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Environmental Noise Impact Assessment Shoalhaven Sands – River Dredging Expansion

At:

Shoalhaven River

Nowra, NSW 2541

Prepared for: -

Shoalhaven Sand Pty Ltd
125 Terara Road
Terara NSW 2541

Attention: C/- Ernie Panucci

Reference: 1808009E-R

Prepared by: -

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14th March, 2019



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Harwood Acoustics, was requested by Shoalhaven Sand Pty Ltd to carry out a noise impact assessment of a proposed expansion of its allowable dredging area in the Shoalhaven River at Nowra, NSW 2541.

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.

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1. INTRODUCTION AND SUMMARY

Harwood Acoustics was engaged by Shoalhaven Sands Pty Ltd to assess the potential noise impact of a proposed expansion of its sand dredging operations in the Shoalhaven River at Nowra, NSW.

Shoalhaven Sands operates a river extraction business at 125 Terara Road, Terara, NSW approximately 2 kilometres to the northeast of the town of Nowra. The operation comprises a river-based dredge which extracts river sand and pumps it to their land-based operation on the southern bank of the Shoalhaven River where it is filtered, stock piled and sold.

It is proposed to expand the allowable area where river dredging takes place. The proposed expanded area is located toward the west and north west of the currently approved area, as shown in Figure 1.

This assessment addresses noise emission from the operation of the sand dredge in the proposed expanded area only. It does not consider noise emission from the operation of any land-based activities as land-based activities are currently approved and there are no proposed changes to those operations.

The nearest residential receptors to the proposed expanded dredging area are located on the southern side of the Shoalhaven River in the Shoalhaven Village Caravan Park to the south east and Riverview Road and Ferry Lane to the south west.

Project specific noise trigger levels are derived from the NSW Environment Protection Authority's (EPA) Noise Policy for Industry 2017. These are based on background noise surveys undertaken in Riverview Road in 2019 and previously at the Shoalhaven Village Caravan Park in 2013.

Project noise trigger levels during the day time period are 47 dBA in Nowra along Riverview Road and 45 dBA at the Shoalhaven Village Caravan Park.

A noise survey was undertaken on Tuesday 29 January 2019 to determine the level of noise emission arising from the operation of the dredge. Noise measurements were taken at varying distances from, and in close proximity to the dredge. These noise measurements have been used to model the level of noise emission from the dredge at the closest receptor locations during future operations in the expanded dredging area.

Calculations show that the level of noise emission from the operation of the dredge in the proposed expanded area will meet the project trigger noise levels at all receptor locations without the need for noise controls other than those outlined in Section 6 of this Report.

Recommendations are administrative and include restricting the operation of the dredge to day time hours only, as defined by the EPA and ensuring the dredge does not operated closer than 120 metres from any residential receptor.

Providing these recommendations are implemented and adhered to the EPA's Noise Policy for Industry 2017 project noise trigger levels will be met for this proposal.

2. DESCRIPTION OF PROPOSAL AND ENVIRONS

Shoalhaven Sands operates a river extraction business at 125 Terara Road, Terara, NSW approximately 2 kilometres to the northeast of the town of Nowra. The operation comprises a river-based dredge which extracts river sand and pumps it to their land-based operation on the southern bank of the Shoalhaven River where it is filtered, stock piled and sold.

It is proposed to expand the allowable extraction area where river dredging takes place. The proposed expanded area is located toward the west and north west of the currently approved area, as shown in Figure 1.

This assessment addresses noise emission from the operation of the sand dredge in the proposed expanded area only.

