



DOCUMENT	Razorback Quarry EIS
PROJECT	Plantation Pine Products Pty Ltd
VERSION	2.0

AUTHOR	Shaun Smith
POSITION	Principal Environmental Planner
DATE	1/03/2023



**Plantation  
Pine Products**

## Appendix H – Noise and Vibration Assessment



Document No: 212131-9745

---

# Noise and Vibration Impact Assessment Razorback Quarry Running Stream, NSW

---

Prepared for:  
Plantation Pine Products Australia Pty Ltd  
c/- Space Urban Pty Ltd

Author:

A handwritten signature in black ink, appearing to be 'N Pennington', is positioned above a dotted line.

.....  
**Neil Pennington**  
*B. Sc. (Physics), B.Math. (Hons), MAIP, MAAS, MASA*  
Principal / Director

February 2023

MEMBER FIRM



# TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Overview of the project .....	1
1.2	Assessed Receivers .....	2
<b>2.0</b>	<b>DESCRIPTION OF TERMS .....</b>	<b>4</b>
<b>3.0</b>	<b>EXISTING ENVIRONMENT AND CRITERIA .....</b>	<b>5</b>
3.1	Meteorology .....	5
3.2	Existing Acoustic Environment .....	5
3.3	Project Noise Trigger Levels .....	5
3.4	Maximum Noise Levels .....	6
3.5	Construction Noise .....	6
3.6	Traffic Noise.....	6
3.7	Blasting and Vibration .....	7
<b>4.0</b>	<b>ASSESSMENT METHODOLOGY .....</b>	<b>7</b>
4.1	Modelled Scenarios .....	7
4.2	Noise Sources .....	9
4.3	Traffic Noise.....	9
<b>5.0</b>	<b>RESULTS AND DISCUSSION .....</b>	<b>10</b>
5.1	Predicted Operational Noise Levels .....	10
5.2	VLAMP Assessment .....	11
5.3	Off-Site Road Traffic .....	12
5.3.1	Traffic Types and Levels.....	12
5.3.2	Product Transport Routes.....	12
5.3.3	Traffic Noise Impact Assessment .....	12
<b>6.0</b>	<b>MONITORING .....</b>	<b>13</b>
<b>7.0</b>	<b>MITIGATION MEASURES.....</b>	<b>13</b>
<b>8.0</b>	<b>CONCLUSION .....</b>	<b>13</b>

## APPENDIX 1 NOISE CONTOURS

## FIGURES

Figure 1: Locality Plan.....	2
Figure 2: Indicative site layout and assessed receivers .....	3
Figure 3: Scenario 1 – Construction .....	8
Figure 4: Scenario 2 – Stage 1 .....	8
Figure 5: Scenario 3 – Stage 3 .....	9
Figure 6: Triangular and trapezoidal noise signals .....	10
Figure 7: Noise contours Scenario 1 – Construction .....	<b>Error! Bookmark not defined.</b>
Figure 8: Noise contours Scenario 2 – Stage 1 .....	<b>Error! Bookmark not defined.</b>
Figure 9: Noise contours Scenario 3 – Stage 3 .....	<b>Error! Bookmark not defined.</b>

## TABLES

Table 1 Proposed Hours of Operation.....	3
Table 2 Coverage of SEARs .....	4
Table 3 Definition of Acoustical Terms .....	4
Table 4 Rating Background Levels and PNTLs – dB(A) .....	6
Table 5 Road Traffic Noise Criteria .....	7
Table 6 Noise Source Sound Power Levels .....	9
Table 7 Predicted noise levels, dB(A),Leq(15min) - Construction .....	11
Table 8 Predicted noise levels, dB(A),Leq(15min) – Operations Stage 1 .....	11
Table 9 Predicted noise levels, dB(A),Leq(15min) – Operations Stage 2 .....	11
Table 10 VLAMP Noise Categories and Recommended Actions .....	12

