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Alexandria Park Community School
Sports Field

Supplementary Noise Impact Assessment
For SSDA Modification

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1 Introduction

White Noise Acoustics has been engaged to undertake the Supplementary Noise Impact Assessment of the proposed SSDA modification for the sports fields associated with the Alexandria Park Community School.

This assessment includes the supplementary assessment base on the previously conducted *Alexandria Park Community School, Development Application Acoustic Assessment* report undertaken by Wilkinson Murray and dated April, 2018.

This report undertakes the assessment of the proposed changes to the project, including the sports fields. As the remaining areas of the project remain unchanged to those assessed in the *Alexandria Park Community School, Development Application Acoustic Assessment* and the previous outcomes for these areas of the project remain unchanged.

This assessment incudes the proposed use of the proposed sports fields to be located on the site including the basketball courts and futsal court. The proposed operation of the courts includes the following:

1. Between the hours of 7am and 10pm Mondays to Friday for training and social recreation activities.
2. Between 8am and 6pm Saturdays and Sundays for organised events and competitions; and
3. No organised events on public holidays.

This assessment includes the acoustic investigation into the potential for noise impacts from the activities included above on the proposed sports fields as detailed in the figure below.

Figure 1 – Proposed Alexandria Park Community School sports fields

2 Development Description

This report includes the supplementary assessment of noise impacts from the proposed activities to be undertaken on the sports field associated with the Alexandria Park Community School project.

The proposed use of the sports fields includes the operational times and activities detailed in the section above.

The location of the proposed sports fields is located to the southern side of Buckland Street within the Alexandria Park Community School redevelopment site.

The receivers to the proposed fields include the following:

1. Existing residential receivers to the north of the fields opposite on Buckland Street to the north.
2. Residential receivers to the west of the site.
3. The existing and future Alexandria Park Community School to the south and west of the fields and associated with the proposed sports fields.

The site location is detailed in Figure 1 below.

