

Proposed PCYC – Revelry Road, Bells Creek

Acoustic Report

Noise Impact Assessment



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Contents

1.	Introduction	2
2.	Referenced Documentation	3
2.1	Regulations, Policies, Standards and Guidelines	3
2.2	Study Inputs	3
3.	Project Details	4
3.1	Site Description	4
3.1.1	Project Location	4
3.1.2	Surrounding Land Uses	4
3.2	Proposed Development	5
3.3	Existing Acoustic Environment	5
3.4	Acoustic Design Issues and Considerations	6
4.	Acoustic Criteria	7
4.1	Environmental Noise Emissions	7
4.1.1	Caloundra South Urban Development Area – Development Scheme	7
4.1.2	Queensland Government – Environmental Protection Act 1994	8
4.1.3	Queensland Government – Environmental Protection (Noise) Policy 2019	8
4.1.4	Summary of Environmental Noise Emission Limits	9
4.2	Environmental Noise Emissions	10
4.3	Outdoor Activities	10
4.3.1	Predicted Noise Levels	10
4.4	Onsite Indoor Activities	11
4.4.1	Indoor Activity Noise Levels	11
4.4.2	Sound Isolation Performance of Building Facade	11
4.4.3	Predicted Noise Levels	12
4.5	Assessment - Mechanical Plant	12
5.	Recommendations	13
5.1	Outdoor Activities	13
5.2	Indoor Activities	13
5.3	Mechanical Plant	13
6.	Conclusion	13

List of Appendices

Appendix A Glossary of Acoustic Terms



1. Introduction

Stantec Australia Pty Ltd have been engaged by PCYC Queensland to undertake a noise impact assessment of a proposed PCYC to be located on Lot 8048 Revelry Road, Bells Creek QLD 4551. The project site is located within the Caloundra South Priority Development Area (CS PDA).

This acoustic assessment report:

- details the site setting in context with the surrounding environment,
- identifies acoustic issues to be address during the design stages of the project,
- outlines the results of noise measurements conducted at the project site,
- establishes environmental noise limits applicable at the nearest external noise sensitive land uses, as well as noise limits from external sources impacting the proposed development,
- provides details of acoustic assessments undertaken for the project and, subsequently, nominates noise mitigation measures deemed necessary to comply with the relevant noise targets (internal and external).

A glossary of acoustic terms used in this report is included in **Appendix A**.

The recommendations made in this report are specific to the project design at the date of issue of this report. The project design may be subject to change during the following stages. Where this occurs, the assumptions made to inform the recommendations in the report may no longer be valid; therefore, further advice should be sought to ensure that the acoustic outcomes presented in this report are achieved.

The performance of products referred to in this report are made to meet the acoustic requirements only. It does not consider other aspects, including but not limited to thermal, wind, impact, structural, mechanical, national construction code, security and fire requirements. Relevant discipline reports, drawings and specifications should be referred to for conformance.

This report relates to this specific project and must not be applied to any other project without prior consultation with Stantec. Designs and conditions can vary between projects causing significant variations in acoustic performance and relevant subsequent advice to one project may not apply to another.

This report shall not be relied upon as providing any warranties or guarantees of construction quality regarding acoustics.



2. Referenced Documentation

2.1 Regulations, Policies, Standards and Guidelines

The following documents detailed in **Table 1** are relevant to the project and are referred to throughout this report.

