



ENFIELD
ACOUSTICS
NOISE
VIBRATION

KING DAVID SCHOOL SPORT & WELLNESS FACILITY

Acoustic Report for Town Planning

For

**ADVERTISED
PLAN**

C/- JACKSON CLEMENT BURROWS ARCHITECTS

**This copied document to be made available
for the sole purpose of enabling
its consideration and review as
part of a planning process under the
Planning and Environment Act 1987.
The document must not be used for any
purpose which may breach any
copyright**

DOC. REF: V794-01-P ACOUSTIC REPORT (R0)
20 DECEMBER 2021

Enfield Acoustics Pty Ltd
ABN 15 628 634 391
Ph: +61 3 9111 0090
PO Box 920
North Melbourne, VIC 3051

ADVERTISED PLAN

Project King David School Sport & Wellness Facility
Subject Acoustic Report
Client c/- Jackson Clement Burrows Architects
Document Reference V794-01-P Acoustic Report (r0).docx
Date of Issue 20 December 2021

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

Disclaimer:

The information contained in this document shall remain the property of Enfield Acoustics Pty Ltd and the Client. The information contained within this document shall not be distributed to third parties without the written consent of Enfield Acoustics Pty Ltd and the Client.

The information contained within this document should not be relied upon by any third parties or applied under any context other than that described within this document. Advice provided in this document is done so with respect to instructions, on the basis of information supplied to Enfield Acoustics Pty Ltd at the time of writing, and in accordance with any reasonable assumptions, estimations, modelling and engineering calculations that we have been required to undertake. Enfield Acoustics Pty Ltd do not represent, warrant or guarantee that the use of guidance in the report will lead to any certified outcome or result, including any data relied on by third parties.

Table of Contents

1	Introduction & Scope	3
2	Site Inspection	5
3	Policy Requirements	6
4	Assessment	7
4.1	Rooftop Terrace/Play Space.....	7
4.2	Lower Floor (Internal) Use.....	9
4.3	Mechanical Plant and Equipment.....	10
5	Conclusion and Recommendations.....	11
Appendix A:	Noise Modelling Maps.....	12

**This copied document to be made available
for the sole purpose of enabling
its consideration and review as
part of a planning process under the
Planning and Environment Act 1987.
The document must not be used for any
purpose which may breach any
copyright**

**ADVERTISED
PLAN**

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

1 Introduction & Scope

Enfield Acoustics has been engaged by the Applicant c/- Jackson Clement Burrows Architects to assess potential noise impacts from the proposed King David School Sport & Wellness Facility at 519 Orrong Road, Armadale (Subject Land).

