

27 May 2022

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Dear Jessie,

RE: APPIN MINE MODIFICATION REPORT – Extended blasting hours and blasting frequency at the Appin Mine Ventilation and Access Project

We refer to our previous correspondence regarding the Appin Mine Ventilation and Access Project (AMVA Project) Modification (the Modification). This document is a Modification Report for the proposed Modification.

Overview

- Illawarra Metallurgical Coal (IMC) received approval for construction of the Appin Mine Ventilation and Access (AMVA) Project as a modification to the Bulli Seam Operations (BSO) Development Consent (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 AMVA Project.
- The AMVA Project site is approximately 35 km northwest of Wollongong, 8 km northwest of Appin and 1.3 km southwest of Menangle.
- IMC proposes a modification to BSO Development Consent (MP08_0150) under section 4.55 (1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to allow extended blasting hours and increased blasting frequency (from one to two blasts per day per shaft) for the AMVA Project.
- The proposed changes are required to allow for the final designed and optimised blasting approach to facilitate efficient delivery of the AMVA Project, including revised bench blasting methods necessitated by challenging geological conditions.
- In consideration of the assessment of impacts in this Modification Report, the Modification would involve minimal environmental impact as defined under section 4.55(1A) of the EP&A Act.
- In weighing up the main environmental impacts (costs and benefits) assessed and described in this Modification Report, the Modification is, on balance, considered to be in the public interest of the State of NSW.

1 INTRODUCTION

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 (Figure 1). Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as IMC.

Illawarra Coal Holdings Pty Ltd (Illawarra Metallurgical Coal [IMC]), a wholly owned subsidiary of South32, is the owner and operator of the Appin Mine. IMC is proposing a modification of the Bulli Seam Operations (BSO) Project Approval (the Modification) to allow extended blasting hours and increased blasting frequency (from one to two blasts per day per shaft) for the AMVA Project. The purpose of this Modification Report is to provide a detailed description of the Modification and to provide a statement of the resulting potential environmental effects.

The BSO Project Approval incorporates the underground longwall mining operations, which extract coal from the Bulli Seam using longwall mining methods, and the associated surface activities. The Mine primarily produces hard coking (metallurgical) coal and has an approved operational capacity of up to 10.5 Million tonnes per annum (Mtpa) of Run-Of-Mine (ROM) coal until 2041.

Longwall mining is currently being undertaken in the approved mining Area 7, following completion of longwall mining activities at West Cliff Colliery in early 2016.

Key surface facilities at the Appin Mine include the:

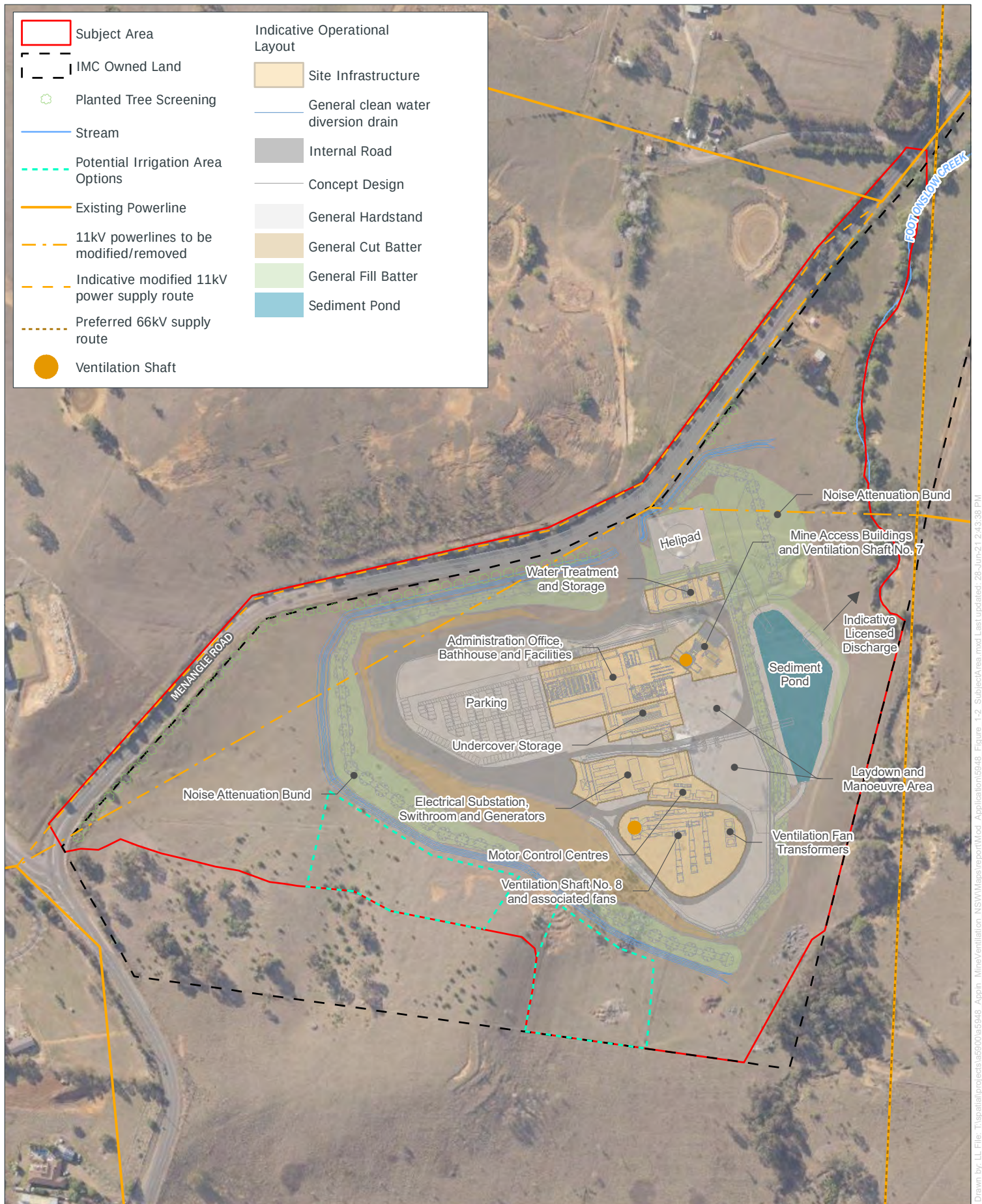
- Appin East Colliery (Appin East);
- Appin West Colliery (Appin West);
- Appin North Colliery (Appin North);
- West Cliff Coal Preparation Plant (WCCPP);
- West Cliff Emplacement Area (WCEA);
- Appin East No. 1 and No. 2 ventilation shaft site;
- Appin East No. 3 ventilation shaft site;
- Appin West No. 6 ventilation shaft site;
- Douglas Park substation site; and
- AMVA Project site (Figure 2 – General Arrangement).

ROM coal is extracted from the Mine's underground mining operations and delivered directly to the WCCPP by winder and conveyor, or is transported from Appin East via truck along Appin and Wedderburn Roads to the WCCPP. Processed coal (clean coal product) from the WCCPP is transported by road to the Port Kembla Coal Terminal (PKCT) for shipping to domestic and international customers, BlueScope Steel or other local customers. Appin Mine is accessed via the shaft at Appin West and drifts at Appin North and Appin East.

The Mine is ventilated by two distinct ventilation districts; Appin Mine and Appin North. The Appin Mine district is ventilated by two upcast shafts (No. 2 and No. 6), four downcast shafts (No. 1, No. 3, No. 4, and No. 5) and two intake drifts at Appin East. The Appin North district is ventilated by one upcast shaft (No. 1), one downcast shaft (No. 2) and one intake drift at Appin North.

RUC Cementation Mining Contractors Pty Ltd (RUC) have been engaged by IMC to construct the ventilation shafts for the AMVA Project. The AMVA Project has recently completed the pre-sink in Vent Shaft 8 (VS8) (excavation down to ~ 50 m below ground level) and is currently undertaking pre-sink in Vent Shaft 7 (VS7).

Following placement of the sinking stage in the shaft and completion of the shaft headframe building and winder building, VS8 will commence the main sink phase (expected mid-2024) 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).



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FIGURE 2

General Arrangement

Appin Mine Ventilation and Access Project



2 STRATEGIC CONTEXT

The AVMA Project site comprises the majority of Lot 20A DP 44508, as well as a portion of the Menangle Road reserve. The AVMA Project site is approximately 35 km northwest of Wollongong, 8 km northwest of Appin and 1.3 km southwest of Menangle. The AVMA Project site is within the Bulli Seam Operations Project Longwall Mining Area and the South Campbelltown Mine Subsidence District in the Southern Coalfield of NSW. The western extent of the AVMA Project site is bounded by Menangle Road and the eastern side by Foot Onslow Creek. The Hume Motorway is approximately 670 m east of the AVMA Project site. There are no protected areas, such as reserves or national parks, adjacent to the Site.

The AVMA Project site is located within the Wollondilly Local Government Area (LGA) and is zoned as RU2 Rural Landscape under Part 2 of the Wollondilly Local Environmental Plan 2011 (LEP).

Access to the AVMA Project site is via a gated, gravel driveway and track from Menangle Road, approximately 600 m north of its intersection with Finns Road. Menangle Road consists of two 3.5 m wide lanes on a single undivided carriageway. IMC has upgraded the intersection on Menangle Road to ensure safe entry and exit from the Site throughout both the construction and operational phases of the Project.

