



Dice
Environmental
Acoustics

Station Road, Spalding
Noise Impact Assessment

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Executive Summary

Dice Environmental were commissioned by Aspbury Planning to undertake a Noise Impact Assessment to support the discharge of a planning condition for a planning application for the change of use of a former station yard to coach parking and maintenance at Station House, Station Road, Gedney, Spalding, PE12 0DD.

Noise Surveys

Environmental noise surveys have been completed to quantify the prevailing soundscape at the site. This comprised an unattended logging survey to capture the existing background noise levels at the nearest noise sensitive receptors (NSR's), supplemented with attended measurements of the existing noise sources, associated both with the site in question and the adjacent industrial premises.

Noise Impact Assessment

A 3D CadnaA noise model has been constructed to predict the noise impact from the proposal upon the nearest noise sensitive residents surrounding the site.

The operations of the site are to remain the same, with the proposal focus being the parking and storage of coaches to the east of the currently operating premises. The proposed location is situated between the existing site's maintenance shed and the existing concrete industrial premises to the east.

The assessment has found that the proposed change in use of the existing station yard will not result in any significant adverse impacts on nearby residential properties in accordance with the IOA/IEMA guidelines or BS4142. The additional activity is expected to remain below current noise levels; therefore, no mitigation measures are required.

It has also determined that no further acoustic fencing is necessary. Accordingly, this report should support the discharge of Condition 8.

The assessment is based upon robust and worst-case assumptions and demonstrates that, in principle, there should be no adverse impact at the existing dwellings as a result of noise arising from the proposed change of use.

1. Introduction

1.1. Background

Dice Environmental has been commissioned by Aspbury Planning, to provide a Noise Impact Assessment to support a planning application for the change of use of a former station yard to coach parking and maintenance at Station House, Station Road, Gedney, Spalding, PE12 0DD, to be referred to hereafter as “the site”.

The site is located on Station Road in the village of Gedney, within the South Holland district of Lincolnshire. The building sits in a semi-rural setting, with open arable fields and drainage channels typical of the Fenland landscape surrounding the village. Immediate surroundings include low-density residential properties, agricultural land to the rear and side, and the former station platform of the building’s historic use.

The site currently comprises of office, shipping container storage, a maintenance workshop and a hard standing storage yard with associated staff parking.

The proposal, illustrated in Figure 1 of Appendix III, involves the change of use of the former station yard to accommodate coach parking. The scheme proposed parking for approximately 20 coaches across the site, with a particular concentration to the east within the currently vacant storage area. All existing units and site uses will be retained.

Planning permission, ref: *H06-0963-24*, has been granted subject to conditions with the following relating to noise.

8 Prior to the change of use commencing, details of an acoustic fence along the northern boundary, including a schedule of fencing levels, heights and materials, and details of the size and species of any hedging, shall be submitted to and approved in writing by the Local Planning Authority, and the details so approved shall be implemented in full before the development is first brought into use and retained thereafter.

Note: Where levels are raised above existing ground levels, the submission shall be supported by cross-sectional drawings showing the relationship with adjoining uses and buildings to enable the Local Planning Authority to be satisfied that sufficient mitigation measures will be in place. Reason: In the interests of the character and appearance of the development and the amenity of the area in which it is set including the amenity of nearby occupiers. This Condition is imposed in accordance with Policies 2 and 3 of the South East Lincolnshire Local Plan, 2019.

This assessment has been undertaken with due regard to the supplied planning layout dated October 2024. The site layout is shown in Figure 2 of Appendix III.

1.2. Limitations

All limitations of this report are presented in Appendix I.

1.3. Confidentiality

Dice Environmental has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Dice Environmental; a charge may be levied against such approval.

2. Assessment Methodology

2.1. National Planning Policy Framework

National Planning Policy Framework [1] states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-taking should take account of the acoustic environment and in doing so consider:

- Whether or not significant adverse effect is occurring or is likely to occur
- Whether or not adverse effect is occurring or is likely to occur; and
- Whether or not a good standard of amenity can be achieved.

