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Consulting Structural, Mechanical & Acoustical Engineers

ACOUSTIC REPORT

Jim Anderson Earthmoving

Report No. **M16529.01**

Site **81 Two Mile Road,**
Coopernook NSW 2426

Client: **Richard Bennett**
Hill Top Planners
PO Box 469
MAITLAND NSW 2320

Prepared by: **Philip Thornton BE(UNSW) CPEng**
Acoustic Consultant

September 28, 2016

Summary:

This acoustic report has assessed the noise from the proposed office and shed of Jim Anderson Earthmoving. Using acoustic measurements and methods as per the requirements of the NSW Industrial Noise Policy, the NSW Environment Protection Authority and Australian Standards, the potential noise level was assessed against the appropriate criteria. The report shows that for the nearest residential receiver the noise level will be within acceptable levels.

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1 Introduction

Jim Anderson Earthmoving proposes to construct a new office and shed at a former RMS works depot at Lot 1 DP 595191, 81 Two Mile Road Coopernook NSW 2426. As a requirement of the Development Application (DA 10/2017), MidCoast Council (MCC) has requested a report that addresses the noise impacts of the proposal.

Richard Bennett, Town Planner with Hill Top Planners has engaged the services of acoustic consultant Philip Thornton of Matrix Thornton Consulting Engineers to conduct this noise assessment.

2 Purpose of the Report

- Identification of the specific noise related activities and associated noise sources.
- Identification of all potentially affected noise sensitive receivers including residences.
- Analysis of noise sources.
- Compare these figures against assessment criteria to determine if within acceptable levels.
- Present possible noise reduction options if required.
- Prepare a report on these findings in response to council.

3 Description of the development

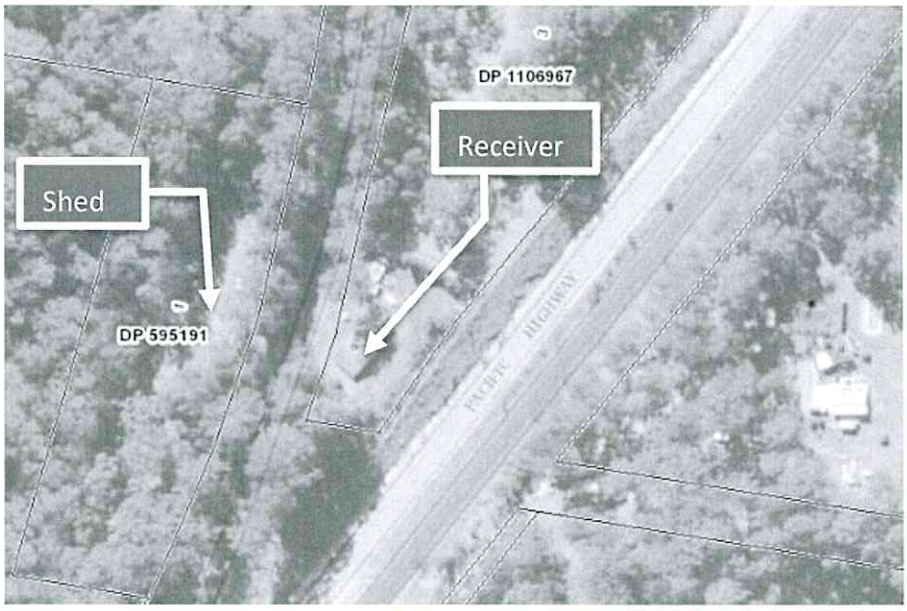

Figure 1. Site and Receiver Location

The site location is shown on Figure 1 It is on a rural property west of the Pacific Highway at Coopernook. The figure shows the relationship of the shed to the nearest receiver to the east of the site at Lot3 DP 1106967 Two Mile Road Coopernook NSW 2426. The nearest receiver is:

- 65 metres from the proposed shed to the front boundary.
- 33 metres from the residence to the north bound lane of the Pacific Highway

Figure 2 shows details of the site layout. The site will operate as a truck depot and truck maintenance workshop with approximately 20 trucks movements per week.

