Existing Noise Climate Assessment

Client:	Ask Consultants Ltd t/as Jani-King (Leicester) Business Box 3 Oswin Road Leicester LE3 1HR
Project:	16 King Street Barwell Leicester LE9 8GQ
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Contents

1.0 Summary

2.0 Introduction

3.0 Site Description

4.0 Assessment Criteria

4.1 World Health Organisation (WHO) Guidance

4.2 BS 8233:2014 “Guidance on Sound Insulation and Noise Reduction for Buildings”

4.3 Planning and Noise: Professional Guidance on Planning and Noise (ProPG)

5.0 Survey Details

5.1 Survey Times and Personnel

5.2 Weather

5.3 Equipment

5.4 Measurement Procedure

6.0 Noise Survey Results

6.1 Results

7.0 Noise Transmission Calculations

7.1 Construction Specification
7.2 Calculation Results

8.0 Conclusion

1.0 Summary

A noise survey with proposals for achieving appropriate noise levels for the future occupants of 16King Street, Barwell is required. The existing building is a 2-storey disused commercial property which is to be converted in to six flats – three on each floor.

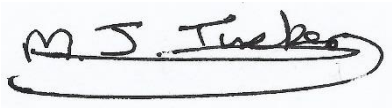
Noise level conditions need to be assessed and reviewed for the change of use. Policies including the 'WHO guidelines for community noise' and 'ProPG' will be assessed against. The NPPF document specifies that noise levels should be deemed appropriate with reference to BS8233:2014.

In support of the application, Climat BCT was commissioned to undertake an assessment of the existing noise climate at 16 King Street, Barwell and use the data from the existing noise climate survey, to assess the likely internal noise climate within the proposed flats resulting from external noise break-in. This will include an assessment of the proposed ventilation and glazing strategy.

All measurements recorded demonstrate compliance with the planning conditions will be achieved. The existing day and night LAeq,t values met the requirements already. Improvements to the glazing and external walls that are proposed will only improve this further.

The proposed build ups will reduce the number of excessive peaks sufficiently to meet the relevant requirements. **From all measurements recorded there does not appear to be any issues with appropriate noise levels being achieved that have been set in the planning condition referenced.**

Report Prepared by:



Matthew Tucker AMIOA Dip IOA

Managing Director – Climat BCT Ltd

2.0 Introduction

A noise survey with proposals for achieving appropriate noise levels for the future occupants of 16King Street, Barwell is required. The existing building is a 2-storey disused commercial property which is to be converted in to six flats – three on each floor.

Noise level conditions need to be assessed and reviewed for the change of use. Policies including the 'WHO guidelines for community noise' and 'ProPG' will be assessed against. The NPPF document specifies that noise levels should be deemed appropriate with reference to BS8233:2014.