In line with the Explanatory Note of the Noise Policy Statement for England [2], this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The Observed Effect Levels are as follows:

- Significant Observed Adverse Effect Level (SOAEL): This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest Observed Adverse Effect Level (LOAEL): This is the level of noise exposure above which adverse effects on health and quality of life can be detected;
- No Observed Adverse Effect Level (NOAEL): This is the level of noise exposure at which the noise is noticeable but has no effect at all on health or quality of life.
- No Observed Effect Level (NOEL): This is the level of noise exposure below which noise is not audible.

Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1: Noise exposure hierarchy

Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No effect	No observed effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological, e.g., regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

-
- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
 - For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise; and
 - The spectral content and general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be taken into account, along with the extent to which the source of noise is intermittent and of limited duration.
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2. British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*

BS4142 [3] describes methods for rating and assessing sound of an industrial 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
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial site.

The procedure detailed in the standard compares the measured or predicted noise level, 'the specific noise level', from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00-23:00): 1 hr; and,
- Night-time (23:00-07:00): 15 minutes.

There are a number of 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows:

Tonality

- +2 dB: where the tonality is just perceptible
- +4 dB: where the tonality is clearly perceptible
- +6 dB: where the tonality is highly perceptible

Impulsivity

- +3 dB: where the impulsivity is just perceptible
- +6 dB: where the impulsivity is clearly perceptible
- +9 dB: where the impulsivity is highly perceptible

Intermittency

- +3 dB: where the intermittency is readily distinctive against the acoustic environment

In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment.

BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the higher the rating level is above the background sound level, the greater the magnitude of 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 is likely to be an indication of an adverse impact, depending on the context.
 - Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

With the above in mind, it is common that a Local Planning Authority will specify their own criteria for the rating level relative to the background sound level and, where this is the case, this criterion usually takes precedence over a simple comparison of the rating level against the background sound level.

BS4142 includes the following text in relation to areas with low and very low noise levels:

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

2.3. IOA Guidelines for Noise Impact Assessment

The Institute of Acoustics and Institute of Environment Management and Assessment has produced a guidance document of Noise Impact Assessment which provides examples of how change in ambient noise levels can be assessed.

The guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment (EIA) process. They cover:

- How to scope a Noise Assessment;
- Issues to be considered when defining the baseline noise environment;
- Prediction of changes in noise levels as a result of implementing development proposals; and,
- Definition and evaluation of the significance of the effect of changes in noise levels (for use only where the assessment is undertaken within an EIA).

Although the guidance states that it is only applicable for use in an Environmental Impact Assessment (EIA), in the absence of any other relevant guidance for assessing changes in ambient noise levels, it is the most appropriate document for establishing significance of effect.

Table 2 categorises the change in noise level for a noise sensitive receptor such as a residential dwelling.

Table 2: Noise exposure hierarchy

Effect	Change in Ambient sound level, $L_{Aeq,T}$, dB
Very substantial	>15dB
Substantial Increase	10.0dB-15.0dB
Moderate Increase	5.0dB – 9.9dB
Slight Increase	3.0dB – 4.9dB
None / not significant	<2.9dB

3. SURVEYS

3.1. Background and Ambient Noise Survey

Dice has conducted a background and ambient noise survey in order to measure the level of noise currently present across the site. The noise survey took place over the following period:

- 15:00 Thursday 6th November 2025 to 13:00 Tuesday 11th November 2025.

The following noise measurement position was chosen:

- Noise Measurement Position 1 (NMP1): A background and ambient noise survey was undertaken within the boundary of the development adjacent to the nearest noise sensitive dwelling. The microphone was situated approximately 1.5m from the ground and in free field conditions.

A summary of the measured sound pressure levels is presented in Table 3.

