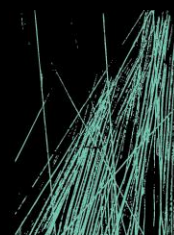




ACOUSTIC REPORT FOR REF / DA

RAIR KINGSCLIFF



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DOCUMENT CONTROL SHEET

Project Number	210240
Project Name	RAIR Kingscliff
Description	Acoustic Report for REF / DA
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Revision History

Issued To	Revision and Date						
Mace Australia Propriety Ltd.	REV	P1					
	DATE	08/02/2022					
	REV						
	DATE						
	REV						
	DATE						

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DRAFT

1 INTRODUCTION

NSW Ambulance is improving infrastructure across NSW rural areas to ensure they continue to enhance the high quality emergency medical care delivered to the community now and into the future.

JHA Consulting Engineers has been engaged by Mace to provide acoustic services for a proposed ambulance station refurbishment for the Rural Ambulance Infrastructure Reconfiguration (RAIR) program in Kingscliff, NSW.

The proposed development involves the construction of a new ambulance station, with an ambulance plantroom and ancillary spaces. An acoustic assessment has been undertaken and it is detailed in this report along with the findings and recommendations.

The objectives of this acoustic assessment are:

- Identify the external noise and vibration sources that will potentially affect the proposed development.
- Carry out noise surveys to determine the existing ambient and background noise levels on site.
- 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.
 - Noise emissions from traffic generated by the proposed development.
 - Noise emissions from the use of the wash bay.
 - Noise intrusion.
- Carry out an 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.
- Provide recommendations for Construction Noise and Vibration Planning.

This report provides:

- A statement of compliance with the relevant statutory criteria for the proposed 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.
- Recommendations for noise and vibration criteria and best practices during construction phase.

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

- Architectural drawings of the proposed development prepared by DJRD Architects.
- Environmental Noise Assessment Report for Tweed Valley Hospital Project (ref: NMA23.V1.1F) by ADE Consulting Group, dated 21st July 2021.

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

Kingscliff is a coastal town just south of Tweed Heads in the Northern Rivers region of New South Wales, located approximately 820 kilometres from Sydney. It belongs to the Local Government Area of the Tweed Shire.

The proposed development site is located in the eastern side of 771 Cudgen Road, Cudgen (on the border between Cudgen and Kingscliff) – legally known as 11/DP1269398 being located within a health services, educational and residential area.

The site is surrounded by Tweed Hospital (under construction), residential buildings, educational buildings and large open spaces, in a suburban residential environment with through traffic and continuous traffic flows during peak periods. The proposed development will operate 24 hours per day, 7 days per week.

The noise sensitive receivers surrounding the site are healthcare, residential, active recreational and educational. Figure 1 shows the proposed site location (red dotted line with yellow shadow), residential receivers (green shadow), active recreational receivers (red shadow) educational receivers (blue shadow) and healthcare receivers (orange shadow).

