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Environmental Noise Impact Assessment Proposed General Industries and landscape Material Supplies Use

At:-

Lot 40 DP 1230679

Gerringong, NSW 2534

Prepared for: -

THL Rural Pty Ltd
C/- Allan Price and Scarratts Pty Ltd
75 Plunket Street
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Attention: Mr James Harris

Reference: 2012004E-R

Prepared by: -

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Allan Price and Scarratts Pty Ltd on behalf of THL Rural Pty Ltd commissioned Harwood Acoustics to carry out an Environmental Noise Impact Assessment for proposed general industries and landscape material supplies at Lot 40 DP 1230679, Gerringong, NSW (the Site).

The planning proposal seeks to amend the Kiama Local Environment Plan 2011 to include the Site in Schedule 1 and list *general industries* and *landscaping material supplies* as additional permitted uses on the Site. If successful, the Site would allow for potential construction of a number of industrial buildings on the Site. This assessment therefore addresses the potential for noise impact arising from the operation of the industrial buildings.

Accordingly, Harwood Acoustics has prepared this report for the exclusive use of the Client identified on the title page. The report is prepared in accordance with the brief and scope of works agreed between the Client and Harwood Acoustics and may not be suitable for use beyond that scope.

Harwood Acoustics undertakes no duty nor accepts any responsibility to any third party who may rely upon this report.

Advice and recommendations provided in this report are in relation to acoustical issues only. No claims of expertise are made, and no liability is accepted, in relation to issues falling outside the field of acoustical consulting. These may include, but are not limited to, structural and waterproofing considerations, fire rating or thermal rating. Relevant authorities and / or experts should be consulted regarding areas other than acoustics.

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1. INTRODUCTION AND SUMMARY

Allan Price and Scarratts Pty Ltd, on behalf of THL Rural Pty Ltd are in the process of preparing Planning Proposal documentation to Kiama Municipal Council seeking to amend the Kiama Local Environment Plan 2011 to allow for industrial use of land at Lot 40 DP 1230679, Gerringong, NSW (the Site).

The Site is located on the north western side of the Princes Highway and is currently zoned RU1 Primary Production under Kiama Municipal Council's Kiama Local Environment Plan 2011 (KLEP). The Site is bound to the east, south east and north east by Sims Road with the Princes Highway beyond. To the west and north are large rural properties and opposite the Princes Highway further to the east is the Gerringong Railway Station, industrial premises, and residences in Victoria Street.

The nearest residential receptors to the Site are 24 Princes Highway to the north west and those in Victoria Street to the east, the nearest of which is at approximately 215 metres.

The Site and surrounding area are shown in in Figure 1.

The planning proposal seeks to amend the Kiama Local Environment Plan 2011 to include the Site in Schedule 1 and list *general industries* and *landscaping material supplies* as additional permitted uses on the Site. A concept master plan has been provided by Architects Edmiston Jones Pty Ltd which is shown in Figure 2 of this Report. The master plan shows provision for six industrial buildings, associated internal road and car parking.

The specific occupancy of future industrial premises is not known at this stage but is likely to include industrial activities such as, for example, wholesale landscape supplies, wood sales, panel beaters, mechanics, kitchen joineries and the like. Individual Development Applications would be required for each premises once established.

This Environmental Noise Impact Assessment has therefore been prepared to consider the potential likely impacts of industrial noise emission arising from the use of the Site and to establish noise design goals at sensitive residential receptor locations.

Project noise trigger levels are derived from the EPA's *Noise Policy for Industry* 2017.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The trigger level is tailored for each specific circumstance to take into account a range of factors that may affect the level of impact, including:

- the receiver's background noise environment
- the time of day of the activity
- the character of the noise
- the type of receiver and nature of the area.

