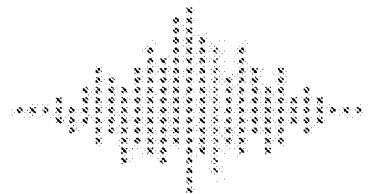


SHARPS REDMORE

ACOUSTIC CONSULTANTS • Established 1990



Report

**Saltbox, Bognor Regis,
Sussex**

Environmental Noise
Assessment of a Proposed
Industrial and Commercial
Development: Shripney Road,
Bognor Regis.

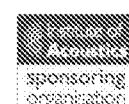
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Date 8th August 2017
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Executive Summary

A noise assessment has been carried out for proposals for the development of a Class B8 warehouse for a hybrid planning application at Saltbox, located off Shripney Road, Bognor Regis, Sussex. A full application is submitted for Unit 2; storage and distribution (Use Class B8); with ancillary offices (B1) and associated car parking, landscape, servicing, fuel island and access.

An outline planning application is submitted for the development of employment units, warehouse, hotel, 2 no. drive through units, public house, gym plus engineering works, landscaping and associated works.

This report contains a consideration of relevant planning policy, local policy in the form of the Planning Noise Advice Document: Sussex 2015, adopted by Sussex Local Authorities and derivation of appropriate assessment criteria with this in mind; details of an environmental noise survey carried out in the vicinity of the site and an assessment of the main potential noise sources.

Computer modelling has been undertaken via SoundPLANTM modelling to demonstrate the noise impact of the proposed scenarios on residential properties to the north of the proposal on Shripney Road and the mitigation effects of an appropriate acoustic barrier of suitable dimensions.

The three sources identified with the potential to produce an impact are:

- ❖ Noise from activities on site (assuming a busy 24 hour use involving HGVs and vans arriving departing and loading / unloading) plus associated staff cars;
- ❖ Noise from plant or equipment on site and
- ❖ Noise arising for the change in road traffic flows affecting people living on the surrounding road system.

Each of these sources has been assessed and it has been concluded that, with appropriate mitigation in the form of suitable screening to the north of the proposal, there would be no significant adverse noise impact from the proposed development on the nearest residential properties on Shripney Road.

The significantly quieter car parking activity to the west of Unit 2 does not require any further attenuation or acoustic screening to enable operation without adverse noise impact on the residential properties on Shripney Road.

Further noise assessment can be required under reserved matters for the remainder of the proposed development, following the outline application.

1.0 Introduction

- 1.1 Sharps Redmore Limited (SR) has been instructed by Landlink Estates to undertake an environmental noise assessment for a proposed industrial/commercial development at Saltbox, off the A29, Shripney Road, Bognor Regis.
- 1.2 The scheme is for a hybrid planning application, part in full, and part outline. The full application comprises a Class B8 warehouse, fuel island, car parking, access roads, engineering works, landscaping and associated works. The outline application is for the development of employment units, warehouse, hotel, two drive through units, public house, gym plus engineering works, landscaping and associated works. The site location and proposed site layout are shown in Appendix B.
- 1.3 The purpose of this assessment is to assess noise from site activities such as vehicle movements, any mechanical services or plant on site which has the potential to impact off-site and the potential impact from noise from the change in road traffic flows on the surrounding network. Consideration is focussed on Unit 2 as the unit subject to a full planning application and its proximity to the residential properties.
- 1.4 The site is located immediately to the west of the main A29 road, and north west of existing major industrial areas of the Southern Cross Trading Estate, large retail stores, fast food restaurants, a Sainsbury's superstore and the recently developed Rolls-Royce logistics hub.
- 1.5 Section 2 discusses the Government's Planning Policy and relevant guidance and standards relevant to the case, including reference to the Planning Noise Advice Document: Sussex adopted by Sussex Local Authorities and published in July 2015.
- 1.6 A noise survey has been undertaken at the site and the gathered data has been used in this assessment. The details of the survey methodology are in Section 3 and the results are discussed in Section 4.
- 1.7 SoundPLANTM computer modelling has been undertaken to show the predicted levels at the nearest noise sensitive properties on Shripney Road, including mitigation scenarios. The models demonstrate the reduction in levels in L_{Aeq} and L_{Amax} parameters when appropriate mitigation is applied to the northern boundary of the site to minimise any impact from noise at these properties and are shown at Appendix A as situations A and B respectively.
- 1.8 The assessment and recommendations for mitigation are contained in Section 5 where predicted levels are compared to existing levels at the nearest noise sensitive premises.
- 1.9 Plans showing the site location, noise measurement locations and proposed site layout included in Appendix B. Appendix C shows a graphical summary showing the 24 hour noise survey results, and Appendix D gives a glossary of acoustic parameters.

2.0 Assessment Methodology and Criteria

- 2.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 123 of the NPPF states the following:

"Planning policies and decisions should aim to:

- ❖ *avoid noise from giving rise to significant adverse impacts²⁷ on health and quality of life as a result of new development*
- ❖ *mitigate and reduce to a minimum other adverse impacts²⁷ on health and quality of life arising from noise from new development, including through the use of conditions,*
- ❖ *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restriction put on them because of changes in nearby land uses since they were established; and*
- ❖ *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"*

27 See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).

- 2.2 The NPPF reinforces the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- ❖ *avoid significant adverse impacts on health and quality of life;*
- ❖ *mitigate and minimise adverse impacts on health and quality of life; and*
- ❖ *where possible, contribute to the improvement of health and quality of life."*

- 2.3 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

2.4 The WHO guideline values are appropriate to what are termed “critical health effects”. This means that the limits are at the lowest noise level that would result in any psychological, physiological or sociological effect. They are, as defined by NPSE, set at the Lowest Observed Adverse Effect Level (LOAEL), but do not define the level above which effects are significant (the SOAEL). Compliance with the LOAEL should, therefore, be seen as a robust aim.