## COMMONLY USED ACRONYMS

AHD	Australian Height Datum
ANZEC	Australian and New Zealand Environment and Council
ANZECC	Australian and New Zealand Environment and Conservation Council
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DPE	Department of Planning and Environment
DRG	Division of Resources and Geoscience
EIS	<i>Environmental Impact Statement</i>
ENM	Environmental Noise Model
EPA	Environment Protection Authority
OEH	Office of Environment and Heritage
MIC	Maximum Instantaneous Charge
MS	Morning Shoulder
NPI	<i>NSW Noise Policy for Industry</i>
OP	overpressure levels
PNTLs	project noise trigger levels
PPV	peak particle vibration
PVS	Peak Vector Sum
RBL	Rating Background Levels
RH	relative humidity
RMS	Roads and Maritime Services
RNP	<i>NSW Road Noise Policy</i>
RTA	Renzo Tonin Associates
SEARs	Secretary's Environmental Assessment Requirements
SPL	Sound Pressure Level
VLAMP	<i>Voluntary Land Acquisition and Mitigation Policy</i>

## EXECUTIVE SUMMARY

A noise and vibration impact assessment has been conducted for the proposed construction and operation of a quarry producing sand and decorative rock products at a Site in the locality of Running Stream approximately halfway between Lithgow and Mudgee, NSW, off the Castlereagh Highway. The proposed operating hours are as follows.

### Proposed Hours of Operation

Activity	Monday to Friday	Saturdays	Sundays or Public Holidays
Site establishment and construction	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Extraction operations	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Processing operations	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Product dispatch	7:00am to 6:00pm	8:00am to 1:00pm	Nil

Documents referred to in conducting the assessment include:

- *NSW Interim Construction Noise Guideline (ICNG)*, EPA (2009);
- *NSW Noise Policy for Industry (NPI)*, EPA (2017);
- *NSW Road Noise Policy (RNP)*, OEH (2011);
- *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC)*; and
- *Voluntary Land Acquisition and Mitigation Policy (VLAMP)*, DPE (2014).

### **Background noise levels**

Project noise trigger levels were based on the EPA default minimum background noise levels of 35 dB(A),L90 (day) and 30 dB(A),L90 (evening and night).

### **Predicted noise criterion exceedances**

Noise modelling predicted no exceedances of default minimum construction and operational noise trigger levels.

### **Off-site traffic noise**

The off-site traffic noise criterion of 50 dB(A), $L_{eq}(1hour)$  for local roads would be achieved for the most affected receiver on Razorback Road, subject to restriction of the use of exhaust brakes and speed limited to 40 km/h when trucks pass the residence.

In summary, the assessment has found that the Project would be able to operate in compliance with the appropriate criteria for operational and road traffic noise emissions.

# 1.0 INTRODUCTION

Spectrum Acoustics Pty Ltd has been commissioned by Space Urban Pty Ltd on behalf Plantation Pine Products Australia Pty Ltd (PPPA), to prepare a noise impact assessment to support an application to Mid-Western Regional Council (MWRC), for the development and operation of a sand and gravel quarry at the property 'Turonfels' located at 39 Razorback Road, Running Stream, NSW (see **Figure 1**). This report provides:

- an overview of the meteorological and acoustic environment around the Site;
- an outline of the acoustic criteria relevant to the Project;
- an assessment of the predicted noise levels associated with the Project and as to the adverse impacts on the existing acoustic environment in vicinity of the proposed operations including traffic noise; and
- an outline of the required noise mitigation measures and monitoring.

This noise and vibration impact assessment has been prepared in accordance with the NSW Noise Policy for Industry (EPA, 2017), Road Noise Policy (OEH, 2011) and the Secretary's Environmental Assessment Requirements (SEARs) for the Project, issued on 2 March 2021 by the NSW Department of Planning and Environment (DPE). **Appendix 1** records the coverage of the requirements within this report.