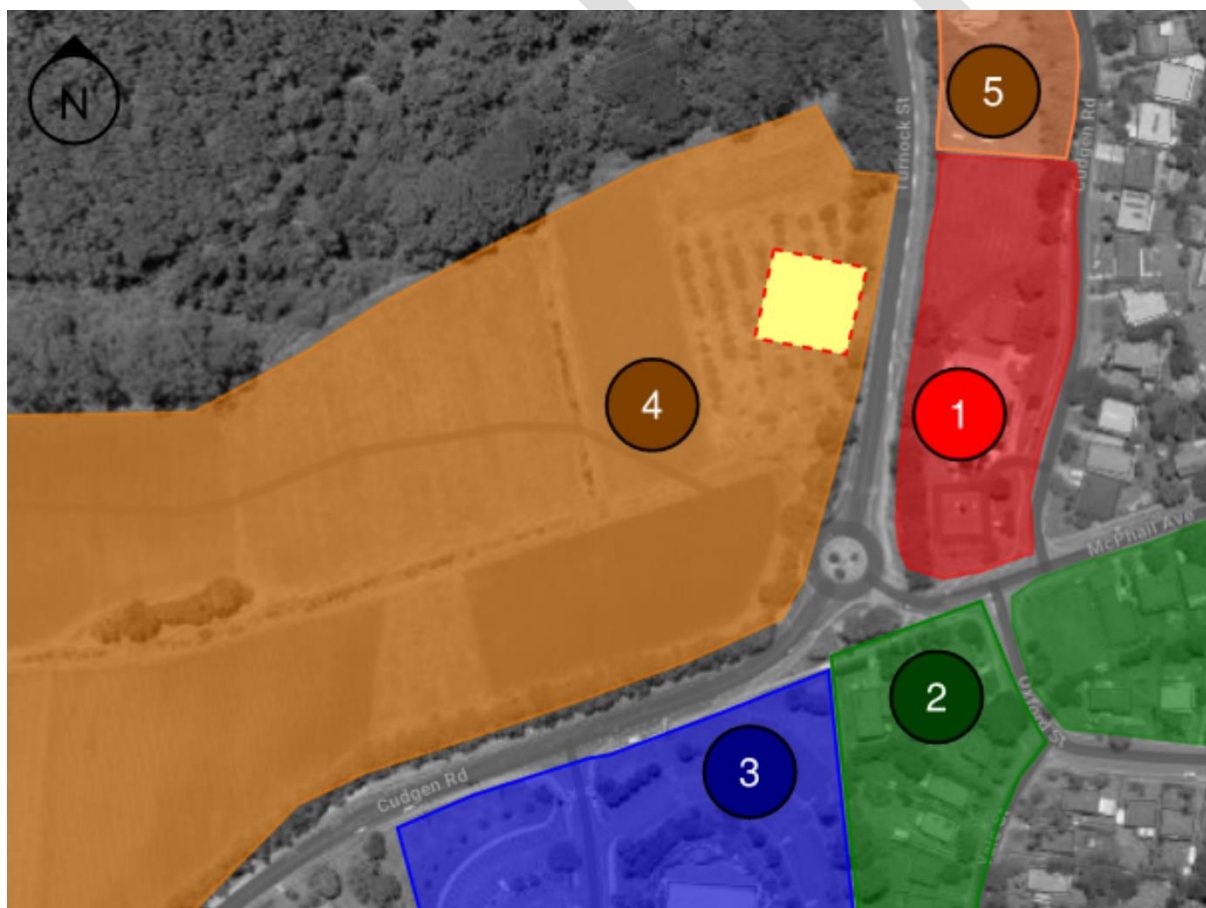


Figure 1: Aerial view of site showing the location of the proposed development and sensitive receivers.

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.

<i>ID</i>	<i>Sensitive Receiver</i>	<i>Receiver Type</i>	<i>Distance (m)</i>
1	Tweed Regional Aquatic Centre Cudgen Road	Active Recreational	40
2	60-64 Cudgen Road	Residential	115
3	TAFE Kingscliff 806 Cudgen Road	Educational	140
4	Tweed Valley Hospital 771 Cudgen Road	Medical	200
5	Kingscliff Community Health Centre 71 Turnock Street	Medical	65

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

The proposed development involves the construction of a new ambulance station with ancillary spaces which will comprise:

- 9 ambulance bays
- 16 staff carparks
- Vehicle wash bay
- Equipment preparation and storage spaces
- Office spaces
- Relief rooms
- Amenities and common areas
- Gym

Figure 2 and Figure 3 show diagrams of the Ambulance Station layout (Source: DJRD Architects).

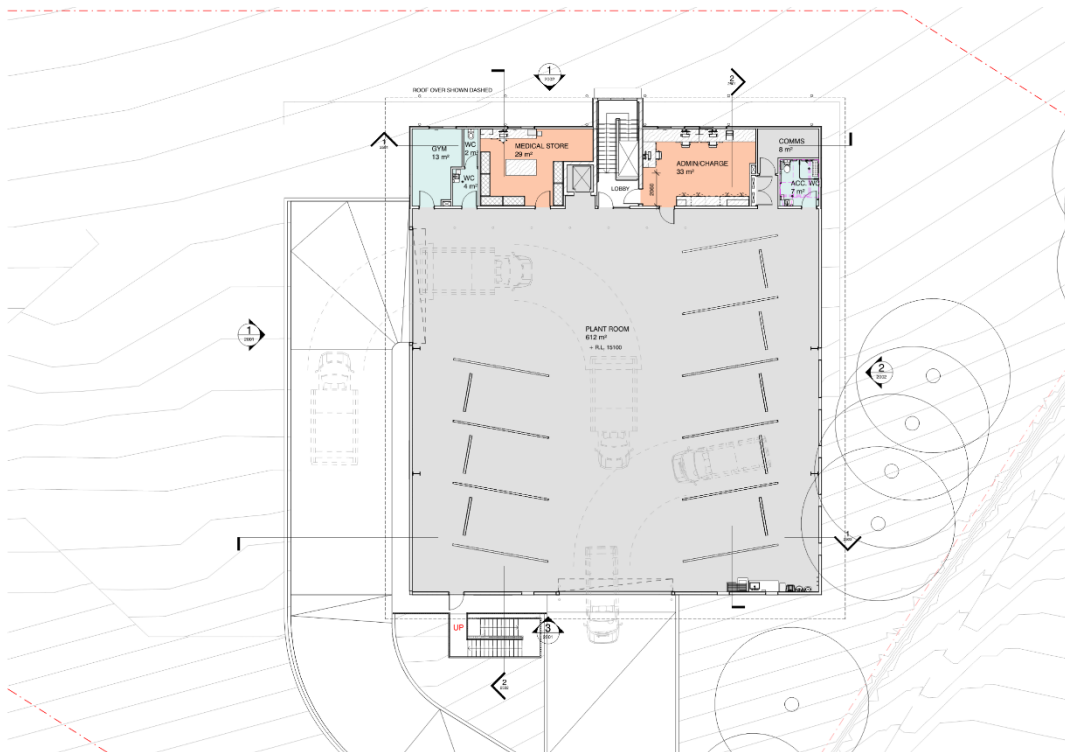


Figure 2: Ambulance Station ground floor layout.

