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Warehouse Redevelopment

94-98 Cosgrove Road, Strathfield South

Noise Assessment Report

Prepared for: Centuria

Document no: NA241319-AC-ACOU

Revision no: 3

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Revisions

Revision	Description	Date	Prepared by	Approved by	Signature
01	Noise Assessment Report	1/08/2024	R. Vega	M. Sheikh	MSh
02	Noise Assessment Report	28/08/2024	R. Vega	M. Sheikh	MSh
03	Noise Assessment Report	4/10/2024	R. Vega	M. Sheikh	Msh

Review Panel

Division/ office	Name
Acoustics/Western Sydney	Mahbub Sheikh

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Executive summary

ACOR Consultants Pty Ltd (ACOR) has been commissioned by Centuria Capital Limited ('Centuria' or 'the Applicant') to support a Planning Proposal to amend the height of buildings and floor space ratio development standards under the Strathfield Local Environmental Plan 2012 (Strathfield LEP 2012) on land identified as 94-98 Cosgrove Road, Strathfield South (the site).

The Planning Proposal will enable the future development of a state-of-the-art three-level warehouse and distribution centre that responds to industrial and logistics market demands and trends. It will deliver modern and in-demand warehouse and distribution floorspace in a location highly accessible to Sydney's key trade gateways of Port Botany and Sydney Airport. It will also support the capacity and future growth of jobs and warehouse and distribution floorspace, as well as the retention of industrial zoned land within the existing employment precinct.

Unattended noise monitoring was undertaken in nearby residential areas to the proposed project site from 24th to 30th of June 2024 to gather existing background noise levels. The measurement data has been used to establish the project noise limits for industry related operational and mechanical plant noise emissions in accordance with NSW EPA Publication Noise Policy for Industry 2017. Captured noise data is presented in Section 5.1.

Assessment of noise emissions from the proposed warehouse development to adjacent sensitive receivers has been conducted in accordance with NSW EPA Noise Policy for Industry 2017. Based on the results and assessment conducted by ACOR it is predicted that operational and mechanical noise will achieve the established acoustic noise criteria presented in Section 6.1 providing that the minimum construction specifications are implemented, as presented in Section 8.

Predicted noise impacts have been compared against Noise Policy for Industry 2017 (NPI) noise criteria and acoustic advice relating to these items have been discussed in the report. Further design reviews will be undertaken as architectural drawings and mechanical plant equipment are selected.

1 Introduction

ACOR Consultants Pty Ltd (ACOR) have been engaged by Centuria ('Centuria' or 'the Applicant') to support a Planning Proposal to amend the height of buildings and floor space ratio development standards under the *Strathfield Local Environmental Plan 2012* (Strathfield LEP 2012) on land identified as 94-98 Cosgrove Road, Strathfield South (the site).

The Planning Proposal will enable the future development of a state-of-the-art three-level warehouse and distribution centre that responds to industrial and logistics market demands and trends. It will deliver modern and in-demand warehouse and distribution floorspace in a location highly accessible to Sydney's key trade gateways of Port Botany and Sydney Airport. It will also support the capacity and future growth of jobs and warehouse and distribution floorspace, as well as the retention of industrial zoned land within the existing employment precinct.

ACOR has been engaged to assess the noise impact of the proposed development on nearby noise sensitive receivers and provide design recommendations to achieve relevant acoustic requirements as per the NSW EPA Noise Policy for Industry 2017.

1.1 Site Description

The site is identified as 94-98 Cosgrove Road, Strathfield South within the Strathfield local government area (LGA). It comprises a singular lot legally described as Lot 100 DP 862635 with a total area of 43,100m^2 and street frontages to Cosgrove Road to the west, Madeline Street to the east and Hope Street to the south.

The site is located within an established industrial precinct zoned E4 General Industrial and sits adjacent to the Enfield Intermodal Logistics Centre to the west operated by NSW Ports. Its immediate surrounding context comprises industrial land uses with sports and recreation fields, and residential areas further to the south.

The below figure presents the project site highlighted in red.

Figure 1 Project site aerial map, Centuria, 94-98 Cosgrove Rd (Nearmap, Ethos Urban)

1.2 Project Description

ACOR understands the below proposal to represent scheduled works outlined by Centuria Capital Limited.

1.2.1 The Proposal

The Planning Proposal seeks to enable the future development of a multi-level warehouse through the following amendments to the Strathfield LEP 2012 for the site:

- Amendment to the Height of Buildings Map from 12m to 35m; and
- Amendment to the Floor Space Ratio Map from 1:1 to 1.6:1.

The Planning Proposal also seeks to amend the *Strathfield Consolidated Development Control Plan 2005* (Strathfield DCP) to include a new Site-Specific DCP for the site. It is noted that no physical works are proposed, with the Planning Proposal limited to the amendment of planning controls for the site only.

The Planning Proposal is accompanied by an Indicative Reference Scheme prepared by Nettletontribe Architects that demonstrates a suitable built form, urban design and landscape outcome can be achieved within the proposed amendments to the Strathfield LEP 2012 and Strathfield DCP. The Indicative Reference Scheme comprises a multi-level warehouse and distribution centre that includes:

- Three (3) levels with a centrally located hardstand area positioned between two warehouse forms;
- A total gross floor area (GFA) of approximately 69,000m^2 comprising warehouse or distribution centre and ancillary office floorspace;
- Heavy vehicle access from Cosgrove Road and ramps in the northern portion of the site;
- On-site car parking; and
- Landscaping along the street frontages to Cosgrove Road, Hope Street and Madeline Street.

The proposed facility will be operating 24/7.

1.2.2 General Arrangement

The below Figure 2 and Figure 3 presents the proposed general arrangement of structures relevant to the project site.

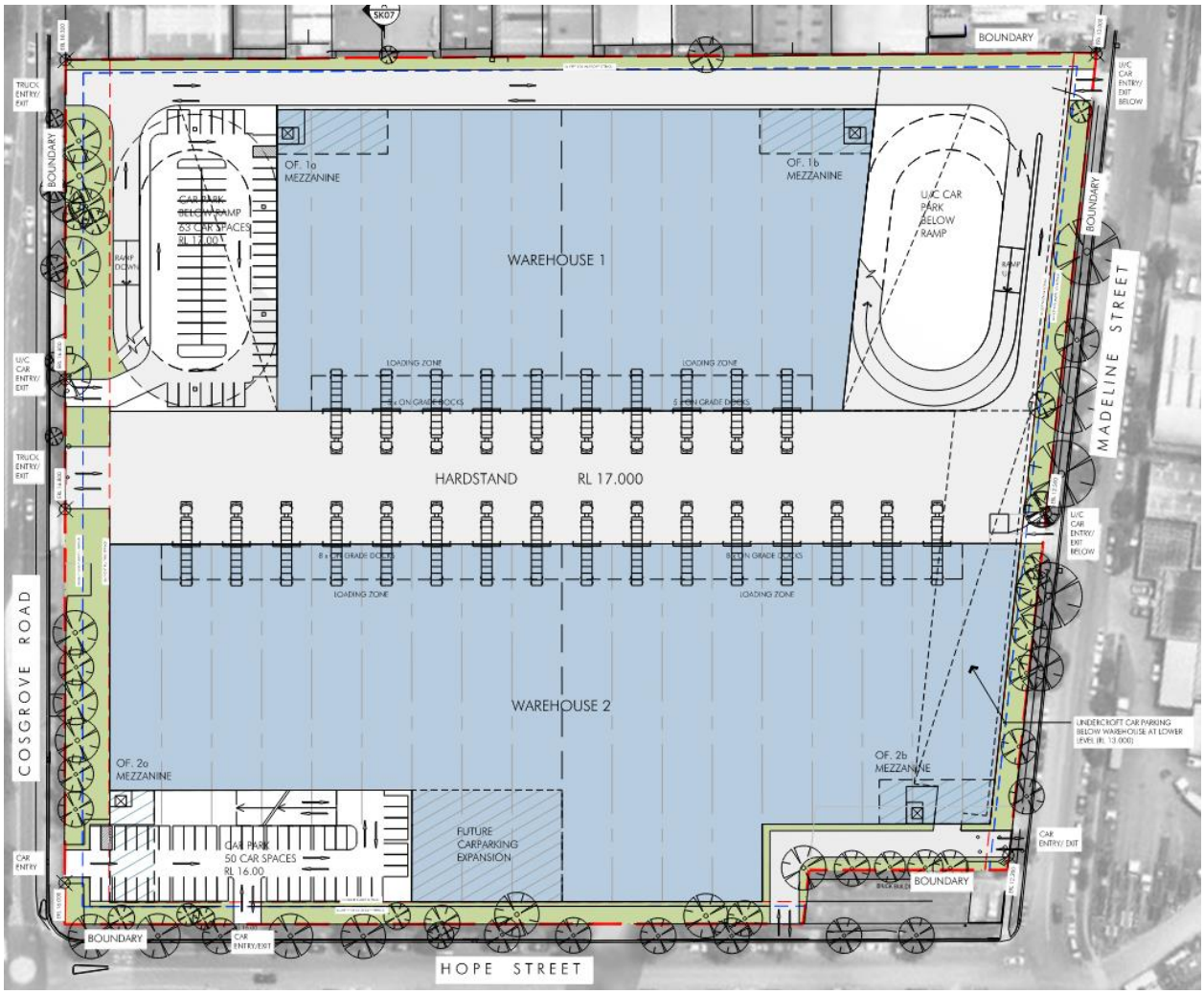


Figure 2 Architectural Drawing – Option 2 Ground Floor, 94-98 Cosgrove Rd (Centuria/Nettleton Tribe)

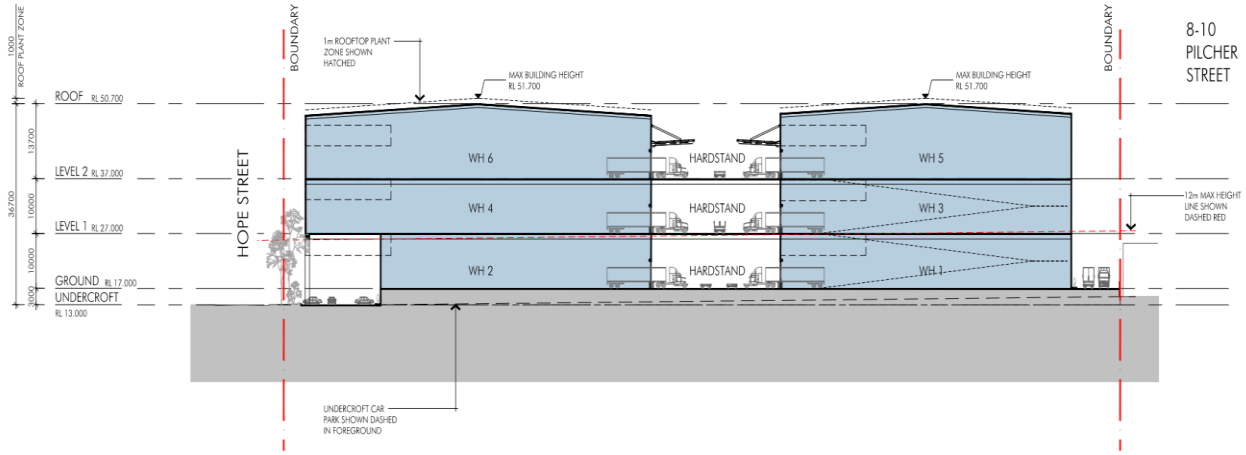


Figure 3 Option 2 section drawing, 94-98 Cosgrove Rd (Centuria/Nettleton Tribe)

2 Reference Documents

Table 2-1 below shows the documents referred to during the assessment.

Table 2-1 Reference documents

Document Name	Drawing No.	Revision	Date
OPTION 2 - GROUND FLOOR	14054_SK004[3]	-	03/07/2024
OPTION 2 - LEVEL 1	14054_SK005[3]	-	03/07/2024
OPTION 2 - LEVEL 2	14054_SK006[3]	-	03/07/2024
OPTION 2 - SECTION	14054_SK007[3]	-	03/07/2024
Concept Design Report	-	C	July 2024
Urban Design Report	-	G	Sep 2024

This report also references correspondence delivered to ACOR from ASON Group (via Centuria), dated 18/07/2024 which outlines the following:

- Proposed traffic generation, preliminary advice on vehicle activities to and within the proposed project site.

3 Regulations, Standards, and Guidelines

The following regulations, standards, and guidelines have been referred to in relation to the noise impact assessment performed:

- NSW EPA Noise Policy for Industry 2017 (NPI).
- Protection of the Environmental Operations (Noise Control) Regulations 2017 (POEO)
- NSW DEC – Assessing Vibration: A Technical Guideline (2006).
- EPA NSW Interim Construction Noise Guidelines (ICNG) 2009.
- NSW EPA Noise Guide for Local Government (NGLG).
- NSW EPA Approved Methods for the Measurement and Analysis of Environmental Noise in NSW.
- AS 1055:2018 – Acoustics – Description and measurement of environmental noise (AS 1055).

4 Noise Sensitive Receivers

The project site is located at 94-98 Cosgrove Rd, South Strathfield. The nearest noise sensitive receivers are predominantly industrial premises to the north, west and south, and residential dwellings to the north and east. Figure 4 below shows the project site and the noise sensitive receivers.

