

WAREHOUSE DEVELOPMENT

**LOT 9, #29 STIRLING CRESCENT
HIGH WYCOMBE**

ENVIRONMENTAL ACOUSTIC ASSESSMENT

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1. INTRODUCTION

Herring Storer Acoustics were commissioned through Planning Solutions to undertake an acoustic assessment of noise emissions associated with the proposed 24/7 warehouse development to be located on Lot 9 (29) Stirling Crescent, High Wycombe.

This report is to provide an assessment of proposed noise emissions from the warehouse units with respect to compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*. We understand that this report is intended to demonstrate that the development will appropriately manage the interface between industrial and residential dwellings. For information, a plan of the proposal is shown in Figure 1.1, with further details contained in Appendix A.

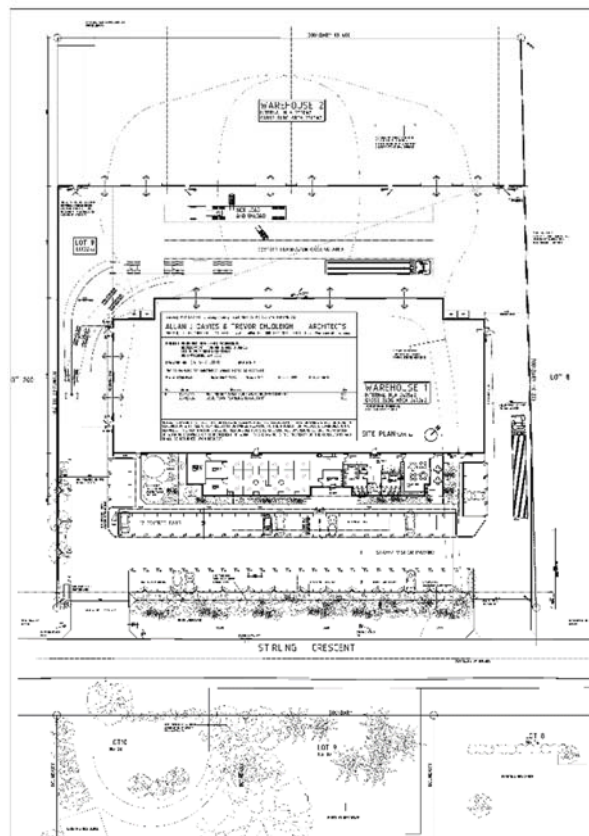


FIGURE 1.1 PROPOSED DEVELOPMENT PLAN

In acoustic terms, the noise emissions related to the movement of trucks and the loading dock activities have been assessed. Expectations are that any noise associated with the warehousing activities internally would be confined within the building.

2. SUMMARY

Based on the assessment, noise received at the neighbouring residential premises from the proposed Warehouse development would be deemed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* for all potential hours of operation noting the following :

- Forklift activities have been determined to be compliant at all times.
- Truck movements in/out are to be restricted to 10 per hour during the night, evening and Sunday/Public Holiday periods.
- Truck movements are unrestricted during the Day Period.

3. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels. For highly sensitive area of a noise sensitive premises this is determined by the calculation of an influencing factor, which is then added to the base levels shown below in Table 3.1. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. For other areas within a noise sensitive premises, the assigned noise levels are fixed throughout the day, as listed in Table 3.1.

TABLE 3.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

Under the Regulations, a highly sensitive area means that area (if any) of noise sensitive premises comprising –

- A building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
 - Any other part of the premises within 15 m of that building or that part of the building.
- It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

“impulsiveness”

means a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax(Slow)} is more than 15 dB when determined for a single representative event;

“modulation”

means a variation in the emission of noise that –

- is more than 3 dB L_{Afast} or is more than 3 dB L_{Afast} in any one-third octave band;
- is present for more at least 10% of the representative assessment period; and

“tonality”

(c) is regular, cyclic and audible;

means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L_{ASlow} levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 3.2 below.

TABLE 3.2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The closest residence adjacent to the development have been identified as shown in the aerial picture below.