Table 1: Applicable Regulations, Policies, Standards and Guidelines referenced in this report

Title	Abbreviation
STATE LEGISLATION AND LOCAL COUNCIL POLICIES	
Caloundra South PDA Development Scheme	CS PDA
Queensland Environmental Protection Act 1994	EPA 1994
Queensland Environmental Protection (Noise) Policy 2019	EPP 2019
AUSTRALIAN AND INTERNATIONAL STANDARDS	
AS 1055:2018 <i>Acoustics – Description and measurement of environmental noise</i>	AS 1055
AS 1055.2 - 1997 <i>Acoustics – Description and measurement of environmental noise – Part 2: Application to specific situations</i>	AS 1055.2 - 1997
International Standards Organization 9613-2:1996 <i>Attenuation of sound during propagation outdoors – Part 2: General method of calculation</i>	ISO 9613
Australian / New Zealand Standard AS/NZS 2107:2016 – <i>Acoustics – Recommended design sound levels and reverberation times for building interiors</i>	AS 2107

2.2 Study Inputs

Acoustic assessment and the preparation of this report have been conducted based on the received documentation detailed in **Table 2**.

Table 2: Received documentation

Date Received	Detail	Revision / Date Prepared	Prepared By	Format
13/03/2025	2025.03.13 DA01.pdf	13/03/2025	TMJ Architects	pdf



