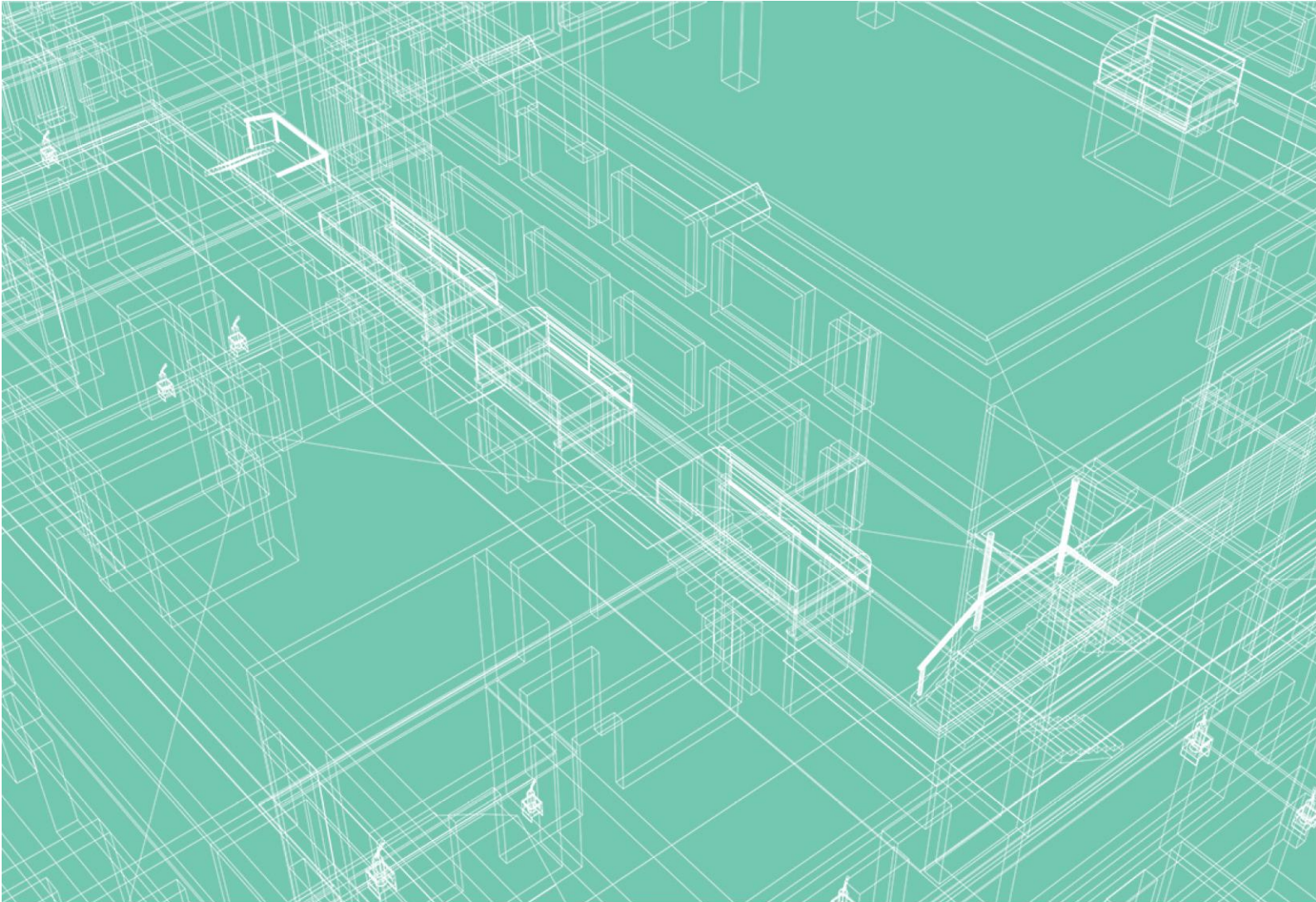
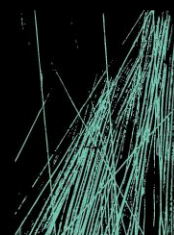




ACOUSTIC REPORT FOR DEVELOPMENT APPLICATION

**BOURKE INTEGRATED
PRIMARY HEALTHCARE CENTRE**



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CONTENTS

1	INTRODUCTION	5
2	DESCRIPTION OF THE PROPOSAL	6
3	RELEVANT NOISE STANDARDS AND GUIDELINES	8
3.1	Standards and Guidelines	8
3.2	Regulatory Framework	8
3.3	Planning Framework	9
3.4	NSW EPA Noise Policy for Industry	9
3.4.1	Intrusiveness Criteria	10
3.4.2	Amenity Criteria	10
3.4.3	Project Noise Trigger Levels	11
3.5	Traffic Noise	11
3.5.1	Transport and Infrastructure SEPP	11
3.5.2	AS/NZS 2107:2016	12
3.5.3	Traffic Noise Generation	12
3.6	Construction Noise and Vibration	12
3.6.1	Noise Criteria	12
3.6.2	Vibration Criteria	13
4	NOISE IMPACT ASSESSMENT AND RECOMMENDATIONS	16
4.1	Operating Hours	16
4.2	Noise Emissions from Mechanical Plant	16
4.3	Noise Emissions from Generator	18
4.4	Noise Emissions from Carpark	19
4.5	Internal Noise	19
4.5.1	Traffic Noise Intrusion	19
4.6	Traffic Generation Noise	21
4.6.1	Ambulance sirens	21
5	CONSTRUCTION NOISE AND VIBRATION PLANNING	22
5.1	Relevant standards for Construction Noise and Vibration Criteria	22
5.2	Working Hours	22
5.3	Preliminary Construction Noise Assessment	22
5.3.1	Noise	22
5.3.2	Vibration	23
5.4	Mitigation Measures	24

5.4.1	Project Specific Acoustic Measures	24
5.4.2	General Control Elements	24
5.4.3	Additional Noise and Vibration Control Measures	26
6	SUMMARY AND CONCLUSIONS	27
	Appendix A: NSW Ambulance - Emergency Driving and Use of Warning Devices Policy Directive (PD2016-033)	28

1 INTRODUCTION

JHA Consulting Engineers has been engaged by Dunn & Hillam Architects on behalf of Bourke Aboriginal Corporation Health Service (BACHS) to provide an acoustic assessment for the proposed healthcare development located at 88 - 96 Mitchell Street, Bourke, NSW.

The proposal involves the construction of a new healthcare clinic that will provide cultural and functional spaces for the local Aboriginal and Torres Strait Islander community. An acoustic assessment has been undertaken and it is detailed in this report along with the findings and recommendations. It has been prepared as part of the Development Application to be submitted to the Bourke Shire Council.

