

Noise Monitoring Assessment

Hodgson Quarries and Plant Pty Ltd

Prepared for: VGT Environmental Compliance Solutions
Pty Limited
November 2022
MAC160257RP7V1



Document Information

Noise Monitoring Assessment

Hodgson Quarries and Plant Pty Ltd

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by VGT Environmental Compliance Solutions Pty Limited to complete a Noise Monitoring Assessment (NMA) for Hodgson Quarries and Plant Pty Ltd ('the quarry'). The NMA has been completed to quantify operational noise emissions and off-site truck noise as per Condition 47 and 48 of their Project Approval (Department of Planning and Environment (DPE)) and Environment Protection License (EPL) (ref:6535) from NSW Environment Protection Authority (EPA).

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), 2017, Noise Policy for Industry (NPI);
- NSW Department of Environment, Climate Change and Water (DECCW), 2011, NSW Road Noise Policy (RNP);
- Australian Standard AS 1055:2018 (AS 1055) – Acoustics – Description and Measurement of Environmental Noise;
- NSW Environment Protection Authority (EPA's), Approved methods for the measurement and analysis of environmental noise in NSW, 2022;
- NSW Environment Protection Authority (EPA), 2015, Environment Protection Licence EPL 6535 (EPL); and
- Development Consent (DA No.267-11-99, Mod 4), Department of Planning and Environment (DPE), Modified August 2021.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

2.1 Operational Noise Criteria

The project has operational noise criteria prescribed by both the DPE and EPA (see **Appendix B**). Notwithstanding, for consistency with the Acoustic Assessment prepared for Modification 4 (August 2021) of the quarry, this assessment has adopted criteria as per the Development Application summarised below:

*Condition 47. The Applicant must ensure that the noise generated by the development does not exceed the criteria in **Table 2** at any receiver or privately owned land.*

Table 1 Operational Noise Criteria

Receiver	Day	Morning Shoulder	Morning Shoulder
	7am-6pm	6am-7am	6am-7am
	Monday to Saturday	Monday to Saturday	Monday to Saturday
	LAeq(15min)	LAeq(15min)	LA1(1min)
B	44	40	50
All Other Receivers	43	40	50

2.2 Road Noise Criteria

Condition 48 of the DA specifies noise criteria for off-site road trucks from the quarry. These criteria are consistent with those outlined in the RNP (DECCW, 2011) for local roads.

Condition 48.

The Applicant shall ensure that traffic noise from the development does not exceed (LAeq(1 hr)) 55dBA between 7am and 10pm and 50dBA between 10pm and 7am at any affected residence under adverse weather conditions. Where ambient LAeq levels already exceed these criteria, the Applicant shall ensure that traffic noise from the development does not result in an increase of more than 2dBA.

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3 Methodology

Attended noise surveys for this assessment were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL.

The acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

3.1 Operational Noise Measurement Methodology

The locality surrounding the quarry is primarily rural/residential. Three representative receivers were selected for this assessment being Location A (north east), Location B (south east) and Location C (north west) (see Figure 1). The measurements were carried out using a Svantek Type 1, 971 noise analyser on Friday 4 November 2022.

The monitoring consisted of six 15-minute monitoring intervals between 6am to 8am. Where possible throughout each survey the operator quantified the contribution of any significant noise sources. Quarry loading and transportation operations commence at 6am, it is noted that processing was not operational during the monitoring period. The programme of the measurements and list of quarry activities is presented in Table 2.

Table 2 Noise Monitoring Programme			
Number of 15 minute Measurements	Measurement Period	Assessment Period	Quarry Activities
3	6am to 7am	Night/Morning Shoulder	Toolbox Talks, Loading/Transportation, No Processing
3	7am to 8am	Day	Loading/Transportation, No Processing

3.2 Road Noise Assessment Methodology

Road noise monitoring was conducted at 4405 Old Northern Road, Maroota NSW using a Type 1 Svantek, 977 noise analyser on Friday 4 November 2022. The monitoring was conducted between 6am to 8am as per Condition 48 of the DA, with the monitoring position situated at a 15m offset from Old Northern Road.

This location was selected as it had a clear line of site to Old Northern Road and could also be used to visually identify project related trucks entering and leaving site via Roberts Road. Noise levels obtained at the monitoring location are considered representative for receivers situated 15m from the road alignment, which is considered a representative worst case.