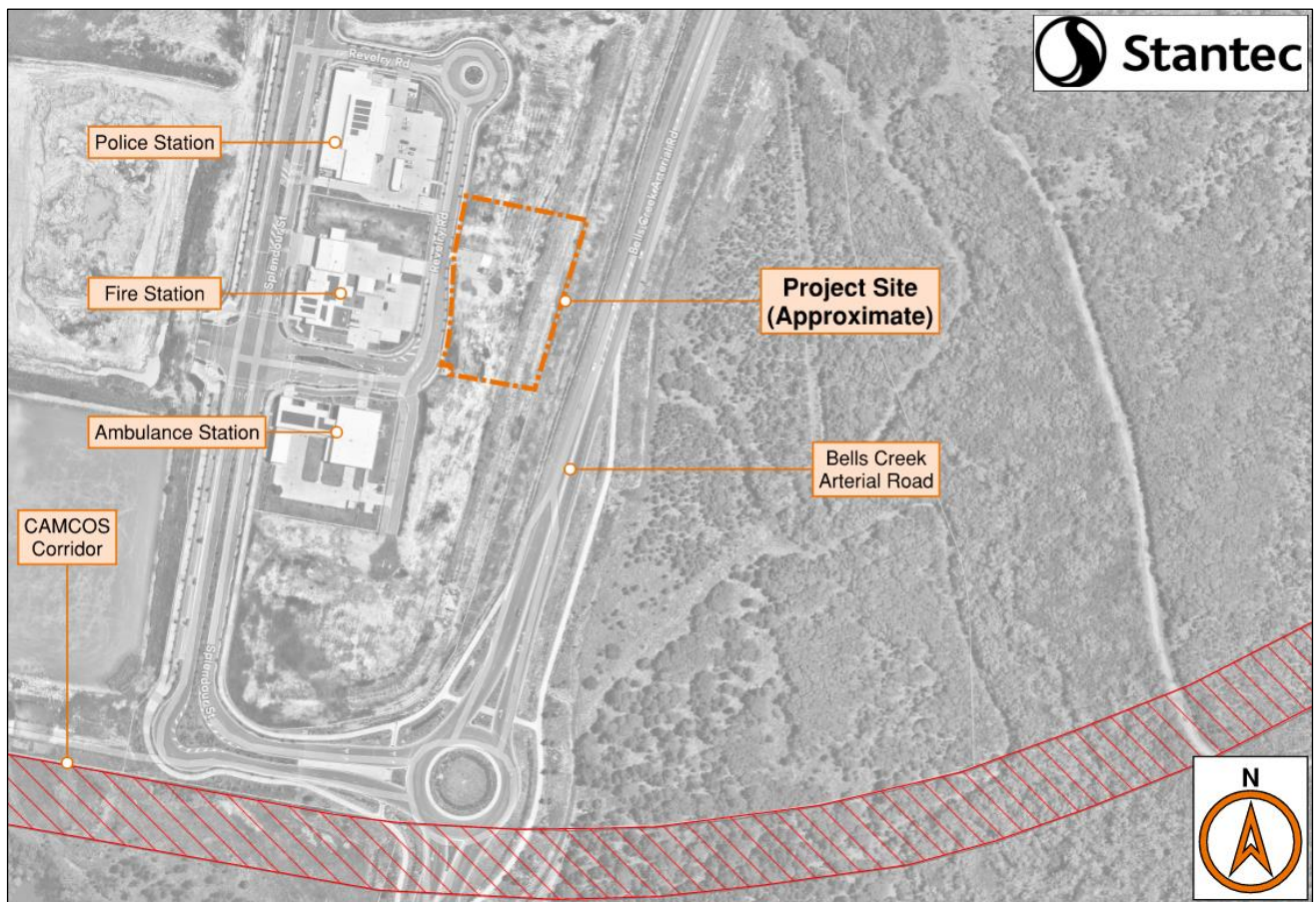
3. Project Details

3.1 Site Description

3.1.1 Project Location

The project site is located on Lot 8048 Revelry Road, Bells Creek QLD 4551 and is within the Caloundra South Priority Development Area (CS PDA). **Figure 1** shows the project site in relation to Bells Creek Arterial Road, the CAMCOS corridor, and surrounding land uses.

Figure 1: Project site, surrounding uses and CAMCOS corridor



Source: Nearmap (image dated 21/01/2025 – [link](#)) | Annotations by Stantec

3.1.2 Surrounding Land Uses

The following surrounding land uses were identified:

- Bells Creek Arterial Road is located east of the site;
- Revelry Road bounds the site to the west and separates the development from a fire and police station;
- Lots north and south of the site are currently vacant.
- The planned location of the CAMCOS rail corridor is >250m south of the project site.

3.2 Proposed Development

The proposed development shall include:

- Gym
- Gymnastics
- 3 x Multipurpose rooms
- Reception
- Outdoor functional fitness
- Amenities
- Comms room
- 81 x carparking spaces
- Youth room
- Office
- 2 x Meeting rooms
- Outdoor activity space
- Consult room
- First aid room
- Store rooms
- Plant space

3.3 Existing Acoustic Environment

It is normal practice to establish the existing noise climate by noise logging over a period. However at this location, the ambient noise climate is affected by construction noise and Bells Creek Road is not fully developed. If noise logging were to be conducted at the site, it would not be representative. Rather than conduct noise logging, the background noise levels have been estimated.

To estimate the existing noise environment, background noise levels were assumed based on AS1055.2 - 1997 noise area categories. Noise area category R4 (Refer to **Table 3**) was deemed suitable as the site acoustic environment will be affected by noise from Bells Creek Arterial Road as well as the various emergency uses nearby (fire, police and ambulance).

Table 3: AS1055.2 – 1997 - Estimated average background A-weighted sound pressure levels ($L_{A90,T}$) for different areas containing residences in Australia

Noise area category (Notes 1 and 2)	Description of neighbourhood	Average background A-weighted sound pressure level, $L_{A90,T}$					
		Monday to Saturday			Sundays and public holidays		
		0700–1800	1800–2200	2200–0700	0900–1800	1800–2200	2200–0900
R1	Areas with negligible transportation	40	35	30	40	35	30
R2	Areas with low density transportation	45	40	35	45	40	35
R3	Areas with medium density transportation or some commerce or industry	50	45	40	50	45	40
R4	Areas with dense transportation or some commerce or industry	55	50	45	55	50	45

By applying the R4 background noise limits the noise descriptors relevant to the site are provided in **Table 4**.