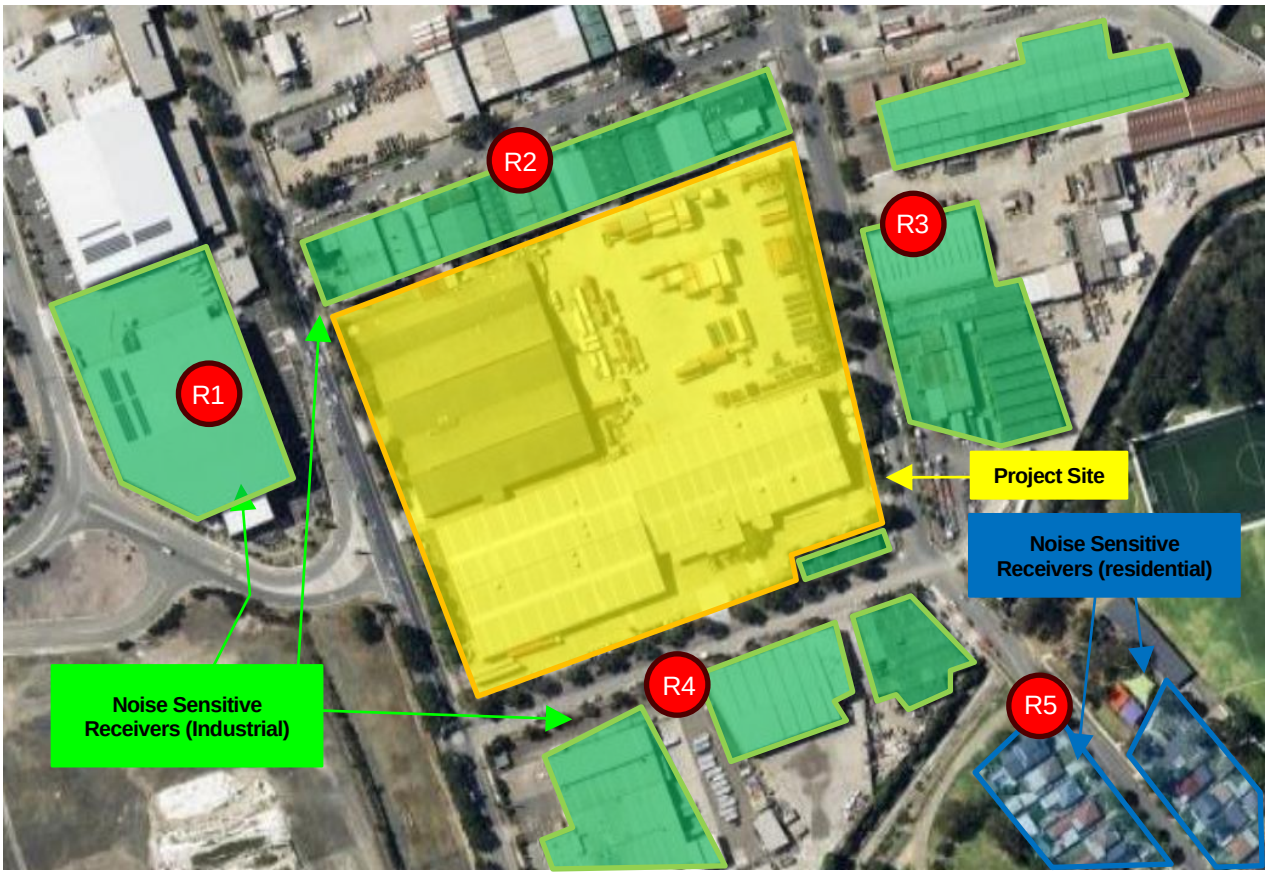


Figure 4 Satellite image showing project site and noise sensitive receivers.

Noise sensitive receivers are grouped and listed below in Table 4-1. Business names have been presented corresponding to aerial imagery available online.

Table 4-1 Noise sensitive receivers

Receiver Group	Noise Sensitive Receiver	Receiver Type	Direction from Project Site
R1	Northside Fine Food	Industrial	West
R2	Eurologic, Auto Friend, Lis-Con, First Choice Towing and other various commercial entities along Pilcher St	Industrial	North
R3	Paper Trade, Aussie Skips, Pro-Axle Enfield and other various commercial entities along Madeline St	Industrial	East
R4	Muirs Prestige Smash Repairs, Alsco Uniforms, Rainbow Floor Services	Industrial	South
R5	75 – 85 Madeline Street	Residential	South-East

Figure 5 shows the nominated land zoning areas relevant to the project site and surrounding areas.

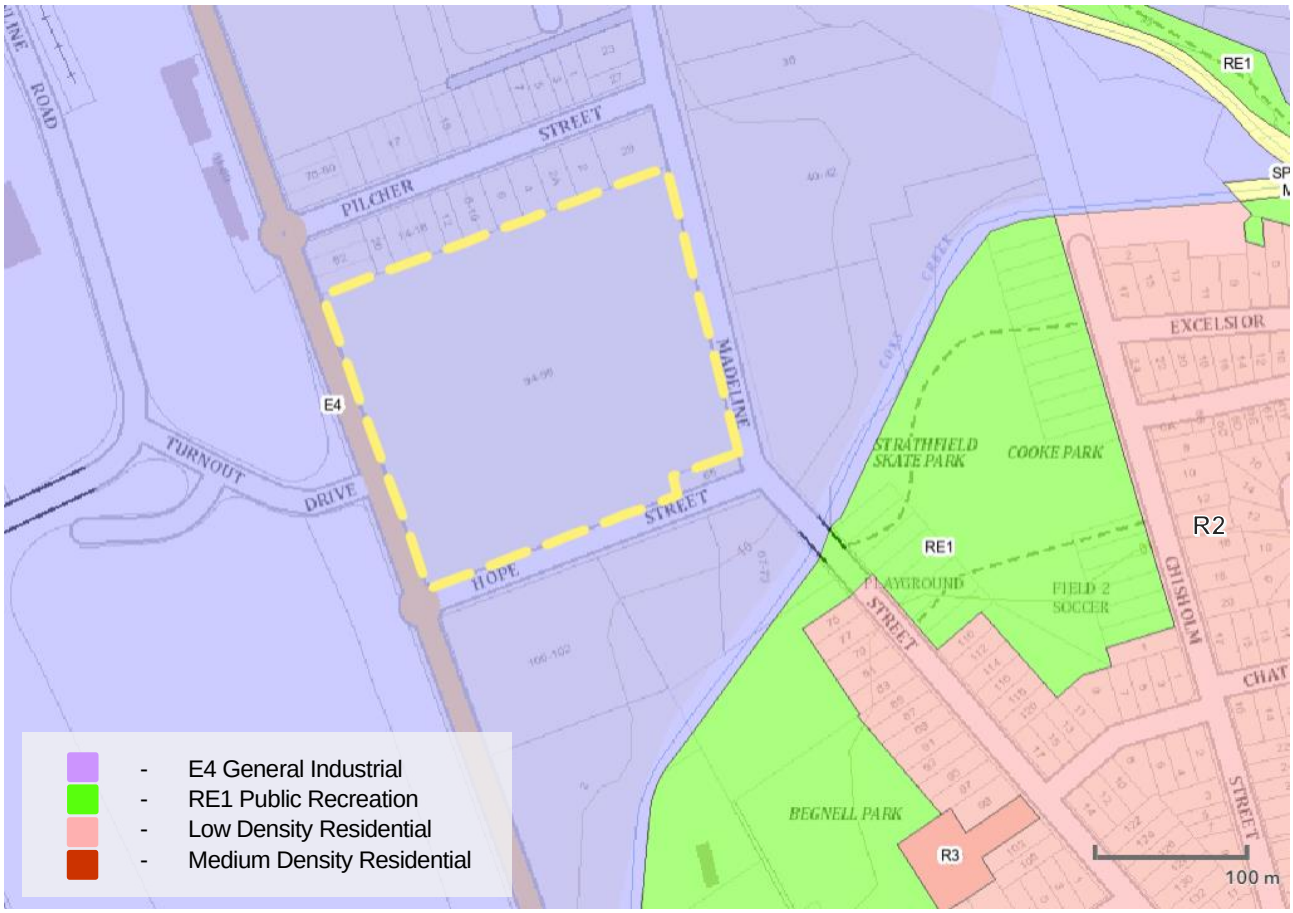


Figure 5 Land Zoning designation, 94-98 Cosgrove Rd (NSW e-Spatial Viewer)

It is noted that the proposed warehouse development at the project site and surrounding industrial entities are located in the E4 General Industrial zone, with the nearest sensitive receiver, indicated to be at 75 Madeline Street located within the R2 Low Density Residential zone approximately 124m south-east from the site boundary.

Indicative Reference Scheme comprises a building height of approximately 35m, which would offer an unobstructed line of sight from the subject property roof to the property boundary of the residential properties in the R2 and R3 zones.

5 Current Noise Environment

5.1 Current Noise Environment

The current noise environment at the project site is dominated by heavy vehicle road traffic noise emanating from port rail operations to the west of the site and freight or distribution entities operating on the existing site or to the south. Additional mechanical and/or operational noise influence from light industrial entities and light vehicle passage is generally present around the entire project site.

5.1.1 Noise Measurements

A noise logger was installed to establish the background noise level at the nearest noise sensitive receiver. Location of unattended noise logging is presented in Figure 6.

The noise logger was configured to record continuous sound pressure levels over a recurring period of 15 minutes during the seven-day period. Measured data was stored for the measurement parameters L_{A10}, L_{A90}, L_{Aeq}, and L_{Amax} during each 15-minute period. Logging was done in A-weighted fast response mode.

The instruments used for unattended measurements are listed in Table 5-1. The equipment was field-calibrated before and after all measurements, with no significant drift (± 0.5 dB(A)) in calibration level. All instruments have been internally calibrated in NATA certified laboratories and hold current and traceable calibration certificates.

Table 5-1 Instrument details

Instrument Name	Make/Model	Serial No.	Equipment Use
Noise Logger (Type 1)	NTi XL2	A2A-18956-E0	Noise logging
Acoustic Calibrator	Larson Davis Cal 200	18644	Field calibration of equipment before use

Measurements were undertaken in general accordance with AS 1055 and NSW EPA Approved Methods for the Measurement and Analysis of Environmental Noise in NSW.

Meteorological data from during the measurement period was collected from the Bureau of Meteorology (BOM) website for Canterbury Racecourse weather station and can be seen in Appendix B NPI states that noise data affected by adverse meteorological conditions (wind speed >5m/s or rain) should be excluded from calculations. Some isolated instances of high wind or rain have been adjusted in results presented in the below sections.

The meteorological parameters measured during the noise measurement period on site were as follows:

- Temperature: 17 ^{O}C.
- Wind Speed: 4 m/s.
- Humidity: R.H. 41%.

Figure 6 Noise logger location, 75 Madeline Street South Strathfield

Table 5-2 shows the noise logging measurement period.

Table 5-2 Noise logger location and measurement period

Noise Logger Location	Measurement Period
75 Madeline Street	24/06/2024 – 30/06/2024

5.1.2 Measured Background and Ambient Noise Levels – Noise Logger

Measured noise data was processed in accordance with NPI 2017 to establish the rating background noise level (RBL). Table 5-3 below provides the noise levels. Detailed noise monitoring results are represented graphically in Appendix C .

Note that in the NPI, time of the day is defined as follows:

- Day: 7am to 6pm
- Evening: 6pm to 10pm
- Night: 10pm to 7am

Table 5-3 Measured background and ambient noise levels at noise logging location

Date	Day of the Week	Background Noise Level, L_{A90} dB(A)			Ambient Noise Level, L_{Aeq} dB(A)		
		Day	Evening	Night	Day	Evening	Night
24/06/24	Monday	-	49.7	45.9	49.5	57.9	52.7
25/06/24	Tuesday	49.0	47.0	45.5	64.1	58.5	51.7
26/06/24	Wednesday	51.5	49.4	44.2	62.0	59.5	54.0
27/06/24	Thursday	50.5	48.8	45.7	61.9	63.6	54.5
28/06/24	Friday	46.9	48.2	44.0	61.8	58.7	51.4
29/06/24	Saturday	47.7	47.0	-	61.6	55.8	48.2
30/06/24	Sunday	-	-	-	-	-	-
Rating Background Level (RBL)		**48**	**48**	**44**			
Average Ambient Noise Level					**60**	**58**	**51**

6 Acoustic Criteria

6.1 NSW EPA Noise Policy for Industry 2017

Industrial noise can have a significant effect on noise-sensitive receivers. Both the increase in noise level above background levels, as well as the absolute level of noise are important factors in how a community will respond to noise from industrial sources. The project “noise trigger level” established in the NPI addresses each of these components of noise impact. The following subsections show the process of determining the project noise trigger level in accordance with the NPI.

6.1.1 Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source ($L_{Aeq,15min}$) does not exceed the RBL by more than 5 dB, when beyond a minimum threshold (35 dB(A) for the day, 30 dB(A) for the evening and night). This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment. The outcome of this approach aims to ensure that the

intrusiveness noise level is being met for at least 90% of the time-periods over which annoyance reactions can occur (taken to be periods of 15 minutes). Project intrusiveness noise level is defined as follows:

- Project intrusiveness noise level ($L_{Aeq,15min}$) = RBL + 5 dB

Based on the measured RBL presented in Table 5-3 above and the NPI, the project intrusiveness noise levels are established in Table 6-1.

Table 6-1 Project intrusiveness noise levels

Rating Background Level RBL, dB(A)			**Project Intrusiveness Noise Levels, $L_{Aeq,15min}$ dB(A)**		
Day	Evening	Night	Day	Evening	Night
48	48	44	53	53	49

6.1.2 Project Amenity Noise Level

To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 of the NPI, where feasible and reasonable. 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 (Table 2.2 of the NPI) 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 $L_{Aeq,15min}$ = Recommended amenity noise level – 5 dB(A) + 3 dB(A)

The recommended amenity noise level should be established from Table 2.2 of the NPI based on the noise sensitive receivers' category, determined based on Table 2.3 of the NPI.

As the NPI states, the approach of deriving the project amenity noise level from the recommended amenity noise level minus 5 dB is based on a receiver not being impacted by more than three to four individual industrial noise sources. To standardise the time periods for the intrusiveness and amenity noise levels, NPI assumes that the Amenity $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq,period}$ + 3 decibels (dB).

Considering that the residential noise sensitive receivers are located in an R4 high density zone, and the surrounding environmental character is similar to urban residential, the NPI recommended Amenity Noise Level and Project Amenity Noise Level for this project are presented in Table 6-2 below.

Table 6-2 Project amenity noise levels

Noise Sensitive Receiver	**Recommended Amenity Noise Level, LAeq dB(A)**			**Project Amenity Noise Levels, LAeq,15min dB(A)**		
	Day	Evening	Night	Day	Evening	Night
R1 (Industrial)	70 (when in use)			68 (when in use)		
R2 (Industrial)						
R3 (Industrial)						
R4 (Industrial)						
R5 (Residential)	55	45	40	53	43	38

6.1.3 Project Noise Trigger Level

The project noise trigger level is the lower (that is, the more stringent) value of the project intrusiveness noise level and the project amenity noise level determined in accordance with the NPI. The project intrusiveness noise level

aims to protect against significant changes in noise levels, whilst the project amenity noise level seeks to protect against cumulative noise impacts from industry and maintain amenity for particular land uses. Applying the most stringent requirement as the project noise trigger level ensures that both intrusive noise is limited, and amenity is protected and that no single industry can unacceptably change the noise level of an area. It is noted that Intrusive noise levels are only applied to residential receivers (residences). For other receiver types identified in Table 2.2 of the NPI, only the amenity levels apply. The project noise trigger levels for this project are established in accordance with the NPI, and are shown below in Table 6-3.

Table 6-3 Project noise trigger levels

Noise Sensitive Receiver	**Project Intrusiveness Noise Level, $L_{Aeq,15min}$ dB(A)**			**Project Amenity Noise Level, $L_{Aeq,15min}$ dB(A)**			**Project Noise Trigger Level, $L_{Aeq,15min}$ dB(A)**		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
R1 (Industrial)	-			68 (when in use)			68 (when in use)		
R2 (Industrial)	-								
R3 (Industrial)	-								
R4 (Industrial)	-								
R5 (Residential)	53	53	49	53	43	38	53	43	38

6.1.4 Correction for Modifying Factors

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, a correction should be applied as per the NPI, to the measured or predicted noise levels at the receiver before comparison with the project noise trigger levels. The maximum correction of 10 dB(A) to be applied to the predicted or the measured level where two or more modifying factors are present. NPI recommended correction factors (Table C1 of the NPI) are shown in Table 6-4.