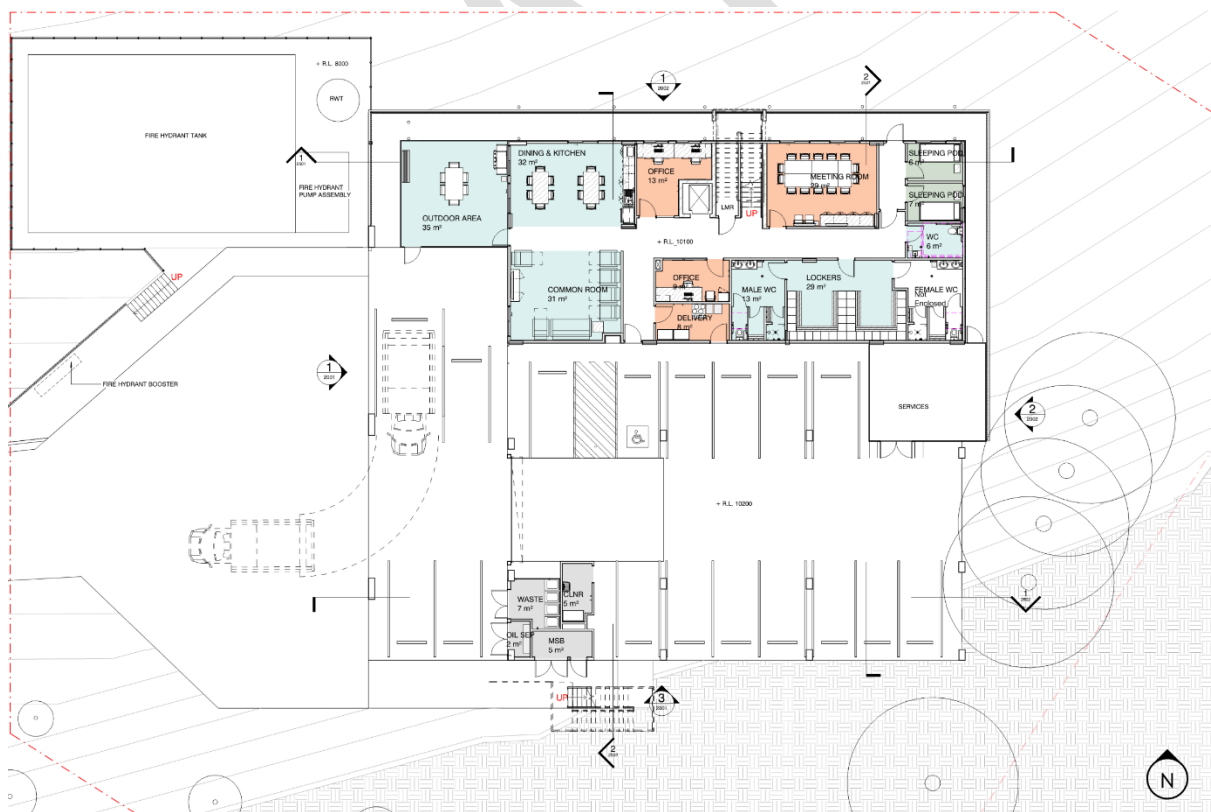


Figure 3: Ambulance Station lower-ground floor layout.

3 SITE MEASUREMENTS

3.1 GENERAL

JHA Engineers has not been engaged to undertake a noise survey for this project. The noise assessments for the ambulance station are based on a desktop assessment. In absence of a noise survey, noise data on site have been extracted from the Environmental Noise Assessment Report¹ by ADE Consulting Group.

Figure 4 shows the locations where the noise surveys were carried out.



Figure 4: Image from Environmental Noise Assessment Report showing the locations of the noise surveys.

3.2 UNATTENDED NOISE MONITORING

As per ADE Consulting report, long-term noise monitoring was carried out from Tuesday 1st June to Wednesday 30th June 2021 at three monitoring locations as shown in the Figure 4. Details of the long-term noise monitoring results are detailed in Section 2 of the Environmental Noise Assessment Report. Table 2 below shows the RBLs and the ambient noise levels (L_{Aeq}) measured for each time period at each monitoring location.

The noise data collected from monitor location 3 has the lowest RBL results and was located closest to the proposed Ambulance Station site. Therefore, the RBL obtained from this monitor location will be used to form the intrusiveness criteria in Section 4.

¹ Environmental Noise Assessment Report, June 2021, Tweed Valley Hospital Project, Cudgen NSW, ADE Consulting Group, (Ref: NMA.V1.1F), 21 July 2021.

