

TECHNICAL MEMO

Our Ref: SRP1029-AAL-ZZ-ZZ-T-J-0002



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Date: 10 April 2026

SUBJECT: GREENWAY JUNIOR SCHOOL – NOISE IMPACT ASSESSMENT

1 INTRODUCTION

Anderson Acoustics Ltd was commissioned by Morgan Sindall to provide acoustic design advice for the proposed development at Greenway Junior School. The project involves the construction of a new build block to be erected to the west of the current teaching blocks at Greenway Junior School, Greenway, Horsham RH12 2JS. Existing school buildings are to be demolished.

This technical memo establishes plant noise criteria to ensure the amenity of nearby residential receptors is protected. The criteria have been informed by a background noise survey and local authority guidance. Furthermore, this report uses manufactures noise data of proposed items of plant to determine the predicted noise levels at the nearest noise sensitive receptors.

This report is technical in nature and, as such, a summary of noise units and terminology used within this report can be found here.

2 DESIGN CRITERIA

It is understood there are currently no planning conditions associated with the development. Design criteria adopted in this assessment is summarised below.

2.1 LOCAL PLANNING POLICIES

Planning Noise Advice Document: Sussex¹ presents the current local authority guidance in relation to plant noise. Policy 3.2.1 states:

2.6.1 For a new noise source being introduced near existing noise sensitive premises then an ambient and background noise survey (LA90) should cover the times when the proposed development will be in operation. The expected levels and duration of all the potential noise sources likely to be in operation from the proposed development, whether measured or predicted, should be provided with details of tonality, character, impulsivity and/or intermittency of each noise (e.g. BS 4142). Reference shall also be made if a noise source is anticipated to be readily distinctive against the residual acoustic environment. This could also apply to extensions/ alterations to existing development.

¹ Planning Noise Advisory Document: Sussex 2023

3.2.1. The rating level of the industrial or commercial sound source should, where practicable, achieve a level no greater than the representative background sound, when measured in accordance with BS 4142:2014 + A1: 2019. There may be instances, for specific sites, where a rating level below background is deemed appropriate. This can be determined through discussion with the Local Planning Authority (LPA). A rating level below background may be required if there are concerns for potential noise creep, for example in a High Street setting. It is considered that meeting this criterion would avoid adverse noise impacts, in the interests of ensuring a good standard of amenity and protecting human health. Where these criteria are not attainable, the noise report should explain why, and how best practicable means will be implemented to control noise in order to satisfy the LPA that the development is acceptable. At all times the reports shall have regard to the context. Good Acoustic Design will be a consideration for any mitigation proposals.

Details of BS 4142:2014 are presented below.

2.2 BRITISH STANDARD 4142:2014+A1:2019

Guidance on the assessment of the impact of noise from fixed installations and sources of an industrial nature is provided in BS 4142:2014.

BS 4142 provides methods for rating and assessing sound/noise of an industrial or commercial nature in relation to residential premises, hence its relevance here. The assessment methodology evaluates the “specific sound level” of each industrial or commercial sound source, corrects for distinguishable features to derive the “rating level”, and compares this with the “background sound level”.

The advice is that the background sound level ($L_{AF90,T}$) should be derived from continuous measurement of normally not less than 15-minute intervals over the period of interest, and that it should not be the lowest level, but representative of typical conditions at the noise-sensitive receptor(s) relevant to the periods of operation.

The specific sound level ($L_{Aeq,T}$) is obtained (by measurement or calculation) over a reference period of 1 hour in terms of the daytime (07:00 to 23:00) and 15 minutes during the night-time (23:00 to 07:00).

The rating level ($L_{A,r,Tr}$) is the specific sound level corrected to account for any acoustic features present in the sound in question, as experienced at the receptor, such as distinguishable, discrete, continuous note (a whine, hiss, screech or hum etc.) or distinct impulses (bangs, clatters or thumps etc.). Where no correction is warranted, the rating level is equal to the specific level.

The “subjective method” to calculate the rating level incorporates the following corrections (particularly appropriate for new sources that cannot be measured in-situ):

- Up to +6 dB due to tonality, subjectively this might be +2 for a tone that is just perceptible, +4 where it is clearly perceptible and +6 where it is highly perceptible.
- Up to +9 dB for impulsivity, subjectively this might be +3 for impulsivity that is just perceptible, +6 where it is clearly perceptible and +9 where it is highly perceptible; and
- Up to +3 dB for other acoustic features that are neither tonal nor impulsive, though readily distinctive at the receptor.

