

5 December 2017
Ref: J0130-117-L1

Hansen Bailey Pty Ltd
P.O. Box 473
SINGLETON NSW 2330

78 Woodglen Close
P.O. Box 61
PATERSON NSW 2421

Phone: 02 4938 5866
Mobile: 0407 38 5866

E-mail: bridgesacoustics@bigpond.com

Attn: Mr Andrew Wu

Dear Andrew,

RE: INTEGRA LONGWALL EXTENSION MODIFICATION - ACOUSTICS

INTRODUCTION

HV Coking Coal Pty Limited (HVCC) operates the Integra Underground Mine (Integra Underground) in the Upper Hunter Valley of New South Wales (NSW). HVCC is a wholly owned subsidiary of Glencore Coal Pty Limited (Glencore).

Hansen Bailey is currently preparing an application on behalf of HVCC to modify Integra Underground's Project Approval (PA 08_0101). This modification application will be made under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act). HVCC is seeking approval to continue longwall mining of the Middle Liddell Seam further to the north of the currently approved longwall panels (the Modification). The Modification also involves the construction and operation of ancillary surface infrastructure. The Modification includes the following components:

- Adjustments to the approved mine plan for the Middle Liddell Seam including:
 - Realignment and extension of the main headings further to the north-west;
 - Increases to the lengths and widths of the approved LWs 15-17; and
 - Mining of additional longwall panels (LWs 18-19 or LWs 18-20).
- Construction and use of additional surface infrastructure including:
 - Auxiliary fans in the maingate of each longwall panel to assist in the efficient ventilation of the longwall mining area;
 - Additional electricity transmission and distribution lines;
 - Additional dewatering boreholes and associated infrastructure;
 - Additional gas drainage boreholes to ensure the safety of underground operations;
 - Increased usage of the currently approved gas flares; and
 - Relocation of the existing store facility and the construction and use of an additional access road off Middle Falbrook Road.
- Use of the C4 Dam to store raw water from Glennies Creek.

The proposed mining activities and ancillary surface infrastructure associated with the Modification are conceptually illustrated in a plan attached to this report.

Integra Underground is located adjacent to the Mount Owen Complex (MOC) which is also owned and operated by Glencore. The Modification does not involve any alterations to the Development Consent (SSD-5850) for the MOC. However, the proposed mining activities and infrastructure development will be undertaken within the approved Project Area for the MOC.

This report presents an assessment of acoustic issues associated with the Modification. The report has been commissioned by Hansen Bailey on behalf of Glencore to form part of an Environmental Assessment of the Modification. The assessment only considers construction and operational activities that have the potential to be audible at private receivers. The assessment does not consider noise from underground construction and operational activities including development of additional longwall panels, or operational noise from surface components of the Modification with no significant noise emissions such as use of the C4 Dam to store raw water from Glennies Creek.

Weather Conditions

Prevailing weather conditions that occur in the region have been reported in the *Integra Underground Mine Modifications Air Quality and Greenhouse Gas Assessment* (AQGG Assessment) (Jacobs, November 2017) which is attached to the project Environmental Assessment (EA) as Appendix G. Section 5.2 of the AQGG Assessment presents wind roses for representative year 2014 which show prevailing winds from the north-west and south-east directions, which are common for the Hunter Valley region. The wind roses show winds from the north-east and south-west occur less than 5% of the time in all seasons.

Receptors located generally south-east or north-west of construction or operational noise sources would therefore be more likely to receive enhanced noise levels due to weather effects, compared to other receptors.

Assessed Receptor

A number of rural properties located generally between Integra Underground and MOC are owned by mining companies. The closest privately owned residence to the Modification (the receptor) is at 517 Glennies Creek Road, as shown on the plan in Appendix A.

An indicative location for the goaf dewatering site has been included on the plan in Appendix A, however the auxiliary ventilation fans may be sited at any location within the Modification Underground Extraction Area. To ensure worst case noise impacts are considered, noise from the ventilation fans is assessed at the point closest to the receptor. Under this worst case scenario, the receptor would be located approximately:

- 3.4 km south-east of the nearest auxiliary ventilation fan site (which is indicatively located above proposed longwall panel LW15). The next nearest privately owned receptor is located approximately 3.8 km to the south east of LW15, with noise levels to both residences potentially affected by north-westerly prevailing winds;
- 3.4 km south-east of the underground goaf dewatering site (which is indicatively located adjacent to proposed longwall panel LW15). The next nearest privately owned receptor is located approximately 3.7 km to the south east of the underground goaf dewatering site, with noise levels to both residences potentially affected by north-easterly prevailing winds;
- 1.4 km east of the closest section of the 66 kV powerline. The next nearest receptor is located approximately 1.5 km south of the proposed powerline route, with both of these residences potentially mildly affected by north-easterly prevailing winds;
- 1.4 km east of the existing gas flares within the Forest Road Services Site and potentially mildly affected by north-easterly prevailing winds. The next nearest receptor is located approximately 1.7 km

south east of the gas flares and more strongly affected by north-easterly prevailing winds, resulting in similar anticipated noise levels from this source to both residences; and

- 1.9 km north-west of the proposed store facility and access road off Middle Falbrook Road and potentially affected by south-easterly gradient winds. The next nearest receptor is located approximately 2.3 km to the north east from the store facility and access road, with noise levels at this residence not anticipated to be enhanced by prevailing winds.

The receptor is identified as Residence 80 and is subject to acquisition upon request according to Schedule 3 Condition 1 of PA 08_0101. All other privately owned residences are located at a greater distance from proposed surface infrastructure and would be less affected by noise enhancement due to prevailing winds, therefore the assessment is limited to considering acoustic impacts at the receptor.

NOISE CRITERIA

Construction Phase

Construction work associated with the Modification is assessed according to the *Interim Construction Noise Guideline* (ICNG) (EPA, 2009). Table 2 in the ICNG recommends the following noise management levels:

- A 'noise affected' level of 10 dBA above the background level, representing a point above which there may be some community reaction to noise. Where the predicted or measured level is above the noise affected level, all feasible and reasonable work practices should be applied to meet the noise affected level or minimise noise levels; and
- A 'highly noise affected' level of 75 dBA, above which a strong community reaction may occur. Where the predicted or measured level is above the highly noise affected level, the relevant authority may require respite periods or other restriction of construction hours to minimise impacts, particularly at more sensitive times as identified by the affected community.

The background noise level at the receptor has not been measured as part of this assessment, however relevant background noise data are reported in the Integra Underground Mine Noise Management Plan (NMP) (Glencore, September 2017). Table 2-1 in the NMP reports a Rating Background Level of 30 LA90,15min during the day for Noise Assessment Group 1 (NAG1) which includes the receptor, resulting in a noise affected level of 40 LAeq,15min at the receptor. According to the ICNG, construction hours are defined as 7 am to 6 pm Monday to Friday and 8 am to 1 pm Saturday, excluding public holidays.

Any construction work occurring outside the standard hours would be subject to noise limits in the Integra Underground Project Approval, specifically in Schedule 3, Condition 2. The condition specifies noise limits of 38 LAeq,15min during the evening and 36 LAeq,15min and 46 LA1,1min during the night at this receptor in NAG1.

Operational Phase

The receptor is acknowledged to be potentially affected by noise from Integra Underground and is therefore subject to acquisition upon request from the owner. Operational noise criteria have therefore not been allocated in PA 08_0101 to this receptor, however if the receptor was not subject to acquisition rights then the following noise limits would apply:

- 38 LAeq,15min during the day and evening; and
- 36 LAeq,15min and 46 LA1,1min during the night.

This assessment compares proposed noise levels to the noise limits applying to receptors in Noise Assessment Group (NAG) 1 as described in Schedule 3 Condition 2 of PA 08_0101. The receptor would have been included in NAG 1 if it were not subject to acquisition.

CONSTRUCTION NOISE

Construction noise levels at the receptor have been calculated considering distance attenuation only, ignoring other factors that reduce noise levels such as atmospheric absorption and topographical shielding and factors that may increase noise levels such as prevailing winds from source to receptor. These factors approximately cancel each other over distances of 1.4 km to 3.4 km considered in this assessment, as demonstrated at two relevant distances. Noise enhancement due to prevailing winds is approximately equal to enhancement reported in Appendix D of the INP for a 3°/100m inversion plus 2 m/s wind case, while atmospheric absorption has been calculated for typical daytime conditions of 20°C and 70% relative humidity using the procedure in ISO9613-1.