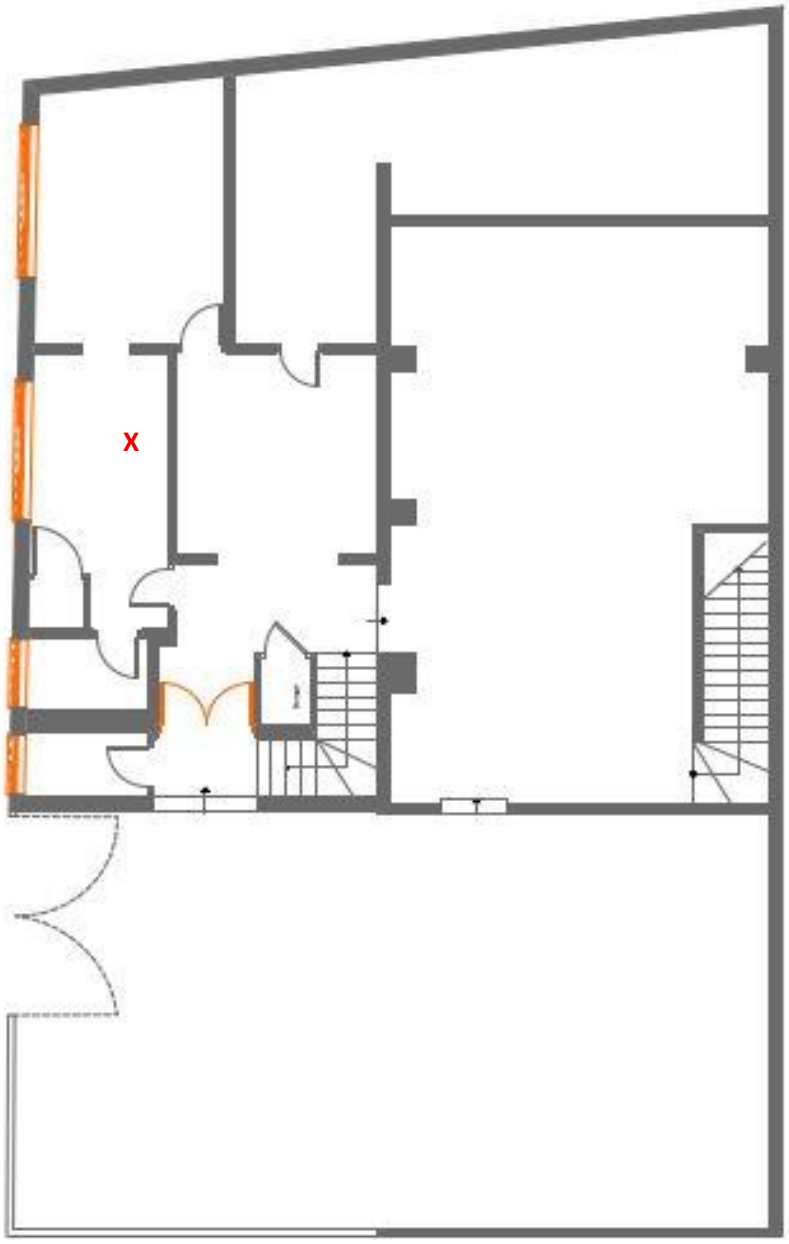
In support of the application, Climat BCT was commissioned to undertake an assessment of the existing noise climate at 16 King Street, Barwell and use the data from the existing noise climate survey, to assess the likely internal noise climate within the proposed flats resulting from external noise break-in. This will include an assessment of the proposed ventilation and glazing strategy.

3.0 Site Description

The proposal for the development is for a full change of 16 King Street from a two-storey commercial space in to a block of six flats. The existing noise climate is regarded as being essentially suburban in character with minimal road traffic on King Street. To the south of the development is Shilton Road – a residential road. Office units are located immediately to the West of the site across King Street. To the North and East of site are industrial premise. These are not operational at weekends or during the evening and night. Johnson Plumbing immediately adjacent to the development has operating hours of Monday to Friday 7am-5pm.



Existing layout



Existing Ground Floor Plan @1:100

Red X marks location of Sound level meter

Proposed layout



Red X marks location of Sound level meter

4.0 Assessment Criteria

The planning permission application for the conversion of the former commercial block at 16 King Street, Barwell requires the following:

'The potential impact from adjacent commercial premises from noise will need to be considered. This can either be done prior to determination or through a suitable condition.

C40. Noise attenuation

a) *Development shall not begin until a scheme for protecting the proposed dwellings from noise from adjacent commercial premises has been submitted to and approved by the Local Planning Authority*
b) *All orks which form art of the scheme shall be completed before any of the permitted dwellings are first occupied.*

With reference to the analysis of the likely internal noise levels within the permitted flats, reference will be made to the guidance contained within: The World Health Organisation's "Guidelines for Community Noise" document and British Standard (BS) 8233:2014 "Guidance on sound insulation and noise reduction for buildings". Further guidance will be employed, as appropriate, from documents such as the Planning and Noise: Professional Guidance on Planning and Noise (ProPG), May 2017, document.

Achieving recommended noise levels from BS8233:2014 and WHO guidance should be acceptable to achieving compliance with condition C40.

4.1 World Health Organisation (WHO) Guidance

The WHO "Guidelines for Community Noise" is a comprehensive document that co-defines much of the work contained within the earlier "Community Noise" document produced in 1995. The 1999 document includes summaries on: the effects on noise on health, guideline values, noise management proposals and recommendations. It is the guideline values on community noise levels contained in Table 1 of the Executive Summary that are amongst the most frequently cited elements of this document. For the sake of clarity, the sections of this table that are applicable to residential dwellings are reproduced in Table 1 below.