Table 4: Summary of background noise descriptors used to determine noise limits and inform acoustic assessment

Assumed Background Noise Level, $L_{90,T}$ dB(A)		
Day ¹⁾	Evening ¹⁾	Night ¹⁾
55 ²⁾	50 ²⁾	45 ²⁾

NOTES:

1) Day – 7am-6pm | Evening – 6pm-10pm | Night – 10pm-7am

2) Background noise levels obtained from AS 1055.2 – 1997 noise category R4



3.4 Acoustic Design Issues and Considerations

Based on the review of the design documentation the following acoustic design issues have been identified:

- Noise emissions from onsite activities are required to comply with the applicable criteria (EPA 1994, EPP 2008 / 2019) at the nearest sensitive receiver (fire station sleeping quarters).
- Ambient noise levels at the development site and surrounding areas will be influenced by Bells Creek Arterial Road and the various emergency services. Therefore, it is assumed that sleeping quarters in the fire and ambulance station would be provided with alternative ventilation to allow external windows to be closed when used for sleeping. This allows a 20 dB adjustment to be applied when assessing external noise intrusion into these spaces.



4. Acoustic Criteria

4.1 Environmental Noise Emissions

4.1.1 Caloundra South Urban Development Area – Development Scheme

The [Caloundra South Urban Development Area – Development Scheme](#) (CS UDA) prepared by the Economic Development Queensland (EDQ) provides the following as guidance for assessment of noise.

3.3.1 Neighbourhoods:

- do not prejudice future core industry and enterprise precincts adjoining the northern boundary outside the UDA³.
³ The context planning process will resolve any development constraints and manage the interface between industrial land and sensitive land uses, consistent with State Planning Policy 5/10: Air, Noise and Hazardous Materials.

The State Planning Policy 5/10: Air, Noise and Hazardous Materials makes multiple references to the Environmental Protection (Noise) Policy 2008 for the assessment of noise.

3.3.8 Natural Values

- manages air quality, noise and hazardous materials according to current standards.

3.3.9 Community safety and development constraints:

Development ensures that people and property are safe from potential hazards and disturbances including landslip, bushfire, noise, flooding and the predicted effects of climate change.

Future residents are to be provided with a level of amenity that addresses noise sources. Sensitive uses to nearby noise sources such as the Caloundra Aerodrome and the Bruce Highway are to be protected. The preferred means to control noise impacts will be determined at the development application stage.

Development adjoining the Bruce Highway

A buffer is to be provided between the limit of development, the Bruce Highway corridor and the southwest boundary of the site fulfilling the following:

- provision of a predominantly landscaped treatment that achieves a natural and rural edge as viewed from the Bruce Highway
- provision of visual separation between development and the highway. Acoustic walls are not visually prominent and do not result in a continuous, monotonous stretch of acoustic wall along the length of the site's frontage to the Bruce Highway
- inclusion of a variety of techniques at different locations including separation distances, mounding, landscaping, noise attenuation measures and recreational opportunities
- compliance with the applicable noise standards and requirements including:
 - Department of Transport and Main Road Traffic Noise Management: Code of Practice with respect to external road traffic noise levels
 - Queensland Development Code and Section MP 4.4 'Buildings in a Transport Noise Corridor'
- The visual buffer is designed to achieve the principles and standards set out in the applicable ULDA guideline.

Development located near the Caloundra Aerodrome

Development located near the Caloundra Aerodrome must not prejudice the ongoing operations of the Aerodrome. Nearby noise sensitive development that has the potential to receive intrusive noise is required to address the following:



- Justify that the proposed land use is suitable on amenity grounds based on the extent of aircraft noise at the subject site and information about future noise projections from the aerodrome operator comprising both fixed wing aircraft and helicopter movements. This will include information about:
 - Areas forecast to be exposed to above 20 noise events a day exceeding 70dB(A)
 - The Transparent Noise Information Package (TNIP) N70 contour forecast for the year 2030
- Inclusion of a variety of appropriate noise attenuation measures
- Provision of suitable levels of indoor residential amenity (by appropriate building siting and construction) to comply with the indoor design sound levels from the applicable Australian Standard

Relationship with Sunshine Coast Planning Scheme 2014

The CS PDA does not reference the Sunshine Coast Planning Scheme 2014. Therefore, based on guidance from State Planning Policy 5/10, assessment of environmental noise shall be in accordance with EPA 1994 and EPP 2019.