At 1.4 km –	INP inversion plus wind	+4.5 dBA
	Atmospheric absorption	–4.0 dBA at 500 Hz
	Difference ignored in this assessment	+0.5 dBA
At 3.4 km –	INP inversion plus wind	+4.3 dBA
	Atmospheric absorption	–5.5 dBA at 500 Hz
	Difference ignored in this assessment	–1.2 dBA

The calculations indicate Modification noise levels may be approximately 0.5 dBA higher at a distance of 1.4 km and approximately 1.2 dBA lower at a distance of 3.4 km under prevailing wind conditions, compared to the calculated levels presented in this assessment. Such differences are not significant and are not considered further.

Auxiliary Fans

Installation of additional or auxiliary fans and associated shafts to the underground mine would require the following construction machines and activities;

- An excavator, backhoe, grader, roller and trucks to level, install gravel and grade the site;
- A drilling and most likely a raiseboring machine to drill and bore the ventilation shaft;
- Concrete trucks and a concrete pump to line the shafts with concrete, or alternatively trucks and a crane to install steel liners in the shafts;
- A backhoe and small loader to prepare the ground around the shafts, and foundations for the ventilation fans and motors, for concrete formwork;
- Various hand tools to construct concrete formwork;
- Concrete trucks and most likely a truck-mounted concrete pump; and
- Trucks, a mobile crane and various hand tools to install ventilation fans, ducts and motors.

Worst case noise levels would most likely be produced during either the initial earthworks phase or the concrete pouring phase, as both require a number of diesel powered machines to operate simultaneously. An average of two and maximum of three trucks (or equivalent machines) operating on the site results in a construction sound power level in the range of 111 to 113 dBA.

The anticipated sound power level would result in a construction noise level in the range 32 to 34 LAeq,15min at the receptor, after subtracting 79 dBA distance correction for the 3.4 km setback from the auxiliary fans to the receptor, which is well below the ‘noise affected’ construction level of 40 LAeq,15min.

Dewatering Site

Construction of a dewatering borehole and water drainage equipment would require similar construction machines and activities as the auxiliary ventilation fans, although the dewatering borehole is significantly smaller than the ventilation shafts and may require a smaller drilling machine. Construction work would therefore produce a sound power level in the range of 111 to 113 dBA, similar to the auxiliary fan construction work. A construction noise level in the range 32 to 34 LAeq,15min is predicted at the receptor, after subtracting 79 dBA distance correction for the 3.4 km setback from the auxiliary fans to the receptor, which is well below the 'noise affected' construction level of 40 LAeq,15min.

Gas Drainage Boreholes

Gas drainage boreholes and associated infrastructure are established above the approved longwall panels and would continue to be required for the proposed panels. As the proposed panels are located generally north of the approved panels, at a greater distance from the receptor, construction of the proposed gas drainage boreholes and associated infrastructure would result in similar or lower noise levels than the construction of previous boreholes. Therefore, a detailed assessment of construction noise associated with the new boreholes is not required.

Gas Flares

Gas flares have been installed and are currently operating within the Forest Road site approximately 1.4 km from the receptor. Additional use of the existing gas flares does not require any construction work, therefore a construction noise assessment is not required.

Relocation of Store Facility and Construction of Access Road

Construction of a store and associated access road off Middle Falbrook Road would require similar construction machines and activities as those listed above for other components of the Modification, except that drilling and boring equipment would not be required and work to seal the access road would be required. Earthworks and road sealing associated with access road construction or concrete pouring for the store are expected to produce worst case construction sound power levels for this component.

Construction work would therefore produce a sound power level in the range of 111 to 113 dBA, similar to the auxiliary ventilation fan construction work. A construction noise level in the range 37 to 39 LAeq,15min is predicted at the receptor located approximately 1.9 km to the north-west, after subtracting a distance correction of 74 dBA, which is below the 'noise affected' construction level of 40 LAeq,15min.

66kV Powerline

Construction of a 66 kV powerline from the Forest Road site to the Modification Area would require truck mounted drilling and boring equipment, a crane or equivalent machine to handle and install the poles and a concrete truck to supply concrete to refill the holes. Transmission lines would be installed using bucket trucks, with typically three trucks operating at mild engine power simultaneously although at various working locations. Construction work would therefore produce an average sound power level of 111 LAeq,15min distributed over multiple locations along the route. For this assessment, three working locations 1.4 km, 1.5 km and 1.6 km from the receptor are assumed.

A construction noise level of 39 LAeq,15min is predicted at the receptor located approximately 1.4 km from the nearest end of the powerline route, after subtracting an average 72 dBA distance attenuation for the three closest working locations at distances of 1.4 km to 1.6 km from the receptor. The predicted level meets the

‘noise affected’ construction level of 40 LAeq,15min. Construction work on more remote sections of the powerline would produce a lower noise level at the receptor.