## 1.1 Overview of the project

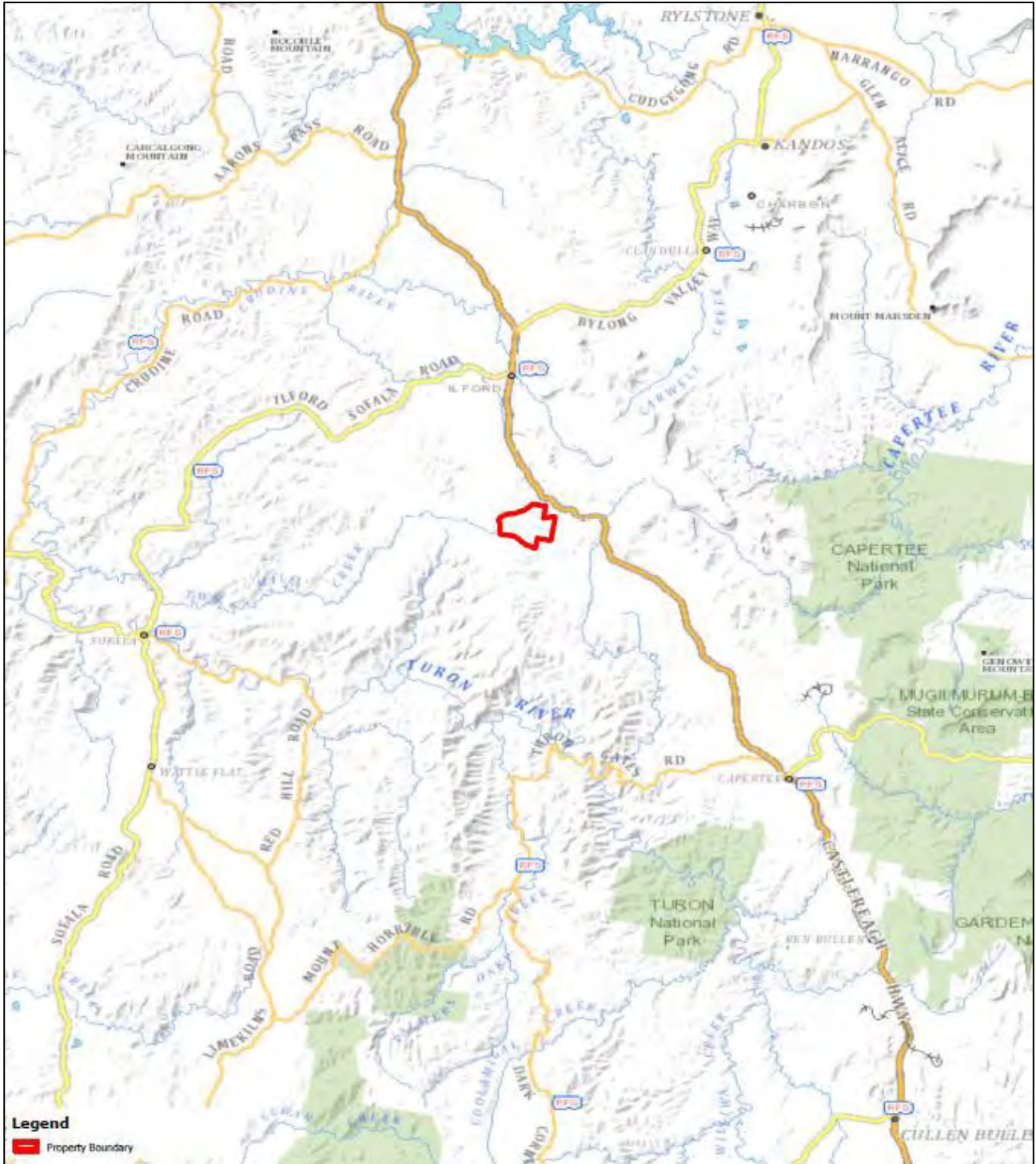
The quarry is proposed to extract up to 200,000 tonnes per annum (tpa) over a period up to 30 years and will include access roads, a site office, workshop, and weighbridge. The quarry will be progressively rehabilitated to pasture and pine plantation with potential future use of the facilities area for forestry related activities.

Key components of the development will include:

- Up to 200,000tpa of extraction over a 30 year period,
- Operations to occur Monday to Friday and Saturday mornings only,
- Construction of an internal haul road, sediment control dams, site office, weighbridge, and workshop,
- Construction of noise/visual bunds,
- Installation of site drainage to separate clean and dirty water area,
- Extraction by excavator and transport by highway trucks,
- In-pit material screening and stockpiling, and
- Progressive rehabilitation.

Quarry products would be despatched by road using the existing road network with access to the Site via the Razorback Road and Castlereagh Highway.