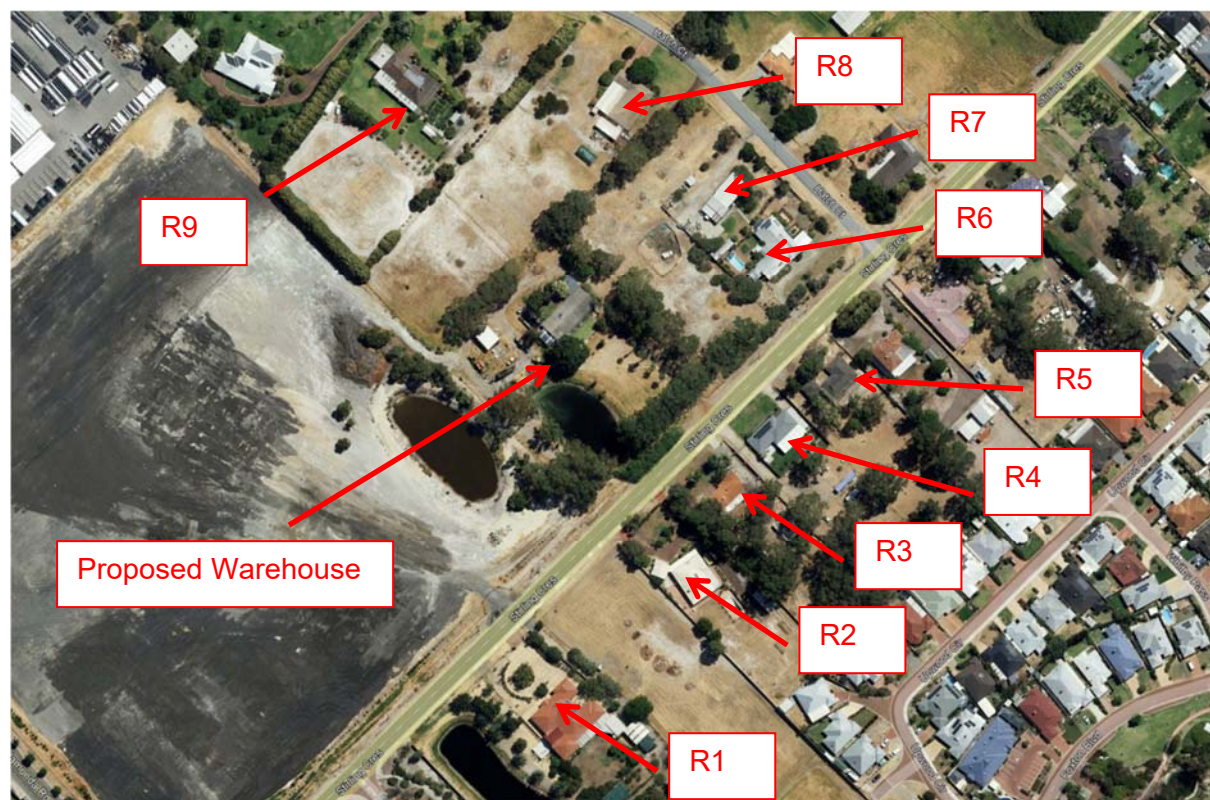


FIGURE 3.1 - RESIDENTIAL LOCATIONS

The Influencing Factor has been the determination at the identified noise sensitive premises as follows, noting that this is a conservative calculation (i.e. Underestimation):

Secondary Road within the inner circle; Stirling Crecent	+ 2 dB
Industrial Premises within the inner circle; 40 %	+ 4 dB
Industrial Premises within the outer circle; 40 %	+ 4 dB
Total IF	+10 dB

Hence the influencing factor would be +10 dB and the assigned noise levels would be as listed in Table 3.3.

TABLE 3.3 - ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
R1 to R9	0700 - 1900 hours Monday to Saturday (Day)	55	65	75
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day)	50	60	75
	1900 - 2200 hours all days (Evening)	50	60	65
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	45	55	65

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

4. DEVELOPMENT

For the purpose of the development application, based on the concept design of the buildings, the activities would be centered around storing goods, with in coming and outgoing transport of the goods. Loading docks are situated between two warehouses, with the loading/unloading area covered between.