Table 6-4 Modifying factor corrections for noise characteristics

Factors	**Corrections[1]**	**Notes**
Tonal Noise	5 dB[2,3]	[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
Low-Frequency Noise	2 or 5 dB[2]	
Intermittent Noise	5 dB	
Duration	0 to 20 dB(A)	
Maximum Adjustment	Maximum correction of 10 dB(A)[2] (excluding duration correction).	

As per the NPI, correction for duration is applied where a single-event noise is continuous for a period of less than two and a half hours in any assessment period. The allowable exceedance of the $L_{Aeq,15min}$ equivalent noise criterion is provided in Table C3 of the NPI for the duration of the event. This adjustment is designed to account for unusual and one-off events and does not apply to regular and/or routine high-noise level events. The adjustments for duration are to be applied to the criterion.

6.1.5 Sleep Disturbance Criteria

The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. NPI recommends, where the subject development/premises night-time noise levels at a residential location exceed:

- $LA_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAF_{max} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

that a detailed maximum noise level event assessment should be undertaken. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period. Based on the NPI, the sleep disturbance criteria for the proposed development are determined as shown in Table 6-5.

Table 6-5 Sleep disturbance criteria

Noise Sensitive Receiver	**Rating Background Level (RBL) at Night, L_{A90} dB(A)**	**NPI Recommended Sleep Disturbance Criteria, dB(A)**	
		$L_{Aeq,15min}$ **(**40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater**)**	**L_{AFmax}** **(**52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater**)**
R5 – 75 Madeline Street	44	49	59

In addition to the above, NSW Road Noise Policy (RNP) noted that the research on sleep disturbance to date concluded that:

- Maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep
- One or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

6.2 Protection of the Environment Operations (POEO) Act 1997

The POEO Act 1997 aims to protect, restore and enhance the quality of the noise environment in New South Wales. 'Offensive noise' in the Act is defined as noise:

> *(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances—*
>
> > *(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or*
> >
> > *(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or*
>
> *(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.*

For control of noise from Air Conditioners, Pumps and Heat Pump Water Heaters, the Act defines the following in regard to its use on residential premises:

> *A person is guilty of an offence if -*
>
> *(a) the person causes or permits an air conditioner / pump to be used on residential premises in such a manner that it emits noise that can be heard within any room in any other residential premises (that is not a garage, storage area, bathroom, laundry, toilet or pantry) whether or not any door or window to that room is open -*
>
> > *(i) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or*
> >
> > *(ii) before 7 am or after 10 pm on any other day,*

However, there is no quantitative criteria to define the "offensive noise" in the POEO. Generally speaking, the recommended noise criteria defined in the Noise Policy for Industry (NPfI) 2017 should be adopted for acceptable noise level at different noise sensitive receivers.

6.3 Construction Noise Criteria - DECC Interim Construction Noise Guideline (ICNG) 2009

6.3.1 Airborne Noise Criteria

The Interim Construction Noise Guideline (ICNG) (DECC, 2009) guideline recommends standard hours for construction activities as Monday to Friday: 7am to 6pm, Saturday: 8am to 1pm and no work on Sundays or public holidays. These hours are not mandatory and the ICNG acknowledges that the following activities have justification to be undertaken outside the recommended standard construction hours assuming that all reasonable and feasible mitigation measures are implemented to minimise the impacts to the surrounding sensitive land uses:

- the delivery of oversized plant or structures that police or other authorities determine to require special arrangements to transport along public roads.
- emergency work to avoid the loss of life or damage to property, or to prevent environmental harm.
- works where a proponent demonstrates and justifies a need to operate outside the recommended standard construction hours.
- works which maintain noise levels at sensitive receivers to below the noise management levels outside of the recommended standard construction hours.

Construction noise management levels at sensitive residential receivers are provided in Table 6-6. The construction noise management levels during recommended standard hours represent a noise level that, if exceeded, would require management measures including:

- reasonable and feasible work practices.
- contact with the residences to inform them of the nature or works to be carried out, the expected noise levels and durations and contact details.

The management measures are aimed at reducing noise impacts at the residential receivers. However, it may not be reasonable and feasible to reduce noise levels to below the noise affected management level. The noise affected construction noise management levels during recommended standard hours is not intended as a noise limit but rather a level where noise management is required and as such should not be included as a noise limit in the environmental protection license.

Table 6-6 presents the construction noise objectives provided by the Interim Guideline (2009)

Table 6-6 Residential construction noise management levels, dBA

Time of day	Noise Management level, $L_{Aeq\ (15\ min)}$	Application Notes
Recommended standard hours	Noise affected: RBL + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. ▪ where the predicted or measured $L_{Aeq(15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ the proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected: 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting

Time of day	Noise Management level, $L_{Aeq\ (15\ min)}$	Application Notes
		the hours that the very noisy activities can occur, taking into account: ▪ times identified by the community when they are less sensitive to noise (such as before and after school, or mid-morning or mid-afternoon for works near residences) ▪ if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected: RBL + 5 dBA	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable measures have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community.

Noise management levels for other sensitive land uses are provided in Table 6-7 and only apply when the properties are in use. The external noise levels should be assessed at the most-affected occupied point of the premises:

Table 6-7 Noise management levels for other sensitive land uses

Land Use	Noise management, $L_{Aeq\ (15\ minutes)}$
Commercial premises	70 dBA (external)
Industrial Premises	75 dBA (external)

A summary of the construction noise management levels is provided in Table 6-8.

Table 6-8 Proposal construction noise management levels, dBA

Receiver type	Construction noise management levels, $L_{Aeq(15\ min)}$				
	Standard construction hours		Outside standard construction hours		
	Noise affected	Highly noise affected	Day	Evening	Night
R1 (Industrial)	75 (when in use)		75 (when in use)		
R2 (Industrial)					
R3 (Industrial)					
R4 (Industrial)					
R5 (Residential)	58	75	53	53	49

6.3.2 Ground-borne Noise Criteria

Ground-borne noise is noise generated by vibration transmitted through the ground into a structure. The following ground-borne noise levels for residences indicate when management actions should be implemented. These levels recognise the temporary nature of construction and are only applicable when ground-borne noise levels are higher than airborne noise levels. The ground-borne noise levels are for evening and night-time periods only, as the objectives are to protect the amenity and sleep of people when they are at home.

- Evening (6 pm to 10 pm): Internal: L_{Aeq} (15 min) 40 dB(A).
- Night-time (10 pm to 7 am): Internal: L_{Aeq} (15 min) 35 dB(A).

The internal noise levels are to be assessed at the centre of the most affected habitable room. Mitigation options to deal with ground-borne noise may include extensive community consultation to determine the acceptable level of disruption and the provision of respite accommodation in some circumstances, not just restriction of work hours. The level of mitigation of ground-borne noise would depend on the extent of impacts and also on the scale and duration of works. Any restriction that the relevant authority (consent, determining or regulatory) may impose on the days when construction work is allowed should take into account whether the community:

- has identified times of day when they are more sensitive to noise (for example, Sundays or public holidays)
- is prepared to accept a longer construction duration in exchange for days of respite.

6.4 NSW DEC Assessing Vibration: A Technical Guideline (2006)

6.4.1 Construction Vibration Criteria

The latest release of BS 6472-1:2008 includes information on the evaluation of intermittent vibration by introducing a 'vibration dose' concept. This approach can be used for the evaluation and assessment of vibration from trams, heavy road vehicles, construction activity and other vibration sources which are not continuous.

The DECC "Assessing Vibration: A Technical Guideline" is based on the guidelines contained in BS 6472.1:2008, Guide to evaluation of human exposure to vibration in buildings - Vibration sources other than blasting.

Vibration criteria for continuous and impulsive vibration are presented in Table 6-9 and Table 6-10 below.

Table 6-9 Vibration acceleration and velocity criteria for exposure to continuous and impulsive vibration

Place	**Time**	**Weighted RMS acceleration (m/s^2);Vibration acceleration value (dB re 10^{-6} m/s^2)**		**Weighted RMS velocity (mm/s). Vibration velocity value (dB re 10^{-6} mm/s)**	
		Preferred	**Maximum**	**Preferred**	**Maximum**
Continuous vibration					
Residences	Day time	0.010 (80dB)	0.020 (86dB)	0.20 (106dB)	0.40 (112dB)
	Night-time	0.0070 (77dB)	0.014 (83dB)	0.14 (103dB)	0.28 (109dB)
Offices	Day-or night-time	0.020 (86 dB)	0.040 (92 dB)	0.40 (112 dB)	0.80 (118 dB)
Workshops	Day-or night-time	0.040 (92dB)	0.080 (98 dB)	0.080 (118dB)	1.6 (124dB)
Impulsive vibration					
Residences	Day time	0.30 (110dB)	0.60 (113dB)	6.0 (136dB)	12.0 (142dB)
	Night-time	0.10 (100dB)	0.20 (106dB)	2.0 (126dB)	4.0 (132dB)
Offices	Day-or night-time	0.64 (116 dB)	1.28 (122 dB)	13.0 (142 dB)	26.0 (148 dB)

Place	Time	Weighted RMS acceleration (m/s^2);Vibration acceleration value (dB re 10^{-6} m/s^2)		Weighted RMS velocity (mm/s). Vibration velocity value (dB re 10^{-6} mm/s)	
		Preferred	Maximum	Preferred	Maximum
Continuous vibration					
Workshops	Day-or night-time	0.64 (116 dB)	1.28 (122 dB)	13.0 (142 dB)	26.0 (148 dB)

Table 6-10 Peak velocity criteria for exposure to continuous and impulsive vibration

Place	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Continuous vibration			
Residences	Day time	0.28	0.56
	Night-time	0.20	0.40
Offices	Day-or night-time	0.56	1.1
Workshops	Day-or night-time	1.1	2.2
Impulsive vibration			
Residences	Day time	8.6	17.0
	Night-time	2.8	5.6
Offices	Day-or night-time	18.0	36.0
Workshops	Day-or night-time	18.0	36.0

7 Operational Noise Assessment

7.1 Assumptions for Acoustic Modelling

Project building specifications and operations at this stage are considered preliminary, with only concept drawings and high-level architectural specifications available for assessment. In order to provide preliminary advice, it is necessary to assume some elements of operation and construction specifications. These assumptions have been made by ACOR from experience in previous projects of similar type and scale. Reviews on building construction, mechanical specification and operational activity will be reviewed and presented in subsequent reporting stages as the project progresses.

The following project elements are known and given in preliminary architectural drawings referenced in Section 2.

- General site arrangement comprising of:
  - 2 x 3 storey structures, housing 6 warehouses
  - Underground carparking
  - Hardstand area accommodating 26 Heavy Goods Vehicles (HGV), 10 docks along Warehouse Building 1 & 16 docks along Warehouse 2.
  - Roof area encompassing total structure and hardstand areas.

The following elements were not known at the time of writing this report and are assumed for this assessment, approximated in modelling.

- Internal operational activity
- Rooftop mechanical plant
- Building envelope construction specifications
- Hardstand area HGV dock concentration
- Ramp screening construction specifications

In the following sections noise from the entire development is assessed against the noise requirements of the NSW EPA Noise Policy for Industry (2017). The detail noise assessment methodology, findings of the noise assessments and relevant recommendations to achieve noise compliance are also included in this section.

7.2 Operational Activities adopted for Acoustic Modelling

The following operational activities, associated with the proposed development are considered for the noise assessment of the project site development.

- It is indicated that the proposed site development is seeking the approval to operate 24hrs.
- The noise assessment is for a worst-case 15-minute period (at any time during the operation of then facility) as per the requirements of the NPI. Therefore, the following operational activities (noise sources) are considered during a typical 15-minute period to assess the worst-case noise level at the nearby noise sensitive receivers. It is noted that all these sources are considered to be operating simultaneously during the 15-minute period, which in reality is unlikely to occur and is considered 'worst-case'.
- In consideration of HGV movement and activity a conservative approximation of 80% of simultaneous operational activity was made for each floor of hardstand, warehouse and ramp areas considered to be in use continually throughout the day and night periods, summarised in

Table 7-1.

- There is an expectation that traffic generation and operational activity data will be made available in successive stages of the project.

Table 7-1 Proposed operational activities in a 15-minute period

Description of Activities / Noise Sources	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
Warehouse Operations	▪ 3 automated or manually operated bench machinery – CNC or similar ▪ 1 forklift moving/operating <5km/hr and 1 idling ▪ 1 forklift idling ▪ 1 forklift tine lift	▪ 3 automated or manually operated bench machinery – CNC or similar ▪ 1 forklift moving/operating <5km/hr and 1 idling ▪ 1 forklift idling ▪ 1 forklift tine lift	▪ 3 automated or manually operated bench machinery – CNC or similar ▪ 1 forklift moving/operating <5km/hr and 1 idling ▪ 1 forklift idling ▪ 1 forklift tine lift
Light Vehicle Movement	▪ 22 Light vehicle movements at points of site entry, through hardstand area and carpark (ground & undercroft) ▪ 22 Light vehicle movements at points of site exit through hardstand area and carpark (ground & undercroft)	▪ 11 Light vehicle movements at points of site entry, through hardstand area and carpark (ground & undercroft) ▪ 11 Light vehicle movements at points of site exit through hardstand area and carpark (ground & undercroft)	▪ 2 Light vehicle movements at points of site entry, through hardstand area and carpark (ground & undercroft) ▪ 2 Light vehicle movements at points of site exit through hardstand area and carpark (ground & undercroft)
HGV Movement	▪ 3 HGV movements at points of site entry and through hardstand area ▪ 3 HGV movements at points of site exit and through hardstand area	▪ 1 HGV movements at points of site entry and through hardstand area **(see note)** ▪ 1 HGV movements at points of site exit and through hardstand area **(see note)** ▪	▪ 1 HGV movements at points of site entry and through hardstand area **(see note)** ▪ 1 HGV movements at points of site exit and through hardstand area **(see note)**
Hardstand – Ground Floor, Level 1 and Level 2	▪ 18 HGV vehicles idling on each hardstand area (Ground Level, Level 1 & Level 2)	▪ 18 HGV vehicles idling on each hardstand area (Ground Level, Level 1 & Level 2)	▪ 18 HGV vehicles idling on each hardstand area (Ground Level, Level 1 & Level 2)
Mechanical Plant – Warehouse Air Handling & Office	▪ 6 rooftop mounted ducted exhaust fans per building structure ▪ 9 Heat pump or condensers per building structure rooftop mounted	▪ 6 rooftop mounted ducted exhaust fans per building structure ▪ 9 Heat pump or condensers per building structure rooftop mounted	▪ 6 rooftop mounted ducted exhaust fans per building structure ▪ 9 Heat pump or condensers per building structure rooftop mounted
▪ Note: Heavy Goods Vehicle operations listed correspond to preliminary information provided by ASON Traffic Modelling (See Appendix D Heavy Goods Vehicle operational activity used in the formulation of noise propagation model adopts the 'Day' period activity schedule as it represents the maximum operational activity, and hence, the 'worst possible case' condition.			