4.1.2 Queensland Government – Environmental Protection Act 1994

The objective of the Queensland Government Environmental Protection Act 1994 (EPA 1994) is “*to protect Queensland’s environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*”

To uphold this intent, and of relevance to acoustic assessment for the project, the EPA 1994 defines a series of noise-related standards in [Chapter 8, Part 3B Offences relating to noise standards](#). The following sections are considered applicable to the project:

Section 440R Building work

- (1) *A person must not carry out building work in a way that makes an audible noise—*
 - on a business day or Saturday, before 6.30a.m. or after 6.30p.m; or*
 - on any other day, at any time.*
- (2) *The reference in subsection (1) to a person carrying out building work—*
 - includes a person carrying out building work under an owner-builder permit; and*
 - otherwise does not include a person carrying out building work at premises used by the person only for residential purposes.*

Section 440U Air-conditioning equipment

- (1) *This section applies to premises at or for which there is air-conditioning equipment.*
- (2) *An occupier of the premises must not use, or permit the use of, the equipment on any day:*
 - before 7am, if it makes a noise of more than 3dB(A) above the background level; or*
 - from 7am to 10pm, if it makes a noise of more than 5dB(A) above the background level; or*
 - after 10pm, if it makes a noise of more than 3dB(A) above the background level.*

4.1.3 Queensland Government – Environmental Protection (Noise) Policy 2019

The Queensland Government Environmental Protection (Noise) Policy 2019 (EPP 2019) identifies environmental values to be enhanced or protected, states acoustic quality objectives, and provides a framework for making decisions about the acoustic environment.



Schedule 1 Acoustic Quality Objectives

The acoustic quality objectives are stated in Schedule 1 of the *Queensland Environmental Protection (Noise) Policy 2019*. In accordance with EPP 2019, the acoustic quality objectives are stated for a defined type of noise sensitive use and specified period of the day (reproduced in **Table 5**). The environmental values which EPP 2019 aims to enhance or protect are also stated. It is intended that the acoustic quality objectives be progressively achieved as part of achieving the purpose of EPP 2019 over the long term.

Table 5: Acoustic quality objectives as defined in Schedule 1 of the EPP 2019

Sensitive Receptor	Time of Day	Acoustic Quality Objectives ¹⁾ (measured at the receptor) dB(A)			Environmental Value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
residence (for indoors) ²⁾	daytime and evening	35	40	45	health and wellbeing
	night-time	30	35	40	health and wellbeing, in relation to the ability to sleep

NOTES:

- 1) The L_{Aeq,Adj,T} noise limits apply to all noise sources, whilst the L_{A10,Adj,1hr} and L_{A1,Adj,1hr} only apply to intermittent noise sources (i.e., excludes air conditioning).
- 2) Residence indoor levels have been applied to the fire and ambulance station sleeping quarters.

4.1.4 Summary of Environmental Noise Emission Limits

The noise limits for the Project are applicable to all noise emissions from the proposed development. The applicable noise limits at sensitive receptors are obtained when the noise criteria are combined with the measured noise levels as summarised in the tables below.

Table 6: All operational environmental noise limits

Location	Noise Criteria, dB(A)	Noise limit at the receptor, dB(A)		
		Day (7 AM – 6 PM)	Evening (6 PM – 10 PM)	Night (10 PM – 7 AM)
EPA 1994 – Mechanical Plant Criteria				
At a sensitive use	Assumed L90 (AS1055.2 – 1997 noise category R4)	55	50	45
	Permitted increase above L90	+5	+5	+3
	Noise limit external to sensitive use, L _{Aeq,T}	60	55	48
EPP 2019 – Acoustic Amenity Criteria				
Residential dwellings (fire and ambulance station sleeping quarters)	Noise limit internal , L _{Aeq,1hr}	35	35	30
	Noise limit external , L _{Aeq,1hr}	55 ¹⁾	55 ¹⁾	50 ¹⁾

Notes:

- 1) External noise limits are based on internal noise criteria +20 dB. This is based on the assumption that alternative ventilation has been provided to sleeping quarters to allow windows to remain closed when in use to exclude noise from Bells Creek Arterial Road and other emergency services in the area.