Monitoring Location	Rating Background Levels, dB(A)			L _{Aeq} Ambient Noise Levels, dB(A)		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
1	53	43	40	69	64	61
2	48	44	40	67	62	59
3	48	43	39	60	56	53

Table 2: Results of unattended long-term noise monitoring.

4 RELEVANT NOISE STANDARDS AND GUIDELINES

4.1 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:
 - Tweed Local Environment Plan 2014.
 - Tweed Shire Development Control Plan 2008.
- Operational Noise
 - Protection of the Environment Operations. Noise Regulation Controls (NRC) 2008.
 - NSW EPA Noise Policy for Industry (NPI) 2017.
 - NSW Department of Environment Climate Change and Water (DECCW) Noise Guide for Local Government (NGLG) 2013.
 - NSW DECCW Road Noise Policy (RNP) 2011.
- External Noise Intrusion
 - NSW Health Infrastructure 'Engineering Services Guideline' (ESG) Update July 2017.
- Construction Noise and Vibration
 - NSW DECCW Interim Construction Noise Guideline (ICNG) 2009.
 - NSW DECC Assessing Vibration: A Technical Guideline 2006.
 - NSW Road Maritime Service (RMS) Construction Noise and Vibration Guideline 2016.
 - Australian Standard AS 2436:2010 '*Acoustics – Guide to Noise Control on Construction, Maintenance & Demolition Sites*'.
 - NSW EPA, Draft Construction Noise Guideline 2020.

4.2 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.

" ...

4.3 KINGSCLIFF COUNCIL LEGISLATION

Relevant Planning Documents of Tweed Shire Council have been reviewed for any noise requirement or criteria.

The Tweed Local Environmental Plan (T-LEP 2014) sets the Land Zoning as shown in Figure 5 as per information extracted from the T-LEP map 7550_COM_LZN_023_020_20200803. The site is categorised as Health Services Facility (SP1).



Figure 5: Land Zoning of the site (red outline) and surroundings.

Tweed Shire Development Control Plan (T-DCP 2008) has 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 T-DCP 2008 provide general planning strategies.

4.4 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW EPA Noise Policy for Industry 2017 assesses noise from industrial noise sources - scheduled under the POEO. Mechanical noise from the development shall be addressed following the recommendations in the NSW NPI.

The assessment is carried out 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.

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

4.4.1 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 5dB when beyond a minimum threshold."

Based on the intrusiveness criteria definition and the measured background noise levels on site, Table 3 shows the intrusiveness criteria for the noise sensitive receivers.

Indicative Noise Amenity Area	Period	Measured Rating Background Level (L_{A90}), dB(A)	Intrusiveness Criteria, dB(A)
Low Density Residential (R2)	Day	48	53
	Evening	43	48
	Night	39	44

Table 3: Determination of the intrusiveness criterion for residential noise sensitive receivers.

4.4.2 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 4 shows the amenity criteria for the noise sensitive receivers.

<i>Indicative Noise Amenity Area</i>	<i>Period</i>	<i>Recommended Amenity Noise Level (L_{Aeq}, dB(A))</i>	<i>Amenity Criterion, dB(A)</i>
<i>Low Density Residential (R2)</i>	Day	55	53 $L_{Aeq,15min}$ (55-5+3)
	Evening	45	43 $L_{Aeq,15min}$ (45-5+3)
	Night	40	38 $L_{Aeq,15min}$ (40-5+3)
<i>Hospital Ward (External)</i>	Nosiest 1-hour	50	48 $L_{Aeq,15min}$ (50-5+3)
<i>School Classroom</i>	Nosiest 1-hour when in use	35 (internal)* 45 (external)	43 $L_{Aeq,15min}$ (45-5+3)
<i>Active Recreation</i>	When in use	55	53 $L_{Aeq,15min}$ (55-5+3)

Table 4: Determination of the amenity criterion for noise sensitive receivers. Note*: Where reference is made to an internal noise level, an external noise level 10dB above the internal noise levels are applied which should achieve the internal noise level where a window is adequately opened to provide natural ventilation.

4.4.3 PROJECT NOISE TRIGGER LEVELS

The PNTL's are shown in Table 5 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</i>	<i>Amenity Criterion</i>
<i>Low Density Residential (R2)</i>	Day	53	53
	Evening	48	43
	Night	44	38
<i>Hospital Ward (External)</i>	Nosiest 1-hour	---	48
<i>School Classroom (External)</i>	Nosiest 1-hour when in use	---	43
<i>Active Recreation</i>	When in use	---	53

Table 5: Determination of PNTL's (light grey highlight) for noise sensitive receivers.

4.5 POEO NOISE REGULATION CONTROLS

The POEO Noise Regulation Controls streamlines the handling of common neighbourhood noise problems by providing more specific controls than the general powers provided under the POEO Act. The provisions of the regulation are aimed at residential activities and equipment, rather than those on commercial or industrial premises.