7.2.1 Sound Power Level of Vehicle/Operation adopted for Acoustic Modelling

Sound Power Levels provided in Table 7-2 have been adopted for the noise assessment of different operational activities associated with the project, which is considered representative of a typical warehouse operational scenario and cannot be considered 'worst-case' per individual warehouse or bay. However, acoustic assessment should be

further reviewed when the mechanical design has been finalised to ensure noise compliance with the Noise Policy for Industry.

Table 7-2 Warehouse internal operation machinery and mechanical sound power levels

Noise Sources	Sound Power Level (L_w) of Noise Source, dB(A)
1 Automated or manual operated bench mechanical machinery – in operation	98
1 Forklift - Engine idle	77
1 Forklift – Movement in warehouse <5km/hr	89
1 Forklift – Goods loading operation	81
1 Heavy Goods Vehicle* – Engine idle	86
1 Heavy Good Vehicle* – Movement through warehouse and ramp <15km/hr	95

*Heavy Goods Vehicle is classified as any vehicle over 4.5 tonnes Gross Vehicle Mass (GVM) and include Heavy Rigid, Combination Truck and Prime Movers (Short & B-Double). In this case, sound power levels adopted in the above table refer to enclosed B-Double Prime Movers.

7.2.2 Sound Power Levels of Equipment adopted for Acoustic Modelling

Mechanical plant equipment for the project building is not known at this stage of reporting and will be further reviewed in subsequent stages of the project.

The following mechanical equipment in Table 7-3 is considered/assumed located on the rooftop and used as a general approximation of minimum required plant equipment. Equipment selections are based on similar projects of similar scale and type.

Table 7-3 New mechanical equipment sound power levels

Equipment	Model Number	Sound Power Level, L_w, dB(A) – per unit
12 x Fan – Vertical Discharge Exhaust	Fantech RVE1254GP6/23[1]	106
18 x Condenser	Daikin 25kW Inverter Ducted FDYQN250LBV1 / RZQ250LV1[1]	79

7.3 Location of Noise Sources adopted for Acoustic Modelling

Locations of operational activities summarised in

Table 7-1 are provided in the below Figure 7 & Figure 8.

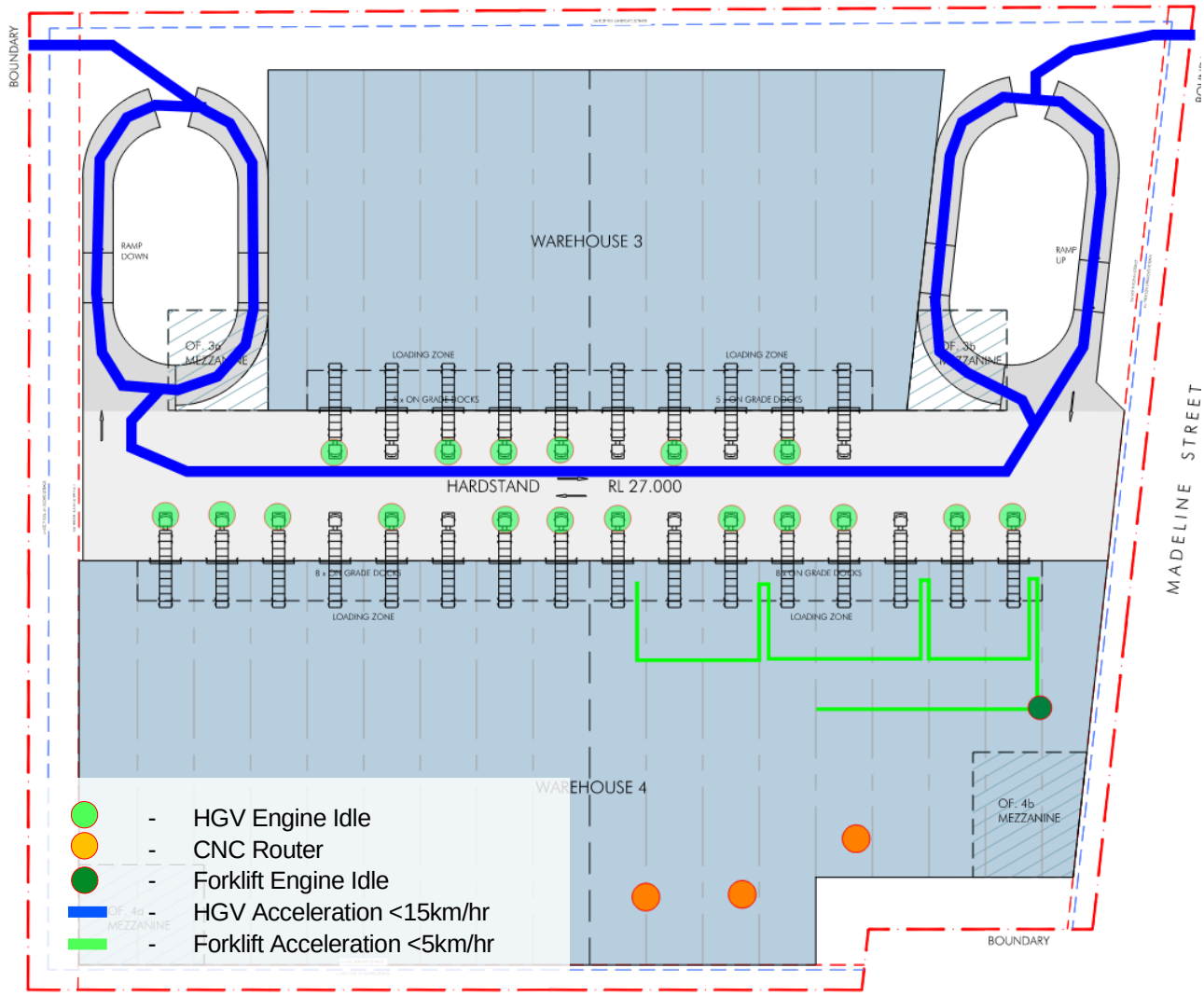


Figure 7 Operational activities adopted for acoustic modelling - Internal and hardstand area – Ground, Level 1 & level 2

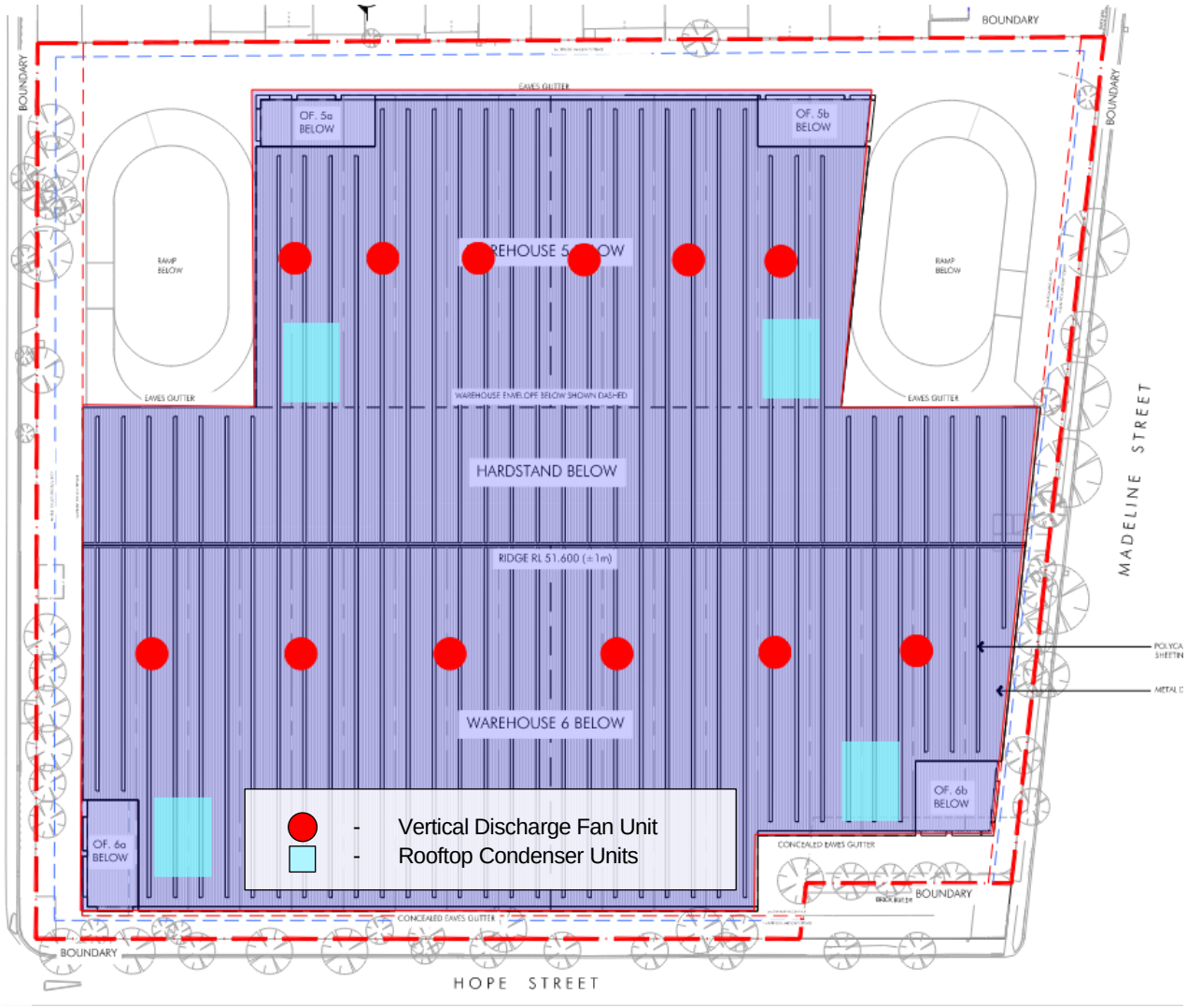


Figure 8 Mechanical plant equipment location adopted for acoustic modelling – Roof

7.4 Acoustic Modelling

An acoustic model was developed using SoundPLAN 9 noise modelling software to predict the mechanical equipment noise associated with the proposed development to the noise sensitive receivers. The CONCAWE noise propagation algorithm was used to perform the calculations, with the noise-enhancing meteorological conditions specified in Table D1 of the NPI. This is further discussed in the following section.

7.4.1 Meteorological Conditions

Certain meteorological/weather conditions may increase noise levels by focusing sound-wave propagation paths at a single point. Such refraction of sound waves will occur during temperature inversions (atmospheric conditions where temperatures increase with height above ground level), and where there is a wind gradient (that is, wind velocities increasing with height) with wind direction from the source to the receiver. Meteorological conditions need to be considered for both the impact assessment phase (pre-operation) and compliance assessment phase (post-operation) for an industrial activity.

The NPI specifies the following two options to consider meteorological effects:

Option 1:

"Adopt the noise-enhancing meteorological conditions for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur – a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night", OR

Option 2:

"Determine the significance of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment".

Acoustic modelling in this assessment adopted 'Option 1' of the NPI recommended meteorological conditions, which is provided in Table 7-4.

Table 7-4 Noise-enhancing meteorological conditions

Meteorological Conditions	**Meteorological Parameters**
Noise-enhancing meteorological conditions	▪ Daytime/evening: stability categories A-D with light winds (up to 3m/s at 10m above ground level). ▪ Night-time: stability categories A-D with light winds (up to 3m/s at 10m above ground level) and/or stability category F with winds up to 2m/s at 10m above ground level.

7.4.2 Modelling Parameters

Modelling Parameters	**Modelling Details/Specifications**
Ground Absorption	▪ 0.5
Elevation Data	▪ Elevation data imported into model (based on ICSM*)
Meteorological Conditions	▪ Daytime/evening: stability categories A-D with light winds (up to 3m/s at 10m above ground level). ▪ Night-time: stability categories A-D with light winds (up to 3m/s at 10m above ground level) and/or stability category F with winds up to 2m/s at 10m above ground level.
Noise Sensitive Receivers	▪ As described in Section 4
Sound Power Level (L_w of the Noise Sources)	▪ As per Section 7.2.1
Operating Hours	▪ 24hrs – all applicable NPI noise levels
Height of Receiver	▪ 1.5m above ground level and storeys
Duration of Assessment	▪ 15 min