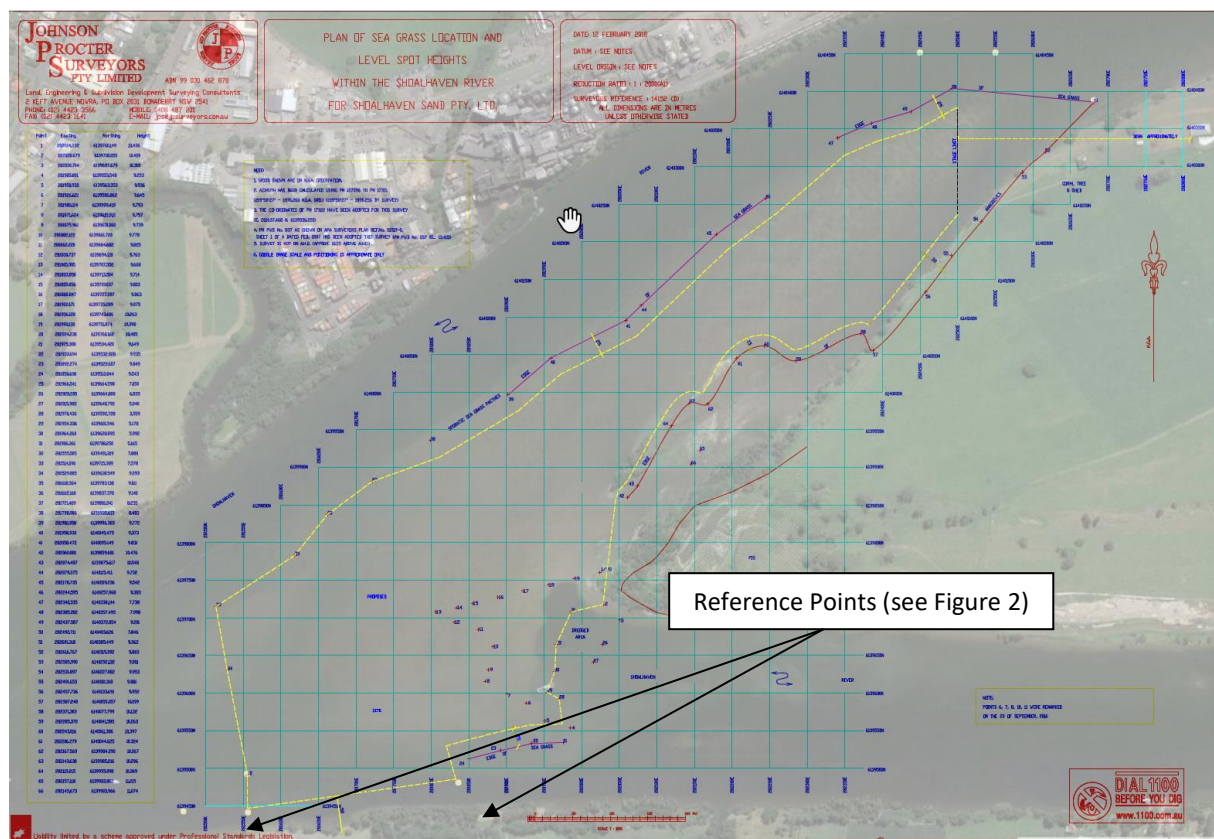


Figure 1. Proposed Expansion Area – Shoalhaven River, Nowra, NSW

(source: Johnson Proctor Surveyors Pty Ltd)

The nearest residential receptors to the proposed expanded dredging area are located on the southern side of the Shoalhaven River in the Shoalhaven Village Caravan Park to the south east and Riverview Road and Ferry Lane to the south west. For the purpose of noise assessment, the most potentially sensitive residential receptors are considered to be those identified in Figure 2 below and are as follows: -

R1 – 43 Ferry Lane
(circa 100 metres)

R2 – 66 Riverview Rd
(Circa 130 metres)

R1 – Shoalhaven Village Caravan Park
(circa 180 metres)