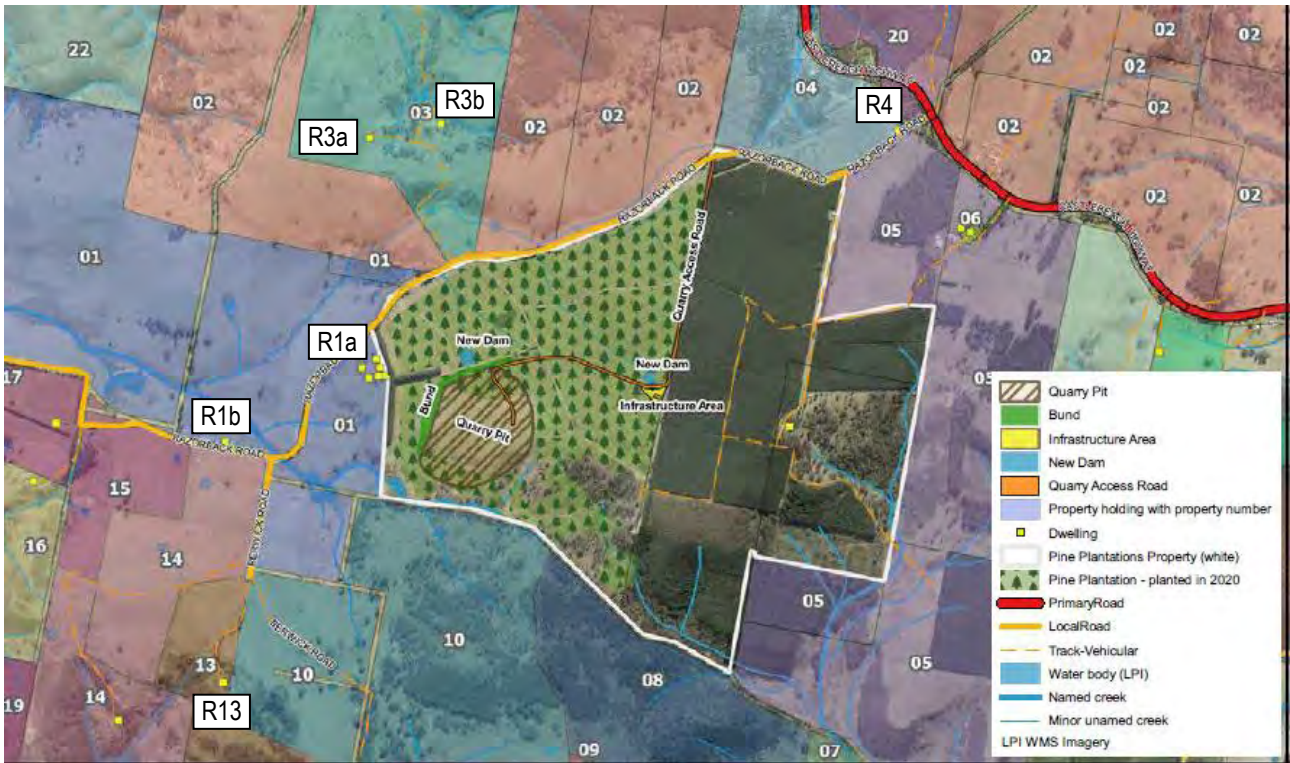


**Figure 1: Locality Plan**

## 1.2 Assessed Receivers

Privately-owned residential properties surrounding the Site are shown in **Figure 2**. Additional residences located at greater distances from the proposed extraction area are also included in the noise modelling domain. Construction and operational calculations are conducted for receivers R1a, R1b, R3a, R3b and R13 and traffic noise impacts are considered at R4.





**Figure 2: Indicative site layout and assessed receivers**

**Table 1** lists the proposed hours of operation for a range of activities that would be undertaken at the Site throughout the life of the Project.

**Table 1 Proposed Hours of Operation**

Activity	Monday to Friday	Saturdays	Sundays or Public Holidays
Site establishment and construction	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Extraction operations	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Processing operations	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Product dispatch	7:00am to 6:00pm	8:00am to 1:00pm	Nil

The hours nominated in **Table 1** are those that the Applicant would operate within, not that they would be operating throughout the entire nominated periods. That is, the nominated hours would provide the flexibility needed to undertake all Project-related activities, when required. The flexibility achieved by the proposed operating hours would be important in order that the Applicant to operate the quarry on a campaign basis. **Table 2** details where the report assessment contained in the SEARs have been addressed in this report.

