Darlington Point Quarry

Noise Assessment

E.B. Mawson & Sons Pty Ltd

Prepared by:

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Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with E.B. Mawson & Sons Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

E.B. Mawson & Sons Pty Ltd (Mawsons) has commissioned SLR Consulting Australia Pty Ltd (SLR) to prepare a Noise Assessment (NA).

The purpose of the NA is to assess the noise emissions associated with the proposed Darlington Quarry (the Site) expansion (the Project).

The Project is an extension of the existing sand quarry that will extract up to 300,000 tonnes per annum (tpa) for up to 25 years.

Noise emissions associated with the proposed and existing quarrying operations have been considered with regard to the following documents in place in NSW:

- Quarry noise – NSW EPA *Noise Policy for Industry*
- Off-site Delivery vehicles – NSW *Road Noise Policy*

Blasting is not required as part of the operation of the Project.

2.0 Project Overview

2.1 Site Location

The Site is located on the corner of Kidman Way and Jim Cattanach Road, Darlington Point, NSW. The Site is located approximately 38 km south of Griffth and 40 km east of Leeton, see **Figure 1** (note that the aerial imagery predates the construction of the existing quarry).

The Site location is properly described as Lot 175 DP750908, which contains the current pit. The current pit is approximately 12 hectares (ha) in size, while the total Site is approximately 122 ha.

As shown in **Figure 1**, the Site's southern boundary is formed by Jim Cattanach Road, the eastern boundary is formed by Kidman Way, and the northern and western boundaries are formed by two private lots. The Site is accessed via Jim Cattanach Road and the current and proposed haul route is from Jim Cattanach Road to Kidman Way.

2.2 Existing Operations

The equipment currently used at the Site includes:

- 20 tonne (t) excavator
- Mobile screen
- 950 Cat front-end loader
- Water truck – 10,000 litres (L).

Sand material is extracted from the pit wall by the excavator operating at the pit floor. Sand is transferred to the screen hopper using the front-end loader. The front-end loader also stockpiles the processed sand to be loaded onto delivery trucks ("truck and dog") as required. The front-end loader bucket has a weighing scale which eliminates the need for a dedicated weighbridge.

Delivery trucks ingress and egress the pit via separated haul roads that converge near the site office. There are currently approximately 20 vehicle movements per day.

2.3 Proposed Operations

The Project is to increase the scale and intensity of the existing quarry by:

