GM³
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23 January 2025

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Dear Jessie,

Appin Mine Ventilation and Access Project – Application for 24/7 Blasting

Background

Illawarra Coal Holdings Pty Ltd (ICHPL) received approval for construction of the Appin Mine Ventilation and Access (AMVA) Project as a modification to the Bulli Seam Operations (BSO) Project Approval (MP08_0150) in April 2022, to allow for the construction and operation of two ventilation shafts (VS), mine access infrastructure and improved site access at 345 Menangle Road, Menangle NSW, referred to as the Appin Mine Ventilation and Access Project (AMVA Project).

In August 2024, ICHPL received approval for a modification application (MOD6) to the BSO Project Approval to:

- extend the construction blasting hours at the AMVA Site to Monday to Saturday 7 am to 10 pm and Sunday 8 am to 10 pm; and
- increase the construction blasting frequency to a maximum of two blasts per 24-hour period at each of the AMVA Site ventilation shafts.

Redpath Australia Pty Ltd have been engaged by ICHPL to construct the ventilation shafts. The AMVA Project has completed the pre-sink in VS7 and VS8. The shaft headframe building and winder building including acoustic cladding have been installed over VS8 and the main sink phase commenced 26 October 2024. Excavation of VS8 is currently at a depth of ~70 m and will continue to a target depth of ~ 560 m.

BSO Project Approval

I refer to the BSO Project Approval, Condition 5 of Schedule 4A:

If the Proponent decides to seek the Planning Secretary's approval to carry out blasting outside of the hours specified in condition 5 above, then it must demonstrate that the airblast overpressure levels from the blasting complies with the night-time LAF_{max} sleep disturbance maximum noise trigger level criteria specified in Table 2B of condition 2C, Schedule 4.

ICHPL has engaged SoundIN Pty Ltd (SoundIN) to monitor blast noise results at sensitive receivers near the AMVA Site (Figure 3-1 of SoundIN [2025]) and prepare a report (Attachment A) which:

- Presents measured overpressure L_{Zpeak} and L_{Amax} noise levels associated with the blasts and assesses these levels against relevant limits.
- Compares the measurement results with those from the network of real-time blast monitoring equipment deployed on the site.

It should be noted that, construction blasting criteria (Condition 3, Schedule 4A of the BSO Approval) do not apply if the Proponent has a written agreement with the relevant owner. ICHPL has written agreements with two sensitive receivers which are labelled (R2 and R16). The property which sensitive receiver R3 is located on has been acquired by ICHPL.

SoundIN (2024) analysed the unattended noise monitoring results and concluded:

- The measured L_{Zpeak} levels at all monitoring locations comply with the 115 dBL limit for all measured blasts. In fact, the results were well below the criteria (95 dB or below).
- The measured/estimated L_{Amax} levels at L1 and L2 comply with the (night time) 54 dBA limit for all measured blasts. In fact, the highest estimated L_{Amax} noise levels at L1 and L2 were 48 dBA, which is well below the limit.
- The audible blasts at L1 and L2 exhibited L_{AFmax} levels of 35 – 48 dBA, which is well within the range of typical ambient noise levels from sources such as traffic and wildlife.

The results demonstrate that blasting noise complies with the night-time L_{AFmax} sleep disturbance maximum noise trigger level criteria (54 dBA) specified in Table 2B of condition 2C, and therefore satisfies BSO Project Approval, Condition 5 of Schedule 4A.

Pursuant to BSO Project Approval, Condition 5 of Schedule 4A, ICHPL is seeking the Planning Secretary's approval to carry out blasting on a 24/7 basis (outside of the hours specified in condition 4). It is proposed that the Project CEMP would be updated accordingly.

Justification

1. Current Project Blasting Performance and potential for annoyance from the 24/7 blasting.

Attachment 1 demonstrates that main sink blast noise impacts at sensitive receivers are negligible and that the blast noise mitigation measures being implemented are effective in practice. For the main sink phase, ICHPL has invested significant effort in designing and implementing noise mitigation measures into the construction of the shaft headframe buildings, such as:

- Double skin (2 x 0.55 mm Custom Orb steel sheet) internal and external cladding (i.e. four layers of cladding) with minimum 150 mm cavity with 100 mm of acoustic insulation inside the wall cavity.
- Heavy-duty collar and collar doors to contain the blast inside the shaft.
- Underground concrete encased shaft ventilation system will be blocked at the shaft and at the outlet to the environment during each night-time blast. The ventilation shaft is blocked by a series of acoustic doors separated by the fan room – effectively creating an airlock been the Vent Shaft and the environment. Refer Plates 1 to 6 below.