2.5 The WHO guideline noise values are summarised in the following table:

Table 2.1: WHO guideline noise values

Document	Level	Guidance
World Health Organisation “Community Noise 2000”	$L_{AeqT} = 55 \text{ dB}$	Serious annoyance, daytime and evening. (Continuous noise, outdoor living areas)
	$L_{AeqT} = 50 \text{ dB}$	Moderate annoyance, daytime and evening. (Continuous noise, outdoor living areas).
	$L_{AeqT} = 35 \text{ dB}$	Moderate annoyance, daytime and evening. (Continuous noise, dwellings, indoors)
	$L_{AeqT} = 30 \text{ dB}$	Sleep disturbance, night-time (indoors)
	$L_{AMAX} = 60 \text{ dB}$	Sleep disturbance, windows open at night. (Noise peaks outside bedrooms, external level).
	$L_{AMAX} = 45 \text{ dB}$	Sleep disturbance at night (Noise peaks inside bedrooms, internal level)

2.6 For L_{AeqT} criteria the time base (T) given in the documents is 16 hours for daytime limits and 8 hours for night time limits.

2.7 British Standard 4142 2014: Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142:2014) was revised in November 2014, and is the relevant standard to determine impact from sound from industrial and manufacturing processes, sound from fixed installations which comprise mechanical and electrical plant and equipment and sound from the unloading and loading of goods and materials at industrial and/or commercial premises.

2.8 The revised BS 4142:2014 document was published following extensive consultation with industry and local authorities. Amongst the changes to the Standard, the concepts of certainty in results and the consideration of context of measured values was introduced. In particular, the assessment of impacts reinforces and expands on the concept of context and a commentary is available in Chapter 11 of the Standard, which is reproduced in part below. Further changes include the replacement of ‘likelihood of complaint’ with the ‘likelihood of adverse impact or serious adverse impact’. This is consistent with the approach in the Noise Policy Statement for England (NPSE), also reproduced in part above in 2.2. The character and level of the residual sound compared to the character and level of the specific sound has been considered, together with an assessment of uncertainty of the measured values.

“The significance of sound of an industrial nature depends on 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 undertaken without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.”

2.9 BS 4142: 2014 comments further in Chapter 11 (Assessment of impacts) on the derivation of the impact of the specific sound by subtracting the measured background level from the rating level and gives consideration to the following:

- 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 significant adverse impact depending on 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 level, the less likely it is that the specific sound source will have an adverse or significant adverse impact. Where the rating level does not exceed the background level, this is an indication that the specific sound source will have a low impact, depending on context.

2.10 BS 4142: 2014 comments further with reference to low levels in section 11 in the assessment of impacts and context. It maintains that where background 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 for night time or where daytime levels are also low.

Changes in Level

2.11 Changes in noise levels of less than 3 dBA are not perceptible under normal conditions and changes of 10 dBA are equivalent to a doubling of loudness. This guidance has been accepted by inspectors, at inquiry, to encompass changes in noise levels in the index L_{AeqT} .

2.12 The following table shows the response to changes in noise (known as a Semantic Scale):

Table 2.2: Response to changes in noise

Change in noise level L_{AeqT} dB	Response	Impact
<3	Imperceptible	None
3 – 5	Perceptible	Slight
6 – 10	Up to a doubling	Significant
11 – 15	More than a doubling	Substantial
>15	-	Severe

Ref: Manning “Criteria for the Environmental Assessment, Planning and Mitigation of Railway Noise” Proc. IOA Vol. 20 Part 1 (1998) pp 195 – 202.

- 2.13 Changes in level are useful for considering the potential noise impact arising from changes in road traffic flows.
- 2.14 Taking into account the above the following assessment methods are recommended:
- ⌘ Noise from delivery activity – BS 4142:2014/WHO Guidelines
 - ⌘ Noise from mechanical services plant – BS 4142:2014
 - ⌘ Noise from van/lorry movements – WHO Guidelines/Change in noise level
 - ⌘ The sensitivity of the receptors – BS 4142:2014/WHO Guidelines
- 2.15 The Planning Noise Advice Document: Sussex 2015 (PNADS) contains guidelines relating to industrial and commercial noise sources and considers that noise should be minimised “as far as is reasonably practicable” where there is new noise generating development. It considers the relevant standards and refers to background comparisons and that where rating levels below existing background levels are not achievable as outlined in 2.10 above, then best practicable means should be demonstrated in order to control noise to the satisfaction of the LPA.

3.0 Survey Methodology, Details and Results

- 3.1 Unattended monitoring was undertaken for approximately a 24 hour period over 13th-14th July 2017 at a location at the northern boundary of the proposed development site bordering the nearest residential property to the north of the site on Shripney Road. This has provided data to represent the existing ambient and background levels at this property.
- 3.2 A location was selected at the north east corner of the site, shown below in figure 3.1, to be representative of the nearest residential property. The microphone was sited in free field at a height of approximately 2 metres. The survey was largely unattended but during the setting up and ending of the survey it was noted that the noise climate was largely dominated by road traffic noise from the A29 with birdsong and occasional aircraft flyovers.