* ANZLIC Committee on Surveying & Mapping

A snapshot of the 3D Acoustic Model is shown below in Figure 9

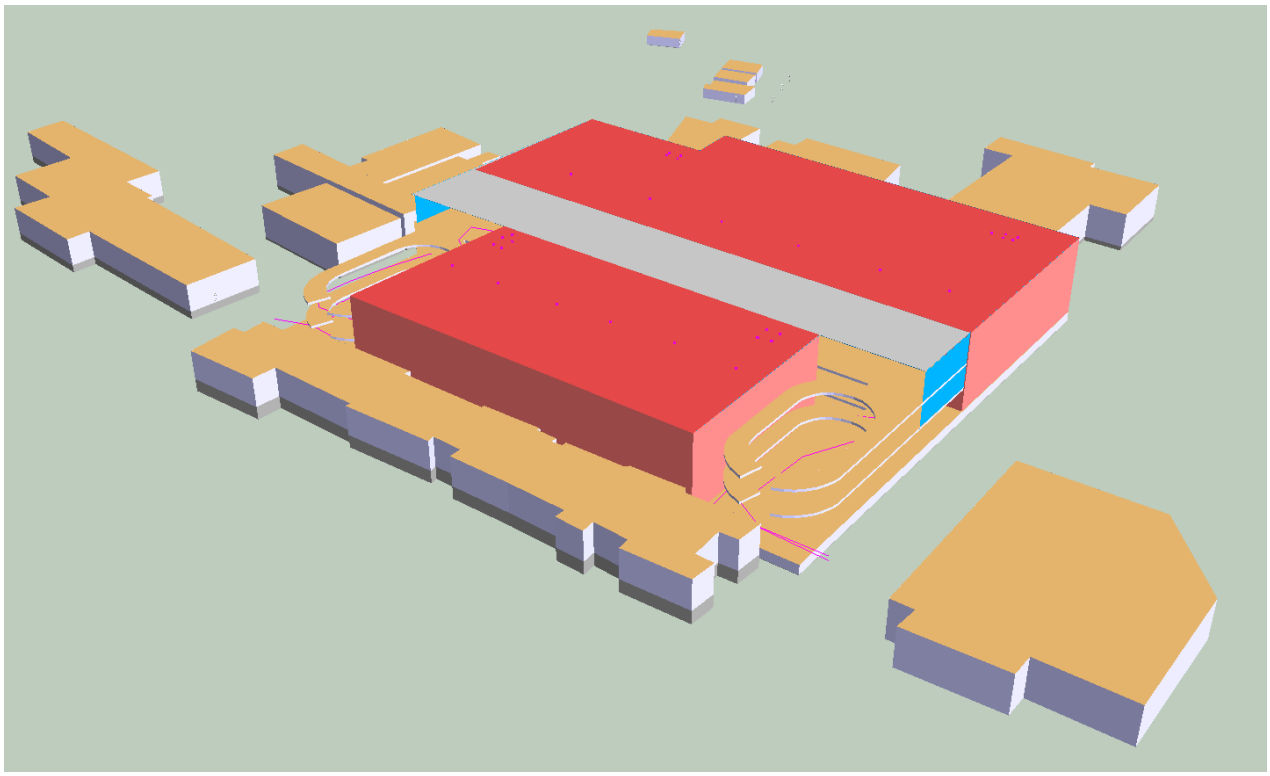


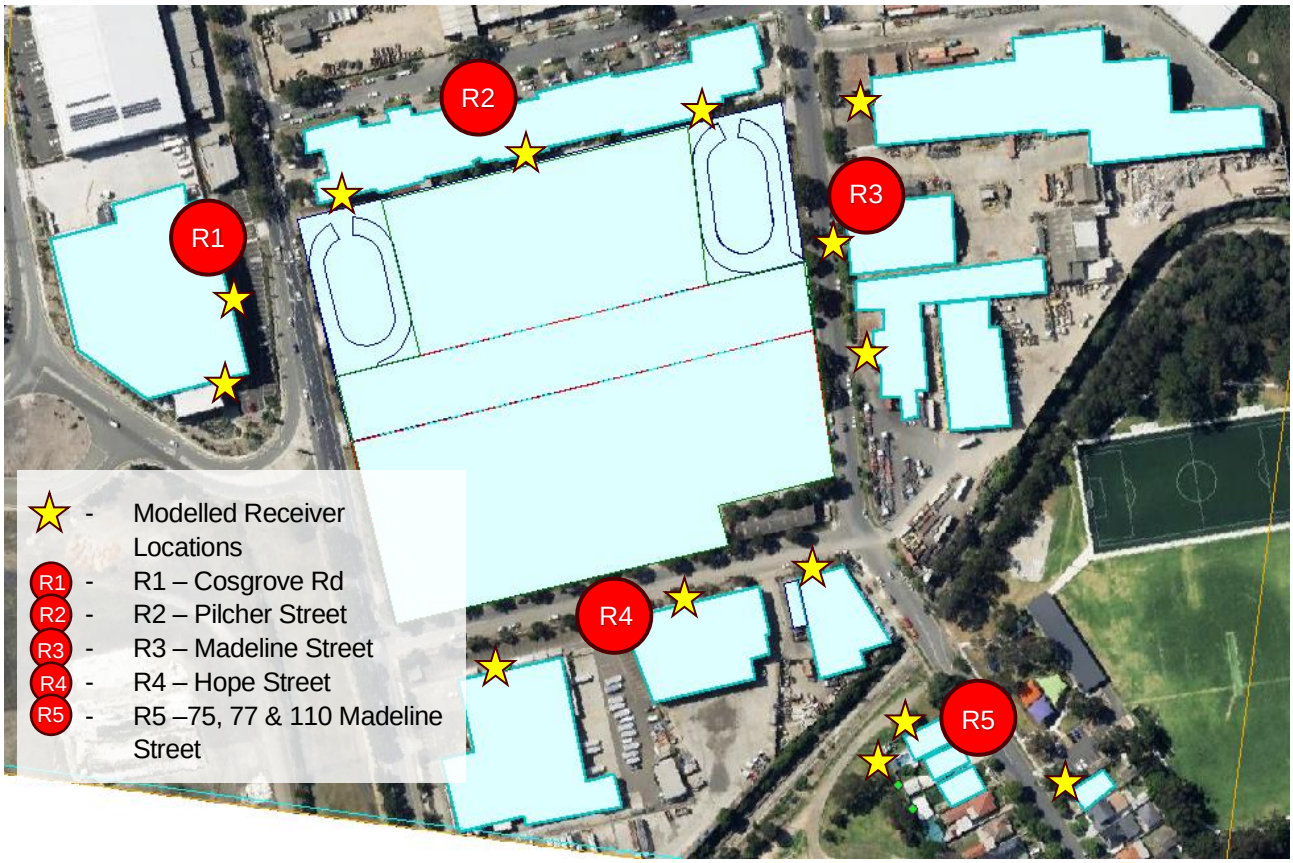
Figure 9 3D illustration of subject site

7.4.3 Predicted Operational Noise Levels – NPI Project Noise Trigger Level Assessment

The operational activities associated with the proposed development, locations of noise sources, relevant sound power levels and key modelling parameters for the acoustic assessment are provided in Section 7.1 to Section 7.3. Based on this information provided, an acoustic modelling and assessment has been performed in SoundPLAN to predict the cumulative noise levels at nearby noise sensitive receivers around the proposed development. It is noted that the acoustic modelling has considered simultaneous operation of all the operational activities to its maximum capacity, therefore considered a worst-case scenario. The acoustic modelling has incorporated the recommendations provided in Section 8.

The predicted noise levels at nearby noise sensitive receivers are shown in Table 7-5. It is noted from Table 7-5 that predicted noise levels are within the project noise trigger levels at all receivers during day evening and night period. Considering that the recommendations provided in Section 8 are implemented for this project, it is predicted that the proposed development will achieve the noise requirements of the NSW EPA Noise Policy for Industry.

The below figure highlights the locations of sensitive receiver points placed at nominated street frontages or business addresses surrounding the project site. Detailed receiver group names are detailed in Table 4-1.



The predicted noise levels, with the recommendation implemented, at the nearby noise sensitive receivers are provided in Table 7-5. Preliminary modelling results are presented as a single integer 'Predicted Noise Level' corresponding to the 'worst possible case' predicted to occur throughout the total day period (day, evening & night). This is intended to apply a conservative approach to a preliminary case in which minimal operational specifics are known.

Table 7-5 Predicted operational noise levels

Noise Sensitive Receiver	**Receiver Type**	**Predicted Noise Levels anytime during Day, Evening or Night, $L_{Aeq,15min}$ dB(A)**	**Project Noise Trigger Level, $L_{Aeq,15min}$ dB(A)**	**Criteria Satisfied?**
R1 – Northside Fine Food (East Façade – Cosgrove Rd)	Industrial	56	68 – When in use	Yes
R1 – Northside Fine Food (South Façade – Turnout Drive)	Industrial	53	68 – When in use	Yes
R2 – Eurologic (South Façade)	Industrial	57	68 – When in use	Yes
R2 – Lis Con (South Façade)	Industrial	42	68 – When in use	Yes

Noise Sensitive Receiver	Receiver Type	Predicted Noise Levels anytime during Day, Evening or Night, $L_{Aeq,15min}$ dB(A)	Project Noise Trigger Level, $L_{Aeq,15min}$ dB(A)	Criteria Satisfied?
R2 – First Choice Towing (South Façade)	Industrial	55	68 – When in use	Yes
R3 – Paper Trade (West Façade – Madeline St)	Industrial	52	68 – When in use	Yes
R3 – Aussie Skips (West Façade – Madeline St)	Industrial	56	68 – When in use	Yes
R3 – Pro-Axle Enfield (West Façade – Madeline St)	Industrial	49	68 – When in use	Yes
R4 – Alsco Uniforms (North Façade – Hope St)	Industrial	38	68 – When in use	Yes
R4 – Muirs Prestige Smash Repairs (North Façade – Hope St)	Industrial	37	68 – When in use	Yes
R5 – 75 Madeline St (North Façade)	Residential	36	53 (day) 43 (evening/night) 38 (night)	Yes
R5 – 75 Madeline St (West Façade)	Residential	35	53 (day) 43 (evening/night) 38 (night)	Yes
R5 – 77 Madeline St (West Façade)	Residential	33	53 (day) 43 (evening/night) 38 (night)	Yes
R5 – 110 Madeline Street (North Façade)	Residential	33	53 (day) 43 (evening/night) 38 (night)	Yes

Based on the results, the modelled noise levels are predicted to comply with the NPI project noise trigger levels outlined in Section 6.1.3.

Figure 10 presents a noise map showing the operational noise impact at nearby noise sensitive receiver

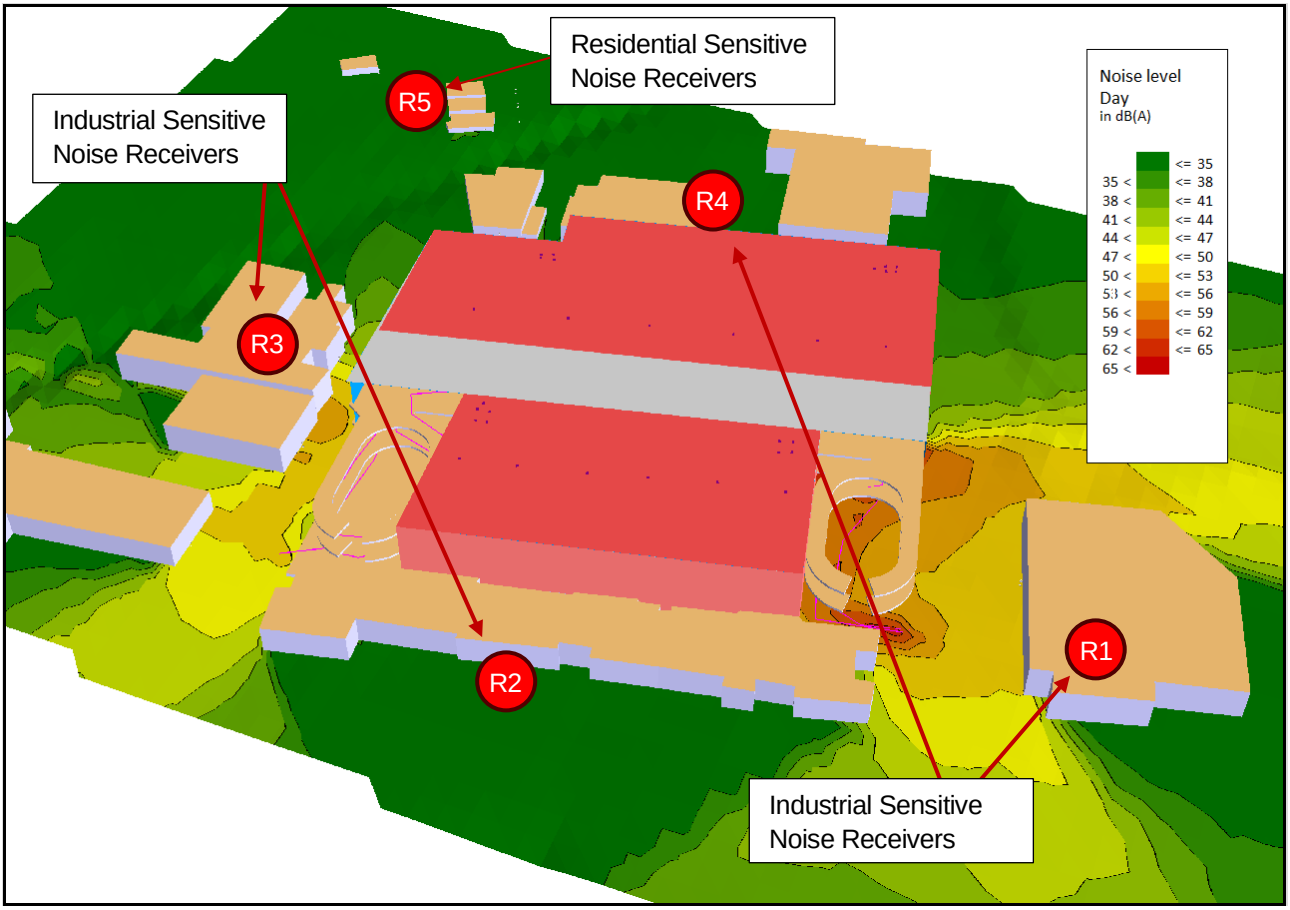


Figure 10 Noise map showing operational noise impact ($L_{Aeq,15min}$ dB(A) day, evening or night,) at 1.5m above ground level

7.4.4 Predicted Operational Noise Levels – Sleep Disturbance Assessment

Lmax operational noise levels were predicted based on assumed operational activities outlined in the below table. Sound power levels are summarised as a logarithmic cumulation of worst-case activities over a 15-minute period and describe the general operation of a freight distribution industrial operation and heavy goods loading and movement. It is expected that impulsive mechanical noise caused by reversing and metallic impacts within the reverberant space will form the dominant source of environmental noise during the night and should be minimised at all times.

Table 7-6 Source noise level and activity

Noise Source/Activity	**LAmax SWL (dBA)**
18 x HGV Engine Idle	107
8 x Loading (Metallic Clang)	125
3 x Reversing Alarm	117
Cumulative	**126**

The below table outlines predicted operational noise impacts at the nearest sensitive receiver, indicated to be 75 Madeline Street corresponding to NPI Sleep Disturbance Criteria

Table 7-7 Summary of sleep disturbance noise and impacts

Source	Receiver	Period	LA_{max} Noise Level (dBA)		Compliance
			Project Trigger	Predicted	
Cumulative	75 Madeline Street	Night	59	38	Yes

Based on the above predicted noise levels, it is considered that the operation of the proposed development is unlikely to cause any sleep disturbance at nearby noise sensitive receivers.

However, recommendations on best work practice as provided in Section 8 should be adopted for minimising operational noise from the proposed development.

7.4.5 Traffic Growth Assessment

The application notes for the Road Noise Policy state that "for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level as a result, the development should be limited to 2 dB above that of the noise level without the development. This limit applies wherever the noise level without the development is within 2 dB of, or exceeds, the relevant day or night noise assessment criterion." This is also considered to be applicable for construction noise therefore if road traffic noise increases from construction is within 2 dB(A) of current levels then the objectives on the Road Noise Policy are achieved.

A significant increase in traffic volumes would be needed to increase road traffic noise by 2 dB(A) (a doubling in traffic corresponds to an approximate 3 dB(A) increase). Construction work would generate light and heavy vehicle movements associated with employees, deliveries, transportation of machinery, materials and equipment to work sites.

Preliminary traffic growth assessment on development traffic submitted by Ason Group – Traffic Modelling describes the current understanding.

7.4.5.1 Current Understanding of Traffic Impacts

There are two initial traffic intersection points currently established to assess growth. These are located at the intersection of the below streets are described the Figure 11.