Part 4 deals with common neighbourhood noise problems such as the times of use of air conditioners, heat pump water heaters, pneumatic tools, swimming pool pumps, power tools, building intruder alarms and loud

music. This part mainly applies to council enforcement / authorised officers and Police officers, but OEH enforcement / authorised officers also have powers in relation to some provisions.

The regulation applies different methods of control to different neighbourhood noise problems. These controls are:

- Preventing the use of certain articles where they can be heard during noise sensitive periods (e.g. night time).
- Placing limits on how long an article can emit noise (e.g. alarms).
- Prohibiting the use of certain articles where they emit 'offensive noise' (e.g. off-road trail bikes).

Although the clause below refers to residential premises, it is understood that it could be applied as a good practice plus establish a noise control. Power tools and equipment noise management is described as follows:

"...

Clause 51 – Use of power tools on residential premises

(a) the person causes or permit a power tool 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:

(a) before 8 am or after 8 pm on any Saturday, Sunday or public holiday, or

(b) before 7 am or after 8 pm on any other day.

..."

Therefore, noise from power tools shall be inaudible during the above listed time periods and shall not be 'offensive noise' (as per POEO Act definition) for other time periods.

4.6 TRAFFIC NOISE

Road traffic noise impact is assessed in accordance with the introduced NSW OEH Road Noise Policy (RNP) 2011. The NSW 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 2dB above the existing noise levels. An increase of up to 2dB represents a minor impact that is considered barely perceptible to the average person.

4.7 NSW HEALTH INFRASTRUCTURE ESG

Section 13 of the NSW Health Infrastructure Engineering Services Guideline provides acoustic design for healthcare buildings considering internal noise levels, reverberation times plus sound insulation performances that should be achieved for the Ambulance Station.

Therefore, the criteria and guides outlined in the ESG shall be adopted for this project, particularly during the design stage.

4.8 CONSTRUCTION NOISE AND VIBRATION

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

In order to establish the airborne construction noise criteria, noise levels from the unattended noise monitoring have been used for the noise sensitive receivers – refer to Section 3. Table 6 below summarises the airborne construction noise criteria for most the affected noise sensitive receivers surrounding the development site.

Sensitive Receiver		Airborne Construction Noise Criteria, L_{Aeq} dB(A)	
		Within Standard Hours	Outside Standard Hours
Residential	Noise affected / External	RBL + 10	RBL + 5
	Highly noise affected / External	75	N/A

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

Table 7 summaries the airborne construction noise criteria for healthcare facilities surrounding the development site.

Land Use	Management Level, L_{Aeq} dB(A)
Hospital Wards and operating theatres	Internal Noise Level 35dB(A)
	External Noise Level 45dB(A)

Table 7: ICNG construction airborne noise criteria for healthcare.

Where reference is made to an internal noise level, an external noise level 10dB above the internal noise levels are applied which should achieve the internal noise level where a window is adequately opened to provide natural ventilation.

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.

4.8.2 VIBRATION CRITERIA

4.8.2.1 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 Table 8.

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 of 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 8: DIN 4150.3:2016 Guideline values of vibration velocity (PPV) for evaluating the effects of short-term vibration.

4.8.2.2 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 9 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
Critical Areas	When in use	0.10 [100 dB]	0.20 [106 dB]	0.10 [100 dB]	0.20 [106 dB]
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 9: 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 10 shows the acceptable VDV values for intermittent vibration.

Place	Time	Vibration Dose Values, m/s ^{1.75}	
		Preferred	Maximum
Critical Areas	When in use	0.10	0.20
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 10: Intermittent vibration criteria applicable to the site.

5 NOISE EMISSIONS ASSESSMENT

Noise break-out from the proposed Ambulance Station has the potential to impact on existing noise sensitive receivers. For the purpose of this noise impact assessment, the noise sources are assumed as follows:

- Noise emissions from mechanical plant from the Ambulance Station to the surrounding receivers.
- Noise emissions from traffic generated by the proposed development.
- Noise emissions from wash bay.

Each of these noise sources has been considered in the noise impact assessment. 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.
- Lowest measured background noise levels at the nearest noise sensitive receiver have been used to provide a worst-case scenario.

5.1 EXTERNAL MECHANICAL PLANT

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

The mechanical plant will operate continuously during all day periods. At this stage, a preliminary selection of the external mechanical plant has been provided and a noise assessment at the nearest noise sensitive receivers has been carried out based on the noise data from the manufacturers. The selected units and their noise levels are listed below:

- Condenser Unit Daikin REYQ18TAY1 – 62dB(A) @1m

The following assumptions have been made in the noise assessment:

- The location of the external plant is as per Figure 6.
- The nearest noise sensitive receivers are Tweed Regional Aquatic Centre (to the east), 71 Turnock Street – Kingscliff Community Health Centre (to the north-east) and 62 Cudgen Rd (to the south).
- Building reflections and directivity.

The noise assessment of the mechanical plant is summarised in Table 11.