Figure 3.1 Monitoring position for survey:



- 3.3 The instrumentation used to carry out the long term noise survey was as follows.
- ❖ Norsonic 118 type 1 precision sound level meter (SLM)
 - ❖ Norsonic 1250 acoustic calibrator
- 3.4 The SLM was set to measure the following “A” weighted parameters: L_{Aeq} , L_{A10} , L_{A90} and L_{Amax} . The measurement sample period was 15 minutes. Immediately before and after the measurements were carried out, the SLM was calibrated using the acoustic calibrator with no noticeable drift.
- 3.5 The weather during the survey was dry with temperatures of around 20°C with a gentle breeze of around 3 mph.

- 3.6 The noise survey established the measured noise levels at the measurement location is summarised below in Tables 3.1. The long term data is also shown graphically in Appendix C. Full survey data is available.

Table 3.1: Long Term Survey Noise Levels – Shripley Road

Measurement Period	Measured Free-Field Noise Level, dB			
	$L_{Aeq,T}$	$L_{A10,15m}$ (range)	$L_{A90,15m}$ (range)	L_{Amax} (range)
Daytime	55 dB	53-60 dB	35-50 dB Typical 48dB	64-79 dB
Night Time (2300-0700)	51 dB	40-61 dB	25-45 dB Typical 34dB	60-80 dB

4.0 Assessment

Noise from Site Activities

Service Yard

- 4.1 The majority of site noise will come from external activities (Van and HGV movements, loading etc). Data in Table 4.1 below shows predicted noise levels from the service yard using data widely used in the design of distribution facilities, based on measurements taken at retail service yards over a period of years by SR and generic data within the SoundPLAN software. The likely levels at the nearest noise sensitive premises; approximately 150m away to the north of the site on Shripney Road arising from service yard activities from Unit 2 have been predicted using SoundPLAN™ modelling. SR has used SoundPLAN 7.4 noise modelling software package to predict the noise levels from the service yard activities.
- 4.2 SoundPLAN calculates LAeq T and/or LAmax levels at defined receptors in accordance with the relevant standards. The calculation is based on a number of input parameters including, source noise level data, receptor positions, barriers and screening, topography and intervening ground conditions. The location and dimensions of the physical elements of the model such as location and dimensions of buildings, have been taken directly from architectural drawings, and OS mapping. The topography has been derived from online GIS data.
- 4.3 Noise contours can be plotted at defined intervals, and height above ground level. The results can also be plotted as façade noise maps. The resulting noise maps are included at Appendix A.

Table 4.1: Predicted Service Yard Noise Levels from Unit 2 at nearest residential property:

Parameter	dB
L _{Aeq}	50-52
L _{Amax}	64-66

- 4.4 The levels shown above are unmitigated and represent worst case scenario. The first contextual consideration in this case is the comparison of the predicted noise levels against the WHO Guideline Values. As discussed in section 2.0 the WHO Guideline Values can be considered the lowest observed adverse effect level (LOAEL). This means that the guideline values are set at the lowest level below which the impact can be considered negligible. Table 4.2 below compares the predicted noise level from servicing activity against the WHO Guidelines for Community Noise.

Table 4.2 WHO Assessment: (Unmitigated)

Noise level	Day time	Night time	
	L _{AeqT}	L _{AeqT}	L _{Amax}
Predicted yard activity noise level (Unmitigated)	50-52	50-52	66
Existing noise levels	55	51	64-79
Below existing level	YES	YES	YES
WHO guideline noise value	50 - 55	45	60
Comply with WHO guidelines	YES	NO	NO

- 4.5 The levels summarised in table 4.2 above indicate that further consideration is required for the predicted worst case scenario night time noise levels. It is understood that the operation of the site will be 24/7 given the nature of the proposed use. The levels predicted are based on all loading bays being used simultaneously to represent worst case.
- 4.6 Further SoundPLAN modelling has been undertaken to demonstrate the efficiency of a 4m acoustic barrier to part of the northern boundary of Unit 2. This barrier would extend to the service road to the east of Unit 2 and is returned south along the service road as far as the end of the fuelling island. This model is shown at Appendix A (2A and 2B showing L_{Aeq} and L_{Amax} respectively).
- 4.7 The performance of this barrier can be further demonstrated by revising table 4.2 above to show the effect of mitigation as table 4.3 below.

Table 4.3 WHO Assessment: (With Acoustic Barrier Mitigation)

Noise level	Day time	Night time	
	L _{AeqT}	L _{AeqT}	L _{Amax}
Predicted yard activity noise level (mitigated)	46-48	46-48	58-60
Existing noise levels	55	51	64-79
Below existing level	YES	YES	YES
WHO guideline noise value	50 - 55	45	60
Comply with WHO guidelines	YES	Marginal exceedance	YES

- 4.8 Generally it is the L_{Amax} parameter that is most relevant to night time noise and sleep disturbance. As can be seen from Table 4.3 the introduction of the acoustic barrier enables compliance with WHO guidelines for external L_{Amax} events and is significantly below existing levels experienced by the nearest residential property along Shripney Road. The marginal exceedance of the L_{Aeq} WHO guideline represents worst case scenario. The reality is that the site would only rarely operate at that level of activity. The predicted L_{Aeq} is significantly below the existing night time ambient level as surveyed.