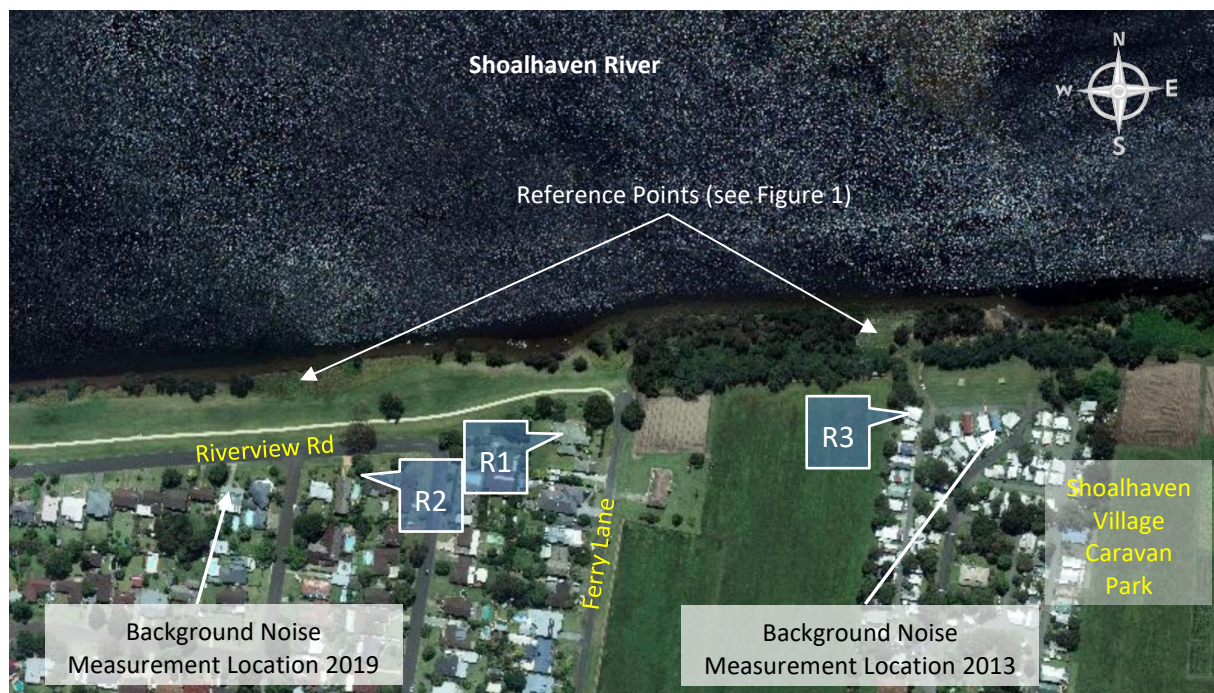


Figure 1. Location Plan – Riverview Road & Shoalhaven Village Caravan Park, Nowra, NSW

(source: NSW Government Spatial Information Exchange)

All distances are based on the closest boundary of the expansion area identified with the yellow dotted line in Figure 1 as a reference only.

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.

3.1 NSW EPA's Noise Policy for Industry 2017

3.1.1 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.

This 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 Noise Policy for Industry 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.

In this instance the Policy is used to determine the potential for noise impact from the proposed expansion of the dredge.

3.1.2 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**.

3.1.3 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:

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

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 *Represents the background level to be used for assessment purposes, as determined by the method outlined in Fact 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 (Leq, 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

3.1.4 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	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	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	35
		Noisiest 1-hour	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

Relevant Notes:

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.

* the Shoalhaven Village Caravan Park contains predominantly permanent residences as well as a small number of transient sites. The assessment criterion for this receptor is therefore 5 dB above the recommended amenity noise level for a residence. Based on the amenity level for a suburban residence during the day of 55 dBA, this becomes (55 + 5 =) 60 dBA.

3.1.5 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.

3.2 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 $L_{A90, 15 \text{ minute}}$ 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 $L_{A90, 15 \text{ minutes}}$ 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 a noise logger was placed at 58 Riverview Road, Nowra, near to Receptor R2 as shown in Figure 2. The noise logger was placed at this location between Monday 25 February and Friday 1 March 2019. During the long-term noise assessment, the dredge was reported to be in operation for approximately 2 to 3 hours per day, other than Monday. The dredge was located in toward Pig Island, approximately 220 metres from the closest receptor in the Shoalhaven Village Caravan Park.

The results of the background noise survey are shown in graphical format in the attached Appendix C and summarised in Table 3 below.

Details of instrumentation used during the noise survey can be seen in the attached Appendix A.