The proposed 11 kV powerline would be constructed significantly further from the receptor than the 66 kV powerline, therefore noise produced during construction of the 11 kV powerline would also be acceptable at the receptor.

Construction Noise Summary

Analysis of likely construction noise levels indicates no significant risk of noise levels at the receptor exceeding the ‘noise affected’ level recommended in the ICNG, assuming all significant construction work occurs during normal construction hours which are 7 am to 6 pm Monday to Friday and 8 am to 1 pm Saturday. Any construction work that occurs outside the standard hours would normally be subject to the operational noise limits required by the Project Approval, however in this case the noise limits in Schedule 3 Condition 2 of PA08_0101 do not apply to the receptor as it is subject to acquisition upon request.

Construction work should be completed according to the *Integra Underground Mine Exploration Activities and Minor Surface Infrastructure Management Plan* (MSIMP) (Glencore, February 2017). Consultation with the owner of Residence 80, as recommended in Section 3.3 of the MSIMP, may not be required given the relatively low predicted noise levels at the receptor.

A detailed Construction Noise Management Plan may not be required for work occurring within standard construction hours, however preparation of such a plan may be required if work outside standard construction hours is required within audible range of the receptor.

OPERATIONAL NOISE

Auxiliary Fans

Auxiliary fans would generally be smaller units than the main ventilation fans at the Forest Road Infrastructure Site and would be operate at least 3.4 km from the receptor. Noise from the fans is therefore unlikely to be audible and would be acceptable.

Dewatering Site

The dewatering borehole would be fitted with an electric powered pump which will most likely be installed at the bottom of the borehole rather than on the surface. Noise from the pump, at a distance of approximately 3.7 km from the receptor, would not be audible at any time.

Gas Drainage Boreholes

Gas drainage boreholes and associated infrastructure would produce no appreciable operating noise, therefore no further assessment of this component of the Modification is required.

Gas Flares

Gas flares have been installed and are currently operating within the Forest Road Services Site approximately 1.4 km from the receptor. The flares generally operate 24 hours per day, although operation depends on the availability of gas from the existing drainage boreholes. Additional use of the approved gas flares would not increase noise levels produced by the flares, and noise from the flares is not audible at Noise Assessment Group (NAG) NAG1 located close to the receptor according to *Environmental Noise*

Monitoring glencore Integra Underground Mine Winter 2017 (Umwelt, 2017) and the corresponding Spring 2017 report. No further assessment of this component is required.

Relocation of Store Facility and Construction of Access Road

Operation of the store facility would require intermittent truck, utility vehicle and forklift movements, with a maximum truck sound power level of 108 dBA and an estimated average sound power level of less than 103 LAeq,15min. After subtracting a distance correction of 71 dBA for the 1.4 km setback distance, a noise level of 32 LAeq,15min is predicted at the receptor which is less than the relevant noise criteria.

66 kV Powerline

Operation of the powerline does not produce significant noise. No further assessment of this component is required.

Operational Noise Summary

Analysis of likely operational noise levels indicate no significant potential for noise associated with the Modification to exceed operational noise criteria at the receptor. The Modification will primarily utilise similar equipment to the existing operations at Integra Underground, however proposed activities will generally be located further from the receptor due to the underground mine progressing generally towards the north (away from the receptor).

A review of the NMP indicates the Plan is likely to remain appropriate for the Modification. No changes to noise limits, noise monitoring locations or other relevant details are recommended for the Modification.

Proposed operational noise levels, from existing sources combined with additional sources proposed as part of the Modification, would not significantly increase given the low predicted noise levels from each component of the Modification. Cumulative noise impacts from the existing operation and the Modification are therefore not expected to occur.

OTHER ACOUSTIC ISSUES

The Modification is not expected to significantly affect other acoustic issues including sleep disturbance, road or rail traffic noise and low frequency noise. No blasting is expected to be required during the construction or operational phases. Some additional traffic will occur during the construction period, however the additional traffic would produce insignificant noise at the receptor and in any case will not persist beyond the construction period of up to 12 months.

CONCLUSION

This assessment indicates the Modification would produce noise levels within the construction noise criteria and operational noise limits. Construction work associated with the Modification should be completed according to the MSIMP. A detailed Construction Noise Management Plan is not considered necessary for the Modification. Similarly the current NMP is considered appropriate to manage construction and operational noise impacts.