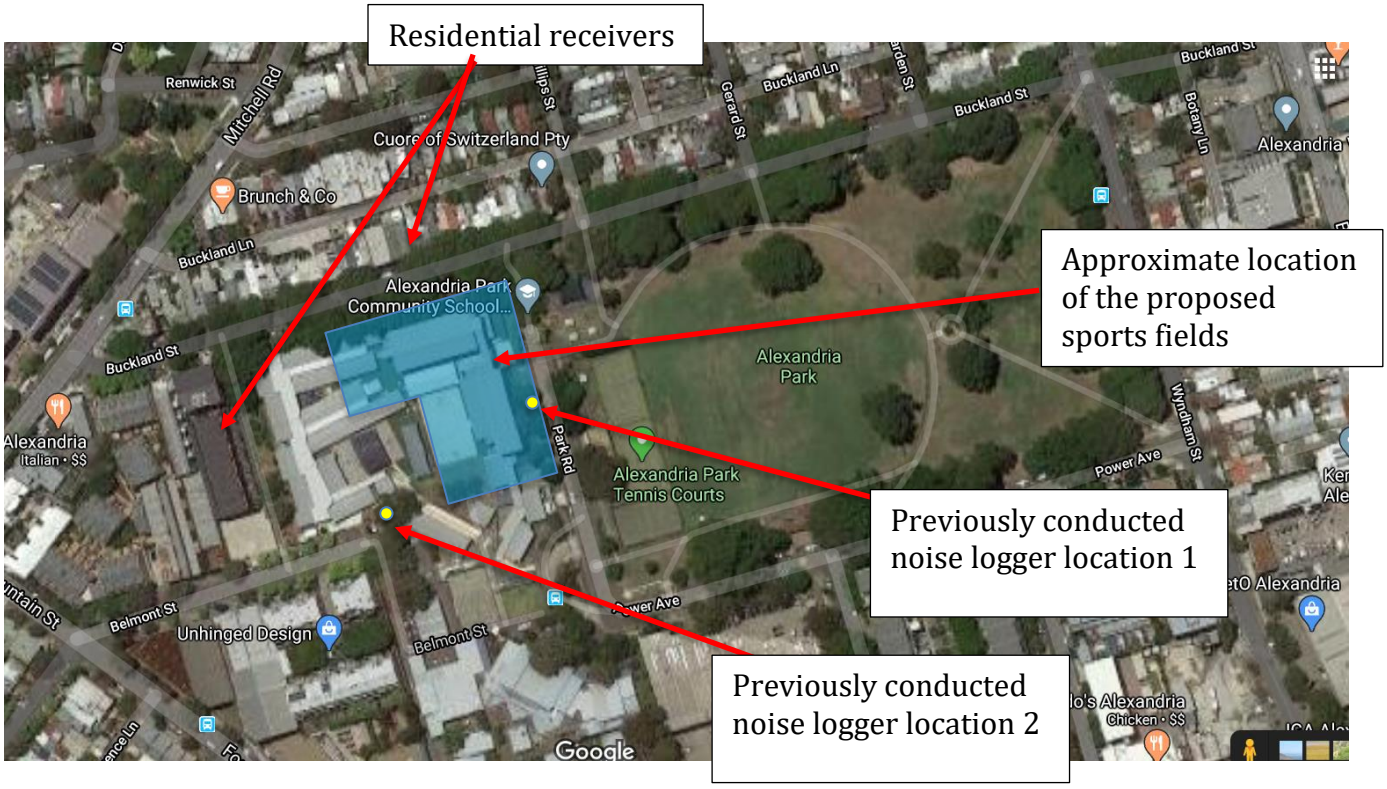

Figure 2 – Proposed location of the Alexandria Park Community School sports field

3 Existing Acoustic Environment

This supplementary assessment has been based on the previously conducted *Alexandria Park Community School, Development Application Acoustic Assessment* report undertaken by Wilkinson Murray and dated April, 2018.

The *Development Application Acoustic Assessment* includes an acoustic survey of the exiting acoustic environment at the site which has been undertaken in accordance with the requirements of the EPA and the methods described within the Australian Standard AS/NZS 1055:2018 *'Acoustics – Description and measurement of environmental noise'*.

The results of detailed within the previously conducted report has been used as the basis of this assessment.

The existing noise levels at the site are predominantly as a result from traffic movements of the roadways surrounding the site including Buckland Street as well as general hum form the uses within the surrounding areas of the site.

As part of the *Development Application Acoustic Assessment* unattended noise levels have been undertaken to obtain ambient and background noise levels at the site.

3.1 Noise Survey Results

The unattended noise locations are suitable to obtain noise levels for the assessment of background noise levels ($L_{90\,(t)}$) as well as the impact from traffic movements ($Leq_{(t)}$). The summary of the acoustic survey are detailed in the tables below which have been used as the basis of this assessment.

Table 1 – Results of the Noise Logging at the Site

Measurement Location	Time of Measurement	Maximum Repeatable $L_{Aeq,\,15min}$ dB(A)	Representable Background noise Level (RBL) $L_{A90,\,15min}$ dB(A)
Location 1, Park Road	Day	59	49
	Evening	52	43
	Night	47	39
Location 2, Belmont Street	Day	60	47
	Evening	50	43
	Night	45	39

Note: Results included those undertaken as part of the survey conducted within the *Alexandria Park Community School, Development Application Acoustic Assessment* report undertaken by Wilkinson Murray and dated April, 2018

4 External Noise Emission Assessment

This section of the report details the relevant noise level criteria for noise emissions generated from the operation of any plant and equipment associated with the Alexandria Park Community School.

The relevant authority which provides the required noise level criteria for noise levels generated on the site includes the NSW Environmental Protection Authority's (EPA) Noise Policy for Industry (NPfI).

4.1 NSW Environmental Protection Authority, Noise Policy for Industry

The NSW Environmental Protection Authority (EPA) Noise Policy for Industry (NPfI), previously Industrial Noise Policy, details noise criteria for the control of noise generated from the operation of developments and the potential for impact on surrounding receivers.

The NPI includes both intrusive and amenity criteria which are summarised below.

1. Intrusive noise level criteria, The NPfI states the following:

   'The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the LAeq descriptor), measured over a 15minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.'

2. Amenity noise level criteria, The NPfI states the following:

   '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.'

   Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)

   Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.

The LAeq is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, this policy assumes that the LAeq,15min will be taken to be equal to the LAeq, period + 3 decibels (dB), unless robust evidence is provided for an alternative approach for the particular project being considered.