A number of rural residential properties are in the general location of the AVMA Project site and may be potentially impacted by the AVMA Project. These rural residential properties are considered sensitive receivers for the purposes of assessing the potential impacts of the AMVA Project on noise and air quality in the local area.

Following approval of the AMVA Project, the receiver environment has changed significantly as the three nearest receivers have been acquired or agreed to negotiated noise agreements. IMC has entered into written noise agreements with receivers identified as R2 and R16 and purchased R3 (as shown in the map in Appendix 3 of the Project Approval titled “Appin Ventilation and Access Project – Sensitive Receivers”).

3 DESCRIPTION OF THE MODIFICATION

The purpose of the proposed Modification is to request extended blasting hours and increased blasting frequency (from one to two blasts per day per shaft). These proposed changes are required to allow for the final designed and optimised blasting approach to facilitate efficient delivery of the AMVA Project, including revised bench blasting methods necessitated by challenging geological conditions.

Project Approval

Construction-specific environmental conditions are provided in Schedule 4A of the consent which contains the following conditions in relation to blasting:

Blasting Criteria

3. 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.

Table 11: Construction blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

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.

Blasting Hours

3. Unless the Planning Secretary agrees otherwise, the Proponent must only carry out blasting on the Appin Mine Ventilation and Access Site Monday to Friday 9 am to 5 pm and Saturday 9 am to 1 pm. No blasting is allowed on Sundays, 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.
4. 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.

Blasting Frequency

5. The Proponent may carry out a maximum of 1 blast 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.

Schedule 4A Condition 2 also requires that each blast during main sink must also satisfy the following L_{Amax} noise condition during the night-time period (this is additional to Condition 3 in regard to airblast overpressure).

2. The Proponent must ensure that the noise generated by construction of the Appin Mine Ventilation and Access Site does not exceed the noise impact assessment criteria set out in Table 2B of condition 2C, Schedule 4 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 2B: Operational noise criteria dB(A)

Location	Day L_{Aeq} (15 min)	Evening L_{Aeq} (15 min)	Night	
			L_{Aeq} (15 min)	L_{Amax}
All privately owned residences	43	43	39	54

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Justification For Proposed Increased Blasting Frequency

Condition 6, Schedule 4A of the Consent permits “a maximum of 1 blast 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”.

Conventional full floor blasting was undertaken for VS8 pre-sink and worked satisfactorily through the overlying Ashfield Shales strata. However, the method has proven less efficient in the harder underlying Hawkesbury Sandstone strata.

Based on experience to date with the sandstone, a “Bench Blasting Method” is proposed to be adopted in main sink and potentially with pre-sink in VS7 once fully in sandstone due to the larger cross-sectional area of VS7 (diameter of ~8.1 m unfinished). A bench blast design is represented in Figures 3 and 4 below. Figure 5 shows full floor blasting method.

Rather than a full face/ floor blast, only half ($\frac{1}{2}$) the face is blasted at one time, which is staggered (Figure 3). This methodology reduces the time between blasts and two (2) blasts per shaft can occur within a 24-hour period, albeit these are only ~ 50% of the full-face load (explosive power).

Bench blasting in these conditions is more efficient as the face of the bench provides additional unconfined surface area for the explosive force to act upon and fracture the rock mass into free space. Conventional full floor blasting maybe be reverted to if the bench blasting is no longer required i.e. softer underlying strata conditions.

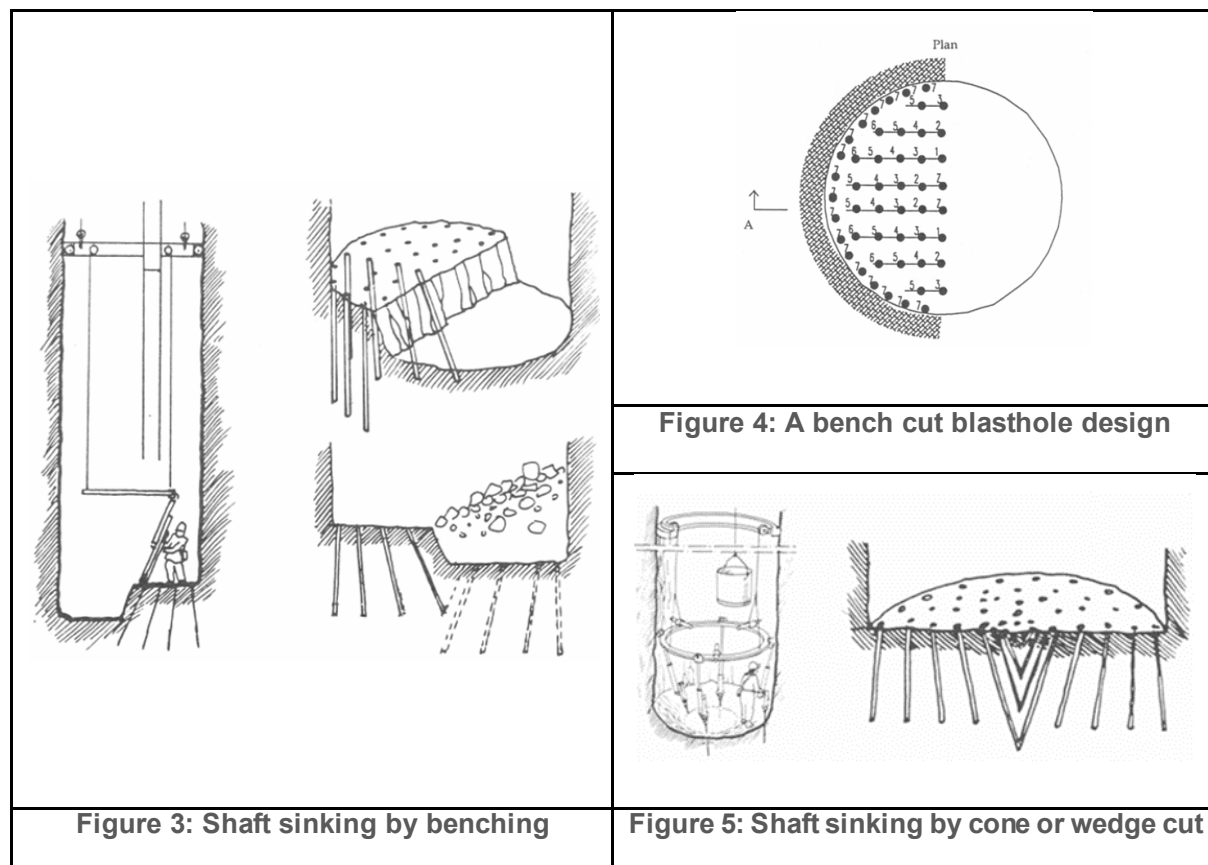
It has been identified that the AMVA Project is likely to encounter gassy zones (identified ~250 m - 350 m depth), which will require the use of lower power explosives (required by law - electronic programmable detonators are not permitted), and in this circumstance bench blasting will be the only available option. In the event that the gaseous zone has sufficient gas levels to trigger the legislative requirement which prohibits programmable electronic detonators, blasting operations will employ electric detonators and lower powered explosives.

If only one blast per shaft per day is permitted, this would add considerable time to the AMVA Project with extended waiting periods with no activity between some blasts. Consent for two blasts per day (per shaft) would expedite the shaft sinking process and reduce AMVA Project duration and related impacts to the community i.e. reduced construction duration.

No community complaints due to blasting have been received for the VS8 pre-sink to date, noting that:

- Blast overpressure/noise will continue to attenuate with depth.
- Blast noise in main sink will be effectively mitigated by the acoustically designed headframe buildings and shaft collar doors (Appendix 1).
- Blast overpressure from VS8 pre-sink was evaluated to be compliant to the consent blast criteria (Appendix 2).

It should be noted that in each shaft, there will still be several days per week with no blasts in a day when concrete lining activities are taking place.



Justification For Proposed Extended Blasting Hours

Background

The RWDI noise assessment accompanying the AMVA Project application recommended an L_{Amax} noise limit of 75 dBA, citing a summary on sleep disturbance from the NSW Road Noise Policy and noting that a maximum of 2 blast events could occur per night.

In the Modification Assessment Report, the Department stated:

However, the Department does not consider it appropriate to approve OOH blasting unless the applicant can demonstrate that the blasting would not cause annoyance or sleep disturbance for surrounding residences. In order for this to be achieved, the Department considers that airblast overpressure levels from blasting should comply with the sleep disturbance criteria established under the NPfI,which the Department imposed as 54 dBA.

Sleep disturbance/ L_{Amax} noise levels are assessed during the night time assessment period, defined in the NSW Noise Policy for Industry (NPfI) as 10pm – 7am Monday to Saturday and 10pm – 8am on Sundays and Public Holidays.

If the Department were to permit the proposed extended blasting hours, then the available timewindows for blasting would be significantly longer which would facilitate more efficient blasting cycles and reduce the AMVA Project construction period.

Context

It is proposed that blasting hours be increased to 7 am to 10 pm Monday to Saturday and 8am to 10pm Sunday (rather than 9 am to 5 pm Monday to Friday and Saturday 9 am to 1pm). The night time sleep disturbance criteria (L_{Amax} of 54 dBA) would not apply as these hours are outside the period assessed as the night time assessment period.