Table 3: Summary of measured background sound levels

Date Range	Period	Ambient sound level L _{Aeq,T} , dB	Background sound level L _{A90,T} , dB	
			Range	Typical*
06 Nov. 2025 – 11 Nov. 2025	Daytime (07:00-23:00)	57	37-59	54
	Night time (23:00-07:00)	51	32-51	39

*Based on modal values occurring within each stated time period

3.2. Source Noise Survey

Dice has conducted a Noise Survey of the activities associated with the current development. Measurements were also undertaken of the industrial development to the east of the site to establish the various noise sources and their origin. The Noise Survey took place over the following period:

- 12:30 to 15:00 6th November 2025

The survey was undertaken at the following positions:

- Noise Measurement Position 2 (NMP2). Dice undertook attended measurements around the site to capture the noise levels associated with the existing operations. Full location details can be seen within Appendix III.

A summary of the measured sound pressure levels is presented in Table 4.

Table 4: Summary of measured noise levels at NMP2

Measurement	Description	Distance to Source (m)	Average Measured Sound Pressure Levels, free-field $L_{Aeq,T}$, dB
1	Coach Arriving Site	2	74.2
2	Wheel Gun – Maintenance Shed	1	81.2
3	Car Wash Machine	10	62.5
4	Fuel Pump – Coach Fuelling	4	60.7
5	Coach leaving fuelling site	2	67.9
6	Coach Leaving Site	4	67.6
7	Minibus Leaving Site	2	55.9
8	Staff Car Leaving Site	2	57.7

Noise spot measurements were conducted for all activities currently occurring on site, as summarised in Table 3. Since no changes are proposed to existing activities, and the only new noise source will be vehicle movements associated with the 20 coaches arriving, parking, and departing, Measurements 1 and 6 have been identified as the primary sources of predicted noise for this assessment.

3.3. Survey Conditions

The weather conditions during the noise surveys were conducive towards the measurement of environmental noise being fine and dry with wind speeds below 5 m/s.

The noise survey was completed using the following noise measurement equipment.

Table 5: Noise Measurement Equipment

Position	Description	Manufacturer & Type	Serial No.	Calibration Expiry
NMP1	01dB Solo	65947	6 Dec. 25	01dB Solo
	01dB-Metravib Pre21S	16255		01dB-Metravib Pre21S
	01dB MCE 212	175280	6 Jan. 26	01dB MCE 212
	01dB-Stell Cal21	34744600 (2014)		01dB-Stell Cal21
NMP2	01dB Solo	65771	29 May. 26	01dB Solo
	01dB-Metravib Pre21S	17100		01dB-Metravib Pre21S
	01dB MCE 212	447457		01dB MCE 212
	01dB-Stell Cal21	34975432 (2017)	17 Jun. 26	01dB-Stell Cal21

The sound level meters were field-calibrated on site prior to and after the measurements were taken. No significant drift was witnessed.

4. Noise Impact Assessment

4.1. Noise model

In order to accurately assess noise propagation across and from the site, a 3D noise model has been constructed using the modelling software CadnaA. The following assumptions, inputs and considerations have been included in the model:

- Terrain data taken from DEFRA Data Services Platform [4];
- Planning layout drawing as described in Section 1;
- Existing buildings that provide shielding from any of the noise sources;
- NMP2 has been successfully used to calibrate the model;
- A reflection order of 2 has been used in all calculations;
- Building heights are as supplied by the client; and
- Noise levels generated using ISO 9613-1 [5] and ISO 9613-2 [6] as incorporated into CadnaA software.

4.2. Coach Movements

The assessment has assumed that most of the significant vehicular movement, in terms of noise, will be coaches. Accordingly, this assessment has used the noise level data for the various operations of the site.

The criterion used is the strictest contained within BS4142:2014,

$$L_{A,r} = L_{A90} \text{ dB}$$

This approach is therefore considered robust. The average background sound levels from the survey period have been adopted in accordance with the requirement for 'typical' levels.