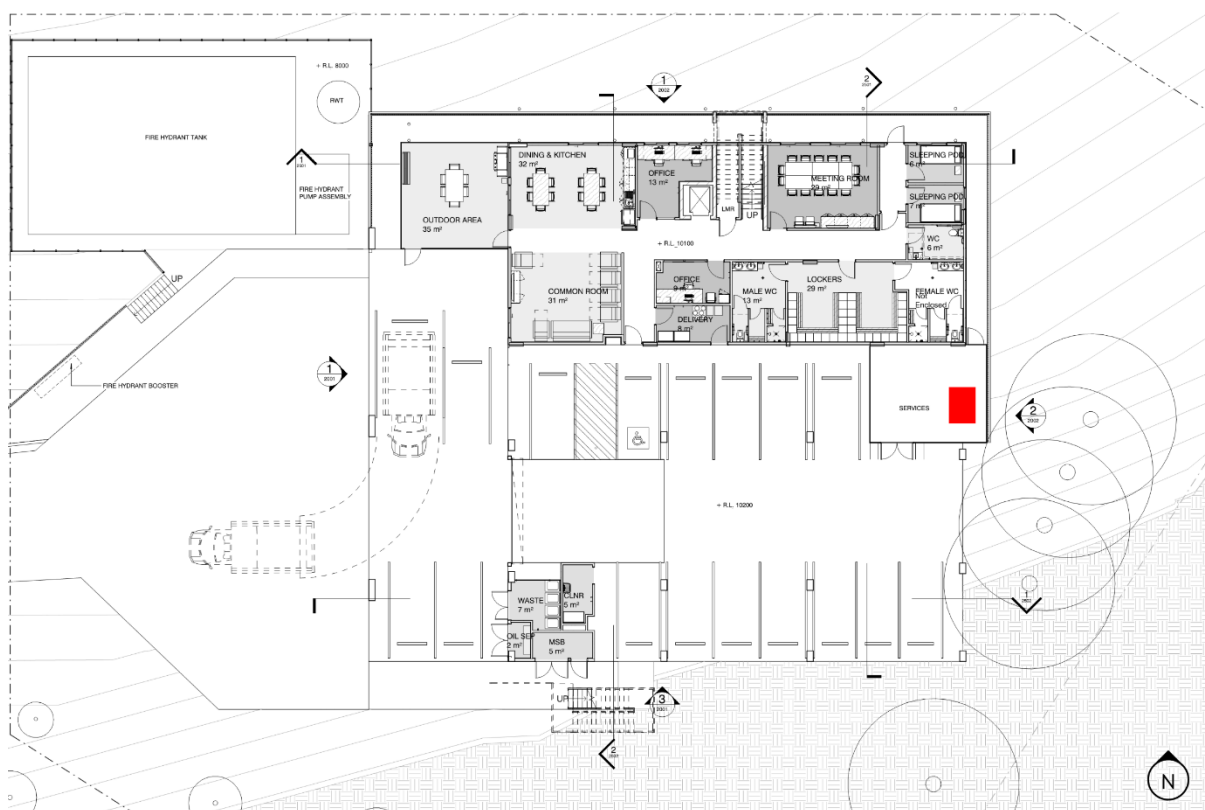


Figure 6. Proposed location of the external mechanical plant (red shadow).

Calculation	Overall A-weighted noise level, in dB(A)		
	Tweed Regional Aquatic Centre	Kingscliff Community Health Services	62 Cudgen Rd
L_{Aeq} CU @1m	62	62	62
Distance attenuation, dB	-32	-36	-41
Building attenuation / reflections / directivity, dB	---	---	---
$L_{Aeq,15min}$ resulting at residential receiver	30	26	21
Evening criteria NPI / Complies	53 / Yes	48 / Yes	53 / Yes
Night-time criteria NPI / Complies?	---	---	38 / Yes

Table 11: Noise assessment of external mechanical plant to the nearest noise sensitive receivers.

Based on this assessment and the NSW NPI noise level criteria in Table 5, the mechanical plant will meet the noise level criteria at the nearest noise sensitive receivers.

Usual design noise controls that may need to be implemented will typically include, but are not limited to:

- Strategic location and selection of plant to ensure the cumulative noise level at the receiver boundaries is met.
- Selection of appropriate quiet plant.
- Acoustic noise control measures to be put in place to minimise noise impacts such as:
 - In-duct attenuation

- Noise enclosures as required
- Sound absorptive panels
- Acoustic louvres as required
- Noise barriers as required

Acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures. If new or replacing external mechanical plant is proposed, then an acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.

5.2 VEHICLE NOISE EMISSIONS

The potential noise sources associated with the proposed vehicles operations will be:

- Noise generated by vehicles movements, particularly ambulances dispatched for emergencies during night-time.
- Noise generated by ambulance sirens.
- Noise generated by staff vehicles movements.

It is expected that vehicle movements will be moving slowly and the number of vehicles movement will be low compared with the existing traffic flows.