**Table 2 Coverage of SEARs**

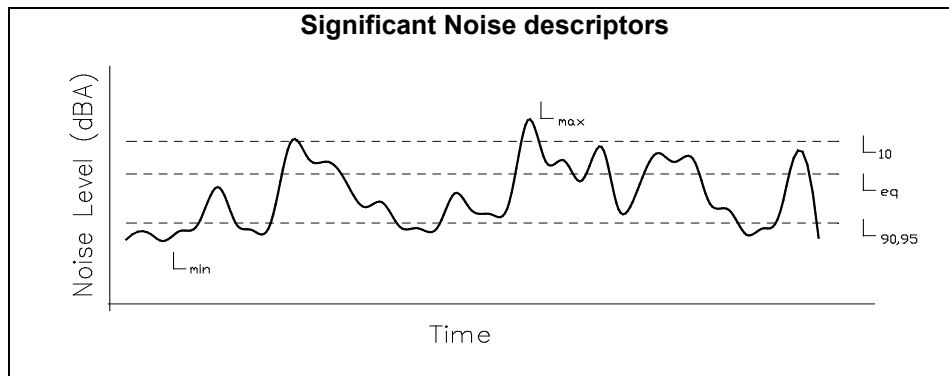
Government Agency	Paraphrased Requirement	Relevant Section(s)
DPE	Detailed assessment of construction noise – Interim Construction Noise Guideline (DECC, 2009)	3.5, 4.1, 5.1
	Detailed assessment of operational noise – NSW Noise Policy for Industry (NPI)	3.3, 4.1, 5.1, 5.2
	Detailed assessment of offsite transport noise – NSW Road Noise Policy (DECCW, 2011)	3.6, 4.3, 5.3
	Consider Voluntary Land Acquisition and Management Policy (VLAMP)	5.2
	Reasonable and feasible mitigation measures	7.0
	Monitoring and management measures	6.0

## 2.0 DESCRIPTION OF TERMS

**Table 3** contains qualitative descriptions of commonly used acoustical terms and is presented as an aid to understanding this report.

**Table 3 Definition of Acoustical Terms**

Term	Definition
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period (for noise assessments this is typically 15 minutes).
Lmax	Maximum Noise Level – used to assess the potential for disturbance from impact noise at night time
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.



## 3.0 EXISTING ENVIRONMENT AND CRITERIA

The existing meteorological and acoustical environments of the Site and its surrounds have been studied to determine prevailing conditions and to allow noise goals to be set.

### 3.1 Meteorology

The atmospheric conditions most relevant to noise assessments are temperature inversions, gentle winds (indicative of possible wind shear) and relative humidity. The NSW Noise Policy for Industry (NPI) (EPA, 2017) states that wind effects need to be assessed where source to receiver winds (at 10m height) of 3m/s or below occur for 30% or more of the time in any season in any assessment period.

Since there are no meteorological stations near the site, the project Scoping Report (November 2020) analysis data from the nearby Nullo Mountain Bureau of Meteorology station. Long-term 9am and 3pm wind roses suggest winds up to 3m/s occur for 12-14% of the time from the west to northwest and 10% of the time from the east. Acknowledging that the data is not comprehensive, it does confirm that winds up to 3m/s do not occur for more than 30% of the time. Since there are no proposed noise-generating activities during night time hours, inversions will not be considered.

Noise modelling has been conducted under meteorologically neutral daytime conditions of 70% relative humidity, 20°C temperature with no wind or vertical temperature gradient.

### 3.2 Existing Acoustic Environment

The proposed extraction site and residential receivers are several kilometres west of the Castlereagh Highway. There are no industrial sources near the site, which is considered rural in nature. To present a conservative assessment, no background noise monitoring has been conducted. Rather, the NPfI default minimum ratings background levels (RBL) of 35 dB(A), L90 (day) and 30 dB(A), L90 (night) have been adopted.

### 3.3 Project Noise Trigger Levels

Project-generated noise within the Site is required to be assessed against the provisions of the NPfI. In relation to the residences surrounding the Site, the NPI specifies two noise criteria: *intrusiveness and amenity criteria*.

The *Intrusiveness Criterion* limits Equivalent Continuous Noise Level (Leq) from the industrial source to a value of 'background plus 5dB'. That is, the Rating Background Level (RBL) for the time period, plus 5 dB(A). The RBL ( $L_{A90}$ ) is defined as the overall single figure background level representing each assessment period.