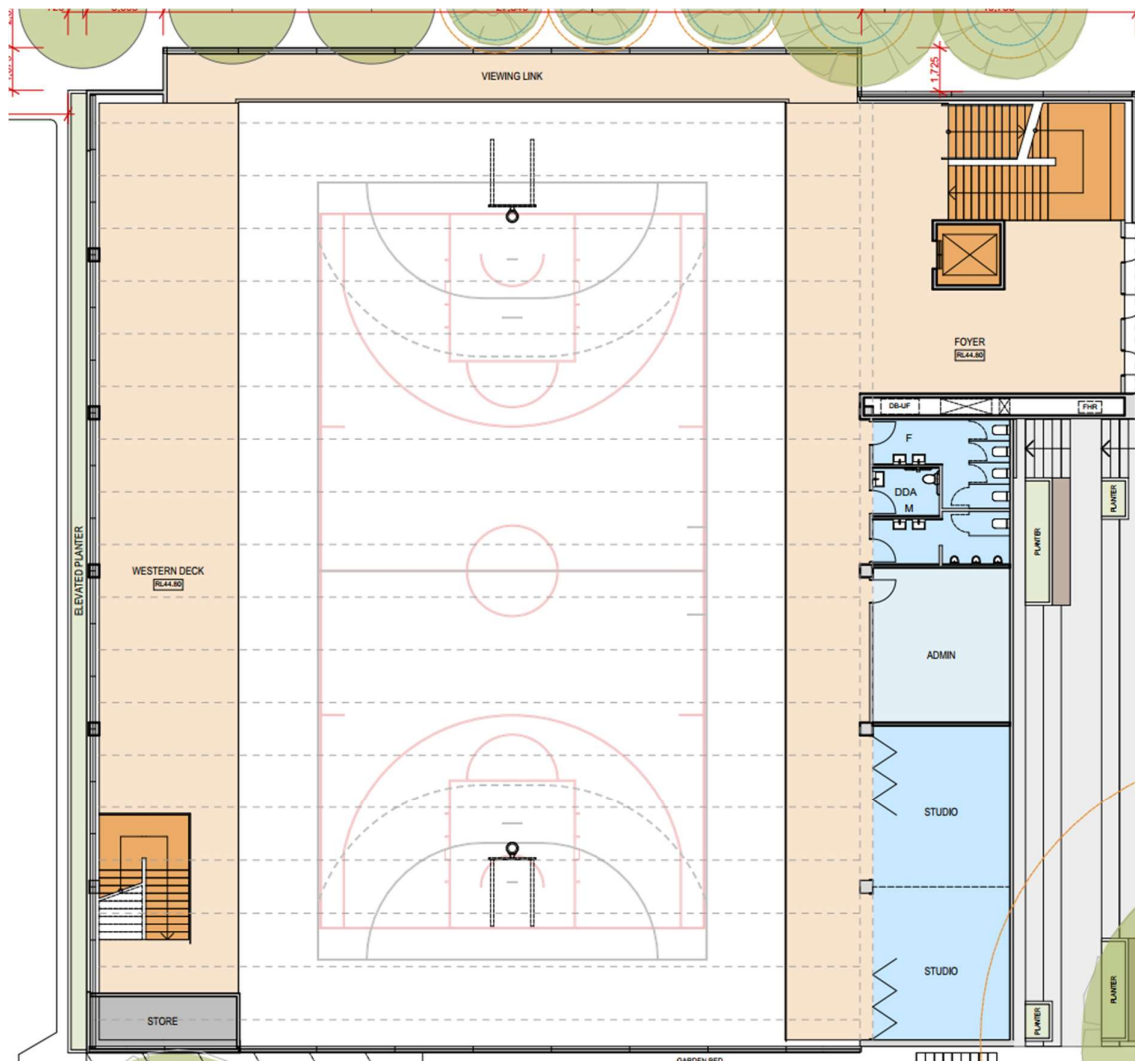
This report is written in support of the Application to construct a new indoor and outdoor sports facility consisting of:

- Indoor (lower floor level) sports facility with a full sized basketball court
- Rooftop terrace play space with a full sized basketball court

A site plan of the proposal is presented below:

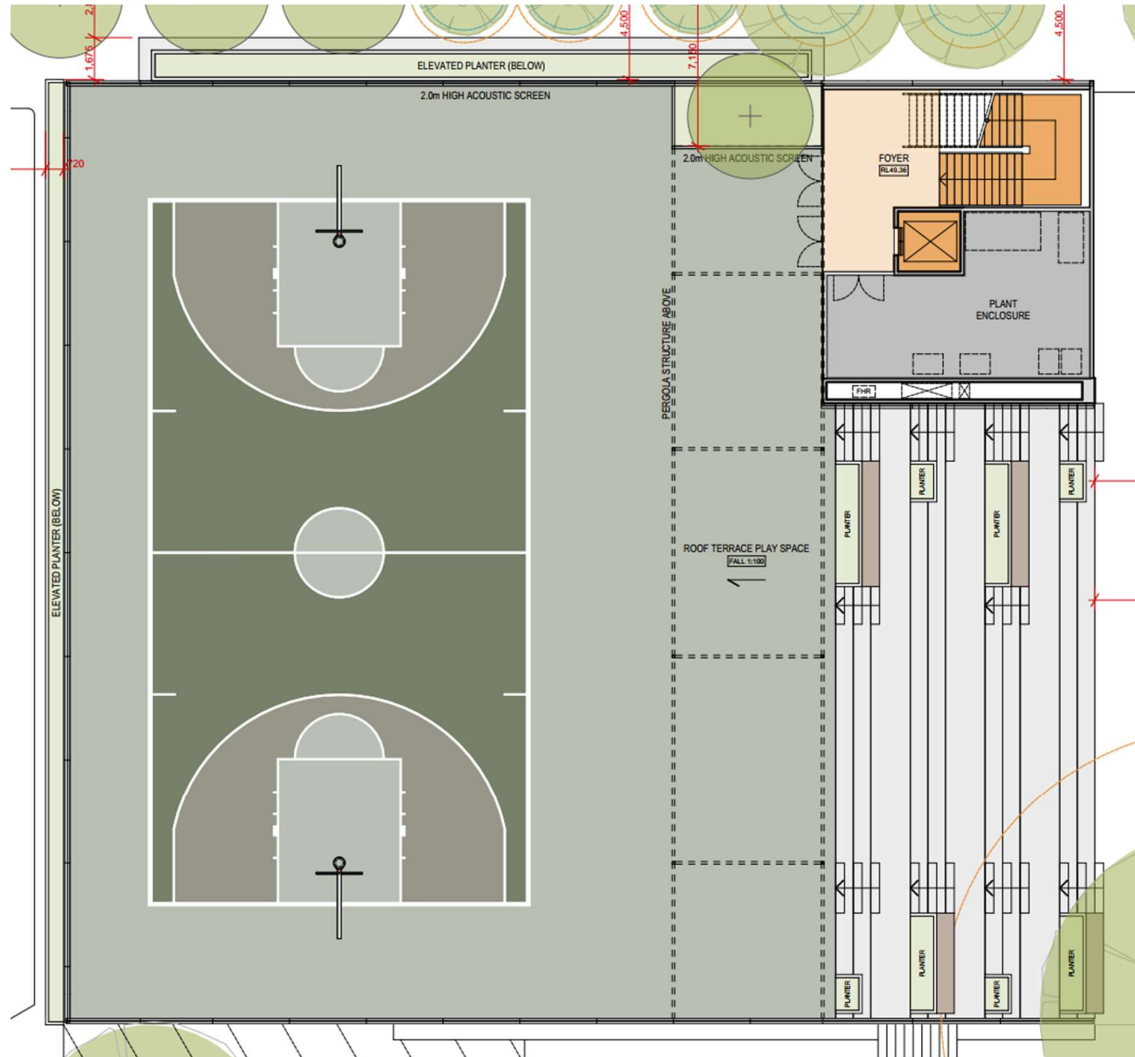
Lower Floor Plan

**ADVERTISED
PLAN**



This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

Rooftop Plan



The new sports facility will replace an existing outdoor basketball court on the Subject Land, noting that basketball play noise is already characteristic of the surrounding area. To this end, the proposal is not introducing any new noise sources.

While other activities may occur within the sports facility (such as general play, group activities, physical education classes, etc), it is unlikely that they would generate noise emissions greater than what would be expected during basketball play. On this basis, it is inherent that where basketball play will result in reasonable noise impacts at surrounding sensitive uses, other less intensive use will also result in reasonable noise impacts.

To assess the proposal, Enfield Acoustics has:

1. Identified existing noise-sensitive uses that proximate the Subject Land;

2. Conducted attended noise measurements of another basketball court to obtain empirical data for use in our assessment;
3. Conducted 3D computational noise modelling to assess potential noise impacts from the proposal to determine the likelihood of compliance with 'best practice' noise criteria; and
4. Where required, recommended noise mitigation measures to the risk of adverse noise impacts occurring as a result of the proposal.

Our assessment has been conducted in reference to Plans prepared by Jackson Clement Burrows Architects dated 15 December 2021.

2 Site Inspection

A site inspection was carried out on 1 October 2021 to survey surrounding sensitive uses and to conduct attended background noise monitoring.

Enfield Acoustics has previously conducted noise measurements at other sporting complexes with basketball courts including the North Melbourne Recreation Centre, which includes a full sized basketball court similar to the proposal.

Nearby sensitive uses were identified as follows:

Tag	Location of Sensitive Use	Direction	Type
R1	Dwellings on Larnook Street	North	Mix of single and double-storey dwellings
R2	Dwellings on Vail Street	West	Single-storey
R3	17 Stawell Street	West	Single-storey

Refer to the site map below for locations of nearby sensitive uses and monitoring conducted.

**ADVERTISED
PLAN**

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright.

