



REPORT R210194R1

**Revision 0** 

# DA Noise Impact Assessment Proposed FS8 Gym 54 West Esplanade, Manly

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1 April 2021

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## DA Noise Impact Assessment

Proposed FS8 Gym

54 West Esplanade, Manly

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Reference	Status	Date	Prepared	Checked	Authorised
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## 1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (here forth referred to as RSA) has been engaged by Daniel Capilli to prepare a Development Application (DA) Noise Impact Assessment for the proposed FS8 Gym at 54 West Esplanade, Manly

This assessment addresses the potential operational (i.e. training/workout) noise and vibration impacts associated with the proposed FS8 Gym on the amenity of the adjoining sensitive receivers.

Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in Appendix A.

## 2 PROPOSED DEVELOPMENT

It is understood that a new FS8 Gym is proposed at 54 West Esplanade, Manly. The proposed FS8 Gym is to be located in an existing commercial area. The gym premises are bounded by an adjoining a commercial tenancies to the east, a foyer to the west and The Quest Apartments above. A photograph indicating the nearest receivers in relation to the proposed gym is presented in Figure 2-2.

The existing external noise environment in the area of the proposed FS8 gym is mainly an urban "hum", with noise influence from the road traffic on Road. Figure 2-1 shows an aerial image of the site area and the surrounding environment.

#### 2.1 Hours of Operation and Patron Numbers

The proposed hours of operation of the gym and number of patrons are as follows:

- Monday to Friday 5:00am to 10:30am and 5:00pm to 7:30pm
- Saturdays and Sundays 6:00am to 10:00am

The gym will run supervised classes of up to 30 patrons. We have been informed by FS8 Gym management that this gym will only carry out pilates related exercises, no weights will be used during the sessions. We have based our calculations on the information provided above.



#### Figure 2-1 Site Location

Image Courtesy of Google Maps © 2021.

Figure 2-2 Location of Nearest Receivers



## 3 BASELINE NOISE SURVEY

#### 3.1 Unattended Noise Monitoring

In order to characterise the existing acoustical environment of the area unattended noise monitoring was conducted between the dates of Wednesday 24<sup>th</sup> March and Wednesday 31<sup>st</sup> March 2021 at the logging location shown in Figure 2-1

Logger location was selected with consideration to other noise sources which may influence readings, security issues for noise monitoring equipment and gaining permission for access from residents and landowners.

Instrumentation for the survey comprised of a RION NL-42 environmental noise logger (serial number 572542) fitted with microphone windshields. Calibration of the logger was checked prior to and following measurements. Drift in calibration did not exceed ±0.5 dB(A). All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Measured data has been filtered to remove data measured during adverse weather conditions upon consultation with historical weather reports provided by the Bureau of Meteorology (BOM).

The logger determines L<sub>A1</sub>, L<sub>A10</sub>, L<sub>A90</sub> and L<sub>Aeq</sub> levels of the ambient noise. L<sub>A1</sub>, L<sub>A10</sub>, L<sub>A90</sub> are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary for definitions in Appendix A). Detailed results at the monitoring location are presented in graphical format in Appendix B. The graphs show measured values of L<sub>A1</sub>, L<sub>A10</sub>, L<sub>A90</sub> and L<sub>Aeq</sub> for each 15-minute monitoring period

#### 3.2 Data Processing

#### 3.2.1 Noise Emission (Noise Policy for Industry)

In order to assess noise emission from the proposed gym, the data obtained from the noise logger has been processed in accordance with the procedures contained in the NSW Environmental Protection Authority's (EPA) Noise Policy for Industry (NPfI, 2017) to establish representative noise levels that can be expected in the residential vicinity of the site. The monitored baseline noise levels are detailed in Table 3-1.

		Measure	ed Noise Level – dB(A) r	e 20 μΡa
Location	Measurement — Descriptor	Daytime 7 am - 6 pm	Evening 6 pm – 10 pm	Night-time 10 pm – 7 am
Logger Survey on	L <sub>Aeq</sub>	60	61	57
Site	RBL (Background)	54	52	44

#### Table 3-1 Measured Baseline Noise Levels Corresponding to Defined NPfI Periods

Notes: All values expressed as dB(A) and rounded to nearest 1 dB(A);

L<sub>Aeq</sub> Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.

L<sub>A90</sub> Noise level present for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

## 4 OPERATIONAL NOISE CRITERIA

#### 4.1 Northern Beaches Council DCP 2013

Northern Beaches Council does not specify operational noise and vibration requirements for fitness facility type development. Therefore, RSA considers the following documents to be the most appropriate for assessing the noise and vibration impacts from the operation of FS8 Gym at 54 West Esplanade, Manly:

 AS/NZ 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors.

