PROFESSIONAL CONSULT

FUTURE ENVIRONMENTS

Noise Impact Assessment

Proposed Residential Development – Aspinall Street, Heywood

Client: **1 Level Limited**

Reference: **19.036.1.R1**

Issue Date: **21/09/2019**



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EXECUTIVE SUMMARY

This Assessment has been undertaken to identify the key noise sources surrounding the Site, with particular regard being paid to the storage yard which lies adjacent to the Site. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework, its associated National Planning Policy Guidance and the appropriate British Standard for assessing commercial noise impacts upon residential receptors - BS4142:2014+A1:2019.

This Assessment has shown that, following the guidance presented in BS4142:2014+A1:2019, the rated level of noise generated by vehicles accessing the storage yard falls below the adopted noise criteria level and, as such, the guidance offered in BS4142:2014+A1:2019 for such a situation is '*where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context*.' It should be noted that the level, type and character of the noise associated with operation of the storage yard is not dissimilar to the surrounding noise climate which is dominated by road traffic noise.

Subject to the incorporation of the specified mitigation measures, it is considered reasonable to suggest that the level of noise generated by the storage yard at the Receptor accords with the 'No Observed Effect Level' as detailed in the PPG.

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1 INTRODUCTION

1.1 Background

1.1.1 Professional Consult Limited was appointed by 1 Level Limited to prepare a Noise Impact Assessment ('the Assessment') for a proposed residential development located off Aspinall Street in Heywood OL10 to be referred to hereafter as 'the Site'.

1.1.2 Proposals include for the development of four accessible bungalow dwellings on a parcel of land adjacent to the No.27 Aspinall Street. The Site is bound by Aspinall Street to the east and Townrow Street to the south. To the west lies a storage yard and to the north, open public space.

1.1.3 It is understood that Rochdale Borough Council have requested that a Noise Impact Assessment is submitted in order to support the planning application given that the Site is located next to a storage yard which may give rise to noise impacts at the proposed dwellings.

1.1.4 This Assessment has been undertaken to identify the key noise sources surrounding the Site, with particular regard being paid to the storage yard which lies adjacent to the Site. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework, its associated National Planning Policy Guidance and the appropriate British Standard for assessing commercial noise impacts upon residential receptors - BS4142:2014+A1:2019.

1.1.5 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.2 Limitations

1.2.1 The limitations of this report are presented in Appendix 1.

1.3 Confidentiality

1.3.1 Professional Consult 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 Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 19th February 2019 and its associated National Planning Practice Guidance (NPPG) on 22nd July 2019. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.

2.1.3 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.

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

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

2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, 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.

2.1.6 The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

2.1.7 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
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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 Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.1.8 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.

2.1.9 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;
- the spectral content of the noise and the 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.

2.1.10 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; and

- 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 Local Authority Guidance and Criteria – Rochdale Borough Council's Environmental Health Department

2.2.1 Professional Consult have contacted Paul Fletcher at Rochdale Borough Council in order to outline the proposed Assessment methodology, as follows:

'We have been appointed by a client to complete a Noise Impact Assessment for a proposed residential development on a parcel of land located off Aspinall Street in Heywood. The Site is bound by Aspinall Street to the east, Townrow Street to the south and a commercial storage yard to the west.

Professional Consult will complete the following survey work at the Site:

- *Noise measurements of any operations associated with the storage yard. Where commercial noise is measured, a background sound measurement will also be completed in the absence of any commercial sound.*

Professional Consult will complete the following assessments:

- *Commercial Yard: Any noise associated with the commercial storage yard will be assessed in accordance with the guidance contained in BS4142:2014+A1:2019.*

Where exceedances of the criteria are identified Professional Consult will recommend appropriate and reasonable mitigation measures to ensure that adopted noise level criteria is not exceeded.'

2.3 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.3.1 This standard 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; and
- 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.

2.3.2 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.'

2.3.3 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 hour; and

- Night-time (23:00 - 07:00): 15 minutes.

2.3.4 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

Tonality

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

Impulsivity

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

Intermittency

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

2.3.5 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

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

2.3.7 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.

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

- Typically, the greater this difference (between the rating level and the background sound level), 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 sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.3.9 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state *'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*'. Example 6 in the Standard states *'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance*'. Furthermore, Example 8, which considers night-time commercial noise impacts at a dwelling states *'BS 8233 indicates that 40 dBA sound level from the plant, equating to an internal level of around 30 dBA or possibly lower, but with some acoustically distinguishing characteristics, may not be suitable for a bedroom*.'

2.3.10 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

3 NOISE SURVEYS

3.1.1 In order to inform an accurate and robust Assessment, Professional Consult has completed a number of noise surveys on the boundary of the Site with the storage yard. Table 2 details the measured noise levels and the activity noted.