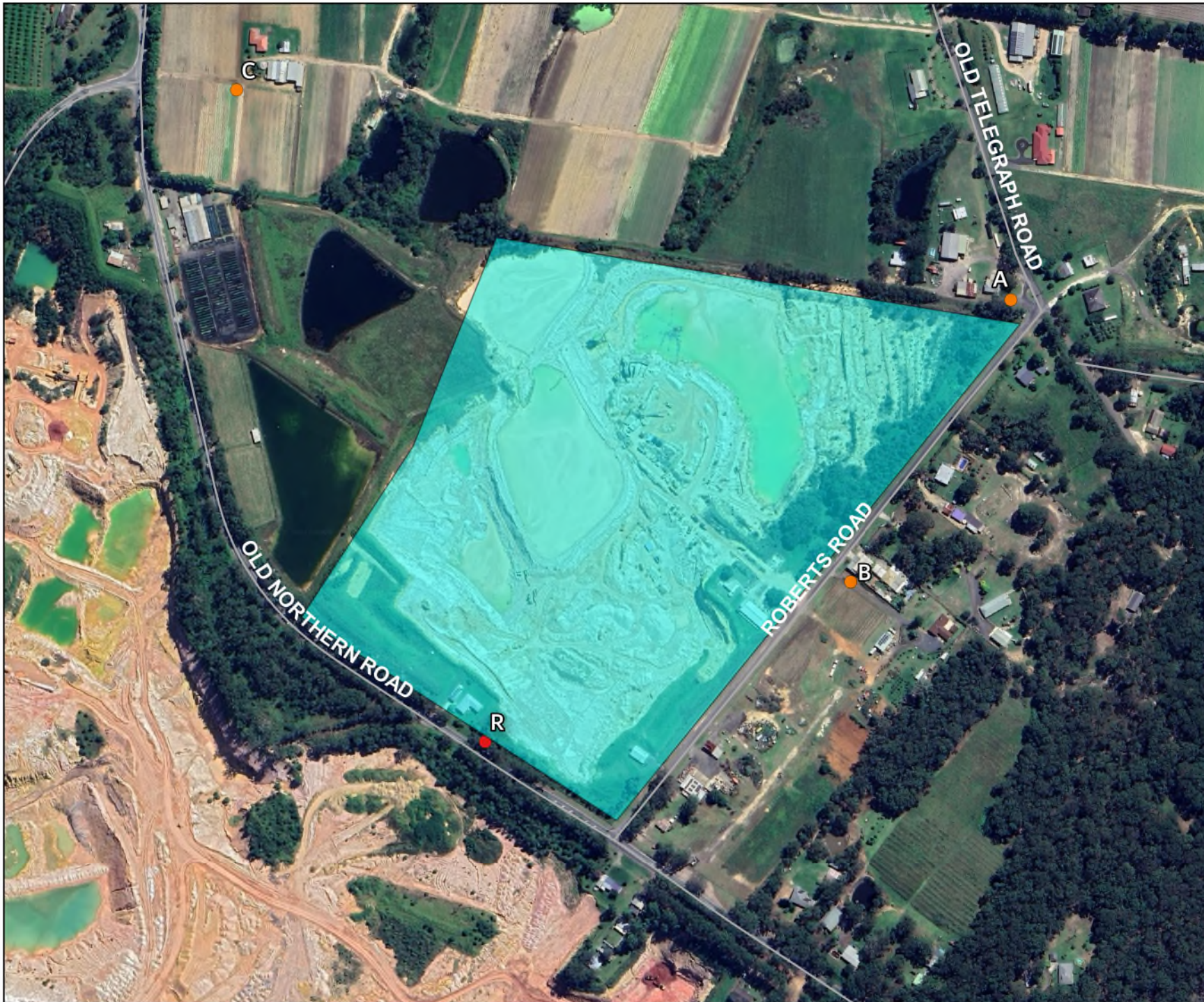
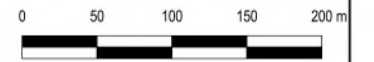


FIGURE 1
Site Locality
MAC160257

KEY

- Attended Monitoring Locations
- Road Noise Monitoring Location
- Site Boundary



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4 Results

4.1 Operational Noise Results – Location A

The monitoring and assessment results are presented in individual tables for each monitoring location. The results of the 15-minute attended noise measurements for Friday 4 November 2022 for Location A are summarised in **Table 3**.