- Liverpool Rd (Hume Highway) & Cosgrove Rd
- Punchbowl Rd & Cosgrove Rd

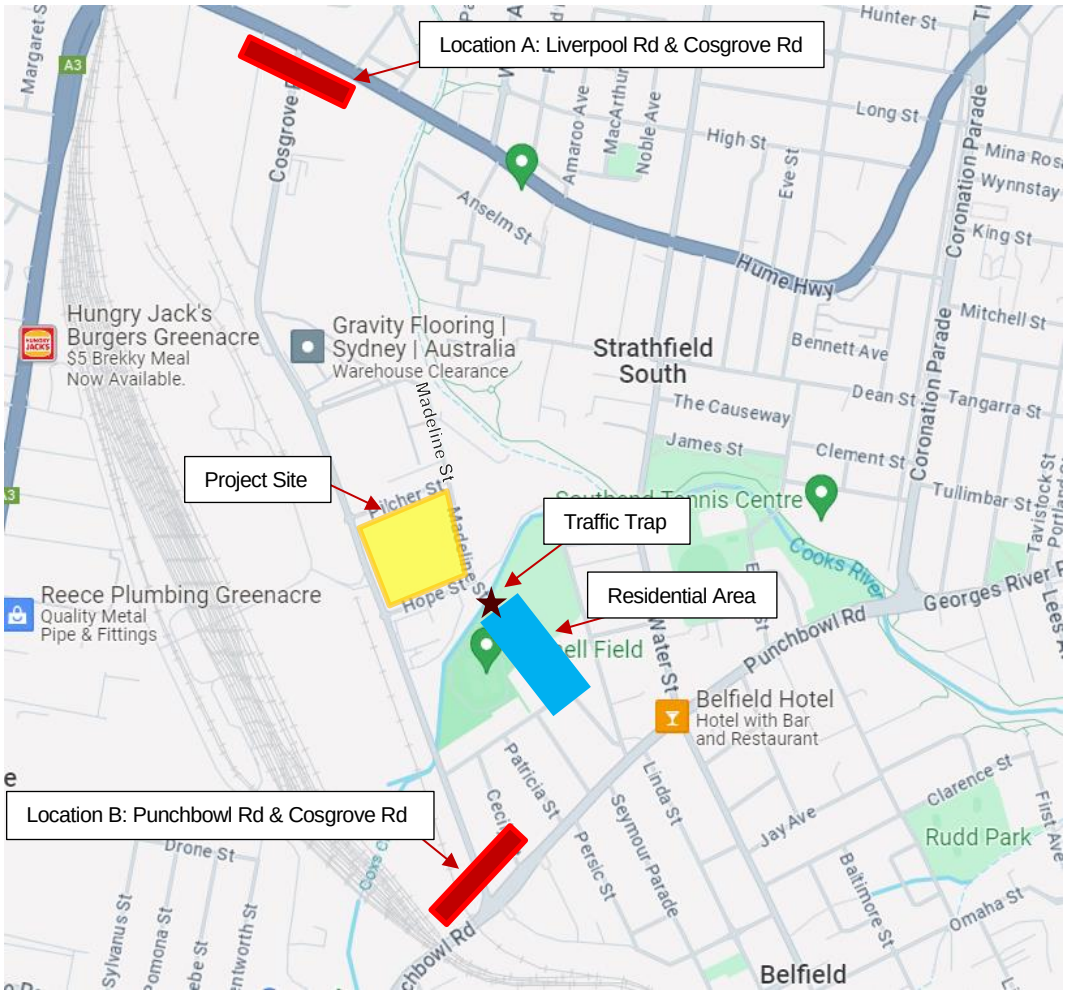


Figure 11 Traffic Assessment and understanding of surrounding environment

7.4.5.2 Current Assessment of Traffic Impacts

The following is understood to be current at time of reporting.

- Location **A**: up to a **6%** increase due to development traffic on the southern leg of the intersection of Liverpool Road / Cosgrove Road during both AM (8-9AM) and PM (5-6PM) peak hours
- Location **B**: up to a **5%** increase due to development traffic on the northern leg of the intersection of Punchbowl Road / Cosgrove Road during both AM (8-9AM) and PM (5-6PM) peak hours

It is noted that residential land zone areas are located on Madeline St, which is not currently assessed. It is further noted that there is a traffic trap or obstruction installed between the R2 and E4 zones that completely impedes vehicles wider than a standard utility vehicle. Based on the above information, it can be concluded that there will be no HGV movements along the residential section of Madeline St. In addition, it is expected that traffic growth in the area due to development will be minimal in residential land use areas, R2 and R3.

Based on the above, it is considered that currently assessed traffic growth is not predicted to increase environmental noise by 2dB and would therefore remain below the traffic growth noise criteria as per notes presented in the NSW EPA Road Noise Policy.

8 Noise Control Recommendations

8.1 Design Recommendations

It is noted that at this time of reporting, detailed external and internal building construction specifications are not known, with the recommended constructions provided in the following sections considered to be a general modelled approximation of minimum construction specifications and not intended as a detailed design review.

Based on the acoustic assessment, it is predicted that the proposed development will achieve the NSW EPA NPI noise objectives using the minimum construction specifications presented below.

8.1.1 External Façade Construction

The below Table 8-1 presents the recommended minimum construction specifications modelled at the building façade envelope.

Table 8-1 External façade construction

Construction Element	Minimum Acoustic Rating, R_w dB	Minimum Construction Specification
Masonry	50	▪ 150mm Pre-cast concrete
Lightweight Wall	45	▪ Profiled sheet metal (0.55BMT) external lining ▪ 150mm Z-Girt Steel Framing (1.0 – 1.6mm BMT) ▪ 90mm Fibre or glasswool insulation wall batt (14kg/m3) ▪ 6mm Compressed fibre wallboard (9.4kg/m2) or equivalent acoustic specification.

8.1.2 Roof/Ceiling Assembly Construction

8.1.2.1 Warehouse Roof

The below Table 8-2 presents the recommended minimum construction specifications required at the roof/ceiling assembly of the warehouse buildings.

Table 8-2 Roof Construction

Construction Element	Minimum Acoustic Rating, R_w dB	Minimum Construction Specification
Roof	38	▪ Profiled sheet metal (0.55BMT) external lining ▪ 9mm compressed fibre cement sheet (14.3kg/m^2) ▪ 150mm Steel Framing (1.0 – 1.6mm BMT) ▪ 50mm Bradford SUPERTEL insulation ceiling blanket (32kg/m^3) (NRC 0.9)

8.1.2.2 Canopy Over Hardstand

It is recommended that the roof/ceiling assembly in areas above hardstand or increased vehicle movement be implemented as per the construction specifications presented in the below Table 8-3.

Table 8-3 Canopy assembly

Construction Element	Minimum Acoustic Rating, R_w dB	Construction Specification
Hardstand Canopy	38	▪ Profiled sheet metal (0.55BMT) external lining

		▪ 9mm compressed fibre cement sheet (14.3kg/m^2) ▪ 150mm Steel Framing (1.0 – 1.6mm BMT) ▪ StratoCell WHISPER 50mm closed cell polyethylene or equivalent (NRC 0.8)

The below Figure 12 shows sectional diagram of proposed roof canopy over hardstand area between warehouse buildings.

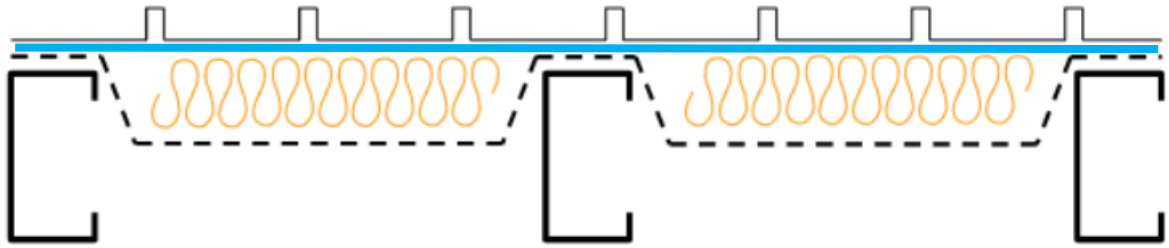


Figure 12 Hardstand roof canopy construction diagram

8.1.3 Mechanical Plant and Equipment Acoustic Specification

The following table outlines recommended noise control measures corresponding to modelled plant equipment presented in Table 7-3.

Table 8-4 Recommended minimum acoustic specification of mechanical plant and equipment

Mechanical Element	Octave – Band Centre Frequencies (Hz) Sound Pressure Level, dB								dB(A)
	63	125	250	500	1000	2000	4000	8000	
Fantech RVE1254GP6/23	73	83	89	95	97	94	90	82	**101**
Outlet Duct Attenuator	-3	-4	-7	-13	-14	-9	-8	-6	**-**
Condenser									**79**

Any change in equipment sound power level or locations (if different from acoustic modelling) would require a further acoustic assessment for noise compliance as per NPI 2017.

8.1.4 Best Work Practice Recommendations for Minimising Noise Emission

The following recommendations are provided to assist in the progression of design specifications to ensure the general acoustic amenity of surrounding sensitive receivers.

- Mechanical plant should be selected on the basis of low noise emission and or should be fitted with manufacturer designed acoustic attenuation.
- Vertical discharge fans or exhaust plant equipment should be installed as far away from the R2 residential zones indicated in Figure 5 as practicably possible.
- Forklifts should have broadband reverse/operation warning modules installed in replacement of narrow-band tonal alarms.
- Worker's to be educated on the acceptable noise practice during quieter periods (10pm – 7am) covering subjects such as:
  - Loud music

- Public Address
- Careful loading and unloading
- Scheduling loud operation activities to earlier time of the day if possible.

- Driver training & Signage to advise on minimising loud driving practices, including, but not restricted to:
  - Minimise use of airbrakes in areas around the project site, especially along the junctions of Madeline St, Cosgrove Rd and length of Hope St.
  - Minimise gear changes and excessive 'revving' of engine.
  - Reduce speed around junctions of Madeline St, Cosgrove Rd and length of Hope St
- Forklifts to be gas or electric if possible
- Roller doors to be specified as low noise, including sourcing suitable belt drive or screw drive components. Door and track components to be maintained by a suitable professional to ensure proper and quiet mechanical operation.
- A noise management plan should be established to ensure that any noise complaints are registered and addressed accordingly. A "Noise Register" should be created which would comprise of the following elements:
  - Date and time of noise complaint
  - Name and address of the person complaining about the noise
  - Nature of noise that was concerned
  - Date and time of the noise event and duration of the noise
  - Detail of the noise and how it impacted/annoyed the complainant
  - Is the noise event on-off or regular (how many times a day/night)
  - Response time of the noise complaint.
  - Summary of investigation about the noise event
  - Corrective measures/noise control measures adopted to address the noise event
  - Is the noise complaint resolved?
  - Name of the person who received the complaint.
  - Name and contact number of the person who would be managing noise complaint.
  - The noise management plan should also ensure privacy of the person complaining about the noise.

9 Conclusion

ACOR has undertaken an operational noise impact assessment of the proposed new warehouse development at the project site, located at 94 – 98 Cosgrove Rd, South Strathfield. Based on the assessment, it is predicted that the NSW EPA Noise Policy for Industry 2017 criteria will be achieved at the nearest noise sensitive receivers, provided the recommendations in Section 8 are implemented.

We trust this information meets your requirements. If you have any questions, please contact ACOR on 02 9634 6311.

Yours faithfully,

Rodrigo Vega

Acoustic Engineer – Graduate

AAAS

ACOR Consultants Pty Ltd

Appendix A Glossary of Acoustic Terms

A-weighting	Frequency weighting applied to the level in each stated octave band by a specified amount, in order to better represent the response of the human ear. The letter 'A' will follow a descriptor, indicating the value has been 'A' weighted. An 'A' weighted noise level may also be written as dB(A).
C_{tr}	The spectrum adaptation term C_{tr} adjustment factor takes account of low frequency noise.
CAC	Ceiling Attenuation Class. The CAC determines how much cross-talk will occur between one room and another through the ceiling cavity where both rooms have the tested ceiling tile. This is an ideal situation, with no wall head leaks and no services penetrations in the ceiling. Therefore, it defines the ideal, best possible result as tested in a laboratory
dB	Decibel. This is the unit measurement of sound.
dBA	A weighted decibel is the most commonly used descriptor. The A weighting is an adjustment to the raw sound level to approximate what the average human ear can hear, which is less sensitive at very low and very high frequencies.
D_w	The Weighted Level Difference as defined in AS/NZS ISO 717.1:2004. This is the single number rating describing the ability of a partition to reduce noise as measured in the field with no standardisation or normalisation.
D_nT_w	The Weighted standardised level difference as defined in AS/NZS ISO 717.1:2004. This is the single number rating describing the ability of a partition to reduce noise as measured in the field. The higher the D_nT_w rating, the better is the acoustic performance of the wall or floor.
$D_nT_w + C_{tr}$	$D_nT_w + C_{tr}$ is D_nT_w with the addition of a low frequency sound correction factor Ctr (always a negative number remember). Rw + Ctr is used because of the increase in low frequency sound sources such as surround sound systems, drums or bass guitars, and of course traffic or aircraft noise. Two walls can have the same D_nT_w rating, but have different resistance to low frequency sound, thus a different $D_nT_w + C_{tr}$.
L_w or SWL	Sound power level. This is the total radiated sound energy.
L_p or SPL	Sound pressure level. This is the measurable sound level at a given distance from an item.
L_{max}	The RMS maximum noise level of a measurement
L_{10}	90^{th} percentile sound level of a measurement. Often called the average maximum noise level
L_{eq}	The energy average noise level of a measurement.
L_{90}	10^{th} percentile sound level of a measurement. Often called the average background noise level
L_{min}	The minimum noise level of a measurement
$L_{eq(T)}$	The time (T) equivalent energy noise level. The time interval is often in blocks of 10 or 15 minutes for short term measurements, or hours for long-term measurements. Common increments for long term measurements are 1 hour, day, night, 18 hours and 24 hours.
$L_{eq(8h)}$	The 8 hour equivalent energy noise level. Primarily used for occupational noise assessments
LC_{peak}	The C weighted peak noise level. Primarily used for occupational noise assessments
$L_{n,w}$	The Weighted Normalized Impact Sound Pressure Level. This is a single number rating describing the impact sound performance of a floor ceiling assembly as measured in a laboratory. Assessed in accordance with AS/NZS ISO 717.2. The lower the $L_{n,w}$ rating, the better is the impact sound isolation performance of a floor-ceiling assembly
L'_{nTw}	The weighted standardized impact sound pressure level. This is a single number rating describing the impact sound performance of a floor ceiling assembly as measured in a filed. Assessed in accordance with AS/NZS ISO 717.2. The lower the $L'_{nT,w}$ rating, the better is the impact sound isolation performance of a floor-ceiling assembly
NRC	Noise Reduction Coefficient. The NRC defines how much sound is absorbed by a surface. An NRC of 0 means it absorbs no sound while an NRC of 1 means it will absorb most sound.
R_w	The Weighted Sound Reduction Index. This is the single number rating describing the ability of a building element to reduce noise as measured in a laboratory. Assessed in accordance with AS/NZS ISO 717.1. The higher the R_w rating, the better is the acoustic performance of the wall or floor.
$R_w + C_{tr}$	$R_w + C_{tr}$ is R_w with the addition of a low frequency sound correction factor Ctr (always a negative number remember). Rw + Ctr is used because of the increase in low frequency sound sources such as surround sound systems, drums or bass guitars, and of course traffic or aircraft noise. Two walls can have the same Rw rating, but have different resistance to low frequency sound, thus a different Rw + Ctr.