Table 3 Rating Background Levels – 58 Riverview Road, Nowra, NSW

Time of Day	Rating Background Level (L_{90})
Day (7 am to 6 pm)	44 dBA
Evening (6 pm to 10 pm)	48 dBA
Night (10 pm to 7 am)	40 dBA

A list of times of operation of the dredge has been Mr Stephen McCormac of Shoalhaven Sands. A review of the measured noise levels does not clearly identify any correlation between the measured noise levels and the operation of the dredge during the times specified by Mr McCormac.

During the noise survey there were strong winds on most days and insect noise dominates the evening time measurements. The unattended noise survey conducted over the five days appears to be affected by extraneous noise and strong winds, at least on some occasions, particularly in the evenings.

The author also carried out attended short-term background noise monitoring on Tuesday 5 and Wednesday 6 March 2019. Measurements were taken opposite 46 Riverview Road as shown in Figure 2. During the attended measurements the dredge was not operating and conditions were calm. Measured background noise levels ranged between 42 and 45 dBA ($L_{90, 15 \text{ minute}}$).

In addition to the 2019 noise surveys the author has also undertaken previous Environmental Noise Impact Assessments in the area, including for Shoalhaven Sands in 2012.

At the time of the 2012 noise assessment, long-term background noise monitoring was undertaken at Shoalhaven Village Caravan Park in May 2012.

The measured background noise levels are shown in the Table 3 below.

Table 1 Rating Background Levels – Shoalhaven Village Caravan Park (2012)

Period	Rating Background Level (L_{90})
Day (7 am to 6 pm)	40 dBA
Evening (6 pm to 10 pm)	42 dBA
Night (10 pm to 7 am)	43 dBA

It can be seen that the measured short term attended background noise level of 42 dBA is in line with the rating background noise level of 40 dBA measured in 2012.

As a conservative approach, this assessment considers a day time rating background noise level of 42 dBA for receptors in Ferry Lane and Riverview Road.

As outlined in Section 3.1.4 the Shoalhaven Village Caravan Park is not considered as a residential receptor under the EPA's Noise Policy for Industry and is assessed against an amenity criterion for the day time period.

Given that the dredge will operate during day time hours only (i.e. between 7 am and 6 pm Monday to Saturday and between 8 am and 6 pm on Sundays and Public Holidays) no consideration is given to the evening or night time periods.

3.5 Environmental Project Noise Trigger Levels

The most relevant criteria are as follows: -

Residential receptors R1 and R2

- $(42 + 5 =) \textbf{47 dBA } L_{eq, 15 \text{ minute}}$ during the day time period,

Shoalhaven Village Caravan Park R3

- $(55 + 5 =) \textbf{60 dBA } L_{eq, \text{period}}$ during the day time period.

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 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 B.

In this instance measured noise levels of the dredge do not display characteristics requiring modifying factor adjustments.

5. DEVELOPMENT NOISE EMISSION

5.1 Measured Noise Levels

The author visited the site on Tuesday 29 January 2019 to undertake noise measurements of the dredge in operation. Measurements were taken in close proximity to the dredge, from an anchored tender, and at varying distances.

Measurements were taken in the form of 'A' frequency weighted, energy average sound pressure levels (LAeq, short-term) and have been used to calculate the sound power level of the dredge shown in Table 3 below.

Table 3 shows the octave band sound power level in decibels re: 1 pW (10-12 Watts) and overall 'A' frequency weighted sound power level of Shoalhaven Sand's sand dredging plant.

Table 3 $L_{eq, 15 \text{ minute}}$ Sound Power Levels – Sand Dredge

Description	dBA	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)							
		61	125	250	500	1k	2k	4k	8k
Day Time (7 am to 6 pm)	98	106	95	95	94	92	92	88	81

5.2 Noise Level Predictions

5.2.1 Modelling Equations

The level of noise emission at the receptors 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.

5.2.2 Predicted Noise Levels

The predicted noise levels at each receptor are shown in the Table 4 below.