An “initial estimate” of the impact of the specific sound is calculated by subtracting the measured background sound level from the rating level. The following advice applies:

- a) Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

- d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur.

Where the initial estimate of the impact needs to be modified due to the context, the assessment should take into account all pertinent factors, including:

- the absolute level of sound
- the character and level of the residual sound compared to the character and level of the specific sound, and
- the sensitivity of the receptor and whether dwellings will already incorporate design measures that secure good internal and/or outdoor acoustic conditions

Where background sound levels are already low, designing plant to achieve noise rating levels which are 10 dB lower at nearest noise sensitive receptors can be impractical and, indeed, unnecessary.

In this regard, it is stated in BS 4142 Annex A (informative) that:

“In addition to the rating/background sound level comparison, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance.”

BS 8233 indicates that, based on the assumption of a partially open window, a rating level of 30 dB outside equates to an internal level of around 15-20 dBA, which is significantly below the target ambient noise level of 30 dBA for bedrooms.

Therefore, based on the guidance in BS 4142 and BS 8233, where existing background sound levels are very low, the recommended target noise rating levels applicable at 1 m from the façade of the nearest residential premises is 30 dB. This would ensure that ideal indoor ambient noise levels within nearby residential receptors are not undermined, whilst balancing the practicalities of specifying the proposed nearby fixed plant.

2.3 BUILDING BULLETIN 93

Building bulletin 93 sets out maximum indoor ambient noise levels of up to 40 dBA for new build, naturally ventilated general teaching spaces and 35 dBA for new build, mechanically ventilated spaces.

The indoor ambient noise level includes noise from external sources transmitted via the building fabric, mechanical services, and electrical systems. But excludes noise from occupants and their activities (i.e. teaching activities).

Site noise levels have been considered to demonstrate that the proposed ventilation strategy will be suitable for the proposed development.

For onsite noise sensitive receptors within the site, absolute noise limits for plant noise emissions shall be set to ensure that BB93 noise criteria are achieved and maintained for teaching spaces and offices (assuming open windows as a worst-case ventilation mode).

3 SITE DESCRIPTION

The development site is located at Greenway, Horsham RH12 2JS.

The site is situated within a predominantly residential area, with residential properties bordering the site to the Northeast (Merryfield Drive), North (Larch End), Southwest (Churchill Avenue) and Southwest (Greenway).

An aerial view of the site is displayed in Figure 3-1, with the unattended monitoring position (MP1) marked in red.

Figure 3-1: Existing site and Unattended Monitoring Position



4 ENVIRONMENTAL NOISE SURVEY

The prevailing noise conditions at the site have been determined by a detailed unattended environmental noise survey, supported with observations of the existing noise environment at the nearest noise sensitive premises. The unattended survey was undertaken in order to determine the representative background and ambient sound levels at the assessment location.

The monitoring location is detailed in Figure 3-1. Measurements were undertaken at a height of 2.0 m above ground level and under free-field conditions.

Measurement locations were considered representative of acoustic conditions at the nearest noise sensitive receptors, which have been identified as residential properties on Greenway.

Observations during the site visit indicate that the dominant noise source was road traffic from the A24, located approximately 600m northeast of the site. Secondary noise sources included birdsong and occasional aircraft noise.

4.1 INSTRUMENTATION

Details of the equipment used in the survey are shown in Table 4-1. Equipment was calibrated before and after the survey and no significant drift in calibration was observed.

Table 4-1: Survey Equipment Details

Description	Equipment	Serial no.	Calibration Expiry	Calibration Certification No.
Sound Level Meter	Rion NL-52	00743139	09/05/2027	TCRT25/1371
Preamplifier	Rion NH-25	42864		
Microphone	Rion UC-59	17093		
Calibrator	Rion NC-75 Calibrator	34745931	10/09/2026	TCRT25/1680

4.2 WEATHER CONDITIONS

Weather conditions during the survey period have been obtained from an internet source www.wunderground.com (weather station Horsham Town Centre, ID: IHORSH78), which indicates light wind throughout the survey period. Some periods of wet weather were also indicated. The data has been analysed alongside weather data to determine whether any adverse conditions may impact measurements.

Data measured on Thursday 12th March has been excluded from the assessment due to the impact of poor weather conditions.