Background noise monitoring has been undertaken near to the two residential receptor locations and these measured levels have been used to establish project intrusiveness trigger levels. The project intrusiveness noise levels at the closest residences in this instance are therefore as follows:-

Victoria Street (east)

- 60 dBA $L_{eq, 15\ minute}$ during the day time period,
- 53 dBA $L_{eq, 15\ minute}$ during the day time period, and
- 43 dBA $L_{eq, 15\ minute}$ during the night time period.

24 Princes Highway (north west)

- 55 dBA $L_{eq, 15\ minute}$ during the day time period,
- 47 dBA $L_{eq, 15\ minute}$ during the day time period, and
- 40 dBA $L_{eq, 15\ minute}$ during the night time period.

The project amenity noise trigger level at future industrial properties is **65 dBA** ($L_{eq, when\ in\ use}$).

Noise sources potentially associated with the proposed industrial premises are likely to include truck movements, yard machines (bobcats, etc), forklift movements, use of power tools and operation of mechanical plant such air compressors or air conditioning condensers.

Calculations show that the level of noise emission from the operation of the use of any future industrial premises, that may be constructed on the Site, will easily meet the project noise trigger levels at all receptor locations, particularly during the daytime and evening periods.

Noise controls may be required for future developments if they are required to operate at night, however these will not be particularly extensive and may include, as an example, keeping doors and windows closed in the night time period.

Notwithstanding this, individual noise assessments will be required for any future industrial premises and activities and these will be prepared to be submitted with individual development applications.

There is no reason acoustically that the subject land cannot be used for general industries and landscape material supplies.

2. SITE AND PLANNING PROPOSAL DESCRIPTION

2.1 Site Description

The Site is located on the north western side of the Princes Highway and is currently zoned RU1 Primary Production under Kiama Municipal Council's Kiama Local Environment Plan 2011 (KLEP). The Site is bound to the east, south east and north east by Sims Road with the Princes Highway beyond. To the west and north are large rural properties and opposite the Princes Highway further to the east is the Gerringong Railway Station, industrial premises, and residences in Victoria Street.

The nearest residential receptors to the Site are 24 Princes Highway to the north west and those in Victoria Street to the east, the nearest of which is at approximately 230 metres.

The nearest receptors to the Site are shown in Figure 1 below and are as follows:-

R1 – 26 Victoria Street – (circa 215 metres)

R2 – 24 Princes Highway – (circa 230 metres)

Figure 1. Location Plan – Lot 40 DP 1230679, Gerringong, NSW

(source: NSW Government Spatial Information Exchange © 2019)

Distances are based on the closest potential future industrial building (see Figure 2) to the assessment location for noise impact at each receptor location.

2.2 Planning Proposal Description

The planning proposal seeks to amend the Kiama Local Environment Plan 2011 to include the Site in Schedule 1 and list *general industries* and *landscaping material supplies* as additional permitted uses on the Site. If successful it is proposed to establish industrial premises on the Site and a concept master plan has been provided by Architects Edmiston Jones Pty Ltd which is shown in Figure 2 below.

The specific occupancy of future industrial premises is not known and would most be subject to individual Development Applications at the time.