The hours of operation would be **6.00am to 6.00pm Monday to Saturday**.

Details of noise generating activities are discussed in **Section 6**.

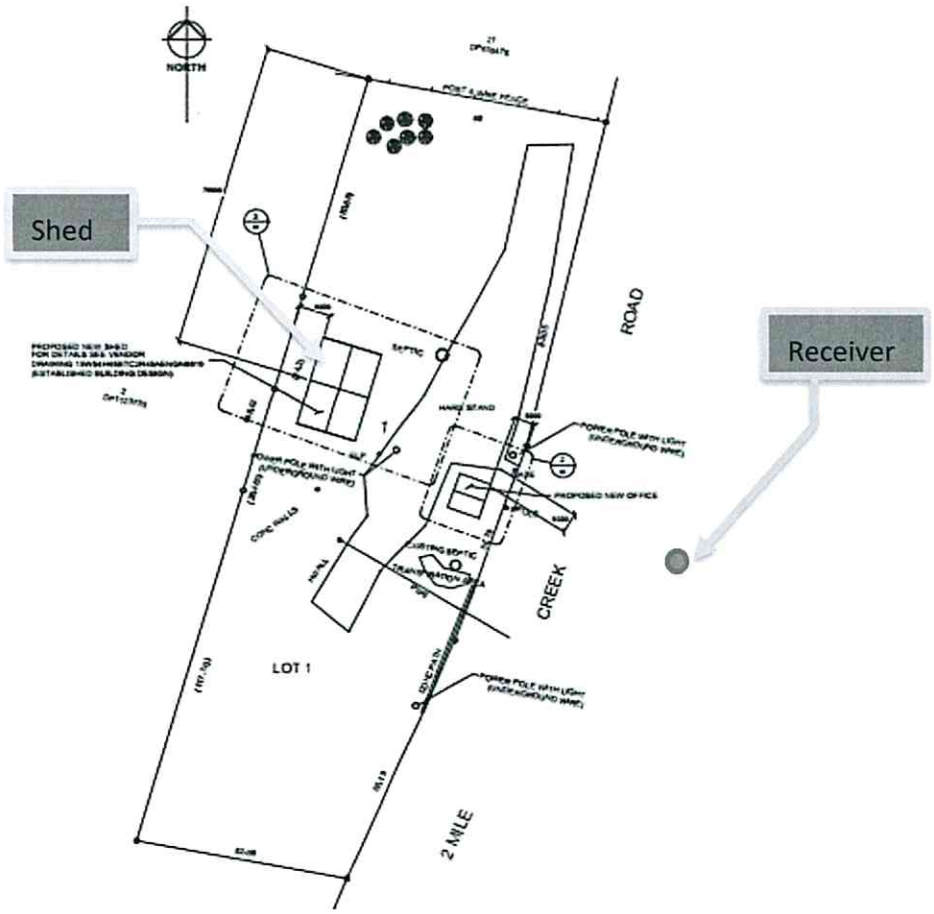

Figure 2. Layout of site

4 Planning Noise Levels

4.1 Planning Policy

The relevant document that sets acceptable noise limits for this type of operation is the NSW Industrial Noise Policy (INP). It provides the framework and process for deriving noise limits that enable the NSW EPA to regulate premises under the Protection of the Environment Operations Act 1997. Within these guidelines, the local council is the regulatory authority responsible for non-scheduled commercial premises. Although "the INP is designed for large and complex industrial sources" (INP Section 1.3 Scope of Policy), the general principles are used in preparing this assessment in accordance with the following two criteria:

- Account for intrusive noise impacts in the short term.
- Protect the noise level amenity for particular land uses

Intrusive Noise Impacts: The INP states that the noise from any single source should not intrude greatly above the background noise level. Industrial noise sources may generally be considered acceptable if the equivalent continuous (energy average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15 minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB. This is defined as the Intrusiveness Criterion.

