Acoustic & Engineering Consultants Limited

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Your ref: 21 December 2007

Our ref: P1464/L03/PES

Mr A Gray
Hodder Associates.
113-115 Portland Street
Manchester
M1 6DW

By post & e-mail

Dear Adam

Regency House, 62-66 Deansgate, Manchester

I understand that since the submission of our planning report in December 2005, a further application has been made in respect of a development at the above address. Our original report P1464/R1 dated 23 December 2005 assessed the potential impact of external noise on a development consisting of the addition of two floors to the existing four storey building. The top floor was proposed for residential use and the lower of the additional floors was for office use.

The latest application is only for a single additional floor for office use, i.e. there will be no residential floor.

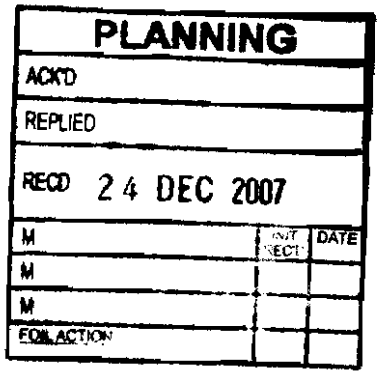
I discussed the situation with David Robinson in the planning department of Manchester City Council, who stated that he sought clarification on the appropriate nature of the assessment and noise measurements made in December 2005, in relation to this development.

I confirm that report P1464/R1 is still appropriate for the present application for office use, i.e. the noise control requirements stated in paragraphs 5.8, 5.9 and 5.12 for the building still apply. In my opinion, the external noise climate, primarily due to road traffic and pedestrian activity on Deansgate, which was measured in December 2005, would be similar to the situation now.

I trust this is adequate for your needs.

Yours sincerely

Peter Sacre



HODDER ASSOCIATES

NOISE ASSESSMENT

PROPOSED MIXED USE DEVELOPMENT

62-66 DEANSGATE

MANCHESTER

23 December 2005

AEC REPORT: P1464/R1/PES

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CONTENTS

		Page
1.0	INTRODUCTION	3
2.0	DEVELOPMENT PROPOSALS	3
3.0	NOISE MEASUREMENTS	3
4.0	BASIS OF ASSESSMENT	4
5.0	ASSESSMENT OF PROPOSED DEVELOPMENT	6
6.0	CONCLUSIONS	8

FIGURE 1 – Site Location Showing Monitoring Positions

APPENDIX A – Measurement Procedure

APPENDIX B - Acoustic Terminology in Brief

APPENDIX C – PPG24 Guidance

1.0 INTRODUCTION

1.1 Acoustic & Engineering Consultants Limited (AEC) have been instructed by Hodder Associates, on behalf of Montpelier Group, to assess the implications of noise on the proposed mixed use development site at 62-66 Deansgate, Manchester.

1.2 This report details the ambient and background noise levels measured on site, and discusses the implications on the building fabric to achieve acceptable internal levels and meet appropriate planning guidance.

2.0 DEVELOPMENT PROPOSALS

2.1 A scheme to develop the existing office/retail building at 62-66 Deansgate has been prepared by Hodder Associates. The location of the building is identified in Figure 1 and is bounded on the east by Deansgate. The building adjoins existing retail/office buildings to the south and is surrounded by similar buildings to the north and west. On the north there is a narrow passageway to Parsonage Lane.

2.2 The proposed scheme comprises the addition of two further floors to the existing four storey building. In the existing building, the ground floor is operated as a wine bar, RSVP, with office accommodation above on the first to third floors. The additional floors are proposed as office accommodation with residential above on the top floor.

2.3 As part of the planning permission being sought, the local authority requires a noise assessment to be undertaken, in accordance with the requirements of PPG24 'Planning and Noise'. Discussions with Manchester City Council's Environmental Health Department on similar projects has identified that they require a sound insulation scheme to ensure that internal noise levels in the apartments would meet criteria based on the recommendations in WHO guidelines, and adequate control of noise from plant serving the offices. They normally have concerns relating to Friday or Saturday night-time public activity, and also peak hour road traffic noise.