#### 4.2 Australian Standard AS/NZ 2107:2016

There is the potential of the training activities to impact on the amenity of the adjoining commercial and residential tenancies adjoining the FS8 Gym. As Northern Beaches Council's DCP 2013 has no acoustic criteria for the preservation of the amenity of commercial tenancies specific to this type of assessment, we have adopted noise objectives as set out in *AS/NZS 2107:2016 – Recommended Design Sound Levels and Reverberation Times for Building Interiors*. Table 4-1 is an extract from the standard that pertains to recommended noise levels for different receiver types.

#### Table 4-1 AS/NZS 2107:2016 – Recommended Internal Noise Levels

Type of Occupancy/Activity	Recommended Design Sound Level, L <sub>Aeq</sub> dB(A)		
	Design Sound Level (L <sub>Aeq,t</sub> ) Range		
Residential Buildings Near Major Roads			
Apartment Common Areas	45 – 50		
Living Areas	35 – 45		
Sleeping Areas	35 - 40		
Restaurants and Cafeterias			
Restaurants	40 - 50		

#### 4.3 Operational Noise Project Trigger Noise Levels

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the EPA. The EPA oversees the Noise Policy for Industry (NPfI) October 2017 which provides a framework and process for deriving project trigger noise level. The NPfI project noise levels for industrial noise sources have two (2) components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity for particular land uses for residents and sensitive receivers in other land uses.

#### 4.3.1 Intrusiveness Noise Levels

For assessing intrusiveness, the background noise generally needs to be measured. The intrusiveness noise level essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dB(A) above the measured Rated Background Level (RBL), over any 15 minute period.



#### 4.3.2 Amenity Noise Levels

The amenity noise level is based on land use and associated activities (and their sensitivity to noise emission). The cumulative effect of noise from industrial sources needs to be considered in assessing the impact. The noise levels relate only to other industrial-type noise sources and do not include road, rail or community noise. The existing noise level from industry is measured.

If it approaches the project trigger noise level value, then noise levels from new industrial-type noise sources, (including air-conditioning mechanical plant) need to be designed so that the cumulative effect does not produce total noise levels that would significantly exceed the project trigger noise level.

#### 4.3.3 Area Classification

The NPfl characterises the "Urban" noise environment as an area with an acoustical environment that:

- is dominated by 'urban hum' or industrial source noise,
- where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources
- has through-traffic with characteristically heavy and continuous traffic flows during peak periods
- is near commercial districts or industrial districts
- has any combination of the above.

The area surrounding the proposed development falls under the "Urban" area classification.

#### 4.3.4 Project Specific Trigger Noise Levels

Having defined the area type, the processed results of the unattended noise monitoring have been used to determine project specific project trigger noise levels. The intrusive and amenity project trigger noise levels for nearby residential premises are presented in Table 4-2. These project trigger noise levels are nominated for the purpose of assessing potential noise impacts from the proposed development.

For each assessment period, the lower (i.e. the more stringent) of the amenity or intrusive project trigger noise levels are adopted. These are shown in bold text in Table 4-2.

				Measured		Project Trigger Noise Levels	
Receiver	Time of Day	Time of ANL <sup>1</sup> Day L <sub>Aeq</sub>	RBL <sup>2</sup> La90(15min)	Existing LAeq(Period)	Intrusive L <sub>Aeq(15min)</sub>	Amenity L <sub>Aeq(15min)</sub>	
	Day	60	54	60	59	58	
Residential	Evening	50	52	61	57	48	
	Night	45	44	57	49	43	

#### Table 4-2 Operational Project Trigger Noise Levels

Note 1: ANL = "Amenity Noise Level" for residences in Urban Areas.

Note 2: RBL = "Rating Background Level".

The NPfI provides noise trigger levels for commercial and industrial premises, the noise trigger level is **65** dB(A) for commercial tenancies and **70** dB(A) for Industrial premises



#### 4.4 Sleep Disturbance

The NSW EPA Noise Policy for Industry (NPfI) provides a guidance for sleep disturbance or sleep arousal assessment. The NPfI states the following:

The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

Where the subject development/premises night-time noise levels at a residential location exceed:

• LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or

• LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level event assessment should be undertaken. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the NSW Road Noise Policy

Other factors that may be important in assessing the extent of impacts on sleep include:

how often high noise events will occur

• the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development

• whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods)

• current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night.

