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Independent Planning Commission
Level 3, 201 Elizabeth Street
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1 February 2019
Our ref: 6083-2.1L

Attention:	Chairperson and IPC Panel
Project:	United Wambo Open Cut Coal Mine (SSD 7142) and associated modifications (DA 305-7-2003 MOD 16 and DA 177-8-2004 MOD 3)
Date:	Tuesday 5 February 2019
Place:	Independent Planning Commission, Level 3, 201 Elizabeth Street, Sydney NSW 2000

Dear IPC Panel,

I am the Principal Acoustic Consultant of Day Design Pty Ltd. I have been engaged by the Environmental Defenders Office NSW (EDO NSW) on behalf of the Hunter Environment Lobby Inc to review the Noise Impact Assessment (NIA) prepared by Umwelt (Australia) Pty Limited in July 2016 for the United Wambo Open Cut Coal Mine Project and the various responses by the Department of Planning and Environment, Environment Protection Authority, Independent Planning Commission, and finally the applicant's reply submission.

It is agreed that the **Industrial Noise Policy** (INP) was the appropriate policy used for the acoustic assessment. This Policy was superseded in October 2017 by the **Noise Policy for Industry** (NPI) and several submissions have been made in relation to the impact of assessing the Project to this more recent document. It is accepted that there is little change to the noise impact of the Project under the NPI.

It is difficult to comprehensively assess the noise impact of a Project without access to the acoustic modelling files and parameters. However my review of the assessment procedure finds that the methodology and assessment process in the INP and hence NPI have largely been followed. There is however, in my opinion, one significant omission from the assessment.

The INP requires the noise impact from the Project to be predicted. Relevant extracts from the INP, copied below, with full pages attached.

> *"The noise levels predicted should correspond to the noise descriptor of the project-specific noise levels applicable to the project" (INP, Section 6.2, p36)*

> *"The development is considered to cause a noise impact if the predicted noise level at the receiver exceeds the project-specific noise levels for the project." (INP, Section 6.3, p37)*

In some cases the predicted noise levels will exceed the project-specific noise level (PSNL).

> *"When the predicted noise level from the noise source exceeds the project-specific noise levels, mitigation measures that will reduce noise levels to meet the project-specific noise levels need to be considered." (INP, Section 7.1, p38).*

The NPI, is similar but more explicit. The NPI states

> *"When determining whether noise mitigation is 'feasible and reasonable', the starting point is identifying mitigation measures that would result in achieving the relevant project noise trigger levels, and then identifying why particular measures may not be either feasible or reasonable." (NPI Section 3.4, p23)*

Table 3.1 in the NPI provides an example of how the mitigation measures may be considered. I have not seen anything in the Applicant's submissions that consider mitigation measures to meet the PSNLs, and certainly no discussion of why those measures are not reasonable or feasible. This is an important deficiency of the application. Instead, mitigation measures that are considered, by the applicant, to be reasonable and feasible are proposed and discussed.

Section 5.1.5 of United's NIA briefly discusses the generic control measures that were included during the iterative Project design and assessment process. The mitigation measures proposed by United are said to be the result of investigations into alternate mine plans, production schedule and fleet optimisation.

There is no evidence of mitigation measures that would meet the PSNLs, but were considered unreasonable or not feasible. There is no analysis shown to demonstrate that the applicant has applied the process described in Table 3.1 of the NPI. Fact Sheet F in the NPI, **attached**, provides a detailed definition of "Feasible" and "Reasonable" mitigation.

In many of the Responses to Submissions, United reiterates its commitment to implement a range of noise mitigation and management measures as part of the Project to meet the predicted noise levels. This appears to skip the step of discussing and considering the mitigation measures that will meet the PSNLs. The Predicted noise levels are not equal to the PSNLs. This small fact may be missed by all but the trained acoustician.

It is a failing of the NIA that it doesn't discuss and consider all the mitigation measures required to meet the PSNLs and avoids any scrutiny of whether the measures not finally proposed are actually reasonable and feasible.

It is likely that the assessment of whether a mitigation measure is reasonable and feasible would vary depending on who is considering the option.

For example, to reduce the noise emission from an open cut mine to the PSNL may require a 50 m high earth berm. The applicant may consider this feasible, but unreasonable due to the additional costs associated with its construction, therefore proposes a 20 m high earth berm as reasonable. However the 20 m earth berm causes the noise impacts to exceed the PSNLs by 5 dB at several receptors.