- 4.9 BS 4142: 2014 refers to low levels in section 11 in the assessment of impacts and context. It maintains that where background 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 for night time or where daytime levels are also low. As can be seen from the survey summary, backgrounds drop at night to minimum of 24dB L_{A90} with a representative, typical background of 34 dB L_{A90} . It is generally accepted that consideration of margins exceeding background levels is not appropriate with such low levels and that absolute levels such as those contained within the WHO guidelines are more appropriate in such circumstances.

Car Parking

- 4.10 Staff parking is provided to the west of Unit2. The closest car parking spaces will be approximately 200m from the nearest residential properties.
- 4.11 SR has previously undertaken many noise surveys at office and retail car parks. At 10m from the boundary of a busy car park measured noise levels of 43-48 dB $L_{Aeq\ 1hr}$ have been found. Peak noise levels in car parks are attributed to door slams. SR has measured many door slams as part of noise surveys and peak noise levels are considered to be up to 66 dB L_{Amax} at 10m.
- 4.12 The closest car parking spaces to residential properties on Shripney Road will be approximately 200m. At this distance noise levels will be attenuated by 26 dB resulting in an upper noise level at the closest residential from parking associated levels will be 25 dB $L_{Aeq\ 1hr}$. This includes a façade correction of +3 dB. These predicted car parking noise levels are below existing daytime and night time ambient noise climate and within guidance levels.
- 4.13 At 200m noise levels from car door slams, L_{Amax} , including a façade correction will be 43 dB L_{Amax} . The predicted levels are below existing peak levels recorded during day and within the range of levels measured at night time and within guidance levels for day and night.
- 4.14 Given the likely limited vehicle movements it would be expected that the noise from car parking within the proposal would be even lower than the figures referred to above. The above figures can be considered a worst case scenario to provide a robust assessment.

Noise from fixed plant and equipment

- 4.15 Since it is not possible to predict what type and number of plant are to be used at the site an appropriate planning condition could control noise levels from plant along the lines of:
- "All fixed plant and machinery within the development should be designed and installed such that the rating level of the fixed development shall not exceed the background level using BS 4142:2014 at the nearest noise sensitive receptor"*
- 4.16 Given the distances and existing screening involved and the scope for simple on site noise control measures (such as selection of quieter plant, careful siting and orientation, enclosure and additional screening), if needed, these limit values can be readily achievable without the need for any novel or complex mitigation schemes.

Noise from road traffic on surrounding network

- 4.17 A comparison of the increase in road traffic noise can be made by means of the formula found in "Calculation of Road Traffic Noise": Increase in Noise Level = $10 \log_{10} (\text{future total traffic flow} \div \text{existing traffic flow})$ dB.

Table 4.4 Noise Impact from Road Traffic

Assessment Site	Existing Traffic Flow Based on 2017 survey	With Development Traffic Flow	Resultant Change in Noise Level	Impact on Receptors
A29 Shripney Road	1736	1775	+0.1 dB	Negligible
A259 Rowan Way	2073	2105	+ 0.06	Negligible

- 4.18 Table 4.4 shows the predicted change in noise levels at the nearest residential properties resulting from additional traffic during peak hours on the surrounding road network. (Figures are as supplied by ADL transportation consultants).
- 4.19 None of the predicted noise levels exceeds the threshold at which a change in level is likely to be perceptible (3 dB, see Section 2.0 above). The increase in road traffic noise will therefore be insignificant.

Noise from internal activity

- 4.20 To determine the impact from internal activity SR has measured noise levels within the similar warehouses across the country. Based on measurements carried out, reverberant internal noise levels from warehouse activities were typically 70 dB L_{AeqT} .
- 4.21 The proposed building will be constructed using profiled metal cladding. Level dock loading bays will be sited at northern elevation. This type of construction will provide a minimum sound reduction performance (R_w) of 25-30 dB.
- 4.22 Taking into account the acoustic performance of the profiled metal cladding, the internal noise levels and the distance to the nearest residential properties on Shripney Road, it is concluded that noise from internal activity will be significantly below the existing representative background noise levels measured at the site.
- 4.23 The acoustic performance of the warehouse structure relies on doors being kept closed. It is recommended that the doors to the northern boundary of the site are kept closed apart from emergency access to maintain the acoustic integrity of the structure and prevent breakout from internal activities and radios etc.

- 4.24 A minimum construction detail for the 4m high acoustic barrier referred to in 4.6 and 4.7 above to provide appropriate attenuation would be :

Tanalised timber feather edged close board fencing. To include 175mm x 150mm timber posts notched and weather topped to allow fixing of 100mm x 50mm Arris rails and 65mm x 38mm top counter rail.

The base of the fence should have a 65mm x 25mm timber gravel board and 125mm x 25mm (minimum) continuously mounted (i.e. across the front of the posts, not butting to them) feather edge boards, overlapping at 100mm centres, i.e. a 25mm overlap to each board joint. A stump post 175mm x 150mm should be positioned to the centre of each bay and attached to the bottom Arris Rail to support the centre of each bay. The fence should be topped with a 65mm x 38mm weathered capping nailed to the top counter rail.

Or

Two layers of treated external quality square edge timber boards 100 x 22mm with overlapped / staggered joints fixed vertically to arris rails. Posts to comprise 200 x 100mm galvanised mild RHS steel posts complete with pre welded shoes to be set in concrete foundations minimum 400mm below ground level. Timber top rail 100 x 100mm fixed to galvanized steel shoes welded to posts. 100 x 100mm treated and weathered cut timber arris rails fixed to galvanized steel shoes welded to posts. Weather cill board to be fixed to timber fence bottom edge.

