

PROPOSED RETAIL DEVELOPMENT ON GREENBROW ROAD, WYTHENSHAW
NOISE IMPACT ASSESSMENT

On behalf of:
Seva Patidar Ltd

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Q+A Planning Ltd, on behalf of Seva Patidar Ltd, to carry out a noise impact assessment in connection with a proposed retail development at the former Anchors Away Play Centre on Greenbrow Road, Wythenshawe.
- 1.2 The site is located on the corner of Greenbrow Road and Simonsway just off junction 4 of the M56 Motorway. The site is bounded by Simonsway to the north, Greensbrow Road to the west and Deptford Avenue to the south. Simonsway and Greenbrow are busy well trafficked roads. Shore Green housing association (care home) is located to the east. The site location is shown in Figure 1. The nearest dwellings to the site are Shore Green care home and those on Deptford Avenue and Greenbrow Road.
- 1.3 It is proposed to convert and extend the existing building into a 3410 sqm Convenience Store two <900 sqm retail units with associated car parking, access and servicing of the store. The store opening hours are proposed to be 06:00 to 22:00 hours Monday to Saturday and 08:00 to 22:00 hours on Sunday. The two retail units opening hours are proposed to be 08:00 to 18:00 hours seven days a week. Main deliveries to the store will be made Monday to Saturday during daytime hours only (i.e. not before 08:00 hours and up to 15:00 hours) by HGV. Deliveries to the retail units would be provided by vans.
- 1.4 The assessment has been based on drawings provided by Corstorphine & Wright dated August 2021. The proposed layout of the development is shown in Figure 2.
- 1.5 The noise assessment has included:
- An inspection of the site and surrounding area;
 - Measurement of noise levels during representative periods of the daytime and at night;
 - Calculation of potential noise levels outside the nearest dwellings from car park and delivery activities;
 - Calculation of the noise level from proposed building services equipment outside the nearest dwellings;
 - Recommendation of appropriate mitigation measures.
- 1.6 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 GUIDANCE AND ACOUSTIC DESIGN CRITERIA

NPPF:2021

- 2.1 Paragraph 185 of the National Planning Policy Framework (NPPF) 2021 states that planning policies and decisions should *“ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;”*

NPSE:2010

- 2.2 The Noise Policy Statement for England (NPSE) 2010, which is referred to in NPPF, includes three aims:
- i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - ii. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - iii. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

BS 4142:2014+A1:2019

- 2.3 British Standard 4142:2014+A1:2019, ‘Methods for rating and assessing industrial and commercial sound’ is the appropriate guidance for assessing the potential noise impact at residential locations from commercial and industrial sources.
- 2.4 BS 4142 requires a ‘rating’ level ($L_{A\tau T_r}$) calculated from the operation of the noise source to be compared with the background sound level ($L_{A90,T}$) which is measured in the absence of the noise source. The noise is evaluated over a 1-hour period for daytime operations (i.e. 07:00 - 23:00 hours) and 15-minute period for night-time operations (i.e. 23:00 - 07:00 hours).

- 2.5 The rating level ($L_{Ar,Tr}$) is based on the 'specific' sound level ($L_{Aeq,Tr}$) attributed to the operating noise source, with 'character corrections' added for sound sources where 'certain acoustic features can increase the significance of impact'.
- 2.6 The acoustic character correction applied to the specific sound level in order to obtain the rating level can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.
- 2.7 An initial estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the background level and the rating level.
- 2.8 Regarding the outcome of the initial estimate, BS 4142 states that:
- Typically, the greater this difference, the greater the magnitude of impact;
 - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and,
 - The lower the rating level is relative to the measured background level, the less likely it is that the operation will have an adverse impact or a significant adverse impact. Where the rating level is does not exceed the background sound level, this is an indication of the specific sound source having low impact, depending on the context.
- 2.9 BS 4142 also states in respect of background sound levels that *"it is important to ensure that values are reliable and suitably represent the particular circumstances and periods of interest... the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*.
- 2.10 BS 4142 states that all pertinent factors must be taken into account regarding the context in which the noise occurs, including but not limited to:
- The absolute level of sound.
 - The character and level of the residual sound compared to the character of the specific sound; and,
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will incorporate design measures that ensure good internal and/or outdoor acoustic conditions such as acoustic screening.
- 2.11 The initial numerical assessment and the context are then both taken into account when determining the potential noise impact.