Table 1. Guidelines for noise levels in specific environments (reproduced from Table 1 of the "Guidelines for Community Noise document, (WHO 1999))

Specific environment	Critical health effect(s)	L_{Aeq} [dB(A)]	Time base [hours]	L_{Amax}, fast dB
Outdoor living area	Serious annoyance, daytime and evening. Moderate annoyance, daytime and evening.	55 50	16 16	- -
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening.	35	16	-
Inside bedrooms	Sleep disturbance, night time	30	8	45

4.2 BS 8233:2014 "Guidance on Sound Insulation and Noise Reduction for Buildings"

BS 8233:2014 draws together research and best practice relating to building design, providing guidance to facilitate the development of buildings that have internal noise environments that are consistent with and appropriate for their intended use. The British Standard highlights methods for the control of noise from a number of sources including external noise and building services etc., as well as evaluating the effect that noise from these sources may have on the acoustics of the internal spaces.

With reference to the design guidance relating to the internal noise climate of residential dwellings, BS 8233:2014 summarises this guidance within table 4 of section 7.7.2. The main elements of this guidance are reproduced in table 2 below.

Table 2. Indoor ambient noise levels for dwellings (reproduced from table 4 of BS8233:2014)

Activity	Location	0700 to 2300	2300 to 0700
Resting	Living room	35dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining room/area	40dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,\ 16\ hour}$	30dB $L_{Aeq,\ 8\ hour}$

4.3 Planning and Noise: Professional Guidance on Planning and Noise (ProPG)

This document was published in May 2017 and was produced jointly by representatives of the Chartered Institute of Environmental Health (CIEH), the Institute of Acoustics (IoA) and the Association of Noise Consultants (ANC). The ProPG document seeks to provide guidance on and complement the wider aims contained within the Noise Policy Statement for England (NPSE) and the additional guidance contained within the National Planning Policy Framework (NPPF). In addition, the ProPG document acknowledges the contribution made by existing guidance contained within both the World Heath Organisations (WHO) "Guidelines for Community Noise" and (BS) 8233:2014 “Guidance on sound insulation and noise reduction for buildings”.

The ProPG document guidance is restricted to the consideration of new residential developments and the potential implications for these developments arising from predominantly airborne noise that typical emanate from transportation noise sources.

The guiding principle of the ProPG document with reference to the existing noise climate, is that once the potential impact on a development has been quantified, good acoustic design should be implemented to mitigate the potential effects that the existing noise climate may have on the proposed resident of any new residential development. In this case the good design principle relates to both the internal acoustic environment within dwellings and any external amenity areas serving those dwellings. With reference to good acoustic design Pro PG does recognise that this does not mean "overdesign or gold plating", but it does mean delivering "the optimum acoustic outcome for a particular site".

With respect to the internal noise level guidelines, ProPG makes reference to the guidance contained within table 2 of section 7.7.2BS 8233:2014, reproduced in section 4.2 above. Whilst recognising that it is preferable to achieve the internal noise guidelines ProPG does, at paragraph 2.30, recognise that national planning and noise policy does not always require that these levels are achieved. This is particularly the case where to do so would "disproportionately increase the cost of the development".

Remaining with the issue of internal noise level guidance and the proposed levels for individual noise events, expressed as an L_{max}, the guidance contained within Appendix A of the ProPG is instructive. The Appendix contains a short summary of research into the effects of individual noise events and the effect that these can have on sleep. In the light of this summary the document, at paragraph A.20, states the following, "*...therefore, it is considered that if, in bedrooms at night, the $L_{Amax,F}$ from individual noise events (from all sources) would not normally exceed 45dB more than 10 times a night, then this represents a reasonable threshold below which the events on sleep can be regarded as negligible*".

The potential impact of ventilation on the acoustic integrity of the façade of a dwelling is also addressed by the ProPG document. The document suggests that good acoustic design should be used to achieve the internal design targets in noise sensitive rooms with windows open. Here it is assumed that this relates to windows partially open for ventilation purposes. Despite this it also recognises the limitations of acoustic design and highlights that internal noise levels may only be achievable with window closed in certain environments such as urban areas or sites adjacent to transportation noise sources. In these situations, it is suggested that internal noise levels are assessed with windows closed but with any façade openings used for ventilation purposes in their open position (trickle ventilators). Finally, and with reference to ventilation ProPG at paragraph 2.35 states that "internal noise level guidance are generally not applicable under purge ventilation conditions".