Table 2. Activity Associated with Storage Yard & Measured Noise Levels

Period		Activity	Measured Noise Level (dB)	On-time Duration (seconds)	Measurement Distance (m)	Measured Background Sound Level (dB)
Date	Time					
Friday 30th August	14:00 - 16:00	-	-	-	-	-
Monday 2nd September	07:00 – 08:00	Small lorry exited storage yard	62.6	50	6	44.3
	08:00 – 09:00	Passenger vehicle exited storage yard	58.6	25	6	
	09:00 – 10:00	Distant commercial noise beyond storage yard	53.9	40	-	
	10:00 – 11:00	-	-	-	-	-
	16:00 – 17:00	-	-	-	-	-
Friday 6th September	14:00 – 15:00	-	-	-	-	-
	15:00 – 16:00	Small lorry reverses into storage yard, reversing alarm, operatives depart	67.3	185	6	46.4
	16:00 – 17:00	-	-	-	-	-
Tuesday 10th September	10:00 – 11:00	-	-	-	-	-
	11:00 – 12:00	-	-	-	-	-
	12:00 – 13:00	-	-	-	-	-
	13:00 – 14:00	-	-	-	-	
	14:00 – 15:00	-	-	-	-	-
Monday 16th September	15:00 – 16:00	Passenger vehicle enters storage yard	59.8	60	6	46.2
	16:00 – 17:00	Small lorry reverses into storage yard, reversing alarm, operatives depart	64.8	120	6	

3.1.2 During each visit to Site in order to measure noise associated with operations at the storage yard, there was no discernible noise associated with any operations within the yard itself.

3.2 Survey Equipment

3.2.1 The following equipment was used for the Noise Surveys.

Table 3. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
Site Boundary with Storage Yard	Sound Level Meter	01dB Fusion	12038	26 March 2021
	Pre-amplifier	01dB PRE22	1805093	
	Microphone	GRAS 40CE	330801	
	Calibrator	01dB CAL-31	87280	06 March 2020

3.2.2 The sound level meter was field calibrated prior to and following the survey and no significant drift was identified.

3.2.3 During the Background Sound Survey the weather conditions were conducive to the measurement of environmental noise, i.e. wind speeds no more than 5m/s and dry conditions.

4 NOISE IMPACT ASSESSMENT

4.1.1 The Assessment has accounted for the following:

- Distance attenuation for the reduction of noise between source and receptor has been allowed for at 6dB/doubling of distance;
- No attenuation has been allowed for with regards to air or ground attenuation;
- Calculation of any noise impacts has been determined for the rear of the proposed bungalows where residents would spend time and potentially notice any commercial noise associated with the storage yard.
- Following various noise surveys at the Site, it reasonable to assume that the storage yard does not operate during the night-time period (23:00 – 07:00).

4.1.2 Table 4 calculates the overall specific 1-hour sound pressure level at the closest proposed bungalow for the various periods when noise from the storage yard has been audible.

Table 4. Calculated Specific Noise Levels at Closest Proposed Receptor

Period		Activity	Measured Noise Level (dB)	On-time Duration (seconds)	Measurement Distance (m)	Distance to Receptor (m)	Barrier* Attenuation (dB)	Calculated Specific Noise Level $L_{Aeq,1hr}$ at Receptor (dB)
Date	Time							
Friday 30th August	14:00 - 16:00	-	-	-	-	-		
Monday 2nd September	07:00 – 08:00	Small lorry exited storage yard	62.6	50	6	13	-5	32.3
	08:00 – 09:00	Passenger vehicle exited storage yard	58.6	25	6	13	-5	25.3
	09:00 – 10:00	Distant commercial noise beyond storage yard	53.9	40	-	-	-5	29.4
	10:00 – 11:00	-	-	-	-			
	16:00 – 17:00	-	-	-	-			
Friday 6th September	14:00 – 15:00	-	-	-	-	-		
	15:00 – 16:00	Small lorry reverses into storage yard, reversing alarm, operatives	67.3	185	6	13	-5	42.7
	16:00 – 17:00	-	-	-	-	-		
Tuesday 10th September	10:00 – 11:00	-	-	-	-	-		
	11:00 – 12:00	-	-	-	-	-		
	12:00 – 13:00	-	-	-	-	-		
	13:00 – 14:00	-	-	-	-	-		

	14:00 – 15:00	-	-	-	-	-		
Monday 16th September	15:00 – 16:00	Passenger vehicle enters storage yard	59.8	60	6	13	-5	30.3
	16:00 – 17:00	Small lorry reverses into storage yard, reversing alarm, operatives	64.8	120	6	13	-5	38.3
*Barrier attenuation afforded by the boundary concrete wall between the storage yard and the Site which is approximately 2m in height. This wall also screens the dwellings from vehicles accessing and egressing the yard.								

