ACOUSTIC ASSESSMENT PEER REVIEW

McPhillamys Gold Project (SSD 9505)

Prepared for Belubula Headwaters Protection Group

Prepared by RCA Australia

RCA ref 16545-401/2

February 2023

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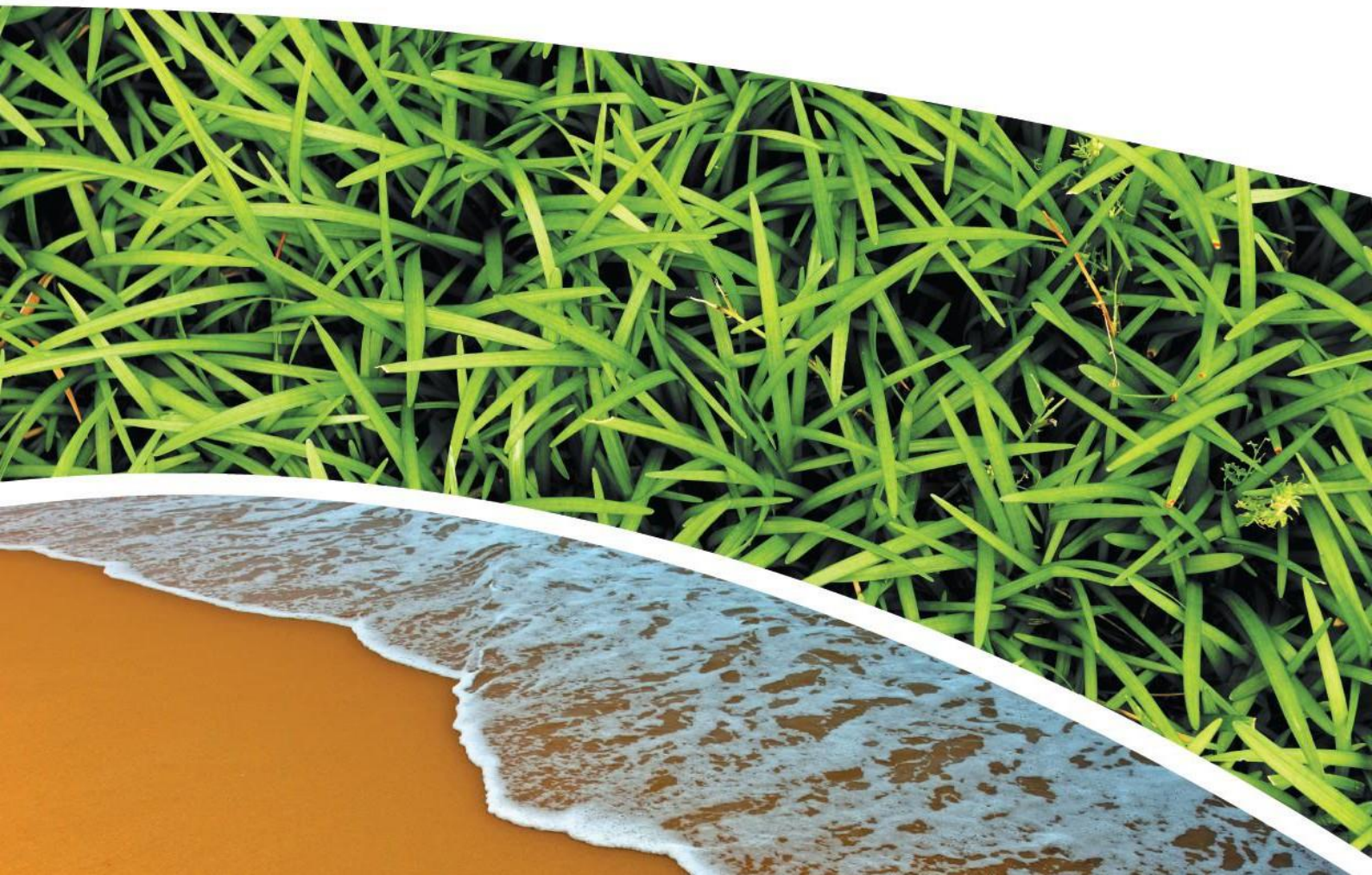