4.2 Environmental Noise Emissions

4.3 Outdoor Activities

Noise from carparks and the outdoor activity space has the potential to affect the acoustic amenity for offsite sensitive receivers. Therefore, assessment of car parking movements and the outdoor activity space was completed to determine whether acoustic treatments are required to comply with the project noise limits.

Calculations of carpark outdoor activity space noise included the following inputs and assumptions:

- The site operates 24 hours a day.
- The shortest distance from each point source to the receiver was used.
- To allow for a worst-case scenario, it was assumed the entire carpark will turnover within an hour period.
- Source noise levels based on the values provided in **Table 7**.

Table 7: Noise source sound power levels

Noise Source	Source Type	Sound Power Level dB(A)	Duration	Events / Hr
Car passby	Point	83	10 seconds	81
Car door close	Point	88	1 second	162
Car start	Point	86	2 seconds	81
Half basketball court	Conformal Area	83 ¹⁾	3600 seconds	1

Notes:

1) Half basketball court sound power level based on measurements of 3 v 3 half court game. The sound power level has been applied to each court with noise propagation based on a conformal area source.

4.3.1 Predicted Noise Levels

A noise emissions assessment was conducted based on the inputs outlined above with the predicted noise levels at the nearest sensitive receiver provided in **Table 8** and compared against the applied noise limits.

Table 8: Predicted noise impacts to offsite receivers from onsite carpark and basketball courts

Receptor	EPP 2019 external noise limits dB(A)		Predicted noise levels external, L _{eq} dB(A)	
	Day / Evening	Night	Day / Evening	Night
1 Revelry Road (west) – Fire station sleeping quarters	55 ¹⁾	50 ¹⁾	41	41

Notes:

1) Based on internal EPP 2019 internal noise limits for residence +20 dB to account for attenuation from a closed façade.

Noise impacts to the nearest sensitive receivers are expected to comply with the project noise limits without additional acoustic treatment.



4.4 Onsite Indoor Activities

The gym and gymnastics areas were identified as the main noise producing indoor uses of the development. Assessment of these spaces has been undertaken based on 24-hour operation.

4.4.1 Indoor Activity Noise Levels

Reverberant noise levels used to assess the indoor uses are provided in **Table 9**.

Table 9 Indoor activity noise levels

Source	Sound Power Level dB						Reverberant Sound Pressure Level – L_{eq} dB(A)
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Gym – with low level music	82	80	80	80	79	77	85
Gymnastics hall	62	62	65	68	70	70	75

The overall reverberant noise levels are based on measurements completed in sports halls and gyms. Noise spectrums are based on:

- **Gym:** pop music spectrum since the main continuous noise source within the space is expected to be the background music.
- **Gymnastics Hall:** A mix of male and female voices using raised vocal effort since the majority of noise is expected to be associated with vocal coaching.

4.4.2 Sound Isolation Performance of Building Facade

Noise emission calculations of indoor reverberant noise levels utilised the sound reduction index provided in **Table 10**.

NOTE: The assumed construction is for informative purposes only and shall not limit the construction implemented for the project. Actual construction is expected to provide improved attenuation to that which has been modelled.