The headframe buildings demonstrate significant attenuation of L_{Zpeak} and L_{AFmax} levels. Redpaths's acoustic consultant (Waves Acoustic Consulting) indicated that this structures capacity to attenuate sound is likely to exceed 30 dB. Therefore, compliance with the "night time" L_{AFmax} criterion is likely to continue for the duration of the main sink phase. Attachment 1 concludes that three of the five representative blasts analysed at sensitive receivers were either inaudible or below the sound level of the ambient environment.

With the abovementioned noise mitigation measures in place, it is unlikely that any more than negligible additional annoyance would be caused by the proposed increase to 24/7 blasting hours.

We also reiterate that blast overpressure/noise will continue to attenuate with the increasing depth of the shaft.

Plate 1: Acoustics designed VS8 Headframe building

Plate 2: Heavy duty shaft blast doors

Plate 3: Heavy duty headframe doors

Plate 4: Double skin cladding and noise insulation

Plate 5: Underground concrete encased shaft ventilation system

Plate 6: Acoustic doors in VS8 underground concrete encased ventilation system

2. Blast cycle duration and relative frequency of night time blasts.

ICHPL is seeking the Planning Secretary's approval to carry out blasting on a 24/7 basis however it is ICHPL's and the Contractors preference to blast during day or evening shift where practical. This is because there are more contractor staff on site (engineers, technical, Project Manager etc.) that can support any troubleshooting rather than the skeleton mining shift on duty at night time.

The main sink construction cycle involves drilling blast holes, load/charging with explosive, blasting, removing spoil (mucking out), shaft geotechnical reinforcement and installation of concrete shaft lining using movable formwork. The cycle times will vary at any point in time so a shaft crew could be undertaking any activity on any day/evening/night. The ability to blast at any time of nights will improve the overall efficiency of shaft sinking.

It is noted that any charged blast, must be blasted for safety reasons, it may not be delayed until the next day shift.

The typical duration of the shaft construction cycle is in the order of 2-4 days and concrete lining is often installed every second blast depending on the depth. This means that in effect:

- There will be several days per week with no blasts in a day/night when concrete lining activities are taking place inside each shaft (i.e. the nature of the shaft construction cycle inherently provides periods of respite from blasting).
- That it is more likely that blasting will be conducted in day and evening periods (7am – 10 pm) rather than night periods 10 pm – 7 am) simply due to the respective duration of that time window within each day.

The abovementioned factors confirm that the frequency of night time blasts are expected to be relatively low when compared to day/evening blasts.

3. Agreements with potentially affected receivers.

The three nearest receivers have been acquired or agreed to negotiated noise agreements. ICHPL has entered into written noise agreements with receivers identified as R2 and R16 and purchased R3.

4. Current blasting complaint status.

No complaints relating to blasting have been received through the community hotline or the Menangle Advisory Panel (MAP) to date. It is therefore considered that blasting impacts to the community have been minor.

5. Duration and timeframes of blasting.

The pre-sink phase (where shaft sinking down to a depth of ~ 50 m occurs) for both VS7 and VS8 has been successfully completed. The main sink commenced in October 2024 in VS8 and is scheduled for end of Q1 2025 in VS7 if other regulatory approvals are forthcoming. Estimating the duration of blasting for the Project is inherently complex and difficult due to the numerous shaft sinking factors involved and constraints of blasting hours and frequency. If the Project can transition to 24/7 blasting, then a duration in the order of twelve to fifteen months is expected for each shaft.

The SoundIn Report (Attachment 1) demonstrates that the Project is adequately managing blast noise and that blast noise is not causing annoyance to the community. Constraining the Project to the currently approved blasting hours rather than the proposed 24/7 hours would slow shaft sinking rates accordingly, with little environmental or social benefit.

A transition to 24/7 blasting would have the following benefits:

- facilitate more efficient blasting cycles;
- expedite the AMVA Project schedule; and
- reduce the duration of blasting impacts on the community.