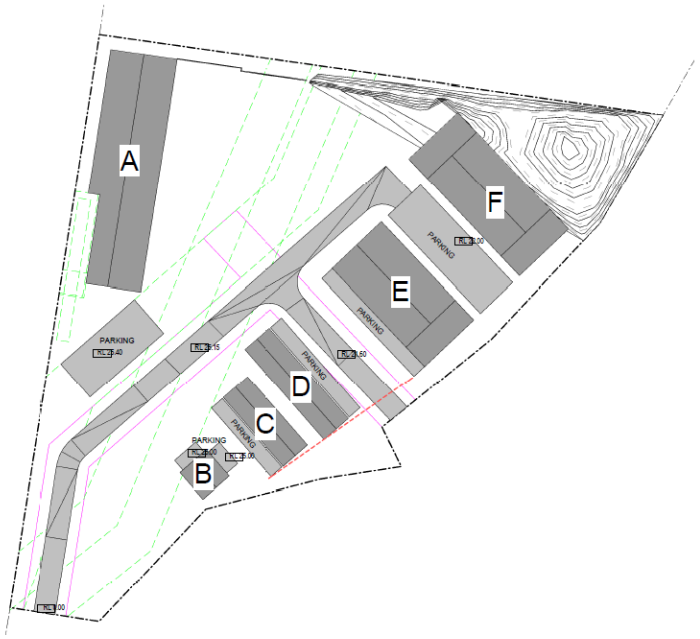

Figure 2. Concept Master Plan

(source: Architect's Edmiston Jones architectural drawings for project number 20-0064, dated February 2021)

3. NOISE CRITERIA

This section outlines the noise guidelines applicable to this proposal and establishes the project specific noise trigger levels and noise design goals.

3.2 NSW EPA's Noise Policy for Industry 2017

3.2.1 Introduction

The NSW Environment Protection Authority (EPA) published the NSW Noise Policy for Industry in October 2017 (the Policy). This Policy has now replaced the Industrial Noise Policy (INP) 2000.

The Policy sets out the NSW Environment Protection Authority's (EPA's) requirements for the assessment and management of noise from industry in NSW. It aims to ensure that noise is kept to acceptable levels in balance with the social and economic value of industry in NSW.

The Policy is designed to assist industry and authorities to ensure that potential noise impacts associated with industrial projects are managed effectively.

The purpose of the policy is to ensure noise impacts associated with particular industrial developments are evaluated and managed in a consistent and transparent manner. It provides noise levels for assessing the potential impact of noise from industry and includes a framework for considering feasible and reasonable noise mitigation measures.

The objectives of the policy are to:

- provide the noise levels that are used to assess both change in noise level and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;

- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified;
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, taking into account the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy is designed for large industrial and agricultural sources and specifies substantial monitoring and assessment procedures that may not always be applicable to the types of sources councils need to address.

However, local government may find the policy helpful in assessing noise from premises it regulates and in the carrying-out of its land-use planning responsibilities.

3.2.2 Project Noise Trigger Level

Section 2 of the Noise Policy for Industry 2017 sets out the procedure to determine the **project noise trigger levels** relevant to a particular industrial development.

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures.

The project noise trigger level, feasible and reasonable mitigation, and consideration of residual noise impacts are used together to assess noise impact and manage the noise from a proposal or site. It is the combination of these elements that is designed to ensure that acceptable noise outcomes are determined by decision makers.

The **project noise trigger level** is defined as the lower (that is, the more stringent) value of the project **intrusiveness noise level** and project **amenity noise level**.

3.2.3 Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the **L_{Aeq} descriptor**), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

The intrusiveness noise level is determined as follows:

$L_{Aeq,\ 15\ minute}$ = rating background noise level (RBL) + 5 dB

Where:

$L_{Aeq,\ 15\ minute}$	*Represents the equivalent continuous energy average A-weighted sound pressure level of the source over 15 minutes.*

And:

Rating background noise level Fact	*Represents the background level to be used for assessment purposes, as determined by the method outlined in Sheets A and B.*

Intrusiveness noise levels are not used directly as regulatory limits. They are used in combination with the amenity noise level to assess the potential impact of noise, assess

reasonable and feasible mitigation options and subsequently determine achievable noise requirements.

Minimum assumed RBLs are applied in the Policy and these result in minimum intrusiveness noise levels. These are shown in Table 2.1 in the Policy and are replicated in Table 1 below.

Table 1 Minimum assumed RBLs and project intrusiveness noise levels (Derived from EPA Table 2.1)

Time of Day	Minimum Assumed Rating Background Level dBA	Minimum Project Intrusive Noise Level ($L_{eq,\ 15\ minute}$, dBA)
Day (7 am to 6 pm)	**35**	**40**
Evening (6 pm to 10 pm)	**30**	**35**
Night (10 pm to 7 am)	**30**	**35**

3.2.4 Amenity Noise Levels and Project Amenity Noise Levels

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise levels within an area from **all** industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. (EPA Table 2.2 is replicated in Table 2 below).