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14 February 2023

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Attention: Dan Sutton

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ACOUSTIC ASSESSMENT PEER REVIEW: MCPHILLAMYS GOLD PROJECT SSD 9505

1 EXECUTIVE SUMMARY

This report presents a technical peer review of the Amended Noise and Vibration Impact Assessment report prepared by Muller Acoustic Consulting (MAC) which assessed noise impacts for a proposed open cut gold mine project located in Blaney, NSW.

Overall, RCA consider the ANVIA to be a comprehensive report. With the benefit of the reviewer's perspective, RCA have identified several areas of the assessment which RCA believe need further review prior to project approval could be considered. These areas are tabled below.

Table 1 *Summary of items recommended for further review*

Item recommended for further review	Brief description of item for review
RBLs, Table 10 of MAC report	RCA believe the NPI procedure for setting RBLs (particularly the rules for excluding data) have not been followed for the Kings Plains location. This could have bearing on the adopted criteria and then the degree of impacts discussed. See **section 4.2** of this report for more information.
Meteorological analysis, section 5.2 of MAC report	There is some doubt over the temperature inversion analysis since the NPI states that the location of a 10 m high weather station needs to be on "level terrain" in order to execute the chosen method for analysing temperature inversions. RCA recommend this is a vitally important detail to the assessment and that the analysis should be double checked against another nearby weather station. See **section 4.1** of this report for more information.
Road noise assessment, section 5.4 of MAC report	The Road Noise Assessment has not assessed maximum noise level events associated with braking and engine noise at the proposed intersection at the site access, which could potentially cause significant sleep disturbance impacts for the nearest resident. See **section 4.4** of this report for more information.
Construction vibration human comfort impacts, section 2.5 of MAC report	RCA believe a typographical error was made in referencing safe working distances supplied by the TfNSW Construction Noise and Vibration Strategy. This should be corrected for accuracy. See **section 6** of this report for more information.
Proposed DPIE noise conditions	The client has forwarded RCA the DPIE proposed noise conditions. RCA have concerns that the proposed conditions in B7 Table 1 will not protect the amenity of the nearby receivers. See **section 8** of this report for more details.

2 INTRODUCTION

RCA Australia (RCA) have been engaged by Belubula Headwaters Protection Group (the client) to provide a peer review of a noise impact assessment report prepared to support an Environmental Impact Statement (EIS) for a proposed gold mine in Blaney, NSW (SSD 9505). The noise impact assessment was prepared by Muller Acoustic Consulting Pty Ltd (MAC), and the EIS was prepared by EMM Pty Ltd (EMM).

This peer review was undertaken by RCA's Acoustics Manager, Alex Rees. Alex has been a member of the Australian Acoustical Society for over six years and has been an acoustic consultant for over 10 years. Alex has also been a sessional lecturer at the University of Newcastle since 2019 where he provides a lecture on Noise Impact Assessment.

RCA has prepared this peer review report based primarily on the Amended Noise Impact Assessment report prepared by MAC. Report version details of the ANVIA reviewed by RCA are shown in **Table 2**.

Table 2 *Review documents*

Document author	Document title	Revision
MAC	Appendix J – Revised Noise and Vibration Impact Assessment – Mine Development	Ref MAC170434RP2V2, dated 25 August 2020

3 PROPOSAL DESCRIPTION

The proposal is for a greenfield open cut gold mine located approximately 8 km north-east of Blayney, in central-west NSW. The following brief proposal description has been taken from the amended EIS report:

> *LFB Resources NL is seeking development consent for the construction and operation of the McPhillamsy Gold Project (the project), a greenfield open cut gold mine and associated water supply pipeline in the Central West of New South Wales.*
>
> *The project is comprised of two key components:*
>
> - *The mine site where the ore will be extracted and processed (ie the mine development); and*
> - *An associated water pipeline which will enable the supply of water from near Lithgow to the mine site (ie the pipeline development)*

This peer review report focuses on the mine development.