3.0 NOISE SURVEY

- 3.1 An attended environmental noise survey has been carried out by Hepworth Acoustics to establish the prevailing noise climate at dwellings closest to the site for representative periods of the daytime, evening and at night. The noise measurements were undertaken at two location representative of the nearest dwellings on Deptford Avenue and Greenbrow Road as shown in Figure 1. Location 1 is also considered representative of the Shore Green care home.
- 3.2 Noise measurements were carried out in 15 minute periods between approximately 08:00 – 10:30 hours on Wednesday 17 November and between 21:00 – 00:00 hours on Thursday/Friday 18/19 November 2021. The survey periods were chosen to be representative of key periods associated with the operation of the proposed development i.e. periods in the morning when deliveries occur, in the evening when customer vehicles are entering/leaving from site and at night for the control of plant noise.
- 3.3 The noise measurements were taken in ‘free-field’ conditions and at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Frequency analysis was also carried out.
- 3.4 The weather conditions during the noise survey were suitable for the purposes of the survey and subsequent assessment.
- 3.5 The results of the noise survey are summarised in Table 1, and the full results along with details of the equipment used, and the weather conditions during the survey periods, are shown in Appendix II.

Table 1: Summary of measured noise levels (dB)

Location	Measured Noise Levels					
	08:00 – 10:30		21:00 – 23:00		23:00 – 00:00	
	<i>L</i> _{Aeq,15mins}	<i>L</i> _{A90,15mins}	<i>L</i> _{Aeq,15mins}	<i>L</i> _{A90,15mins}	<i>L</i> _{Aeq,15mins}	<i>L</i> _{A90,15mins}
1. Deptford Avenue	56 – 58	54 – 55	53 – 55	50 – 51	51	48
2. Greenbrow Road	61 – 64	54 – 56	57 – 60	50 – 52	54	46 – 47

- 3.6 During the morning/daytime period the noise climate of the area was due to road traffic on the local roads (i.e. Simonsway and Greenbrow Road) and distant road traffic from the M56 motorway. Buses regularly run on Simonsway and Greenbrow Road with a bus stop located opposite the site on Greenbrow Road.

- 3.7 In the evening/night-time period, the noise climate was again due to regular road traffic on Simonsway and Greenbrow Road including buses, with distant road traffic noise from the Motorway. After midnight noise levels reduced appreciably as local road traffic and Motorway traffic reduced.
- 3.8 The assessment of noise impact from the various potential noise sources (i.e. car parking activities, deliveries and mechanical plant) associated with the proposed store require the existing noise climate to be considered in different parameters and different periods of interest.
- 3.9 For the purposes of assessing noise impact from car parking the measured ambient noise levels in $L_{Aeq,T}$ towards the end of trading have been used.
- 3.10 Noise from service yard operations (i.e. HGV deliveries) and mechanical services equipment has been assessed in accordance with BS 4142.
- 3.11 In terms of background sound levels (i.e. $L_{A90,T}$) the values are similar at both locations due to the influence of the M56 motorway. Therefore, for the purposes of this assessment we have adopted the values of 55 $L_{A90,T}$ as the representative daytime/morning background sound level, 50 $L_{A90,T}$ as the representative evening background sound level and 47 $L_{A90,T}$ as the representative night-time background sound level at the nearest dwellings. These values have been adopted as noise design limits in our assessment described in Section 4.0.

4.0 ASSESSMENT OF NOISE IMPACT FROM STORE

4.1 In terms of the potential noise impact of the proposed store, it is considered that the following issues need to be assessed:-

- noise associated with use of the customer car park;
- noise associated with deliveries/servicing, including HGV movements;
- noise from mechanical services plant for ventilation, refrigeration, etc.