The *Amenity Criterion* aims to protect against excessive noise levels where an area is becoming increasingly developed. Amenity criteria are dependent upon the nature of the receiver area and the existing level of industrial noise. There is no significant existing industrial noise near the Site and the residences that are potentially affected by noise emissions from the Project is best described acoustically as an area dominated by environmental noise with some road traffic noise.

Time periods for assessment as defined in the NPI are:

- Daytime – 7:00am (8:00am on Sundays) to 6:00pm;
- Evening – 6:00pm to 10:00pm; and
- Night – 10:00pm to 7:00am (8:00am on Sundays).

The area surrounding the site is not impacted by significant traffic or industrial noise levels and the intrusiveness criteria become the most stringent.

Based on the default minimum daytime background noise level of 35 dB(A),L90 the adopted noise trigger level for all receivers is shown in **Table 4**.

**Table 4 Rating Background Levels and PNTLs – dB(A)**

Location	RBL*	Trigger levels/PNTLs
	L <sub>A90</sub>	L <sub>Aeq(15minute)</sub>
All Receivers	35	40
* NPI default minimum daytime RBL.		

### 3.4 Maximum Noise Levels

There are no proposed activities outside daytime hours so assessments of maximum noise levels for potential “sleep disturbance” is not required.

### 3.5 Construction Noise

Noise criteria for the initial period of constructing access roads and site preparation earthworks in the surface infrastructure area are derived for the EPA’s Interim Construction Noise Guideline (ICNG, 2009). Construction works should be confined to the EPA’s “standard recommended hours” of 7am – 6pm Monday-Friday and 8am-1pm on Saturday. Construction works outside these hours would usually require approval from the consent authority and must comply with the operational noise trigger levels discussed in **Section 3.3**.

The applicable construction noise management level is equal to the RBL + 10 dB. Adopting the EPA default minimum daytime RBL of 35 dB(A),L90 as discussed in **Section 3.3**, gives a construction noise management level of 45 dB(A),Leq(15min). Exceedances of this level at non-project related residential receivers usually triggers the requirement for consideration of reasonable and feasible noise management or control measures.

### 3.6 Traffic Noise

In NSW, noise from vehicle movements associated with an industrial source is assessed in terms of the NPfI if the vehicles are not on a public road. If the vehicles are on a public road, the *NSW Road Noise Policy* (RNP) applies. Noise from the Project must, therefore, be assessed against the project noise trigger levels of the NPfI and also the criteria in the RNP.

The RNP recommends various criteria based on the functional categories of roads applied by the Transport for NSW (TfNSW). The TfNSW differentiates roads based on a number of factors including traffic volume, heavy vehicle use, or through local traffic, vehicle speeds and applicable traffic management options. Vehicles accessing the Site will do so via Razorback Road which falls under the TfNSW definition of a local road.

**Table 5** shows the noise criteria relevant to arterial roads extracted from Table 3 of the RNP. For the assessment of traffic noise, the daytime period is from 7:00am to 10:00pm, whilst night is from 10:00pm to 7:00am.

**Table 5 Road Traffic Noise Criteria**

Situation	Recommended Criteria	
	Day (7:00am to 10:00pm)	Night (10:00pm to 7:00am)
Existing residences affected by additional traffic on existing local roads generated by land use developments	Leq (1-hour) 55	Leq (1-hour) 50

### 3.7 Blasting and Vibration

There is no proposed blasting or any identifiable significant source of vibration and further consideration of blasting and vibration is not required.

## 4.0 ASSESSMENT METHODOLOGY

### 4.1 Modelled Scenarios

A full description of the Project is given in the EIS. In discussion with the Applicant, it was determined that the following construction and two operational noise scenarios represent worst case potential for noise impacts at the surrounding residential receivers. There is no proposed processing on site, apart from possibly dry-screening of organic material at the infrastructure area, with extracted material to be transported directly to the customer or processed (washed and screened) at an approved Borg facility. These scenarios and noise source locations are indicated in **Figures 3-5**. Noise modelling using the Environmental Noise Model (ENM v3.06) was undertaken for the atmospheric conditions described in **Section 3.1**.