The 'Rating Background Level (RBL) is the background noise level to be used for assessment purposes and is determined using either the long term or short term methods described in section 3.1 of the INP. This approach results in the intrusiveness criterion being met for 90% of the time. "Modifying factor" adjustments are to be applied to the source noise level before comparison with the criterion where the noise source contains annoying characteristics – such as prominent tonal components, impulsiveness, intermittency, irregularity and dominant low frequency content.

Protecting noise amenity: To limit continuing increases in noise levels, the maximum ambient noise levels within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.1 of the INP. Meeting these levels will protect the community against speech interference, general annoyance and, to some degree, sleep disturbance.

Due to the high traffic noise from the Pacific Highway, the area under study would be considered "urban" for the purposes of setting amenity criteria. For receivers in this area the recommended amenity criteria for the different time periods are shown in red in Table 1.

Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level dB(A)	
		Acceptable	Rec. Maximum
Rural Residence	Day	50	55
	Evening	45	50
	Night	40	45
Suburban Residence	Day	55	60
	Evening	45	50
	Night	40	45
Urban Residence	Day	60	65
	Evening	50	55
	Night	45	50
Commercial Premises	When in use	65	70
Industrial Premises	When in use	70	75

Table 1. Recommended amenity criteria from the NSW Industrial Noise Policy

In assessing the noise impact of the project, both criteria must be taken into account for residential receivers, but, in most cases, only one will be the limiting criteria and form the project specific noise levels.

The noise impact of the proposal may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor) does not exceed the criteria when measured at the nearest residential premises. This may be summarised as follows:

a) Intrusiveness Criterion:

Noise at the receiver L_{Aeq} ≤ Rating Background Level + 5

b) Amenity Criterion:

Noise at the receiver L_{Aeq} ≤ Amenity Criteria

4.2 Rating Background Level

5 Existing Background Noise Levels

The background noise measurements tabulated in Table 2 were recorded using a Convergence Instruments Noise Sentry data logger over a seven-day period from 26/0816 to 1/09/2016 and are classified as long-term recordings. The logger was positioned near the road boundary of Lot3 DP 1106967 Two Mile Road Coopernook, opposite the proposed development. The levels were recorded under conditions that are considered reliable and typical for the receptor area. The ambient noise levels were characterised by very high noise levels from road traffic along the Pacific Highway during all time periods.

	Jim Anderson Earth Moving Measured Noise								
	L10			L90			Leq		
Date	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Fri 26/08/2016	61.6	60.8	57.9	59.4	57.4	53.5	60.6	59.0	56.2
Sat 27/08/2016	61.2	57.8	56.4	58.4	54.7	47.7	59.8	56.4	53.1
Sun 28/08/2016	60.0	59.8	57.3	57.4	56.9	52.1	59.2	58.9	54.8
Mon 29/08/2016	60.0	59.7	59.2	57.9	57.8	55.8	59.0	58.7	57.7
Tue 30/08/2016	60.0	58.9	57.9	58.0	56.6	54.9	59.2	58.0	56.4
Wed 31/08/2016	59.3	59.2	59.2	57.6	56.4	56.2	58.6	57.8	57.8
Thu 1/09/2016	59.7	58.3	57.7	57.6	57.1	55.5	58.7	57.8	56.6
RBL				**58**	**57**	**55**			
Log Average	**60**	**59**	**58**						
Ambient L_{Aeq}							**59**	**58**	**56**

Note: Daytime is defined as 7.00am to 6.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.
Evening is defined as 6.00pm to 10.00pm, Monday to Saturday and Public Holidays.
Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.
Shoulder is defined as 5.00am to 7.00am, Monday to Saturday; 5.00am to 8.00am Sunday and Public Holidays.

Table 2. Measured background A-weighted sound pressure levels

Note that because the workshop's proposed hours of operation are 6am to 6pm Monday to Saturday, there is a shoulder period in the early morning as well as the daytime period to be considered. Section 3.3 of the INP deals with this situation:

"There will be situations that call for different assessment periods. For example, where early morning (5 am to 7 am) operations are proposed, it may be unduly stringent to expect such operations to be assessed against the night-time criteria—especially if existing background noise levels are steadily rising in these early morning hours. As a rule of thumb it may be appropriate to assign a shoulder period rating background level as the mid-point value between the rating background levels of the two assessment periods that are on either side of the shoulder period".