3.0 NOISE MEASUREMENTS

3.1 Noise levels were measured in December 2005, primarily at one location over an extended period from Friday to Monday at the third floor level on the existing building. Thus measurements included typical and peak hour daytime traffic noise levels and Friday and Saturday night activity. In addition, night time background noise levels were measured overnight on a Thursday morning at ground level at the rear of the building. Full details of the measurement procedure are included in Appendix A and acoustic terminology is outlined in Appendix B. The measured data is given in Table A1, and typical frequency data in Table A2.

3.2 Noise levels in the area, during the day, were dominated by road traffic on Deansgate. There was also significant pedestrian activity, during the Friday night. The existing night-time background noise level was dominated by plant serving nearby buildings.

3.3 In summary, the free-field noise levels during the daytime were 66dBL_{Aeq} at the Deansgate elevation. Similarly at night, the free-field noise levels were typically 68dBL_{Aeq}, due to both road traffic and public activity, with typical maximum levels of about 85-91dBL_{Amax}.

3.4 At night, the lowest background noise levels were 51dBL_{A90} on the Deansgate elevation and at the rear of the building were 53-55dBL_{A90}.

3.5 During the day, the background noise levels were significantly higher at 62-63dBL_{A90} on the Deansgate elevation.

4.0 BASIS OF ASSESSMENT

4.1 The appropriate planning guidance for assessment of proposed residential developments is Planning Policy Guidance PPG 24 'Planning and Noise' issued by the Department of the Environment in 1994.

4.2 Paragraph 8 of PPG 24 states "*this guidance introduces the concept of Noise and Exposure Categories (NECs), ranging from A-D, to help local planning authorities in their consideration of applications for residential development near transport-related noise sources. Category A represents the circumstances in which noise is unlikely to be a determining factor, while Category D relates to the situation in which development should normally be refused. Categories B and C deal with situations where noise mitigation measures may make development acceptable.*"

4.3 Paragraph 9 of PPG 24 states "*the table in Annex 1 contains a recommended range of noise levels for each NEC covering day and night-time periods. However, in some cases it may be appropriate for local planning authorities to determine the range of noise levels which they wish to attribute to any or each of the NECs. For example, where there is a clear need for new residential development in an already noisy area some or all NECs might be increased by up to 3dB(A) above the recommended levels. In other cases, a reduction of up to 3dB(A) may be justified.*" We are not aware of any relaxation by Manchester City Council in this respect.

4.4 PPG 24 acknowledges the importance of mitigation measures to reduce and control exposure to noise. Paragraph 13 identifies traditionally accepted measures, such as the use of purpose-built barriers and specifying an acceptable noise limit.

4.5 Annex 1 of PPG 24 states "*when assessing proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) the proposed site falls, taking account of both day and night-time noise levels.*" Advice is then given depending on which NEC the site falls into. The advice and noise exposure categories are given in Appendix C of this report. It should be noted that the NECs are based on free field noise levels. Annex 3 of PPG 24 identifies how noise from road traffic should be assessed and. In addition it refers to the Noise Insulation Regulations and guidance for calculation of road traffic and in accordance with the Department of Transport's 'Calculation of Road Traffic Noise'.

4.6 Advice on sound insulation of buildings is given in Annex 6 of PPG 24 and advises that "*guidance on suitable internal noise levels can be found in BS8233:1987*". BS8233 'Sound insulation and noise reduction for buildings – Code of practice' was updated in 1999. BS8233:1999 gives a design range for indoor ambient levels in living rooms and bedrooms as presented in Table 1 below.

Table 1 – Internal Noise Levels in Residential Units Based On BS8233

Area	Design Range, $dBL_{Aeq,T}$	
	Good	Reasonable
Living Room	30	40
Bedrooms *	30	35

* for a reasonable standard in bedrooms at night, individual noise events should not normally exceed $45dBL_{Amax}$ (fast response).

4.7 The World Health Organisation's (WHO) document "Guidelines for Community Noise" proposes guideline values for noise both inside and outside dwellings. These are to achieve acceptable internal noise levels to avoid annoyance and sleep disturbance. Inside dwellings, the noise level should not exceed $30dBL_{Aeq}$ and $45dBL_{Amax}$ at night and $35dBL_{Aeq}$ during the day. Manchester City Council ideally require $30dBL_{Aeq}$ at night and $35\text{-}40dBL_{Aeq}$ during the day to be achieved in residential habitable rooms.