The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance.

The recommended amenity noise levels represent the objective for **total** industrial noise at a receiver location, whereas the **project amenity noise level** represents the objective for noise from a **single** industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a **project amenity noise level** applies for each new source of industrial noise as follows:

> **Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB**

Amenity noise levels are not used directly as regulatory limits. They are used in combination with the project intrusiveness noise level to assess the potential impact of noise, assess reasonable and feasible mitigation options, and subsequently determine achievable noise requirements.

Table 2 Amenity Noise Levels (EPA Table 2.2)

Receiver	Noise Amenity Area	Time of Day	L_{Aeq}, dBA
(see Table 2.3 to determine which residential receiver category applies)			**Recommended amenity noise level**
Residential	Rural	Day Evening Night	50 45 40
	Suburban	Day Evening Night	55 45 40
	Urban	Day Evening Night	60 50 45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks *	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day
School classroom – internal	All	Noisiest 1-hour period when in use	35 (see notes for table)
Hospital ward internal external	All	 Noisiest 1-hour Noisiest 1-hour	 35 50
Place of worship – internal	All	When in use	40
Area specifically reserved for passive recreation (e.g. national park)	All	When in use	50
Active recreation area (e.g. school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	All	Add 5 dB(A) to recommended noise amenity area

Notes: The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as follows:

- rural residential
- suburban residential
- urban residential
- industrial interface – an area that is in close proximity to existing industrial premises and that extends out to a point where the existing industrial noise from the source has fallen by 5 dB or an area defined in a planning instrument. Beyond this region the amenity noise level for the applicable category applies. This category may be used only for existing situations.
- commercial – commercial activities being undertaken in a planning zone that allows commercial land uses
- industrial – an area defined as an industrial zone on a local environment plan; for isolated residences within an industrial zone the industrial amenity level would usually apply.

Time of day is defined as follows:

- day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
- evening – the period from 6 pm to 10 pm
- night – the remaining periods.

Section 2.4.1 of the Policy states:-

> *'The level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the L_{Aeq} noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the $L_{Aeq,\ period(traffic)}$ minus 15 dB(A).'*

3.2.5 Assessment Locations

For a **residence**, the project noise trigger levels are to be assessed at the reasonably most-affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the reasonably most-affected point within 30 metres of the residence, but not closer than 3 metres to a reflective surface and at a height of between 1.2–1.5 metres above ground level. This should not be read to infer that the project noise trigger level (or a limit in a statutory document) applies only at the reasonably most-affected location. For commercial or industrial receptors the assessment location is at the most-affected point within the property boundary.

3.3 Measured Background Noise Levels

In order to establish the project intrusive noise levels, it is necessary to determine the background noise levels in the vicinity of all potentially affected residential receptors.

The background noise level is defined by the EPA as 'the underlying level of noise present in ambient noise when all unusual extraneous noise is removed' and is considered to be represented by the $L_{A90,\ 15\ minute}$ descriptor. This is a statistical measure of the sound pressure level that is exceeded for 90 % of the time.

The Rating Background Level is the single-figure background noise level derived from monitoring $L_{A90,\ 15\ minutes}$ over a representative period of time. The Rating Background Level is established for the day, evening and night time periods and is used for assessment purposes.

When measuring background noise levels, it is important to undertake sufficient monitoring of background noise to allow intrusive noise to be assessed adequately.

In this instance noise loggers were placed near to the boundary of receptor R1 and at the north western corner of the Site between Thursday 14 and Friday 22 January 2021.

The results of the noise survey are shown in Tables 3 and 4 below and instrumentation used during the noise survey is shown in Appendix A.

The results of the background noise survey are shown in Table 3 below.