Project amenity noise level (ANL) is urban ANL (Table 2.1) minus 5 dB(A) plus 3 dB(A) to convert from a period level to a 15-minute level (dB = decibel; dB[A] = decibel [A-weighted]; RBL = rating background noise level).

Noise level used in the assessment of noise emission from the site have been based on the noise level survey conducted at the site and detailed in this section of the report.

Consequently, the resulting noise level criteria are summarised in the table below. The criteria are nominated for the purpose of determining the operational noise limits for the operation of the site including mechanical plant associated with the development which can potentially affect noise sensitive receivers and operational noise levels from the future tenancies. For each assessment period, the lower (i.e. the more stringent) of the amenity or intrusive criteria are adopted. The calculated *Project Amenity Noise Level* includes either the Recommended Amenity Noise Level minus 5 dB(A) plus 3 dB(A) (for a 15minum period) or the measured existing Leq noise level – 10 dB if this is greater as determined by the NPfI.

Table 2 – External Noise Level Criteria in Accordance with the NSW NPfI

Location	Time of Day	Project Amenity Noise Level, $L_{Aeq, period}$ [1] (dBA)	Measured $L_{A90, 15\ min}$ (RBL) (dBA)	Measured $L_{Aeq, period}$ Noise Level (dBA)	Intrusive $L_{Aeq, 15\ min}$ Criterion for New Sources (dBA)
Suburban residences Northern Locations	Day	**53**	49	59	54
	Evening	**43**	43	52	48
	Night	**38**	39	47	43
Suburban residences Western Locations	Day	53	47	60	**52**
	Evening	**43**	43	50	48
	Night	**38**	39	45	44

Note 1: Project Amenity Noise Levels corresponding to "Suburban" areas, recommended noise levels.
Note 2: Project Noise Trigger Levels are shown in bold

The criteria detailed above includes the suitable noise emissions from industrial source including building services and the like as detailed within the EPA's *Noise Policy for Industry.* The detailed noise levels above are not specific for the noise emissions associated with the proposed sporting activities.

5 Sports Fields Noise Emissions

The *Alexandria Park Community School, Development Application Acoustic Assessment* report undertaken by Wilkinson Murray and dated April, 2018 includes an assessment of the proposed sporing fields and notes the following:

> *Alexandria Park is currently used for outdoor activities by the existing school and general community. In addition, noise from outdoor activities taking place at the existing primary and secondary schools form a part of the prevailing ambient noise environment of the immediate area.*
>
> *Sporting activities on the outdoor courts will generate noise from players, spectators, whistles and announcements.*
>
> *No appreciable change or significant acoustical impact is therefore expected to result due to the school redevelopment.*
>
> *Noise from sports-related PA should be limited by locating any speakers on the northern side of the courts directed downwards towards the courts and school.*

And:

> *Noise levels during a game with a small crowd can be expected to be in the order of 55dBA at residences on the northern side of Buckland Street and 59dBA at the residential apartment building to the west of the site. These levels exceed the daytime noise objective of 51dBA, and in the case of outside hours use, the evening objective of 48dBA. Noise emissions associated with sporting activities (school and community use) are expected to be generally within the range of background LA90 + 10dBA.*

Based on the proposed sporting fields which are proposed for the Alexandria Park Community School the assessment undertaken within the *Alexandria Park Community School, Development Application Acoustic Assessment* report undertaken by Wilkinson Murray and dated April, 2018 includes an acoustic assessment and mitigations which remain suitable for the mitigation of noise from the use of the proposed sporting fields.

Providing suitable acoustic mitigations are included in the use of the sporting fields then the resulting noise impact on surrounding residential receivers will not appreciably change as a result of the proposed sporting courts.

Suitable acoustic mitigations include the following:

1. Any building services or plant/equipment to be designed to ensure noise levels detailed in section 4.1 of this report are achieved.
2. Restrict the use of the sports courts prior to include the approved hours of use, including:
    - Between the hours of 7am and 10pm Mondays to Friday for training and social recreation activities.
    - Between 8am and 6pm Saturdays and Sundays for organised events and competitions; and
    - No organised events on public holidays.