In order to maintain longwall continuity and production rates for Appin Mine, the sinking and completion of VS8 is required in order to provide VS8 intake ventilation. Reduction of adequate ventilation at the longwall face would significantly impact production of coal.

ICHPL will continue to implement the following:

- Real-time automated blast monitoring at three locations around the site as per the Project CEMP.
- Targeted blast compliance monitoring at/near receivers.
- If non-compliances are identified, adjustment of blasting (reduced explosive loads, alternative methods, additional stemming etc) to reduce noise levels if necessary.
- Proactive consultation with potentially affected neighbouring residents.
- Ongoing periodic consultation with the MAP via meetings and other updates.
- Project activity updates with residents within 1 km of site.
- General information via the GM³ Community Portal.
- The Project's Community and Environment Officers will be available to manage any queries during the period.

Sincerely,

Gary Brassington

General Manager Sustainability and Approvals

Attachment A

R4 & R10 Blast Monitoring - VS8 Main Sink (SoundIN)

APPIN MINE VENTILATION AND ACCESS PROJECT

R4 & R10 BLAST MONITORING - VS8 MAIN SINK

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VERSION 1.0

JANUARY 2025

PREPARED FOR

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DOCUMENT CONTROL

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies. To describe the overall noise environment, a number of noise descriptors have been developed, and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. The most common of these noise descriptors are defined below.

L_{AFmax} The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time.

L_{A90} The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This descriptor is a common measure of environmental noise.

ABL The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day.

RBL The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

L_{Zpeak} The highest instantaneous sound pressure level, in decibels, with a “Z” frequency weighting. The Z-weighting response replaces the “flat” and “linear” responses. This descriptor is used to measured airblast overpressure from blasting activities.

1 INTRODUCTION

1.1 Background

The Appin Mine is an existing underground coal mine in the Southern Coalfield of New South Wales (NSW) approximately 25 kilometres (km) north-west of Wollongong. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as GM[3].

In April 2022 a modification of the Project Approval (MOD 3) was granted to allow for the construction and operation of two ventilation shafts (VS), mine access infrastructure and improved site access at 345 Menangle Road, Menangle NSW, herein referred to as the Appin Mine Ventilation and Access Project (AMVA Project or the Site).

The main sinking phase has recently commenced in Vent Shaft 8 (VS8), where excavation will continue to a target depth of ~560 m. The same process will be undertaken in VS7 (to a target depth of ~590 m).

1.2 Purpose of this Report

This report has been prepared by SoundIN Pty Ltd (SoundIN) to document the results of unattended blast noise monitoring conducted at two sensitive receivers during December 2024 and January 2025. This report:

- Presents measured overpressure and L_{Amax} noise levels associated with the blasts and assesses these levels against relevant limits.
- Compares the measurement results with those from the network of real-time blast monitoring equipment deployed on the site.

2 BLAST NOISE/OVERPRESSURE CRITERIA

The Project Approval for the AMVA Project stipulates noise limits for construction blasting as follows:

> *The Proponent must ensure that the construction blasting at the Appin Mine Ventilation and Access Site does not cause exceedances of the criteria in Table 11.*
>
> *However, these criteria do not apply if the Proponent has a written agreement with the relevant owner and the Proponent has advised the Department in writing of the terms of this agreement, or if other criteria is agreed by the Planning Secretary*
>
> *Unless the Planning Secretary agrees otherwise, the Proponent must only carry out blasting on the Appin Mine Ventilation and Access Site Monday to Saturday 7 am to 10 pm and Sunday 8 am to 10 pm. No blasting is allowed on public holidays, or at any other time without the written approval of the Planning Secretary unless an additional blast is required following a blast misfire or to ensure the safety of the mine or its workers.*
>
> *If the Proponent decides to seek the Planning Secretary's approval to carry out blasting outside of the hours specified in condition 5 above, then it must demonstrate that the airblast overpressure levels from the blasting complies with the night-time L_{Amax} sleep disturbance maximum noise trigger level criteria specified in Table 2B of condition 2C, Schedule 4.*
>
> *The Proponent may carry out a maximum of 2 blasts per 24 hour period at each of the Appin Mine Ventilation and Access Site ventilation shafts, unless an additional blast is required following a blast misfire.*
>
> *This condition does not apply to blasts required to ensure the safety of the mine or its workers.*
>
> *Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a ventilation shaft of the site.*

The noise criteria for construction blasting set out in Table 11 from the Project Approval are presented in **Table 2-1**. The night-time L_{AFmax} sleep disturbance maximum noise trigger level criteria specified in Table 2B of condition 2C, Schedule 4 is 54 dBA.