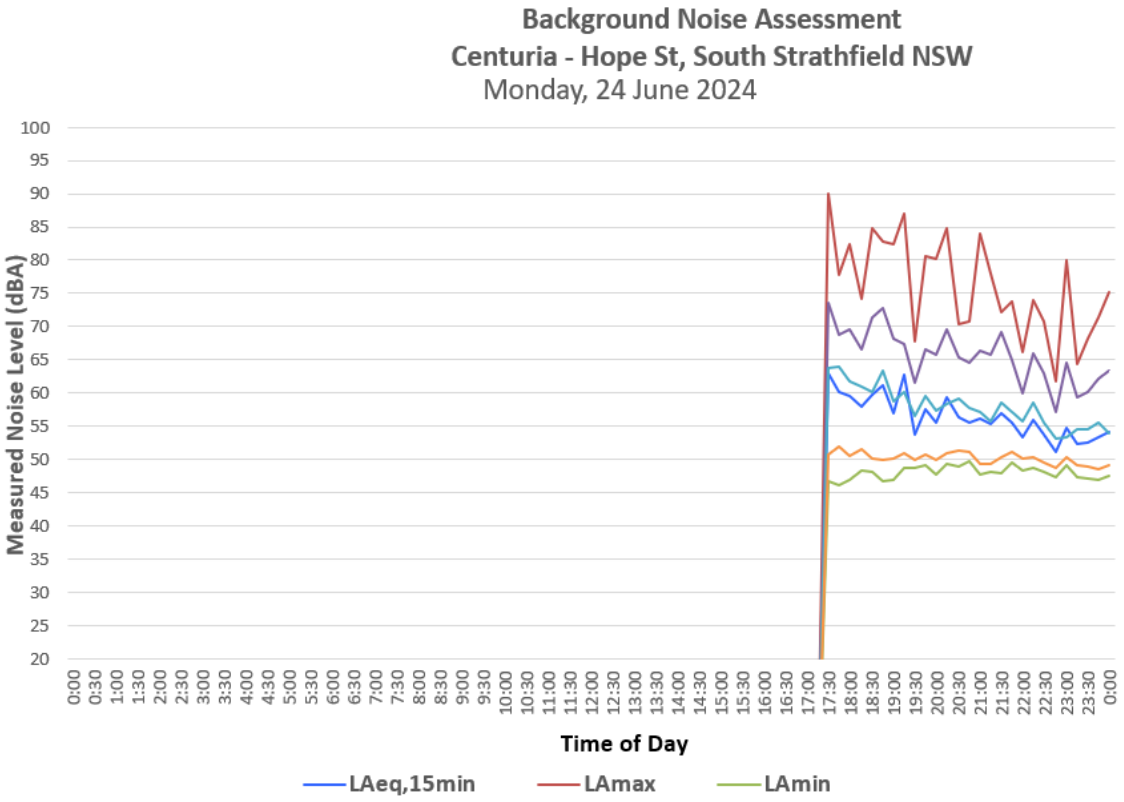
Appendix B Meteorological Conditions

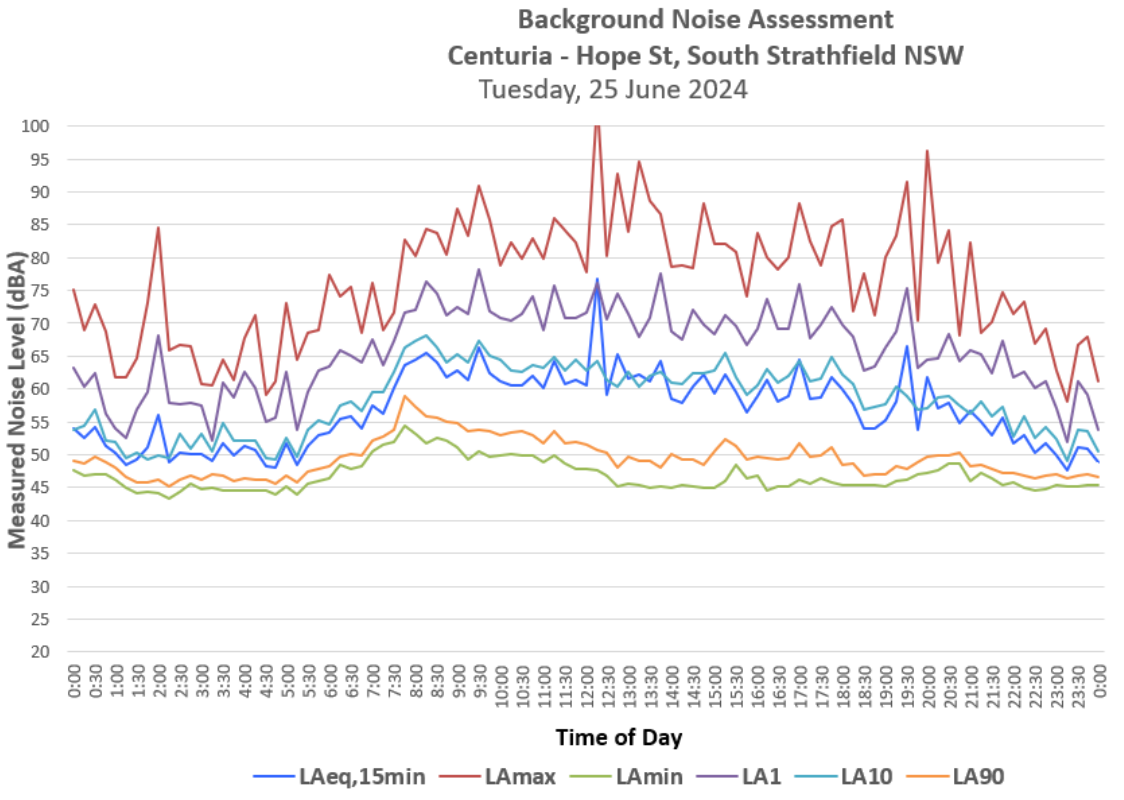
Canterbury, New South Wales
June 2024 Daily Weather Observations

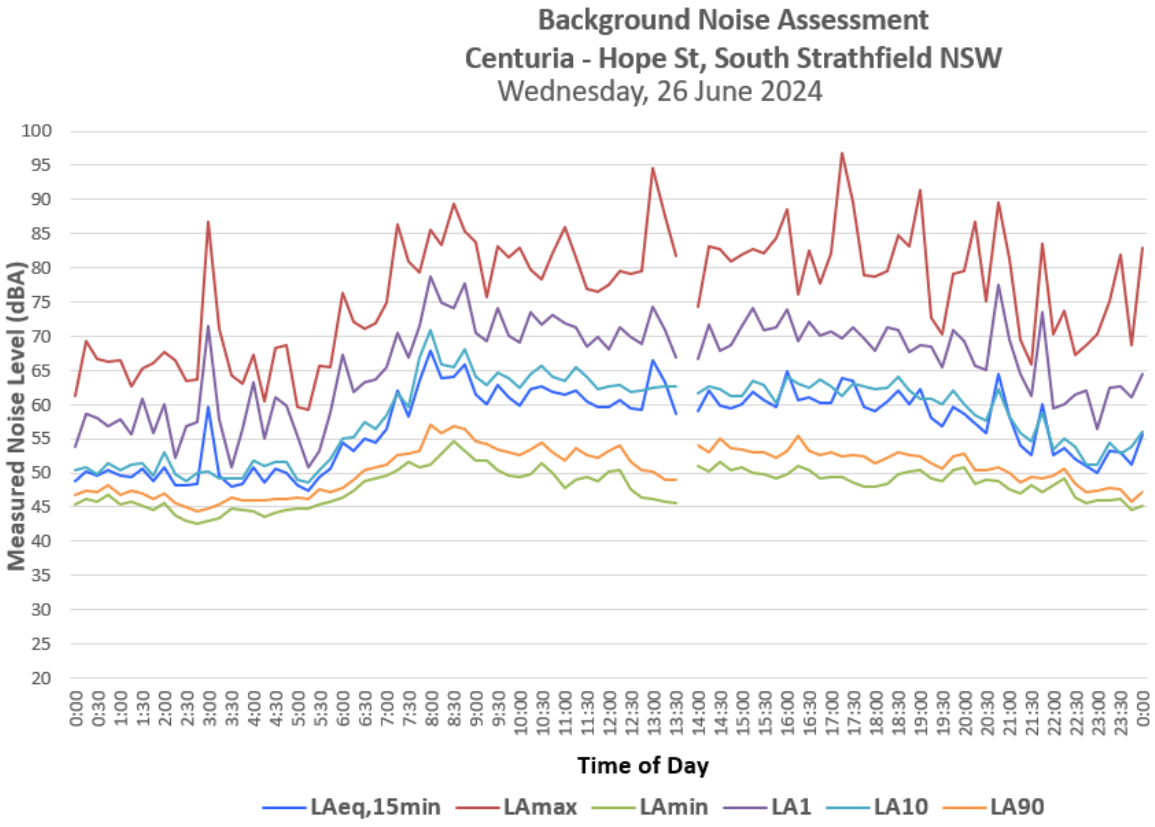
Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Sa	12.9	16.5	0			S	43	13:52	14.1	70		NNW	6		14.7	99		SSE	20	
2	Su	11.5	16.8	103.2			SW	35	10:01	13.9	58		WSW	15		16.3	56		WSW	13	
3	Mo	6.4	17.8	0			WNW	37	11:04	13.5	61		NW	15		17.1	38		WNW	11	
4	Tu	7.1	18.0	0			WNW	26	11:09	11.8	65		NW	13		17.0	52		WSW	6	
5	We	9.7	15.5	0			SW	20	12:44	11.8	72		WNW	11		15.1	85		SW	9	
6	Th	10.4	15.9	7.6			W	24	22:25	13.7	100		NW	6		13.7	99		SSW	2	
7	Fr	12.8	18.2	41.0						12.9	99		NNW	6		16.8	84		W	9	
8	Sa	10.6	20.3	8.2			WSW	33	13:39	13.4	89		WNW	9		19.4	54		WSW	13	
9	Su	6.2	20.4	0.2			SW	30	20:09	12.0	100		WNW	6		18.8	49		S	9	
10	Mo	6.7	18.2	0			SW	35	10:57	12.9	67		SW	15		15.9	54		SSE	13	
11	Tu	5.7	16.5	0			NNW	35	20:27	9.8	83		WNW	4		15.7	53		NW	7	
12	We	5.5	19.5	0			WSW	61	12:02	14.7	75		SE	6		13.1	63		S	24	
13	Th	6.8	15.9	0			WSW	28	06:23	10.6	56		SW	15		15.2	52		SSW	9	
14	Fr	7.6	15.6	0			ESE	31	15:27	11.5	72		NW	9		12.7	96		E	15	
15	Sa	10.9	14.5	37.2			S	31	13:58	11.4	99		WSW	6		13.0	77		S	20	
16	Su	7.0	16.0	0.8			WSW	35	12:40	10.1	65		WSW	15		15.8	33		WSW	15	
17	Mo	5.1	16.4	0			S	41	13:05	12.5	57		SW	13		16.3	55		SSW	19	
18	Tu	4.8	17.4	0			W	26	09:52	11.0	61		WSW	13		16.0	50		SSE	11	
19	We	4.2	16.2	0			SW	31	09:50	9.9	62		WSW	15		15.7	41		WSW	9	
20	Th	2.2	17.5	0			WNW	17	11:08	7.7	79		NW	9		16.2	31		Calm		
21	Fr	4.8	17.6	0			WSW	28	12:50	10.2	73		NW	9		16.0	57		ESE	9	
22	Sa	6.5	13.4	31.2			SSW	35	15:06	9.3	99		Calm			12.8	87		S	15	
23	Su	9.3	15.9	17.4			SSW	28	11:33	12.5	88		W	7		15.3	69		S	11	
24	Mo	4.2	18.3	0.6			NW	20	10:01	9.3	100		WNW	7		17.8	41		W	6	
25	Tu	3.1	20.7	0			NW	17	10:25	9.2	100		NW	9		19.5	36		N	4	
26	We	4.6	21.5	0			NNW	31	13:00	12.6	100		Calm			21.3	47		NNW	13	
27	Th	3.9	19.4	0			WSW	28	14:48	11.3	78		WSW	7		19.4	32		W	13	
28	Fr	2.9	19.6	0			W	20	09:52	10.7	74		WNW	7		19.0	34		WSW	6	
29	Sa	3.3	19.8	0			N	20	12:52	7.1	95		WNW	6		18.9	47		N	7	
30	Su	7.1	14.8	5.0			SSE	37	15:19	13.3	100		N	2		13.3	76		S	19	
Statistics for June 2024																					
	Mean	6.8	17.5							11.5	79			8		16.3	58			11	
	Lowest	2.2	13.4	0						7.1	56		Calm			12.7	31		Calm		
	Highest	12.9	21.5	103.2			WSW	61		14.7	100		#	15		21.3	99		S	24	
	Total			252.4																	