Table 3 Rating Background Levels – 26 Victoria Street, Gerringong (R1)

Time of Day	Rating Background Level (L_{90})	Existing Ambient Noise Levels (L_{eq})
Day (7 am to 6 pm)	**55 dBA**	63 dBA
Evening (6 pm to 10 pm)	**48 dBA**	60 dBA
Night (10 pm to 7 am)	**38 dBA**	57 dBA

Table 3 Rating Background Levels – 24 Princes Highway, Gerringong (R2)*

Time of Day	Rating Background Level (L_{90})	Existing Ambient Noise Levels (L_{eq})
Day (7 am to 6 pm)	**50 dBA**	57 dBA
Evening (6 pm to 10 pm)	**42 dBA**	55 dBA
Night (10 pm to 7 am)	**35 dBA**	51 dBA

* Background noise measurements were taken at the north western corner of the property for the purpose of this assessment as it was not practicable to measure background noise levels at the dwelling at receptor location R2. Background noise levels at receptor R2 may be slightly lower than those shown in Table 4 given the additional distance from the highway, particularly during the day time period hen noise levels are dominated by road traffic. This is discussed in Section 5.2.1 of this Assessment.

3.4 Project Noise Trigger Levels

The most relevant criteria are as follows: -

<u>Residential receptors location R1</u> – Project Intrusiveness Noise Levels

- (55 + 5 =) **60 dBA** $L_{eq,\ 15\ minute}$ during the day time period,
- (48 + 5 =) **53 dBA** $L_{eq,\ 15\ minute}$ during the evening time period, and
- (38 + 5 =) **43 dBA** $L_{eq,\ 15\ minute}$ during the night time period.

<u>Residential receptors location R2</u> – Project Intrusiveness Noise Levels

- (50 + 5 =) **55 dBA** $L_{eq,\ 15\ minute}$ during the day time period,
- (42 + 5 =) **47 dBA** $L_{eq,\ 15\ minute}$ during the evening time period, and
- (35 + 5 =) **40 dBA** $L_{eq,\ 15\ minute}$ during the night time period.

Nearby Industrial Receptors

- (70 - 5 =) **65 dBA** $L_{eq,\ when\ in\ use}$

4. MODIFYING FACTOR ADJUSTMENTS

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. On the other hand, some sources may cause less annoyance where only a single event occurs for a limited duration.

Fact Sheet C of the *Noise Policy for Industry* (2017) outlines the correction factors to be applied to the source noise level at the receiver before comparison with the project noise trigger levels, to account for the additional annoyance caused by these modifying factors.

The modifying factor corrections should be applied having regard to:

- the contribution noise level from the premises when assessed/measured at a receiver location, and
- the nature of the noise source and its characteristics (as set out in this fact sheet).

Table C1 of the fact sheet sets out the corrections to be applied. The corrections specified for tonal, intermittent and low-frequency noise are to be added to the measured or predicted noise levels at the receiver before comparison with the project noise trigger levels. The adjustments for duration are to be applied to the criterion.

Table C1 of Fact Sheet C is replicated in the attached Appendix A.

In this instance the noise sources associated with the proposal are likely to include only truck movements and potentially forklift movements. Consideration is given to modifying factor adjustment for tonality from reversing alarms in Section 5 of this Report. No other modifying factor corrections apply.

5. MEASURED AND PREDICTED NOISE LEVELS

5.1 Potential Source Noise Levels

This section of the Report provides an overview of the likely possible noise levels associated with the industrial premises and activities and a prediction of the potential noise levels as received at the receptor locations.

The specific occupancy of future industrial premises is not known at this stage but is likely to include industrial activities such as, for example, wholesale landscape supplies, wood sales, panel beaters, mechanics, kitchen joineries and the like.

Table 5 below provides a schedule of ‘A’ frequency weighted sound power levels, in decibels re: 1 pW, of plant and equipment that may be used.