Table 3 Operational Noise Results – Location A						
Time (hrs)	Primary Noise Descriptor (dBA re 20 µPa)				Meteorology	Description and SPL, dBA
	L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}		
06:00 (Morning Shoulder)	67	42	44	36	WS: <0.5m/s WD: W Rain: Nil	Traffic 30-67 Birds 30-55 Quarry - Mobile Plant 30-35 Quarry - Vehicle Movements 30-38
Quarry Site L _{Aeq} (15min) Contribution						<35
Criteria L _{Aeq} (15min)						40
Quarry Site L _{Aeq} (15min) Contribution						<45
Criteria L _{A1} (1min)						50
07:02 (Day)	83	50	57	35	WS: <0.5m/s WD: SW Rain: Nil	Traffic 30-83 Birds 30-57 Residential Noise 30-54 Quarry - Mobile Plant 30-35 Quarry - Vehicle Movements 30-38
Quarry Site L _{Aeq} (15min) Contribution						<35
Criteria L _{Aeq} (15min)						43

4.2 Operational Noise Results – Location B

The results of the 15-minute attended noise measurements for Friday 4 November 2022 for Location B are summarised in Table 4.

Table 4 Operator-Attended Noise Survey Results – Location B						
Time (hrs)	Primary Noise Descriptor (dBA re 20 µPa)				Meteorology	Description and SPL, dBA
	L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}		
06:17 (Morning Shoulder)					WS: <0.5m/s	Traffic 30-71 Birds 30-63
	71	55	50	37	WD: SW	Truck Idle (offsite) 47-49
					Rain: Nil	Quarry - Mobile Plant 30-40
						Quarry - Vehicle Movements 30-46
						Quarry Site L _{Aeq} (15min) Contribution 37
						Criteria L _{Aeq} (15min) 40
						Quarry Site L _{Aeq} (15min) Contribution 46
					Criteria L _{A1} (1min) 50	
07:20 (Day)					WS: <0.5m/s	Traffic 30-78 Birds 30-59
	78	49	51	34	WD: SW	Dogs Barking 35-46
					Rain: Nil	Quarry - Mobile Plant 30-35
						Quarry - Vehicle Movements 30-35
						Quarry Site L _{Aeq} (15min) Contribution <35
						Criteria L _{Aeq} (15min) 44

4.3 Operational Noise Results - Location C

The results of the 15-minute attended noise measurements for Friday 4 November 2022 for Location C are summarised in Table 5.

Table 5 Operator-Attended Noise Survey Results – Location C						
Time (hrs)	Primary Noise Descriptor (dBA re 20 µPa)				Meteorology	Description and SPL, dBA
	L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}		
06:37					WS: <0.5m/s	Traffic 30-69
(Morning	69	50	47	35	WD: SW	Birds 30-56
Shoulder)					Rain: Nil	Quarry Inaudible
Quarry Site L _{Aeq} (15min) Contribution						<30
Criteria L _{Aeq} (15min)						40
Quarry Site L _{Aeq} (15min) Contribution						<40
Criteria L _{A1} (1min)						50
07:41					WS: <0.5m/s	Traffic 30-67
(Day)	67	47	45	37	WD: SW	Birds 30-61
					Rain: Nil	Commercial Noise 34-43
Quarry Site L _{Aeq} (15min) Contribution						<30
Criteria L _{Aeq} (15min)						43

4.4 Road Noise Results

The results of the road noise attended measurements for Friday 4 November 2022 are summarised in **Table 6**.

Noise monitoring identified that overall LAeq(1hr) noise levels were dominated by vehicles not associated with the quarry. Therefore, road traffic noise calculations were undertaken to quantify project road noise contributions at the measurement position. The calculations were completed using United States (US) Federal Highway Administration (FHWA) calculation method (Report 550/9-74-004) Appendix A-13 and CORTN amendments. This method is an internationally accepted theoretical traffic noise prediction calculation, ideal for calculation of road traffic noise where relatively small traffic flows are encountered. The FHWA Traffic Noise Model (TNM) is listed in the RNP as an appropriate calculation method. Results of the traffic noise calculations identify that quarry vehicles satisfy the relevant day and night (morning shoulder) road noise criteria.