4.2 Likely noise levels from the proposed development have been calculated for the nearest dwellings to the noise sources and are discussed below.

Customer Car Parking

4.3 The proposed site layout shows a total of 15 car parking spaces on the southern part of the site. Cars manoeuvring at slow speeds in car parks generate only low levels of noise but higher levels can be generated (albeit briefly) from car doors being closed and engines being started.

4.4 In order to determine the likely car park noise levels outside the nearest dwellings, calculations have been undertaken based on typical 'sound exposure level' (L_{AE}) measurements carried out by Hepworth Acoustics previously in car parks, as shown in Table 2.

Table 2: Summary of Measured Car Park Activity Noise at 10 metres (dB)

Source	L_{AE}
Vehicle engine start and pull away	71
Door/Boot closure	69

4.5 The L_{AE} is the total sound energy generated by one discrete noise event normalised to a 1 second duration. The approach of using L_{AE} values for discrete events is useful since it allows calculation of 'equivalent continuous noise levels' ($L_{eq,T}$) over a longer period.

4.6 For a worst case assessment, we have assumed that during a busy daytime/evening hour period each car parking space will be occupied - i.e. for each parking space we have assumed that one car departs and one car arrives during the hour.

4.7 An overall specific sound level at the nearest dwellings has been calculated based on the above parameters from the L_{AE} values:

$$L_{Aeq,T} = L_{AE} + 10 \log N - 10 \log T$$

where $L_{Aeq,T} = L_{Aeq}$ over time period T

L_{AE} = 'Sound Exposure Level'

N = Number of events in time period T

T = Time period in seconds, (i.e. 3600s for a 1 hour period)

- 4.8 The resulting noise levels outside the nearest dwellings associated with use of the car park have been calculated with allowances for distance attenuation and any acoustic screening, as shown in Table 3 below:

Table 3: Calculated Noise Levels from Customer Car Parking (dB)

Location	$L_{Aeq,1hr}$
Shore Green	52
Deptford Avenue	49

- 4.9 The predicted noise level outside dwellings on Deptford Avenue associated with use of the car park is modest and is below the existing measured ambient noise levels (i.e. $L_{Aeq,15mins}$) of the area. Similarly, noise from car parking outside dwellings on Greenbrow Road would be below the existing measured ambient noise levels. The predicted noise level outside the Shore Green dwellings is within the upper range of the noise levels measured in the daytime. Therefore, some noise mitigation measures will be necessary, as detailed later in this report.
- 4.10 We conclude that there will be no unacceptable impact from car parking noise subject to implementation of the proposed noise mitigation measures detailed later in this report.

Delivery/Service Noise

- 4.11 The proposed service yard will be located to south in the car park, approximately 10 metres from the nearest existing dwelling (Shore Green).
- 4.12 Deliveries will be made on Monday to Saturday during daytime hours only (i.e. not before 08:00 hours and up to 15:00 hours) by HGV.
- 4.13 Newspapers will typically be delivered outside of these core hours, from 06:00 to 08:00 hours by van, and are moved into the store by hand (via the front entrance), and takes no more than about 60 seconds. These newspaper deliveries will occur only once per day, be of a very brief duration, and will not be a significant source of noise given the level and character of the existing noise climate around the site, and thus does not warrant further assessment. Furthermore, deliveries to the small retail

units would be carried out by vans in daytime hours only (i.e. 08:00 to 15:00 hours), and therefore are not considered further in this assessment.

- 4.14 However, the potential noise impact from daily HGV deliveries to the store does warrant assessment. An HGV delivery could be made at any time between 08:00 and 12:00 hours Monday to Saturday and extending to 15:00 hours on Wednesdays.
- 4.15 Calculations of the potential noise from delivery activities have been carried out using source noise data that has been measured previously by Hepworth Acoustics in connection with similar developments. The source noise levels have been measured for HGV movements in terms of L_{AE} . The measured source noise levels used in the assessment are summarised in Table 4.

