

Report VA4345.221208.NIA2

734-744 Lordship Lane, London

Noise Impact Assessment

06 February 2023

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VA4345/SP1	Indicative Site Plan
VA4345/TH1-TH2	Environmental Noise Time Histories
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Appendix B	Acoustic Calculations

1. Introduction

A planning application is being made for the use of the hardstanding to the rear of 734-744 Lordship Lane, London as a hand car wash.

Venta Acoustics has been commissioned by Top Residential to undertake an assessment of the potential noise impact of the proposed use on the nearby residential receivers in support of the application.

An environmental noise survey was undertaken to determine the background noise levels at the site as well as the sound levels generated by the surrounding premises. These levels were then used to undertake an assessment of the likely impact with reference to the methodology in BS4142:2014 *Methods for rating and assessing industrial and commercial sound*.

All staff at Venta Acoustics are fully qualified and members of the Institute of Acoustics, the recognised UK professional body for acoustics, noise and vibration professionals and are fully competent to undertake BS4142 assessments.

2. Site Description

As illustrated on attached site plan VA4345/SP1, the proposed site is a hardstanding located on the corner of Berners Road and Hardy Passage. It is currently used as a parking area and also has a small taxi office located at the western end of the site.

The most affected noise sensitive receivers are expected to be the apartments to the rear of Lordship Lane to the south, which overlook the site. The house on the corner of Berners Road and Hardy Passage has a solid brick wall facing the hardstanding, with a windows on the western and southern façade stepped back overlooking the area.

3. Design Criterion and Assessment Methodology

3.1 BS4142:2014+A1:2019

British Standard BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and;
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

The Standard is therefore suited to this assessment.

The assessment methodology considers the Specific Sound Level, as measured or calculated at a potential noise sensitive receptor, due to the source under investigation in terms of a L_{Aeq} value over a one-hour period during daytime operation (07:00-23:00 hours) and a fifteen-minute period during night-time operation (23:00-07:00 hours).

A correction factor is added to this level to account for the acoustic character of the sound. This is determined as follows when using the subjective assessment methodology:

Tonality - For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be allocated as a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity - A correction of up to +9dB can be applied for sound that is highly impulsive considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be allocated as a penalty of 3 dB for impulsivity which is just perceptible at the receiver, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics - Where the specific sound contains characteristics that are neither tonal nor impulsive, but are otherwise startling, disturbing or incongruous with the residual acoustic environment, a penalty of +3 dB can be applied.

Intermittency - When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.

An initial estimate of the impact of the source is then obtained by subtracting the typical background noise level, in terms of a LA_{90} value over the relevant period of operation, from the corrected Specific Sound Level.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB could be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound having a low impact, depending on the context.

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

4. Environmental Noise Survey

4.1 Survey Procedure & Equipment

In order to establish the existing background noise levels at the site, a noise survey was carried out between Monday 26th and Tuesday 27th September 2022 at the location shown in site plan VA4345/SP1. This location was chosen to be representative of the background noise level at the most affected noise sensitive receivers.

Continuous 5-minute samples of the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels were undertaken at the measurement location.

The weather during the survey period was generally dry with light winds. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2017 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-11461-E0	TCRT22/1490	3/8/22
Larson Davis calibrator	CAL200	19816	44622-19816-CAL200	2/3/22

Table 4.1 – Equipment used for the survey

The calibration of the sound level meter was verified before and after use with no significant calibration drift observed.

5. Results

The measured sound levels are shown as time-history plots on the attached charts VA4345/TH1-2.

The background noise level is determined by road traffic in the surrounding area.

The typical background noise levels measured were:

Monitoring Period	Typical ¹ $L_{A90,5min}$
07:00 – 23:00 hours	46 dB
23:00 – 07:00 hours	42 dB
07:00 – 19:00 hours	47 dB

Table 5.1 – Typical background noise levels [dB ref. 20 μ Pa]

¹ The typical L_{A90} value is taken as the 10th percentile of all L_{A90} values measured during the relevant period.

6. BS4142 Noise Impact Assessment

6.1 Specific Sound Level

Due to the significant degree of overlooking and clear line of sight from the flats on Lordship Lane, special consideration has had to be given to controlling noise from the car cleaning activities on site.