Table 6 Road Noise Survey Results				
Period	Number of Quarry Trucks (passbys)	Overall Measured	Calculated LAeq(1hr)	Criteria
		LAeq(1hr) (dBA re 20 µPa)	Project Truck Contribution	dBA
		dBA	dBA	LAeq(1hr)
6am to 7am	10	69	50	50
7am to 8am	2	65	44	55

5 Discussion

5.1 Operational Noise Discussion

5.1.1 Discussion of Results – Location A

Attended measurement results for monitoring conducted at Location A on Friday 4 November 2022 identified that quarry noise was audible during morning shoulder measurements and day measurements, with non-quarry sources dominating measured noise levels. Generally, quarry noise sources included loader movements, reverse alarms and road truck movements and non-quarry noise sources included local and distant traffic and birds.

Therefore, estimated quarry noise contributions were below the relevant EPL noise limit for all measurements at Location A.

5.1.2 Discussion of Results – Location B

Attended measurement results for monitoring conducted at Location B on Friday 4 November 2022 identified that quarry noise was audible during morning shoulder measurements and day measurements. Generally, quarry noise sources included loader movements, reverse alarms and road truck movements and non-quarry noise sources included local and distant traffic, birds, dogs barking and heavy vehicles idling offsite.

Therefore, estimated quarry noise contributions were below the relevant EPL noise limit for all measurements at Location B.

5.1.3 Discussion of Results – Location C

Attended measurement results for monitoring conducted at Location C on Friday 4 November 2022 identified that quarry noise was inaudible during morning shoulder and day measurements, with non-quarry sources dominating measured noise levels. Generally, non-quarry noise sources included traffic, birds, and nearby commercial noise.

Therefore, estimated quarry noise contributions were below the relevant EPL noise limit for all measurements at Location C.

5.1.4 Road Noise Discussion

Road noise emission from quarry vehicles, satisfied relevant noise criteria as specified by Condition 48 of the DA for receivers situated at a 15m offset to the roadway. Furthermore, ambient road traffic not associated with the project dominated measured noise levels throughout measurements.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment on behalf of Hodgson Quarries and Plant Pty Ltd. The assessment was completed to quantify site noise emissions against relevant noise criteria pertaining to quarry operations and off-site truck movements.

Attended monitoring has identified that operational and road noise emissions generated by the quarry comply with relevant statutory noise limits. Furthermore, project related noise emissions are generally masked by extraneous non-quarry sources.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

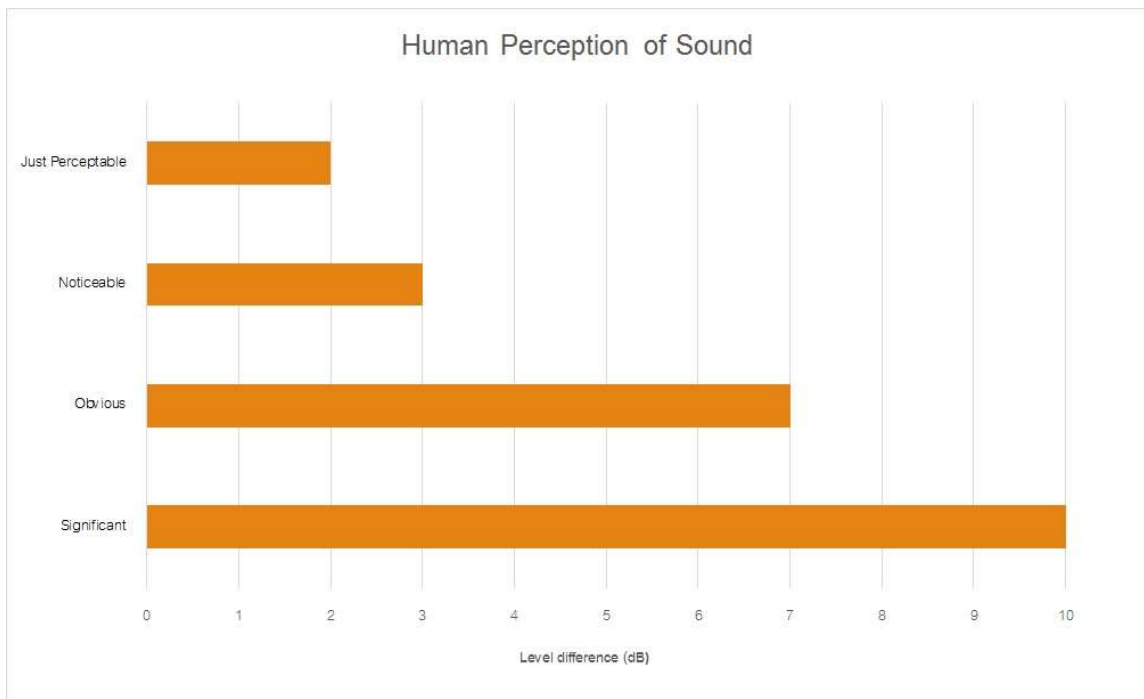
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAm _{ax}	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (L _w or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (L _p or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from L _w in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Appendix B – Regulatory Noise Limits