The Commission may consider the 50 m earth berm as reasonable as it would protect more residents from an unreasonable noise impact, however if this information is never presented, the Commission will never know what mitigation measures are actually required to meet the PSNLs, only what the applicant considers reasonable and feasible.

I urge the Commission to require the applicant to follow due process in the NPI and present a range of mitigation measures that would reduce the noise impacts from the Project to meet the PSNLs, so that they can be given due consideration.

Kind regards

Stephen Gauld

Stephen Gauld, MEngSc (Noise & Vibration), MIEAust, MAAS

Principal Acoustical Engineer

For and on behalf of Day Design

Attachments:

- INP Section 6, p36-37
- INP Section 7, p38
- NPI Section 3.4, p23
- NPI Table 3.1, p29
- NPI Fact Sheet F

6 Predicting noise levels & determining impacts

An important aspect of noise assessment—after determining the project-specific noise levels—is the prediction of noise levels from an industrial noise source, leading to the determination of noise impact.

This process involves:

1. Identifying all possible source, site and receiver parameters so that noise can be adequately predicted.
2. Predicting noise levels from the source at receiver locations—taking into account all important parameters identified, as well as the project-specific noise levels.
3. Comparing the predicted noise level with the project-specific noise levels to determine the noise impact.

6.1 Identifying noise parameters

The important parameters for predicting noise are listed below. These will set the boundaries of the noise prediction process. They need to be determined and clearly identified for noise impacts to be predicted adequately:

- all noise sources related to the proposed development, including vehicles that operate on site
- source noise levels, site location and effective height of the noise source. References should be provided for all source noise levels used in the assessment (for example, direct measurement, previous EIS, manufacturer's specifications)
- all stages of project development
- all nearby receivers potentially affected by the development
- weather conditions applicable to the site (from *Section 5*); noise criteria apply under existing weather conditions
- site features (including natural and constructed, development and surrounding land uses) that affect noise propagation
- operating times of the development.

6.2 Noise prediction

To quantify the noise impact, the noise levels from the source at all potentially affected receivers should be predicted, taking account of the parameters identified (*Section 6.1*).

The noise levels predicted should correspond to the noise descriptor of the project-specific noise levels applicable to the project. For example, the noise levels should be predicted in terms of:

- $L_{Aeq,period}$ if the amenity criteria establish the project-specific noise levels
- $L_{Aeq,15\ minute}$ if the intrusive criterion establishes the project-specific noise levels.

Any assumptions made when determining descriptors should be clearly validated and reported in the assessment.

For small or simple projects, the predicted noise level from the source may be calculated manually, taking into account the distance from the source to receiver and any shielding between the source and receiver.

For large or difficult projects, noise is generally predicted through the use of computer noise models. Such models generally take account of noise attenuation due to distance, atmospheric absorption, barriers, effects of intervening ground types and weather conditions. They use information about source noise levels, location of sources, topography between source and receiver and weather conditions to calculate overall noise levels at a receiver location. Strong preference will be given for the use of modelling approaches that have been the subject of peer review and that form accepted practice (for example, Environmental Noise Model (ENM) or Soundplan). Any other modelling approaches used would need to be validated before being used for a particular project. Where large numbers of people are likely to be affected by noise, a map showing predicted noise levels as noise contours surrounding the development is required.

6.3 Determining impacts

The noise impact of the development can be determined by comparing the predicted noise level at the receiver with the project-specific noise levels that have been derived for that particular location. The development is considered to cause a noise impact if the predicted noise level at the receiver exceeds the project-specific noise levels for the project. The extent of noise impact from the development is defined by the extent the predicted noise level exceeds the project-specific noise levels and the number of receivers affected.

6.3.1 Impacts under adverse weather conditions

As described in *Section 5*, adverse meteorological conditions such as temperature inversions and winds can act to increase the level of noise received from a noise source. These meteorological effects may also result in increased levels of ambient noise contributed by industry and background noise. Wind can also reduce noise levels at the receiver where it blows from the receiver towards the industry.