The current blasting hours provide a window of only eight (8) hours on Monday to Friday in which to conduct the proposed two blasts (as outlined above). This is insufficient time to prepare blast holes, load/charge, test, fire, remove the spoil (muck out), then repeat the cycle.

With the current approved blasting times, up to four (4) shifts per week can be lost due to the inability to blast past 1pm on Saturdays. This is a significant constraint on AMVA Project efficiency and schedule.

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 bore and charge on nights with firing early the following morning will improve the overall efficiency of shaft sinking. It is estimated that approval of the proposed extended hours and two blasts per day per shaft could expedite the AMVA Project schedule by around twenty percent (20%) compared to the current hours.

An extension of blasting hours as requested would:

- facilitate more efficient blasting cycles, using the bench blasting method described above (where required);
- expedite the AMVA Project schedule;
- reduce the duration of blasting impacts on the community;

- facilitate continued blast cycle efficiency (up to 2 cycles per day) in gassy zones requiring permitted explosives (lower power explosive); and
- Facilitate a smoother transition to proposed 24/7 blasting at the consent LAmax noise levels.

It is noted that subsequent to approval of the AMVA Project, the receiver environment has changed significantly as the three nearest receivers have been acquired or agreed to negotiated noise agreements. IMC has entered into written noise agreements with receivers identified as R2 and R16 and purchased R3 (as shown in the map in Appendix 3 of the Development Consent titled “Appin Ventilation and Access Project – Sensitive Receivers”).

It is requested blasting hours be increased to 7 am to 10 pm Monday to Saturday and 8am to 10pm Sunday (rather than 9 am to 5 pm Monday to Friday and Saturday 9 am to 1pm) via either:

- Revision of the AMVA Project CEMP blasting hours, or
- Revision of Schedule 4A consent condition 4 to:

*Unless the Planning Secretary agrees otherwise, the Proponent must only carry out blasting on the Appin Mine Ventilation and Access Site **7 am to 10 pm Monday to Saturday and 8am to 10pm Sunday**. No blasting is allowed on ~~Sundays~~, public holidays, or at any other time without the written approval of the Planning Secretary unless an additional blast is required for ~~following a blast misfire~~ **safety purposes or misfire management reasons**.*

Misfire Definition and Management

A technical misfire recently occurred at the AMVA Project which necessitated an out of hours blast which was reported to DPHI. The current consent condition wording implies such an out of hours blast would be considered a non-compliance, whereas the Construction Environmental Management Plan (CEMP) has a broader provision that facilitates emergency blasts after hours if required. Additional information is provided below to clarify the matter for DPHI and seek concurrence regarding out of hours blasts required for safety purposes.

A misfire can be defined as ‘any shot that fails, or partially detonates’. The AMVA Project uses electronic detonators.

A technical misfire can occur with electronic detonators, if a face is charged, logged and then when the exploder is finally wired into the blast circuit to undertake the blast, there is a fault or error code due to a faulty detonator or connection. In this case, clearly the blast cannot take place and the fault must be found and rectified. This is a technical misfire as the shot has failed.

With normal detonators the shot would be fired and there would be unexploded explosives and detonators in the muck pile, which would then become reportable and a potential hazard when mucking out.

Electronic detonators provide a more robust system. Once a fault is indicated it can take several hours to re-enter the shaft, identify the faulty detonator(s) and replace those faulty items.

It is the same as charging a normal face, then retreating and connecting the blast wire to find there is a continuity problem. Fault finding has to take place before the face can be fired. It becomes a “charged face” and must be treated as such until detonated.

It is requested that the Department either:

- Revise the Schedule 4A Consent Condition 4 to add.... *unless required for safety purposes or misfire management reasons*', (as per red text in above suggestions) or
- Acknowledge that the AMVA Project may continue to manage misfires in accordance with the description in the CEMP, and that any resultant blasts out of hours would be notified to DPHI, but not as a non-compliance.

The Modification would involve no change to:

- Approved longwall mining.
- Approved surface disturbance.
- Mine life, mining activities or other surface activities associated with the approved Appin Mine.
- Employment numbers at the Appin Mine.

To date, MP08_0150 has been modified on three occasions. A comparative analysis that outlines the Appin Mine components of the approved AVMP Project and the key components of the Modification is provided in Table 1.

Table 1
Comparison of the Approved Appin Mine and Modified Project

Project Component	Approved Appin Mine (MP08_0150)				Modified Project
Blasting Criteria	Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance	No change.
	Residence on private property	120	10	0%	
		115	5	5% of the total number of blasts over a period of 12 months	
Blasting Hours	Blasting on the Appin Mine Ventilation and Access Site Monday to Friday 9 am to 5 pm and Saturday 9 am to 1 pm. No blasting is allowed on Sundays or public holidays.				Blasting hours be amended to 7 am to 10 pm Monday to Saturday and 8am to 10pm Sunday. No blasting is allowed on public holidays.
Blasting Frequency	Maximum of 1 blast per 24 hour period at each of the Appin Mine Ventilation and Access Site ventilation shafts.				Maximum of 2 blasts per 24 hour period at each of the Appin Mine Ventilation and Access Site ventilation shafts.
Blasting Misfire Definition	No blasting is allowed on ... or at any other time without the written approval of the Planning Secretary unless an additional blast is required for following a blast misfire.				No blasting is allowed on ... or at any other time without the written approval of the Planning Secretary unless an additional blast is required for safety purposes or misfire management reasons.

Project Component	Approved Appin Mine (MP08_0150)	Modified Project
		Safety purposes or misfire management resultant blasts out of hours would be notified to DPHI, but not as a non-compliance.
Construction and Operating Hours	<u>Construction (Table 7B of schedule 2)</u> Shaft sinking activities prior to the construction of acoustic sheds/mitigation can occur between 7.00am to 6.00pm, Monday to Friday, 8.00am to 1.00pm Saturday. No works on Sunday or Public Holidays.	Shaft sinking hours be amended to 7 am to 10 pm Monday to Saturday and 8am to 10pm Sunday. No blasting is allowed on public holidays.

4 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the Modification. In accordance with the guideline *Preparing a Modification Report* (Department of Planning, Industry and Environment [DPIE], 2021), Attachment 1 provides a statutory compliance table for the AMVA Project incorporating the Modification that identifies all the relevant statutory requirements and the relevant sections in this Modification Report that address these requirements.

Environmental Planning and Assessment Act 1979

IMC is seeking to modify Project Approval (MP08_0150) under section 4.55(1A) of the EP&A Act. Section 4.55(1A) relevantly provides.

- (1A) **Modifications involving minimal environmental impact** A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—
- (a) it is satisfied that the proposed modification is of minimal environmental impact, and
 - (b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and
 - (c) it has notified the application in accordance with—
 - (i) the regulations, if the regulations so require, or
 - (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and
 - (d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

Subsections (1), (2) and (5) do not apply to such a modification.

In accordance with clause 3BA(6) of Schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*, the consent authority is required to satisfy itself that any consent as modified would result in the AMVA Project remaining substantially the same development as was last modified under section 75W of the EP&A Act (i.e. Modification 3, which is the existing/approved Appin Mine), inclusive of consideration of the changes arising from previously approved modifications.

A comparative analysis that outlines the Appin Mine components of the approved AMVA Project and the key components of the Modification is provided in Table 1. The AMVA Project incorporating the Modification would demonstrably remain a large coal mine project that incorporates the key elements approved under Project Approval (MP08_0150).

Furthermore, this Modification Report includes a Statement of Environmental Effects in accordance with clause 115(1)(e) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The assessments contained herein conclude that the Modification is of “minimal environmental impact”.

Accordingly, the consent authority can be satisfied that the AMVA Project incorporating the Modification would remain “substantially the same” and that the Modification is of “minimal environmental impact”.

Objects of the NSW Environmental Planning and Assessment Act 1979

Section 1.3 of the EP&A Act describes the objects of the EP&A Act. The modification is considered to be generally consistent with the objects of the EP&A Act, as it:

- would continue to involve the orderly economic use and development of land at the AMVA Project;
- would continue to be ecologically sustainable development, with no significant change to the currently accepted environmental impacts, and not increase in the duration of existing impacts of the AMVA Project, with the proposed changes resulting in shortening of the project duration and related impacts to the community; and
- would be developed in a manner that incorporates community engagement, with a range of stakeholders consulted through the preparation of this Modification Report.

Evaluation under section 4.15(1) of the Environmental Planning and Assessment Act 1979

In evaluating the Modification, under section 4.15(1) of the EP&A Act, the consent authority is required to take into consideration a range of matters as they are of relevance to the subject of the application. While this is a requirement of the consent authority, this Modification Report has been prepared to generally address the requirements of section 4.15(1) of the EP&A Act to assist the consent authority as follows:

- Detail on potential Modification requirements under the key environmental planning instruments is included in the statutory compliance table provided in Attachment 1.
- Clause 11 of the *State Environmental Planning Policy (State and Regional Development)*, 2011 states that development control plans do not apply to State Significant Developments, such as the Modification.
- IMC will continue to sponsor initiatives in accordance with the requirements of Project Approval (MP08_0150).
- This Modification Report has been prepared in consideration of the prescribed matters in the EP&A Regulation.
- A description of the existing environment, an assessment of the potential environmental impacts associated with the Modification, and a description of the potential measures to avoid, mitigate, rehabilitate, remediate, monitor and/or offset the potential impacts of the Modification are described in this Modification Report.
- The suitability of the Modification site has previously been considered and would not change for the Modification (i.e. the Modification disturbance areas are wholly located within Consolidated Coal Lease 767).
- Consideration of whether, on evaluation, the Modification is considered to be in the public interest is provided in this Modification Report.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) requires the consent authority to consider whether a development proposal is a potentially hazardous industry or a potentially offensive industry. This is addressed in Section 6.11 of the Modification 3 Modification Report (South32, 2021). The AMVA Project is not potentially hazardous or offensive and, therefore, a preliminary hazard analysis has not been prepared.