Table 2-1 Construction Blasting Criteria

Receiver	Airblast overpressure dB(Lin Peak)	Allowable exceedance
All privately owned residences	120	0%
	115	5% of the total blasts over a period of 12 months

The overpressure criteria in the Project Approval (see **Table 2-1**) are expressed in decibels (dB) with a linear (Lin) frequency weighting. As noted in the glossary, the Z frequency weighting has replaced the linear (Lin) frequency weighting. In this report, the "L_{Zpeak}" noise descriptor is used to describe overpressure impacts from blasts and is consistent with the dB (Lin Peak) nomenclature used in the Project Approval.

3 MONITORING METHODOLOGY

3.1 Permanent Blast Monitors

Monitoring of acoustic impacts associated with blasting project is carried out by a network of blast monitors. The locations of the blast monitors are shown in **Figure 3-1**.

The blast monitors measure both L_{AFmax} and L_{Zpeak} levels from blast events. The measured L_{AFmax} and L_{Zpeak} levels during blasts from the blast monitors have been provided to SoundIN by GM[3].

3.2 Unattended Blast Monitoring

During the periods of 25 November 2024 –3 January 2025, and 6 January –15 January 2025, SoundIN conducted unattended noise monitoring at receivers R4 and R10. The locations of SoundIN's loggers are shown in **Figure 3-1**.

Monitoring location L1, situated on the property of R4, is representative of the most potentially affected receivers on the western side of Menangle Road (R4 – R8). These receivers are situated behind a ridge, along the top of which runs Menangle Road.

Monitoring location L2, situated on the property of R10, is representative of the most potentially affected receivers further to the south of the site.

The SoundIN loggers incorporate NTi XL2 sound level meters. This sound level meter conforms to *Australian Standard 1259 Acoustics – Sound Level Meters* as a Type 1 precision sound level meter which has an accuracy suitable for field and laboratory use.