3. Minimise PA use and ensure speakers are appropriately located and limited to achieve acceptable levels.
4. The LAmax noise level from the PA system operation shall not exceed 56 dB(A) at the nearest residential boundary.
5. The PA system should use small low-powered horn-type speakers oriented in such a manner to fire away from residential premises.
6. Speakers should be mounted at a downward angle of 45^{o} and as close to ground level as possible.
7. Only nominated persons, trained in the appropriate use of the system, should be permitted to operate the PA system.
8. A sound limiter is to be installed to ensure that the maximum limiting criterion at residential boundaries is not exceeded.

Providing the acoustic mitigations detailed above are included within the design and operation of the proposed sports fields of the Alexandria Park Community School then the resulting noise impact on surrounding residential receivers will be similar to those experienced prior to the development of the school and will therefore be acoustically acceptable.

6 Conclusion

This report details the Noise Impact Assessment of the proposed sports fields associated with the Alexandria Park Community School development. The assessment has been undertaken in accordance with the previously undertaken *Alexandria Park Community School, Development Application Acoustic Assessment* report undertaken by Wilkinson Murray and dated April, 2018 and included in the approvals for the development.

This report undertakes the assessment of the proposed activities to be undertaken on the proposed sports fields. Providing the proposed mitigations detailed in this report then the resulting noise impact on surrounding residential receivers will be similar to those experienced prior to the development of the school and will therefore be acoustically acceptable.

For any additional information please do not hesitate to contact the person below.

Regards

Ben White
Director
White Noise Acoustics

7 Appendix A – Glossary of Terms

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0dB the faintest sound we can hear 30dB a quiet library or in a quiet location in the country 45dB typical office space. Ambience in the city at night 60dB Martin Place at lunch time 70dB the sound of a car passing on the street 80dB loud music played at home 90dB the sound of a truck passing on the street 100dB the sound of a rock band 115dB limit of sound permitted in industry 120dB deafening
dB(A)	*A-weighted decibels* The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to *pitch*. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Background Sound Low	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted, external ambient noise sources. Usually taken to mean the L_{A90} value
Ctr	A frequency adaptation term applied in accordance with the procedures described in ISO 717.
dB (A)	'A' Weighted overall sound pressure level

Noise Reduction	The difference in sound pressure level between any two areas. The term “noise reduction” does not specify any grade or performance quality unless accompanied by a specification of the units and conditions under which the units shall apply
NR Noise Rating	Single number evaluation of the background noise level. The NR level is normally around 5 to 6 dB below the “A” weighted noise level. The NR curve describes a spectrum of noise levels and is categorised by the level at 1000 Hz ie the NR 50 curve has a value of 50 dB at 1000 Hz. The NR rating is a tangential system where a noise spectrum is classified by the NR curve that just encompasses the entire noise spectrum consideration.
R_w	Weighted Sound Reduction Index - Laboratory test measurement procedure that provides a single number indication of the acoustic performance of a partition or single element. Calculation procedures for Rw are defined in ISO 140-2:1991 “Measurement of Sound Insulation in Buildings and of Building Elements Part 2: Determination, verification and application of precision data”.
R'_w	Field obtained Weighted Sound Reduction Index - this figure is generally up to 3-5 lower than the laboratory test determined level data due to flanked sound transmission and imperfect site construction.
Sound Isolation	A reference to the degree of acoustical separation between any two areas. Sound isolation may refer to sound transmission loss of a partition or to noise reduction from any unwanted noise source. The term “sound isolation” does not specify any grade or performance quality and requires the units to be specified for any contractual condition
Sound Pressure Level, L_P dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, L_W dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt
Speech Privacy	A non-technical term but one of common usage. Speech privacy and speech intelligibility are opposites and a high level of speech privacy means a low level of speech intelligibility. It should be recognised that acceptable levels of speech privacy do not require that speech from an adjacent room is inaudible.
Transmission Loss	Equivalent to Sound Transmission Loss and to Sound Reduction Index in terminology used in countries other than Australia. A formal test rating of sound transmission properties of any construction, by usually a wall, floor, roof etc. The transmission loss of all materials varies with frequency and may be determined by either laboratory or field tests. Australian Standards apply to test methods for both situations.