4.3 UNATTENDED SURVEY RESULTS

Table 4-2 presents the results from the unattended monitoring at the position indicated in Figure 3-1.

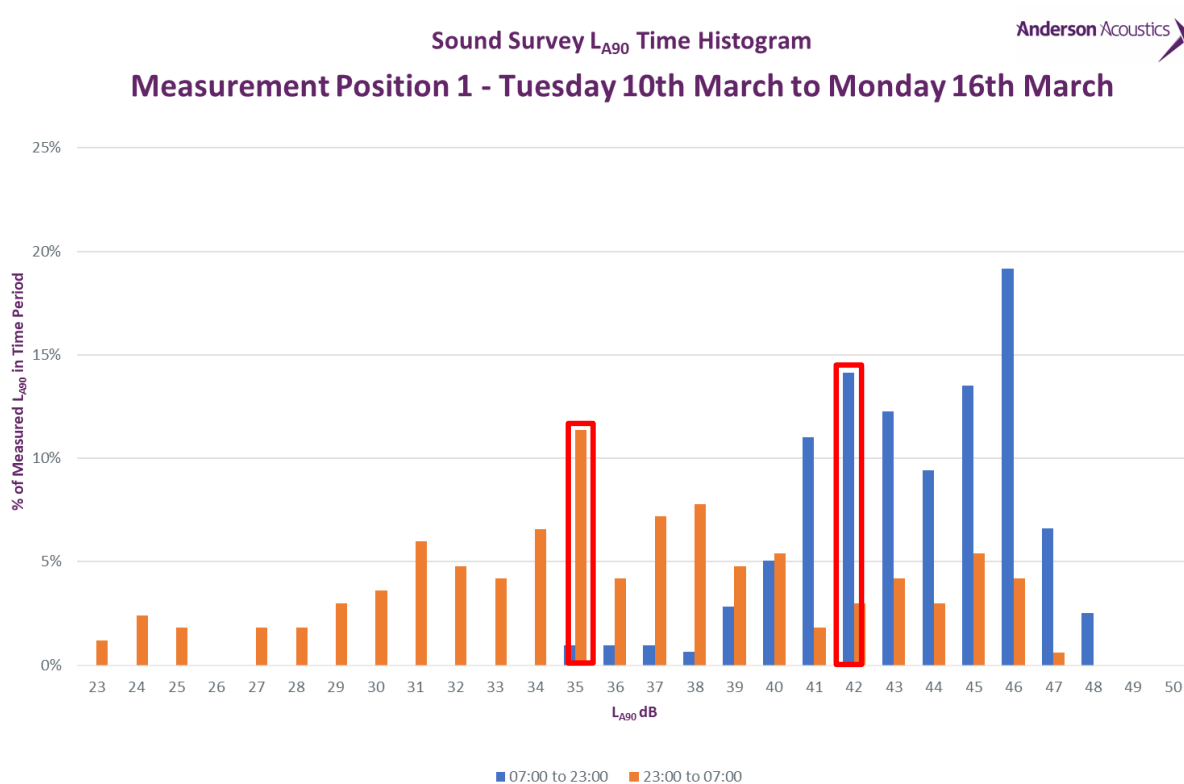
The histogram detailed in Figure 4-1 indicates that the typical modal background sound level is 42 dB $L_{A90,15min}$ during the daytime period and 35 dB $L_{A90,15min}$ during the night-time period. $L_{A90,15min}$ data has been presented as it is likely to represent a worst case for the daytime $L_{A90,1hr}$, as well as meeting the BS4142 requirements for the night-time assessment.

Table 4-2: Unattended Survey Results – MP1

Date	Period	Ambient Noise Level $L_{Aeq,T}$ dB	Modal Background Noise Level $L_{A90,15min}$ dB
Tuesday 10 March 2026	10:30 to 23:00	48	41
	23:00 to 07:00	48	35
Wednesday 11 March 2026	07:00 to 23:00	49	46
	23:00 to 07:00	37	31
Friday 13 March 2026	07:00 to 23:00	48	45
	23:00 to 07:00	42	37
Saturday 14 March 2026	07:00 to 23:00	47	43
	23:00 to 07:00	43	35
Sunday 15 March 2026	07:00 to 23:00	50	46
	23:00 to 07:00	40	29
Monday 16 March 2026	07:00 to 10:30	51	46