Table 4 Predicted L_{eq} Noise Levels Equipment and Machinery – Nearest Receptors

Description	Predicted Noise Level $L_{eq, 15 \text{ minute}}$ (dBA) at Receptor Location		
	R1	R2	R3
Project Noise Trigger Level – Day	47	47	60
Dredge operating at 120 metres	47	42 – 47*	44
Within trigger level	Yes	Yes	Yes

Predictions in Table 4 consider the following:-

- Distance loss to each receptor;
- Attenuation from the levy bank on Riverview Road of:-
 - 1 dB for two storey dwellings,
 - 6 dB for single storey dwellings
- * Range based on single and double storey dwellings
- Recommendations made in Section 6 of this report have been implemented and adhered to.

6. NOISE CONTROL RECOMMENDATIONS

The predictions in Section 5 of this report assumed the following noise controls have been implemented.

6.1 Operating Hours

- The dredge should only be operated during day time hours, i.e:-
 - Between 7 am and 6 pm Monday to Saturday, and
 - Between 8 am and 6 pm on Sundays and Public Holidays.

6.2 Minimum Allowable Distance

- The dredge should not operate any closer than 120 metres from any residential receptor location,
- Based on the proposed expansion area, this will be achieved for every residential receptor location with the exception of receptor R1 at 43 Ferry Lane, Nowra. The receptor at 43 Ferry Lane is approximately 100 metres from the southern most boundary of the demarcated extension area, as such:-
 - When operating opposite this receptor, the dredge should remain at 20 metres from the southern boundary of the demarcated area at all times.

7. CONCLUSION

An assessment of the potential noise emission arising from the proposed expansion of Shoalhaven Sands river dredging area in the Shoalhaven River at Nowra, NSW has been undertaken.

Calculations and predictions show that the level of noise emission from the river dredge operating in the proposed expansion area will meet the EPA's *Noise Policy for Industry 2017* project noise trigger levels at all nearby receptor locations. This is providing that recommendations made in Section 6 of this report are implemented.



Matthew Harwood, MAAS

Principal Acoustical Consultant

Attachments: -

Appendix A – Noise Survey Instrumentation

Appendix B – Modifying Factor Corrections (EPA 2017)

Appendix C – Background Noise Survey Results

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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Noise Survey Instrumentation	Appendix A
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The instrumentation used during the noise survey consisted of the following:-

Description	Model No.	Serial No.
SvanTek Sound Level Meter	SVAN 957	15395
Acoustical Calibrator	SV34A	58762
Infobyte Im4 Noise Logger	Im4	104

The sound level meter conforms to Australian Standards AS IEC 61672.1-2004 : 'Electroacoustics - Sound level meters – Specifications' as a Class 1 precision sound level meter and AS 1259 as a Type 1 precision sound level meter. The infobyte noise logger conforms to AS 1259 as a Type 2 precision sound level meter.

The calibration of the meter and logger 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 (<i>ISO1996-2:2007 – Annex D</i>).	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: <ul style="list-style-type: none"> • 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 <i>ISO1996-2:2007, Annex C</i> 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: <ul style="list-style-type: none"> • 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...*