Other Relevant NSW Legislation

Other NSW legislation that may be applicable to the AMVA Project were described in the AMVA Project Modification Report (South32, 2021). IMC would continue to obtain relevant licences or approvals required under this NSW legislation for the AMVA Project, incorporating this Modification.

Biodiversity Conservation Act 2016

The Modification does not seek to change the approved surface development extent for the and would not involve additional potential impacts on biodiversity to those previously assessed.

National Parks and Wildlife Act 1974 (NPW Act)

The Modification does not seek to change the approved surface development extent for the and would not involve additional potential impacts on Aboriginal cultural heritage to those previously assessed.

Wollondilly Local Environmental Plan 2011 (LEP)

The Wollondilly LEP applies to the AVMA Project. The Site is zoned RU2 Rural Landscape under the LEP. The AVMA Project's consistency with the zone objectives is described in detail in Section 4.6.4 of Modification Report 3 (South32, 2021). The Modification has been developed in a manner that considers the impacts, mitigation measures and management measures required for effective land uses. The Modification would facilitate local and regional employment and economic development opportunities.

Environment Protection and Biodiversity Conservation Act 1999

The AMVA Project was approved under the *Environment Protection and Biodiversity Conservation Act 1999* on 15 May 2021 (EPBC 2010/5350). It is concluded that the Modification would not have a significant impact on Matters of National Environmental Significance for the following reasons:

- The Modification would not have a significant impact on listed threatened species and ecological communities and/or migratory species as there would be no additional surface development area.
- The Modification would not have a significant impact on wetlands of international importance.
- The Modification would not have a significant impact on World Heritage properties or national heritage places.
- The Modification would not impact the Great Barrier Reef Marine Park and/or Commonwealth marine areas.
- The Modification is not a nuclear action.
- The Modification would not have a significant impact on water resources.

It is therefore considered that there is no need to refer the Modification to the Commonwealth Minister.

5 ENGAGEMENT

Landholders within 1 km of the AMVA Site, members of the Menangle Advisory Panel (MAP) and members of the Appin Community Consultative Committee were notified in writing of the proposed Modification on 11 April 2024. The information was distributed via letter or email and provided details of the Modification. A copy of the letter is available in Attachment 2. Approximately 45 emails/letters were distributed.

The MAP is a forum enabling regular two-way communication between representatives of Menangle and Douglas Park and IMC about the AMVA Project. The MAP was briefed on the proposed Modification during a tour of the AMVA Site's facilities on 6 May 2024. The site visit also included a presentation on the function and use of onsite monitoring equipment. Members were given the opportunity to ask questions during this meeting. No concerns or issues were raised regarding the Modification.

To date, no enquiries or concerns have been received from the local community on the Modification.

IMC will continue ongoing consultation with the community, including:

- Periodic consultation with the MAP via meetings and other updates as required.
- General information and Project updates will also be communicated to the community via emails, letters, newsletters, and the IMC Community Portal.
- The Project's Community and Environment Officers will be available to respond to any queries regarding the proposed Modification.

6 ASSESSMENT OF IMPACTS

IMC has prepared this Modification Report to address the key potential environmental impacts of the Modification. The Modification Report includes:

- a description of the approved and modified Appin Mine;
- a description of the strategic and statutory context of the Modification;
- a summary of the stakeholder engagement undertaken for the Modification; and
- an assessment of the potential environmental impacts of the Modification, including comparison with approved potential environmental impacts of the Appin Mine.

The key environmental matters identified are summarised in Table 2 and addressed in this section.

Table 2
Summary of Key Potential Environmental Matters/Impacts

Environmental Aspect	Key Potential Environmental Issues/Impacts	Report Section
Noise	• limited potential for increased noise impacts during VS7 and VS8 main sink phase, mitigated by monitoring and management measures	Appendix 1
Noise	• limited potential for increased noise and overpressure impacts during VS7 pre-sink phase, mitigated by monitoring and management measures.	Appendix 2

Blast Noise – Main Sink

Waves Acoustic Consulting modelled the predicted Airblast Overpressure and L_{AFmax} for main sink at VS7 and VS8 of the AVMA Project. The modelling accounted for the proposed detailed design mitigation measures (Appendix 1). The predicted blasting results show that the L_{AFmax} noise criteria of 54 dB are satisfied at all residential receivers for blasts at both VS7 and VS8, provided the collar doors, headframe and ventilation shaft are closed.

The acoustically designed headframe buildings and shaft collar doors will effectively mitigate the blast noise.

Blasting Overpressure Review

Waves Acoustic Consulting undertook a review of the Airblast Overpressure monitoring results from the VS8 pre-sink construction phase of the AVMA Project (Appendix 2).

The results show that the Project Approval conditions were satisfied at each receiver for each blast, with all the Overpressure results below the 95% 115 dB L_{zpeak} criteria. The risk of Overpressure exceedances at any receiver is considered low (Appendix 2).

Ground Vibrational Levels

Condition 3, Schedule 4A of the Bulli Seam Operations Project Approval (MP08_0150) provides blasting criteria during the construction phase of the AMVA Project. Maximum ground vibrational criteria is provided in Table 11 of Condition 3.

Ground vibration caused by construction blasting at the AMVA Project is monitored at three locations on IMC owned property in and around the AMVA Site (Figure 6).

At the time of writing, 27 blasts have occurred at VS8 and 20 at VS7. The data captured during pre-sink blasting at VS8 used a type of blast monitor which had a limited recording range. While there were no exceedances recorded, the monitoring system was replaced with an upgraded Class1 monitor with full spectrum bandwidth to ensure data integrity. Due to the recording limitations data from the VS8 blasts are not considered further, however the VS7 blasting results are considered comparable.

A summary of the ground vibration monitoring results for VS7 is provided in Table 3.

Table 3
Ground Vibration Monitoring Results for VS7 Blasting

Monitoring Locations	Average Ground Vibration (mm/s)	Maximum Ground Vibration (mm/s)	Number of Exceedances
TOP	0.107	0.165	0
FIN	0.141	0.226	0
TED	0.148	0.298	0

The highest average ground vibration level of the three monitoring locations was 0.148 mm/s. The largest ground vibration induced by blasting at VS7 was 0.298 mm/s on 10 May 2024. The ground vibration levels are significantly less than the criteria approved in Table 11 of Section 3. Further, the nearest sensitive receivers are located further away from the AMVA Site than the monitoring locations, and therefore would experience further reduced ground vibration levels.

As a result of the proposed Modification, where two additional blasts may occur in a 24 hour period, there is no material change to potential vibration impacts as were assessed in the Noise and Vibration Impact Assessment (RWDI 2021) prepared for the AMVA Project Application (MOD 3). The mitigation and management measures developed in MOD 3, the CEMP (South32 2023) will continue to be implemented to manage vibration impacts to within the approved limits. It is therefore considered that further assessment of ground vibration levels is not required to justify the proposed Modification.

Proposed Mitigation And Management Measures

IMC will be implementing the following mitigation and management measures for the AVMA Project:

- Real-time automated blast monitoring at three locations around the site as per the AVMA Project CEMP.
- Targeted blast compliance monitoring at/near receivers.
- For Main Sink – integrated design measures for blast noise mitigation including the shaft headframe building facade design and shaft heavy duty collar doors.

- 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 to discuss current onsite noise attenuation and options for noise mitigation treatment at their property.
- Periodic consultation with the MAP via meetings and other updates as required.
- General information and Project updates will also be communicated to the community via emails, letters, newsletters, and the IMC Community Portal.
- The Project's Community and Environment Officers will be available to respond to any queries regarding the proposed Modification.



Illawarra
Metallurgical
Coal

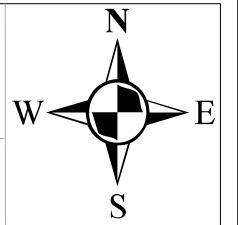
-  Vibration and Overpressure Monitoring
-  Ventilation Shafts
-  Main Roads
-  Minor Roads



AMVA Vibration Monitoring Figure 6

Date: May, 2024
Author: J. Parkinson

Version 1
Horizontal Datum
MGA - Zone 56



7 EVALUATION OF MERITS

The Modification would facilitate the timely completion of the AVMA Project at the Appin Mine. The modified Appin Mine would be substantially the same as the existing/approved Appin Mine. The Modification Report concludes that the Modification is of minimal environmental impact.

The proposed extended blasting hours and increased blasting frequency can be carried out with minimal impact to the community and would result in significant benefits to the project and community, including a reduced construction period.

In weighing up the main environmental impacts (costs and benefits) associated with the proposal as assessed and described in this Modification Report, the Modification is, on balance, considered to be in the public interest of the State of NSW.

If you have any queries, please don't hesitate to contact Cody Brady (Cody.Brady@south32.net) or myself.