The objectives of this acoustic assessment are:

- Identify the external noise and vibration sources that will potentially affect the proposed development.
- Establish the appropriate noise level and vibration criteria in accordance with the relevant standards, guidelines and legislation for the following issues:
 - Noise emissions from mechanical plant from the development to the surrounding receivers.
 - Emergency generator operational noise.
 - Noise intrusion from vehicle movements from surrounding traffic.
 - Noise emissions from traffic generated by the proposed development.
- Carry out a preliminary acoustic assessment to determine whether the relevant criteria can be achieved and, where applicable, comment on noise control measures required to achieve compliance with the relevant noise level criteria.
- Establish noise and vibration criteria for construction work, in accordance with standards and guidelines.
- Provide recommendations for Construction Noise and Vibration Planning.

This report provides:

- A statement of compliance with the relevant statutory criteria for the proposed use development within the vicinity of the nearest potentially affected receivers.
- Recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria when compliance is not achieved.

The following documentation has been used for the preparation of this report:

- Architectural drawings of the proposed development provided by Dunn & Hillam Architects
- Traffic Impact Assessment Report, 2024, PDC Consultants.
- Bourke Integrated Primary HealthCare Centre – (BIPHCC) Operational Plan Report, 2023

This document and related work have been prepared following JHA Consulting Engineers Quality Management System, which is based on AS/NZS ISO 9001:2015 and ISO 14001:2015 Environmental Management Systems.

2 DESCRIPTION OF THE PROPOSAL

Bourke is a town in the north-west area of NSW, approximately 800kms north-west of Sydney. It belongs to the Local Government Area of Bourke Shire.

The proposed development site is located at 88 - 96 Mitchell Street, Bourke, NSW, legally known as Lot 6 to Lot 10/DP35797. The site is surrounded by residential buildings, places of worship, educational buildings and commercial buildings in a rural environment. The clinic will generally operate Monday to Friday from 8:00am – 5:00pm.

The proposed development will include:

- A multi-purpose room and servery,
- An open plan office area,
- 2 single-person executive offices,
- A meeting room,
- Reception and waiting room area,
- 11 consultation and treatment rooms, including 2 dental rooms and 1 OPG room, and,
- 23 on-grade external parking spaces, including an ambulance bay

Figure 1 shows the proposed site location and surrounding sensitive receivers.



Figure 1: Aerial view of site showing the location of the proposed development site (red dashed line) with residential receivers (green), commercial receivers (blue), educational receiver (orange) and place of worship receivers (purple).

It is noted that if noise impacts associated with the proposed development are controlled at the nearest noise sensitive receivers, then compliance with the recommended criteria at all noise sensitive receivers will be achieved. For the residential catchments, the nearest residential receiver will be used for assessment purposes.

A summary of the nearest sensitive receivers surrounding the site location is shown in Table 1, including the approximate distances between closest lot boundaries.

ID	Sensitive Receiver	Receiver Type	Distance (m)
1	86 Mitchell Street	Residential	≤5
2	121 Oxley Street	Residential	≤5
3	107 Mitchell Street	Residential	25
4	Bourke Seventh-Day Adventist Church	Place of Worship	60
5	Holy Spirit Catholic Church	Place of Worship	≤5
6	Darling River Motel	Commercial	140
7	Bourke Highschool	Educational	80

Table 1: Nearest sensitive receivers surrounding the site location plus approximate distances.

The figure below shows the architectural floor plan of the proposed development.

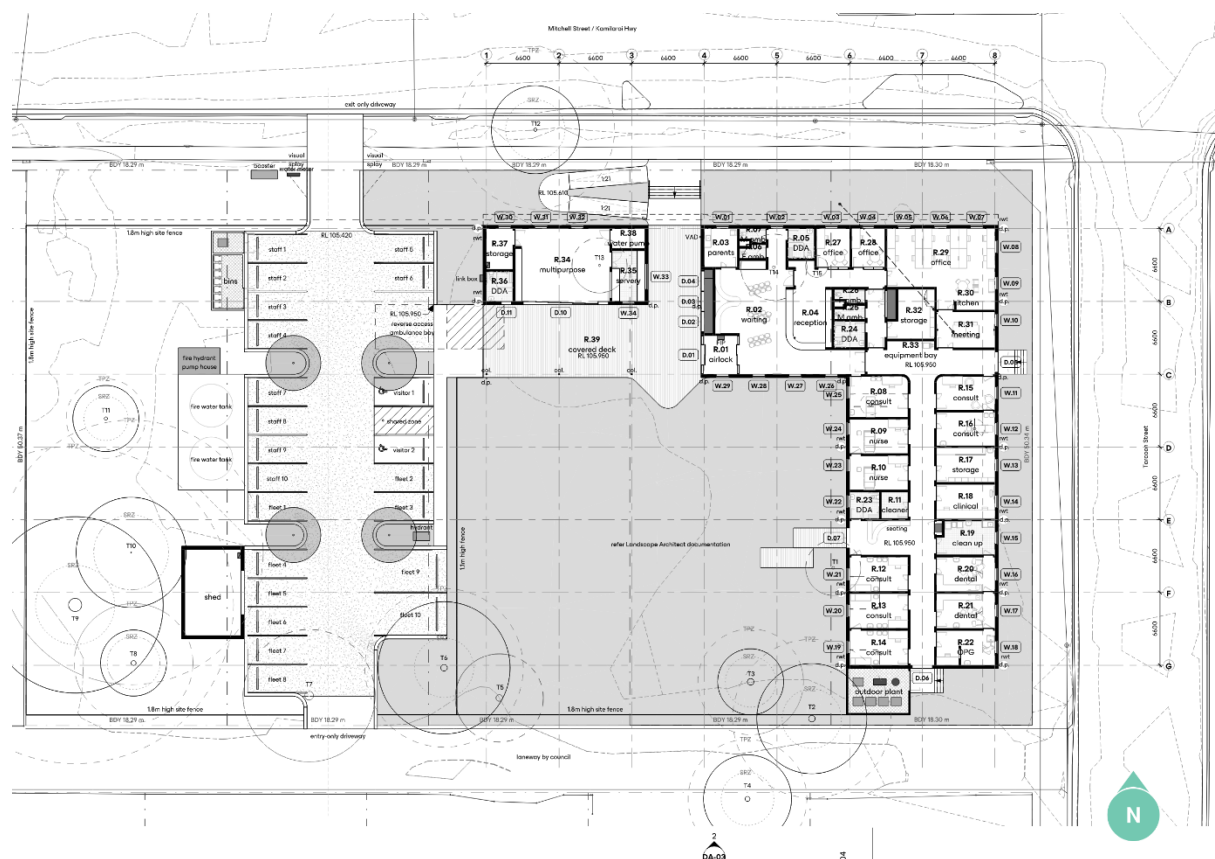


Figure 2: Ground floor plan (Ref: DA-02 Ground Plan).

3 RELEVANT NOISE STANDARDS AND GUIDELINES

3.1 STANDARDS AND GUIDELINES

The following standards and guidelines are considered relevant to the project and have been referenced in developing the project noise level criteria.

Regulatory Framework:

- Environmental Planning and Assessment (EP&A) Act 1979.
- Protection of the Environment Operations (POEO) Act 1997.

Planning Framework:

- Bourke Shire Local Environment Plan (LEP), 2013.
- Bourke Shire Development Control Plan (DCP), 2016.