For the industrial units it has been assumed these could operate 7 days a week, 24 hours a day.

5. MODELLING

To determine the noise that would be received at the surrounding premises from the facility, modelling of noise emission propagation was carried out using "SoundPlan".

Based on previous experience and the measured noise levels from existing facilities with the same operations, Table 5.1 contains the sound power level used for the modelling. As the building are assumed to attenuate the noise levels due to the structure (concrete walls etc.) for internal noise emissions, the focus of the noise egress has been on the docks at each location and for truck movements around the docks and yard area. Figure 5.1 details the source locations.

TABLE 5.1 – SOUND POWER LEVEL

Noise Source	Sound Power Level dB(A)
Semi-trailer Truck	92
Forklifts	81

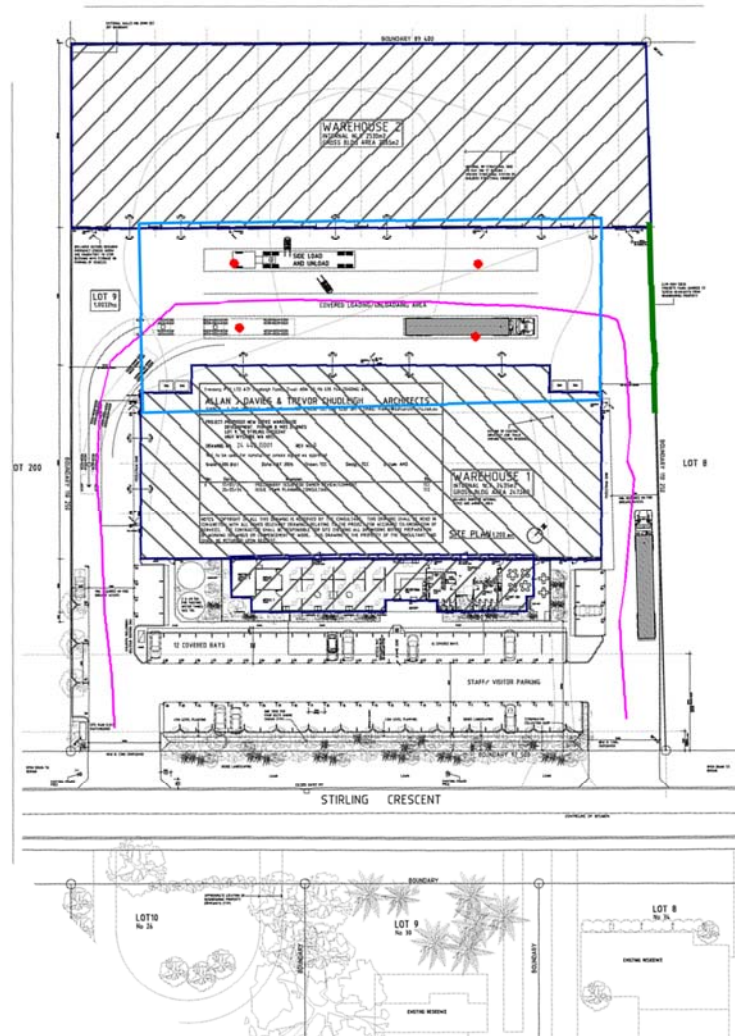


FIGURE 5.1 - SOURCE LOCATIONS

Included in the predictive noise model is a 2.4m barrier to the north-east boundary as per the development plan drawings.

The calculations used the following input data:

- a) Ground contours (site topography).
- c) DWER worst case day weather conditions.

Weather conditions for the modelling were undertaken using the “Default Conditions for Noise Modelling” as stipulated within the Environmental Protection Authority’s “Draft Guidance for Environmental Noise for Prescribed Premises” as listed in Table 5.2.

TABLE 5.2– WEATHER CONDITIONS

Condition	Day	Night
Temperature	20°C	15°C
Relative humidity	50%	50%
Pasquil Stability Class	E	G
Wind speed	4 m/s*	3 m/s*

* From sources, towards receivers.

6. RESULTS

The results of the noise modelling are attached in Appendix B.