Yours sincerely



Gary Brassington
Approvals Manager
South32 Ilawarra Metallurgical Coal

8 REFERENCES

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- Department of Planning and Infrastructure (2011). *Assessment Guideline: Multi-level Risk Assessment*.
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- Waves Acoustic Consulting (2024b). *Vent Shaft 8 Pre-Sink - Blasting Overpressure Review*.

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APPENDIX 1
MAIN SINK BLASTING NOISE REVIEW AND NOISE MITIGATION MEASURES
(WAVES ACOUSTIC CONSULTING, 2024A)

11/04/2024

Document No. 60.00915.01 LTR6R3.docx

RUC Cementation Mining Contractors Pty Ltd
3/138 Abernethy Road
Belmont
Perth
WA 6104

Attention: Nigel Bennett

Dear Nigel

Consultant Advice Notice
Appin Mine Vent Shaft Construction
Main Sink - Blasting LAFmax Review

1 Introduction

The Appin Mine Vent Shaft Construction project involves controlled blasting to progress excavation of the vent shafts. The consent conditions for the project stipulate the following Airblast Overpressure criteria are met at the nearest residential receivers for each blast:

CONSTRUCTION BLASTING

Blasting Criteria

3. 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.

Table 11: Construction blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

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

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During the Main Sink period each blast must also satisfy the following LAFmax noise condition during the night-time period (this is additional to the airblast overpressure condition).

Operational Noise - Appin Mine Ventilation and Access Site

- 2C. The Proponent must ensure that the noise generated by operational activities at the Appin Mine Ventilation and Access Site does not exceed the noise impact assessment criteria set out in Table 2B at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 2B: Operational noise criteria dB(A)

Location	Day <i>L_{Aeq} (15 min)</i>	Evening <i>L_{Aeq} (15 min)</i>	Night	
			<i>L_{Aeq} (15 min)</i>	<i>L_{Amax}</i>
All privately owned residences	43	43	39	54

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

The project will start Main Sink blasting at Vent Shaft VS8 in mid-2024.

The following letter discusses the night-time LAFmax noise level predictions for the Main Sink blasting at Vent Shaft VS7 and VS8.

2 Site Overview

Figure 1 and Table 1 illustrate the location of the site and the nearest residential receivers.

Figure 1. Site Location and Surrounding Area



Aerial photography courtesy of NSW Imagery

The site is situated in a rural location and is surrounded by rural residential dwellings in all directions. Table 1 below illustrates the offset distances from Vent Shaft VS7 and VS8 to the nearest residential receivers.

Table 1. Summary of Receiver Distance to VS7 & VS8

Receiver ID	Receiver Address	VS7 Distance (m)	VS8 Distance (m)
4	15 Finns Road, Menangle	670	623
5	3 Finns Road, Menangle	649	569
6	430 Menangle Road, Menangle	645	536
7	436 Menangle Road, Menangle	664	554
8	450 Menangle Road, Menangle	741	619
9	470 Menangle Road, Menangle	941	811
10	475 Menangle Road, Menangle	921	784
11	485 Menangle Road, Menangle	1030	893
12	486 Menangle Road, Menangle	1162	1031
13	775 Moreton Park Road, Menangle	1152	1089
14	251 Menangle Road, Menangle	1153	1274
15	235 Menangle Road, Menangle	1114	1249
17	195 Menangle Road, Menangle	1579	1714
18	110 Finns Road, Menangle	1405	1477
19	25 Carrolls Road, Menangle	1240	1255
20	47 Carrolls Road, Menangle	1306	1297
21	45 Finns Road, Menangle	1159	1154
22	45 Carrolls Road, Menangle	1164	1142
23	35 Finns Road, Menangle	1006	962
24	5 Finns Road, Menangle	943	871
25	454 Menangle Road, Menangle	1025	929
26	460 Menangle Road, Menangle	1117	1013
27	474 Menangle Road, Menangle	1277	1164
28	514 Menangle Road, Menangle	1300	1175
29	490 Menangle Road, Menangle	1230	1104
30	510 Menangle Road, Menangle	1314	1183
31	520 Menangle Road, Menangle	1354	1219
32	530 Menangle Road Douglas, Park	1396	1260
33	516 Menangle Road, Menangle	1433	1303
34	165 Carrolls Road, Menangle	1490	1377
35	115 Carrolls Road, Menangle	1196	1112

Note: 1. Receivers R2, R3 and R16 from Figure 2 are not required to be assessed.

3 Noise Mitigation Measures – Integrated Design

The detailed design of the headframe buildings has progressed to reduce the overall noise impacts and blasting impacts. This section summarises the noise mitigation measures integrated into the design of the headframe building.

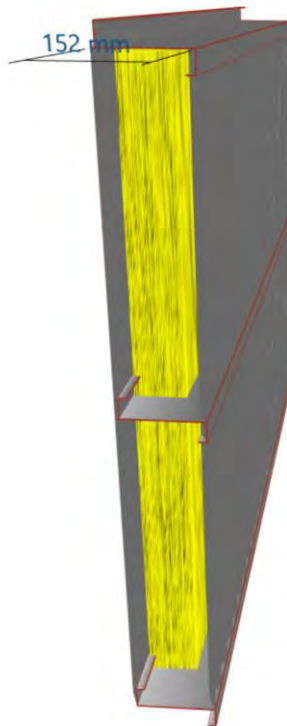
3.1 Headframe Facade

The headframe facade detailed design now comprises the following:

- 2 x 0.55 mm Custom Orb steel sheet.
- Minimum 150 mm cavity with 100 mm of acoustic insulation inside the wall cavity.
- 2 x 0.55 mm Custom Orb steel sheet.

Figure 2 below provides a schematic of the facade construction.

Figure 2. Headframe Facade Construction Schematic



This design increases the acoustic performance of the facade and rationalises the construction / build-ability of the facade. The Custom Orb sheets can be easily overlapped and sealed to ensure an 'air-tight' facade. Figure 3 below illustrates the VS8 headframe building currently under construction on site.

Figure 3. Headframe Currently Under Construction



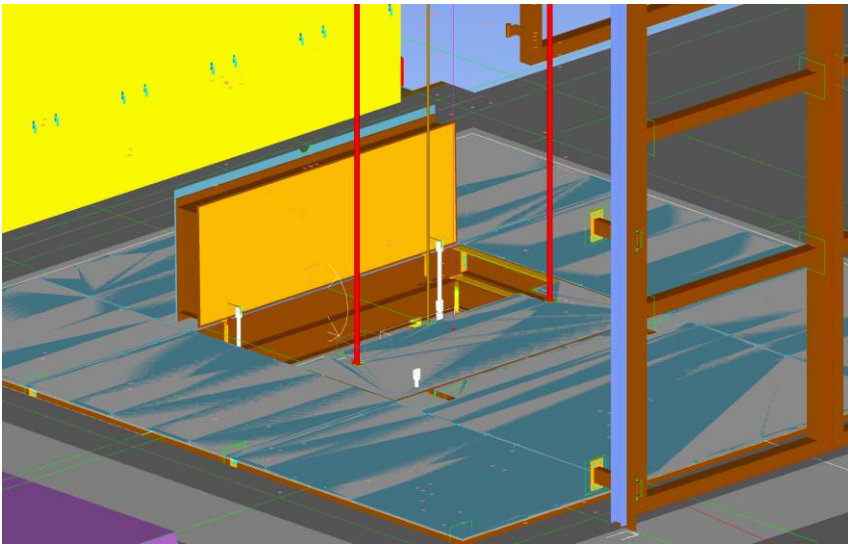
3.2 Headframe Collar & Collar Doors – Blasting Mitigation

Blasting events at night have the potential to exceed the LAFmax noise criteria for the project. The blasting approach now fully contains each blast inside the shaft by sealing off the top of the shaft. The shaft collar and collar door have now been upgraded to contain the blast inside the shaft. The collar and collar door will now comprise the following construction:

- 6 – 8 mm solid steel top plate.
- 300 mm cavity with 150 mm acoustic insulation.
- 2 mm solid steel bottom plate.
- Rebated framing with rubber seals.

Figure 4 below illustrates a 3D view of the collar and collar doors.

Figure 4. Heavy Duty Collar & Collar Doors



The blast overpressure is now designed to be contained within the shaft and will be attenuated through the following processes:

- Sound transmission reduction through the heavy-duty collar and collar doors.
- Volume expansion (propagation effect) into the headframe building. The headframe will have all access doors closed during each night-time blast.
- Sound transmission reduction through the upgraded headframe facade.
- Propagation from the headframe facade to the nearest receivers.

3.3 Shaft Ventilation – Blast Mitigation

The ventilation system for the shaft has the potential to allow blast overpressure to vent to the environment and bypass the containment of the blast within the Vent Shaft. The 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 between the Vent Shaft and the environment. Overall, the ventilation mitigation has been designed to provide the same or greater attenuation as provided by the collar / headframe.

4 Blasting Noise Modelling

The Main Sink will use a controlled blasting method. Controlled blasting involves the use of small explosive charges to break up hard rock into smaller pieces. The method involves pre-drilling a series of small diameter holes in the rock face, loading the holes with small explosive charges and electronically detonating them. This is a conventional excavation methodology that has been safely used throughout Australia.

Controlled blasting will be used from the surface of the PreSink scenario (5 to 50 m) through to the final depth of the Main Sink (50 to 600 m). The Maximum Instantaneous Charge (MIC) nominated for the PreSink and Main Sink are as follows:

- PreSink (5 to 50 m) – 2 kg MIC.
- Main Sink (50 to 600 m) – 10 kg MIC.