ADVERTISED PLAN



The following background noise level was recorded:

Item	Sound Pressure Level, LA90
LA90, background noise - 11am to 12pm	39dB(A)

Noise measurements were carried out between 11am to 12pm as it is typical to find lowest background noise throughout the middle of the day (between peak traffic periods). This results in a conservative noise assessment in comparison to average daily measurements being considered, which would include peak traffic periods.

3 Policy Requirements

There are no specific policy requirements that addresses noise from school sports facilities.

However, for the purposes of determining whether noise would potentially result in adverse noise impacts, our assessment will adopt criteria from EP Regulations 2021 and *Publication 1826: Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues* (Noise Protocol).

The Noise Protocol generally applies to commercial and industrial uses, with particular relevance to mechanical plant and equipment.

ADVERTISED PLAN



Our view is that the Noise Protocol is reasonable for use in assessing the risk of adverse noise impacts and whether noise mitigation is appropriate to minimise adverse impacts. The methodology under the Noise Protocol also allows for adjustments of impulsive noise, which is characteristic of basketball play.

It is reasonable to expect that basketball play will generally occur during the 'Day' period, generally being school hours and to this end, the relevant noise limit at identified sensitive uses have been calculated as follows:

Period	Zoning Level	Background Noise Level	Noise Limit
'Day' Period 7am to 6pm (Monday to Saturday)	50 dB(A)	39dB(A)	50dB(A)

The Noise Protocol noise limit is taken to be the Zoning Level as the background noise environment surrounding the Subject Land was found to be 'Neutral'.

Because movement restrictions were in place as a result of Covid-19 at the time of measurement, reported background noise levels are considered to be conservative. It is reasonable to expect that the background noise environment surrounding the Subject Land would be higher under 'normal' conditions, where increased general activity and road traffic is expected.

The Noise Protocol recommends an assessment of the equivalent 30-minute average energy noise emissions, meaning that the assessment metric under consideration is $L_{Aeq-30min}$.

4 Assessment

4.1 Rooftop Terrace/Play Space

To assess the proposal, a 3D computational noise model has been generated using the software package CadnaA.

The assumptions and inputs use in the model, which were derived from our benchmark noise measurements are presented below:

Assumptions within one 'half-court'

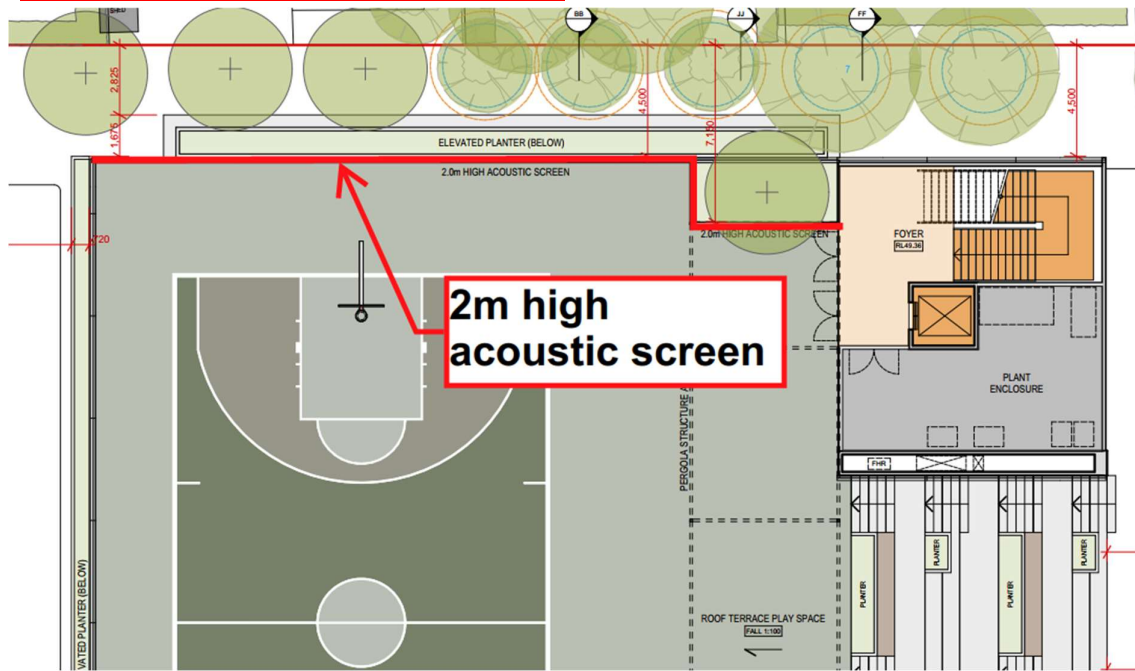
Noise Source	Assumptions	SWL $L_{Aeq-30min}$
Continuous dribbling	15 minutes	86dB(A)
Ball hitting backboard	30 events (1 sec each)	79dB(A)
Referee whistle	30 events (2 sec each)	76dB(A)