Noise Emissions

- NSW EPA Noise Policy for Industry (NPI) 2017.

Noise Intrusion

- AS/NZS 2107:2016 *'Acoustics – Recommended design sound levels and reverberation times for building interiors'*, 2016.

Traffic Noise

- NSW DECC Road Noise Policy (RNP) 2011.
- Infrastructure State Environmental Planning Policy (SEPP) 2021.
- NSW DoP Development near Rail Corridors and Busy Roads – Interim Guideline 2008.

3.2 REGULATORY FRAMEWORK

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides the regulatory framework for the protection of the environment in NSW. The EP&A Act is relevantly about planning matters and ensuring that “environmental impact” associated with the proposed development is properly considered and reasonable before granting development consent to develop.

The assessment of “environmental impact” relies upon the identification of acceptable noise criteria which may be defined in a Development Control Plan, or derived from principles using guidelines like NSW EPA Noise Policy for Industry (NPI 2017) or Noise Guide for Local Government (NGLG 2013).

The Protection of the Environment Operations (POEO) Act 1997 has the objective of protecting, restoring and enhancing the quality of NSW environment. Abatement of noise pollution is underpinned by the definition of “offensive noise” as follows:

“...

(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.

..."

3.3 PLANNING FRAMEWORK

Relevant Planning Documents of Bourke Shire Council have been reviewed for any relevant noise requirements or criteria for the proposed development. There are no specific noise level criteria, but rather sections of the DCP provide general planning strategies.

The LEP sets the land zoning of the site as shown in Figure 3 as General Residential (R1).



Figure 3: Land zoning of the site (red dotted outline) and surroundings. (Ref: 1150_COM_LZN_008B_20_20160329)

3.4 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW EPA Noise Policy for Industry (NPI) 2017 assesses noise from industrial noise sources - scheduled under the POEO. Mechanical noise from the development shall be addressed following the recommendations in the NPI. Criteria is based on the existing ambient and background noise levels addressing the following:

- Intrusiveness Criteria, to control intrusive noise into nearby sensitive receivers.
- Amenity Criteria, to maintain the noise level amenity for particular land uses.

For residential receivers these criteria are established for each assessment period (day, evening and night) and the more stringent sets the Project Noise Trigger Level (PNTL's).

3.4.1 INTRUSIVENESS CRITERIA

The NSW NPI defines the intrusiveness criteria as follows:

"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold."

Background noise monitoring has not been conducted, rather the intrusiveness criteria have been based on the minimum assumed Rating Background noise Level (RBL), as defined in Table 2.1 of the NPI. This approach is conservative as it is expected that the background noise level will be likely be higher. Table 2 shows the intrusiveness criteria for residential noise sensitive receivers.

Period	Minimum Rating Background Level, dB(A)	Minimum Intrusiveness Criterion dB(A)
Day	35	40 $L_{Aeq,15min}$
Evening	30	35 $L_{Aeq,15min}$
Night	30	35 $L_{Aeq,15min}$

Table 2: Determination of the intrusiveness criterion, based on NPI.

3.4.2 AMENITY CRITERIA

The NSW NPI states the following to define the amenity criteria:

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

Based on the amenity criteria definition and the land zoning, Table 3 shows the amenity criteria for the noise sensitive receivers.

Indicative Noise Amenity Area	Period	Amenity Noise Level $L_{Aeq,period}$ dB(A)	Adjusted Amenity Criterion dB(A)
Urban Residential (R1)	Day	60	53 $L_{Aeq,15min}$ (60-5+3)
	Evening	50	48 $L_{Aeq,15min}$ (50-5+3)
	Night	45	43 $L_{Aeq,15min}$ (45-5+3)
Educational - Internal	Noisiest 1-hour	35	--
Educational – External*		45	--
Place of worship -Internal	When in use	40	--
Place of worship -External*		50	--
Commercial	When in use	65	--

Table 3: Determination of amenity criterion. *Note: Recommended internal amenity noise level has been increased by 10dB to adjust for external noise levels (assuming open windows)

3.4.3 PROJECT NOISE TRIGGER LEVELS

The PNTL's are shown in Table 4 and have been obtained in accordance with the requirements of the NSW NPI. These shall be assessed to the most affected point on or within the noise sensitive receiver boundary.

<i>Indicative Noise Amenity Area</i>	<i>Period</i>	<i>Intrusiveness Criterion, $L_{Aeq,15min}$ dB(A)</i>	<i>Amenity Criterion, $L_{Aeq,15min}$ dB(A)</i>
<i>Urban Residential (R1)</i>	Day	40	53
	Evening	35	48
	Night	35	43
<i>Educational - External</i>	When in use	---	45
<i>Place of worship - External</i>	When in use	---	50
<i>Commercial</i>	When in use	---	65

Table 4: Determination of PNTL's (light grey highlight) for noise sensitive receivers.

3.5 TRAFFIC NOISE

3.5.1 TRANSPORT AND INFRASTRUCTURE SEPP

Per clauses 2.100 and 2.120 of the Transport & Infrastructure State Environmental Planning Policy (SEPP) 2021, when a development is adjacent to a rail corridor, a freeway, a toll-way, a transit-way or a road with an annual average daily traffic volume (AADT) of more than 20,000 vehicles, an acoustic assessment is required to determine compliance with the clauses.

As per NSW Roads & Maritime Services traffic volume data for nearest relevant station (i.e. Kamilaroi Hwy) AADT of Mitchell St is less than 20,000 vehicles. Therefore, clause 2.100 and 2.120 of the SEPP and the NSW DoP 'Development near Rail Corridors and Busy Roads – Interim Guideline' do not apply.

Therefore, the internal noise goals have been derived from the Australian/New Zealand Standard 2107:2016. Noise goals have been set to specific uses within the proposed development, based on the internal noise levels within AS/NZS 2107:2016. Refer to Table 5 for the recommended internal noise goals due to external noise sources.

3.5.2 AS/NZS 2107:2016

The internal noise criteria due to external traffic noise has been derived based on the recommended levels from AS/NZS 2107:2016. Refer to Table 5 for the internal noise targets.

<i>Type of occupancy / activity</i>	<i>Design sound level ($L_{Aeq,t}$) range, in dB(A)</i>
Executive office	35 to 40
Open plan office	40 to 45
Meeting room (small)	40 to 45
Waiting rooms, reception areas	40 to 50
Toilets	45 to 55
Corridors and lobbies	45 to 50
Dental clinics	40 to 45
Consulting / treatment room	40 to 45
MRI/CT scan/X-Ray areas/Ultrasound	45 to 50

Table 5: Internal noise level ($L_{Aeq,t}$) range as per AS2107:2016.

3.5.3 TRAFFIC NOISE GENERATION

The NSW DECC Road Noise Policy (RNP) establishes criteria for traffic noise from:

- Existing roads
- New road projects
- Road development projects
- New traffic generated by developments

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 should be limited to 2.0dB above the existing noise levels. An increase of up to 2.0dB represents a minor impact that is considered barely perceptible to the average person.