Blast overpressure and vibration are dependent upon several factors, including the blast design, meteorological conditions (overpressure only) and the properties of the site (rock type, terrain, etc).

4.1 Blasting Assessment Methodology

Calculation of overpressure was undertaken using AS 2187.2-2006 Equation J7.2 which uses a cube root scaling formula as presented below.

$$P = K_a \left(\frac{R}{Q^{1/3}} \right)^a$$

Where:

- P = pressure, in kilopascals
Q = explosives charge mass, in kilograms
R = distance from charge, in metres
K_a = site constant
a = site exponent

The calculation parameters summarised in Table 2 were used to predict the Airblast Overpressure and LAF_{max} noise levels for each blast. Table 2 illustrates the calculation parameters which were originally used in the planning stages and those used for this assessment. For this assessment the calculation parameters have been revised and in general made more conservative.

Table 2. Comparison of the Blast Calculation Parameter from the Planning Stages vs This Assessment

Parameter	Planning Stages (dB)	This Assessment (dB)	Comment
MIC (kg)	10	10	No change
a (site exponent)	-1.45	-1.45	No change (note the site exponent is not in dB, it is a linear scalar value as used in the equation above)
K _a (site constant)	30	50	A more conservative assessment. A worst-case value of 50 K _a has been derived from Site Law investigations as per Waves Consulting report 60.00915.01 LTR5R1.DOCX
Attenuation due to collar door	-32	-15	A more conservative assessment
Volume expansion inside the headframe	-18	-15	A more conservative assessment
Attenuation due to the headframe facade	-11	-8	A more conservative assessment
Depth attenuation	0	0	No change

Parameter	Planning Stages (dB)	This Assessment (dB)	Comment
Attenuation due to the gantry inside the vent shaft	0	-10	A conservative estimate. The metal gantry inside the vent shaft is a large structure which effectively plugs the vent shaft. This will disrupt the blast shock wave as it propagates up the vent shaft towards the closed collar doors.
Amplification due to potential blast 'rifling'	0	+10	Rifling occurs infrequently and is caused by the blast energy not being fully imparted into the rock. Some of the blast energy is re-directed into the air generating an increase in the airblast overpressure. This amplification is conservative as measurements during September to December 2023 showed rifling effects of the order of 4 - 5 dB.
LZpeak to LAFmax conversion	-15	-27	Simultaneous blast measurements in September 2023 showed the original conversion was too conservative.
Overall Attenuation to Calculate LAFmax	-76	-66	This assessment is approximately 10 dB more conservative than the assessment conducted in the planning stages.

The blast calculations have not included topography or weather effects. These effects typically attenuate noise propagation in the environment. Not including these factors provides a more conservative assessment on average.

5 Blasting LAFmax Predictions

Table 3 below summarises the worst-case LAF_{max} noise predictions at each residential receiver surrounding the site and compares them against the applicable LAF_{max} noise criteria as per the consent conditions. These predictions have used the blast parameters as per Table 2 above and assumed the collar doors, headframe and ventilation shaft are closed for each blast.

Table 3. Predicted LAFmax Noise Levels vs Criteria for VS7 & VS8

Receiver ID	Receiver Address	LAFmax Noise Level		Exceedance Above 54 dB LAFmax Criteria	
		VS7	VS8	VS7	VS*
4	15 Finns Road, Menangle	50	51	0	0
5	3 Finns Road, Menangle	50	52	0	0
6	430 Menangle Road, Menangle	51	53	0	0
7	436 Menangle Road, Menangle	50	52	0	0
8	450 Menangle Road, Menangle	49	51	0	0
9	470 Menangle Road, Menangle	46	48	0	0
10	475 Menangle Road, Menangle	46	48	0	0
11	485 Menangle Road, Menangle	45	46	0	0
12	486 Menangle Road, Menangle	43	45	0	0
13	775 Moreton Park Road, Menangle	43	44	0	0
14	251 Menangle Road, Menangle	43	42	0	0
15	235 Menangle Road, Menangle	44	42	0	0
17	195 Menangle Road, Menangle	39	38	0	0
18	110 Finns Road, Menangle	41	41	0	0
19	25 Carrolls Road, Menangle	42	42	0	0
20	47 Carrolls Road, Menangle	42	42	0	0
21	45 Finns Road, Menangle	43	43	0	0
22	45 Carrolls Road, Menangle	43	43	0	0
23	35 Finns Road, Menangle	45	45	0	0
24	5 Finns Road, Menangle	46	47	0	0
25	454 Menangle Road, Menangle	45	46	0	0
26	460 Menangle Road, Menangle	44	45	0	0
27	474 Menangle Road, Menangle	42	43	0	0
28	514 Menangle Road, Menangle	42	43	0	0
29	490 Menangle Road, Menangle	42	44	0	0
30	510 Menangle Road, Menangle	42	43	0	0
31	520 Menangle Road, Menangle	41	43	0	0
32	530 Menangle Road Douglas, Park	41	42	0	0
33	516 Menangle Road, Menangle	40	42	0	0
34	165 Carrolls Road, Menangle	40	41	0	0
35	115 Carrolls Road, Menangle	43	44	0	0

Note: 1. Receivers R2, R3 and R16 from Figure 2 are not required to be assessed.

The results show that the L_{AFmax} noise criteria of 54 dB are satisfied at all residential receivers for blasts at both VS7 and VS8, provided the collar doors, headframe and ventilation shaft are closed. No further mitigation measures are required as a result.

I trust this letter provides sufficient detail for your current requirements. If you have any questions, please do not hesitate to contact me.

Yours sincerely



Tom Cockings
Director | Acoustic Engineer

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E: tom@wavesconsulting.com.au

Waves Acoustic Consulting Pty Ltd

APPENDIX 2

VENT SHAFT 8 PRE-SINK - BLASTING OVERPRESSURE REVIEW (WAVES ACOUSTIC CONSULTING, 2024B)

01 March 2024
Document No. 60.00915.01 LTR5R2.docx

RUC Cementation Mining Contractors Pty Ltd
3/138 Abernethy Road
Belmont
Perth
WA 6104

Attention: Nigel Bennett

Dear Nigel

Consultant Advice Notice
Appin Mine Vent Shaft Construction
Pre-Sink - Blasting Overpressure Review

1 Introduction

The Appin Mine Vent Shaft Construction project requires controlled blasting to progress excavation of the vent shaft. The consent conditions for the project stipulate the following Airblast Overpressure criteria are met at the nearest residential receivers for each blast:

CONSTRUCTION BLASTING

Blasting Criteria

3. 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.

Table 11: Construction blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

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

The project started blasting on 12 September 2023 and has undertaken a total 27 blasts through to the start of December 2023. All of the blasts have occurred at Vent Shaft 8 (VS8).

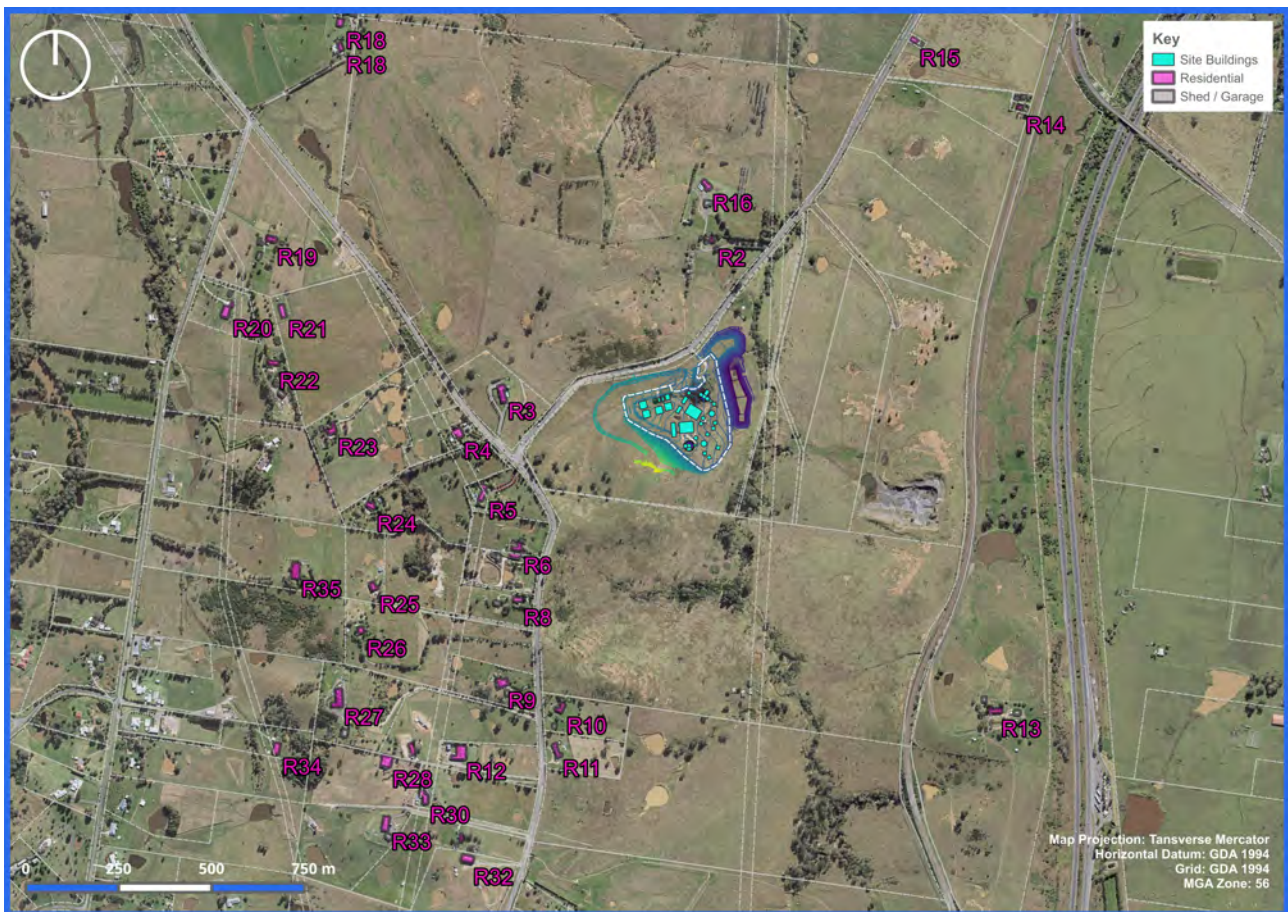
Its not possible to measure at all of the receivers for each blast; however, measurement data can be used to validate noise / airblast predictions at all of the receivers with acceptable accuracy.