4 REVIEW OF OPERATIONAL NOISE IMPACT ASSESSMENT

4.1 BACKGROUND INFORMATION

RCA firstly note that there is some room for interpretation when a consultant is deciding on how to approach a particular assessment. If ten consultants were to assess the same development proposal, you would find variations in the approach and predicted receiver levels. You would expect though, that there remains consistency in overall assessment outcomes. RCA's objective in preparing this peer review then, is to determine if the assessment is fair and representative, as well as providing some additional information to the client on important technical concepts that have shaped the assessment outcome.

4.2 BACKGROUND NOISE MONITORING AND PROJECT NOISE TRIGGER LEVELS

The Amended Noise and Vibration Impact Assessment (ANVIA) includes discussion around historic and more current background noise monitoring undertaken in preparation of the assessment. Table 10 of the ANVIA presents ABLs measured within Kings Plains over 87 days. RCA noted a very large range in the ABL day values. The maximum daytime ABL was 44 dB and the minimum was 14 dB (14 dB was reported on both the 4th and 5th of January), giving a range of 30 dB. This range is too large to be correct. When RCA reviewed the noise monitoring charts in Appendix B it was seen that several days (including the 4th and 5th of January) had large segments of data missing (the noise terminal appears to have been offline). Firstly, the process to calculate the ABL for these days has somehow been corrupted by large sections of missing data, but secondly, the NPI has exclusion rules that exclude day, evening and night periods if a minimum number of samples was not present, meaning no value should have been presented for these days. Also, much of this data was taken during school holidays, when the NPI states that background noise monitoring should not be undertaken during school holidays. Finally, the report does not state that periods of wind above 5 m/s has been excluded prior to analysis and the monitoring charts do not show periods of exclusions. This indicates that periods of rain or wind above 5 m/s may not have not been excluded prior to analysis.

Similarly, the range of presented ABLs for the evening is 21 dB (maximum of 45 dB and minimum of 24 dB). This large range seems implausible unless the ABLs have been affected by either extraneous noise, atypical conditions (ie school holidays) or periods of wind greater than 5 m/s.

While it won't make a large difference to the criteria, RCA recommend that the ABLs and then the RBLs for Kings Plains be reviewed by MAC in accordance with NPI's procedure for calculating RBLs including all exclusion rules. The potential outcome is that the day and evening RBLs might need adjusting downwards (maximum adjustment would be 1 dB during the day and 2 dB during the evening to meet the minimum background levels). Even a small adjustment would have bearing on both operational and construction noise criteria and how all results and the VLAMP assessment are presented. A downwards adjustment will also give further context to whether the current DPIE proposed noise conditions are reasonable. RCA discuss this point further below.

We also note an inconsistency in reported night time RBLs for Kings Plains. Table 10 and Table 11 of the ANIVIA report a measured night time RBL of 28 dB while Table 12 reports a measured night time RBL of 30 dB. It appears that the NPI minimum night time RBL has been erroneously entered into Table 12 instead of the measured RBL. This minor typographical error does not change the assessment outcomes (since it is later corrected), but we mention it here for accuracy, but also as a reminder of how quiet this rural environment is.

4.1 WEATHER ASSESSMENT

MAC present the results of local weather data analysis which show that noise enhancing weather is not a feature of the area. The ANVIA states that temperature inversions were assessed from the onsite weather station, and RCA has confirmed with MAC that the sigma-theta method was used. Table D6 of the NPI includes notes on the application of this method. The first note reads:

> *"These criteria are appropriate for steady-state conditions, a measurement height of 10 metres for level terrain, and an aerodynamic surface roughness length of 15 centimetres…"*

RCA has been informed by the client that the onsite weather station is positioned "low down the slope near the valley floor". RCA question whether the local terrain could be considered "level", and whether the adopted method for determining the stability class is accurate. The presence of noise enhancing weather conditions is a key assessment principle. Future consent conditions will state the meteorological conditions for which noise limits are "valid", based on this assessment. If noise enhancing weather conditions are dismissed through error now, the future consent conditions will not protect the amenity of the nearby community.