Table 10: Assessed sound reduction performance of buildings

Building	Building component	Assumed construction	Octave band sound reduction index, dB(A)						$R_w + C_{tr}$
			125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Gym	Façade / Roof	0.54mm sheet metal	9	13	12	16	21	27	15
	Fixed Glazing	4mm thick fixed glazing	18	22	26	31	33	30	27
	Doors	N/A	0	0	0	0	0	0	0
Gymnastics	Façade / Roof	0.54mm sheet metal	9	13	12	16	21	27	15
	Fixed Glazing	4mm thick fixed glazing	18	22	26	31	33	30	27
	Doors	N/A	0	0	0	0	0	0	0

The sound reduction indices in **Table 10** assume that:

- All glazing on the west façade of the gym and gymnastics hall will be fixed (i.e. non openable).
- Conservatively, the doors to the gym and gymnastics hall have been modelled as open at all times.



4.4.3 Predicted Noise Levels

A noise emissions assessment was conducted based on the inputs outlined above with the predicted noise levels at the nearest sensitive receiver provided in **Table 11**.

Table 11: Predicted noise impacts to offsite receivers from indoor gym and gymnastics

Receptor	EPP 2019 external noise limits dB(A)		Predicted noise levels external, L_{eq} dB(A)	
	Day / Evening	Night	Day / Evening	Night
1 Revelry Road (west) – Fire station sleeping quarters	55 ¹⁾	50 ¹⁾	49	49

Notes:

1) Based on internal EPP 2019 internal noise limits for residence +20 dB to account for attenuation from a closed façade.

Noise emissions from internal activities are predicted to comply without additional acoustic treatment for all time periods. It is recommended that the south gym doors and west gymnastic door are kept closed when not being used for entering and exiting each space.

4.5 Assessment - Mechanical Plant

At this stage of the project the proposed plant space location is known but the type and noise levels of the mechanical plant are not. Therefore, detailed calculations of noise emissions could not be conducted. In lieu of this, a calculation was undertaken based on first principles formulation to estimate the maximum sound power level (L_w) for combined plant which is expected to comply with the noise limits at the closest sensitive receivers.

The following inputs and assumptions were considered, which is considered highly conservative and results in underestimated sound power limits:

- EPA 1994 Night-time noise criteria provided in **Table 6**;
- The shortest distance from the plant space to the receivers;
- No screening included within the calculation;
- Standard directivity influences caused by building reflections (a Q-factor of 4 applied, semi-hemispherical propagation);

Based on the comments, inputs and assumptions provided above, the following maximum plant noise limits (preliminary) provided in **Table 12** have been determined for the plant deck.

Table 12: Maximum plant sound power levels (L_w) based on shortest distance to noise sensitive location

Source	Receiver	Distance (m)	Noise limit at receptor dB(A)	Maximum sound power level for combined plant, L_w dB(A)
Plant space	1 Revelry Road (west) – Fire station	118	48	94

Based on the above, mechanical plant or air intake/discharge points which are without additional screening, attenuation or other noise mitigation measures shall not exceed L_w 94 dB(A). It is noted that this result is preliminary, where the only purpose is to assess the viability of the project from a noise emissions perspective. Therefore, a development approval condition **should not** be imposed based on the limiting sound power level stated above.

Instead, noise emissions from mechanical plant shall be assessed in detail during the design stages of the project, when equipment selections and information regarding the source type (e.g., operative periods, sound power levels, designated location, etc.) are established.



5. Recommendations

5.1 Outdoor Activities

Outdoor activities are predicted to comply at the nearest sensitive receivers without the need for acoustic treatments.

5.2 Indoor Activities

Indoor activities are predicted to comply with the noise criteria at the nearest sensitive uses on the basis that the building facades achieve the minimum $R_w + C_{tr}$ ratings provided in **Table 10**. While it is not necessary for compliance the following management controls will assist in reducing noise emissions from the site:

- Keeping entry doors on the south façade of the gym closed when not in use for ingress / egress.
- Keeping the entry door on the west façade of the gymnastics hall closed when not in use for ingress / egress.

To achieve this, it is recommended that automatic door closers are installed in these locations.