Date	Period	Ambient Noise Level $L_{Aeq,T}$ dB	Modal Background Noise Level $L_{A90,15min}$ dB
	23:00 to 07:00	-	-
Overall	07:00 to 23:00	49	42
	23:00 to 07:00	46	35

Figure 4-1: $L_{A90,15min}$ Histogram – MP1



5 ASSESSMENT CRITERIA

5.1 PLANT NOISE EMISSIONS TO RESIDENTIAL RECEPTORS

The nearest noise sensitive premises have been identified as the residential premises 55 and 57 Greenway, located approximately 25m to the southwest of the site boundary. Background noise levels captured at monitoring position MP1 are considered representative of these nearest noise sensitive receptors and will therefore be used for this assessment.

Established typical background sound levels at the nearest noise sensitive receptor are:

- **Daytime:** 42 dB $L_{A90,15min}$
- **Night-time:** 35 dB $L_{A90,15min}$

The Local Planning Authority typically requires noise emissions from building services plant to be controlled to a level no greater than the background sound level at the nearest noise-sensitive receptor. Based on the measured levels, this would equate to target plant noise rating levels of no more than 41 dB(A) during the daytime and 35 dB(A) at night.

Table 5-1: Plant Noise Limits

Position	Time Period	Proposed Noise Limit at Receptor, dB $L_{A,r,Tr}$
NSR 1 (55 Greenway)	Daytime (07:00 – 23:00)	42
	Night-time (23:00 – 07:00)	35

It is understood that plant will be operational during the night-time period in a setback mode to maintain internal temperatures. A 50% set back has been assumed for the night-time operation.

5.2 PLANT NOISE TRANSMISSION TO SCHOOL BUILDING

It is understood that all teaching rooms are to have hybrid ventilation. On this basis, it is understood that openable windows are not required for ventilation. It is also understood that all proposed windows shall be specified to achieve at least 28 dB R_{w+Ctr} (standard double glazing).

2 no. rooftop mounted windcatchers are proposed for a hybrid ventilation strategy to the Assembly Hall. It is understood that Monodraught Mk3 X-Zero Windcatcher 180 l/s or similar are proposed. A sound insulation performance of 23 dB $D_{n,e,w}$ per unit is assumed.

As such, plant noise should be controlled to no greater than 58 dBA at 1 m from the façade and 50 dBA at 1 m from each rooftop windcatcher unit, such that an appropriate internal ambient noise level may be achieved during teaching.

It is also noted within the IoA Acoustics of Schools: A Design Guide that “Noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,30min}$ ”. Therefore, plant noise transmission to these areas will also be considered in accordance with this guidance.

6 ASSESSMENT METHODOLOGY

DataKustik’s “CadnaA” modelling software has been used to determine the specific sound levels at the nearest noise sensitive receptors, as described earlier. The assessment has been made over a 1-hour period during the daytime (07-23h) and a 15-minute during the night-time (23-07h), in keeping with the assessment period specified within BS 4142.

Predictions have been carried out in accordance with the ISO 9613-2 methodologies, which allow consideration of the effects of the acoustic screening provided by the existing buildings surrounding the application site, the topographical conditions throughout the area, ground absorption, atmospheric absorption, acoustic reflections and acoustic screening, as well as applying a light downwind propagation correction to represent a worst-case.

Modelling software has been used to predict the specific noise level of plant at nearby noise sensitive receptors. 3D modelling details are as follows:

- The topography across the development site and surrounding area has been rendered within the model using 1 m LIDAR data provided by DEFRA.
- Receivers have been set at a height of 1.5 m above local ground level. For multistorey buildings, receivers are set at a height of 1.5 m above ground level, the 3.0 m for each additional storey.
- Ground modelled as a mix between hard and soft (i.e. $G = 0.5$)

Plant is not expected to be tonal, intermittent or impulsive in nature, so no penalty rating has been applied.

As detailed above, a 50% set back has been assumed for the night-time operation. It is assumed that the loading will be distributed across the units without clear on/off periods that would result in intermittent characteristics at the receptor locations.

7 PROPOSED PLANT

7 items of fixed plant are proposed at rooftop level, as specified on the M&E schedule provided. Table 7-1 details the proposed unit and corresponding Sound Pressure Level measured at 1 m, as provided by the manufacturer.