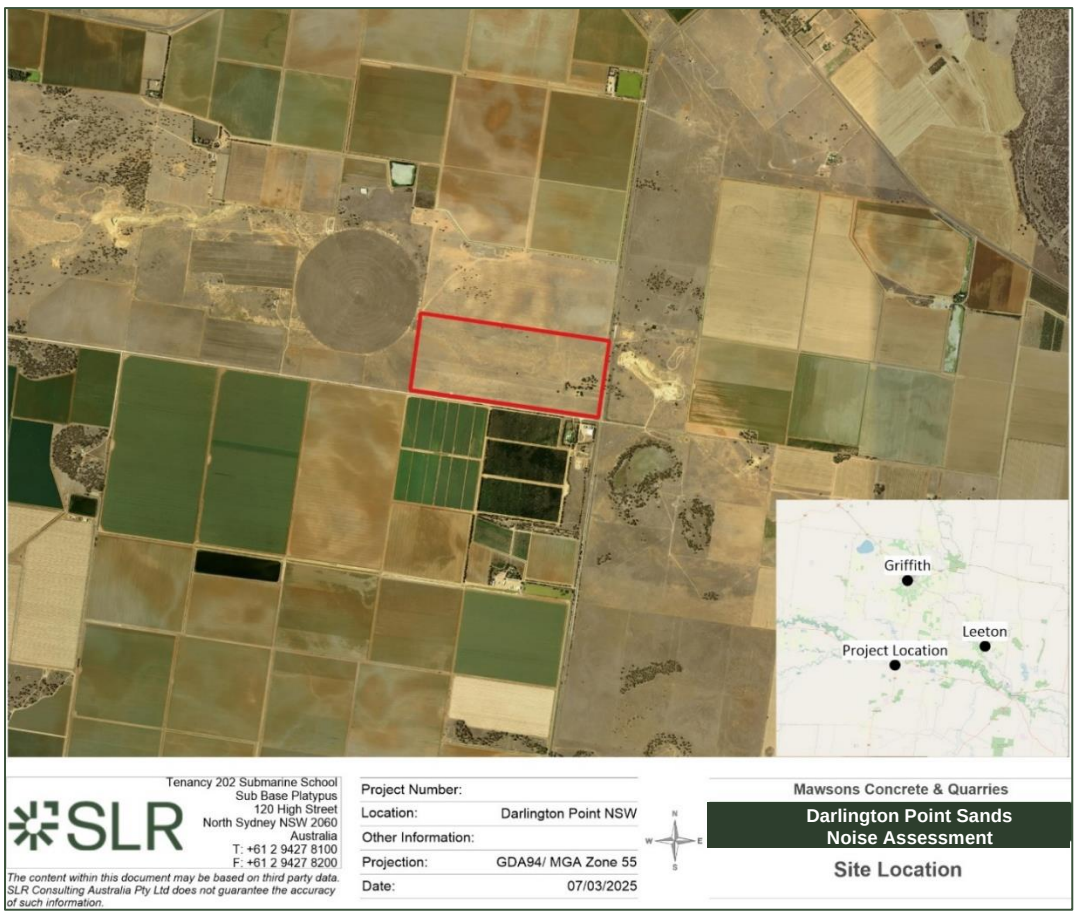
- Increasing the annual production to 300,000 tpa, for up to 25 years.
- Increasing the maximum area of disturbance of the quarry to 40 ha at any time.
- Increasing truck movements from approximately 20 truck movements per day (ie approximately 10 in and out) to approximately 70 truck movements per day (ie approximately 35 in and out).

The plant and equipment operated at the Site may change over time in response to contracts, maintenance, replacement and technological advancements, subject to maintaining compliance with the relevant noise criteria for the Project.

The following aspects of the operations are not proposed to change:

- The existing depth of extraction to RL 114 m Australian Height Datum (AHD), which is 10 m below natural ground level, will be maintained.
- The screening and stockpiling of material and loading of delivery trucks within the pit.
- The existing hours of operation will not change, which are:
  - 7:00 am to 6:00 pm Monday to Friday
  - 8:00 am to 4:00 pm Saturdays
  - No operation on Sundays or Public Holidays.

Figure 1 Site Location



3.0 Existing Environment

3.1 Sensitive Receptors

The Site is situated in a rural environment surrounded by farmland and scattered residential properties. **Table 1** lists the nearest sensitive receptors to the Site, while **Figure 2** illustrates each receptor location around the Site.

Table 1 Details of Identified Sensitive Receptors

Receptor ID	Receptor Type	Location (m, UTM 55H)		Distance from Project Site (m)	Elevation (m, AHD)
		Easting	Northing		
R1	Residential	406,270	6,169,052	803	125
R2	Residential	408,356	6,170,006	2,579	124
R3	Residential	406,018	6,167,503	200	123
R4	Residential	405,522	6,166,296	1,463	125
R5	Residential	403,392	6,168,667	1,293	122
R6	Residential	402,785	6,170,081	2,419	124
R7	Residential	404,829	6,169,375	803	127

Figure 2 Locations of Sensitive Receptors and Noise Monitoring Locations

3.2 Ambient Environment

Noise monitoring was conducted in order to establish the existing noise environment in the vicinity of the receptors around the project site. The measured noise levels assist in determining appropriate operational noise limits for the project.

Environmental noise "loggers" were deployed at the locations shown in **Figure 2** between Thursday 13 February 2025 and Wednesday 26 February 2025. The loggers were positioned to measure existing ambient noise levels that are representative of receivers potentially most affected by the project.

Measurements were conducted using the 'A weighting' filter and 'fast' response. The noise loggers were programmed to record noise levels in 15-minute intervals. The microphone of each noise logger was positioned 1.5 m above ground level and fitted with a microphone windshield.

The results of the noise survey for the operating time of the Site were analysed in accordance with NSW *Noise Policy for Industry* (NPfI) methodology and are summarised in **Table 2**.