The blast monitors initially deployed by RUC have been shown to be inaccurate with respect to Airblast Overpressure. Since the start of November additional blast measurements have been made by Waves Consulting. These measurements have been used to establish a 'site law' (ie validation) for Airblast Overpressure predictions to the nearest receivers.

2 Site Overview

Figure 1 and Table 1 illustrate the location of the site and the nearest residential receivers.

Figure 1. Site Location and Surrounding Area



Aerial photography courtesy of NSW Imagery

The site is situated in a rural location and is surrounded by rural residential dwellings in all directions. Table 1 below illustrates the offset distances from VS8 to the nearest residential receivers.

Table 1. Summary of Receiver Distance to VS8

Receiver ID	Receiver Address	Distance (m)
4	15 Finns Road, Menangle	623
5	3 Finns Road, Menangle	569
6	430 Menangle Road, Menangle	536
7	436 Menangle Road, Menangle	554
8	450 Menangle Road, Menangle	619
9	470 Menangle Road, Menangle	811
10	475 Menangle Road, Menangle	784
11	485 Menangle Road, Menangle	893
12	486 Menangle Road, Menangle	1031
13	775 Moreton Park Road, Menangle	1089
14	251 Menangle Road, Menangle	1274
15	235 Menangle Road, Menangle	1249
17	195 Menangle Road, Menangle	1714
18	110 Finns Road, Menangle	1477
19	25 Carrolls Road, Menangle	1255
20	47 Carrolls Road, Menangle	1297
21	45 Finns Road, Menangle	1154
22	45 Carrolls Road, Menangle	1142
23	35 Finns Road, Menangle	962
24	5 Finns Road, Menangle	871
25	454 Menangle Road, Menangle	929
26	460 Menangle Road, Menangle	1013
27	474 Menangle Road, Menangle	1164
28	514 Menangle Road, Menangle	1175
29	490 Menangle Road, Menangle	1104
30	510 Menangle Road, Menangle	1183
31	520 Menangle Road, Menangle	1219
32	530 Menangle Road Douglas, Park	1260
33	516 Menangle Road, Menangle	1303
34	165 Carrolls Road, Menangle	1377
35	115 Carrolls Road, Menangle	1112

Note: 1. Receivers R2, R3 and R16 from Figure 2 are not required to be assessed.

3 Additional Blast Monitoring

3.1 Monitor Locations

Waves Consulting undertook additional blast monitoring on 28 September 2023 and throughout November and December 2023. The blast monitoring locations are provided in Figure 2 below.

Figure 2. Additional Blast Monitoring Locations



The R3 Boundary location provides a good proxy location for the closest residential receivers R4, R5, R6 and R7.

3.2 Blast Monitoring Equipment

All noise monitoring was conducted in the free-field to eliminate extraneous noise sources (ie residential occupant noise or air conditioning units etc) and to eliminate unusual reflections from building structures and nearby out-buildings such as garages and sheds.

All noise measurement instrumentation used in the survey have valid calibration certificates and are designed to comply with the requirements of:

- Australian Standard AS IEC 61672.1—2004 - *Electroacoustics—Sound level meters, Part 1: Specification.*
- Australian Standard AS 2187.2 – 2006 - *Explosives—Storage and use. Part 2: Use of explosives.*

The equipment was set up with microphones at 1.5 metres above the ground level. All microphones were fitted with wind shields.

The field calibration of the loggers was checked both before and after the measurement survey. The variation (or drift) in calibration at all locations was found to be within the allowable tolerance of ± 0.5 dB.

3.3 Blast Measurement Summary

Table 2 below summarises the blast monitoring on 28 September 2023 and throughout November 2023. The table shows the date, location of the monitor, offset distance to the VS8 shaft, the Maximum Instantaneous Charge (MIC) of the blast, the depth of the blast as well as the Overpressure, also called the LZ_{peak} .

Table 2. Summary of the Additional Blast Measurements

Date & Time	Monitor Location	Distance to Monitor (m)	Blast Name	Blast Depth	MIC (kg)	OverPressure (LZ_{peak} dB)
28/09/2023 10:59	R3 Boundary	495	VS8-005	9.5	1	108.6
28/09/2023 10:59	SE Site Boundary	180	VS8-005	9.5	1	118.0
07/11/2023 12:22	SE Site Boundary	180	VS8-015	26.8	-	109.5
10/11/2023 09:44	SE Site Boundary	180	VS8-016	27.9	-	118.1
13/11/2023 10:37	SE Site Boundary	180	VS8-017	28.0	6	122.2
14/11/2023 15:49	SE Site Boundary	180	VS8-018	29.9	4	119.9
16/11/2023 17:39	SE Site Boundary	180	VS8-019	31.5	4	118.3
17/11/2023 16:44	SE Site Boundary	180	VS8-020	31.9	7	122.9
20/11/2023 10:48	SE Site Boundary	180	VS8-021	33.4	6	115.9
21/11/2023 13:37	SE Site Boundary	180	VS8-022	35.2	7	120.6
28/11/2023 14:51	SE Site Boundary	180	VS8-026	40.5	5	121.5
07/12/2023 12:15	SE Site Boundary	180	VS8-027	41.8	6	118.2

4 Site Law Calculations

From the blast monitoring data in Table 2 it is possible to establish a relationship between the blast depth, the blast MIC and Overpressure at each receiver using Appendix J7 of AS 2187.2-2006 Equation J7.2 as presented below.

$$P = K_a \left(\frac{R}{Q^{1/3}} \right)^a$$

Where:

- P = pressure, in kilopascals
- Q = explosives charge mass, in kilograms
- R = distance from charge, in metres
- K_a = site constant
- a = site exponent

For this project the site exponent, a, was fixed at -1.45. The site constant, K_a, can be calculated for each blast using the Overpressure measurements for validation. It is then possible to use the same formula to provide validated predictions to each receiver (by changing the distance, R) for each blast.

Table 3 summarises the site constant, K_a, calculated as part of this validation assessment.

Table 3. Summary of the Blast Validation / Site Law

Date & Time	Blast Depth (m)	Site Constant K _a
28/09/2023 10:59	9.5	44
13/11/2023 10:37	28.0	34
14/11/2023 15:49	29.9	34
16/11/2023 17:39	31.5	34
17/11/2023 16:44	31.9	34
20/11/2023 10:48	33.4	29
21/11/2023 13:37	35.2	29
28/11/2023 14:51	40.5	29
07/12/2023 12:15	41.8	29

The table shows that as the blast depth increases the site constant, K_a, decreases. In general, this means that as the blast depth increases the Overpressure (LZ_{peak}) at the nearest neighbours would decrease, assuming a constant MIC for each blast.

5 Overpressure Results

The validated site constant, K_a from Table 3 have been used to evaluate the Overpressure results at each receiver for each measured blast. The results are presented in Table 4 below.

Table 4. Summary of the Overpressure Results (L_{Zpeak} dB) for Each Blast at Each Receiver

Receiver	Distance (m)	Blast Date								
		28/10/23	13/11/23	14/11/23	16/11/23	17/11/23	20/11/23	21/11/23	28/11/23	07/12/23
R4	623	106	111	109	109	112	110	110	109	110
R5	569	107	112	111	111	113	111	111	110	111
R6	536	108	113	111	111	114	112	112	111	112
R7	554	107	113	111	111	113	111	112	110	111
R8	619	106	111	109	109	112	110	110	109	110
R9	811	102	108	106	106	108	106	107	106	106
R10	784	103	108	106	106	109	107	107	106	107
R11	893	101	107	105	105	107	105	106	104	105
R12	1031	99	105	103	103	105	103	104	103	103
R13	1089	99	104	102	102	105	103	103	102	103
R14	1274	97	102	100	100	103	101	101	100	101
R15	1249	97	102	101	101	103	101	102	100	101
R17	1714	93	98	97	97	99	97	98	96	97
R18	1477	95	100	99	99	101	99	99	98	99
R18	1426	95	101	99	99	101	99	100	99	99
R19	1255	97	102	101	101	103	101	102	100	101
R20	1297	97	102	100	100	102	100	101	100	100
R21	1154	98	103	102	102	104	102	103	101	102
R22	1142	98	103	102	102	104	102	103	101	102
R23	962	100	106	104	104	106	104	105	103	104
R24	871	102	107	105	105	108	105	106	105	105
R25	929	101	106	104	104	107	105	105	104	105
R26	1013	100	105	103	103	106	104	104	103	104
R27	1164	98	103	102	102	104	102	102	101	102
R28	1175	98	103	101	101	104	102	102	101	102
R29	1104	99	104	102	102	105	102	103	102	102
R30	1183	98	103	101	101	104	102	102	101	102
R31	1219	97	103	101	101	103	101	102	100	101
R32	1260	97	102	101	101	103	101	101	100	101
R33	1303	97	102	100	100	102	100	101	100	100
R34	1377	96	101	99	99	102	100	100	99	100
R35	1112	99	104	102	102	104	102	103	102	102

The results show that the consent conditions were satisfied at each receiver for each blast, with all the Overpressure results below the 95% 115 dB L_{Zpeak} criteria.