RCA has received correspondence from MAC supporting the validity of the determined frequency of temperature inversions. While RCA follow the logic of MAC's argument, RCA recommend that the presence of noise enhancing weather be reviewed against a second nearby weather station to double check this vital assessment factor.

4.2 NOISE PREDICTIONS

MAC have modelled many combinations of both construction and operational scenarios. MAC have used a reputable noise modelling software and a common algorithm to predict outdoor noise propagation.

The ANVIA states that construction and operational noise predictions are lower than what was presented in the original EIS, largely due to quieter equipment being selected. RCA note however that the ANVIA also states that the fleet has not been finalised, and we would stress the importance that any future consent be based on fleet meeting the modelled sound power data presented in the ANVIA.

The operational noise results presented in Table 37 of the ANVIA may change pending a review of the Kings Plains noise criteria (once the RBL analysis is reviewed) and also once the stability class frequencies are confirmed.

Section 6.8 of the ANVIA states that *"Mobile equipment such as haul trucks, excavators and drills are to be mitigated to achieve low noise emissions. Therefore, factors such as intermittent noise and duration have not been considered further in this ANVIA."* This once again points out how important the sound power data and spectrum of the mining fleet is.

Notwithstanding MAC's confidence that the noise model has accurately captured the final fleet selection, RCA would contend that the question of intermittency cannot be immediately dismissed. The NPI lists intermittency as an annoying characteristic, which when present, attracts a 5 dB penalty. The penalty applies at night time only, "where the level suddenly drops/increases several times during the assessment period. With a noticeable change in source noise levels of at least 5 dB(A)". It is difficult to tell from the noise contour figures provided in the ANVIA which do not show noise source locations, but one scenario where intermittency could be applicable is where mobile plant cycle through periods of varying exposure to a receiver. This consideration will change as the pit shape changes.

It is difficult to visually verify if the use of the access road at night time has been included in the noise models, and RCA suspect it has not. Any noise from vehicles on the access road should be added to general "site noise" and assessed against the NPI. The access road itself may add an "intermittent" nature to noise levels received by the receiver closest to the access road.

MAC have concluded that tonality and low frequency noise will not be an issue based on the modelled fleet. RCA once again point out that if the final fleet differ to what was modelled, this assumption may prove false.

4.3 VLAMP ASSESSMENT

The outcome of the VLAMP assessment are based on the current project noise trigger levels (which may change for Kings Plains following a review of the RBLs) and the determination that noise enhancing weather is not a feature of the area (which we recommend is confirmed against a second nearby weather station). This assessment will need review once the above points are confirmed.

4.4 REVIEW OF ROAD NOISE ASSESSMENT

The ANVIA includes a road noise assessment based on reputable computer noise modelling software using the industry trusted CORTN algorithm. The assessment concludes that the overall day and night road noise limits set out in the Road Noise Policy will be achieved, however, the assessment does not consider the additional noise that will be caused by braking and engine noise at the proposed intersection connecting the Mid-Western Highway with the site access road. Appendix C7 of the Road Noise Policy states:

"Engine brake noise from heavy vehicles is a major source of community noise, and impacts can occur during both the day and night. It can be a source of sleep disturbance in both rural and metropolitan areas. Likely locations for noise impacts from engine braking include traffic intersections..."

The Environmental Noise Management Manual (RTA, 2001) states that *"Although sleep assessment goals are not provided in the Environmental Criteria for Road Traffic Noise* (now superseded by the NSW Road Noise Policy)*, the ECRTN recommend that an assessment of maximum noise levels should be made where impacts may occur during the night".* It goes on to say *"The ECRTN recommend that the assessment should include a calculation of the maximum noise levels, the extent to which the maximum noise levels for individual vehicle pass-bys exceed the Leq for each hour of the night, and the number of maximum noise events"*.