These effects are site specific and often complex and difficult to quantify. Extended monitoring and/or detailed modelling may be needed to capture the effects or predict what is expected to occur. The complexity and expense involved in quantifying the effect of adverse meteorological conditions on background noise levels or ambient noise levels contributed by industry preclude these detailed procedures from being a requirement in assessing noise impact. However, it is recognised that such effects do occur, and these procedures may be used to assess the effects of meteorological conditions on background noise levels and ambient noise levels in the noise assessment report.

The over-riding objective is to 'compare like with like' and to ensure that the situations where the maximum level of impact is likely to occur are identified and quantified. For example, where the impact from a proposed development is to be assessed under adverse wind conditions (for example, a 3 m/s wind blowing from source to receiver), then where a background noise level can be quantified for those same conditions it is reasonable that this background noise level should be used to assess impacts under these conditions.

In all cases the rating background level should be determined (as per *Section 3.1*) as the starting point, and any adjustments for adverse meteorological conditions can then be applied to this base value. Impact should be assessed under both adverse and non-adverse meteorological conditions to determine the maximum impact that may occur.

Quantifying the influence of temperature inversions on background noise levels can be done in a similar fashion, and the policy provides a number of methods for estimating the presence of temperature inversions.

The influence of adverse meteorology on the industry contribution to ambient L_{Aeq} noise levels may be more difficult to establish. However, where this can be quantified with a reasonable level of confidence the resultant noise levels may be used in assessing impact against the criteria.

It is emphasised that sufficient objective evidence must be supplied to support any claim for increased background noise levels or industry contribution to the ambient L_{Aeq} levels. It is not sufficient to rely solely on past experience; a site-specific analysis of the effects of meteorology must be undertaken.

7 Mitigating noise from industrial sources

7.1 Introduction

The processes described in *Sections 2* to *6* establish the project-specific noise levels and the predicted noise levels from the source. When the predicted noise level from the noise source exceeds the project-specific noise levels, mitigation measures that will reduce noise levels to meet the project-specific noise levels need to be considered. The degree of noise impact quantifies the extent of mitigation required, and points to an appropriate mix of noise control measures to be adopted as a mitigation strategy.

This policy focuses on achieving the desired environmental **outcomes**—there is no prescribed management or mitigation strategy to achieve the project-specific noise levels. In this way, the noise-source manager is given maximum flexibility in controlling noise.

The sections below provide guidance on what mitigation and management measures might be appropriate for particular types of development associated with specific noise problems.

Essentially, there are three main mitigation strategies for noise control:

1. Controlling noise at the source.

   There are two approaches: Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA). These are described in *Section 7.2.*

2. Controlling the transmission of noise.

   There are two approaches: the use of barriers and land-use controls—which attenuate noise by increasing the distance between source and receiver. These are detailed in *Section 7.3.*

3. Controlling noise at the receiver.

   These measures are detailed in *Section 7.4.*

The overall approach to assessing appropriate strategies is outlined in *Section 7.5.*

The management of short-term exceedances for which mitigation is impractical is discussed in *Section 7.6.*

A set of generic mitigation measures that may apply to industrial development in general, plus additional measures for specific types of development, are set out in *Section 7.7.*

7.2 Controlling noise at the source

Best management practice

Best management practice (BMP) is the adoption of particular operational procedures that minimise noise while retaining productive efficiency.

When an appropriate mitigation strategy that incorporates expensive engineering solutions is being considered, the extent to which cheaper, non-engineering-oriented BMP can contribute to the required reduction of noise should be taken into account.

Application of BMP includes the following types of practice:

- in open-cut mines: restricting movement of trucks on ridgelines and exposed haul routes where their noise can propagate over a wide area, especially at night. This means restricting night-time movement of spoil to areas shielded by barriers or mounds, and reserving large-scale spoil movement for daytime
- scheduling the use of noisy equipment at the least-sensitive time of day
- siting noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area; or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise
- where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently
- keeping equipment well maintained

Measures for reducing noise impacts from industrial activities follow three main control strategies:

- reducing noise at the source
- reducing noise in transmission to the receiver
- reducing noise at the receiver.

These control strategies should be considered in a hierarchical way so that all the measures that reduce noise for a large number of receivers (that is, source controls) are exhausted before more localised mitigation measures are considered.