Additionally, for information, the resultant noise level at the worst-case receiver for the above scenario is listed in Table 5.1

**TABLE 6.1 – SUMMARY OF RESULTS
WORST CASE RECIEVER**

Receiver Location	Calculated Noise Level dB(A)	
	Semi-Trailer Truck Movements	Forklifts
R1	39	31
R2	46	-
R3	46	-
R4	46	-
R5	43	28
R6	46	36
R7	47	37
R8	39	8
R9	17	-

7. ASSESSMENT

The number of truck movements in/out of the facility would dictate what parameter is pertinent to assess the noise impact against.

In the event that truck noise is present for less than 10% of a representative time period, which would be 24 mins in a 4 hour period, it would be the L_{A1} parameter.

Based upon trucks moving at 10km/hour, this would equate to 10 trucks in and out in a 4 hours period, which is assumed to be a reasonable assumption on the basis that each truck needs to be loaded/unloaded. This is considered appropriate numbers to be assumed for the night/evening period – and Sunday/Public holiday day period.

During the day period (Monday to Saturday, 7am – 7pm, excluding public holidays) it has been assumed that there may be, on occasion, more than 10 trucks in a 4 hour period, and therefore, be considered against the L_{A10} parameter.

Forklifts could be operating for greater than 10% of a representative time period, and therefore, has been compared to the L_{A10} parameter.

Based on the definitions of tonality, noise emissions from truck movements during the night/evening periods (and Sundays/Public Holidays), being an L_{A1} , being present for less than 10% of the time, would not be considered tonal.

Noise levels associated with forklift activity could contain tonal characteristics, hence, a + 5 dB adjustment would be applicable. Additionally, noise levels associated with truck movements during the day could be considered tonal.

Therefore, the assessable noise levels for each of the noise sources are listed below in Table 7.1 below, with the assessment of the noise levels shown in Tables 7.2 to 7.4.

TABLE 7.1 – ASSESSABLE NOISE LEVELS

Receiver Location	Assessable Noise Level dB(A)		
	Semi-Trailer Truck Movements Day Period	Semi-Trailer Truck Movements Evening/Night/ Sunday Periods	Forklifts
R1	44	39	36
R2	51	46	-
R3	51	46	-
R4	51	46	-
R5	48	43	33
R6	51	46	41
R7	52	47	42
R8	44	39	13
R9	22	17	-

TABLE 7.2 – ASSESSMENT OF NOISE LEVELS – TRUCK MOVEMENTS – EVENING/NIGHT/SUNDAY

Receiver	Noise Assessable Noise Level dB(A)	Time of Day	Assigned L_{A01} Level (dB)	Compliance
R1	39	Night / Evening / Sundays	55/60	Complies
R2	46			Complies
R3	46			Complies
R4	46			Complies
R5	43			Complies
R6	46			Complies
R7	47			Complies
R8	39			Complies
R9	17			Complies

TABLE 7.3 – ASSESSMENT OF NOISE LEVELS – TRUCK MOVEMENTS – DAY PERIOD

Receiver	Noise Assessable Noise Level dB(A)	Time of Day	Assigned L _{A10} Level (dB)	Compliance
R1	44	Day	55	Complies
R2	51			Complies
R3	51			Complies
R4	51			Complies
R5	48			Complies
R6	51			Complies
R7	52			Complies
R8	44			Complies
R9	22			Complies

TABLE 7.4 – ASSESSMENT OF NOISE LEVELS – LOADING DOCK NOISE (ALL HOURS)

Receiver	Noise Assessable Noise Level dB(A)	Time of Day	Assigned Night L _{A10} Level (dB)	Compliance
R1	36	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	45	Complies
R2	-			Complies
R3	-			Complies
R4	-			Complies
R5	33			Complies
R6	41			Complies
R7	42			
R8	13			
R9	-			Complies