The Rating background level, RBL, is the overall single-figure background level representing each assessment period (day/evening/night).

Day	Day Period	Rating Background Level	Intrusive Criterion RBL+5	Ambient L_{Aeq}	Maximum Amenity Criterion	Acceptable Noise Level ANL	Assessment Criterion
Monday to Sunday	Day	58	63	59	65	60	**60**
	Evening	57	62	58	55	50	**50**
	Night	55	60	56	50	45	**45**
	Shoulder	57	62	58	58	53	**53**

Note: Daytime is defined as 7.00am to 6.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.
Evening is defined as 6.00pm to 10.00pm, Monday to Saturday and Public Holidays.
Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.
Shoulder is defined as 5.00am to 7.00am, Monday to Saturday; 5.00am to 8.00am Sunday and Public Holidays.

Table 3. Table 1Summary of environmental criteria

Day	Time of day	Criterion, $L_{A90,15min}$
Monday to Sunday	Day	**60 dB(A)**
	Evening	**50 dB(A)**
	Night	**45 dB(A)**
	Shoulder	**53 dB(A)**

Table 4. Project specific criteria for operational noise at the Riverview Service Centre.

6 Operational Noise Levels

Matrix Thornton Consulting Engineers has recorded the noise level of truck movements and workshop activities over many years. Typical activities that would apply to this development are shown in Table 5.

Activity	Sound Power Level, L_{WA} Plus correction	Sound Power Level, L_{WA}
B-Double semi-trailer - idling	94	94
B-Double semi-trailer - reversing incl. beeper	97 + 5	102
B-Double semi-trailer – drive by at 10 kph	104	104
B-Double semi-trailer – parking brake	101 + 5	106
B-Double semi-trailer – door closing	86 + 5	91
Mobile plant – e.g. Electric forklift	95 + 5	100
Workshop activities incl. compressor	87 + 5	92

Table 5. Noise levels of typical activities associated with the project

6.1 Modifying Factor Corrections

The INP assessment method applies adjustments to noises "*Where a noise source contains certain characteristics, such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content.*"

The possible modifying factors are listed in Table 6. As some sources would be tonal, a 5dBA penalty will be applied to the predicted noise levels.

Factor	Applicable	Correction	
Tonal Noise	Sometimes	5dBA	Applies to parking brake for example
Low Frequency Noise	No	-	Based on the type of noises, this is not applicable.
Impulsive Noise	No	-	The noise sources are not impulsive as defined in the INP.
Intermittency	No	-	Night Time only, so not applicable
Total Adjustment		**5dBA**	

Table 6. Modifying Factor Corrections

7 Received Noise Levels at Nearest Residential Boundary

The predicted noise levels at the nearest residential receiver, Lot3 DP 1106967 Two Mile Road Coopernook NSW 2426, are given in Table 7, and take into account:

- Distance attenuation for 65 metres between the shed and the boundary of the nearest residential receiver of 45 dB(A), refer AS 2436-2010, Table B1.
- Soft ground attenuation of 2 dB(A), refer AS 2436-2010, Table B3.
- The day, evening and shoulder period adjusting factor for the procedure of trucks releasing the parking brake, reversing out of the shed and leaving the site, a one off short duration event from 15 minutes to 1 hour is 'minus 5 dBA', refer INP, Table 4.2.

For the 6.00 am start time (activity 5) during the early morning shoulder period, the workshops during the day (activity 2) and for the truck motor idling during the other periods (Activities 1,3 & 4), the noise levels are compared to the criterion to determine if acceptable.