4.1.3 The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptors:

- Tonality - In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the objective method – either a 0dB penalty is allocated where no tones are present or 6dB penalty is allocated where tonality is present;
- Impulsivity – in determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the objective method which can result in a penalty from 0dB to 9dB being allocated depending upon the extent of impulsiveness;
- Intermittency – whether or not the measured operations turn on or off during the (1hr) assessment period; and
- Other sound characteristics – where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.

4.1.4 Table 5 allocates appropriate character corrections.

Table 5. Allocation of Character Corrections

Measured Activity	Tonality Correction (dB)	Impulsivity Correction (dB)	Intermittency Correction (dB)	Other Sound Characteristics Correction (dB)
Small lorry exited storage yard	0	0	3	0
Passenger vehicle exited storage yard	0	0	3	0
Distant commercial noise beyond storage yard	0	0	3	0
Small lorry reverses into storage yard, reversing alarm, operatives depart	0	0	3	0
Passenger vehicle enters storage yard	0	0	3	0
Small lorry reverses into storage yard, reversing alarm, operatives depart	0	0	3	0
Highest Correction for Assessment Period	**0**	**0**	**3**	**0**
Total Overall Correction to be added to Specific Noise Level at Receptor	**3**			

4.1.5 Table 12 completes the BS4142 Assessment. BS4142 prescribes the use of a typical background sound level (taken as the median value) however in the interests of a worst-case assessment the lowest measured background sound level has been used.

Table 6. BS4142 Assessment

Period		Activity	Calculated Specific Noise Level $L_{Aeq,1hr}$ at Receptor (dB)	Character Correction (dB)	Calculated Rating Level (dB)	Measured Background Sound Level (dB)	Criteria (dB)	Difference +/- (dB)
Date	Time							
Monday 2nd September	07:00 – 08:00	Small lorry exited storage yard	32.3	+3	35.3	44.3	44.3	-9.0
	08:00 – 09:00	Passenger vehicle exited storage yard	25.3	+3	28.3	44.3	44.3	-16.0
	09:00 – 10:00	Distant commercial noise beyond storage yard	29.4	+3	32.4	44.3	44.3	-11.9
	15:00 – 16:00	Small lorry reverses into storage yard, reversing alarm, operatives depart	42.7	+3	45.7	46.4	46.4	-0.7
Monday 16th September	15:00 – 16:00	Passenger vehicle enters storage yard	30.3	+3	33.3	46.2	46.2	-12.9
	16:00 – 17:00	Small lorry reverses into storage yard, reversing alarm, operatives depart	38.3	+3	41.3	46.2	46.2	-4.9

4.1.6 Table 6 indicates that the rated level of noise, for all measured commercial noise sources, fall below the criteria noise level and so the consideration of mitigation measures is not warranted.

4.1.7 The highest calculated 1-hour rated noise level is 45.7dB and so should a resident open a living room window, affording only 15dB of noise attenuation, the internal rated noise level would be 30.7dB which falls below the criteria noise level offered in BS8233:2014 of 35dB for living rooms.

5 CONCLUSION

5.1.1 Professional Consult Limited was appointed by 1 Level Limited to prepare a Noise Impact Assessment for a proposed residential development located off Aspinall Street in Heywood OL10.

5.1.2 Proposals include for the development of four accessible bungalow dwellings on a parcel of land adjacent to the No.27 Aspinall Street. The Site is bound by Aspinall Street to the east and Townrow Street to the south. To the west lies a storage yard and to the north, open public space.

5.1.3 It is understood that Rochdale Borough Council have requested that a Noise Impact Assessment is submitted in order to support the planning application given that the Site is located next to a storage yard which may give rise to noise impacts at the proposed dwellings.

5.1.4 This Assessment has been undertaken to identify the key noise sources surrounding the Site, with particular regard being paid to the storage yard which lies adjacent to the Site. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework, its associated National Planning Policy Guidance and the appropriate British Standard for assessing commercial noise impacts upon residential receptors - BS4142:2014+A1:2019.

5.1.5 This Assessment has shown that, following the guidance presented in BS4142:2014+A1:2019, the rated level of noise generated by vehicles accessing the storage yard falls below the adopted noise criteria level and, as such, the guidance offered in BS4142:2014+A1:2019 for such a situation is '*where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'* It should be noted that the level, type and character of the noise associated with operation of the storage yard is not dissimilar to the surrounding noise climate which is dominated by road traffic noise.

5.1.6 Subject to the incorporation of the specified mitigation measures, it is considered reasonable to suggest that the level of noise generated by the storage yard at the Receptor accords with the 'No Observed Effect Level' as detailed in the PPG.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

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.

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APPENDIX 2: 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 impulsiveness 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 following table.

Table 1: Typical Sound Pressure Levels

Sound Pressure Level (dB)	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 2: Terminology

Descriptor	Explanation
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 (2x10-5Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	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 Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
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 Ln 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	2A 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 as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX 3: SITE LOCATION PLAN & NOISE MEASUREMENT POSITION

Figure 1: Noise Measurement Position