5.0 ASSESSMENT OF PROPOSED DEVELOPMENT

External Residential Envelope

5.1 Based on the measured data summarised in Section 3, external free-field noise levels at the proposed residential part of the development would be about 61dBL_{Aeq} during the daytime and 63dBL_{Aeq} generally at night on the Deansgate elevation, with maximum noise levels of about 82dBL_{Amax}. On the other elevations, the daytime level would be about 56dBL_{Aeq}, and during the night would be about 58dBL_{Aeq},. Therefore in terms of PPG24 Noise Exposure Categories, which are identified in Appendix C, the residential part of the development would be in NEC C. Therefore, mitigation measures would be needed to control internal noise levels in habitable rooms, particularly at night, but also during the day.

5.2 Based on a curtain walling system, and to achieve an internal standard of 30dBL_{Aeq} at night, a minimum sound insulation value of 40dBR_w / 34dBR_{TRA} e.g., should ideally be specified. A totally glazed curtain walling system equivalent to 10mm glass/thermal cavity/6.4mm glass could achieve this. In lounge areas, or habitable rooms used during the daytime, a curtain walling construction achieving a minimum sound insulation of 38dBR_w / 32dBR_{TRA}, would control external noise to 35-40dBL_{Aeq} during the day. A totally glazed area equivalent to 10mm glass/thermal cavity/4mm glass could achieve this. The curtain walling design, including framing and any seals, must be able to achieve the sound insulation values stated. Alternatively, a reduced glazing area could be considered, which may reduce the required sound insulation performance of the glazing, but would need a higher sound insulation value for the remaining façade area to maintain the overall performance necessary, i.e. 40dBR_w / 34dBR_{TRA}

5.3 It would also be necessary to control potential flanking between adjacent apartments via the curtain walling system.

5.4 Controlling the average noise levels would also control typical maximum noise levels at night to below 45dBL_{Amax}, and, hence, achieve acceptable standards.

5.5 In addition, ventilation would be required for these rooms and if this were to be achieved by the use of trickle vents, the acoustic ventilator would need to achieve a sound insulation performance of 45dB$D_{n,e,w}$. An example of a suitable vent achieving this minimum sound insulation performance is the Glidevale A101dB with a TGA4 canopy. Alternatively, consideration could be given to a mechanical system with either an extract system relying on leakage via the external building fabric, or a whole house system.

5.6 The sound insulation performance for the roof structure would not be onerous and a build up which would achieve 35dBR_w would be adequate. However, if a single ply membrane is to be used, the build up should include a damping layer to control impact noise from rain.

5.7 It should be noted that, although the development adjoins an existing building, the residential part does not share a party wall, since it extends well above the height of the existing building.

External Office Envelope

5.8 Guidance on acceptable internal noise levels in offices is provided in BS8233 'Sound insulation and noise reduction for buildings – Code of practice', which is also used by British Council for Offices and the BREEAM credit system. In open plan offices, the acceptable internal noise level is 45-50dBL_{Aeq}. If the higher noise level of 50dBL_{Aeq} is the design aim, the equivalent external noise level via a building envelope with opening windows would be 60-65dBL_{Aeq}. The external daytime free field noise levels at the fourth floor of the Deansgate elevation of the offices would be 65dBL_{Aeq}. Therefore, ideally, the building ventilation strategy should avoid opening windows.

5.9 In cellular offices, the acceptable internal noise level is 40-45dBL_{Aeq}. The external envelope of the offices would only need to achieve an overall sound insulation performance of 35dBR_w, and since the glazing would be the weakest element, acoustically, the requirement can be achieved by standard glazing, although a 10mm thick glass would be beneficial in the build up to control low frequency noise from the buses.

Internal Sound Insulation

Adjacent Residential

5.10 The sound insulation requirements between adjacent residential apartments would need to satisfy the latest requirements of Approved Document E of The Building Regulations.

5.11 To control potential flanking via a curtain walling system the following sound insulation requirements need to be met and would need to be included in the tender specifications.

Separation at Floor Slabs

The curtain wall shall provide a junction between adjoining floors that maintains an installed weighted sound insulation value of 45dB$R'_w + C_{tr}$ when measured in accordance with BS EN ISO 140-4, and rated in accordance with BS EN ISO 717-1. To achieve this the system shall provide a weighted flanking sound reduction index of at least 48dB $R_{Ft,w} + C_{tr}$, when tested in an accredited independent laboratory and determined as identified in BS EN 12354-1 and rated in accordance with BS EN ISO 717: Part 1. The test method should be in accordance with the equivalent of DIN 52 210-7, which is designed for curtain walling systems and should be adapted in the absence of any other International Test Standards.

