



MR R DHIR

REDEVELOPMENT OF THE PHEASANT INN
110 CHESTERFIELD ROAD S, MANSFIELD, NG19 7AP

NOISE ASSESSMENT


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SECTION 1 INTRODUCTION

- 1.1 RP Acoustics Ltd (RPA) has been commissioned by Mr R Dhir to undertake a noise assessment for the redevelopment of the Pheasant Inn, 110 Chesterfield Road S, Mansfield, NG19 7AP (the application site). The development proposals consist of a commercial unit at ground floor level (Use Class E), with four apartments on the upper floors.
- 1.2 The objectives of the assessment were to:
- i.* Determine the ambient noise climate at the application site during representative periods of the daytime and night time.
 - ii.* Assess the potential impact of the noise climate on the proposed residential element of the development with reference to pertinent guidelines.
 - iii.* Provide recommendations for a scheme of sound attenuation works, as necessary, such that that future occupants of the proposed residential element of the development do not experience an unacceptable loss of amenity due to noise. Attenuation works include (i) glazing and ventilation specifications, (ii) the acoustic specification for the separating floor between the ground floor commercial use and first floor residential use, and (iii) limiting noise levels for any external plant associated with the ground floor commercial use.
- 1.3 This report has been prepared to accompany a full planning application to be submitted for the redevelopment of the site. It details the methodology and results of the assessment, together with recommendations for the control of noise.
- 1.4 This report has been prepared for Mr R Dhir and his agent, AK Innovative Design Solution, for the sole purpose described above, with no extended duty of care to any third party implied or offered.
- 1.5 A glossary of acoustics terms used in the main body of the text is contained in Appendix 1.

SECTION 2 SITE SETTING AND DEVELOPMENT PROPOSALS

2.1 SITE SETTING

- 2.1.1 The application site is located to the north west of the centre of Mansfield. An annotated aerial image of the site and its environs is contained in Appendix 2.1. The application site is bound by:
- i.* Chesterfield Road S to the south west.
 - ii.* A grassed area to the north west.
 - iii.* Residential dwellings to the north east.
 - iv.* Pheasant Hill to the south east, with an auto service centre (Mr Tyre Ltd) beyond.
- 2.1.2 During the course of the noise survey, Chesterfield Road S was noted to be heavily trafficked (circa 1200 vehicles/hour based on a manual traffic count at 12:35 hours) and was noted to be the dominant noise source during both the daytime and night time periods. The auto service centre was operating



during the course of the daytime noise survey, but no significant noise sources were audible over the road traffic noise. Opening hours are understood to be 08:30 to 17:30 hours Monday to Friday and 08:30 to 16:00 hours Saturday.

2.2 DEVELOPMENT PROPOSALS

2.2.1 The development proposals consist of the conversion of the existing building to form a commercial unit at ground floor level (Use Class E) with residential units at 1st and 2nd floor level. Proposed internal layout plans are contained in Appendix 2.2.

2.2.2 With reference to the proposed layout plans, it can be seen that bedrooms are located on the Chesterfield Road S façade and a kitchen/living room on the Pheasant Hill façade at 1st floor level and a bedroom, lounge and kitchen/living room on the Chesterfield Road S façade at 2nd floor level (no windows on the Pheasant Hill façade).

SECTION 3 ENVIRONMENTAL NOISE SURVEY

3.1 In order to assess the ambient noise climate at the site and obtain design data for a sound attenuation scheme, baseline noise surveys were undertaken between 10:16 hours on Thursday 15th December and 12:12 hours on Friday 16th December 2022. For the purpose of the assessment, the following monitoring positions (MPs) were used (note: 1st floor measurements were undertaken by extending a boom through a window):

- i.* MP1 (short term) was located at 1 metre from the north western façade, overlooking the car parking area, at 1.5 metres above ground level (mAGL) in a reflective field environment.
- ii.* MP2 (short term) was located at 1 metre from the north eastern façade, at first floor level, in a reflective field environment.
- iii.* MP3 (short term) was located at 1 metre from the south eastern façade, overlooking Pheasant Hill and the auto service centre, at first floor level, in a reflective field environment.
- iv.* MP4 (long term) was located at 1 metre from the south western façade, overlooking Chesterfield Road S, at first floor level, in a reflective field environment.

3.2 The approximate location of the monitoring positions is identified on the annotated aerial image contained in Appendix 2.1.

3.3 Noise measurements were undertaken using a Nti Audio XL2 Type 1 integrating sound level meter. A 90 mm windshield was fitted for all measurements. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end. No drift in calibration level was noted. Weather conditions throughout the survey were appropriate for monitoring.

3.4 Measurements consisted of A-weighted broadband parameters, together with linear third octave band Leq levels, with a logging interval of 1 second. The long term survey at MP4 was predominantly unmanned, with full audio recording undertaken. Measurement data was post-processed using Nti Audio Data Explorer software.



3.5 The following table contains a summary of the noise measurement data, rounded to the nearest decibel. The tabulated measurements have been corrected for façade enhancement and, as such, represent free field (incident) noise levels.

Table 3.1: Summary of Noise Measurement Data

MP	Date	Time	L _{Aeq,T} (dB)	L _{AFmax} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)	Comments
MP1	15/12/22	10:16-10:36	58	67	61	50	Road traffic, Chesterfield Road S.
MP2	15/12/22	11:01-11:18	52	58	55	47	Screened road traffic, Chesterfield Road S.
MP3	15/12/22	11:23-12:23	63	77	66	50	Road traffic, Chesterfield Road S. Auto service centre operational.
MP3	15-16/12/22	12:31-23:00 07:00-12:12	68	81	71	56	Road traffic, Chesterfield Road S.
MP3	15-16/12/22	23:00-07:00	62	79*	67	37	Road traffic, Chesterfield Road S.

* 10th highest night time L_{AFmax}

3.6 During both the daytime and night time periods, traffic noise was noted to be the main noise source.

SECTION 4 ASSESSMENT CRITERIA

4.1 NATIONAL PLANNING POLICY FRAMEWORK

4.1.1 The National Planning Policy Framework (NPPF) is a material consideration in planning decisions. At the heart of the NPPF is a presumption in favour of sustainable development, and the policies in Paragraphs 18 to 219 of the NPPF, taken as a whole, constitute the Government's view on what sustainable development in England means in practice for the planning system.

4.1.2 The NPPF states that there are three dimensions to sustainable development, which include an economic role (contributing to building a strong, responsive and competitive economy), a social role (providing the supply of housing required to meet the needs of present and future generations) and an environmental role (which includes minimising waste and pollution).

4.1.3 The main policy statement in relation to noise is Paragraph 123 of the NPPF, which states:

Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*



- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

4.1.4 In relation to 'adverse impacts', the NPPF refers to the Explanatory Note to the Noise Policy Statement for England (NPSE) for guidance.

4.1.5 The Noise Policy Statement for England (NPSE) and associated Explanatory Note were published by DEFRA in 2010 and set out the Government's noise management strategy to enable noise management decisions to be made within the wider context (i.e. guiding principles of sustainable development), in a cost-effective manner and in a timely fashion.

4.1.6 Fundamental to this approach is *'there is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors'*.

4.1.7 The noise policy aims of NPSE are to (i) avoid significant adverse impact on health and quality of life, (ii) mitigate and minimise adverse impacts on health and quality of life, and (iii) where possible, contribute to the improvement of health and quality of life. The policy aims are always to be considered within the context of the Government's policy on sustainable development.

4.1.8 In relation to the mitigation and minimisation of adverse impacts, NPSE considers that *'in reality, although not always stated, the aim has tended to be to minimise noise 'as far as is reasonably practical'*. This is reinforced in Paragraph 2.24 of the Explanatory Note, which requires that *'all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur'*.

4.1.9 In relation to explaining the 'significant adverse' and 'adverse' effects quoted in the NPPF, NPSE uses the two established concepts from toxicology that are currently being applied to noise impacts, for example by the World Health Organisation (WHO), these are:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

4.1.10 The NPSE then extends these concepts to lead to a SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.



4.1.11 No specific criteria are presented in the NPSE, to provide the necessary policy flexibility until further evidence and suitable guidance is available. In lieu of specific criteria, for this assessment, RPA makes reference to existing guideline documents, which are summarised in the following paragraph(s).

4.2 NATIONAL PLANNING PRACTICE GUIDANCE: NOISE

4.2.1 Guidance provided in the National Planning Practice Guidance (NPPG) for noise, presents a table of noise exposure hierarchy, which relates the NOEL, LOAEL and SOAEL levels to the subjective perception of noise and examples of outcomes (reproduced in Table 4.1 below).

Table 4.1: Summary of Noise Exposure Hierarchy (from NPPG, Noise)

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 Adverse 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

4.2.2 When considering the factors that influence whether noise could be a concern, the NPPG considers that *'the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected'*. This includes factors such as the source and absolute level of the noise, the time of day it occurs, the number of noise events and the frequency and pattern of occurrence.



4.3 BS 8233:2014

4.3.1 BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ (BS 8233) sets guideline indoor ambient noise levels for dwellings, for steady external noise sources, which it is desirable are not exceeded. These levels are reproduced in Table 4.2 and are based on guidelines issued by the World Health Organisation (WHO). The Standard also states that where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

4.3.2 The Standard considers that for regular individual noise events, a guideline value may be set in terms of SEL or L_{AFmax} depending on the character and number of events per night. The WHO Guidelines on Community Noise, 1999 (WHO Guidelines) considers that if negative effects on sleep are to be avoided, noise events exceeding 45 dB L_{Amax} should be limited. ProPG: Planning & Noise (Note 4 to Figure 2) considers ‘Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night.’

4.3.3 Note 5 to Figure 2 of ProPG: Planning & Noise states ‘...Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however, any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded,....’

Table 4.2: Indoor Ambient Noise Levels in Dwellings (as recommended in BS 8233:2014)

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

4.3.4 With reference to the above guidelines, by definition, ‘reasonable internal conditions’ cannot represent a significant adverse impact (the prevention of which is the 1st aim of NPSE). With cognisance to the 2nd aim of NPSE (to minimise noise impact), the internal ambient noise levels detailed in Table 4.2 are considered appropriate.



4.3.5 On the basis of the above, for road traffic noise sources, the following design criteria are considered to be in keeping with the aims of the NPPF:

- i. Living rooms and bedrooms ≤ 35 dB L_{Aeq} (07:00–23:00)
- ii. Bedrooms ≤ 30 dB L_{Aeq} (23:00–07:00)
- iii. 45 dB L_{AFmax} not normally exceeded in bedrooms at night (based on 10th highest level).

4.4 BRITISH STANDARD BS 4142:2014 + A1:2019

4.4.1 British Standard BS 4142:2014+A1:2019 '*Methods for Rating and Assessing Industrial and Commercial Sound*' (BS 4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in BS 4142 use outdoor sound levels to assess the likely effects of sound on people for the purposes of (i) investigating complaints, (ii) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature, and (iii) assessing sound at proposed new dwellings or premises used for residential purposes.

4.4.2 BS 4142 considers that the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. It goes on to suggest that:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB 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 or a significant 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, depending on the context.

4.4.3 Where the initial estimate of the impact needs to be modified due to the context, factors to be taken into account include the absolute level of sound and whether dwellings will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

4.4.4 The rating level is described as the specific sound level (L_s - the equivalent continuous A weighted sound pressure level at the assessment position produced by the specific sound source over the given reference time interval) plus any adjustment for the characteristic features of the sound. The character correction relates to whether and to what degree the specific sound is assessed to have an element of tonality, impulsivity and/or characteristics that are readily distinctive against the residual acoustic environment.

4.4.5 The background sound level is the A-weighted sound pressure level of the residual sound at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting 'F' and quoted to the nearest whole number of decibels. The residual sound is described



as the ambient sound remaining in a given position in a given situation when the specific sound source is suppressed to a degree such that it does not contribute to the ambient sound.

SECTION 5 SOUND ATTENUATION SCHEME PROPOSALS – ENVIRONMENTAL NOISE

5.1 INTRODUCTION

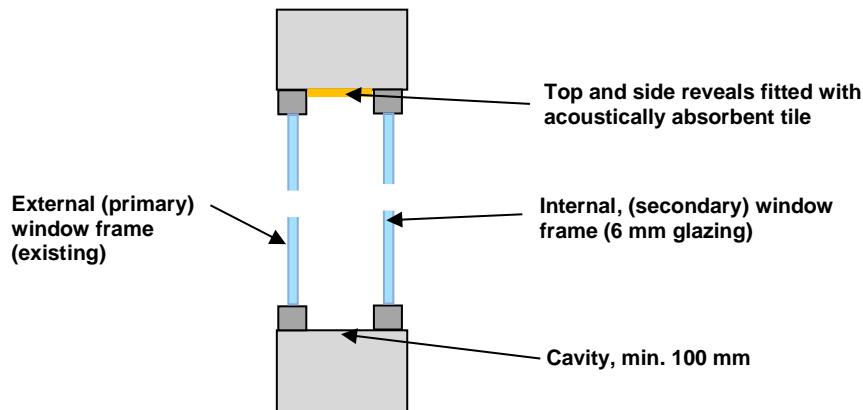
- 5.1.1 The sound attenuation scheme proposals are based on the design criteria detailed in Para. 4.3.5 and the proposed layout contained in Appendix 2.2. Should layout changes be considered, RPA should be consulted as to the potential impact on the sound attenuation scheme.
- 5.1.2 In order to calculate the sound insulation requirements of the building envelope for habitable rooms throughout the development, the Building Research Establishment (BRE) building envelope insulation calculation spreadsheet was used. This spreadsheet is based on the calculation methodology advocated in BS 8233. The spreadsheet allows input of external noise levels, room dimensions and reverberation time together with parameters for the various elements of the building envelope and calculates the internal noise level in terms of the external noise level metric (L_{Aeq} and L_{AFmax} in this case). Calculations were based on dimensions taken off plan.
- 5.1.3 Based on the BRE spreadsheet, the sound insulation to road traffic provided by standard double glazed windows with standard trickle vents in a masonry façade is of the order of 27 dB(A).
- 5.1.4 The ventilation recommendations relate to the sound insulation scheme only and the developer should ensure compliance with the ventilation requirements of the Building Regulations.
- 5.1.5 The sound attenuation scheme proposals detailed below are summarized on the annotated layout plans contained in Appendix 2.2.

5.2 HABITABLE ROOMS ON THE SOUTH WESTERN, SOUTH EASTERN AND NORTH WESTERN FAÇADES

- 5.2.1 Where the existing glazing is to be replaced, habitable rooms on the south western, south eastern and north western façades (i.e. exposed to road traffic noise) should be fitted with glazing rated at ≥ 32 dB $R_w + C_{tr}$, such as a generic 10 mm float glass (16-20 mm air gap) 6 mm float glass double glazing configuration. Acoustic trickle vents should be provided that have a vent open $D_{n,e,w} + C_{tr}$ of ≥ 38 dB per 5000 mm² EA (e.g. Greenwood 5000EAW.AC2, or equivalent).
- 5.2.2 Where the existing glazing is to be retained, a secondary glazing system with the following specification is recommended (typical section shown in Figure 5.1):
- i.* Primary (external) unit consisting of the existing windows made good.
 - ii.* Cavity between frames of min. 100 mm. Top and side reveals to be lined with acoustically absorbent tile.
 - iii.* Secondary (internal) unit consisting of horizontal or vertical sliding frame fitted with 6 mm glazing.

5.2.3 The weighted sound reduction index of this system is circa 38 dB $R_w + C_{tr}$. Ventilation requirements are detailed in Section 5.4.

Figure 5.1: Typical Section Through Secondary Glazing System (not to scale)



5.2.4 Roof constructions are commonly weak acoustically. It is recommended that sloped ceilings to the 2nd floor habitable rooms on the south western roof pitch are lined with two layers of dense 12.5 mm plasterboard with staggered joints (e.g. British Gypsum SoundBloc or Fireline board or equivalent).

5.3 HABITABLE ROOMS ON THE NORTH EASTERN FAÇADE

5.3.1 Habitable rooms on the north eastern (rear) façade should be fitted with standard thermal double glazing and standard trickle vents (or the existing glazing retained and made good).

5.4 VENTILATION REQUIREMENTS

5.4.1 Where an enhanced glazing system is proposed, in order to provide whole house ventilation, the use of some form of assisted (mechanical) ventilation is recommended.

5.4.2 Mechanical ventilation requires either an individual room system or a 'whole house' ducted system. The choice of system is, however, primarily dependant on the ventilation requirements of the development.

5.4.3 Appropriate ventilation solutions include:

- i.* A fully ducted mechanical ventilation system with heat recovery (MVHR).
- ii.* A System 3 mechanical extract ventilation (MEV) system (make-up air provided by natural façade leakage where secondary glazing fitted).
- iii.* A whole house positive input ventilation (PIV) system.
- iv.* An individual room ventilator, such as the Titon Sonair unit (or equivalent).



SECTION 6 SOUND ATTENUATION SCHEME PROPOSALS – SEPARATING FLOOR

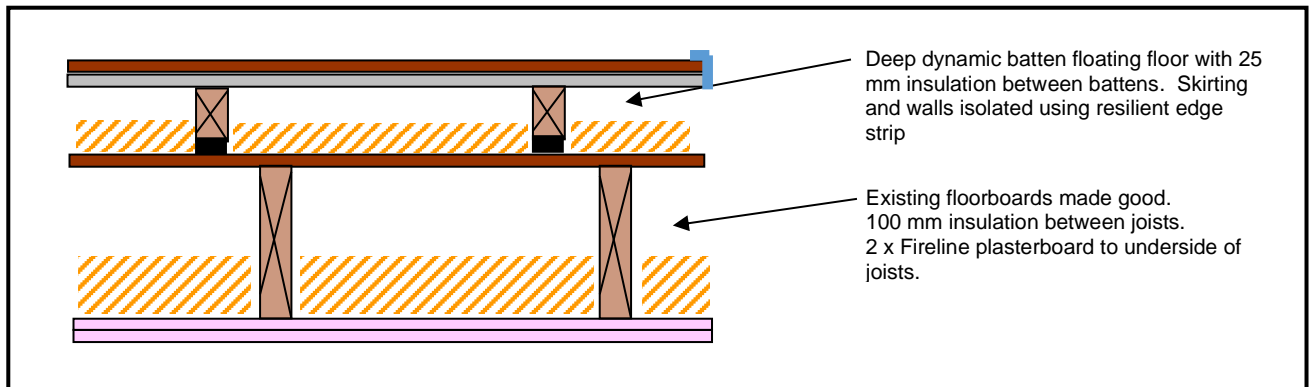
- 6.1 In relation to the sound insulation performance of separating elements between spaces used for normal domestic purposes and non-domestic purposes, Approved Document E 2003 (as amended) (ADE 2003) to the Building Regulations states ‘a higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required, and if so, to determine the appropriate level.’ In this respect, RPA is a specialist acoustic consultancy.
- 6.2 An airborne sound insulation performance of $D_{nT,w} + C_{tr} \geq 48$ dB is considered appropriate for the separating floor between the ground floor commercial unit (Use Class E) and overlying residential use and is 5 dB in excess of the minimum airborne sound insulation required by ADE 2003 (normal domestic purposes) for a material change of use.
- 6.3 Following an inspection of the building, it was noted that there are a number of steps between spaces at both ground and 1st floor, so floor levels vary across the building footprint, as do floor to ceiling heights. It was also noted that the existing floor between the ground and 1st floors is a standard timber joist floor with tongue & groove floorboards and a lath and plaster ceiling (ceiling stripped out in some areas).
- 6.4 The upgrade of the existing floor to the required standard can be undertaken by upgrading the floor at 1st floor level or the ceiling at ground floor level. Given the variation in floor levels and floor to ceiling heights, both options are detailed in the report as it is anticipated that a combination of the two approaches will be required.

Dynamic Batten Floating Floor (1st Floor Treatment)

- 6.5 The upgrade (see Figure 6.1) consists of the installation of a deep dynamic batten floating floor at 1st floor level, as follows:
- Floorboards should be in good repair, and all gaps in the existing floorboards and at the perimeter wall junctions should be sealed with flexible sealant (if in poor condition, overlay with a 6 mm plywood layer). Where floorboards are replaced, 18 mm or 22 mm t&g chipboard should be used.
 - On top of the existing floorboards install 75 mm resilient composite battens with a resilient layer pre-bonded to the battens (e.g. Isomass, Isocheck Deep Batten System, or equivalent).
 - Install a 25 mm unfaced mineral wool layer (min. density 24 kg/m³, e.g. Isover APR1200, or equivalent) between battens.
 - Overlay the batten system with a layer of 19 mm plasterboard plank and 18 mm tongue and groove chipboard (fixings must not penetrate the resilient strip of the batten).
 - Install 5 mm perimeter resilient edging strip to isolate the floating floor from all perimeter walls and skirting.

- Install 100 mm unfaced mineral wool layer (min. density 10 kg/m³ - Isover Spacesaver/Knauf Acoustic Roll, or equivalent, would be appropriate) between the existing timber joists.
- Underdraw the existing joists with two layers of 12.5 mm or 15 mm (depending on fire separation required) British Gypsum (BG) Fireline plasterboard (or equivalent) with staggered joints.

Figure 6.1: Dynamic Batten Separating Floor Construction



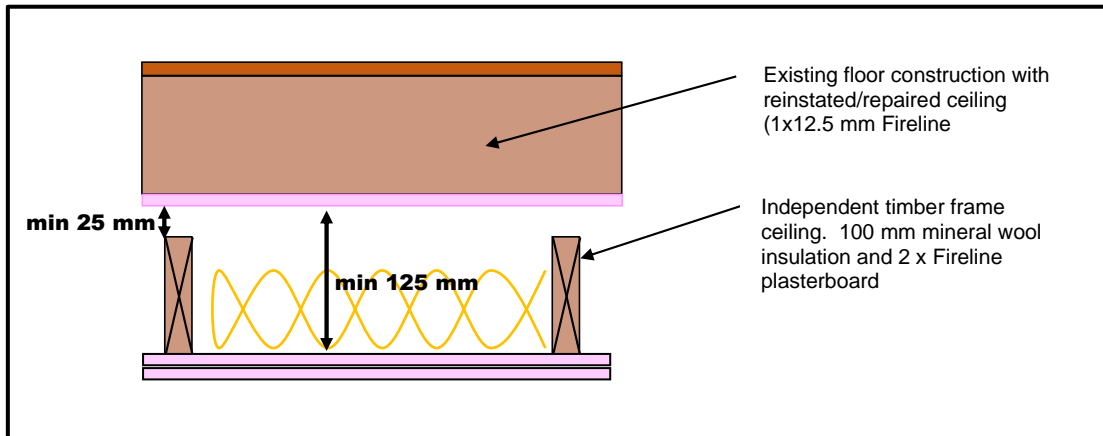
Independent Timber Joist Ceiling (Ground Floor Treatment)

6.6 The upgrade (see Figure 6.2) consists of the installation of an independent timber joist ceiling below the existing floor construction (new ceiling joists fixed to perimeter walls only) at ground floor level, as follows:

- Floorboards should be in good repair, and all gaps in the existing floorboards and at the perimeter wall junctions should be sealed with flexible sealant (if in poor condition, overlay with a 6 mm plywood layer). Where floorboards are replaced, 18 mm or 22 mm t&g chipboard should be used.
- Make good/reinstate the ceiling to the underside of the existing floor joists using one layer of 12.5 mm BG SoundBloc or FireLine plasterboard (or equivalent).
- The independent ceiling should consist of (i) two layers of 12.5 mm or 15 mm (depending on fire separation required) BG Fireline plasterboard (or equivalent) with staggered joints, (ii) an absorbent layer of mineral wool insulation laid on the ceiling, minimum thickness 100 mm, minimum density 10 kg/m³ (Isover Spacesaver/Knauf Acoustic Roll, or equivalent, would be appropriate).
- The ceiling should be supported by independent joists fixed only to the surrounding walls (if required for large spans, additional support may be provided by resilient hangers, such as Gypsum Acoustic Braces, or AH302 hangers by Arthur Hough, or equivalent, attached directly to the existing floor base).
- A clearance of at least 25 mm should be left between the top of the independent ceiling joists and the underside of the existing floor construction.
- It should be noted that this construction involves a separation of at least 125 mm between the upper surface of the independent ceiling and the underside of the existing floor construction

(i.e. overall thickness, including new ceiling plasterboard, of 150 mm for 12.5 mm boards). However, structural considerations determining the size of ceiling joists will often result in greater separation. A pelmet detail may be required at the head of ground floor glazing units.

Figure 6.2: Independent Timber Joist Ceiling



SECTION 7 SOUND ATTENUATION SCHEME PROPOSALS – PLANT NOISE

- 7.1 Details of any externally located plant/louvres servicing the ground floor unit are not currently available. As such, and based on the requirements of BS 4142, it is considered appropriate that the design/specification of external plant is based on the premise that the cumulative rating level ($L_{Ar,T}$) does not exceed the representative background noise level ($L_{A90,T}$) when measured as a free field level at the nearest noise sensitive receptor.
- 7.2 Typical background noise levels are contained in Table 7.1 to provide an initial assessment point when considering the suitability of plant and required attenuation measures.

Table 7.1: Typical Background Noise Levels

Period	Time	Background noise level, $L_{A90,T}$ (dB)
Daytime	07:00-23:00	47
Night	23:00-07:00	37



SECTION 8 CONCLUSIONS

- 8.1 An assessment has been undertaken of the potential impact of noise associated with the proposed redevelopment of the Pheasant Inn, Chesterfield Road S, Mansfield, NG19 7AP. The development proposals consist of a commercial unit at ground floor level (Use Class E) with residential units on the upper floors.
- 8.2 The assessment has considered (i) glazing and ventilation specifications in the residential units to control environmental noise, (ii) the acoustic specification for the separating floor between the ground floor commercial use and first floor residential use, and (iii) limiting noise levels for any external plant associated with the ground floor commercial use.
- 8.3 On the basis of the sound attenuation scheme proposals, noise is not considered to represent a constraint to the development of the site.



APPENDIX 1 ▪ Glossary of acoustic terms

Appendix 1 Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

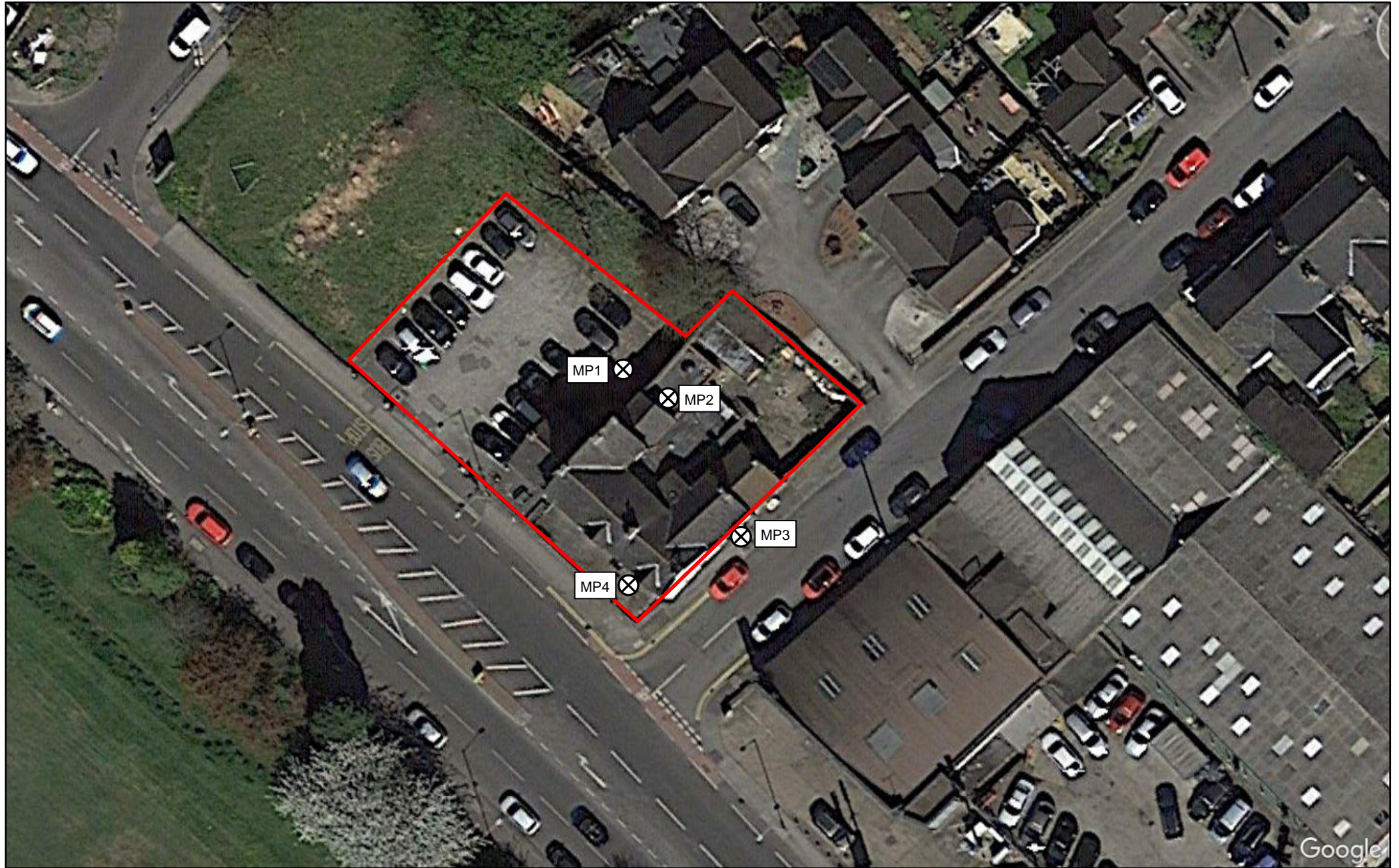
Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.



APPENDIX 2 ▪ Annotated aerial site image and proposed layout plans

Appendix 2.1: Annotated Aerial Site Image



Appendix 2.2: Proposed Layout Plans

Legend:

- Floor/ceiling treatment
- Enhanced glazing and ventilation. See Para. 5.2 & 5.4.
- Standard glazing and ventilation. See Para 5.3.