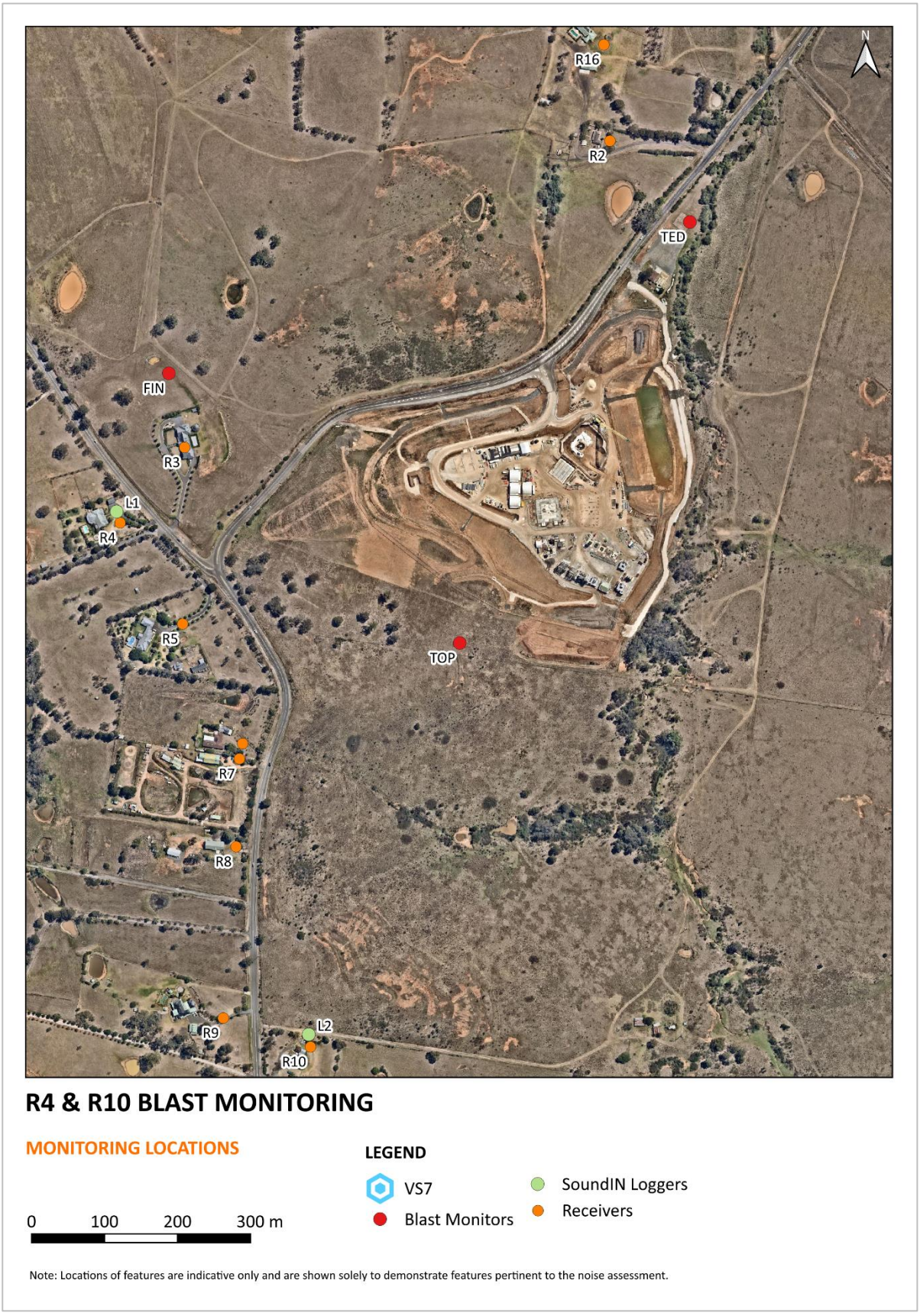
A large rain event on 6 and 7 June resulted in some erroneous data thereafter and some apparent drift in the calibration of the sound level metres. After being dried out, the calibration of the equipment showed no significant drift from the calibration conducted prior to the monitoring.

The noise loggers were set to measure L_{AFmax} and L_{Zpeak} levels at 100ms intervals with contemporaneous audio files.

L_{AFmax} and L_{Zpeak} levels measured by the loggers during blasts with maximum instantaneous charge (MIC) close to that of the blast design for the VS8 main sink phase (10kg) have been identified from the 100ms data. Aural analysis of the audio data has been conducted to ensure that the measured levels correspond to blasting events and not extraneous sources such as traffic, wildlife, etc.

It should be noted that L_{Zpeak} and, in particular, L_{Amax} levels associated with blasts were at times difficult to distinguish from the ambient noise environment.

Figure 3-1 Monitoring Locations



4 RESULTS & DISCUSSION

The results of the noise measurements are summarised in **Table 4-1**. The results indicate that:

- The measured L_{Zpeak} levels at all monitoring locations comply with the 115 dBL limit for all measured blasts. In fact, the results were well below the criteria (95 dB or below).
- On most occasions, the L_{Zpeak} level was able to be determined from the 100ms data whereas the recorded 100ms L_{Amax} levels during the blast did not deviate from their typical ambient levels immediately prior to and after the blast. In these instances, the L_{Amax} level associated with the blast is likely to be at least 5 – 10 dBA below the recorded L_{Amax} level. For assessment purposes, the L_{Amax} level for these blasts is conservatively assumed to be 5 dBA below the typical ambient L_{Amax} levels over the blast interval.
- The measured/estimated L_{Amax} levels at L1 and L2 comply with the 54 dBA limit for all measured blasts. In fact, the highest estimated L_{Amax} noise levels at L1 and L2 were 48 dBA, which is well below the limit.
- No clear trends appear between L_{Zpeak} and/or L_{Amax} levels recorded at L1 and L2 and their nearest permanent blast monitors (FIN and TOP, respectively). The absence of any trends is likely due to the very low L_{Zpeak} and L_{Amax} levels from the blasts and the difficulty in accurately determining these levels from the existing ambient noise environment.
- The audible blasts at L1 and L2 exhibited L_{AFmax} levels of 35 – 48 dBA, which is well within the range of typical ambient noise levels from sources such as traffic and wildlife.
- On the rare occasions that L_{AFmax} levels were clearly identifiable from the 100ms data, they were approximately 40 dB below their corresponding L_{Zpeak} levels at both monitoring locations.