Table 2 Summary of Unattended Noise Logging Results

ID	Location	Daytime[1] Ambient Noise Level, dBA	
		Background Noise, RBL[2]	Average Noise Level, dBA L_{Aeq}
NML1	Towards northwest site boundary	35 (26 actual)[3]	50
NML2	At south boundary	35 (34 actual)[3]	58

1. 7:00 am to 6:00 pm Monday to Saturday and 8:00 am to 6:00 pm on Sundays and public holidays (Operations on Sunday and Public Holiday is not proposed).
2. RBL = Rating Background Level. It is described as the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period, and is the level used for assessment purposes.
3. Actual RBLs are below assumed policy minimums; therefore assumed minimums would be adopted.

3.3 Operational Plant and Equipment

Measurements of the noise output of the plant and equipment currently in use at the Site were undertaken to inform the noise prediction modelling. The derived values based on the noise measurements are shown in **Table 3**.

Table 3 Plant and Equipment Sound Power Levels

Plant/equipment	Sound Power Level (SWL), dB Octave Band Centre Frequency (Hz)									Overall, dBA
	31.5	63	125	250	500	1000	2000	4000	8000	
Front end loader – CAT 950G (loading idling delivery truck)	97	111	102	94	90	89	88	80	75	95
Tracked excavator – Volvo EC460CL	91	100	97	95	94	94	88	87	85	98
Delivery truck (truck + dog) – On pit haul road	91	100	97	95	94	94	88	87	85	98
Vibrating screen	93	102	98	98	97	93	90	86	80	99

3.4 Acoustic Instrumentation

The noise monitoring equipment used to undertake noise monitoring and measurements is outlined in **Table 4**.

Table 4 Noise Monitoring Equipment

Instrument	Serial Number	Location Used
ARL Type 316 Environmental Noise Logger	16-207-049	NML1
ARL Type 316 Environmental Noise Logger	16-306-044	NML2
G.R.A.S 42AG Acoustic Calibrator	280549	NML1 / NML2
Rion Type NA-28 Precision Sound Level Meter	01060054	Onsite source noise measurements
RION NC-74 Acoustic calibrator	34973239	Onsite source noise measurements

The calibration of the sound level meters was checked before and after the measurements and was found to be within an acceptable margin of ±1 dBA of the reference signal.

All items of acoustic instrumentation were designed to comply with Australian Standard (AS) IEC 61672.1:2019 "*Electroacoustics – Sound Level Meters*" and IEC 60942:2017 "*Electroacoustics – Sound calibrators*".

4.0 Assessment Criteria

Noise from the Site operations including from fixed and mobile sources and delivery trucks, will require consideration in accordance with Planning Secretary's Environmental Assessment Requirements 1926 (EAR 1926).

There will not be any significant construction works required as part of the Project. Similarly, blasting is not required as part of the Project operations.

Consequently, further consideration of construction noise or vibration, and blasting emissions, is not required.

4.1 Environment Protection Licence

The Site operates under Environment Protection Licence Number (EPL) 21567. In relation to noise, EPL 21567 stipulates:

L3 Noise limits

L3.1 Noise from the premises must not exceed:

a) 40 dB(A) $L_{Aeq(15\ minute)}$ during the day (7am to 6pm) Monday to Friday; and

b) at all other times 35 dB(A) $L_{Aeq(15\ minute)}$, except as expressly provided by this licence.

If the Project is approved, the EPL would require updating to be representative of this assessment and reflect the overall site activities.

The noise limits would be determined in accordance with the NSW *Noise Policy for Industry* (NPfI), which sets out the requirements for the assessment and management of operational noise from industry in NSW.

4.2 Noise Policy for Industry

4.2.1 Industrial Noise Trigger Levels

The NPfI defines how to determine 'trigger levels' for noise emissions from industrial developments. Where a development is likely to exceed the trigger levels at existing noise sensitive receivers, feasible and reasonable noise management measures are required to be considered to reduce the impacts.