Alternative constructions are available, including proprietary "acoustic fence" systems such as Jacksons or Premier Acoustic Fencing suppliers. Of key importance is that the construction has no gaps and is such that gaps do not appear as the timber ages or shrinks in warm weather.

<https://www.jacksons-fencing.co.uk/fencing/fencing/acoustic-barriers/fencing-acoustic-barriers.aspx?pg=5>

and:

<http://www.premieracousticfencing.co.uk/acoustic-highway.html>

5.0 Impact of Outline Application on existing noise sensitive properties

- 5.1 The focus of this report is on the full application for Unit 2. The remainder of the site is subject to an outline application for a number of uses including; hotel, public house, B1, B8, A3 and D2. The main impacts associated with the proposals will be as discussed above which will include.
- ⌘ Noise from mechanical services plant;
 - ⌘ Noise from delivery activity;
 - ⌘ Noise from activity
- 5.2 The precise details of the uses, mechanical services plant and refrigeration equipment (type and noise signature) are not known at this stage. However, the fixed plant may consist of refrigeration and condenser units, air handling units, extract fans and boilers which will be located in a dedicated plant enclosure on the roof of the hotel and A3 units.
- 5.3 With regard to the assessment of industrial noise sources in commercial premises BS 4142:2014 enables the resultant noise from new equipment to be compared to the existing background noise level (L_{A90}) of an area to assess the significance of impact.
- 5.4 The closest noise sensitive properties to the likely mechanical services plant area are the residential properties on Shripley Road as previously identified to the north of the site.
- 5.5 Taking into account the above the design criteria for mechanical services is that the rating level should not exceed the background noise level at the nearest noise sensitive receptors. This criterion can be secured by a suitably worded planning condition.
- 5.6 Based on knowledge of mechanical services plant associated with similar developments and the distance between the hotel, other noise sources and nearest noise sensitive properties the noise levels required by such a condition would be achievable.
- 5.7 Given the outline nature of this aspect of the application, it is considered that suitable conditions could be applied as reserved matters to enable noise issues to be addressed when further details are known regarding the tenure of the units, likely uses and associated plant.