A calculation has been undertaken to demonstrate the existing noise levels as a result of the currently permitted 15 coaches.

$$10\log_{10}(15) = 10 \times 1.1761 = 11.7 \text{ dB}$$

$$67.6 + 11.76 = 79.3 \text{ dB}$$

Further calculation has been undertaken which has taken the resultant noise level of one coach in transit and then calculated for a worst-case figure of 20 movements in any one hour period using the following calculation.

$$10\log_{10}(20) = 10 \times 1.301 = 13.01 \text{ dB}$$

$$67.6 + 13.0 \approx 80.6 \text{ dB}$$

It should be noted that the majority of movements will occur during two periods, once when coach is leaving site and a second when coaches are returning. As such, the assessment has assumed that all 20 coaches will leave within the same hourly period to provide a worst-case assessment. The following calculation was used to determine the resultant noise level:

4.3. Change in Ambient Assessment

The following table demonstrates the change in ambient noise level from the existing 15 coach movements to the proposed 20 movements.

Table 6: Change in Ambient Noise Assessment

Receptor	Calculated Noise Level at Receptor – Existing 15 Coach Movements L_{Aeq} dB	Calculated Noise Level at Receptor – Proposed 20 Coach Movements L_{Aeq} dB	Predicted Change in Ambient Noise Level dB
1	79.3	80.6	+1.3

The above assessment has determined that the predicted change in ambient noise levels result in a 'None/Not Significant' impact at the nearest noise sensitive receptor. Accordingly, no further mitigation will be required due to the increase in coach movements.

4.4. BS4142 Assessment

The additional 5 no. proposed coaches, each producing a sound level of 67.6 dB at 2 metres, would combine to give a total level of approximately 74.6 dB at the same distance. When this level is projected to the nearest residence, the increased separation distance reduces the sound to around 57.1dB. Taking into account the existing residential boundary fence and the additional acoustic fence—together providing an estimated attenuation of 8dB with the resulting sound level at the residential property is expected to fall to approximately 49.1dB.

The following numerical assessments have been provided in accordance with BS4142 [7] to provide a comparison between rating sound levels of the activities associated with the proposal against the typical sound levels existing prior to development. The assessment has been undertaken for the hourly period associated with the operations of the

Table 7 below identifies applicable acoustic penalties based on the proposed operations of the development.

Table 7: Identification of applicable acoustic penalties

Source	Penalty	Applicable?	Attributable Penalty	Comment
Coach Noise	Tonality	Yes	2	Tonal Elements associated with Coaches
	Impulsivity	No	-	No Impulsivity noted.
	Intermittency	No	-	Not applicable.
	Other Sound Characteristic	No	-	Not applicable.

Table 8 demonstrates the difference between the rating level of noise associated with the proposal against the measured existing background noise level at the nearest noise sensitive dwelling.

Table 8: BS4142 Assessment of Proposed Development

Results	Day 07:00-23:00	Night 06:00-07:00 (In line with operational hours)	Commentary
Background sound level, dB $L_{A90,T}$	54	52	Representative background sound levels at the NSR.
Reference time interval	1-hour	15-min	
Specific sound level, dB $L_{Aeq,T}$	49	49	Highest off-site values established from calculations undertaken within CadnaA model.
Acoustic feature correction, dB	+2		A 5dB feature correction has been applied to account features.
Rating level, dB $L_{Ar,Tr}$	51	51	Specific sound level plus acoustic feature correction.
Excess rating over background sound level	-3	-1	
Assessment indicates likelihood of *depending on context	Meets the background noise level for the day and complies with the BS4142 requirements.		
Uncertainty of the assessment	Uncertainty was minimized by measuring over an extended period and at a location directly representative of the nearest proposed NSRs and measuring the main noise source 1m to remove any external interference.		

The above table has determined that the resultant noise level, as a result of the additional proposed coach movements will not exceed the background noise level during the day time period or during the night time period of 06:00 to 07:00 in line with the sites uses. Accordingly, no further mitigation will be required due to the increase in coach movements.

4.5. Statement of Uncertainty

Uncertainty has been considered as a limit to the accuracy of any noise assessment, including associated steps of measurement, calculation, or prediction. Factors have been considered to include (but not limited to) the following:

- The inherent accuracy limitation of methodology in Standards and guidance.
- Variability in meteorological conditions.
- The accuracy of sound source input data of a calculation.