There are two types of trigger levels – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses:

- The intrusiveness of an industrial noise source is generally considered acceptable at residential receptors if the L_{Aeq} noise level of the source, measured over a period of 15-minutes, does not exceed the representative background noise level by more than 5 dB.
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended amenity levels specified in the NPfI for that particular land use.

For this assessment, the area surrounding the Project is considered to be 'rural' as per the NPfI definitions.

4.2.2 Project Noise Trigger Levels

The Rating Background Level (RBL) values (refer to **Table 2**) established from the noise monitoring results indicate that the ambient background noise levels would be 'low' in the context of the NPfI, as is common in rural environments with few sources of noise-generating infrastructure.

The daytime trigger levels for industrial noise from the Project are summarised in **Table 5**. The Project Noise Trigger Levels (PNTL) are the most stringent of the intrusiveness and amenity trigger level for each operational period and are highlighted in bold below.

Table 5 Project Noise Trigger Levels – All Receptors

Operational Period	Recommended "Rural" Amenity Noise Level, dBA L_{Aeq}	Minimum Noise Level, dBA		PNTL, dBA $L_{Aeq(15minute)}$	
		RBL	$L_{Aeq(period)}$	Intrusiveness	Amenity[1, 2]
Daytime[3]	50	35	50	**40**	53

1. No other sources of industrial noise are present in the area and are not likely to be in the future. As such, the recommended amenity noise levels have been taken as the project amenity noise levels, as outlined in the NPfI.
2. The project amenity noise levels have been converted to a 15-minute level by adding 3 dB, as outlined in the NPfI.
3. Day – the period from 7:00 am to 6:00 pm Monday to Saturday or 8:00 am to 6:00 pm on Sundays and public holidays. (Operations on Sunday and Public Holiday is not proposed).

Therefore the daytime PNTL will be equivalent to the daytime noise limit stipulated in the EPL.

4.2.3 Modifying Factors

Sources of industrial noise can cause greater annoyance where they contain certain characteristics, such as tonality, intermittency or significant low-frequency content.

The NPfI specifies the following modifying factors, shown in **Table 6**, applicable to the Project and which are to be applied to the received noise level where annoying characteristics are present.

Table 6 NPfI Modifying Factors

Factor	Assessment/Measurement	When to Apply	Correction[1]
Tonal noise	One-third octave or narrow band analysis	Level of one-third octave band exceeds the level of the adjacent bands on both sides by the levels defined in the NPfI.	5 dB[2]
Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements	Measure/assess source contribution C and A weighted $L_{eq,t}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and the level to which the thresholds defined in the NPfI are exceeded.	2 or 5 dB[2]
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated.	Maximum correction 10 dB[2] (excluding duration correction)

1. Corrections to be added to the predicted levels.
2. Where a source emits tonal and low-frequency noise, only one 5 dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.

4.3 Project Traffic on Surrounding Roads

When trucks and other vehicles are operating within the boundaries of the Site, noise contributions are included in the predicted noise emissions.

When Project-related traffic moves onto the public road network a different noise assessment methodology is common and appropriate, as vehicle movements are regarded as 'additional road traffic' rather than as part of the works and are assessed in accordance with the NSW *Road Noise Policy* (RNP).

An initial assessment is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2 dB (ie equates to an increase in traffic volumes of approximately 60%) due to site-related traffic.

Where noise levels increase by more than 2 dB (ie 2.1 dB or greater) further assessment is required using the criteria presented in the RNP, as shown in **Table 7**.

Table 7 RNP Criteria for Assessing Project-Related Traffic on Public Roads

Road Category	Type of Project/Land Use	Daytime Assessment Criteria, dBA
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq(1hour)}$ 55 (external)

5.0 Noise Modelling and Assessment

In order to predict noise levels associated with the Project at nearby receptors, a SoundPLAN computer model was developed.

SoundPLAN is a software package which enables compilation of a computer model comprising a digitised ground map (containing ground contours and significant structures, where appropriate), the location and acoustic power levels of significant noise sources, and the location of sensitive receptors.

5.1 Noise Prediction Standard

The model uses the International Organisation for Standardisation (ISO) 9613:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2) prediction methodology within the SoundPLAN software package.

ISO 9613-2 is an industry standard methodology that is considered suitable for use in the prediction of noise from industrial sources.