Maximum noise level event assessments should be based on the LAFmax descriptor on an event basis under 'fast' time response.

The detailed assessment should consider all feasible and reasonable noise mitigation measures with a goal of achieving the above trigger levels

### 5 OPERATIONAL NOISE IMPACT ASSESSMENT

The main noise generating activities carried out at the gym will be music played through the sound system, the gym will not engage patrons in activities related to weightlifting and/or dropping. A number of reformer machines will be used during the sessions, these machines do not generate significant as most activities are guided and done in slow motion. The instructors will not be using voice reinforcement systems.

5.1 Calculated Noise Impacts

Noise levels have been calculated for gym activities. Noise emissions at the nearest adjoining receivers are presented in the table below. The predicted noise calculations take into account the following:

- Heights of receivers are assumed to be 1.5 m above ground level.
- 30 patrons (assumed maximum) will be using participating in a session (worst case scenario)



- A 15 mm thick rubber flooring system with a minimum density of 600 kg/m<sup>3</sup> (minimum) as underlay is in place
- Background music will not be played through a calibrated sound system.
- Patrons are not engaged in activities that involve speaking or shouting
- All patrons are following their programs and will not misuse the equipment
- All activities will be supervised by trainers

Table 5-1	Calculated LAeg	Noise	Levels at Most	Affected Boundary	/
					/

Receiver	Time	Calculated Noise Level	Criteria	Complies
Commercial Tenancy Restaurant	When in Use	48	65	Yes
	Day	41	58	Yes
Apartments Above	Evening	41	48	Yes
	Night	41	43	Yes
	Day	35	58	Yes
Apartments at 53 East Esplanade	Evening	35	48	Yes
	Night	35	43	Yes

#### Table 5-2 Calculated LAeq Internal Noise Levels

Receiver	Calculated Noise Level	Criteria	Complies
Commercial Tenancy Restaurant	28	40 - 50	Yes
Apartment Foyer	37	45 – 50	Yes
Apartments Above – Living Area	35	35 – 45	Yes

Apartments Above – Sleeping Area	32	35 - 40	Yes
Apartments at 53 East Esplanade – Living Area	<20	35 – 45	Yes
Apartments at 53 East Esplanade – Sleeping Area	<20	35 - 40	Yes

## 6 NOISE CONTROL RECOMMENDATION

The operation of the proposed FS8 Gym has been assessed to comply with the project specific noise and vibration criteria with the implementation of the following noise controls to ensure compliance is maintained:

- The bare floor consists of concrete, the floor must be covered with 15 mm thick rubber flooring system with a minimum density of 600 kg/m<sup>3</sup> (minimum) as underlay (Refer to Figure 6-1)
- All patrons must be instructed to not cause unnecessary noise in particular when entering and leaving the gym
- The sound system must be installed with a graphic equaliser and noise limiter, all controls must be enclosed in a case that only FS8 management has access to
- All PA speakers must be self standing, speakers are not to be directly fixed to the walls.
- Trainers will not use voice enhancing equipment
- Upon installation, the sound system must be calibrated by a qualified acoustic engineer to have a maximum noise level of 75 dB(A) at 1 meter from the speakers
- Patrons must not be able to have access to the controls for the music systems.
- All doors must be closed while the sessions take place, music can only be played once the sessions start
- The existing air conditioning system will be used for ventilation purposes.



#### Figure 6-1 Floor Specification



## 7 CONCLUSION

Rodney Stevens Acoustics Pty Ltd has been engaged by Daniel Capilli to assess the operational noise emission from the proposed FS8 gym at 54 West Esplanade, Manly. The noise criterion for the operations of the proposed gym has been established in accordance with the Australian Standard AS/NZ2107:2016 and the Noise Policy for Industry (NPfI) October 2017.

A noise impact assessment has been conducted in relation to the operation of the FS8 Gym, specifically noise impacts from the workout activities. The assessment shows that the proposed FS8 gym will comply with the specific criteria with the implementation of the recommendation presented in this report.

Based on the noise impact assessment conducted, it is recommended that planning approval be granted for the proposed development.