The relevance of this, is that the ANVIA presents traffic numbers for the first three years (Mine Construction, PY1 Construction and PY2 Construction & Operation), which indicate that the mine will add over 100 light vehicles and approximately 70 heavy vehicles to the general traffic each night. Creating an intersection where there is currently free flowing traffic will certainly create additional engine and braking noise which may potentially lead to significant sleep disturbance impacts for the nearest receiver. RCA strongly recommend that this be assessed.

5 REVIEW OF BLAST ASSESSMENT

The ANVIA predicts all properties, heritage items and public infrastructure to comply with the relevant criteria. RCA note that the receiver R30 is predicted to receive an overpressure of 115 dBZ peak which is equal to the limit (which can be exceeded for up to 5% of blasts). RCA also note that the predictions are based on blasts being conducted at the closest point to receivers.

RCA does not have the necessary experience to comment on potential adverse impacts to animals. We note that MAC state that the overpressure from blasting will be less than lightning strikes, but we also note that blasting will be more frequent.

Given the predicted marginal compliance, RCA would recommend that blast monitoring be undertaken at receiver R30 for at least 12 months of blasting.

6 REVIEW OF CONSTRUCTION ASSESSMENT

Various construction scenarios were modelled using computer modelling software. The ANVIA states that quieter plant and equipment has been selected based on the EIS report and that moving the intersection of the access road to the highway has reduced construction noise impacts.

RCA's earlier comments about the adopted RBLs for Kings Plains will have bearing on the adopted construction noise manage levels.

Section 5.2 of the ANVIA states that the *Construction Noise Strategy* (Transport for NSW, 2018) sets a safe working distance of 25 m from a large vibratory roller to achieve the residential human response criteria for continuous vibration, and that since the closest receiver to construction activities is greater than 25 m, no vibration impacts are anticipated. RCA believe this is a typographical error. The Construction Noise Strategy sets a safe working distance of 25 m for a large vibratory roller (> 18t) to avoid **cosmetic damage** to residential buildings, but sets a 100 m safe working distance for the same plant to avoid human comfort vibration impacts. We understand that the closest receiver to the proposed intersection may be within 100 m, and human comfort vibration impacts may therefore be experienced. The ANVIA should be updated for accuracy.

7 REVIEW OF PROPOSED MITIGATION

RCA agree that the proposed noise mitigation strategies are sensible and can be implemented. There are two major assumptions though that are worth singling out.

7.1 PLANT SELECTION

The total sound power from the site has reduced compared to the initial Noise and Vibration Impact Assessment, largely due to the selection of quieter plant and equipment. The ANVIA states "*it is highly likely that alternate (electric drive) haul trucks will be used for the Amended Project (or similar fleet with equivalent sound power levels and spectral content).*

The assumed sound power and spectral content of the plant is the primary input into the noise model. If these assumptions prove false, then the model outputs are not representative. This could have bearing not only on the absolute noise levels but also potentially on low frequency noise. RCA therefore recommend that any project approval be conditioned on the final fleet meeting the sound power level and spectral content which formed the basis of the assessment.

7.2 OEM OR AFTER-MARKET NOISE ATTENUATION

The ANVIA makes reference to noise attenuated fleet (which has implicitly been assumed in some of the sound power data modelled). The problem RCA sees here is that noise attenuation has a lifespan, and so the modelled noise levels are no longer representative after that lifespan. For example, RCA staff have taken sound power measurements of haul trucks on mine sites and found that engine bay attenuation was missing. They were then told that maintenance crews removed the attenuation because it made servicing the plant more difficult. Even if the proponent intends to commit to achieving the sound powers that are presented in the ANVIA, this is very difficult to police and enforce in practice.