ISO 9613-2 has been used extensively on industrial projects in Australia over several decades and has been accepted previously by NSW DPE (now DPHI) for environmental noise assessments.

The noise model includes ground topography, ground absorption/reflection, buildings and noise sources from the development.

The following ground absorption factors have been used (note a factor of 0.0 is fully reflective and 1.0 is fully absorptive):

- Site and haul roads – 0.25
- Grassland beyond the pit and to receptors – 0.75.

5.2 Project Operations and Plant Equipment

The Site will utilise conventional extraction and processing methods which includes the following:

- The loosened overburden material in the expansion area (at current ground level) is loaded into a dump truck using an excavator.
- The overburden is transported on site to form an embankment on the pit edge.
- From the pit wall within the pit, sand is then fed into the screen to be processed/sorted using the front-end loader.
- The screened and sorted material is stockpiled on site using a front-end loader, which is also used to load the delivery trucks.

The acoustically significant plant/equipment associated with the Project operations has been shown in **Table 8**.

The duration of each of the activities, the emission height and the base sound power level or plant currently in use at the Site (SWL, refer to **Table 3**) have been shown in **Table 8**.

The new sources were modelled relative to the existing local ground height at the Project expansion area. In pit operations, which remain consistent with existing operations, have been modelled at the pit level of 114 m AHD.

The number of delivery trucks per day is expected to increase as part of the expansion, with an average maximum of two delivery trucks (truck + dog) per 15-minute assessment period at the Site.