Table 7-1: Proposed items of plant

Description	Sound Pressure Level, Octave Band Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
CAHV-R450YA-HBP at 1 m	64	66	67	60	54	52	52	48	74

Locations of the plant have been based on drawings provided by M&E (doc ref. SRP1029-ECE-XX-RF-D-A-0102).

8 PROPOSED MITIGATION

A 2.5 m louvred screen is proposed around the VRF units. The following insertion loss has been assumed for the louvred element.

Table 8-1: Louvre Insertion Loss

Description	Insertion Loss, Octave Band Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
305 mm Depth Louvre	4	5	8	9	12	9	7	6

Predicted noise levels for the daytime and night-time periods with the proposed mitigation in place is shown below.

Figure 8-1: Predicted Plant Noise Levels with proposed mitigation – Daytime (proposed barriers in blue)

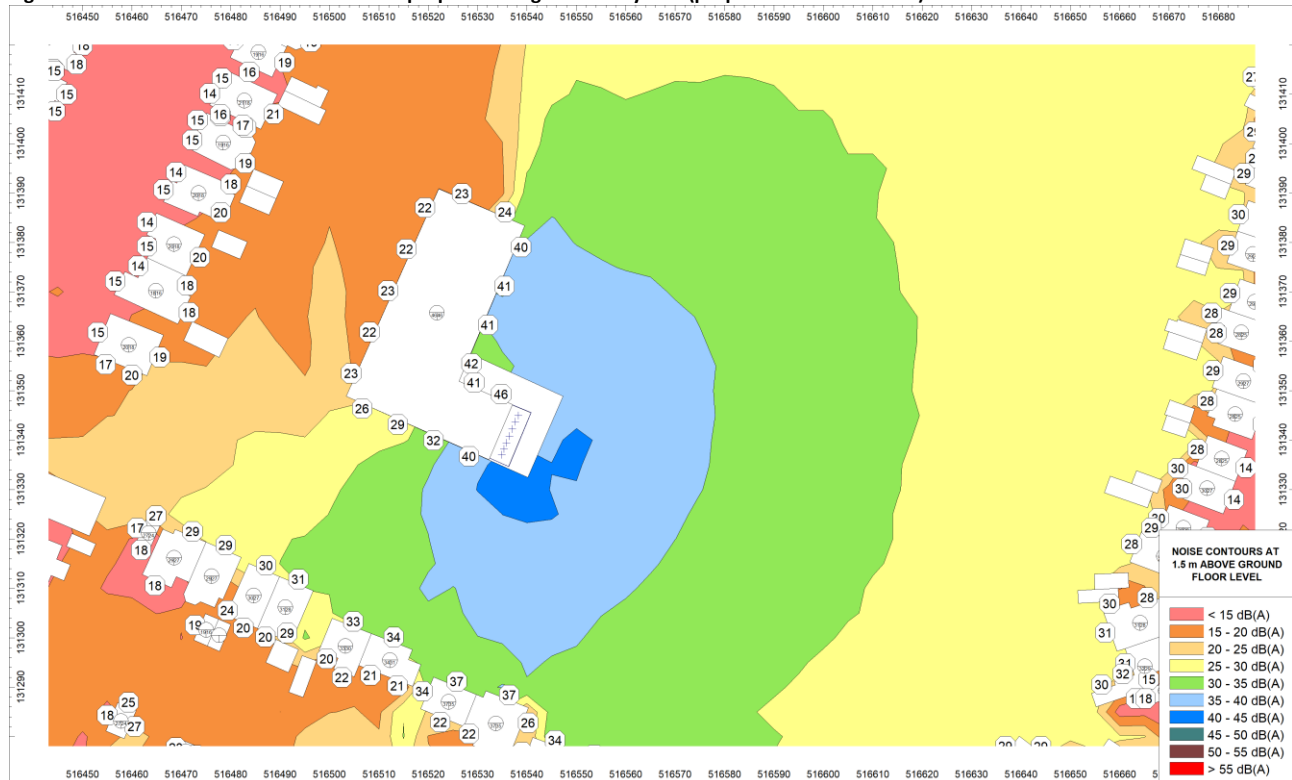
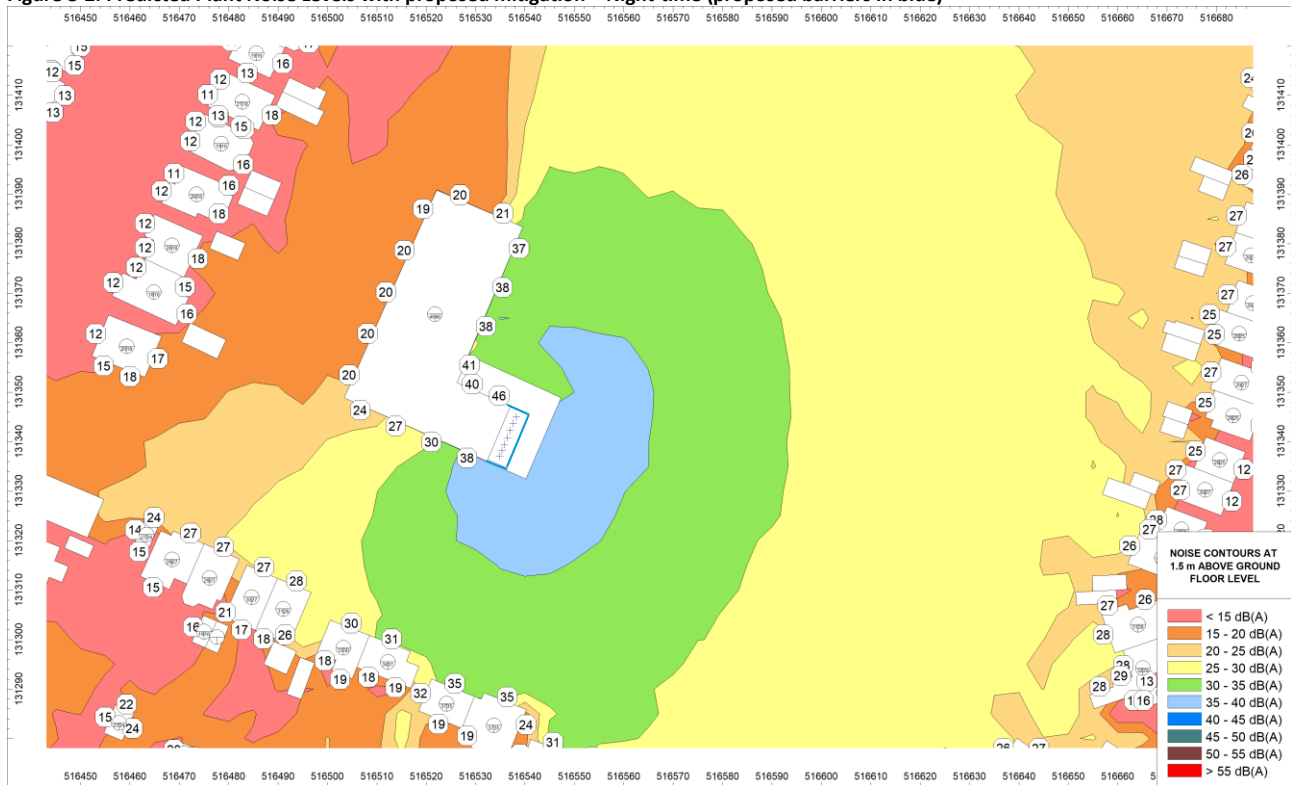


Figure 8-2: Predicted Plant Noise Levels with proposed mitigation – Night-time (proposed barriers in blue)



9 RESULTS

9.1 PLANT NOISE EMISSIONS TO RESIDENTIAL RECEPTORS

Results indicate that the established plant criteria can be achieved at each receptor location during the daytime and night-time periods. Given that no acoustic character corrections are applied, the predicted specific sound levels represent the rating level. Plant is also not expected to be tonal, or intermittent in nature so not penalty rating has been applied.

9.2 PLANT NOISE EMISSIONS TO SCHOOL BUILDING

Results indicates that plant noise levels are expected to be up to 46 dB at the first floor Façade of the proposed school block during the daytime period. This achieves the proposed assessment criteria at the school building.

Predicted noise levels at the roof mounted windcatcher terminal is predicted to be up to 46 dBA and 39 dBA respectively during daytime operation with proposed mitigation in place, which demonstrates that the established external noise criterion is also achieved.

Finally, plant noise emissions are expected to be controlled to less than 55 dB at all outdoor play areas as shown by the noise contours at 1.5 m above ground floor level. As such, noise levels are suitably well controlled in accordance with the IoA Acoustics of Schools: A Design Guide.