The above assumptions were duplicated on both sides of the basketball court to consider noise emissions from the full-sized basketball court.

The results of the modelling indicate that rooftop basketball play can comply with the Noise Protocol, providing that acoustic screening is provided to the North boundary of the rooftop terrace, as follows:

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright



We note that the above recommendation has already been coordinated on the referenced Plans. Inclusive of the proposed treatment above, the following ‘worst-case’ noise levels were modelled at all identified sensitive uses (including to upper-levels):

Location	Effective Noise Level L_{Aeq}	Noise Protocol Noise Limit	Exceedance/comply?
R1	46 dB(A) ^	50 dB(A)	✓
R2	49 dB(A) ^	50 dB(A)	✓
R3	46 dB(A) ^	50 dB(A)	✓
Notes:	^Includes +5dB(A) impulsive adjustment for basketball play		

Further, it is noted that the proposal will likely result in an overall improvement of amenity, in particular to receiver R1 given that no acoustic screening has been provided to the existing outdoor basketball court.

Overall, Enfield Acoustics is satisfied that rooftop terrace play space use will not result in adverse noise impacts, providing that acoustic screening as referenced on the Plans is provided.

Given that compliance is only expected during the ‘Day’ period, it is recommended that rooftop area use is prohibited during the more sensitive ‘Evening’ and ‘Night’ periods, being:

- Between 6pm to 7am from Monday to Saturday
- All hours on Sunday

Acoustic screening shall be constructed as follows:

1. To the specified heights and locations as shown in the referenced Plans

**ADVERTISED
PLAN**

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright.

ADVERTISED PLAN



2. Using fibre cement sheeting, treated timber, lightweight aerated concrete, transparent acrylic panels, glass and profiled sheet cladding as long the selected material (or combined skins) has a mass of at least 10kg/m²;
3. The fence shall have no gaps or holes in it, or the likelihood of such occurring through natural causes or deformations, thus allowing noise to pass through;
4. The fence must be designed and built in an acceptable manner so that noise will not pass underneath it;
5. Any butt joints shall be sealed with a fire-rated weather proof mastic or an overlapping piece of material meeting the mass requirements of 10kg/m² (minimum 35mm each side of the butt joint); and
6. Where multiple cladding layers are used (e.g. FC sheeting over timber paling fence), joints in the cladding materials shall not coincide.

4.2 Lower Floor (Internal) Use

The Plans indicate a full-sized basketball court is proposed within the enclosed lower floor area. It is apparent that the major sound transmission path to sensitive uses would be through the glazing on the North, West and South facades.

Desktop modelling was conducted to predict the reverberant noise level using the same benchmark noise used in our assessment in Section 4.1.

The following corrections for reverberation effects are generally applied to correct free-field noise levels to reverberant noise levels:

Reverberation	Description	Correction
Low	Rooms with large amounts of absorptive finishes or acoustic panels (e.g. acoustic panels to walls/ceiling)	+1dB(A)
Moderate	Rooms with moderate amounts of absorptive finishes	+3dB(A)
High	Rooms with large amounts of flat and hard surfaces (e.g. glass, concrete finishes)	+4dB(A)

A 'High' reverberation correction has been applied to the free-field noise levels, resulting in the following reverberant noise levels within the lower floor area:

Location	Reverberant Noise Level
Lower-floor area	67dB(A) _{Leq-30min}

As a sensitivity analysis, we have assumed a standard glazing construction of 6mm thick glass (R_w30) in our modelling. In our experience, this is considered the minimum form of glazing construction that would likely be installed to the façade.

On the basis of the above assumptions, the following noise levels were modelled at all identified sensitive uses:

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any consent.