5.0 Survey Details

5.1 Survey Times and Personnel

The noise survey, to evaluate the existing noise climate in the vicinity of 16 King Street was undertaken between Sunday 11th and Tuesday 13th October. The Sound level meter was left in proposed flat 2 lounge area from 11am on Sunday until 10am Tuesday. This time frame was chosen as the key noise contributors are from King Street traffic noise which will be at a peak during typical 'business hours' for the nearby industrial premises. As ascertained in section 3.0 above, these units open from 7am on Monday and operate through the weekday closing at 5pm. The time frame selected will gauge the noise impact from these non-domestic noise sources. In addition, the typical weekend noise levels for the area will be established. There are no nearby pubs/bars/cafes therefore the time frame selected should be representative.

5.2 Weather

Throughout the existing noise climate surveys, the weather conditions were as follows:

Sunday 11th October 2026

All surfaces were dry, cloud cover was 4/8, the temperature was approximately 8-15°C, the wind speed was light and variable.

Monday 12th October 2026

Mild conditions with light rain, cloud cover was 6/8, the temperature was between14 and 18°C, the wind speed was light and variable.

Tuesday 13th October 2026

Mild conditions with light rain, cloud cover was 6/8, the temperature was between 14 and 18°C, the wind speed was light and variable.

5.3 Equipment

All the noise surveys and measurements were conducted using the equipment detailed in table 3 below. The sound level meter was field calibrated before and after the survey. No significant deviation in the calibrated level was observed.

Table 3. Equipment used during the existing noise climate surveys

Equipment description	Manufacturer	Model number	Serial number
Acoustic calibrator	Larson Davis	CAL200	31522
Sound level meter	Norsonic	NOR140	A2A-10232-E
Microphone	Norsonic	NOR-1209	8636

5.4 Measurement Procedure

An initial walk-over assessment of the site confirmed that the principal contributor to the existing noise climate was road traffic on King Street along with the industrial unit to the North and East of the property.

In the measurement position the sound level meter microphone was mounted on a tripod which was itself located in the proposed flat 2 lounge on the ground floor approximately 2 metres from the windows as well as approximately 1.5 metres above floor level and at least 1.6m from all internal walls and surfaces. During all surveying the measurement time interval was 15 minutes, all measurements were made with the 'fast' time weighting engaged. These have then been logarithmically averaged per hour which is displayed below.
Windows were left ajar for the duration of the survey in order to allow what could be deemed as an appropriate quantity of ventilation through the plot.

6.0 Noise Survey Results

6.1 Results

The measured noise levels from the measurement position are presented in tables 5 - 7 below and overleaf. The tables also contain an indication of any significant noise events that may have affected the measured levels during each measurement period.

Table 4. Daytime Internal noise levels – proposed flat 2 lounge – 11.10.26 – 11.00-23.00

Location	Start time	dB L_{Aeq}, (60 minutes)
Proposed flat 2 lounge	11:00	34
Proposed flat 2 lounge	12:00	31
Proposed flat 2 lounge	13:00	28
Proposed flat 2 lounge	14:00	30
Proposed flat 2 lounge	15:00	31
Proposed flat 2 lounge	16:00	28
Proposed flat 2 lounge	17:00	31
Proposed flat 2 lounge	18:00	29
Proposed flat 2 lounge	19:00	26
Proposed flat 2 lounge	20:00	25
Proposed flat 2 lounge	21:00	24
Proposed flat 2 lounge	22:00	23
Mean noise level $L_{Aeq\ 16\ hour}$		**28**

Table 5. Night-time Internal noise levels - proposed flat 2 lounge – 11.10.26-12.10.26 – 23.00-07.00

Location	Start time	dB $L_{Aeq,}$ (60 minutes)	dB $L_{Amax,}$ (60 minutes)
Proposed flat 2 lounge	23:00	21	42
Proposed flat 2 lounge	00:00	19	31
Proposed flat 2 lounge	01:00	18	47
Proposed flat 2 lounge	02:00	21	45
Proposed flat 2 lounge	03:00	23	45
Proposed flat 2 lounge	04:00	21	42
Proposed flat 2 lounge	05:00	27	41
Proposed flat 2 lounge	06:00	28	44
Mean noise level $L_{Aeq\ 8\ hour}$ / $L_{Amax\ 8\ hour}$		**24**	**44**

Table 6. Daytime Internal noise levels – proposed flat 2 lounge – 12.10.26 – 07.00-23.00