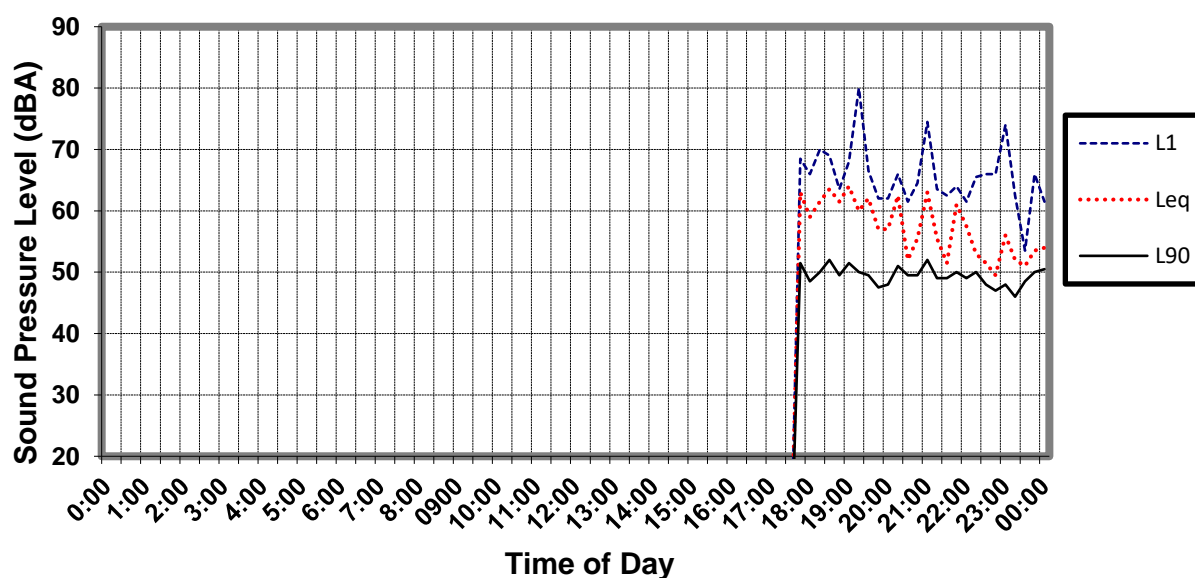
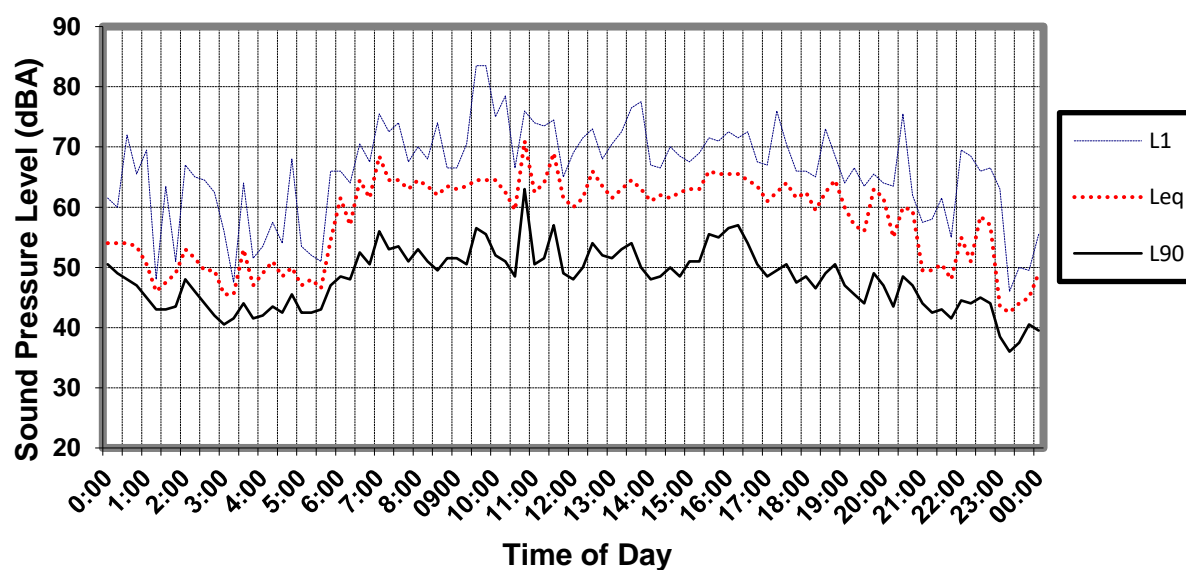
Factor	Assessment/ Measurement	When to Apply	Correction	Comments
Intermittent Noise	Subjectively Assessed but should be assisted with measurement to gauge the extent of change in noise level.	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is 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)	