In cases where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria.

3.6 CONSTRUCTION NOISE AND VIBRATION

3.6.1 NOISE CRITERIA

The ICNG suggest construction noise management levels that may minimise the likelihood of annoyance being caused to noise sensitive residential receivers depending on the duration of works. The management levels for long-term duration works are as follows:

- Within recommended standard hours.

The Management Level ($L_{Aeq,15min}$) measured at the most exposed boundary of any affected residential receiver when the construction site is in operation must not exceed the

background noise level (RBL) by more than 10dB(A). This noise level represents the point above which there may be some community reaction to noise.

However, in the case of a highly noise affected area, the Management Level ($L_{Aeq,15min}$) at the most exposed boundary of any affected residential receiver when the construction site is in operation should not exceed 75dB(A). This level represents the point above which there may be strong community reaction to noise.

- Outside recommended standard hours.

The Management Level ($L_{Aeq,15min}$) measured at the most exposed boundary of any affected residential receiver when the construction site is in operation must not exceed the background noise level (RBL) by more than 5dB(A). It is noted that a strong justification is required for works outside the recommended standard hours.

ICNG suggests construction noise management levels for other sensitive land uses surrounding construction sites, the airborne construction noise criteria are summarised in the table below.

Sensitive Receiver		Airborne Construction Noise Criteria, L_{Aeq} dB(A)	
		Within Standard Hours	Outside Standard Hours
	Noise affected / External	RBL +10	RBL +5
Residential Receivers	Highly noise affected / External	75	N/A
Place of Worship	Internal – When in use		45
Education	Internal – When in use		45
Commercial	External – When in use		75

Table 6: ICNG construction airborne noise criteria for noise sensitive receivers surrounding the site.

The ICNG recommends internal ground-borne noise maximum levels at residences affected by nearby construction activities. Ground-borne noise is noise generated by vibration transmitted through the ground into a structure and can be more noticeable than airborne noise for some sensitive receivers. The ground-borne noise levels presented below from the ICNG are for residential receivers during evening and night-time periods only, as the objective is to protect the amenity and sleep of people when they are at home.

- Evening: $L_{Aeq,15min}$ 40dB(A) - internal
- Night: $L_{Aeq,15min}$ 35dB(A) - internal

The internal noise levels are assessed at the centre of the most affected habitable room.

3.6.2 VIBRATION CRITERIA

3.6.2.1 Human Comfort

The Department of Environment and Climate Change (DECC) developed the document 'Assessing Vibration: A Technical Guideline' in February 2006 to assist in preventing people from exposure to excessive vibration levels within buildings. It 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'.

The guideline does not address vibration induced damage to structures or structure-borne noise effects. Vibration and its associated effects are usually classified as continuous (with magnitudes varying or remaining constant with time), impulsive (such as shocks) or intermittent (with the magnitude of each event being either constant or varying with time). Vibration criteria for continuous and impulsive vibration are presented in Table 7 below, in terms of vibration velocity levels.

Place	Time	r.m.s. velocity, mm/s [dB ref 10 ⁻⁶ mm/s]			
		Continuous Vibration		Impulsive Vibration	
		Preferred	Maximum	Preferred	Maximum
Residences	Day-time	0.20 [106 dB]	0.40 [112 dB]	6.00 [136 dB]	12.00 [142 dB]
	Night-time	0.14 [103 dB]	0.28 [109 dB]	2.00 [126 dB]	4.00 [132 dB]
Offices, schools, educational and worship	When in use	0.40 [112 dB]	0.80 [118 dB]	13.00 [142 dB]	26.00 [148 dB]

Table 7: Continuous and impulsive vibration criteria applicable to the site.

When assessing intermittent vibration comprising a number of events, the Vibration Dose Value (VDV) it is recommended to be used. Table 8 shows the acceptable VDV values for intermittent vibration.

Place	Time	Vibration Dose Values, m/s ^{1.75}	
		Preferred	Maximum
Residences	Day-time	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational and worship	When in use	0.40	0.80

Table 8: Intermittent vibration criteria applicable to the site.

3.6.2.2 Structural Building Damage

Ground vibration from construction activities can damage surrounding buildings or structures. For occupied buildings, the vibration criteria given in previous section for Human Comfort shall generally form the limiting vibration criteria for the Project.

For unoccupied buildings, or during periods where the buildings are unoccupied, the vibration criteria for building damage suggested by German Standard DIN 4150.3:2016 'Vibration in Buildings – Effects on Structures' are to be adopted. Guideline values from DIN 4150.3:2016 are presented in the table below.

Structural type	Vibration velocity, mm/s (Peak Particle Velocity - PPV)				
	Foundation			Plane of floor uppermost full storey in horizontal direction	Floor slabs, vertical direction
	1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All frequencies	All frequencies
Type 1: Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
Type 2: Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
Type 3: Structures that because their particular sensitivity to vibration, cannot be classified under Type 1 and 2 and are of great intrinsic value (e.g. heritage buildings)	3	3 to 8	8 to 10	8	20

Table 9: DIN 4150.3:2016 Guideline values of vibration velocity (PPV) for evaluating the effects of short-term vibration.

4 NOISE IMPACT ASSESSMENT AND RECOMMENDATIONS

Based on the expected operations of the proposed development, the following items have been considered within the acoustic assessment:

- Noise emissions from mechanical plant from the development to the surrounding receivers.
- Noise intrusion from surrounding streets (i.e. Mitchell Street and Tarcoon Street)
- Noise emissions from traffic generated by the proposed development.

The acoustic assessment has considered the following:

- Noise levels have been considered as continuous over assessment time period to provide the worst-case scenario.
- Distance attenuation, building reflections and directivity.

4.1 OPERATING HOURS

The development is proposed to generally operate from Monday to Friday 08:00 – 17:00 with the option to provide weekend and evening services to meet specific service and program needs.

4.2 NOISE EMISSIONS FROM MECHANICAL PLANT

Noise from proposed development's mechanical plant should be controlled to ensure external noise emissions are not intrusive and do not impact on the amenity of the sensitive receivers.

It is assumed that mechanical plant for the development will operate continuously during daytime periods and when required during evening and night periods. At this stage, a preliminary selection of the external mechanical plant has been provided and a noise assessment to the nearest noise sensitive receiver has been carried out based on the noise data from the manufacturers. Based on mechanical drawings provided the development proposes two external plant areas, one to the north within the external bin store and one to the south of the site. The selected units and their noise levels are listed below:

Northern external plant:

- CU-01 (RXYQ14AYM) – 59dB(A) @1m.
- CU-02 (REYQ20BYM) – 65dB(A) @1m.

Southern external plant:

- CU-COMMS (2x REYQ3AV4A) – 55dB(A) @ 1m
- CU-03 (REYQ8BYM) – 57dB(A) @ 1m.
- CU-04 (REYQ16BYM) – 62dB(A) @ 1m.
- CU-05 (REYQ18BYM) - 61dB(A) @ 1m.
- 15kW Heat pump (953015) - 57dB(A) @ 3m (67dB(A) @ 1m)

The following assumptions have been made in the noise assessment:

- The location of southern external plant and details of the enclosure are shown as per Figure 4. The north condenser unit is located to the north of the bin room, with solid wall to the south that extends over the top of the condenser unit, and weather louvres to the north, east and west.