It has been a requirement of the assessment standard BS4142 [7] to minimise uncertainty to a level commensurate with the intention of the assessment objective. Measures taken in this assessment to minimise uncertainty have included:

- Baseline sound levels have been measured over a reasonably long period and therefore provide a good indication of representative background and residual sound levels.
- Baseline sound level measurements undertaken in accordance with recognised Standards, using a tall environmental windshield and during acceptable weather conditions e.g. low wind speeds and precipitation.
- Field calibration checks were undertaken before and after measurements to record very low levels of equipment drift.
- The calculations have been conservative as not to under-predict the resulting impacts.

These measures have been considered to reduce uncertainty to a level considered not to have any significance to the outcome of this assessment.

4.6. Context

The numerical assessments in the above tables have highlighted an indication of no adverse impact at the proposed noise sensitive properties against the representative background sound level during the daytime period.

It has been acknowledged that this assessment needs to be considered in context, following the requirements of BS4142 [7]. The concept of “context” has been notably emphasised in Section 11 of BS4142 when considering numerical impacts established from applying the standard.

5. CONCLUSION

Dice Environmental were commissioned by Aspbury Planning to undertake a Noise Impact Assessment to support the discharge of a planning condition for a planning application for the change of use of a former station yard to coach parking and maintenance at Station House, Station Road, Gedney, Spalding, PE12 0DD.

Environmental noise surveys have been completed to quantify the prevailing soundscape at the site. This comprised an unattended logging survey to capture the existing background noise levels at the nearest noise sensitive receptors (NSR's), supplemented with an attended measurement of the existing noise sources, associated both with the site in question and the adjacent industrial premises.

The assessment concludes that the proposed change in use of the existing station yard will not result in any significant adverse impacts on nearby residential properties. The additional activity is expected to remain below current noise levels; therefore, no mitigation measures are required.

It has also determined that no further acoustic fencing is necessary. Accordingly, this report should support the discharge of Condition 8.

The assessment is based upon robust and worst-case assumptions and demonstrates that, in principle, there should be no adverse impact at the existing dwellings as a result of noise arising from the proposed change of use.

Appendix I – Limitations

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Dice Environmental and the Client as indicated in Section 1.2.
2. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
3. Dice Environmental cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Dice Environmental is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Dice Environmental in this connection without their explicit written agreement there to by Dice Environmental.
4. Where a noise survey is required to inform the assessment, Dice Environmental will endeavour to ensure that all noise measurements taken are robust, representative and reliable in order to inform an accurate noise impact assessment. Where limitations or constraints exist which prevent a suitable noise survey being completed, Dice Environmental will take all reasonable steps to make the client fully aware of any such limitations or constraints with a view to achieving the best possible outcome for the client. Where additional sound surveys are required, over and above those specified in our scope of works, then Dice Environmental reserves the right to charge additional fees.
5. Where mitigation measures are specified in our report, it should be noted that these measures are relative to a specific sound source, both in terms of the measured sound pressure level and the character of the source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, Dice Environmental cannot be held responsible for any subsequent variations in the proposed mitigation performance.

Appendix II – Glossary of Acoustic Terminology

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character, and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsivity may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the Table A1.

Table A1: Typical Sound Pressure Levels

Sound Pressure Level dB(A)	Location/Example
0	Threshold of hearing
20-30	Quiet bedroom at night
30-40	Living room during the day
40-50	Typical office
50-60	Inside a car
60-70	Typical high street
70-90	Inside factory
100-110	Burglar alarm at 1m away
110-130	Jet aircraft on take off
140	Threshold of pain