Environment Protection Licence



Licence - 6535

Licence Details

Number:	6535
Anniversary Date:	12-March

Licensee

HB MAROOKA PTY LTD

PO BOX 1778

GOSFORD NSW 2250

Premises

HB MAROOKA PTY LTD

CNR ROBERTS & OLD NORTHERN ROADS

MAROOKA NSW 2756

Scheduled Activity

Crushing, Grinding or Separating

Extractive Activities

Fee Based Activity

	<u>Scale</u>
Crushing, grinding or separating	> 100000-500000 T processed
Land-based extractive activity	> 100000-500000 T extracted, processed or stored

Region

Metropolitan - Sydney Industry

Level 13, 10 Valentine Ave

PARRAMATTA NSW 2150

Phone: (02) 9995 5000

Fax: (02) 9995 6900

PO Box 668 PARRAMATTA

NSW 2124

Environment Protection Licence

Licence - 6535



P1 Location of monitoring/discharge points and areas

P1.1 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Noise limits

L2.1 Noise from the premises must not exceed the sound pressure level expressed as LA10 (15 minute) of 45 dB(A), except as expressly provided by this licence.

L2.2 Noise from the premises is to be measured or computed at any point within one metre of any residential boundary, or at any point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition L2.1.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:

- a) must be maintained in a proper and efficient condition; and
- b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979**DETERMINATION OF A DEVELOPMENT APPLICATION UNDER SECTION 80(1) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979**

I, the Minister for Urban Affairs and Planning, under Section 80(1) of the Environmental Planning and Assessment Act, 1979 (the Act), determine the Development Application referred to in Schedule 1 by granting consent to the Application, subject to the conditions set out in Schedule 2.

The reason for the imposition of conditions is to minimise any adverse environmental effects of the development, consistent with the objectives of the Act.

Andrew Refshauge MP
Minister for Urban Affairs and Planning

Sydney

2000

File No. S98/00772

SCHEDULE 1

Application made by: Dr L. S. Martin ("the Applicant").

To: The Minister for Urban Affairs and Planning ("the Minister").

In respect of: Lots 1 and 2 DP 228308, Lot 2 DP 312327, Roberts Road, Maroota, in the Baulkham Hills Local Government Area.

For the following: Extraction and on-site processing of sand, clay and pebble; construction of a bund wall.

Development Application: DA No. 267-11-99 lodged with the Department of Urban Affairs and Planning on 22 November 1999, accompanied by a Environmental Impact Statement prepared by Nexus Environmental Planning Pty Ltd. and dated November 1999.

Determination: 1) To ascertain the date upon which the consent becomes effective, refer to Section 83 of the Act.
2) To ascertain the date upon which the consent is liable to lapse, refer to Section 95 of the Act.
3) Section 97 of the Act confers on an applicant who is dissatisfied with the determination of a consent authority a right of appeal to the Land and Environment Court exercisable within 12 months after receipt of notice.

This instrument includes changes made by DA 267-11-99 Mod 1 in 29 November 2000 (marked red).

This instrument includes changes made by DA 267-11-99 Mod 3 in 18 August 2015 (marked blue).

This instrument includes changes made by DA 267-11-99 Mod 2 in 18 March 2016 (marked green).

44. The results of the Groundwater Monitoring Program shall be reported the Department and DPI-Water, using contour plans depicting the surface topography, updated contour maps of the wet weather high groundwater level of the regional aquifer and proposed depth of extraction for each extraction Phase. Reporting is to occur on a six monthly basis for the duration of extractive operations, and throughout rehabilitation of the site, unless otherwise agreed with the Secretary.

The Applicant shall implement the Groundwater Monitoring Program as approved from time to time by the Secretary.