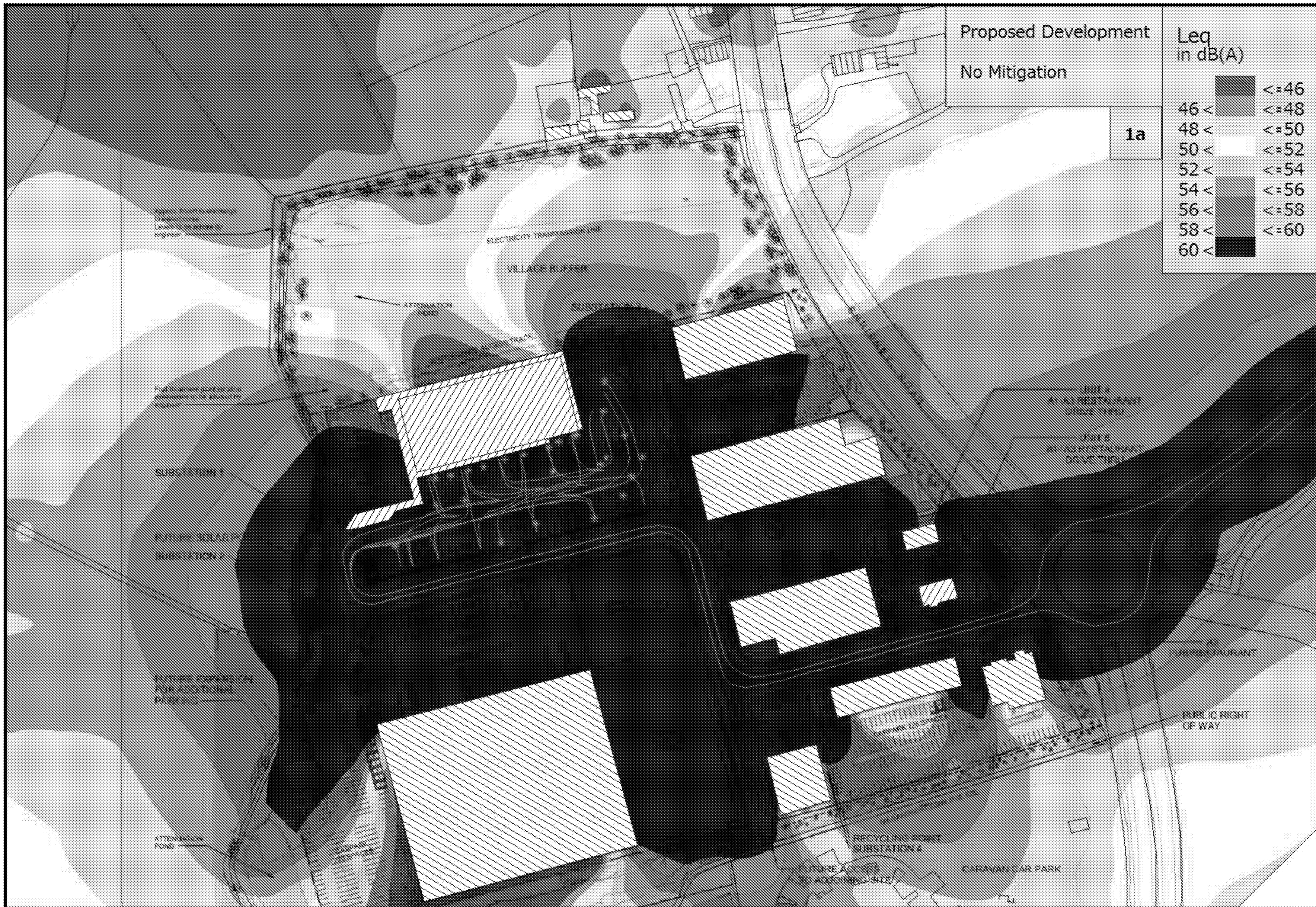
6.0 Conclusions

- 6.1 An assessment of the existing ambient and background noise levels has been undertaken at the boundary to the nearest residential property on Shripney Road to the north of the proposal.
- 6.2 Consideration has been given to the likely noise levels associated with this type of proposal and the levels predicted at the nearest noise sensitive property using SoundPLAN™ computer software modelling.
- 6.3 Consideration has been given to the acoustic performance of a barrier of appropriate construction and is recommended at 4m height to part of the northern boundary as shown on the SoundPLAN™ model to enable appropriate levels and guidance compliance. The impact from operation of the proposal has been assessed against national guidance and existing noise levels.
- 6.4 It is concluded that the proposal will operate below existing levels at the boundary with the nearest residential property as proposed and will not cause a significant impact on the health and life of local residents in accordance with the national policy aims contained within the NPPF, NPSE and in accordance with noise guideline values contained in BS 8233:2014, BS 4142:2014 and World Health Organisation Guidelines for Community Noise 1999 together with local aims.