Residential over Offices

5.12 It is assumed that the floor build up would achieve the airborne sound insulation value equivalent to 200mm concrete, i.e. about 55dBR'_w. Hence, noise levels in a busy office environment, which could be 80dBL_{Amax} if voices are raised, would be controlled to about 25dBL_{Amax} in the apartments above and would be acceptable for daytime use.

Noise Levels from Mechanical Services and Electrical Plant

5.15 There could be mechanical plant serving the office accommodation, which primarily would be at roof top level. During the night-time, the background noise level, L_{A90}, in the area was typically 50-55dBL_{A90}. Thus the noise level from all future mechanical and electrical plant serving the proposed development should not exceed 45dB$L_{Aeq,5\ mins}$, at night, with no distinguishing characteristics e.g. tone or intermittency, say at 20m from the development, to protect any existing residential development. For plant only operating during the daytime period, the noise level from all mechanical and electrical plant should not exceed 55dB$L_{Aeq,1\ hour}$, with no distinguishing characteristics at 20m. These requirements would also ensure that the proposed residential apartments are being protected.

5.16 Typically, a noise limit of NR45 at 3 metres from each plant, or louvre, would need to be set at night. During the day this limit could be increased to NR50-55 at 3 metres. However, this would need checking once more detailed plant information becomes available, but any noise control measures would not be onerous.

6.0 CONCLUSIONS

6.1 Noise levels have been measured at the proposed residential/office development at 62-66 Deansgate, Manchester.

6.2 Noise levels place the proposed residential part of the development into PPG24 NEC C during the night, and NEC B during the day. Therefore, appropriate noise control needs to be applied to the residential units. To achieve acceptable internal noise levels, an external envelope construction achieving the sound insulation requirements provided in Section 5 would be required. Also, a system of ventilation, which does not reduce the sound insulation of the external envelope, needs to be introduced.

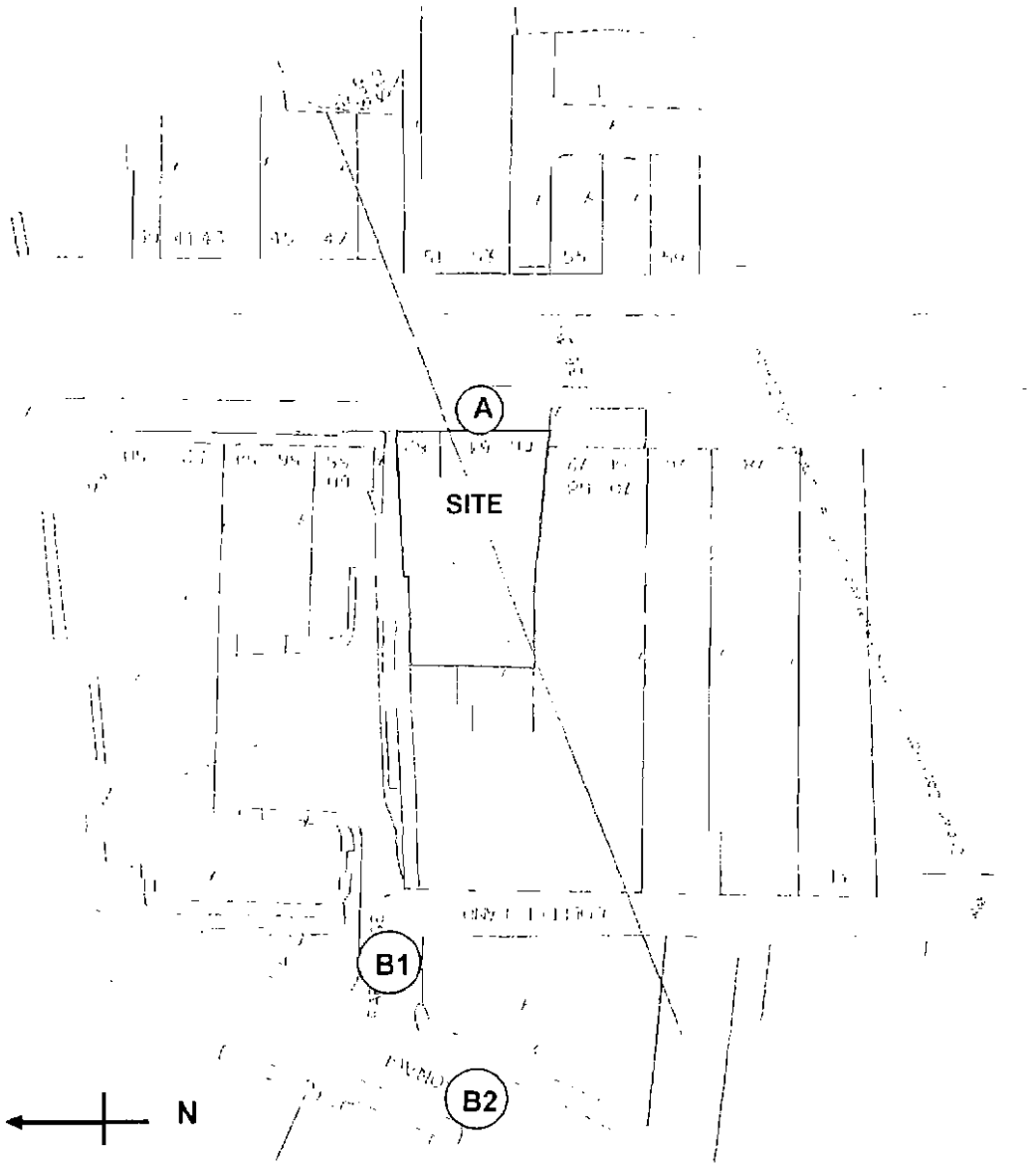
6.3 The sound insulation requirements for the external envelope of the offices are not onerous to achieve reasonable internal standards.