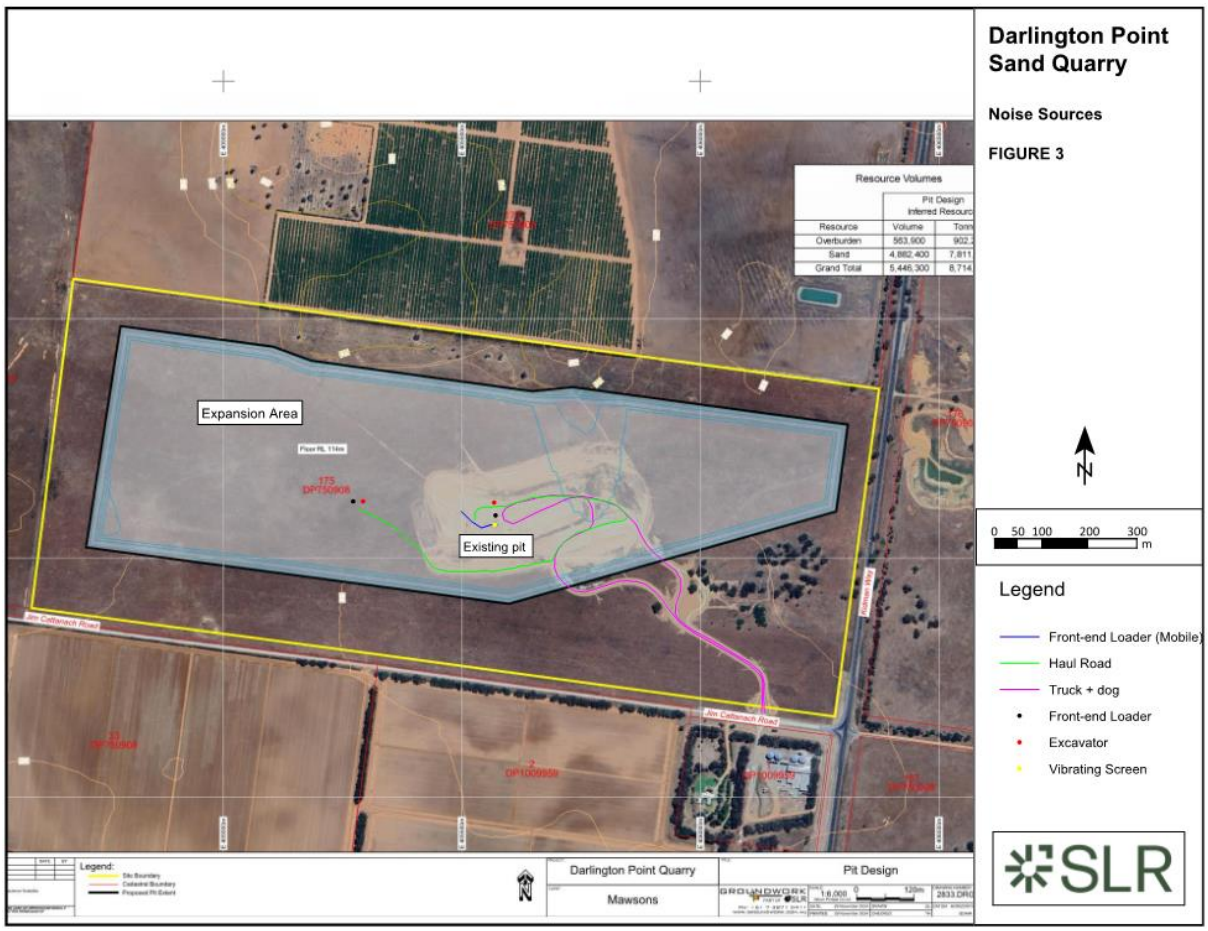
Table 8 Project Noise Sources

Activity	Plant / Equipment Item	Number	Emission Height, m	Duration of Use, minutes	Speed, km/h	SWL, L_W dBA L_{Aeq}
In pit	Screen[1]	1	2.5	15	--	99
	Front-end loader[1]	1	2.5	15	--	95
	Excavator[1]	1	2.5	15	--	98
	Truck + dog[1] (on haul road)	2	2.5	--	10	98
Expansion area (ground level)	Dump truck[2]	1	2.5	--	10	98
	Excavator[1]	1	2.5	15	--	98

1. Based on SLR measurements of plant currently in use at the Darlington Point site
2. Based on measurement at Mawson's Fuzzards Quarry by SLR on 14 February 2025.

The locations of significant activities at the Site as modelled have been shown in **Figure 3**.

Figure 3 Site (Existing) and Project (Expansion) Activities



5.3 Meteorological Conditions

Fact Sheet D of the NPfI requires noise assessments to consider the potential effect of meteorological and atmospheric conditions on the propagation of noise from an industrial site.

In lieu of a detailed weather analysis to determine the frequency of occurrence of noise-enhancing propagation conditions, it is acceptable to undertake the assessment on the basis that noise-enhancing propagation conditions are a feature of the area and perform predictive noise modelling as such.

The noise prediction modelling has used the ISO 9613-2 methodology which includes noise-enhancing weather conditions including downwind propagation (approximately 1 m/s – 5 m/s) applicable during the daytime period in line with the NPfI requirements.

5.4 Noise Prediction Results

The results of the noise modelling are shown in **Table 9**, together with the applicable Project noise limits.

Table 9 Predicted Noise Levels – All Operations (Daytime)

Receptor	Project Noise Limit, dBA	Predicted Noise Level, dBA $L_{Aeq(15minute)}$		
		In Pit	Expansion	Total
R1	40	23	19	25
R2	40	<15	<15	<15
R3	40	29	18	29
R4	40	19	15	21
R5	40	16	<15	18
R6	40	<15	<15	<15
R7	40	20	18	22

It can be seen in **Table 9** that noise levels from the Project (ie existing and expansion activities) would comply with the EA daytime noise limit (40 dBA) at all receptors.

5.5 Consideration of Modification Factors

5.5.1 Low Frequency Noise

The noise sources at the Project may contain major components of low frequency noise in the 10 Hz – 160 kHz range. Consequently, an initial analysis of the predicted noise levels in terms of the unweighted and dBA values was undertaken to identify the potential for and unbalanced spectrum and potential annoyance.

The analysis compared the ‘C-weighted’ and ‘A-weighted’ predicted noise levels for the Project operations during noise enhancing weather conditions as shown in **Table 10**. A difference of greater than 15 dB indicates potentially significant levels of low frequency noise.