- The nearest noise sensitive receiver for the northern and southern external plant are 86 Mitchell Street (approximately 23m to the west of the plant) and 121 Oxley Street (approximately 20m to the south of the plant) respectively.
- The height of the tallest CU is 1.7m.
- The height of the heat pump is 1m.
- All condensers will have vertical 50mm internally lined rigid duct to be level with enclosure heights, approximately 300mm in length.

The noise assessment of the mechanical plant is summarised in Table 10.

Calculation	Overall A-weighted noise level, in dB(A)	
	86 Mitchell Street	121 Oxley Street
L _{Aeq} plant at 1m, dB.	66 (cumulative north plant)	69 (cumulative south plant)
50mm internally lined rigid duct attenuation @500Hz, dB	-2	-2
Distance attenuation, dB	-27	-26
Acoustic screening attenuation, dB	-1 (weather louvre)	-5 (acoustic screening)
Condenser night mode correction, dB	-3	-3
L _{Aeq,15min} resulting at residential receiver	33	33
Evening-time criteria NPI / Complies (Yes/No)	35 / Yes	35/ Yes

Table 10: Noise assessment of mechanical plant to the nearest noise sensitive receivers.

Based on the results of the assessment, the mechanical plant is predicted to comply during the day-time period and evening / night criteria. Note that this assessment is worst-case scenario of all units running at full capacity during the evening, this is unlikely as the development proposes after hours operation to only service specific services and needs which will unlikely require the use of all external plant to operate at full capacity. Therefore noise impacts are likely to be less than the predictions.

The following acoustic screening attenuation measures are required to achieve compliance in accordance with NSW NPI:

- Condenser units to run at low capacity during the evening and night periods to achieve 3dB reduction.
- Install acoustic screening around the southern condenser plant deck as shown in Figure 4. The screening shall extend at 300mm above the top of the plant. Based on 1.7m high units and assumed 100mm plinth, the height of the screening should be at least 2.1m.
- The minimum surface mass of the solid barriers shall be not less than 12kg/m² and be free of any air gaps. Alternatively, acoustic louvre can be used for the screening, equivalent to ACRAN 200. The performance of the acoustic louvre shall meet the following transmission losses, shown in the Table below at a minimum.
- 50mm internally line any discharge duct installed to condenser units, and to not exceed more than 100mm from the top of the screening.

- Install weather-proof louvre to the northern condenser plant deck as shown in Figure 4. The weather-proof louvre shall extend at 300mm above the top of the plant.

Location	Description	Minimum Transmission loss, dB,					
		125	250	500	1k	2k	4k
Southern plantroom	Acoustic louvre	8	7	11	21	24	16

Table 11: Minimum transmission loss for acoustic screening.

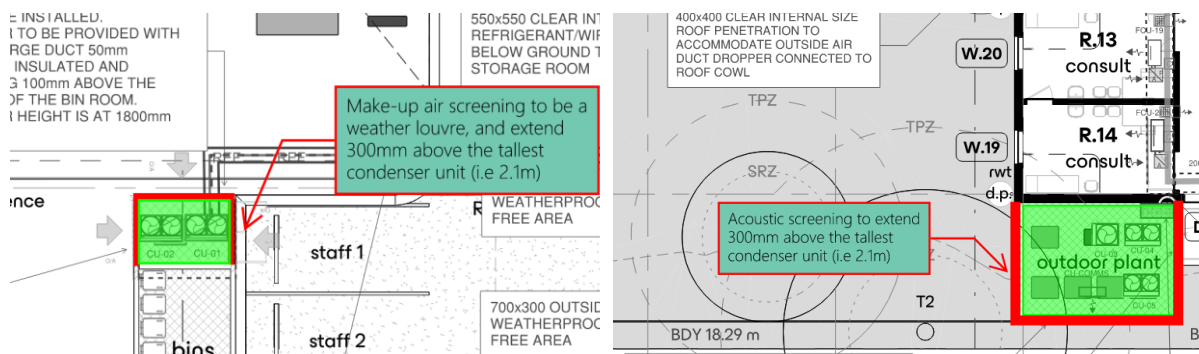


Figure 4: External northern (left) and southern (right) mechanical plant location (green shaded) and acoustic screening (red outline).

Acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.

4.3 NOISE EMISSIONS FROM GENERATOR

There is proposed to be a temporary emergency generator installed on site for use during power outages. Noise from emergency generators within the development should generally be controlled to ensure external noise emissions do not impact the amenity of noise sensitive receivers. There is no criteria for noise emissions from emergency generators, however it is recommended that a generator set that is acoustically treated be used for installation during these events in order to mitigate the noise emissions to surrounding sensitive receivers.

4.4 NOISE EMISSIONS FROM CARPARK

A noise assessment has been conducted for the on-grade carpark to the west of the development. The assessment has been conducted to the nearest most affected residential receiver (i.e. 86 Mitchell Street). The following has been considered for the assessment:

- Assessment conducted for day-time, using peak hour predicted vehicle movements as specified within the Traffic Impact Assessment report.
- Assessment period of 15 minutes used with 13 vehicles per hour entering or leaving the carpark (4 per 15 minutes).
- Typical sound power levels for vehicles as shown in the table below.

<i>Item</i>	<i>Sound Power Level (dB re. 1pW), dB(A)</i>
Vehicle movement	88
Car door slams	95

Table 12: Typical Sound Power Levels of vehicle movements.

Based on the above, the predicted noise levels 86 Mitchell Street from carpark movements are shown below in Table 13.

<i>Calculation</i>	<i>Noise Level, in dB(A)</i>
Total Sound Pressure Level $L_{Aeq,15min}$ at 1m, dB(A)	70
Distance attenuation (33m), dB	-30
Predicted Sound Pressure Level, $L_{Aeq,15min}$	40
Noise Level Criteria / Complies (Yes/No)	40 / Yes

Table 13: Noise assessment of on-grade carpark to nearest residential receiver.

Predicted noise emissions due to operational use of the carpark is not expected to exceed of the noise criteria during the day times hours to the surrounding residential receivers. It should also be noted that the above calculation does not account for shielding from the proposed structures (i.e. bin room, pump house and shed) and, therefore, noise levels due to use of the carpark will likely be lower.

4.5 INTERNAL NOISE

4.5.1 TRAFFIC NOISE INTRUSION

Traffic noise from the surrounding road networks is understood to be very low, and therefore noise impacts are low on the development. Nonetheless, an acoustic assessment has been conducted in order to provide preliminary recommendations on the performance of the glazing in order to meet the internal noise levels as specified in Table 5.

The following assumptions have been considered for the traffic noise impacts:

- Minimum glazing recommendations are based on the assumption that all solid sections of the façade will meet a minimum sound reduction index of R_w50 .