5.2.1 AMBULANCE MOVEMENTS

There is provision for 9 ambulance vehicles within the proposed development. Based on this low number and the Traffic Assessment² for the Tweed Valley Hospital by Bitzios Consulting, it is understood that ambulance movements will only slightly increase the traffic flows. Therefore, it can be stated that there will be no significant increase in the existing ambient and background noise levels road traffic as a result of the development.

As noted in Section 4.6.2, 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, traffic noise associated with the ambulance movements is expected to meet the NSW RNP recommendations.

5.2.2 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 (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.

² Tweed Valley Hospital – Traffic Assessment for Modification to Concept Proposal (Ref: P3378.002T), by Bitzios Consulting, 23/09/2019

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, it is understood that ambulance drivers will make a judgement call on whether to use ambulance sirens on case-by-case basis. It is further understood 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*.

5.2.3 STAFF MOVEMENTS

There is provision for 16 staff carparks in the proposed development. Based on this plus the Traffic Assessment for the Tweed Valley Hospital by Bitzios Consulting, it is understood that staff movements will only slightly increase the traffic flows to the expected traffic levels in the area. Therefore, it can be stated that there will be no significant increase in road traffic as a result of the development due to the additional staff carparks.

As noted in Section 4.6.2, 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, traffic noise associated with the development is expected to meet the NSW RNP recommendations.

5.3 AMBULANCE WASH BAY

Based on the architectural layout, the building façade will provide shielding to the nearest noise sensitive receivers. Distance attenuation will further reduce the noise levels. It is expected that the pressure washer will not be used continuously. Therefore, noise levels from the wash bay are anticipated to be in compliance with the noise level criteria and will not impact the nearest noise sensitive receivers.

The internal location of the ambulance wash bay is shown below in Figure 7.

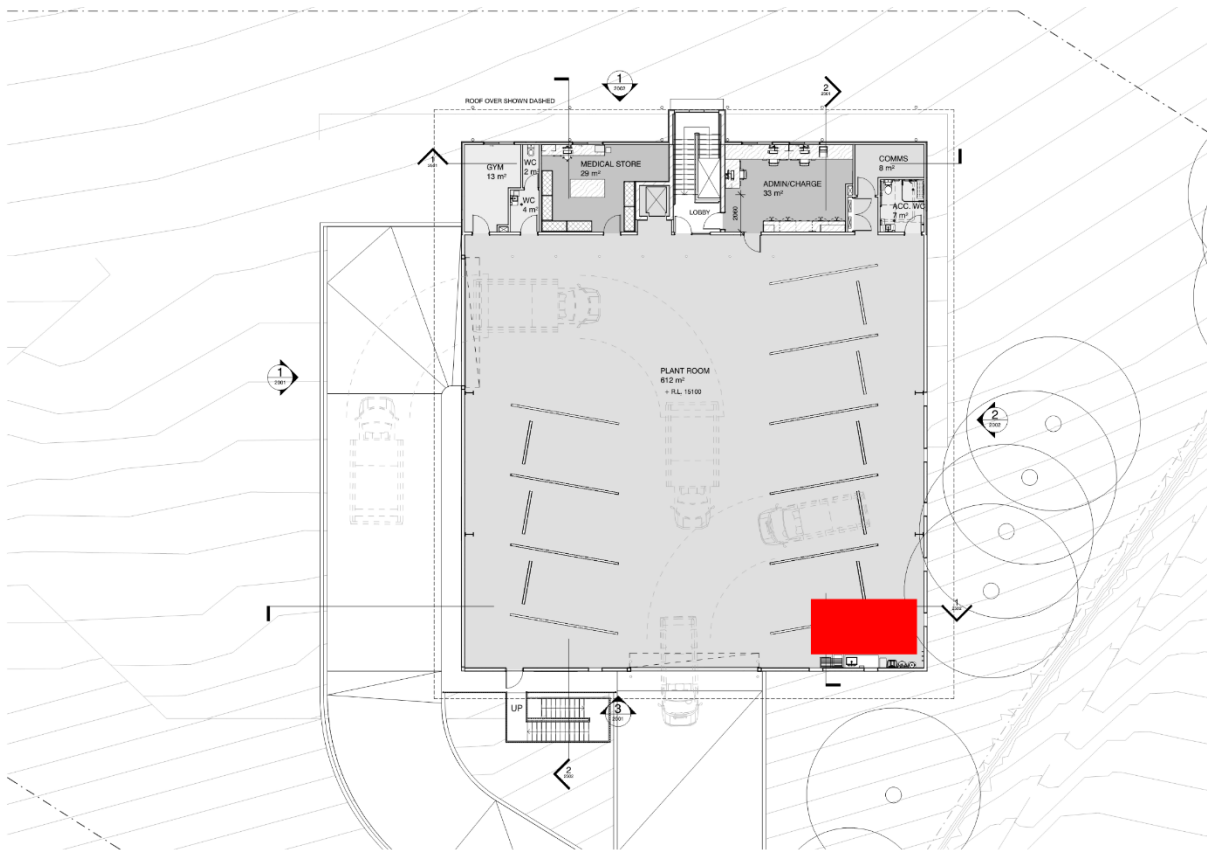


Figure 7. Proposed location of the internal wash bay (red shadow).