These measures include:

- Construction of a cantilevered canopy screening cars from the apartments
- Use of low pressure hoses only, not pressure washers
- Vacuum units will be installed within attenuated enclosures to ensure that they are no louder than 60dB(A) @1m. It is expected this could be achieved with a well constructed, foam lined, 18mm marine ply box, with suitable seals to the doors
- No radios or music on site

To assess the likely sound levels from the facility, a notional 1-hour period has been considered comprising use of 2 vacuum cleaners. Noise from handwashing with a low pressure hose would not be expected to generate appreciable levels of noise. Based on previous car wash facilities, during the busiest times the vacuum cleaners are expected to operate for up to 45 minutes per hour each, with the time in between used for activities such as wiping down vehicles, etc, which are not significantly noise-generating.

Most of the time the car wash is expected to be less busy and the resulting noise levels will be lower than indicated in this assessment.

It is assumed that the vacuum station will be located to the south of the covered area.

The following sound pressure levels have been used for the assessment.

Operation	L _{Aeq}
Enclosed Vacuum Cleaner Unit	60 dB @ 1m

Table 6.1 – Source Specific Sound Levels measured at a similar facility

The resulting specific sound level at the nearest dwelling has been calculated (allowing for screening by the timber fence on the north east boundary) in accordance with ISO 9613-2:1996 *Attenuation of sound during propagation outdoors - Part 2: General method of calculation*.

6.2 Acoustic Character Correction

When objectively analysed, the vacuum equipment would be faintly tonal. A penalty of 2dB for acoustic character and 3dB penalty for intermittency has therefore been applied to the noise source.

6.3 Rating Level and Assessment

The rating level at the receptor is compared against the relevant background noise level to assess the notional significance of the noise impact, as follows.

Results		Relevant Clause	Commentary
Predicted Specific Sound Level	L_{Aeq} 39dB		See Appendix B
Acoustic feature correction	+5 dB	9.2	+2 dB for tonality, +3dB for intermittency
Rating level	L_{Ar} 44 dB	9.2	
07:00 – 19:00 background sound level	L_{A90} 47 dB	8	
Excess of rating over background sound level	-3 dB	11	
Assessment indicates low adverse impact		11	Depending on context

Table 6.2 – BS4142 Assessment

6.4 Context

The site is located in a busy, urban location.

Within this context, the estimated impact of the sound sources is expected to remain valid or be slightly reduced.

6.5 Uncertainty

This section considers the variable in the assessment that may cause variations within the final results and describes how these have been addressed.

- Use of a Class 1 sound level meter is considered to reduce instrument error to insignificant levels as compared with environmental variations. The calibration of the instrumentation was confirmed before and after the noise surveys.
- The background measurements were undertaken under suitable weather conditions over a period designed to include reasonable temporal variations in background noise levels. The monitoring location was selected to be representative of the background noise levels expected to be experienced by the nearby dwellings without being unduly influenced by extraneous noise sources.
- Where library data has been used, propagation calculations have been used to correct noise levels to the relevant distance at the receiver.

Overall, the uncertainty is considered to have been minimised to a suitable range so as not to risk significant variations in the impact assessment of typical operations.

7. Conclusion

A baseline noise survey has been undertaken by Venta Acoustics to establish the background noise climate in the locality of 734-744 Lordship Lane, London.

The measured noise levels have been assessed against BS4142:2014 *Methods for rating and assessing industrial and commercial sound* for the facility to assess potential noise impacts on the nearby residences.

When assessed using BS4142 and allowing for the extensive mitigation measures recommended in this report, noise from activities on site have been shown to have a low impact.