- External noise levels are predicted based on nearby traffic counts provided by NSW Roads & Maritime Services.

Based on the above, the minimum required sound insulation rating of the external glazing are summarised in Table 14. This should be considered in conjunction with the ESD requirements, as there may be other higher requirements.

<i>Space</i>	<i>Weighted Sound Reduction Index (R_w)</i>	<i>Fixed Single Glazing System</i>
<i>All</i>	32	6.38mm laminated

Table 14: Required sound insulation performance and recommended glazing.

These glazing recommendations are high level and should be used as an estimate only and need to be reassessed during detailed design.

4.6 TRAFFIC GENERATION NOISE

Noise from traffic generated by the proposed development has the potential to affect the amenity of the nearby sensitive receivers.

Based on the AM and PM peak hour traffic generation as specified within the traffic report and the existing traffic volume at the nearest station on Kamilaroi Hwy, the increase in traffic noise is predicted to be less than 2dB. As noted in Section 3.5.3, when considering land use development and the impact on sensitive land uses the NSW Road Noise Policy (RNP) states that an increase up to 2dB in relation to existing noise levels is anticipated to be insignificant. Therefore, additional traffic noise associated with the development is expected to meet the NSW RNP recommendations.

4.6.1 AMBULANCE SIRENS

Regarding the use of ambulance sirens on site – when ambulances depart to attend incidents – it is not specifically addressed in relevant regulations. When in use, noise levels from ambulance sirens will be audible at the nearest residential receivers.

Events identified as Priority One events (i.e. Life Threatening Emergencies), require that warning devices must be used, including warning lights and sirens. The NSW Ambulance *Emergency Driving and Use of Warning Policy Directive 2016-033* states that:

"NSW Ambulance personnel who drive a vehicle under emergency response conditions shall use safety equipment provided by NSW Ambulance for that purpose which includes warning devices: lights and sirens. Lights can be used in isolation without the use of a siren if the driver of the vehicle deems the circumstances are safe to do so and can justify reasonable cause to do so."

Based on the above, we understand that ambulance drivers will make a judgement call on whether to use ambulance sirens on case-by-case basis. We further understand that it is the practice of Paramedics to minimise the use of sirens when it will cause a noise disturbance and the sirens are deemed unnecessary. For reference, Appendix A contains the NSW Ambulance Emergency Driving and Use of Warning Policy Directive 2016-033.

5 CONSTRUCTION NOISE AND VIBRATION PLANNING

Currently a detailed construction program is not yet full defined. This section of the Construction Noise and Vibration Planning provides general recommendations only and provides applicable criteria together with feasible and reasonable noise and vibration control practices to be observed during the construction of the proposed development.

This preliminary advice in relation to construction noise and vibration management shall form the basis for the Contractor's Construction Noise and Vibration Management Plan (CNVMP) which shall identify any noise criteria exceedance once construction methods and stages are known.

Any noise from demolition and construction activities to be carried out on site must not result in '*offensive noise*' to any noise sensitive receiver. To this end, the Contractor employed to undertake the demolition and/or construction works is responsible for ensuring that any site noise and, in particular, any complaints shall be monitored, investigated, managed and controlled.

5.1 RELEVANT STANDARDS FOR CONSTRUCTION NOISE AND VIBRATION CRITERIA

Section 3.6 of this report contains the relevant legislation, codes, and standards in addition to construction noise and vibration criteria for this project.

5.2 WORKING HOURS

Standard working construction hours are as follows:

- Monday to Friday: 7am to 6pm.
- Saturday: 8am to 1pm.
- Sundays and Public Holidays: No excavation or construction works.

Noise control measures are to be implemented during these hours following consultation and engagement with the community.

It is recommended that high noise level works – i.e. piling, excavation, etc – shall be scheduled to not occur during shoulder periods of the recommended standard hours – i.e 7am to 8am and 5pm to 6pm. A detailed Construction Noise & Vibration Management Plan (CNVMP) shall further assess the noise impact of construction works and shall include a protocol to minimise any potential noise impacts to identified sensitive receivers and ensure that appropriate noise control measures are defined and implemented to comply with all relevant noise guidelines.

5.3 PRELIMINARY CONSTRUCTION NOISE ASSESSMENT

A preliminary construction noise assessment has been carried out based on typical plant and machinery expected throughout the construction stages. The preliminary noise assessment has been considered at the nearest existing residential receivers.

5.3.1 NOISE

These levels are based on the database published by the UK Department for Environmental, Food and Rural Affairs (DEFRA) & Australian Standard AS2436:2010 '*Guide to Noise Control on Construction, Maintenance & Demolition Sites*' for a 15-minute period.

The expected construction noise sources and the predicted noise levels at the nearest residential receiver (i.e. 86 Mitchell Street) are shown in the table below as a range from the closest distance to the receiver boundary and the middle of the site to the receiver boundary.

<i>Item</i>	<i>Typical Power Noise Level L_{A10} (dB ref 1pW)</i>	<i>Typical Noise Level $L_{A10,15m}$ at 7m (dB ref 20μPa)</i>	<i>Predicted Noise Level $L_{Aeq,15m}$ 86 Mitchell Street</i>
Angle grinders	104	76	62-82
Truck (>20 tonne)	108	80	66-85
Circular saw	115	87	74-93
Piling rig	120	92	74-94
10-40tn Excavator	117	89	75-94
40-50tn Mobile crane	111	83	70-89
Concrete pump	114	86	72-91
Concrete truck	110	82	70-90
Drill	94	66	53-72

Table 15: Predicted airborne noise levels for typical construction plant used during construction works.

Based on the results of the preliminary assessment as shown above, the noise associated with the normal construction works is expected to exceed the noise limits for highly noise affected receivers within standard hours. This assessment is based on typical noise levels associated with construction sites and machinery.

Nevertheless, compliance with the relevant construction noise criteria can be achieved through specific noise mitigation measures such as acoustic screening around the site. These noise mitigation measures are to be provided in a detailed Construction Noise & Vibration Management Plan and prepared by a qualified acoustic consultant prior to Construction Certificate.

5.3.2 VIBRATION

The NSW RMS 'Construction Noise and Vibration Guideline' provides safe working distances for vibration intensive plant and are quoted for both 'cosmetic' damage (in accordance with BS 7385.2:1993) and human comfort (in accordance with DECC's 'Assessing Vibration: A Technical Guideline'). The recommended safe working distances for typical construction plant are provided in Table 16.

<i>Plant Item</i>	<i>Description</i>	<i>Cosmetic Damage</i>	<i>Human Response</i>
Small Hydraulic Hammer	5-12 tonne	2m	7m
Medium Hydraulic Hammer	12-18 tonne	7m	23m
Large Hydraulic Hammer	18-34 tonne	22m	73m
Vibratory Pile Driver	Sheet piles	2-20m	20m
Pile Boring	<800mm	2m	N/A
Jackhammer	Handheld	1m	Avoid Contact with Structure

Table 16: Recommended minimum working distances for vibration intensive plant from sensitive receivers.