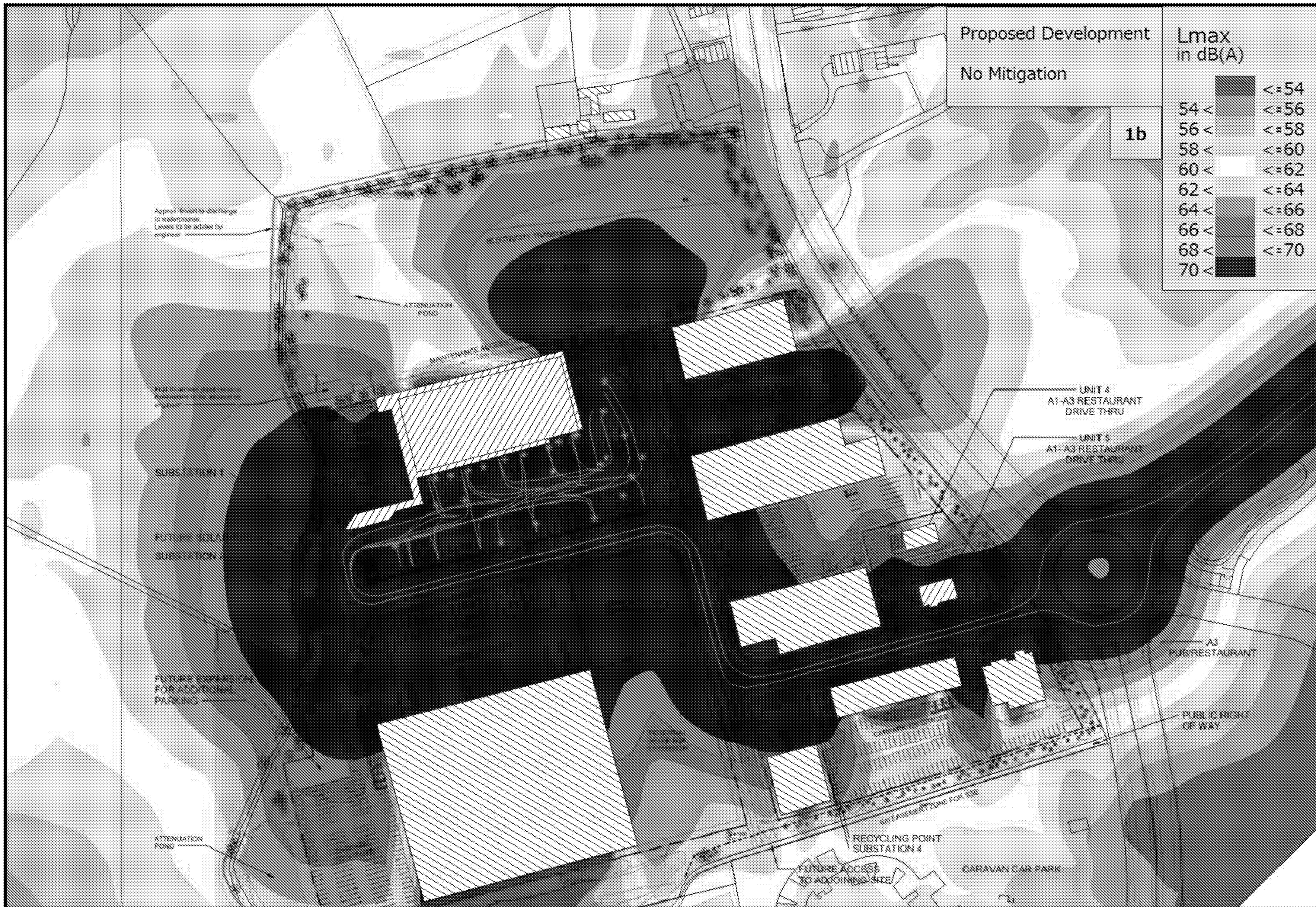
APPENDIX A

SOUNDPLAN™ MODELS

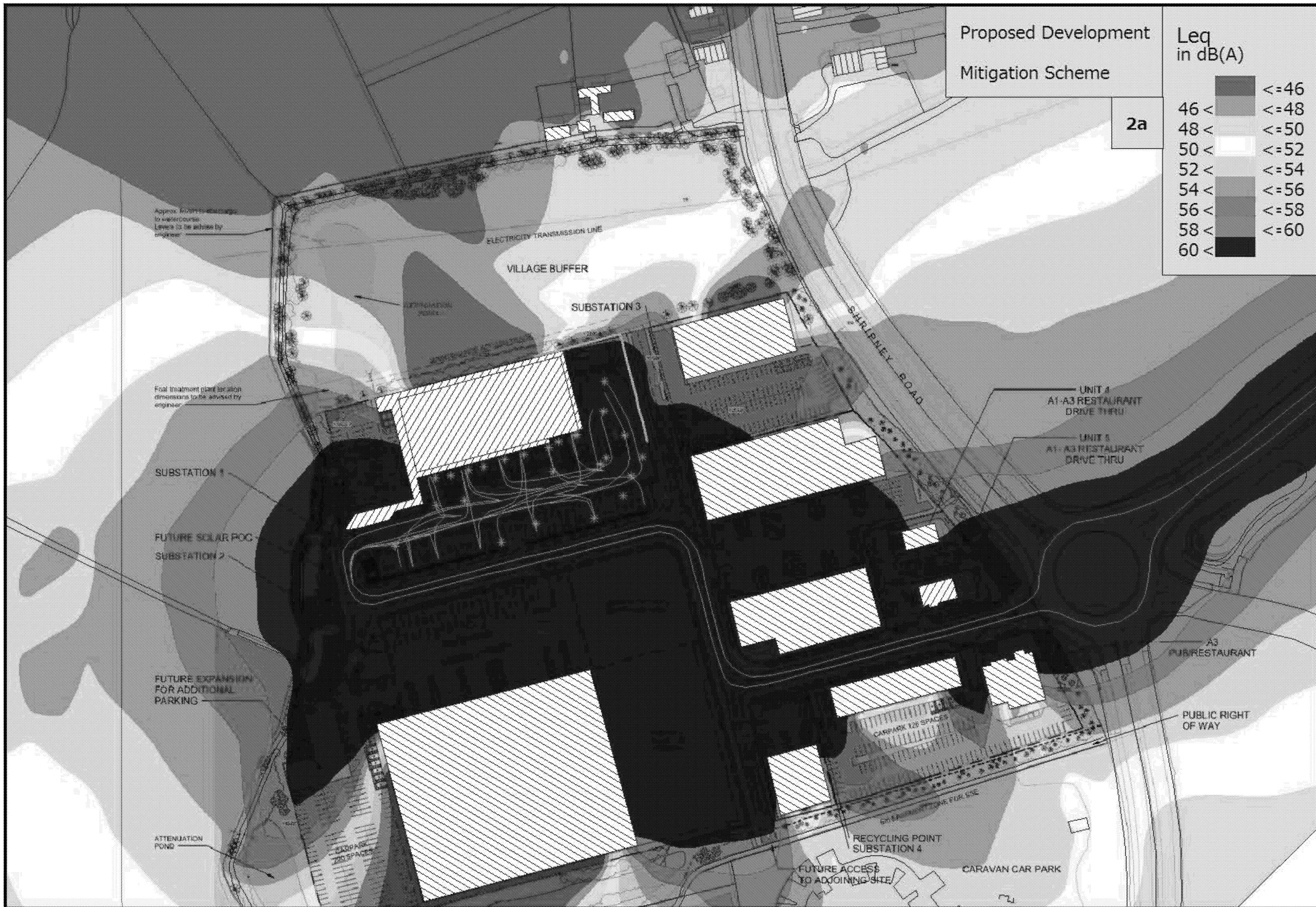
1A: No Mitigation L_{Aeq}



1B: No Mitigation L_{MAX}



2A: With Acoustic Barrier L_{Aeq}



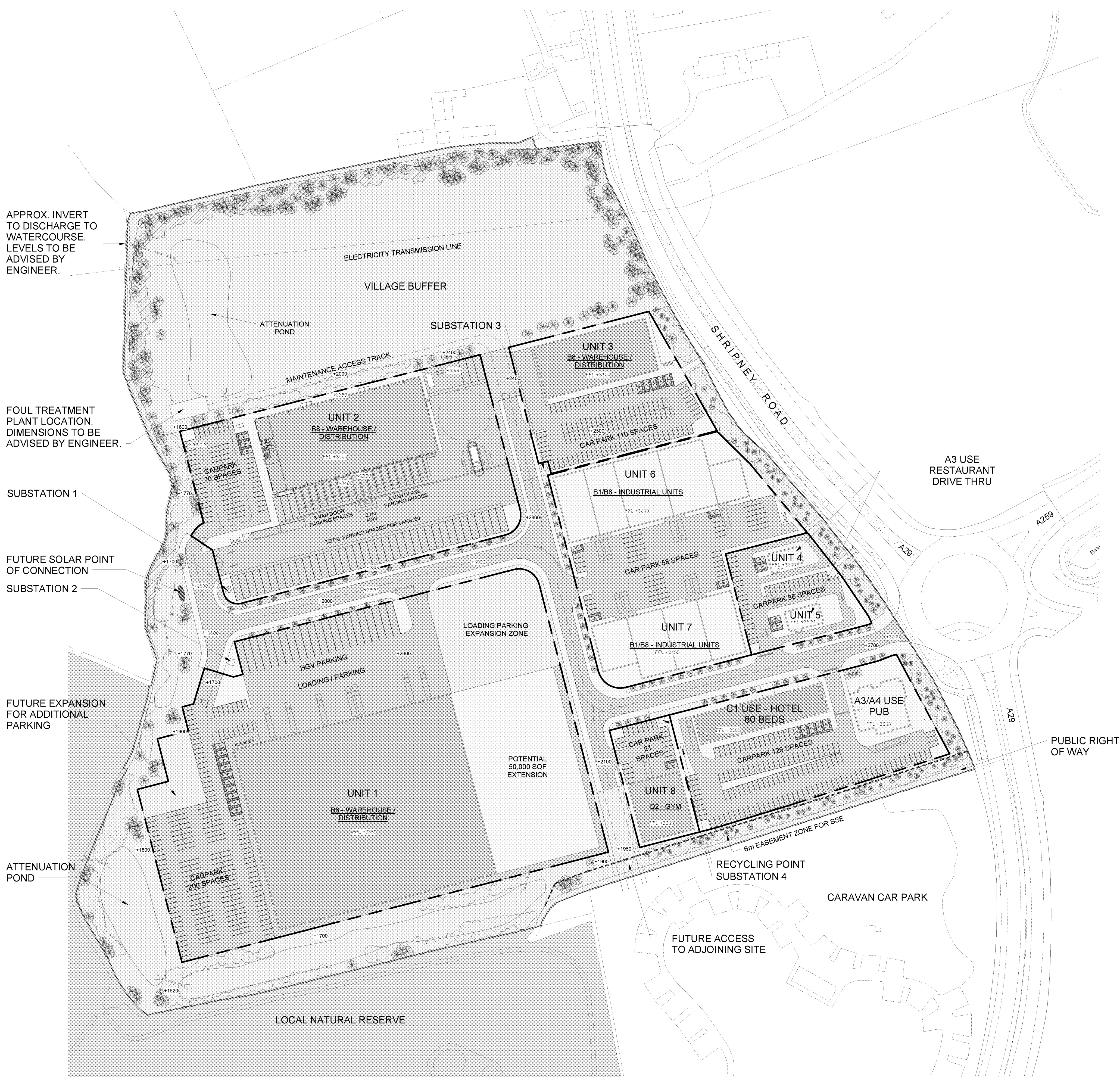
2B: With Acoustic Barrier L_{AMAX}



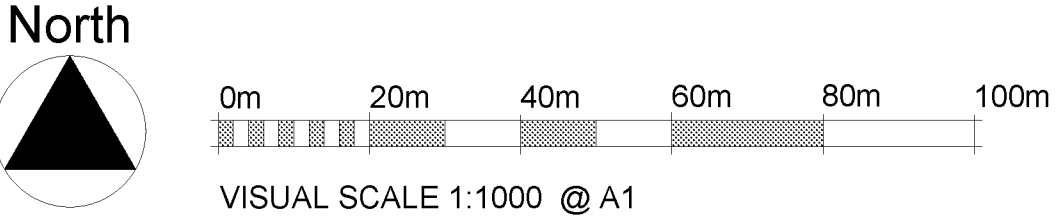
APPENDIX B

PLANS

REVISIONS	DATE	DRN	REV
MINOR EXTERNAL AREA AMENDMENTS (LANDSCAPE / FOOTWAY - UNIT 2)	08.08.17	HA	A



- NOTES:**
- LANDSCAPING - WORK IN PROGRESS
 - LEVELS SUBJECT TO FLOOD RISK ASSESSMENT AND TO BE CONFIRMED BY CIVIL AND HIGHWAY ENGINEER
 - EXISTING LEVELS SHOWN IN **BLACK**
 - PROPOSED LEVELS SHOWN IN **RED**
 - FOR FULL DETAILED PARKING & AREA SCHEDULE SEE DRAWING No.1744 - P34



APPENDIX C

NOISE SURVEY RESULTS

Northern Boundary



APPENDIX D

ACOUSTIC TERMINOLOGY

Acoustic Terminology

1. Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sound is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. A 10 dB increase in sound is perceived as a doubling of loudness.
2. Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz = 1 cycle/second. The range of frequencies audible to the human ear is around 20 Hz to 18000 Hz (or 18 kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.
3. To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability to automatically weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).
4. The second important characteristic of sound is amplitude or level. Two units are used to express level a) sound power level - L_w , and b) sound pressure level - L_p . Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity etc. The sound level that is measured on a meter is the sound pressure level, L_p .
5. External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to difference noises has been found to vary dependent on its temporal distribution (i.e. its variation with time). For this reason, a set of statistical indices have been developed.
6. There are four main statistical indices in use in the UK:
 - L_{A90} The sound level (in dBA) exceeded for 90% of the time. This unit gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background noise level" of an area.
 - L_{AeqT} The equivalent continuous sound level over a period of time, T. this unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the varying noise in question" (In other words, the energy average level). This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as road traffic, aircraft and trains.
 - L_{A10} The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.
 - L_{AMAX} The maximum level of sound, i.e. the peak level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.