ADVERTISED PLAN



Location	Effective Noise Level L_{Aeq}	Noise Protocol Noise Limit	Exceedance/comply?
R1	38 dB(A) ^	50 dB(A)	✓
R2	26 dB(A) ^	50 dB(A)	✓
R3	24 dB(A) ^	50 dB(A)	✓
Notes:	^Includes +5dB(A) impulsive adjustment for basketball play		

The results above indicate that internal basketball play will likely comply with the Noise Protocol noise limits by a significant margin, indicating a satisfactory outcome.

Given that compliance can be achieved with standard forms of glazing construction, we assess that no specific acoustic treatment is required to the façade.

The results indicate that an internal level of approximately 79dB(A) could be supported internally, noting that this level is considered significant and would likely be uncomfortable for any occupants inside.

Enfield Acoustics is satisfied that indoor activity noise will not result in adverse noise impacts at the identified sensitive uses and the building does not require any additional acoustic treatment beyond the built form shown on the Plans.

Further, given that noise emissions from internal use are expected to be at least 8dB(A) lower than rooftop use, cumulative noise impacts when both areas are used concurrently are considered to be immaterial (less than 1dB).

4.3 Mechanical Plant and Equipment

Noise from mechanical plant and equipment is required to comply with the Noise Protocol.

The requirements for mitigation of mechanical plant noise are typically specified during later phases of the project when plant equipment and schedules are known, nothing that it is atypical for plant selections to be made during planning phases. We note that mechanical plant associated with sports facilities will likely consist of air conditioning equipment and ventilation fans, which is not considered high risk where there are sufficient buffers to sensitive uses.

Further, there are sufficient mitigation opportunities to ensure that any mechanical plant associated with the Application complies with the Noise Protocol, as follows:

- Mechanical plant such as air conditioning equipment can be acoustically screened or positioned away from sensitive uses
- Ventilation fans can be attenuated via duct silencers or acoustic louvers
- Selection of quieter mechanical plant
- Architectural/façade treatment where mechanical plant is located within an enclosed room

Overall, we assess that the risk of adverse impacts resulting from mechanical plant and equipment is considered low.

Regardless, it is a statutory requirement that all mechanical plant and equipment comply with the Noise Protocol and this can be conditioned on the permit.

5 Conclusion and Recommendations

Enfield Acoustics is satisfied that the proposed Sport and Wellness Facility at 519 Orrong Road, Armadale will not result in adverse noise impacts and a permit can be issued, noting that:

1. Rooftop terrace play space use is expected to comply with the Noise Protocol, providing that an acoustic screen is provided in accordance with the referenced Plans. It is recommended that the use of this area is prohibited at the following times:
 - a. 6pm to 7am – Monday to Saturday
 - b. All hours – Sundays
2. Internal activity noise from the lower floor is expected to comply with the Noise Protocol by a significant margin without requiring specific acoustic treatment; and
3. Noise from mechanical plant presents as low risk in terms of adverse noise impacts, noting that there are sufficient mitigation opportunities available to ensure that the Noise Protocol is complied with.

We recommend the following conditions be applied on the permit:

1. Rooftop terrace play space shall be prohibited at the following times:
 - a. 6pm to 7am – Monday to Saturday
 - b. All hours – Sundays
2. Noise from mechanical plant and equipment is required to comply with EP Regulations 2021 and *Publication 1826: Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues* (Noise Protocol).