Table A2: Terminology

Descriptor	Explanation
Ambient Noise	Encompassing sound, at a given place, being usually a composite of sounds from many sources near and far.
C_{tr}	Sound insulation performance spectrum adaptation term that accounts for the A-weighted urban traffic noise spectrum.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (20 μ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with the 'A' frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$D_{n,e,w}$	Weighted element normalized level difference. A single-number quantity that describes the sound insulation of ventilators.
$L_{Aeq, T}$	A-weighted, equivalent continuous sound pressure level. L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' time-weighting response.
$L_{A,r,Tr}$	Sound rating level. The A-weighted L_{eq} sound level of an industrial noise during a specified time period, adjusted for tonal character and impulsivity.
L_{10} & L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and 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 the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-Field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, this is measured outside and away from buildings.
Fast	A time-weighting used in the root mean square section of a sound level meter with a 125-millisecond time constant.
Pink Noise Spectrum	Noise whose power spectral density is inversely proportional to frequency.
Residual Noise	The ambient sound remaining when the specific sound is suppressed.
R_w	Weighted Sound Reduction Index. A single number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies, based on laboratory measurements.
Slow	A time-weighting used in the root mean square section of a sound level meter with a 1000-millisecond time constant.
Specific Noise	Noise from the sound source under investigation as defined in BS4142, method for rating industrial noise affecting mixed residential and industrial areas.

Appendix III – Figures

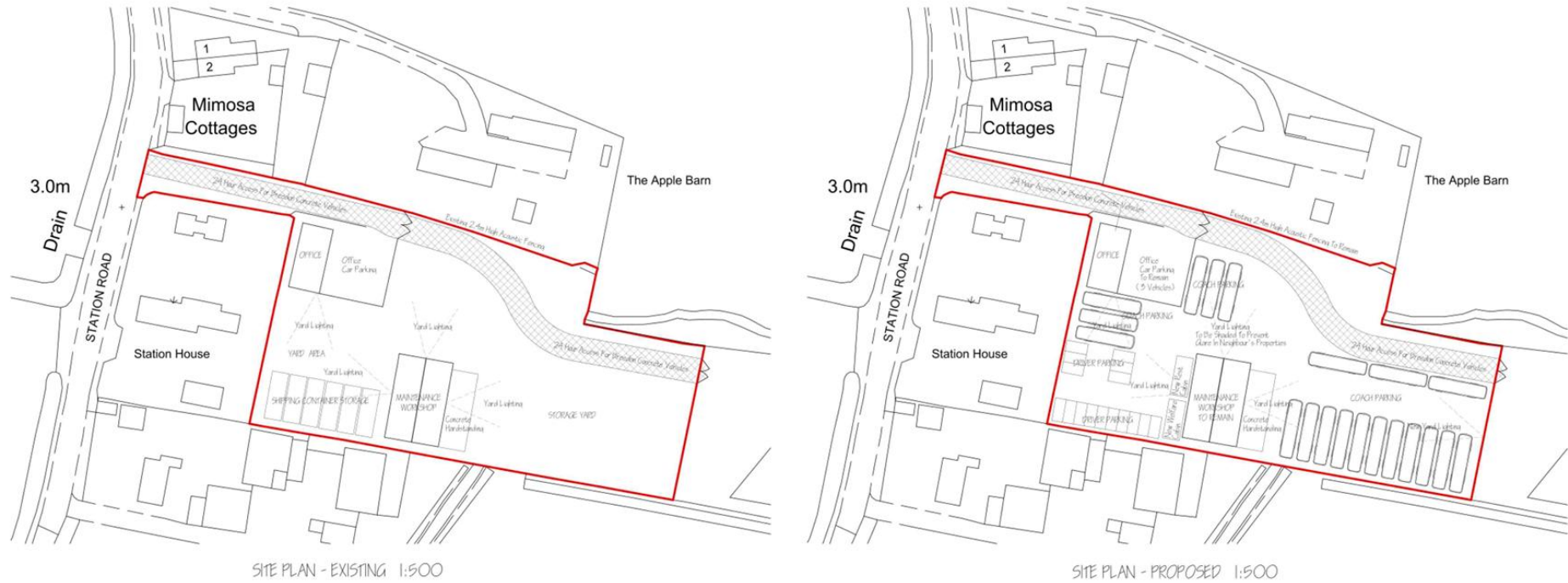


Figure 1: Existing and Proposed Site Plan



Figure 2: Site Location and Noise Measurement Positions (NMP's)

Appendix IV – Bibliography

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