		Predicted Noise Level dBA	Period	Criterion dBA	Excess	Acceptable ✓ or ✗
Activity 1 Truck idling	**(a)**	49	Day	60	-11	✓
Activity 2 Shed activities	**(a)**	47	Day	60	-13	✓
Activity 3 Truck idling	**(a)**	49	Evening	50	-1	✓
Activity 4 Truck idling	**(a)**	49	Night	45	+4	✗
Activity 5 Truck leaving	**(a)**	52	Shoulder	53	-1	✓

Table 7. Summary of Noise Levels at Nearest Residential Boundary

The predicted noise levels for the operations of the proposed office and shed are within acceptable noise level criteria at the nearest residence for the day, evening and shoulder periods. A truck using the depot during the night (after 10.00 pm) is above the INP criterion but would be indistinguishable from the road traffic. These results are a conservative prediction based on actual noise measurements of similar operations.

8 Discussion of Results

The analysis shows that the noise levels for the Jim Anderson Earthmoving proposed new office and shed (workshop) will be below the level in the INP for the daytime period of 7.00am to 6.00pm, the shoulder period between 6.00am to 7.00am and the evening period of 6.00am to 10.00pm, Monday to Sunday. The results are valid for all neighbours.

9 Certification for Noise Impact Statement

Acoustic Certification: *Provided that the activities remain essentially as described in this assessment, the noise associated with the operation of the proposed office and shed for Jim Anderson Earthmoving at Lot 1 DP 595191 81 Two Mile Road Coopernook NSW 2426 will be within the levels specified in the NSW Industrial Noise Policy and MidCoast Council noise policy at the boundary of the nearest residential neighbour at* Lot3 DP 1106967 Two Mile Road Coopernook NSW 2426. *Based on the information obtained from on-site noise measurements and assessment of the expected activities, the proposed development is not expected to be a source of "offensive noise" as defined by the protection of the Environment Operations Act 1997.*

10 Conclusion

Noise levels from the proposed office and shed for Jim Anderson Earthmoving at Coopernook were assessed. The predicted noise levels were based on the measured levels of activities that are likely to occur within the shed and the distance to the nearest noise-sensitive receiver. The background level was set conservatively due to high traffic noise from the Pacific Highway.

The noise assessment of the proposed development showed that for the regular activities of the truck depot and workshop, the noise will be within the government guidelines at the boundary of the nearest potentially affected residence.

P. Thornton

Philip Thornton BE(UNSW) MIE (Aust)
Acoustic Consultant
Chartered Professional Engineer
September 28, 2016

ENGINEERS AUSTRALIA CHARTERED MEMBER

Appendix A: Glossary of Acoustic Terms

Assessment

Period	The period in a day over which assessments are made.
dB(A)	Unit of sound level in A-weighted decibels. The A-weighting approximates the sensitivity of the human ear by filtering these frequencies. The dB(A) measurement is considered representative of average human hearing.
L_{Aeq}	The A-weighted equivalent continuous sound pressure level, used to quantify the average noise level over a time period.
L_{A10}	The A-weighted sound pressure level exceeded for 10% of the measurement period. It is usually used as the descriptor for intrusive noise level.
L_{A90}	The A-weighted sound pressure level exceeded for 90% of the measurement period. It is usually used as the descriptor for background noise level.
$L_{Aeq15min}$	Refers to the A-weighted energy averaged equivalent noise level over a 15 minute time period.
L_{Cpeak}	The highest instantaneous C-weighted sound pressure level over the measurement period. It is usually used for high impulsive noise.
L_{Amax}	The maximum A-weighted sound pressure level for the measurement period.
Loudness	A 3dB(A) change in sound pressure level is just noticeable or perceptible to the average human ear; a 5dB(A) increase is quite noticeable and a 10dB(A) increase is typically perceived as a doubling in loudness.
RBL	The overall single figure background level representing the assessment period over the whole monitoring period. For the short term method of assessment, the RBL is the measured $L_{A90,\ 15min}$ value, or where a number of measurements have been made, the lowest $L_{A90,\ 15min}$ value.

END OF REPORT M16529.01 - Jim Anderson Earthmoving