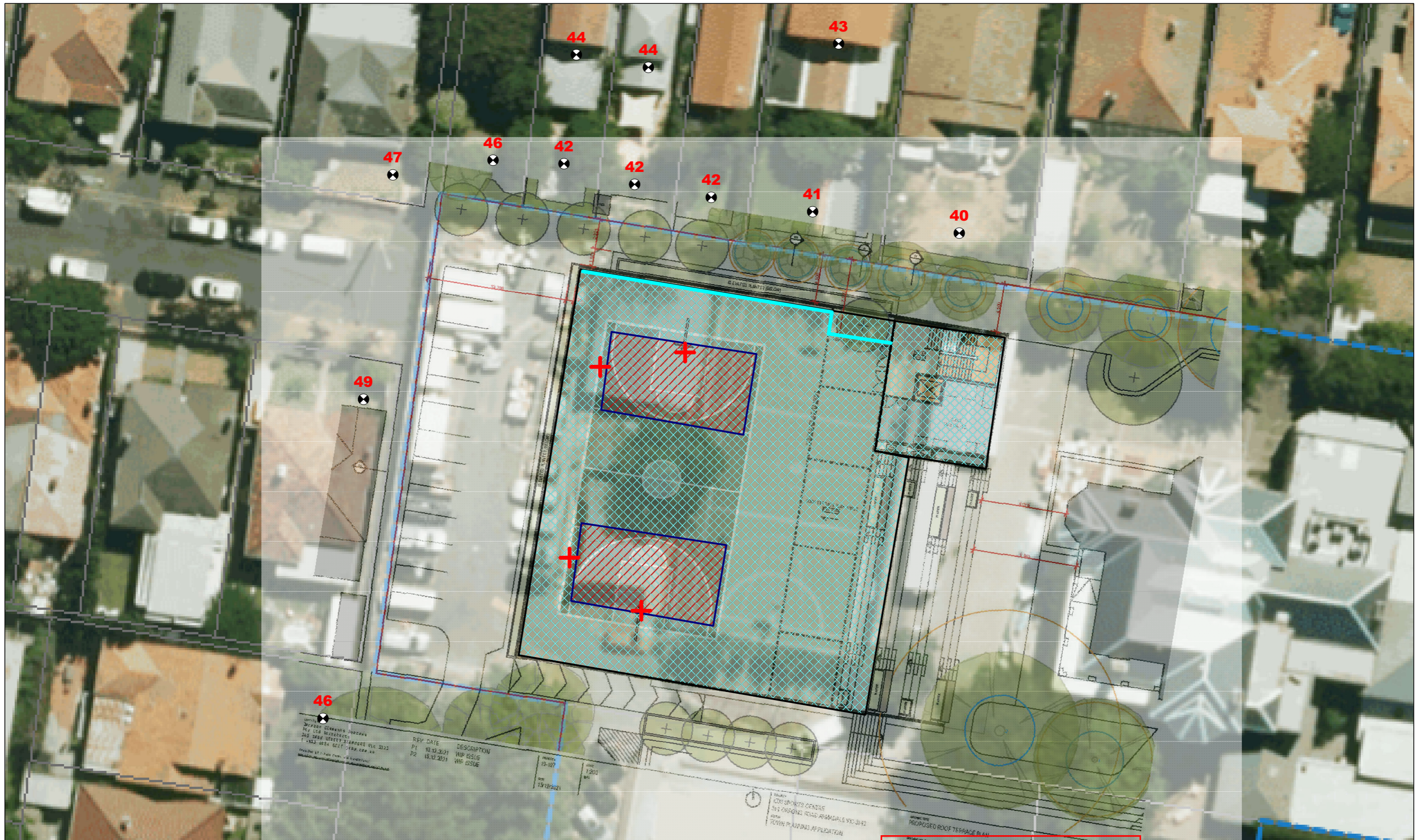
**This copied document to be made available
for the sole purpose of enabling
its consideration and review as
part of a planning process under the
Planning and Environment Act 1987.
The document must not be used for any
purpose which may breach any
copyright**

**ADVERTISED
PLAN**

ADVERTISED PLAN

Appendix A: Noise Modelling Maps

**This copied document to be made available
for the sole purpose of enabling
its consideration and review as
part of a planning process under the
Planning and Environment Act 1987.
The document must not be used for any
purpose which may breach any
copyright**



REV. DATE	DESCRIPTION
P1 10.12.2021	WIP ISSUE
P2 15.12.2021	WIP ISSUE

Scale: 1: 341 @ A3

Legend:

- Point Source
- Area Source
- Building
- Barrier
- Receiver

PO Box 920
North Melbourne, VIC 3051
P: 03 9111 0090

Noise emission levels from ROOFTOP TERRACE PLAY SPACE

LAeq-30min Noise Levels

Noise sources included:
Referee whistles
Dribbling
Backboard noise

+5dB(A) Impulse adjustment applied in accordance with the Noise Protocol

ADVERTISED PLAN

Project No: V794

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach copyright.

NOTES:

*Propagation in accordance with ISO9613

Date: 20.12.2021