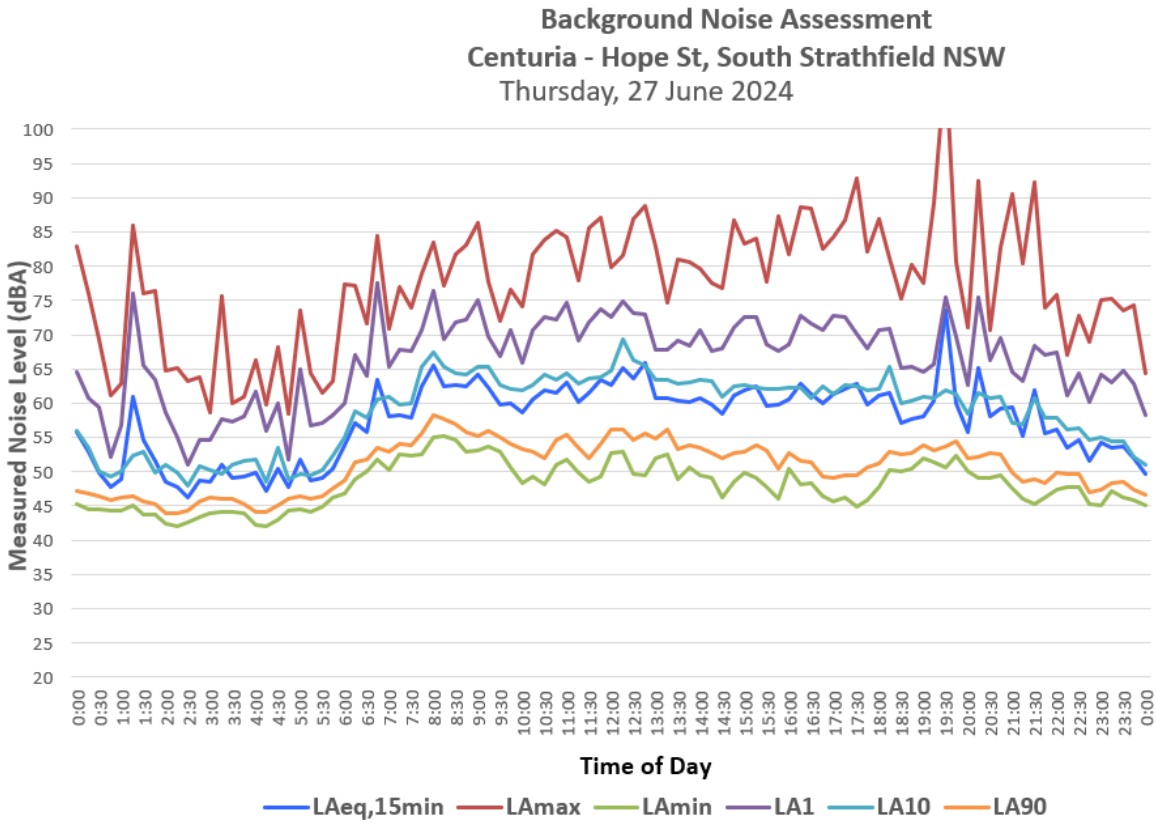
IDCJDW2025.202406 Prepared at 13:00 UTC on Sunday 21 July 2024

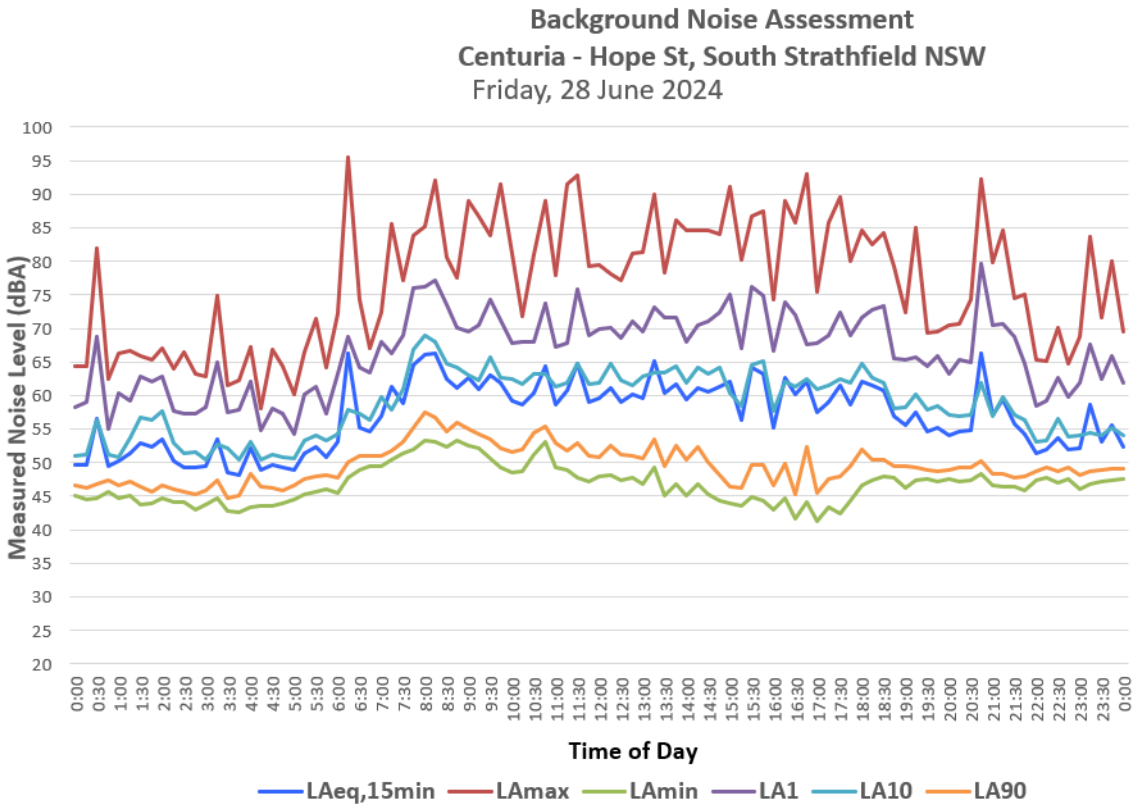
Appendix C Detailed Noise Monitoring Data

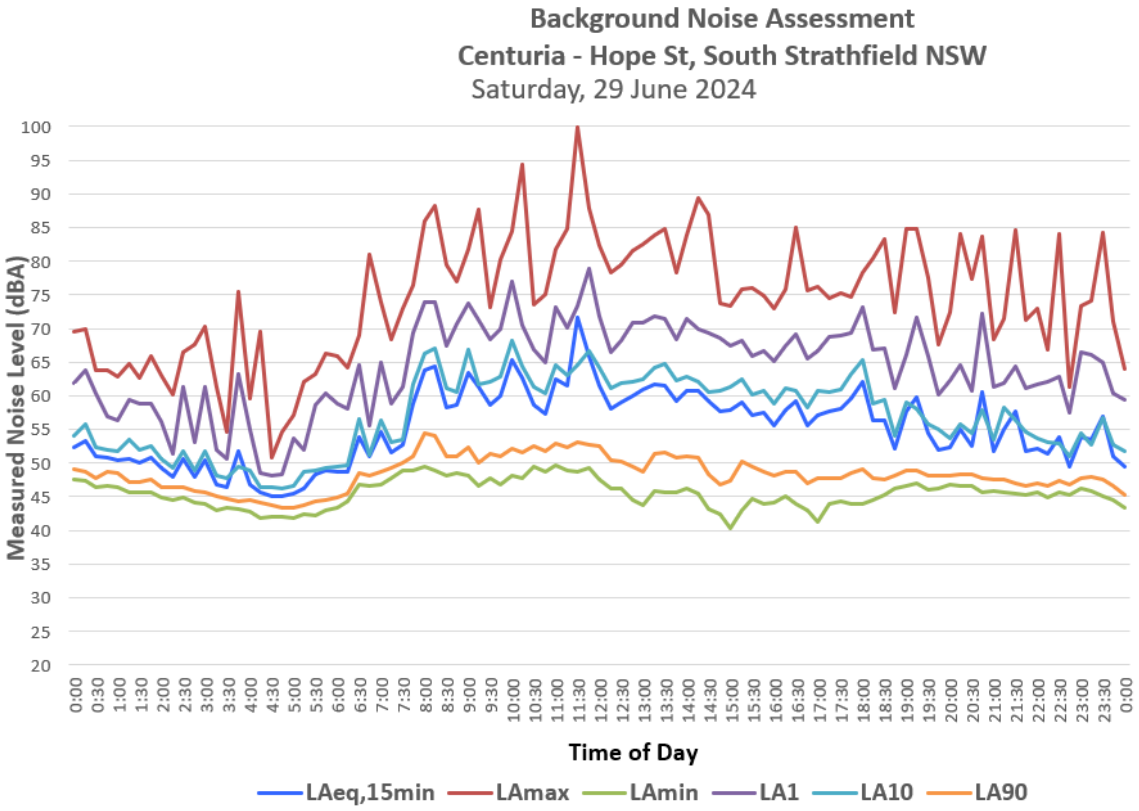


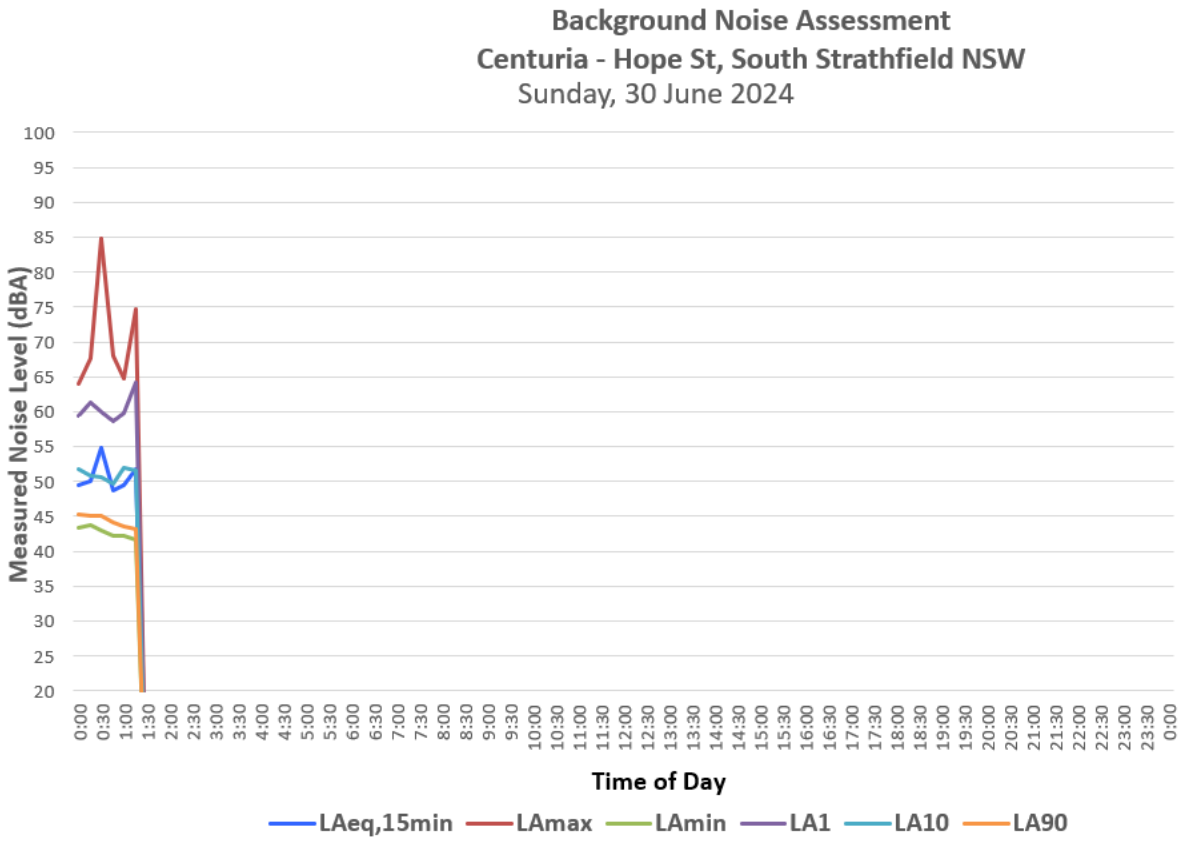



Background Noise Assessment
Centuria - Hope St, South Strathfield NSW
Wednesday, 26 June 2024
Measured Noise Level (dBA)
Time of Day
LAeq,15min
LAmax
LAmin
LA1
LA10
LA90


Background Noise Assessment
Centuria - Hope St, South Strathfield NSW
Thursday, 27 June 2024
Measured Noise Level (dBA)
Time of Day
LAeq,15min
LAmax
LAmin
LA1
LA10
LA90


Background Noise Assessment
Centuria - Hope St, South Strathfield NSW
Friday, 28 June 2024
Measured Noise Level (dBA)
Time of Day
LAeq,15min
LAmax
LAmin
LA1
LA10
LA90


Background Noise Assessment
Centuria - Hope St, South Strathfield NSW
Saturday, 29 June 2024
Measured Noise Level (dBA)
Time of Day
LAeq,15min
LAmax
LAmin
LA1
LA10
LA90


Background Noise Assessment
Centuria - Hope St, South Strathfield NSW
Sunday, 30 June 2024
Measured Noise Level (dBA)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
0:00
0:30
1:00
1:30
2:00
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20:00
20:30
21:00
21:30
22:00
22:30
23:00
23:30
0:00
Time of Day
LAeq,15min
LAmax
LAmin
LA1
LA10
LA90

Appendix D Traffic Volume – ASON (correspondence 18/07/2024)

- **Proposed** trip generation rate of 0.202 veh/hr per 100 m^2 GFA source from Site 3 Wonderland Business Park, Eastern Creek of *RMS Guide to Traffic Generating Developments Updated Traffic Surveys TDT2013/04a.*

Description of Activities / Noise Sources	*Day (7am-6pm) – Worst 15 min Period*	*Evening (6pm-10pm) - – Worst 15 min Period*	*Night (10pm-7am) - – Worst 15 min Period*
Site Trip Generation	*44 Light vehicle movements*	*22 Light vehicle movements*	*4 Light vehicle movements*
	6 Heavy vehicle movements	*2 Heavy vehicle movements*	*2 Heavy vehicle movements*

Description of Activities / Noise Sources	*Day (7am-6pm) – Worst 1 hour Period*	*Evening (6pm-10pm) - Worst 1 hour Period*	*Night (10pm-7am) - Worst 1 hour Period*
Site Trip Generation	*127 Light vehicle movements*	*59 Light vehicle movements*	*6 Light vehicle movements*
	13 Heavy vehicle movements	*9 Heavy vehicle movements*	*7 Heavy vehicle movements*

- **Sensitivity Test** traffic generation rate of 0.32 (AM) and 0.30 (PM) veh/hr per 100m2 GFA is the average of Survey Site 3 and Site 4 of TDT2013/04a.

Description of Activities / Noise Sources	*Day (7am-6pm) – Worst 15 min Period*	*Evening (6pm-10pm) - – Worst 15 min Period*	*Night (10pm-7am) - – Worst 15 min Period*
Site Trip Generation	*69 Light vehicle movements*	*35 Light vehicle movements*	*6 Light vehicle movements*
	9 Heavy vehicle movements	*3 Heavy vehicle movements*	*3 Heavy vehicle movements*

Description of Activities / Noise Sources	*Day (7am-6pm) – Worst 1 hour Period*	*Evening (6pm-10pm) - Worst 1 hour Period*	*Night (10pm-7am) - Worst 1 hour Period*
Site Trip Generation	*201 Light vehicle movements*	*93 Light vehicle movements*	*9 Light vehicle movements*
	20 Heavy vehicle movements	*15 Heavy vehicle movements*	*12 Heavy vehicle movements*

For clarity, 1 movement relates to the number of vehicle movements rather than simply the number of vehicles. As such, 1 vehicle in & out equates to 2 vehicle movements