Table 4: Summary of d Delivery Noise Source Levels Measure at 5 metres

Source	L_{AE} (dB)
HGV moving forward	82
HGV reversing (including reversing alarm)	88
Cages moving across yard	83

- 4.16 Using information about the anticipated number of deliveries, the resulting $L_{Aeq,T}$ values have been calculated. We have calculated likely levels of noise in the gardens of the nearest dwellings generated by HGVs on the basis of one HGV arriving, unloading and leaving in a 1 hour period during the daytime. The calculations consider corrections for distance only.
- 4.17 Due to the intermittent nature of the HGV movements a 3 dB penalty has been applied. A further 3 dB impulsivity penalty has been applied for the assessment at Shore Green which is much closer than dwellings on Deptford Avenue or Greenbrow Road. An initial BS 4142 assessment of the potential delivery noise is set out in Table 5.

Table 5: BS 4142 Initial Assessment of delivery noise (dB)

Description	Deptford Avenue	Shore Green
Calculated Specific Sound Level outside dwelling	41	52
Acoustic feature correction	3	6
Rating Level at dwelling	44	58
Representative Background Sound Level	55	55
Difference	-11	+3
Likely Noise Impact	'low'	'low'

- 4.18 Table 7 shows that the calculated rating level from deliveries in the service yard is 11 dB below the representative background sound levels outside dwellings on Depford Avenue, this indicates that a low impact is likely. Similarly, rating levels outside dwellings on Greenbrow Road would also indicate a low impact.
- 4.19 The calculated rating level from the deliveries is 3 dB above the representative background sound level outside Shore Green, this indicates that a low impact is likely. Nevertheless, we would recommend that an acoustic fence is installed along the eastern boundary of the site to further reduce the noise impact outside Shore Green dwellings.
- 4.20 We therefore conclude that there will be no unacceptable impact from deliveries and service yard operations subject to the proposed noise mitigation measures set out below.

Noise Design Limits for Mechanical Services Equipment

- 4.21 We understand that there may be some mechanical services equipment installed as part of the development, however, there are no details of the noise emissions from this equipment at this stage.
- 4.22 As such, we have derived appropriate noise design limits from the adopted representative background sound levels which will need to be taken into account in the selection, specification and installation of the mechanical services equipment. On this basis, we recommend that the combined noise level from this equipment is controlled to a value no more the representative background sound level outside the nearest dwelling (i.e. the apartments above). Therefore, we recommend that noise level from the proposed plant should not exceed 50 dB $L_{Ar,1hr}$ during trading hours and any equipment required to operate overnight should be controlled to 47 dB $L_{Ar,15mins}$ outside the apartments. These noise levels are low, particularly at night, and thus control of plant noise will require attention at the detailed design stage.
- 4.23 Typical measures that can be taken to adequately control noise from the installation of fixed plant and equipment include:
- Specifying low noise equipment;
 - Careful siting of equipment away from dwellings (i.e. on western sides of the proposed buildings);
 - Installation of acoustic enclosures around the fixed plant and machinery where necessary;
 - Installation of noise attenuators, acoustic louvres, etc;

Conclusion

- 4.24 In order to minimise noise from the development, we would make the following recommendations:
- 2m high acoustic screens/fencing installed on the eastern boundary, must be imperforate (i.e. have no holes or gaps) and if timber should be constructed with double-rebated boards or joint cover strips and have a surface mass no less than 10 kg/m²;
 - Control noise from fixed plant associated with the development to the noise design limits stated above.
- 4.25 With these measures, we conclude that the proposed development would not result in any unacceptable harm to residential amenity by reason of noise disturbance. For the avoidance of doubt the location of the necessary acoustic barriers are indicated in Figure 2.
- 4.26 Furthermore, 'significant adverse impacts' would be avoided and any 'adverse impacts' would be mitigated/minimised, bringing the development in line with the aims of the Noise Policy Statement for England (NPSE) 2010.