Table 4-1 Noise Monitoring Results

	13/12/2024 11:54 am (MIC = 8.07 kg)	18/12/2024 7:00 am (MIC = 6.05 kg)	23/12/2024 7:00 am (MIC = 8.07 kg)	12/01/2025 8:01 am (MIC = 8.07 kg)	13/01/2025 7:00 am (MIC = 10.1 kg)
L_{Zpeak} (limit = 115 dB)					
L1 (R4)	84	Inaudible, extraneous	66	Inaudible, extraneous	83
L2 (R10)	79	83	77	Inaudible, extraneous	85
TOP (Blast Monitor)	CAL[3]	96	80	85	95
FIN (Blast Monitor)	88	88	74	79	74
TED (Blast Monitor)	80	83	81	86	78
L_{AFmax} (limit = 54 dBA [1])					
L1 (R4)	41	Inaudible, extraneous	35 (40)[2]	Inaudible, extraneous	48 (53)[2]
L2 (R10)	39	48 (53)[2]	41 (46)[2]	Inaudible, extraneous	42 (47)[2]
TOP (Blast Monitor)	CAL[3]	51	49	57	53
FIN (Blast Monitor)	45	53	40	44	42
TED (Blast Monitor)	59	52	63	43	47
Weather Conditions					
Wind speed	1.85	3.42	1.74	0.43	1.15
Wind direction	N	SSE	WSW	SW	SSW

1. L_{AFmax} limit applies only at night (10pm – 7am Monday to Saturday, 10pm – 8am Sunday and Public Holidays)
2. Blast detectable during aural analysis but L_{Amax} level unchanged from typical ambient level. Blast L_{Amax} estimated to be 5 dB below typical ambient L_{Amax} (in brackets).
3. Unit offline for calibration

5 CONCLUSION

This report has been prepared by SoundIN to document the results of unattended noise monitoring of several VS8 main sink blasts conducted between 25 November 2024 and 13 January 2025. This report:

- Presents measured overpressure and L_{Amax} noise levels associated with the blasts and assesses these levels against relevant limits.
- Compares the measurement results with those from the network of real-time blast monitoring equipment deployed on the site.

The measurement results indicate that:

- The measured L_{Zpeak} levels at all monitoring locations comply with the 115 dBL limit for all measured blasts. In fact, the results were well below the criteria (95 dB or below).
- On most occasions, the L_{Zpeak} level was able to be determined from the 100ms data whereas the recorded 100ms L_{Amax} levels during the blast did not deviate from their typical ambient levels immediately prior to and after the blast. In these instances, the L_{Amax} level associated with the blast is likely to be at least 5 – 10 dBA below the recorded L_{Amax} level. For assessment purposes, the L_{Amax} level for these blasts is conservatively assumed to be 5 dBA below the typical ambient L_{Amax} levels over the blast interval.
- The measured/estimated L_{Amax} levels at L1 and L2 comply with the 54 dBA limit for all measured blasts. In fact, the highest estimated L_{Amax} noise levels at L1 and L2 were 48 dBA, which is well below the limit.
- No clear trends appear between L_{Zpeak} and/or L_{Amax} levels recorded at L1 and L2 and their nearest permanent blast monitors (FIN and TOP, respectively). The absence of any trends is likely due to the very low L_{Zpeak} and L_{Amax} levels from the blasts and the difficulty in accurately determining these levels from the existing ambient noise environment.
- The audible blasts at L1 and L2 exhibited L_{AFmax} levels of 35 – 48 dBA, which is well within the range of typical ambient noise levels from sources such as traffic and wildlife.
- On the rare occasions that L_{AFmax} levels were clearly identifiable from the 100ms data, they were approximately 40 dB below their corresponding L_{Zpeak} levels at both monitoring locations.

This report demonstrates that overpressure and noise levels from the blasting comply with applicable noise limits, most notably the night-time L_{Amax} sleep disturbance maximum noise trigger level criteria specified in Table 2B of condition 2C, Schedule 4 of the Project Approval.