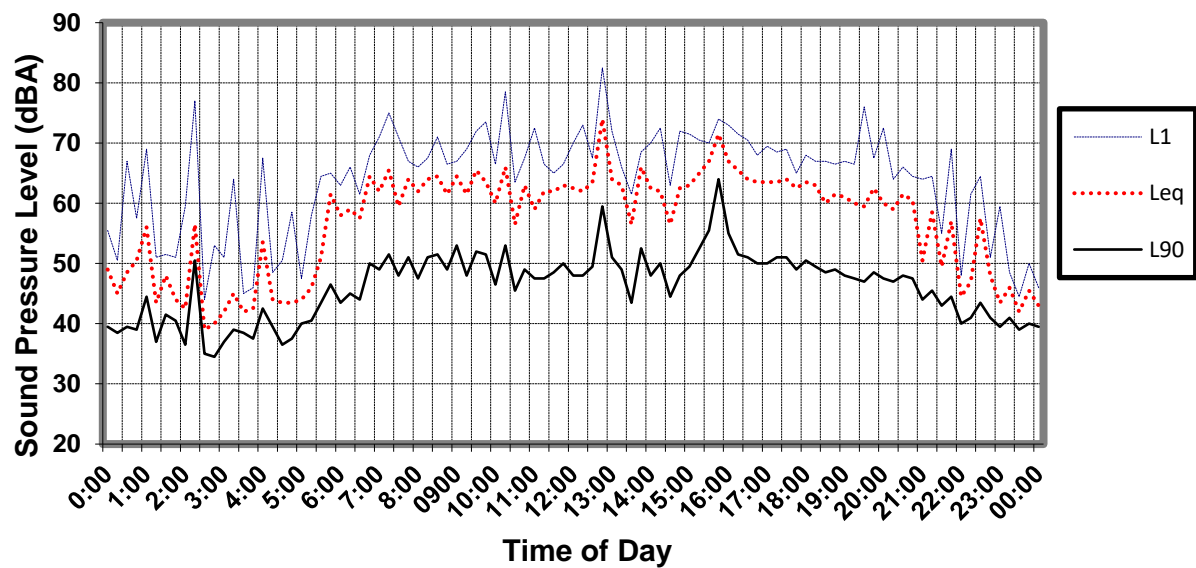
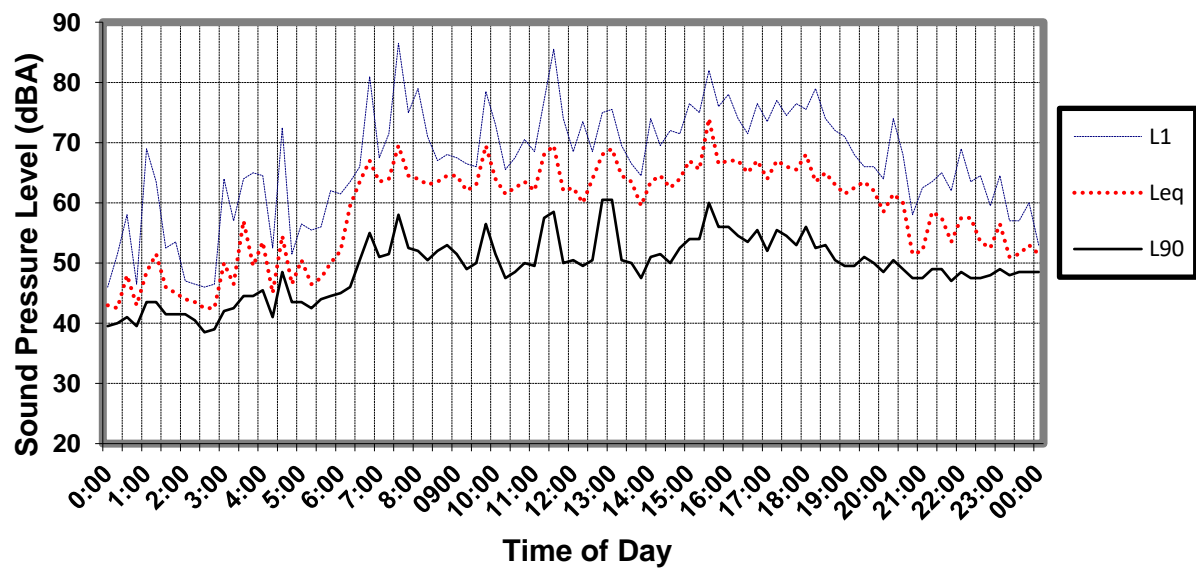
Notes:

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.

Background Noise Survey Results

Appendix C

Monday February 25th 2019Tuesday February 26th 2019

Wednesday February 27th 2019**Thursday February 28th 2019**

Friday February 29th 2019