Planning Condition

- 4.27 The need to ensure that an adequate scheme of noise mitigation measures (i.e. installation of acoustic screening/fencing) is implemented for the proposed development can be formalised by an appropriately worded planning condition.
- 4.28 Similarly, noise impact of any mechanical services equipment associated with use of the proposed development can be adequately controlled by adhering to the environmental noise limits recommended in this report, which if necessary, could form the basis of an appropriately worded planning condition.

5.0 SUMMARY

- 5.1 The impact of noise has been assessed for a proposed retail development at Greenbrow Road, Wythenshawe.
- 5.2 A survey has been carried out to measure prevailing noise levels outside the nearest dwellings.
- 5.3 The potential noise impacts of the proposed store have then been assessed taking into account noise from store car parking, noise from delivery activities and building services noise.
- 5.4 The assessment demonstrates that, subject to the recommendations for noise mitigation made in this report, there will be no significant noise impact from use of the car park, delivery activities or building services equipment.
- 5.5 The implementation of an adequate scheme of noise mitigation measures can be ensured by the use of an appropriately worded planning condition.

Key:

- Not to scale
- X - Noise Measurement Position
- / - Site Boundary

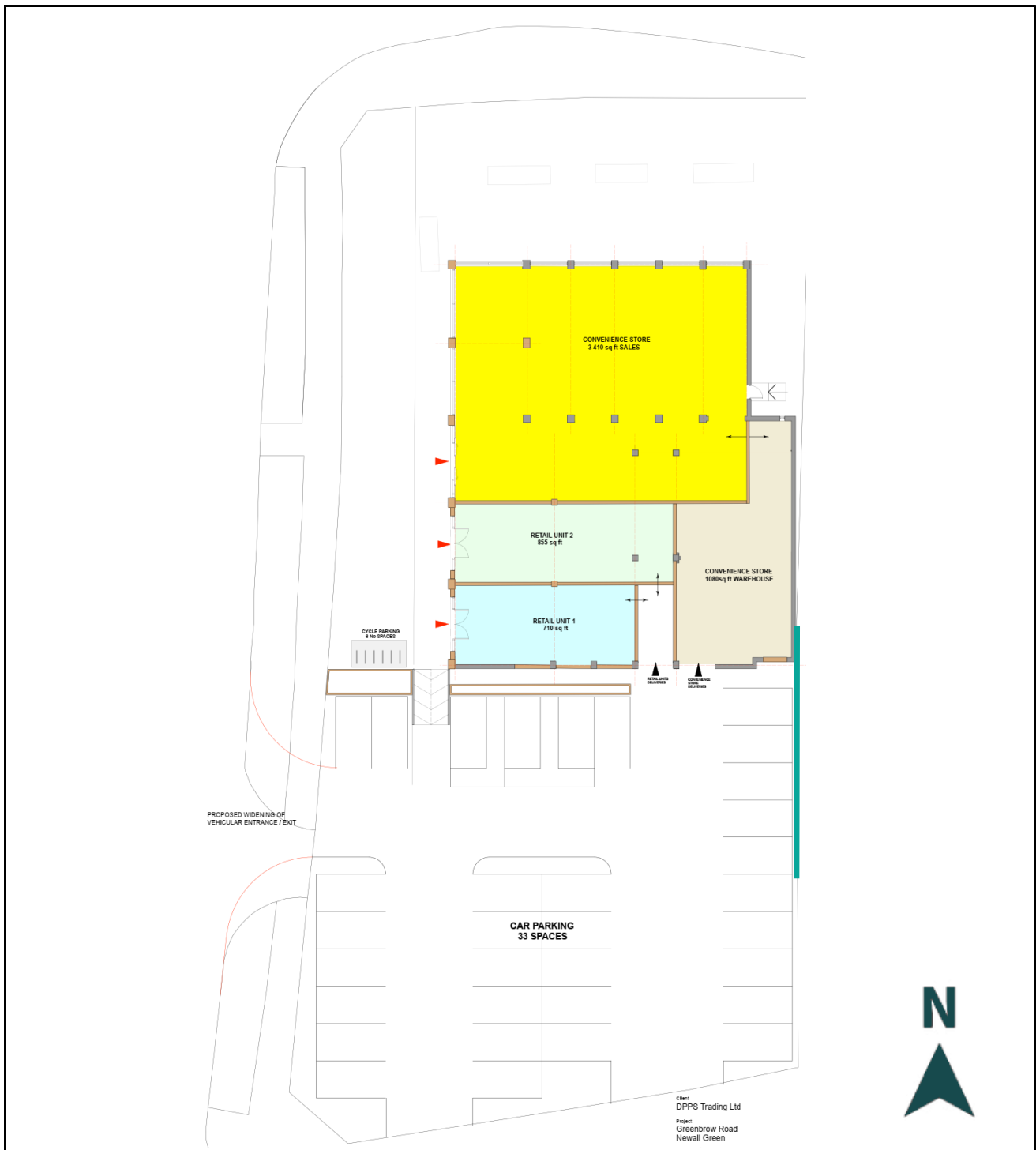


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Title: Figure 1: Site Location & Noise Measurement Positions

Project: P21-507



**Key:**

Not to scale

 - 2m Acoustic Fence



Title: Figure 2: Proposed Site Layout

Project: P21-507

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