Jamie Duncan MIOA

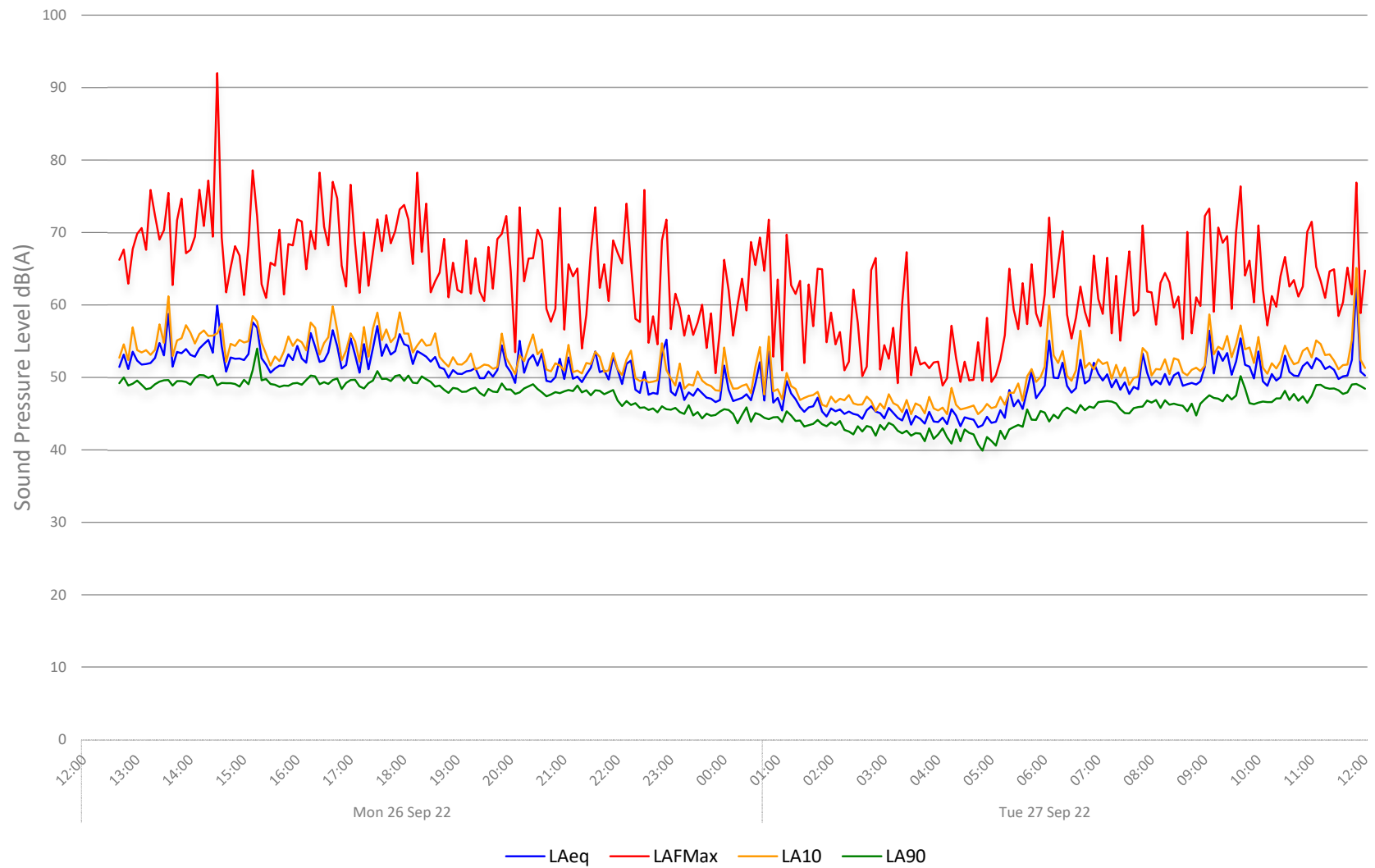


734-744 Lordship Lane, London

Environmental Noise Time History: 1

 **VENTA** ACOUSTICS

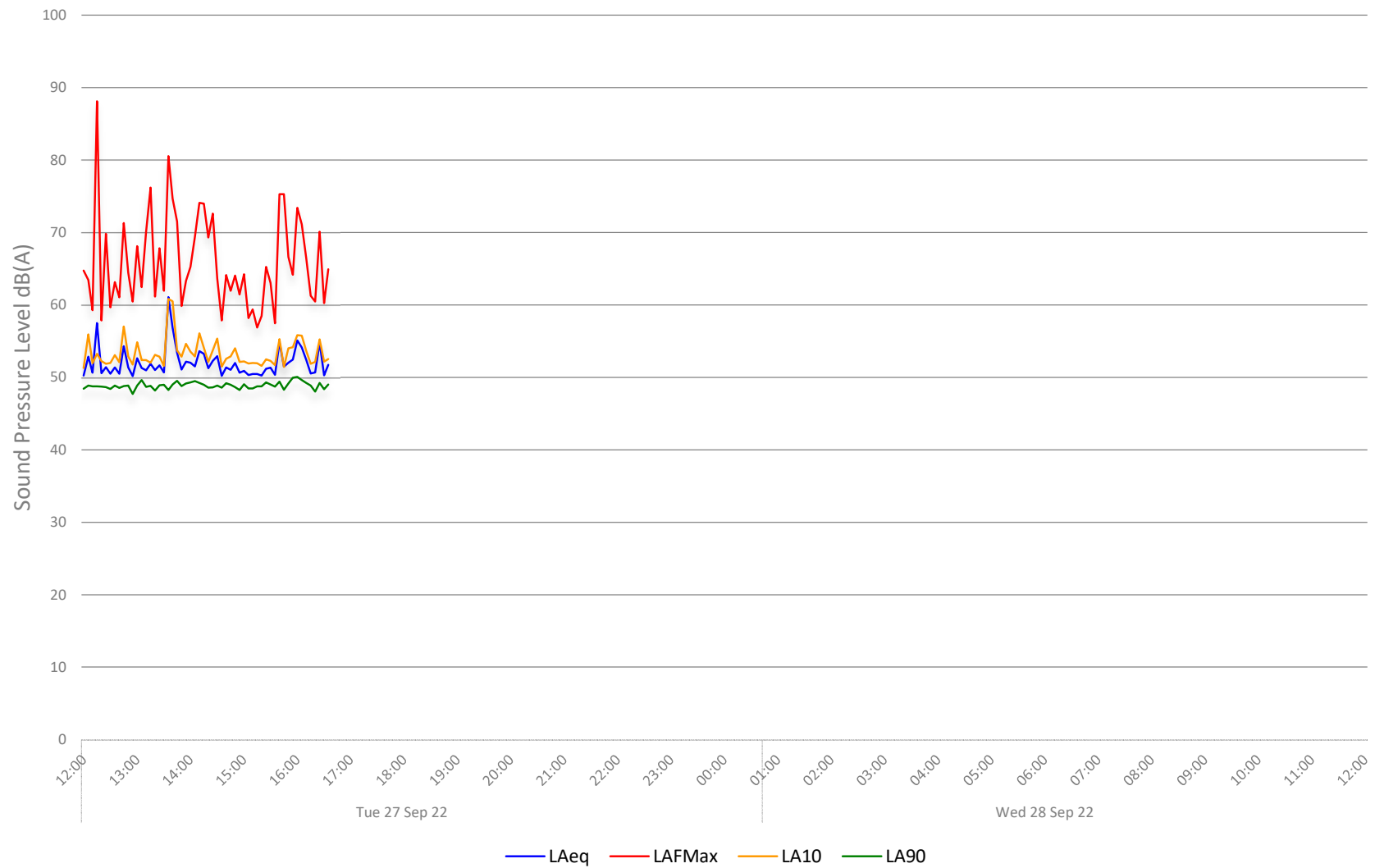
Figure VA4345/TH1



734-744 Lordship Lane, London
Environmental Noise Time History: 2



Figure VA4345/TH2



APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A . A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc).
L_{eq} :	The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz		63		125		250		500		1000		2000		4000		8000
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APPENDIX A

Acoustic Terminology & Human Response to Broadband Sound

1.3 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

APPENDIX B

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Noise Impact Assessment

Vacuum Cleaner		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Vacuum Cleaner	Lp @ 1m	62	61	61	76	71	71	70	68	78
Enclosure loss		-5	-8	-10	-15	-20	-20	-20	-20	
2 units		3	3	3	3	3	3	3	3	
Corrected to 45 mins / hour		-1	-1	-1	-1	-1	-1	-1	-1	
Distance Loss	To 15m	-24	-24	-24	-24	-24	-24	-24	-24	
Level at receiver		35	31	29	39	29	29	28	27	39

BS4142 Character Corrections		BS4142 Assessment		Expected Impact
		Rating Levels		
Acoustic Character	2	Specific Sound Level	39	Indicative of a low impact
Impulsivity	0	Corrected SSL	44	
Intermittency	3	Background (8-18)	47	
Total	5	Difference	-3	