For any vibration intensive plant expected to be within proximity of the minimum distances described above, the contractor must engage a qualified engineer to carry out a vibration survey in order to assess any potential risks.

The vibration survey and assessment will determine whether the vibration levels might exceed the relevant criteria then vibration mitigation and management measures will need to be put in place to ensure vibration impacts are minimized as far as practicable.

5.4 MITIGATION MEASURES

In order to meet the noise and vibration requirements of the site, the Contractor will be required to engage a qualified acoustic consultant to assist in the compilation of a CNVMP and undertake noise and vibration monitoring for the duration of the project.

5.4.1 PROJECT SPECIFIC ACOUSTIC MEASURES

Acoustic amelioration measures will be required due to the expected exceedances of the noise level criteria. Temporary shielding such as solid hoarding/acoustic curtains may reduce the expected noise impacts and is proposed as a noise control measure during construction. The location and extent of the shielding are to be defined in the detailed Construction Noise and Vibration Management Plan (CNVMP).

5.4.2 GENERAL CONTROL ELEMENTS

As a general rule, minimising noise and vibration should be applied as universal work practice at any time of day, but especially for any construction works to be undertaken at critical times outside normal daytime/weekday periods.

It is noted that the reduction of noise and vibration at the source and the control of the transmission path between the construction site and the receiver(s) are the preferred options for noise minimisation. Providing treatments at the affected receivers should only be considered as a last resort. Construction noise and vibration shall be managed by implementing the strategies listed below:

- *Plant and equipment.* In terms of both cost and results, controlling noise and vibration at the sources is one of the most effective methods of minimising the impacts from any work site activities. Work practices that will reduce noise and vibration at the source include:
 - Employing quieter techniques for all high noise activities such as rock breaking, concrete sawing, and using power and pneumatic tools.

- Use quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks.
- Selecting plant and equipment with low vibration generation characteristics.
- Operate plant in a quietest and most effective manner.
- Where appropriate, limit the operating noise of equipment.
- Regularly inspecting and maintain plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively.
- *On site noise management.* Practices that will reduce noise from the site include:
 - Maximising the distance between noise activities and noise sensitive receivers. Strategically locate equipment and plant.
 - Undertaking noisy fabrication work off-site where possible.
 - Avoid the use of reversing beeping alarms or provide for alternative systems, such as broadband reversing alarms
 - Maintaining any pre-existing barriers or walls on a demolition or excavation site as long as possible to provide optimum sound propagation control.
 - Constructing barriers that are part of the project design early in the project to afford mitigation against site noise.
 - Using temporary site building and material stockpiles as noise barriers. These can often be created using site earthworks and may be included as a part of final landscape design.
 - Installing purpose built noise barriers, acoustic sheds and enclosures.
- *Work scheduling.* Scheduling work during periods when people are least affected is an important way of reducing adverse impacts. The following scheduling aspects may reduce impacts:
 - Provide respite periods, including restricting very noisy activities to daytime, restricting the number of nights that after-hours work is conducted near residences, or by determining any specific requirements, particularly those needed for noise sensitive receivers.
 - Scheduling activities to minimise impacts by undertaking all possible work during hours that will least adversely affect sensitive receivers and by avoiding conflicts with other scheduled events.
 - Scheduling work to coincide with non-sensitive periods, to reduce impact on examinations.
 - Scheduling noisy activities to coincide with high levels of neighbourhood noise so that noise from the activities is partially masked and not as intrusive.
 - Planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from sensitive receivers.
 - Optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours.
 - Designating, designing and maintaining access routes to the site to minimise impacts.
 - Including contract conditions that include penalties for non-compliance with reasonable instructions by the principal to minimise noise or arrange suitable scheduling.
- *Consultation, notification and complaints handling.*
 - Provide information to neighbours before and during construction.
 - Maintain good communication between the community and Project staff.
 - Have a documented complaints process and keep register of any complaints.
 - Give complaints a fair hearing and provide for a quick response.
 - Implement all feasible and reasonable measures to address the source of complaint.

Implementation of all reasonable and feasible mitigation measures for all works will ensure that

any adverse noise impacts to surrounding receivers are minimised when noise goals cannot be met due to safety or space constraints.

5.4.3 ADDITIONAL NOISE AND VIBRATION CONTROL MEASURES

If, during construction, an item of equipment exceeds either the noise criteria at any location or the equipment noise level limits, the following noise control measures, together with construction best practices, shall be considered to minimise the noise impacts on the neighbourhood.

- Schedule noisy activities to occur outside of the most sensitive times of the day for each nominated receiver.
- Consider implementing equipment-specific screening or other noise control measures recommended in Appendix C of AS 2436:2010.
- Limit the number of trucks on site at the commencement of site activities to the minimum required by the loading facilities on site.
- When loading trucks, adopt best practice noise management strategies to avoid materials being dropped from height into dump trucks.
- Avoid unnecessary idling of trucks and equipment.
- Ensure that any miscellaneous equipment (extraction fans, hand tools, etc) not specifically identified in this plan incorporates silencing/shielding equipment as required to meet the noise criteria.

Implementation of all reasonable and feasible mitigation measures for all internal and underground works will ensure that any adverse noise impacts to surrounding residential, commercial and recreational receivers are minimised when noise goals cannot be met due to safety or space constraints.

6 SUMMARY AND CONCLUSIONS

A noise assessment has been carried out for the proposed Bourke Integrated Primary Healthcare Centre development. This report forms part of the documentation package to be submitted to Bourke Shire Council as part of the Development Application.

This report establishes relevant noise level criteria, details the acoustic assessment and provides comments and recommendations for the proposed development.

The noise assessment has adopted methodology from relevant guidelines, standards and legislation to assess noise impact.

Based on the NSW NPI noise level criteria and recommended emergency generator criteria, the external plant (i.e. condenser units, pumps and generator) is expected to meet the noise level criteria at the nearest noise sensitive receiver with the implementation of the acoustic mitigation measures as detailed in this report. Acoustic assessment of all plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.

Based on the NSW Roads & Maritime Services traffic volume data nearest to the proposed development, the minimum recommended sound insulation rating of the glazing should be R_w32 to meet recommended internal noise levels.

There is not expected to be any exceedances of the NSW RNP due to the traffic generation from the proposed development during the AM and PM peak hours.

A preliminary construction noise assessment has been carried out. Based on the results of the preliminary assessment as shown above, the noise associated with the normal construction works is expected to exceed the noise limits in accordance with the ICNG Guideline. Nevertheless, compliance with the relevant construction noise criteria can be achieved through specific noise mitigation measures. These noise mitigation measures are to be provided in a detailed Construction Noise & Vibration Management Plan prepared by a qualified acoustic consultant prior to Construction Certificate.

The information presented in this report shall be reviewed if any modifications to the features of the development specified in this report occur, including and not restricted to selection of mechanical plant, modification to the building and the introduction of any noise sources.

Based on the information presented in this report, relevant objectives will be satisfied and therefore approval is recommended to be granted.