**Figure 3: Scenario 1 – Construction**



**Figure 4: Scenario 2 – Stage 1**



Figure 5: Scenario 3 – Stage 3

#### 4.2 Noise Sources

The sound power levels of the significant noise-generating equipment used in the modelling of each scenario are listed in **Table 6**.

**Table 6 Noise Source Sound Power Levels**

Equipment	Number	Use/Activity	Lw, dB(A)
	200 ktpa		Leq
Hydraulic Excavator 33t	1	Resource extraction and haul truck loading.	104
Tracked bulldozer (CAT D9)	1	Material handling in extraction area.	108
Screen	1	Screening of organic material	98
Product truck	3*	Hauling product off-site to market	91
Small water cart	1	Dust management	90 <sup>#</sup>
Small front-end loader		Loading trucks	98

\* Worst-case number on-site at any given time.  
<sup>#</sup> Transient rather than continuous use.

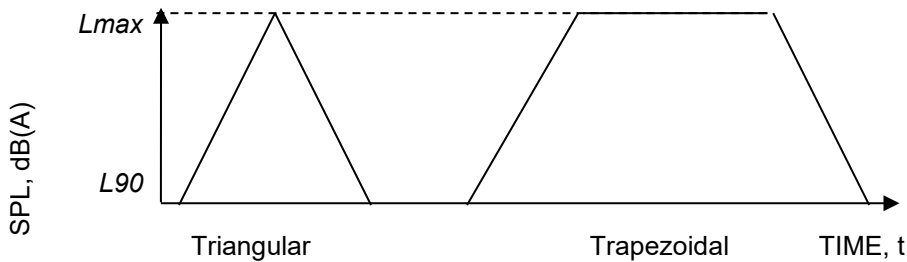
#### 4.3 Traffic Noise

Additional traffic noise generated by the Project at the potentially most impacted residential receiver, R4 in **Figure 2**, will be of a discrete rather than constant nature. There are many methods available for calculating the cumulative noise impact arising from discrete signals of various shapes. The methodology employed in this Section was sourced from the US Environmental Protection Agency document No. 550/9-74-004 *Information on Levels of Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974*.



The document refers to *triangular* and *trapezoidal* time signals, which are illustrated in **Figure 6**. A triangular time signal rises from the background level to a peak noise level and then immediately begins to subside. A trapezoidal time signal rises from the background level to a maximum level and sustains that level for a period of time before subsiding. The trapezoidal time signal is a good approximation of the SPL signal of a train as it passes an observation point.

**Figure 6: Triangular and trapezoidal noise signals**



The value of  $L_{eq,T}$  for a series of identical triangular time patterns having a maximum level of  $L_{max}$  is given by **Equation 1**.

$$L_{eq,T} = L_b + 10 \log \left[ 1 + \frac{ND}{T} \left( \frac{10^{(L_{max} - L_b) / 10} - 1}{2.3} - \frac{(L_{max} - L_b)}{10} \right) \right] \quad (1)$$

Where;

- $L_b$  is background noise level, dB(A)
- $L_{MAX}$  is vehicle noise, dB(A)
- $T$  is the time for each group of vehicles (min)
- $N$  is number of vehicle trips
- $D$  is duration of noise of each vehicle (min)

For calculation purposes,  $L_{max}$  is the maximum vehicle noise at the assessment point(s), and has been based on numerous measurements of quarry truck pass-by noise taken by Spectrum Acoustics at receivers near other quarries in recent years. The background noise level is the level that existed prior to the introduction of the new noise, the  $L_{A90}$  level. The assessment period  $T$  corresponds to the stated criterion period, that is, 60 minutes.

Receiver R4 is estimated from Google Earth to be 15m from the centre of Razorback Road.

## 5.0 RESULTS AND DISCUSSION

### 5.1 Predicted Operational Noise Levels

Noise levels were modelled using Renzo Tonin Associates (RTA) *Environmental Noise Model v3.06* (ENM) software. Point-to-point calculations were performed for all receivers in **Figure 2**.

Predicted noise levels for the three modelled scenarios are summarised in **Tables 7 to 9**. Any exceedances of the noise trigger level, if they occur, are highlighted in bold type. Noise contours are shown in **Appendix 1**.