$L_{A90,T}$ This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

L_{AE} This is the A-weighted 'Sound Exposure Level' which is used for measuring discrete noise events. Essentially it is a measure of the sound energy of the whole noise event normalised to a period of 1 second. The SEL value can be used to calculate the actual L_{Aeq} value for a given time period if the number of noise events is known.

Appendix II: Noise Survey Results

Date(s): Daytime – Wednesday 14 November 2021
 Evening/Night-time – Thursday/Friday 17/18 November 2021

Equipment: B&K 2260 'Type 1' sound analyser (serial no. 2467016) with tripod and calibrator

Weather: Daytime – Dry, mild (~12°C), overcast and calm (<2 m/s)
 Evening/Night-time – Dry, cold (~9°C), clear skies and calm (<2 m/s)

All levels in dB(A)

Location 1: Deptford Avenue

Morning

Time		Measured Noise Levels (dB)			Comments
Start	End	L _{Amax}	L _{Aeq}	L _{A90}	
08:09	08:24	66.3	56.4	53.6	Road traffic
08:46	09:01	74.2	58.0	54.8	
09:20	09:35	72.4	57.6	54.8	
09:51	10:01	65.2	56.3	53.8	

Evening/Night-time

Time		Measured Noise Levels (dB)			Comments
Start	End	L _{Amax}	L _{Aeq}	L _{A90}	
21:04	21:19	73.1	54.7	51.0	Road traffic
21:39	21:54	63.9	53.1	49.8	
22:12	22:27	70.3	54.3	51.4	
22:45	23:00	72.5	54.0	49.6	
23:17	23:33	59.0	50.9	48.4	
23:49	00:04	62.1	50.8	48.4	

Location 2: Greenbrow Road**Morning**

Time		Measured Noise Levels (dB)			Comments
Start	End	L _{Amax}	L _{Aeq}	L _{A90}	
08:30	08:45	79.7	64.1	55.2	Road traffic
09:03	09:18	78.7	63.9	56.0	
09:36	09:51	84.8	62.0	55.6	
10:07	10:22	74.6	61.1	54.2	

Evening/Night-time

Time		Measured Noise Levels (dB)			Comments
Start	End	L _{Amax}	L _{Aeq}	L _{A90}	
21:20	21:36	78.0	59.8	51.6	Road traffic
21:56	22:11	75.4	58.3	49.6	
22:28	22:43	76.6	57.2	49.8	
23:02	23:17	68.6	54.1	47.0	
23:34	23:49	70.0	54.0	46.0	