5.1 Blasts with No Overpressure Measurements

There are several blast events which were not recorded due to malfunctioning monitors. Table 5 below summarises the blasts and estimates the Overpressure levels at receiver R6 (the closest receiver) assuming a worst-case (conservative) site constant, K_a of 50.

Table 5. Summary of Worst-Case Overpressure Predictions (L_{Zpeak} dB) for Each Unmonitored Blast at Receiver R6

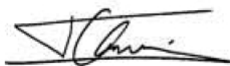
Date & Time	Blast Name	MIC (kg)	OverPressure (dB L_{Zpeak}) at R6
12/09/2023 15:00	VS8-001	1	107
14/09/2023 16:30	VS8-002	1	107
21/09/2023 1000	VS8-003	1	107
23/09/2023 12:32	VS8-004	3	112
17/10/2023 10:00	VS8-006	1	107
17/10/2023 15:05	VS8-007	1	107
21/10/2023 12:30	VS8-008	1	107
23/10/2023 11:30	VS8-009	1	107
27/10/2023 10:30	VS8-010	1	107
30/10/2023 11:45	VS8-011	1	107
02/11/2023 12:30	VS8-012	1	107
04/11/2023 11:45	VS8-013	2	110

Table 5 shows that the Overpressure results are below the 95% 115 dB L_{Zpeak} consent criteria for all blasts.

We note the MIC for most of the blasts are small ~ 1 kg. Given the small MIC of these blasts and the use of a conservative site constant, K_a of 50, the risk of Overpressure exceedances at any receiver is considered low.

I trust this letter provides sufficient detail for your current requirements. If you have any questions, please do not hesitate to contact me.

Yours sincerely



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Director | Acoustic Engineer

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Waves Acoustic Consulting Pty Ltd

ATTACHMENT 1
STATUTORY COMPLIANCE SUMMARY

Table A1-1
Summary Statutory Compliance for State Legislation

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Environmental Planning and Assessment Act, 1979 (EP&A Act)</i>			
section 1.3	Relevant objects of the EP&A Act: - Promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources. - Facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment. - Promote the orderly and economic use and development of land. - Protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats. - Promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage). - Promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State. - Provide increased opportunity for community participation in environmental planning and assessment	Section 4	✓
section 4.15	Relevant environmental planning instruments: <i>State Environmental Planning Policy (SEPP) No 33: Hazardous and Offensive Development (SEPP 33).</i> <i>State Environmental Planning Policy No.55 – Remediation of Land (SEPP 55).</i> - Any planning agreement or draft planning agreement that a developer has entered into under section 7.4 of the EP&A Act. <i>Wollondilly Local Environmental Plan 2011.</i> <i>The Environmental Planning and Assessment Regulation 2000 (EP&A Regulation).</i> The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; the suitability of the site for the	Section 4 and Table A1-2	✓

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
	development; any submissions made in accordance with the EP&A Act or the EP&A Regulation; the public interest.		
EP&A Regulation			
Clause 115	An application for the modification of a development consent under sections 4.55(1), (1A) or (2) or 4.56(1) of the EP&A Act must contain information outlined in clause 115(1) and must satisfy clause 115(1A). Clause 115(2) also provides the notification requirements of clause 49 of the EP&A Regulation apply.	Modification Report – all sections	✓
<i>Biodiversity Conservation Act 2016</i>			
section 7.14(2)	With reference to clause 30A, Sections 1(a) and 2(c) of the <i>Biodiversity Conservation (Savings and Transitional) Regulation, 2017</i> , the Modification does not seek to change the approved surface development extent for the and would not involve additional potential impacts on biodiversity to those previously assessed.	Section 4	✓
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)			
section 43	The approved Appin Mine is currently licensed under Environment Protection Licence (EPL) 2504 to conduct “mineral waste generation” and “mineral processing” as defined in Schedule 1 of the PoEO Act. It is not anticipated that any specific conditions of EPL 2504 would require modification as a result of the Modification.	This attachment.	✓
<i>National Parks and Wildlife Act 1974</i> (NPW Act)			
section 90	The Modification does not seek to change the approved surface development extent for the and would not involve additional potential impacts on Aboriginal cultural heritage to those previously assessed. Notwithstanding, IMC will continue to manage Aboriginal cultural heritage in accordance with the <i>National Parks and Wildlife Act, 1974</i> .	Section 4	✓

Table A1-2
Summary Statutory Compliance for Environmental Planning Legislation

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>SEPP 33</i>			
clause 13	A consent authority must consider current circulars or guidelines published by the DPIE relating to hazardous or offensive development, whether to consult with relevant public authorities regarding any environmental or land use safety requirements, a preliminary hazard analysis prepared by the applicant, feasible alternatives to the development and likely future use of surrounding land. The AMVA Project is not potentially hazardous or offensive and, therefore, a preliminary hazard analysis has not been prepared.	Section 4	✓
<i>SEPP 55</i>			
clause 7(1)	A consent authority must consider whether the land is contaminated and be satisfied that, if the land is contaminated, the land is suitable in its contaminated state (or will be suitable after remediation) for the purpose of the Modification.	The Modification is wholly located within CCL767 therefore there is no 'change of use' of these areas	✓
<i>Wollondilly Local Environmental Plan 2011</i>			
LEP 2011	The Modification has regard to the aims of the Wollongong LEP, as: • The Modification has been developed in a manner that considers the impacts, mitigation measures and management measures required for effective land uses. • The Modification would facilitate local and regional employment and economic development opportunities.	Section 4	✓

ATTACHMENT 2
COMMUNITY NOTIFICATION

11 April 2024

Name
Address
Address

Dear Landholder,

RE: APPIN MINE VENTILATION AND ACCESS PROJECT – CHANGES TO BLASTING REGIME

Construction of the two ventilation shafts at 345 Menangle Road is progressing and in the next few months, the project will commence main sink activities on Ventilation Shaft 8 (VS8). As with the pre-sink, this will involve controlled blasting and mechanical excavation down to the final depth as well as progressive installation of services such as power, water, and compressed air.

We have been operating in accordance with our approval conditions and well within the noise and blast overpressure criteria. We are confident our existing and proposed onsite noise attenuation measures, such as acoustic cladded shaft headframe and blast doors, will ensure we continue to meet these criteria. We have installed three blast monitoring stations on South32-owned land with additional temporary monitoring equipment planned at several surrounding properties to assist with calibrating and verifying our onsite data.

I'm writing to advise that South32 Illawarra Metallurgical Coal (IMC) is seeking approval from the Department of Planning, Housing, and Infrastructure (DPHI) to change the blasting regime for main sink activities. This proposal is aligned with recent interest raised by the local community for IMC to shorten the project schedule and reduce blasting impacts where possible.

Blasting frequency

Conventional full floor blasting was used for VS8 pre-sink; however, this method was less efficient in the harder underlying Hawkesbury Sandstone strata. An alternative method, known as bench blasting, is more efficient in these harder conditions.

Bench blasting uses about 50 per cent of the full-face load, i.e. explosive power, and reduces the time between blasts but requires two blasts per shaft within a 24-hour period. Under this proposal, there will still be several days per week with no blasts while concrete lining activities are taking place.

We are proposing that blasting frequency be increased from one full blast to two half blasts per day per shaft.

Blasting hours

Under the current approved blasting times (9am to 5pm, Monday to Friday; 9am to 1pm, Saturday), there is insufficient time for the bench blasting cycle. Extending hours will allow the project to bore and charge in the evening and fire the following morning. Additionally, shaft crews can undertake other activities during this time.

We are proposing that blasting hours be extended to 7am to 10pm, Monday to Sunday. No blasting will occur on public holidays.

Changes to the blasting regime (frequency and hours) would:

- Reduce the duration and severity of blasting impacts on the community,
- Facilitate more efficient blasting cycles, using bench blasting where required, and
- Shorten the project schedule.

We will continue to update you regarding these proposed changes. In the meantime, if you would like additional information, please contact us at illawarracommunity@south32.net or 1800 102 210 to arrange a meeting.

More information about the project is available by using the QR code below or on our website: www.community.south32.net/appin-mine-ventilation-and-access.

Yours truly,



Rod Mapstone

Principal - Community

South32 Illawarra Metallurgical Coal