Process Water Dam Design and Construction

45. The Applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water Management Plan (see condition 42(b) above).

NOISE

Noise Management Plan

46. The Applicant shall prepare a Noise Management Plan as part of the EMP.

The Noise Management Plan shall:

- (a) identify existing and potential noise sources and their relative contribution to noise impacts from the development;
- (b) specify appropriate intervals for noise monitoring to evaluate, assess and report noise emission levels due to construction and normal operations of the development under prevailing weather conditions;
- (c) outline the methodologies to be used, including justification for monitoring intervals, weather conditions, seasonal variations, selecting locations, periods and times of measurements, the design of any noise modelling or other studies, including the means for determining the noise levels emitted by the development;
- (d) specify measures to be taken to document any higher level of impacts or patterns of temperature inversions, and detail actions to quantify and ameliorate enhanced impacts if they occur;
- (e) provide details of noise amelioration measures, including measures to be used to reduce the impact of intermittent, low frequency and tonal noise (including truck reversing alarms) and reactive management responses for particular noise sources; and
- (f) contingency measures to be implemented should noise complaints be received.
- (g) provision for the notification of adjoining property owners of the commencement and duration of works adjoining the boundary;
- (h) construction of temporary noise shielding to residences affected by short-term noise impacts, including the bund recommended under Modification 2, and include an assessment of the effectiveness of this measure in reducing noise levels; and
- (i) include a noise reduction strategy for typical operations to ensure the noise levels from these operations do not exceed the noise criteria specified in Condition 47.

The Applicant shall implement the approved management plan as approved from time to time by the Secretary.

47. For typical operations, noise from the premises must not exceed:
- an $L_{Aeq,15 \text{ min}}$ noise emission criterion of 43 dB(A) (7am to 6pm) Monday to Saturday;
 - an $L_{Aeq,15 \text{ min}}$ noise emission criterion of 40 dB(A) (6am to 7am) Monday to Saturday; and
 - an $L_{A1,1 \text{ minute}}$ noise emission criterion of 50 dB(A) (6am to 7am) Monday to Saturday.

Noise generated by the development is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated or replaced from time-to-time).

However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement."

- 47(a) The excavator to be used is to be fitted with acoustic mufflers to achieve a noise level of approximately 76dB(A) when measured at 7 metres.
- 47(b) The on-site generator is to be fitted with an acoustic enclosure to ensure that noise levels less than 44dB(A) at 30m are achieved.
- 47(c) A noise compliance investigation is to undertaken within one month of the installation of the equipment to demonstrate compliance with the noise level limits stated in Conditions 47(a) and 47(b). The results of the compliance investigation are to be provided for the approval of the Secretary within 14 days of the completion of the investigations.
- 47(d) The Applicant must ensure works associated with atypical operations, as described in Modification 2, only occur:
- (a) for a maximum of 24 days in a year, and only between 8 am to 5 pm on those days, Monday to Saturday;
 - (b) after an investigation of options for avoiding multiple atypical operations at any one time so as to limit noise levels at affected receptors, and the outcomes of this investigation are detailed in the Noise Management Plan; and
 - (c) at least 24 hours after notifying potentially affected receptors, with such notification to include information on the duration and extent of works, the likely noise to be experienced, and a contact telephone number.

TRAFFIC AND TRANSPORT

Road Noise Management Plan

48. The Applicant shall ensure that traffic noise from the development does not exceed (L Aeq(1 hr)) 55 dB(A) between 7 am and 10 pm and 50 dB(A) between 10 pm and 7 am at any affected residence under adverse weather conditions. Where ambient Leq levels already exceed these criteria, the Applicant shall ensure that traffic noise from the development does not result in an increase of more than 2 dB(A).

Note: Adverse weather conditions means in the presence of winds up to 3 metres per second and/or temperature inversions of up to 4 degrees Centigrade per 100 metres.

49. The Applicant shall prepare a Road Noise Management Plan as part of the EMP. The Plan shall document measures to be taken to meet the criteria, including a monitoring, reporting and response program; and methods for educating drivers in the reduction of road noise impacts.

The Applicant shall implement the approved management plan as approved from time to time by the Secretary.

Truck movements

50. The Applicant shall ensure that truck movements associated with the development do not exceed 100 movements per day (50 laden truck movements) or 20 (10 laden truck movements) movements per hour, during construction or operation.

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