As an absolute minimum safeguard against the above problem, RCA would recommend that any project approval include a condition that the site undertake annual fleet noise testing to track any deterioration of sound performance. The condition should also include that new equipment is sound power tested to the full relevant standards, at the time of commissioning.

8 REVIEW OF DPIE PROPOSED NOISE CONDITIONS

The client has forwarded RCA the DPIE proposed noise conditions. Condition B7 table 1 outlines operational noise criteria. RCA note that these criteria do not reflect the PNTLs presented in the ANVIA, and understand that the criteria is based on the modelled noise levels that will be received. RCA are concerned that accepting the modelled levels as the limit of what is reasonable and feasible will not protect the amenity of the nearby community for the following reasons:

- The proposed noise conditions are higher than the PNTLs derived under the NPI. The NPI already acknowledges that not "all members of the community will find the noise acceptable" even when the PNTLs are adopted.

- The above concern is compounded in a rural environment where the background levels are very low. Table 12 of the ANVIA shows that the night time RBLs are 24 dB (Distant Rural), 28 dB (Kings Plains), 24 dB (Walkom Road) and 26 dB (Sturgeon Hill). RCA refer to NSW Caselaw *Gloucester Resources Limited v Minister for Planning* where it was accepted that the impact of an intrusive noise is "highly dependent on the environment in which it is experienced". This means that the PNTLs are already potentially insufficient to protect the amenity of the community due to the true background levels (particularly at night time) being lower than the adopted levels. If the project approval noise conditions are then higher again, this only further degrades the amenity of the community.

- Finally, Condition B8 Table 2 of the proposed DPIE conditions outline the meteorological conditions for which the proposed criteria are valid. These meteorological conditions are based on what was modelled in the ANVIA assessment. Condition B9 states that "for other meteorological conditions, the applicable noise criteria are as defined as Table 1 plus 5 dB". The concern here is that the ANVIA presented weather analysis that shows that the applicable meteorological conditions very rarely occur. This means that the criteria presented in Table 1 will very rarely be valid, and that the applicable noise criteria will routinely be 5 dB higher than what is shown in Table 1.

As an example, if we consider a "Distant Rural" receiver with a measured night time background level of 24 dB, condition B9 means that the night time noise condition for this receiver will routinely be 40 dBA, which is 16 dBA higher than their existing background level. This clearly demonstrates the DPIE proposed noise conditions are inadequate to protect the amenity of the nearby receivers.

9 RCA'S CONCLUSIONS AND RECOMMENDATIONS

MAC have prepared a comprehensive assessment. RCA would however recommend the following are reviewed prior to project approval:

- The RBLs for Kings Plains are calculated once more, in accordance with the NPI procedures including exclusion rules.
- Once the RBLs are confirmed, new operational and construction noise limits may apply to these receivers. All results and discussion of impacts, including the VLAMP assessment will need review to ensure they are consistent with the confirmed RBLs.
- RCA strongly recommend a maximum noise level assessment is undertaken for the proposed intersection given the number of light and heavy vehicles the project will produce at night time.
- The location of the onsite weather station may not strictly be in accordance with approved methods for determining temperature inversion frequencies. Given the importance of this detail, RCA recommend double checking this analysis using a second nearby weather station.
- If project approval is granted, any and all mitigation strategies outlined in the ANVIA, including sound power levels and spectral content of mining fleet, become conditions of consent. RCA also recommend the site undertake annual fleet noise testing to track and action the sound degradation of fleet.
- If project approval is awarded, RCA recommend that the consent noise criteria reflect the Project Noise Trigger Levels outlined in Table 17 of the ANVIA (once these are confirmed) and that those limits are valid for wind speeds up to 3 m/s, not 0.5 m/s. The wind analysis presented in the ANVIA shows that calm conditions rarely occur. That would mean that proposed noise limits which are only valid for wind speeds up to 0.5 m/s will rarely be enforceable.

Yours faithfully

RCA AUSTRALIA

Alex Rees
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