**Table 7 Predicted noise levels, dB(A),Leq(15min) - Construction**

Receiver	Noise Trigger level	Predicted noise levels, dB(A),Leq(15min)
R1a	45	41
R1b	45	28
R3a	45	<20
R3b	45	<20
R13	45	<20

**Table 8 Predicted noise levels, dB(A),Leq(15min) – Operations Stage 1**

Receiver	Noise Trigger level	Predicted noise levels, dB(A),Leq(15min)
R1a	40	25
R1b	40	<20
R3a	40	<20
R3b	40	<20
R13	40	<20

**Table 9 Predicted noise levels, dB(A),Leq(15min) – Operations Stage 2**

Receiver	Noise Trigger level	Predicted noise levels, dB(A),Leq(15min)
R1a	40	30
R1b	40	22
R3a	40	<20
R3b	40	<20
R13	40	<20

The results in **Tables 7-9** show predicted levels below the adopted default minimum construction and operations noise trigger levels.

## 5.2 VLAMP Assessment

The DPE's *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extraction Industry Development* (VLAMP) lists five (5) different levels of noise impact and recommended actions. These impact levels and actions are shown in **Table 10**.

**Table 10 VLAMP Noise Categories and Recommended Actions**

Noise Category	Project Noise Levels	Recommended action
1. Negligible	0-2 dB(A) above PNTL	Not a discernible noise impact – no action required
2. Marginal	3-5 dB(A) above PNTL and project contributes less than 1 dB at residence	Mechanical ventilation and air conditioning
3. Moderate	3-5 dB(A) above PNTL and project contributes more than 1 dB at residence	Mechanical ventilation, air conditioning and facade upgrade
4. Significant	More than 5 dB(A) above PNTL at residence	Mechanical ventilation, air conditioning and facade upgrade, property acquisition
5. Significant	More than 5 dB(A) above amenity limit over 25% of land area	Property acquisition

The noise impact assessment in **Section 5.1** found that none of the assessed receivers (residences) would be impacted by operational noise under any noise category in **Table 10**.

### 5.3 Off-Site Road Traffic

#### 5.3.1 Traffic Types and Levels

The Applicant anticipates that the bulk of the products would be despatched from the Site using semi-trailers (27.5t to 32t capacity) or rigid trucks (12.5t to 18t capacity).

Traffic levels would vary substantially on a daily basis throughout the life of the Project. For the purposes of this assessment, a maximum of 5 trucks (10 movement movements per hour) was considered in the assessment of potential noise impacts.

#### 5.3.2 Product Transport Routes

All laden trucks accessing the quarry would travel on Razorback Road from the quarry to the intersection with the Castlereagh Highway.

#### 5.3.3 Traffic Noise Impact Assessment

Based on the maximum annual product despatch rate of 200 000t, the Project would generate 5 laden trucks per hour maximum, (or 10 movements), half arriving as empty trucks, and the remaining half departing as full trucks. Potentially the most impacted receiver is R4 at 15m north of the centre of Razorback Road. Point calculation modelling resulted in a road traffic noise level of 48.9 dB(A),Leq(1hour) based on a nominal speed of 40km/h. This is slightly below the criterion of 50 dB(A),Leq(1hour).

It is recommended that roadside signage should be erected approximately 100m each side of R4 to advise drivers not to use engine brakes or exceed 40 km/h when passing the residence.

## 6.0 MONITORING

The low levels of predicted operational noise suggest that routine noise compliance monitoring would not be necessary for this project.

## 7.0 MITIGATION MEASURES

Noise emissions from the extraction and processing area are not predicted to exceed the noise emission criteria and no specific noise mitigation or management measures are required. At maximum production rate, traffic noise levels should be minimised at the receiver adjacent to Razorback Road identified as R4 by limiting the speed of trucks to 40 km/h as they pass the residence and minimising the use of engine brakes.

## 8.0 CONCLUSION

A noise and vibration impact assessment has been conducted for the proposed construction and operation of a quarry producing sand and decorative rock products at a Site in the locality of Running Stream approximately halfway between Lithgow and Mudgee, NSW, off the Castlereagh Highway.

The assessment has found no exceedances of default minimum construction and operational noise trigger levels at any sensitive receiver.

At maximum production rate, traffic noise levels should be minimised at a receiver adjacent to Razorback Road, near the intersection with the Castlereagh Highway, by limiting the speed of trucks to 40 km/h as they pass the residence and minimising the use of engine brakes.

# APPENDIX 1

## NOISE CONTOURS