APPENDIX A: NSW AMBULANCE - EMERGENCY DRIVING AND USE OF WARNING DEVICES POLICY DIRECTIVE (PD2016-033)



NSW Ambulance

POLICY DIRECTIVE

EMERGENCY DRIVING AND USE OF WARNING DEVICES POLICY DIRECTIVE

Document No.	PD2016-033				
File No.	16/623 (D16/23847)				
Date issued	13 January 2017				
Contents	<table><tr><td>Policy Directive</td><td>Policy Directive - Emergency Driving and Use of Warning Devices</td></tr><tr><td>Attachments</td><td>Nil</td></tr></table>	Policy Directive	Policy Directive - Emergency Driving and Use of Warning Devices	Attachments	Nil
Policy Directive	Policy Directive - Emergency Driving and Use of Warning Devices				
Attachments	Nil				
Directorate	Service Delivery				
Author Branch	Service Delivery				
Branch Contact	Executive Staff Officer 9320 7873				
Summary	The purpose of this policy is to outline the correct use of warning devices for all operational staff.				
Applies to	All NSW Ambulance operational staff				
Review Date	February 2022				
Previous Reference	SOP2014-001				
Status	Active				
Approved by	Chief Executive				
Related Documents	Australian Road Rules Part 19 Rule 306 – Exemptions for Drivers of Emergency Vehicles Roads & Traffic Authority Vehicle Standards Information 10.366 Cat No. 45070588 Rev. 4.1 SOP2013-015 Self Responding to Incidents Policy NSW Work Health and Safety Act 2011 SOP2013-014 Dispatch – Emergency Response Standards Policy Fleet Manual Policy Directive PD2016-034 Fleet Manual Operating Procedure PRO2016-039				

Compliance with this work instruction is **mandatory**

**Emergency Driving & Use of Warning Devices Policy Directive****1. Background**

This policy directive has been created to minimise risk to operational personnel and the Public and to ensure legal compliance under Road Traffic Act 1909 No. 5 and The Australian Road Rules 2008 whilst engaged in emergency response driving.

NSW Ambulance personnel driving a NSW Ambulance vehicle under emergency response conditions can claim exemptions in certain circumstances. Specifically the driver must be able to prove, in the circumstances:

- they were taking reasonable care; and
- it was reasonable that the rule should not apply; and
- If the vehicle is a motor vehicle that is moving - the vehicle is displaying a blue or red flashing light and sounding an alarm. Alternatively, displaying a blue or red flashing light only.

The Australian Road Rules refer to the driver of any emergency vehicle, where it is expedient and safe to do so, may:

- Drive in any direction on part of a public street or overtake or pass on either side of another vehicle, but only with due care
- Stop, leave standing or park the emergency vehicle at any time or place
- Exceed the speeds prescribed by the Traffic Act 1909 No. 5 only when safe to do so

2. Use Of Warning Devices

When driving a NSW Ambulance vehicle under emergency response conditions, the driver shall:

- Be solely responsible for the vehicle and afford maximum safety of its occupants and any other road users, at all times.
- Comply with requirements of the Traffic Act 1909 No. 5 and Australian Road Rules 2008.
- Drive at a speed and manner appropriate to traffic, road and prevailing weather conditions.
- Drive in a professional manner at all times.
- Not proceed through a railway or tram crossing when the warning signals are in operation unless directed to do so by an authorised person.



- Wear a seat belt at all times. Seat belts must be worn at all times in the rear patient compartment unless immediate lifesaving intervention is required.
- Not enter an intersection or junction that is controlled by a traffic sign, light or other road marking, at a speed where the driver cannot stop the vehicle in order to avoid a crash or causing a crash.
- On approach to a traffic light controlled intersection faced with a red light, the driver must slow down and stop if necessary until all other traffic has completely stopped. Once all other traffic has stopped, and it is safe to do so, enter and proceed through the intersection with caution.
- Particular care must be exercised when transiting through school zones as the unpredictability of children; especially at the sight of an emergency vehicle approaching is heightened.

2.1 Category One response

- NSW Ambulance personnel who drive a vehicle under emergency response conditions shall use safety equipment provided by NSW Ambulance for that purpose which includes warning devices: lights and sirens. Lights can be used in isolation without the use of a siren if the driver of the vehicle deems the circumstances are safe to do so and can justify reasonable cause to do so.
- Blue or red flashing lights shall be activated at the commencement of all emergency drives. Blue or red flashing lights shall remain active when parked at the emergency scene, unless parked in a position that affords maximum safety without the need to display the lights.
- Where the highest clinical level paramedic responsible for the patient decides that the patient's condition warrants the use of emergency driving procedures during transfer (this decision must be communicated to the control centre immediately).
- A crew decision to upgrade the response in order to expedite to a location as described in SOP2013-014 for priority two (2) incidents (this decision must be communicated to the control centre immediately).
- The siren should be considered on the approach to any hazard, in particular:
 - Physical hazards such as junctions, roundabouts, bends or hill crests
 - Those created by the presence, position or movement of other road users
- Deactivation of the siren during an emergency drive should only be considered if the driver can justify reasonable cause to do so, there is no benefit to be gained from the use of the siren and there is no compromise to the safety of other road users.
- The driver's decision to use all warning devices will always be supported by NSW Ambulance should a complaint be received due to noise made when responding to an emergency



- When exceeding the prescribed speed limit:
 - Drive so that you are able to stop safely in the distance you can see to be clear
 - Drive at a speed which is appropriate to the conditions
 - Remember if you double your speed, quadruple your stopping distance
 - No emergency is so great to justify an accident

3. COLLISION

Personnel involved in a collision must:

- Stop at the scene
- Notify control immediately
- Ensure safety of personnel
- Give all possible assistance to any person involved in the incident
- If extra resources are needed, notify control
- Give all "required particulars" to:
 - any other driver (or that driver's representative) involved in the collision; and
 - any other person involved who is injured (or that person's representative)
 - the owner of any property (including any vehicle) damaged in the collision (or the owner's representative), unless, in the case of damage to a vehicle, the particulars are given to the driver of the other vehicle
- The driver's responsibility
 - the driver must give the driver's required particulars, within the required time, to a police officer; that is not more than 90 minutes after the collision
 - present himself or herself to a police officer at the scene of the collision or at a police station for the purpose of providing particulars of the collision
 - submit to any requirement to undertake a test relating to the presence of alcohol or a drug in his or her blood or oral fluid



4. SELF RESPONDING

It is an organisational mandate that no self-responding to incidents is to occur, however, operational managers and on road supervisors may initiate a response within their geographic area of responsibility provided appropriate notification is given to the control centre so that a tasking record can be produced.

REVISION HISTORY

Version (Document #)	Amendment notes
12/2016 (PD2016-033)	Policy transferred to new template nil changes made
10 April 2014 (SOP2014-001)	Endorsed by Chief Executive. Updating of SOP to make requirement of using warning devices (lights / sirens) as AND / OR + examples of when one or the other might be used as opposed to both. Change to recognise that an Operational Manager can instigate a response to an incident but must advise the Control Centre
5 September 2012 (SOP2012-018)	Endorsed by the Chief Executive