6.4 Adequate sound insulation can be provided by the floor structure between the adjacent residential and office uses to control potential noise impact.

6.5 Noise from mechanical plant serving the offices and retail units can be adequately controlled.

6.6 Appropriate conditions can be applied to any planning permission to ensure all of the above are achieved.

FIGURE 1 – Site Location Showing Monitoring Positions



APPENDIX A – Measurement Procedure

Date & Time of Survey:	Friday 9 December to Monday 12 December 2005 from 1510h to 1605h unattended Thursday 15 December 2005 0100-0115h
Personnel Present:	15 December - Andy Burke (AEC)
Equipment Used:	B&K 2260 Real Time Analysers (AEC Kits 1 and 2)
Weather Conditions:	9 to 12 December: Conditions were generally dry 15 December: Dry, calm, overcast 3°C
Measurement Procedure:	Noise levels were measured at locations around the proposed development, identified as A, B1 and B2 on Figure 1 and described below. Over an extended period from Friday 9 December at 1510h to Monday 12 December at 1605h, noise levels were measured at a single location A. Location A was selected to measure typical noise levels at the façade onto Deansgate due to both road traffic and public activity at a height of about 14m above the ground level and one metre from the façade edge. The measurements were unattended. Locations B1 and B2 were selected to determine the background noise levels at night in the area to develop noise limits for plant for the new building. The locations were free field and the microphone height was at 1.5m above ground. The sound level analysers, which conform to BS EN 60651:1994 "Specification for sound level meters" and BS EN 60804:2001 "Integrating-averaging sound level meters", were in calibration and check calibrated before and after the measurement periods using a Bruel & Kjaer type 4231 (94dB) calibrator. There was no significant drift of calibration
Measured Data:	All measured data is held on file by AEC. A summary of the noise levels measured at specific times are presented in Table A1 with typical octave band frequency spectra presented in Table A2.