Table 5 $L_{eq,\ 15\ minute}$ Sound Power Levels – Mechanical Plant & Equipment

Description	Individual Sound Power Level $L_{eq,\ 15\ minute}$ (dBA)
Large truck	**100**
Yard machinery (bobcats, etc)	**105 - 110**
Small rigid truck / delivery van	**90**
Gas forklift	**85 - 90**
Drop saw	**100 – 105**
Grinder	**105 – 110**
Hammering	**90 – 95**
Paint booth	**105**
Air conditioning condenser unit	**75**

5.2 Noise Level Predictions

5.2.1 Modelling Equations

For all outdoor noise sources, the external noise level at each receptor has been calculated from the formula:-

$$L_{eq} = L_w + Dc - A$$

Where:

- L_w is the sound power level of the noise source;
- Dc is directivity correction; and
- A is the attenuation that occurs during the propagation from source to receiver.

The term A in the equation includes attenuation from geometric divergence (distance loss), atmospheric absorption, ground absorption, barrier effects and miscellaneous other effects.

This model derives from the International Standard ISO 9613-2 (1996(E)) *'Acoustic – Attenuation of sound during propagation outdoors Part 2 General method of calculation'*.

The method described in the Standard is general in the sense that it may be applied to a wide variety of noise sources, and covers the major mechanism of sound attenuation. The method allows for propagation conditions with the wind blowing from the source to the receiver.

For noise sources located within the industrial buildings, the external noise level at each receptor has been calculated from the formula:-

$$Lp_2 = Lp_1 - R_w + 10\ Log_{10}\ S - 20\ Log_{10}\ r - 14 + DI\ dBA$$

Where:

- Lp_2 is the predicted noise level at the receiver;
- Lp_1 is the internal noise level of children at play;
- R_w is the weighted sound reduction index of the building element (wall, roof, window, etc);
- S is the area of the building element (m^2);
- r is the distance between the receiver and the building element;
- DI is the directivity index of the façade.

5.2.2 Predicted Noise Levels

Initial noise predictions have been made based on the following assumed scenario:-

- Typical industrial building,
- Concrete tilt up walls,
- Sheet steel roof,
- Roller doors (some open), windows, clear panelling, ventilation (whirly birds),
- An internal reverberant sound pressure level of 90 dBA $L_{eq,\ 15\ minute}$ as measured anywhere within the building)
    - This is considered a relatively conservatively high noise level,
- A 5 dB correction factor is applied to noise sources with tonal reversing alarms including trucks and forklifts.

The predicted noise levels at both receptors are shown in Table 6 below.

Table 6 Predicted $L_{eq,\ period}$ Noise Levels – Residential Receptors

Description	Predicted Noise Level $L_{eq,\ period}$ (dBA) at Receptor Location	
	R1	**R2***
Project Noise Trigger Level – Day Time	**60**	**55**
Industrial premises described above	46	45
Complies	Yes	Yes
Project Noise Trigger Level – Evening Time	**53**	**47**
Complies	Yes	Yes
Project Noise Trigger Level – Night Time	**40**	**42**
Complies	No + 6	No + 3

It can be seen from Table 6 that the predicted level of noise emission from an example industrial premises is well within the project noise trigger levels at the closest residential receptor locations during the day time and evening periods.

Individual assessments will be required to be submitted with Development Applications for each premises once the occupancy is known.

Future assessments of the site should provide advice and recommendations to ensure that the level of noise emission from each of the premises and proposed activities will meet the project noise trigger levels at all receptors. If night time activity is proposed then noise controls may be required and could include, as an example:-

- Restricting noise producing activities during night time hours,
- Ensuring indoor works only with building openings closed, or
- Acoustically treating individual items of noisy plant and equipment.

Any noise controls if required will not be particularly onerous.

* If background noise levels at receptor R2 are slightly lower than those measured at the north western corner of the subject Site, the project noise trigger levels can still be readily met for this proposal.

6. CONCLUSION

An assessment of the potential noise emission arising of the Site from general industries and landscape material supplies on land t Lot 40 DP 1230679, Gerringong, NSW has been undertaken.