Location	Start time	dB $L_{Aeq,}$ (60 minutes)
Proposed flat 2 lounge	07:00	33
Proposed flat 2 lounge	08:00	33
Proposed flat 2 lounge	09:00	31
Proposed flat 2 lounge	10:00	33
Proposed flat 2 lounge	11:00	30
Proposed flat 2 lounge	12:00	34
Proposed flat 2 lounge	13:00	31
Proposed flat 2 lounge	14:00	33
Proposed flat 2 lounge	15:00	32
Proposed flat 2 lounge	16:00	30
Proposed flat 2 lounge	17:00	32
Proposed flat 2 lounge	18:00	29
Proposed flat 2 lounge	19:00	32
Proposed flat 2 lounge	20:00	25
Proposed flat 2 lounge	21:00	24
Proposed flat 2 lounge	22:00	24
Mean noise level $L_{Aeq\ 16\ hour}$		**31**

Table 7. Night-time Internal noise levels - proposed flat 2 lounge – 12.10.26-13.10.26– 23.00-07.00

Location	Start time	dB $L_{Aeq,}$ (60 minutes)	dB $L_{Amax,}$ (60 minutes)
Proposed flat 2 lounge	23:00	22	43
Proposed flat 2 lounge	00:00	24	48
Proposed flat 2 lounge	01:00	30	56
Proposed flat 2 lounge	02:00	24	46
Proposed flat 2 lounge	03:00	23	48
Proposed flat 2 lounge	04:00	26	49
Proposed flat 2 lounge	05:00	27	48
Proposed flat 2 lounge	06:00	32	56
Mean noise level $L_{Aeq\ 8\ hour}$ / $L_{Amax\ 8\ hour}$		**28**	**51**

Table 8. Daytime Internal noise levels – proposed flat 2 lounge – 13.10.26 – 07.00-11.00

Location	Start time	dB $L_{Aeq,}$ (60 minutes)
Proposed flat 2 lounge	07:00	33
Proposed flat 2 lounge	08:00	35
Proposed flat 2 lounge	09:00	31
Proposed flat 2 lounge	10:00	31
Mean noise level $L_{Aeq\ 16\ hour}$		**33**

7.0 Noise Transmission Calculations

Using the measured noise levels from the existing noise climate surveys, calculations have been performed to assess the likely internal noise levels within the permitted flats. All the assessments have been conducted with reference to the design guidance detailed in sections above.

The subsequent assessment of the potential internal noise levels within the permitted flats have been undertaken using the highest measured levels from the noise surveys. Consequently, the following assessments may be regarded as worst case situations which are unlikely to persist for all but short periods of time.

Table 9. Highest measured noise levels

OBCF, Hz*	63	125	250	500	1k	2k	4k	8k	Overall, dB(A)
Day time, L_{Aeq}, (12:15 – 12:30 hours) 12.10.26	46	39	33	31	30	31	30	18	**37**
Night time, L_{Aeq}, (06:45 - 07:00 hours) 13.10.26	46	41	35	34	31	27	23	17	**36**

The sound insulation provided by the building envelope is calculated from the sound insulation provided by the various façade elements, such as the glazing, external walls etc. and the areas they cover. In the majority of cases, it is the glazing that can be considered as the 'weak' link acoustically, therefore increasing the sound insulation of the glazing will improve the overall sound insulation of the façade. The result of the calculations is a composite sound insulation value for the whole façade.

The assessments contained within the subsequent sections of this assessment report have been undertaken according to drawings issued by Design Studio Architects of Upper King Street, Leicester. To facilitate the calculations to be made the following assumptions have been used:

- The reverberation times within the habitable rooms will be 0.5 seconds.
- The floor to ceiling height will be between approximately 2.1 - 2.4 metres.

For the purposes of the subsequent assessments a ventilation strategy adopting a 'passive' type system incorporating background ventilators, similar to a system 1 ventilation strategy, with intermittent local mechanical extract ventilation (MEV) being provided in areas of potentially high humidity, will be employed. In all cases the assessments have been undertaken assuming the windows were closed but the ventilation openings were open, as per the guidance contained within the ProPG document.

7.1 Construction Specification

The building envelope constructional details described below and overleaf have been assumed for the purposes of the subsequent calculations.

External Walls

The external walls of the existing building are of solid masonry construction around 250 - 275mm thick. Test results for a similar construction suggest that external walls of this type should provide an overall sound insulation of around R_w 50dB, with the octave band sound insulation values being as detailed in table 10.

