nearest wind turbine towards each receiver
- The noise from the wind turbines will be reduced under different wind conditions, e.g. with wind blowing perpendicular to the line in between the nearest turbine and receiver, or the wind blowing from the receiver towards the nearest turbine

Examples of wind frequency analysis graphs



Predicted low frequency noise levels (Section 4.5)

- Low frequency noise emission was forecast based on previous wind farm noise measurements
- Assessment indicated that for similar turbine types and sizes, the low frequency noise content is such that where noise emission complies with the base criterion of 40 dB(A) at nearby residential receivers, it will also comply with the low frequency project criterion of 60 dB(C)

Determining Compliance (Section 4.9)

- Outlines that the proposed method of determining compliance.
- Measurements are to cover at least 2000 intervals with at least 500 pairs of data corresponding to worst case wind direction.
- Additional information to be added to this section including:
 - Proposed low frequency noise measurement methodology
 - Proposed infrasound measurement methodology
 - Proposed tonality measurement and reporting requirements
 - Proposed Amplitude Modulation measurement and reporting requirements

Next Steps

- Outcomes of today's CCC discussion will provide feedback on the Draft Updated Acoustic Report
- Report to be finalized to be included in the Revised Assessment Report (RAR)
- Opportunity to provide comment on the Revised Assessment Report will then follow

Thank You