Table 10 Low Frequency Noise Assessment

Receptor	Total Predicted Noise Level, dB $L_{eq(15minute)}$		
	dBC	dBA	Difference (dBC – dBA)
R1	42	25	17
R2	33	<15	>15
R3	43	29	14
R4	38	21	17
R5	37	18	19
R6	33	<15	>15
R7	40	22	18

It can be seen in **Table 10** that the difference between the dBC and dBA values may exceed 15 dB at several receptors. Therefore, consideration of the 'balance' of the frequency spectrum is required to establish the potential for increased annoyance.

Table 11 reproduces the sound level thresholds from Fact Sheet C of the NPfI. Where the Project noise level would exceed the low frequency threshold values, a correction for increased annoyance would apply.

Table 11 Comparison with One-third Octave Low-frequency Noise Thresholds – R5

Noise Level, dB	One-third Octave Band Frequency (Hz)												
	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Threshold, dB	**92**	**89**	**86**	**77**	**69**	**61**	**54**	**50**	**50**	**48**	**48**	**46**	**44**
Predicted noise level, dB	--	18	25	18	16	18	29	30	34	22	16	16	16

It can be seen in **Table 11** that the predicted noise levels would not exceed the NPfI low frequency threshold levels. Consequently, no modification factor corrections are required.

5.5.2 Tonal Character

An analysis has been undertaken of the predicted noise levels, when audible, to establish the likelihood of any tonal character. In accordance with Fact Sheet C of the NPfI, a +5 dB correction is applied for increased annoyance where:

> *Level of one-third octave band exceeds the level of the adjacent bands on both sides by:*
>
> - *5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz*
> - *8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz*
> - *15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz*

Table 12 Predicted One-third Octave Band Noise Levels

Receptor	Predicted Noise Levels, dB One-third Octave Band Frequency (Hz)															
	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800
R1	21	23	31	34	37	44	27	19	20	19	18	19	18	17	14	15
R2	13	15	23	26	28	36	18	11	11	10	7	7	7	5	1	1
R3	26	26	34	35	38	50	31	22	23	21	22	20	22	21	19	20
R4	18	20	28	31	34	41	24	17	17	16	14	14	15	13	10	10
R5	16	18	27	30	32	38	22	15	16	15	12	12	13	11	7	8
R6	12	14	23	26	28	35	18	11	11	10	7	7	7	5	1	1
R7	19	22	30	33	36	42	26	18	19	18	15	17	16	15	12	12

The values in **Table 12** show that the thresholds for tonal character as per the NPfI modification factors is not exceeded in the audible frequency range at all receptors. Therefore, no correction to the predicted noise level is required.

5.6 Project-Related Road Traffic Noise Assessment

Based on the Project Traffic Impact Assessment report[1], Kidman Way in 2011 carried approximately 1,000 vehicles per day including 21% heavy vehicles.

The traffic report also provides a comparison of future pre- and post-Project traffic volumes for Kidman Way for the year 2036:

- Without Project – 1,100 vpd (AADT)
- Without Project – 1,150 vpd (AADT)

This indicates that the number of additional vehicles will be low relative to the total number of vehicles on Kidman Way, and the percentage of heavy vehicles would increase by a small margin (less than 5%).

Therefore, the Project would not noticeably increase the traffic volume on Kidman Way, so the RNP +2 dB criterion would not be exceeded.

6.0 Conclusion

SLR has undertaken an assessment of operational noise associated with the proposed expansion of the Darlington Quarry. The assessment addresses the requirements relating to noise outlined in the SEARs for the Project.