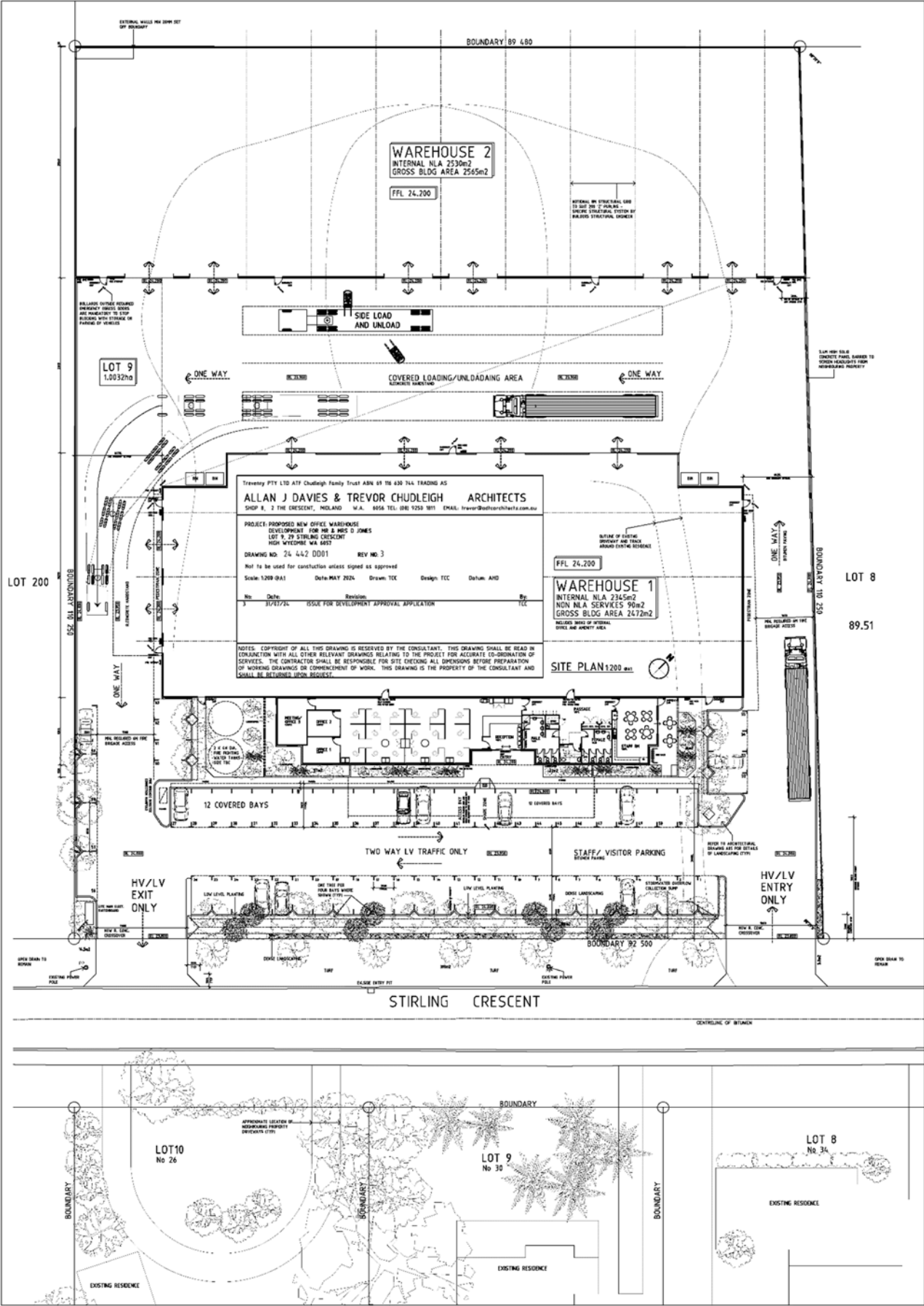
8. CONCLUSION

Based on the above assessment, noise received at the neighbouring residential premises from the proposed Warehouse development would be deemed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* for all potential hours of operation, noting the following :

- Forklift activities have been determined to be compliant at all times.
- Truck movements in/out are to be restricted to 10 per hour during the night, evening and Sunday/Public Holiday periods.
- Truck movements are unrestricted during the Day Period.

APPENDIX A

PLAN



APPENDIX B

NOISE CONTOUR PLOT