Operation of the Modification is unlikely to produce noise levels over the relevant criteria within PA 08_0101 at any privately owned receptor.

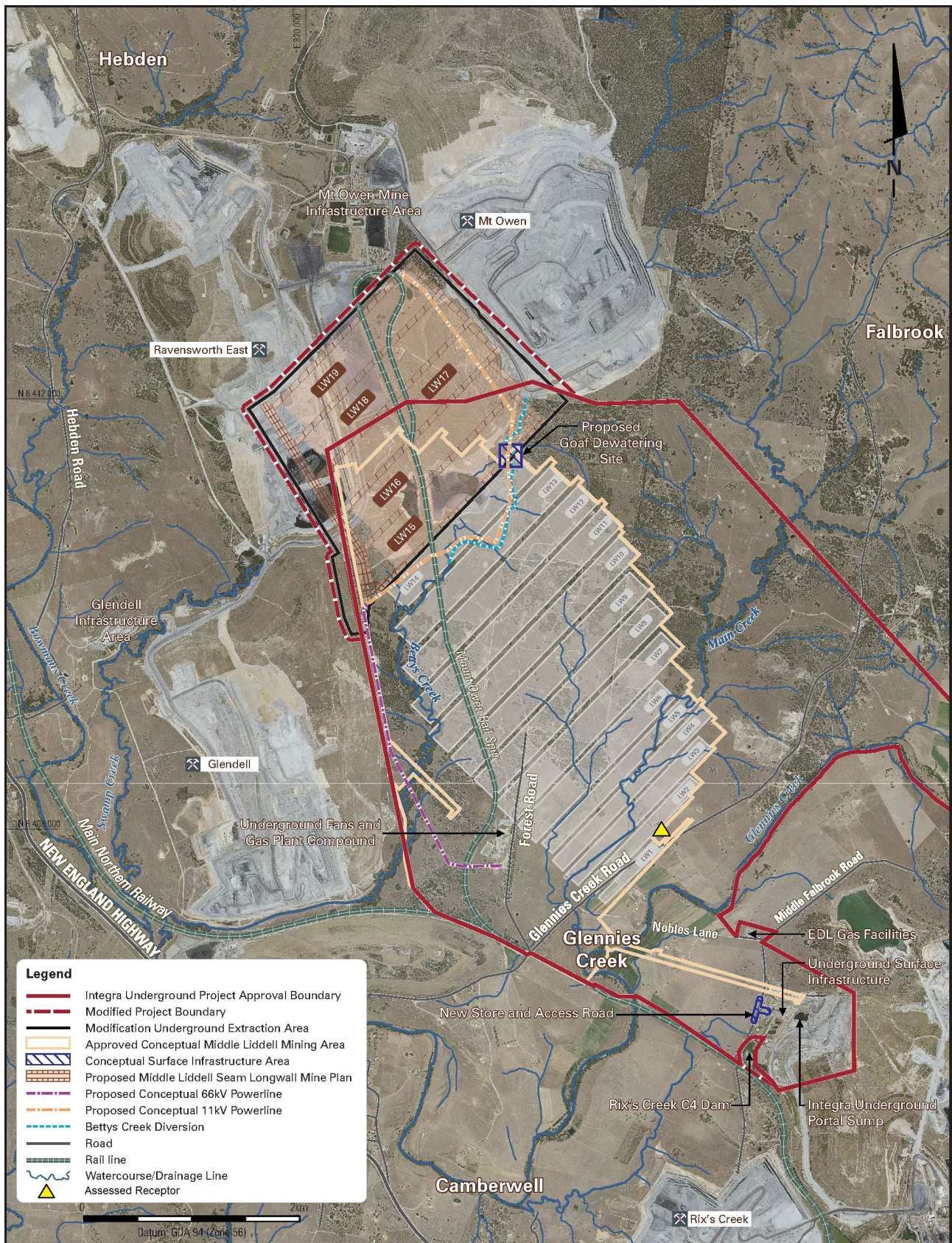
Based on the results of this assessment, the Modification is unlikely to cause significant acoustic impacts. We trust this report presents sufficient information regarding acoustic issues associated with the proposed Modification. Please contact the undersigned for any further information or discussion.

Yours faithfully,

BRIDGES ACOUSTICS

A handwritten signature in dark ink, appearing to read 'M Bridges', is positioned above the printed name.

MARK BRIDGES BE (Mech) (Hons) MAAS
Principal Consultant



INTEGRA UNDERGROUND MINE