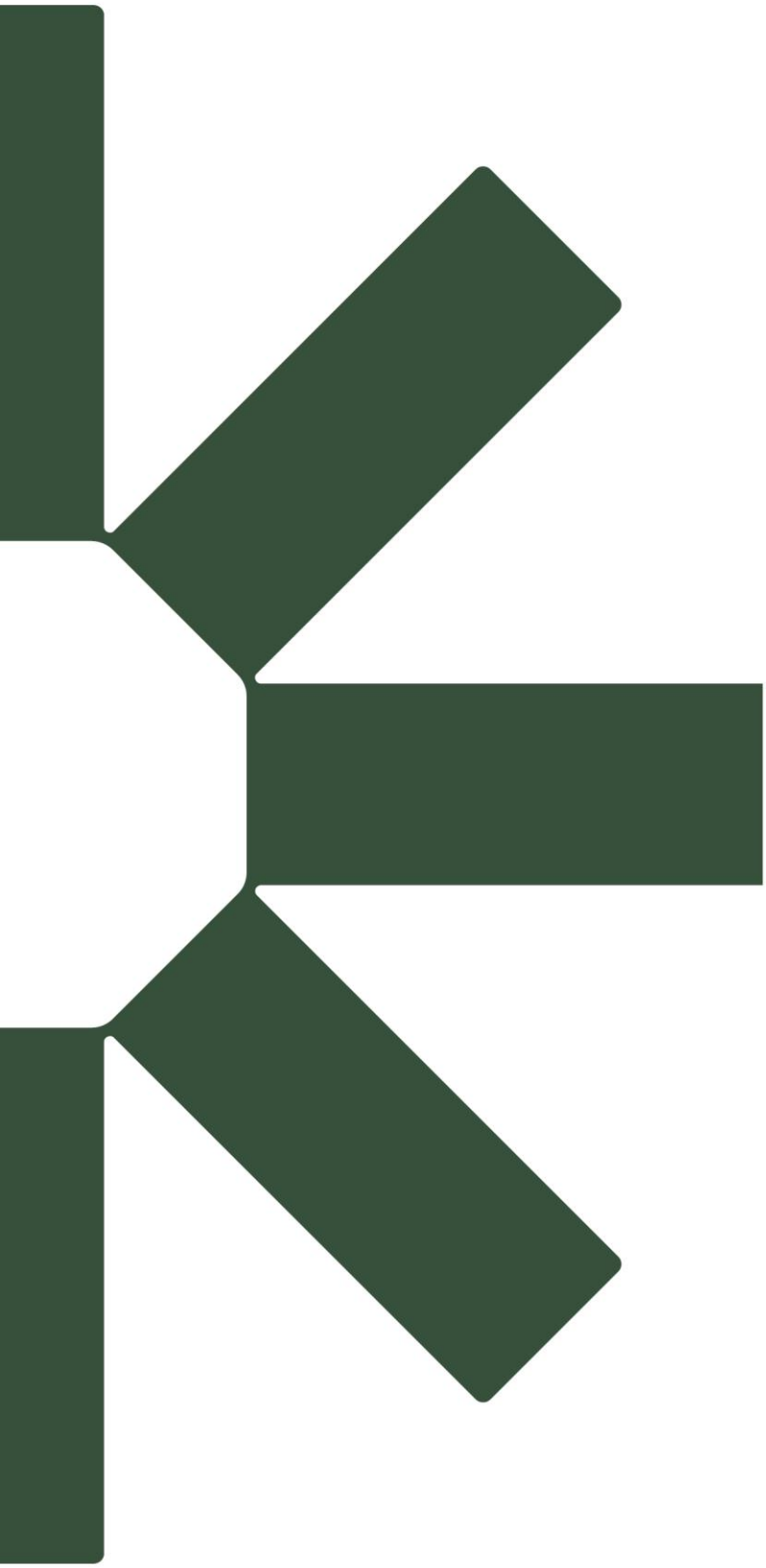
Project specific noise criteria have been established in accordance with the policies applicable to the assessment of industrial operations noise in NSW, and was found to be equivalent to the noise limits stipulated in the current Environment Protection Licence.

Noise modelling based on the existing and future topography of the Project site and surrounds, together with operational activities and plant/equipment currently in use at that Site, has been undertaken. Noise emissions during “noise enhanced” meteorological conditions, together with any ‘annoying’ characteristics, were considered. Compliance with the EPL noise limit during the daytime was predicted at all nearby receptors.

[1] “*Transport Impact Assessment, Darlington Point Sand Quarry Expansion*” prepared by SLR (Ref: 630.032035.00001-R01-v1.0, dated 21 March 2025)

There will not be any significant construction works or blasting required as part of the Project.

The separation distance from the Project site to the nearest sensitive receptors, together with low vibration-generating plant/equipment, is not expected to result in perceptible vibration at any of the identified sensitive receptors.



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