It is recommended to restrict pressure washer operations to day-time period whenever possible. As required by the NSW POEO NCR 2008, noise from all power tools, including the pressure washer, shall not be audible within any habitable room in any residential premises outside the proposed hours. The allowed operation time period is between 7am and 8pm Monday to Friday, and between 8am and 8pm on Saturday, Sundays and Public Holidays. Therefore, whenever reasonable, the pressure washer shall only be used during these hours.

6 NOISE INTRUSION

The total noise level within the internal spaces of the proposed development will be a result of the combination of external noise and noise from the building services. Noise generated by building services, particularly the air-conditioning and ventilation systems, needs to be considered to ensure that the internal noise levels for each space of the Ambulance Station meet the ambient noise levels as per NSW Health Infrastructure ESG.

In order to achieve these internal noise levels for each space, noise control treatments will need to be incorporated into the mechanical systems as required. Table 12 outlines the NSW Health Infrastructure ESG Criteria for Continuous Internal Noise Levels.

Area Designation	Continuous Internal Noise Levels L_{Aeq} dB	
	Satisfactory	Maximum
Dining	45	50
Meeting Room	35	40
Private Offices	35	40
Multi Person Office	40	45
Rest Rooms	40	45
Toilets / Showers / Locker Rooms	50	55

Table 12: Continuous Internal Noise Levels (L_{Aeq}) as per NSW Health Infrastructure ESG.

7 CONSTRUCTION NOISE AND VIBRATION PLANNING

Currently a detailed construction program is not yet fully 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.

7.1 RELEVANT STANDARDS FOR CONSTRUCTION NOISE AND VIBRATION CRITERIA

Section 4.8 of this report contains the relevant legislation, codes and standards in addition to construction noise and vibration criteria for this project.

7.2 CONTROL ELEMENTS

7.2.1 WORKING HOURS

The following construction hours are proposed as follows:

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

It is noted that the proposed construction hours are within the recommended NSW EPA hours. 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.

7.2.2 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 Construction Noise and Vibration Management Plan, and undertake noise and vibration monitoring for the duration of the project, if required by the CNVMP and / or Conditions of Consent.

7.2.2.1 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.
 - 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.
- *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.

7.2.2.2 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 the CNVMP incorporates silencing/shielding equipment as required to meet the noise criteria.

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

8 MANAGEMENT AND COMPLIANCE

Limiting noise nuisance from a premise generally requires management on an ongoing basis. Strategies for the proposed development should consider the following:

- Whenever possible, the pressure washer and other power tools shall be operated between 7am to 8pm during Monday and Friday and between 8am to 8pm on Saturdays, Sundays and Public Holidays.
- Use of ambulance sirens within the Ambulance Station lot and surroundings shall be minimised whenever possible.
- To minimise impact on the surrounding amenity, Waste Collection movements are recommended to occur during the day-time.

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9 SUMMARY AND CONCLUSIONS

A noise assessment has been carried out for the proposed development of a RAIR Ambulance Station at 771 Cudgen Road in Cudgen/Kingsliff, NSW. This report forms part of the documentation package to be submitted to NSW Health Infrastructure as part of the DA / REF 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. The noise impacts have been predicted at the nearest noise sensitive receiver boundaries, taking in account distance attenuation, building reflections and directivity.

At this stage, a preliminary selection of the external mechanical plant has been provided and a noise assessment at the nearest noise sensitive receivers has been carried out based on noise data from the manufacturers. Based on the assessment results, the mechanical plant will meet the noise level criteria at the nearest noise sensitive receivers. If new or replacing external mechanical plant is proposed, then an acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.

Existing ambient and background noise levels will not be significantly increased by vehicle movements from the Ambulance Station as there will only be any additional 9 Ambulance vehicles and 16 staff carpark spaces. For noise from ambulance sirens, it is recommended that their operation within the development and surroundings shall be addressed in the Management Plan and minimised whenever possible.

Wash bay operations are expected to comply with the relevant noise criteria as it is proposed within the ambulance plantroom and, therefore, the building façade will offer shielding to the nearest noise sensitive receivers. It is expected that the pressure washer will not impact the nearest noise sensitive receivers. However, it is recommended to restrict its use to 7am to 8pm during Monday to Friday and 8am and 8pm on Saturdays, Sundays and Public Holidays whenever reasonable.

Preliminary construction noise and vibration management planning has been presented in this report and recommendations based on the relevant guidelines are provided. If, during construction works, an item of equipment exceeds the stated airborne noise and / or vibration criteria at any sensitive location, the additional noise / vibration control measures presented in this report or in the CNVMP, together with construction best practices, shall be considered to minimise noise and vibration impacts on the sensitive receivers.

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, modifications to the building and introduction of any additional 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)

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**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	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