TABLE A1 –Typical Ambient Noise Levels

Date	Location	Period	Noise Level, dB				Comments
			L_{Aeq}	L_{A10}	LA90	L_{Amax}	
Daytime							
9/12/05	A	1510-1600	69.1	71.6	64.9	79.4	*
		1600-1700	69.3	71.2	65.6	84.5	
		1700-1800	69.0	70.5	65.7	84.0	
Night time							
10/12/05	A	2302-2314	71.2	73.5	67.0	84.6	*
		2314-2324	70.5	72.6	67.5	81.3	
		2324-2334	71.4	73.5	67.8	86.3	
		2334-2344	70.1	71.9	66.7	80.2	
		2344-2354	70.9	73.0	66.5	91.0	
		2354-0004	72.2	74.0	67.7	91.0	
		0004-0014	71.3	73.0	66.3	90.0	
		0014-0024	70.8	73.4	66.1	78.5	
		0024-0034	81.2	77.9	67.9	100.9	
		0034-0044	82.3	73.2	66.7	101.9	
		0044-0054	69.9	71.8	65.7	87.2	
		0054-0104	78.4	74.9	66.0	98.9	
		0104-0114	70.8	73.2	65.4	86.5	
12/12/05		0354-0404	58.0	61.3	51.0	72.0	Unattended; general background noise
		0404-0414	62.2	67.2	50.5	75.9	
15/12/05	B1	0100-0105	56.5	57.7	54.6	68.6	Attended; plant on neighbouring buildings
	B2	0105-0110	59.2	61.4	52.8	74.0	
	B1	0110-0113	55.9	56.6	54.8	61.1	
12/12/05	Internal at A	1640-1700	43	45	37	58	Attended; road traffic
	External at A		70	72	65	82	

* Unattended, unless stated otherwise; road traffic and pedestrian activity.

TABLE A2 – Road Traffic Typical Spectrum

Period	Noise Unit, dB	Overall A-weighted, dB	Sound Level, dB at Octave Band Centre Frequency, Hz							
			63	125	250	500	1k	2k	4k	8k
Day	L_{eq}	69.3	79	68	66	65	65	62	58	48
Night	L_{eq}	70.8	79	71	68	67	67	63	57	52
	L_{max}	91	91	83	79	79	85	85	87	76

APPENDIX B - Acoustic Terminology in Brief

$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. May be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the "ambient" noise level.
L_{A10}	The (A-weighted) sound level exceeded for 10% of a measurement period. It is the value used in the past to describe traffic noise.
L_{A90}	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value used to describe background noise.
L_{Amax}	The maximum (A-weighted) sound level during a given time. "Fast" or "Slow" response should be quoted.
Free-field Level	This refers to the sound level measured outside, far away from reflecting surfaces
Façade Level	This refers to the sound level measured within one metre of a building façade, and hence includes the reflected sound energy off that facade
R_w	Single number rating used to describe the airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
R_{TRA}	Single number rating used to describe the airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz, using a traffic noise spectrum as the source.

APPENDIX C – PPG24 Guidance

PPG24 NOISE EXPOSURE CATEGORIES FOR DWELLINGS

NEC	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

RECOMMENDED NOISE EXPOSURE CATEGORIES FOR NEW DWELLINGS NEAR EXISTING NOISE SOURCES

NOISE LEVELS[0] CORRESPONDING TO THE NOISE EXPOSURE CATEGORIES FOR NEW DWELLINGS $L_{Aeq,T}$ dB				
	NOISE EXPOSURE CATEGORY			
NOISE SOURCE	A	B	C	D
Road traffic				
07.00 – 23.00	<55	55-63	63-72	>72
23.00 – 07.00[1]	<45	45-57	57-66	>66
Rail traffic				
07.00 – 23.00	<55	55-66	66-74	>74
23.00 – 07.00[1]	<45	45-59	59-66	>66
Air traffic[2]				
07.00 – 23.00	<57	57-66	66-72	>72
23.00 – 07.00[1]	<48	48-57	57-66	>66
Mixed sources[3]				
07.00 – 23.00	<55	55-63	63-72	>72
23.00 – 07.00[1]	<45	45-57	57-66	>66

Notes

[0] **Noise levels**: the noise level(s) ($L_{Aeq,T}$) used when deciding the NEC of a site should be representative of typical conditions

[1] **Night-time noise levels** (23.0-07.00): sites where individual noise events regularly exceed 82 dB L_{Amax}(S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$(except where the $L_{Aeq,8h}$ already puts the site in NEC D).

[2] **Aircraft noise:** daytime values accord with the contour values adopted by the Department of Transport which relate to levels measured 1.2m above open ground. For the same amount of noise energy, contour values can be up to 2dB(A) higher than those of other sources because of ground reflection effects.

[3] **Mixed sources:** this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the lable. The "mixed source" NECs should only be used where no individual noise source is dominant.