The scope for applying feasible and reasonable mitigation measures to existing industrial activities is generally more limited and potentially more costly than for new greenfield developments. Implementing effective noise management strategies is an integral part of the planning phase for industrial developments and is potentially a cost-saving approach compared to retrospective mitigation.

When determining whether noise mitigation is 'feasible and reasonable', the starting point is identifying mitigation measures that would result in achieving the relevant project noise trigger levels, and then identifying why particular measures may not be either feasible or reasonable.

3.4.1 Reducing noise at the source

Best management practice

Best management practice (BMP) is the adoption of particular operational procedures that minimise noise while retaining productive efficiency.

When an appropriate mitigation strategy that incorporates expensive engineering solutions is being considered, the extent to which cheaper, non-engineering-oriented BMP can contribute to the required reduction of noise should be taken into account.

Where applied, these measures and practices are often documented in a noise management plan so that operational practices and undertakings are clearly understood and applied at all levels of an industrial operation.

Application of BMP can include the following types of practice:

- using the quietest plant that can do the job
- in open-cut mines, restricting movement of trucks on ridgelines and exposed haul routes where their noise can propagate over a wide area, especially at night – this could potentially mean restricting night-time movement of spoil to areas shielded by barriers or mounds, and reserving large-scale spoil movement for daytime
- scheduling the use of noisy equipment at the least-sensitive time of day
- not operating, or reducing operations at night (see below regarding night-time activities in the agricultural sector)
- siting noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area; or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise
- where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently
- keeping equipment well-maintained and operating it in a proper and efficient manner
- employing 'quiet' practices when operating equipment, for example, positioning idling trucks in appropriate areas

Proponents may wish to use the following matrix, or develop a similar decision-making tool, to determine and justify what mitigation measures are feasible and reasonable. This may be taken into account by the planning authority.

Table 3.1: Example of 'feasible and reasonable' mitigation decision-making matrix for inclusion within an environmental impact assessment.

Mitigation option	Feasible mitigation test	Reasonable mitigation test	Justification for adopting or disregarding this option
Mitigation at the source **Option 1** **Option 2** (… and so on, for all mitigation options)	Comment on whether the option under consideration is feasible. Refer to Fact Sheet F for further advice.	Comment on whether the option under consideration is reasonable. Refer to Fact Sheet F for further advice.	Provide details why the particular option under consideration will be included or disregarded, based on: • the noise impacts with and without the option • the noise mitigation benefits • the cost effectiveness of noise mitigation • community views. Refer to Fact Sheet F for further advice.
Mitigation in the transmission path to the receiver **Option 1** **Option 2** (…)	As above	As above	As above
Mitigation at the receiver **Option 1** **Option 2** (…)	As above	As above	As above

Fact Sheet F: Feasible and reasonable mitigation

'Feasible' and 'reasonable' mitigation is defined as follows.

A **feasible** mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. It may also include options such as amending operational practices (for example, changing a noisy operation to a less-sensitive period or location) to achieve noise reduction.

Selecting **reasonable** measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make such a judgement, consider the following:

- Noise impacts:
    - existing and future levels, and projected changes in noise levels
    - level of amenity before the development, for example, the number of people affected or annoyed
    - the amount by which the triggers are exceeded.
- Noise mitigation benefits:
    - the amount of noise reduction expected, including the cumulative effectiveness of proposed mitigation measures, for example, a noise wall/mound should be able to reduce noise levels by at least 5 decibels
    - the number of people protected.
- Cost effectiveness of noise mitigation:
    - the total cost of mitigation measures
    - noise mitigation costs compared with total project costs, taking into account capital and maintenance costs
    - ongoing operational and maintenance cost borne by the community, for example, running air conditioners or mechanical ventilation.
- Community views:
    - engage with affected land users when deciding about aesthetic and other impacts of noise mitigation measures
    - determine the views of all affected land users, not just those making representations, through early community consultation
    - consider noise mitigation measures that have majority support from the affected community.

Take into account the above considerations when determining the mitigation measures proposed to be incorporated into the development. In practice, the detail of the mitigation measures applied will largely depend on project-specific factors. These are the measures that minimise, as far as practicable, the local impacts of the project. Project approval conditions that flow from this process should be achievable. They need to provide clarity and confidence for the proponent, local community, regulators and the ultimate operator that the proposed mitigation measures can achieve the predicted level of environmental protection.