Table 10. External Solid Masonry Wall, Octave Band Sound Insulation Values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, R_w dB(A)
Sound Insulation, dB	36	41	45	49	57	61	50

* Octave Band Centre Frequency

Glazing

The proposed glazing to the flats will be of the sealed unit type and will be of the following nominal specifications: 4mm pane - 16/20mm cavity - 4mm pane and 6mm pane - 16/20mm cavity - 6.8mm pane (SS specification). Laboratory test data obtained from Pilkington and Saint Gobain Glass indicate that these configurations should provide sound insulation values of 31and 39dB R_w. The octave band sound insulation values are as detailed in table 11 below.

Alternative glazing configurations would be acceptable providing the sound insulation performances are at least equivalent to the specifications detailed in the table below.

Table 11. Glazing, octave band sound insulation values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, R_w (+ C_{tr}) dB(A)
4mm, 6 - 20mm, 4mm	24	20	25	35	38	35	**31 (- 6)**
6mm - 16/20mm - 6.8mm SS.	23	25	36	46	49	56	**39 (- 6)**

* Octave Band Centre Frequency

Ventilation

As previously stated, a passive ventilation strategy has been adopted for the proposed rooms. In this respect background ventilation provision in compliance with the requirements of Approved Document F, will be provided by window frame mounted ventilators of the Titan V75/C50 and V75/C75 types. Units offering equivalent sound insulation performance would be acceptable. It is also anticipated that local mechanical extract ventilation (MEV) is provided in areas of high humidity and wet rooms.

Laboratory test data indicates that the specified window frame mounted ventilators should provide a sound insulation values of 42 and 44dB $D_{n,e,w}$ respectively in their open positions. The octave band sound insulation values for the selected window frame mounted ventilators are detailed in table 12 below. Alternative ventilator configurations would be acceptable providing the sound insulation performance is at least equivalent to the specification detailed in table 11 below.

Table 12. Background ventilation, octave band sound insulation values

OBCF, Hz*	125	250	500	1k	2k	4k	Overall, $D_{n,e,w}$ dB
Titan V75/C50	40	37	34	43	50	53	**42**
Titan V75/C75	37	37	36	47	49	55	**44**

* Octave Band Centre Frequency

7.2 Calculation Results

For the purposes of the calculations the highest measured noise levels detailed in table 9 were used. As appropriate the obtained noise levels were distance corrected to account for any variations in distance between the primary noise source, King Road, and the various façades of the flats.

The results of the break-in noise calculations for the windows closed but ventilators open condition are presented, with reference to the design guidance contained within section 4.0 above, in table 13 below. With respect to the presentation of the results the calculations relating to the night time L_{Aeq} and L_{Amax} results are presented in the same columns with the L_{Amax} results being contained in brackets.

Table 13. Calculated internal noise levels, flat 2

Location	Design target, daytime, dB L_{Aeq}	Calculated level, daytime, dB L_{Aeq}	Design target, night time, dB L_{Aeq}	Calculated levels, night time, dB L_{Aeq} and (L_{Amax})
Flat 2 lounge/bedroom	35	**25**	30 (45)	**22 (43)**

* 6mm - 16/20mm - 6.8mm SS glazing/Titan V75/C75 ventilation

As can be seen from table 13 the calculated internal noise levels within the permitted flats, resulting from external noise break-in, would not exceed the design guidance contained within section 4 above. Consequently, it is contended that the proposed glazing and ventilation provisions detailed above, would be sufficient to ensure the establishment of acceptable internal acoustic conditions within the proposed flats.

8.0 Conclusion

On review of the measurements recorded from tables 4-8, we can see that the existing noise climate is low. All measurements recorded demonstrate compliance with the planning conditions will be achieved. The existing day and night LAeq, t values met the requirements already. Improvements to the glazing and external walls will only improve this further.

Night time noise levels fell well below the maximum bedroom levels of 30dB on all bar one of the night time measurements.

Notably the L_{Amax} levels are above the requirements for night time measurements during the week (Monday night) exceeding the limit by 11dB on multiple occasions. The proposed build ups will reduce the number of excessive peaks sufficiently to mee the relevant requirements.

The ventilation systems to be used will be located in wet rooms only so therefore should not increase the noise levels within living rooms and bedrooms. Trickle ventilators noted above are assumed as open permanently to allow for sufficient air through flow. The window during testing was also slightly open to allow for through flow of air.