5.3 Mechanical Plant

Noise emissions from mechanical plant shall be assessed in detail during the design stages of the project, when equipment selections and information regarding the source type (e.g., operative periods, sound power levels, designated location, etc.) are established.

Preliminary assessment indicates that minimal acoustic treatment will be necessary as the current plant location provides separation and screening to the nearest offsite receivers.

6. Conclusion

Stantec Australia Pty Ltd (Stantec) have been engaged by PCYC Queensland to undertake acoustic assessment for Bells Creek PCYC to be located Lot 8048 Revelry Road, Bells Creek QLD 4551. This acoustic report has:

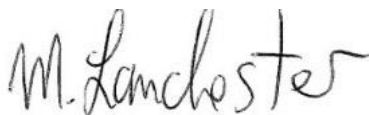
- established relevant design criteria in accordance with current QLD and Council Regulations;
- identified potential acoustic-related issues to be addressed during the design stages of the project; and
- provided recommendations and advice in regard to noise emissions control.

We trust that this report to be sufficient for your current requirements; however, should you have any queries, please do not hesitate to contact the undersigned on (07) 3811 4500.

Regards,



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Acoustic Consultant for **Stantec**



Michael Lanchester (Reviewer)
Acoustics Section Manager (QLD) for **Stantec**





Appendices

Appendix A Glossary of Acoustic Terms

TERM	DEFINITION
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Attenuation	A reduction in the magnitude of sound.
A-weighting	A frequency dependent filter applied to an instrument-measured noise. In its simplest form, the filter is designed to replicate the relative sensitivity to loudness perceived by the human ear.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the LA90 noise level.
Ctr	A standard weighting curve which replicates low frequency noise, such as that from traffic. Often added to DnT,w or Rw to characterise airborne sound insulation performance.
dB	The abbreviation for decibel.
dB(A)	A-weighted sound level in decibels.
Dw	A single number value that represents a field measurement of the weighted level difference between two adjacent spaces separated by a partition. $Dw = L1 - L2$ where, L1 is the average sound pressure level in the source room; and L2 is the average sound pressure level in the receiver room.
Hertz	The frequency of vibration and sound is measured in hertz (Hz) and is representative of the number of cycles occurring per second.
Intermittent Noise	Level that drops to the background noise level several times during the period of observation.
LA1	The A-weighted sound pressure level exceeded for 1 % of the measurement time period.
LA10	The A-weighted sound pressure level exceeded for 10 % of the measurement time period.
LA90	The A-weighted sound pressure level exceeded for 90 % of the measurement time period. Typically represents the background noise level of an environment.
LAeq	The equivalent continuous sound pressure level in dB(A). It is often accompanied by an additional suffix "T", which is indicative of the measurement time period. (e.g. LAeq,15min, symbolising the measurement is evaluated over 15-minutes).
Reflection	Sound wave changed in direction of propagation due to a solid object met on its path.
Reverberation	The persistence of a sound within a space, which will naturally decay over time. Most apparent once the source signal has ceased emitting. Reverberation may have effects on speech intelligibility if not adequately controlled. Reverberation time, represented in seconds, can vary depending on the volume and surface finishes of the space.
Rw	Weighted sound reduction index. A single number value which represents the airborne sound insulation performance of a partition or building element that has been determined under laboratory testing conditions.
Sound Power Level	The total sound energy radiated by a source, expressed in Watts. The sound power level is ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Sound Pressure Level	The measured acoustic wave strength in a given environment and at a particular point of interest where the total sound level expressed is relative to a reference pressure, i.e. the threshold of human hearing. Sound pressure level is typically measured using a standard sound level meter with a microphone, expressed in decibels (dB).
Spectrum	The spectrum is the result of transforming a time domain signal to the frequency domain. Spectrum analysis is the procedure of doing the transformation, and it is most commonly done with an FFT analyser.



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