Approved:-

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Rodney Stevens

Manager/Principal

## Appendix A – Acoustic Terminology

A-weighted sound pressure	The human ear is not equally sensitive to sound at different frequencies. People are more sensitive to sound in the range of 1 to 4 kHz ( $1000 - 4000$ vibrations per second) and less sensitive to lower and higher frequency sound. During noise measurement an electronic ' <i>A</i> -weighting' frequency filter is applied to the measured sound level $dB(A)$ to account for these sensitivities. Other frequency weightings (B, C and D) are less commonly used. Sound measured without a filter is denoted as linear weighted dB(linear).				
Ambient noise	The total noise in a given situation, inclusive of all noise source contributions in the near and far field.				
Community	Includes noise annoyance due to:				
annoyance	<ul> <li>character of the noise (e.g. sound pressure level, tonality, impulsiveness, low-frequency content)</li> </ul>				
	<ul> <li>character of the environment (e.g. very quiet suburban, suburban, urban, near industry)</li> </ul>				
	<ul> <li>miscellaneous circumstances (e.g. noise avoidance possibilities, cognitive noise, unpleasant associations)</li> </ul>				
	<ul> <li>human activity being interrupted (e.g. sleep, communicating, reading, working, listening to radio/TV, recreation).</li> </ul>				
Compliance	The process of checking that source noise levels meet with the noise limits in a statutory context.				
Cumulative noise level	The total level of noise from all sources.				
Extraneous noise	Noise resulting from activities that are not typical to the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.				
Feasible and reasonable measures	Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors:				
	<ul> <li>Noise mitigation benefits (amount of noise reduction provided, number of people protected).</li> </ul>				
	<ul> <li>Cost of mitigation (cost of mitigation versus benefit provided).</li> </ul>				
	<ul> <li>Community views (aesthetic impacts and community wishes).</li> </ul>				
	<ul> <li>Noise levels for affected land uses (existing and future levels, and changes in noise levels).</li> </ul>				
Impulsiveness	Impulsive noise is noise with a high peak of short duration or a sequence of these peaks. Impulsive noise is also considered annoying.				



- Low frequency Noise containing major components in the low-frequency range (20 to 250 Hz) of the frequency spectrum.
- Noise criteria The general set of non-mandatory noise levels for protecting against intrusive noise (for example, background noise plus 5 dB) and loss of amenity (e.g. noise levels for various land use).
- **Noise level (goal)** A noise level that should be adopted for planning purposes as the highest acceptable noise level for the specific area, land use and time of day.
- **Noise limits** Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action.

Performance-<br/>based goalsGoals specified in terms of the outcomes/performance to be achieved, but<br/>not in terms of the means of achieving them.

Rating<br/>Background LevelThe rating background level is the overall single figure background level<br/>representing each day, evening and night time period. The rating<br/>background level is the 10<sup>th</sup> percentile min LA90 noise level measured over<br/>all day, evening and night time monitoring periods.

- **Receptor** The noise-sensitive land use at which noise from a development can be heard.
- **Sleep disturbance** Awakenings and disturbance of sleep stages.

Sound and decibels (dB) Sound (or noise) is caused by minute changes in atmospheric pressure that are detected by the human ear. The ratio between the quietest noise audible and that which should cause permanent hearing damage is a million times the change in sound pressure. To simplify this range the sound pressures are logarithmically converted to decibels from a reference level of 2 x 10-5 Pa.

The picture below indicates typical noise levels from common noise sources.





dB is the abbreviation for decibel - a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.

Sound power The sound power level of a noise source is the sound energy emitted by Level (SWL) the source. Notated as SWL, sound power levels are typically presented in *dB(A)*.

Sound Pressure The level of noise, usually expressed as SPL in dB(A), as measured by a Level (SPL) standard sound level meter with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.

Statistic noise Noise levels varying over time (e.g. community noise, traffic noise, construction noise) are described in terms of the statistical exceedance level.

> A hypothetical example of A weighted noise levels over a 15 minute measurement period is indicated in the following figure:



Key descriptors:

L<sub>Amax</sub> Maximum recorded noise level.

L<sub>A1</sub> The noise level exceeded for 1% of the 15 minute interval.

levels



L<sub>A10</sub> Noise level present for 10% of the 15 minute interval. Commonly referred to the average maximum noise level.

L<sub>Aeq</sub> Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.

 $L_{A90}$  Noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

ThresholdThe lowest sound pressure level that produces a detectable response (in<br/>an instrument/person).

TonalityTonal noise contains one or more prominent tones (and characterised by<br/>a distinct frequency components) and is considered more annoying. A 2 to<br/>5 dB(A) penalty is typically applied to noise sources with tonal<br/>characteristics

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## Appendix B – Logger Graphs



Ambient Logger Data



**Ambient Logger Data** 

54 West Esplanade, Manly



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Ambient Logger Data



**Ambient Logger Data** 

54 West Esplanade, Manly



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Ambient Logger Data





## Appendix C – Calibration Certificate



Rodney Stevens Acoustics Report Number R210194R1 Revision 0