The assessment has considered a concept master plan of the possible future site uses.

Noise goals have been established at the nearest residential receptor locations to the Site in accordance with the NSW EPA's *Noise Policy for Industry* 2017 project noise trigger levels.

An example of typical noise levels arising from any future use of the Site are provided in Section 5 of this Report based on typical industrial activity.

The level of noise emission from any future industrial premises can easily be controlled, if required, to meet the EPA's project noise trigger levels at all receptor locations. Any noise controls, if required would not be particularly onerous.

Dependant on the exact use of the land, further acoustical assessments could be required.

There is no reason acoustically that the subject land cannot be used for general industries and landscape material supplies.

Matthew Harwood, MAAS

Principal Acoustical Consultant

Attachments: -
Important Note
Appendix A – Noise Survey Instrumentation
Appendix B – Modifying Factor Corrections (EPA 2017)

Important Note

All products and materials suggested by Harwood Acoustics are selected for their acoustical properties only.

Recommendations made in this report are intended to resolve acoustical problems only, therefore all other properties such as aesthetics, air flows, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, fumes, grout or tile cracking, loading, shrinkage, smoke, ventilation etc. are outside Harwood Acoustic's fields of expertise and ***must*** *be checked with the supplier or suitably qualified specialist before purchase.*

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Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

Noise Survey Instrumentation	Appendix A

The instrumentation used during the noise survey consisted of the following:-

Description	Model No.	Serial No.
SvanTek Sound Level Meter	SVAN 971	74362
Acoustical Calibrator	SV34A	58762
Infobyte Im4	Im4	104

The SvanTek Model 957 sound level meter conforms to Australian Standard AS IEC 61672.1-2004: 'Electroacoustics - Sound level meters – Specifications' as Class 1 precision sound level meter.

The Infobyte Model iM4 noise logger conforms to Australian Standard AS1259:2-1990 'Acoustics - Sound Level Meters' as a Type 2 sound level meter and has an accuracy suitable for field use.

The calibration of the meter was checked before and after the measurement period. No significant system drift occurred over the measurement period. The sound level meter and calibrator have been checked, adjusted and aligned to conform to the factory specifications and issued with conformance certificates as required by the regulations.

Modifying Factor Corrections (EPA 2017)	Appendix B

Table C1 Modifying Factor Corrections (from Table C.1 of the NSW Noise Policy for Industry 2017)

Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Tonal Noise	One-third octave band analysis using the objective method for assessing the audibility of tones in noise – simplified method (*ISO1996.2-2007 – Annex D*).	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.	5 dB	Third octave measurements should be undertaken using unweighted or Z-weighted measurements. **Note:** Narrow-band analysis using the reference method in *ISO1996-2:2007, Annex C* may be required by the consent/regulatory authority where it appears that a tone is not being adequately identified, e.g. where it appears that the tonal energy is at or close to the third octave band limits of contiguous bands.
Low Frequency Noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10–160 Hz	Measure/assess source contribution C- and A-weighted Leq,T levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2-dB(A) positive adjustment applies for the daytime period.	2 or 5 dB	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for DEFRA fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Table C1 Modifying Factor Corrections (from Table C.1 of the NSW Noise Policy for Industry 2017) *Cont…*

Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Intermittent Noise	Subjectively Assessed but should be assisted with measurement to gauge the extent of change in noise level.	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible.	5 dB	Adjustment to be applied for **night-time only**.
Duration	Single-event noise duration may range from 1.5 m to 2.5 h	One event in any 24-hour period	0 to -20dBA	The acceptable noise trigger level may be increased by an adjustment depending on duration of noise (see Table C.3)
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated	Maximum correction of 10 dBA[2] (excluding duration correction)	

Notes:

1. Corrections to be added to the measured or predicted levels, except in the case of duration where the adjustment is to be made to the criterion.

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.

3. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard