NOISE IMPACT ASSESSMENT



# 10 Grinstead Lane Lancing West Sussex BN15 9DY

**20th October 2022**

**ISSUE 01**

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| Author | Date | Checked | Date | Description |
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This report has been compiled by Deane Austin Ltd (DAA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles. Information contained in this document contains confidential and commercially sensitive information and shall not be disclosed to third parties.

## 1.0 INTRODUCTION

DAA Group has been appointed to carry out a Noise Impact Assessment at 10 Grinstead Lane Lancing West Sussex BN15 9DY to support Planning Application Ref: AWDM/1836/19 for the Demolition of existing bungalow and garage and construction of semi-detached pair of three bedroom houses to ensure it does not prejudice the amenities of any future occupants in accordance with:

- National Planning Policy Framework 2021 (NPPF)
- National Planning Practice Guidance (NPPG)
- Policies 15 and 34 of the Adur Local Plan

The purpose of the survey is to satisfy the below condition:

***"05. The development hereby permitted shall not be commenced until a scheme for protecting the proposed dwellings and outside amenity areas, at the rear of the Ref: AWDM/1836/19 property, from road traffic noise has been submitted to and approved in writing by the Local Planning Authority. The scheme shall follow the ProPG: Planning and Noise process and shall comply with the internal noise level guidelines set out in BS8233:2014 and night time Lmax noise levels. Where windows need to remain closed to achieve these internal noise guidelines then mechanical ventilation with heat recovery, MVHR, shall be provided. The scheme shall also try and achieve as far as reasonably practicable the WHO guidelines for external amenity areas. All works which form part of the agreed scheme shall be completed before the permitted dwellings is occupied."***

Using results of the noise survey, the sound insulation performance for the whole building envelope including glazing (windows) is assessed, and a scheme of noise mitigation measures is established and included in the report verified by BS8233:2014 rigorous method building envelope sound insulation calculations.

A scheme of noise mitigation measures in the report provides specification details as appropriate for sound insulation treatment to the separating walls and separating floors.

The technical content of this assessment has been provided by a Tech member of the Institute of Acoustics.

The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration

## 2.0 NOISE CRITERIA

### 2.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The Department for Communities and Local Government introduced the National Planning Policy Framework (NPPF) in March 2012. The latest revision of the NPPF is dated July 2021.

The NPPF sets out the Government's planning policies for England and how these are expected to be applied. It provides a framework where local Councils can produce their own local and neighbourhood plans which reflect the needs of their communities.

In conserving and enhancing the natural environment, the planning system should prevent both new and existing development from contributing to, or being put at, unacceptable risk from environmental factors including noise.

Planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development. Conditions may be used to mitigate and reduce noise to a minimum so that adverse impacts on health and quality of life are minimised. It must be recognised 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. Reference is made within NPPF to the Noise Policy Statement for England (NPSE) as published by DEFRA in March 2015

### 2.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The long-term vision of the NPSE is stated within the documents scope, to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development'. The policy aims are stated to:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

The application of NPSE should mean that noise is properly taken into account at the appropriate time (for example in planning applications or appeals) where it must be considered alongside other relevant issues. The guiding principles of Government policy on sustainable development should be used to assist in the implementation of the NPSE.

The NPSE should apply to all types of noise apart from occupational noise in the workplace. The types of noises defined in the NPSE includes:

- Environmental noise from transportation sources;
- Neighbourhood noise which includes noise arising from within the community; industrial premises, trade and business premises, construction sites and noise in the street

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- **NOEL – No Observed Effect Level**

o 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 the noise.

- **LOAEL – Lowest Observed Adverse Effect Level**

o This is the level above which adverse effects on health and quality of life can be detected.

**• SOAEL – Significant Observed Adverse Effect Level**
o This is the level above which significant adverse effects on health and quality of life occur.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

## 2.3 ProPG: PLANNING AND NOISE

As outlined above, the National Planning Policy Framework encourages improved standards of design, although it provides no specific noise levels which should be achieved on site for varying standards of acoustic acceptability, or a prescriptive method for the assessment of noise.
ProPG: Planning and Noise was published in May 2017 in order to encourage better acoustic design for new residential schemes in order to protect future residents from the harmful effects of noise. This guidance can be seen as the missing link between the current NPPF and its predecessor, PPG24 (Planning Policy Guidance 24: Planning and Noise), which provided a prescriptive method for assessing sites for residential development, but without the nuance of 'good acoustic design' as outlined in ProPG.
ProPG allows the assessor to take a holistic approach to consider the site's suitability, taking into consideration numerous design factors which previously may not have been considered alongside the noise level measured on site, for example the orientation of the building in relation to the main source of noise incident upon it.
It should be noted this document is not an official government code of practice, and neither replaces nor provides an authoritative interpretation of the law or government policy, and therefore should be seen as a good practice document only.

## 2.4 ACOUSTICS VENTILATION AND OVERHEATING

The AVO Guide includes:

- an explanation of ventilation requirements under the building regulations and as described in Approved Document F, along with typical ventilation strategies and associated noise considerations;
- an explanation of the overheating assessment methodology described in CIBSE TM59; potential acoustic criteria and guidance relating to different ventilation and overheating conditions, for both environmental noise ingress and building services noise;
- and a worked example of the application of the AVO Guide including indicative design solutions.

The AVO Guide is intended for the consideration of new residential development that will be exposed predominantly to airborne sound from transport sources, and to sound from mechanical services that are serving the dwellings in question. Although the policy coverage is limited to England, the approach may be applicable in other parts of the UK.

The AVO Guide is intended to contribute to the practice of good acoustic design, as emphasised in the Professional Practice Guidance on Planning and Noise (ProPG). In particular

## 2.5 BRITISH STANDARD BS 8233:2014

British Standard Code of Practice BS8233:2014 'Sound insulation and noise reduction for buildings' provides recommended guideline value for internal noise levels within dwellings which are similar in

scope to guideline values contained within the World Health Organisation Guidelines for Community Noise 1999 (WHO).

| Activity | Location | 07:00 to23:00 | 23:00 to 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 $L_{Aeq, 8hour}$ |

2.4.1 Indoor ambient noise levels for dwellings

The WHO guideline noise criteria set an internal sleep disturbance noise limit of 45dB LAmax,F which should not be exceeded on a regular basis.

## 3.0 SITE SURVEYS



### 3.1 SITE DESCRIPTION

The site is situated on Grinstead Lane (A2025). The area is predominately residential properties. The dominant noise source is road traffic noise from the surrounding roads (See Figure 3.1)

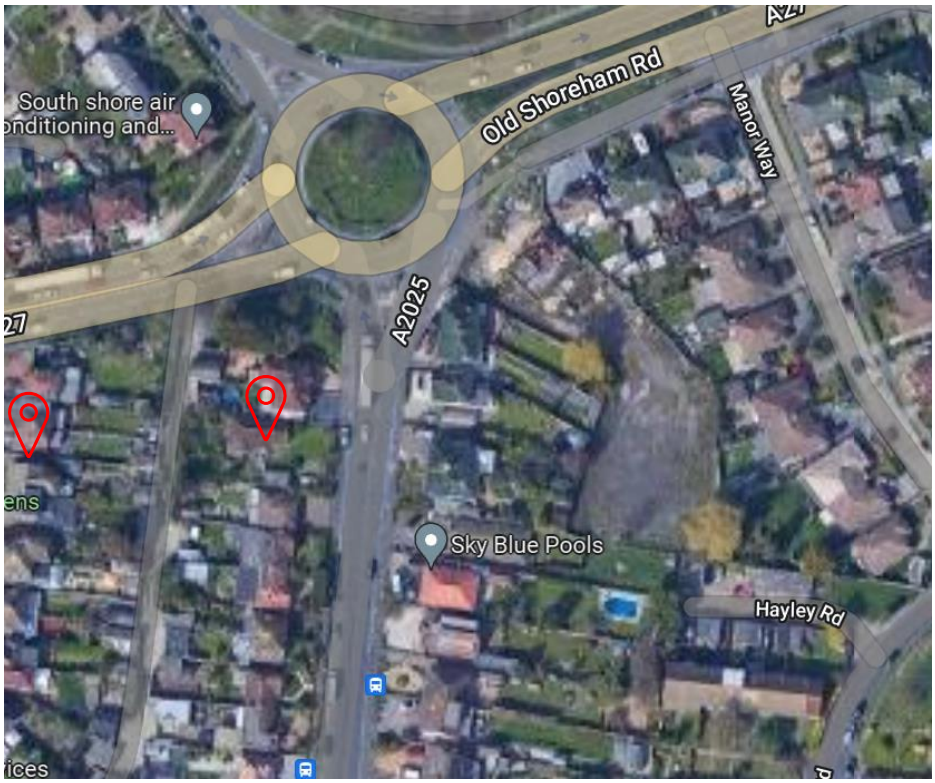



Figure 3.1 – Proposed Site

### 3.2 ENVIRONMENTAL SITE SURVEY PROCEDURE

Noise measurements were taken free field and logged between the 11th and 12th August 2022. The measurements were taken to establish the ambient sound level at the site, with respect to criteria of BS8233:2014.

The weather was suitable conditions to carry out the noise survey.

### 3.3 EQUIPMENT

| | |
|---|---|
| **Instrument manufacturer** | **Rion** |
| **Model** | **NA-28** |
| **Serial Number** | **00392485** |
| **Microphone Type** | **UC-59** |
| **Serial Number** | **14934** |
| **Calibrator** | **NC-74** |
| **Serial Number** | **34494274** |
| **Cirrus CK: 675 Outdoor Kit** | |

The calibration of the sound level meters was verified in-situ before any measurements were taken, using the handheld calibrator and reference tone of 114dB at 1kHz. Validation checks at the end of the survey indicated that all instruments had operated within permitted tolerances for drift and measured level.

Calibration certificates are available on request.

## 4.0 NOISE SURVEY

The following free-field sound levels have been derived for assessment of environmental noise break-in. It shall be noted that the data is 3dB below the information in Appendix A to equate from façade to free-field conditions.
A maximum value is provided for each night-time measurement period. Based on the World Health Organisation interpretation that for a noise to be regular it needs to occur several (i.e. more than two) times per hour; the LAmax(f) noise needs to be based upon an average of 10-15 events that are typical in nature. The aim of protecting against maximum noise levels is to ensure protection against typical intermittent noise levels rather than one-off events; whereby an arithmetic average of the 15 typical maximum events across each night period is used to determine values of dB LAmax(f) reported below. These have been summarised in table 4.1 and 4.2 below.

| Measurement Data | Free Field Sound Pressure Level dB | | |
|---|---|---|---|
| | 10 Grinstead Lane | | |
| Time | Average $L_{Aeq,T}$ | Maximum $L_{AMAX,(f)}$ | Lowest $L_{90}$ |
| 07:00 – 23:00 | 59dB LAeq,15 | 76dB $L_{AMAX,15}$ | 45dB, $L_{90,15}$ |
| 23:00 – 07:00 | 51dB LAeq,15 | 69dB $L_{AMAX,15}$ | 35dB, $L_{90,15}$ |

Table 4.1 Measurement Levels

Leq, ff noise levels are taken as the continuous equivalent free-field sound pressure level outside the room elements under consideration.

| Location | T | Time | Free-Field Sound Pressure Level Leq, T dB re.20µPa | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 65Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8KHz | A |
| 10 Grinstead Lane | 16h | Day | 56 | 62 | 63 | 56 | 53 | 49 | 44 | 39 | 59 |
| | 8h | Night | 48 | 54 | 55 | 48 | 45 | 41 | 36 | 31 | 51 |
| | | LAMax | 66 | 72 | 73 | 66 | 63 | 59 | 54 | 49 | 69 |

Table 4.2 Summary of octave -band sound levels for break in assessment

## 5.0 PROPOSED LAYOUT DESIGN

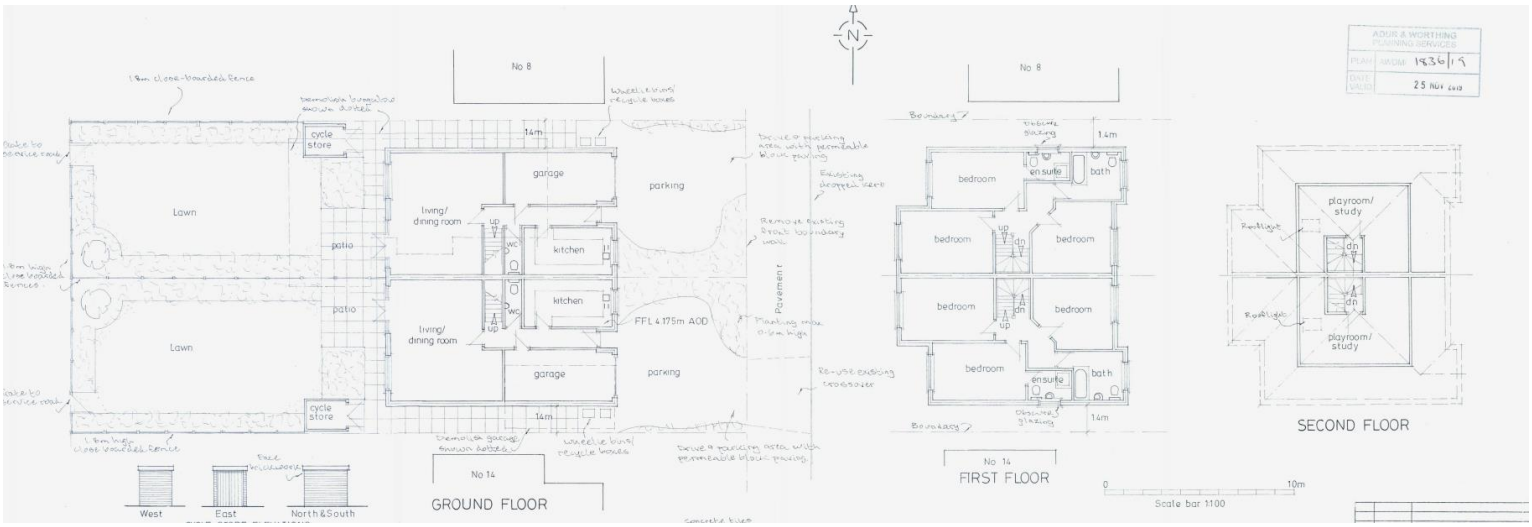



**Figure 5.0 - Proposed Layout**

## 5.1 EXTERNAL SOUND LEVELS

It shall be read from Table 4.2 in Section 4.0 of this report, that the external sound levels taken by means of average equivalent or maximum sound levels exceed the World Health Organisation requirements for external noise as described by Community Noise Guidelines (1999) in Section 2.5 of this report.

### 5.1.1 Pro PG Acoustic Design Statement

The scope of ProPG is restricted to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources. New apartments, flats and houses are the most common type of new residential development, however the guidance can also be applied to other types of residential developments such as residential institutions, care homes etc. As such it is directly applicable to this development.

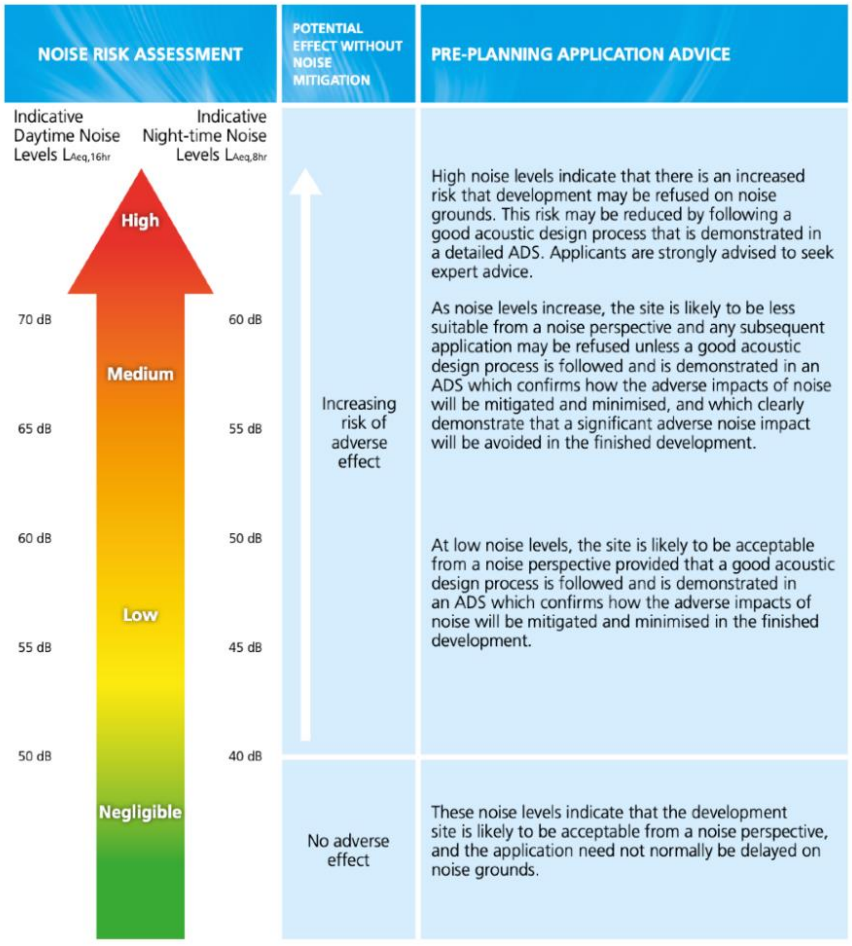



Figure 5.1 - ProPG Noise risk assessment guide

The following table assesses the ProPG noise risk for the measured data. The purpose of this is to provide a view of the noise risk at the site.

| | Daytime $L_{Aeq, 16hr}$ 07:00 – 23:00 | Night-time $L_{Aeq, 8hr}$ 23:00 – 07:00 | Noise Exposure Catergory |
|---|---|---|---|
| Noise Level | 59dB | 51dB | B |
| ProPG Noise Risk | MEDIUM | MEDIUM | |

Table 5.1.1 : ProPG Stage 1 Assessment table

ProPG states that "Particular care should be taken to ensure that any noise events (as quantified by LAmax,F) have been properly identified and assessed". On attendance, the greatest LAFMax events were found to be generated by vehicle movements. No other noise source was found to potentially generate comparable LAFMax levels through the night.

**5.1.2 Noise Control**

Noise Sources : It is not possible to control the traffic noise as source

Building Orientation : The building is fixed in orientation

Building Layout : Good acoustic design may be achieved by careful consideration of the internal room layout. It is generally considered practical to have bedroom windows positioned along quieter facades to minimise noise ingress during summer months when it is desirable to have windows open through the night. Dual use rooms may sometimes allow adequate ventilation to be attained through the opening of windows on the quieter side of the building. However, this generally demands open plan living and is not generally feasible for residences with 2 or more bedrooms.

## 5.2. FAÇADE SOUND INSULATION

In accordance with the assessment guidance in Annex G of BS 8233:2014, the sound insulation performance of the building can be estimated by simple calculation from the free-field noise.

| CALCULATION | | A | B | (A-B) +5 |
|---|---|---|---|---|
| Location | Period | Free-Field Noise Levels LAeq,T dB | BS8233/WHO Internal Noise Guidance Criteria LAeq, T dB | Typical Insulation Specification dB Rw |
| **10 Grinstead Lane** | **Day 07:00 – 23:00** | **59** | **35** | **29** |
| | **Night 23:00 – 07:00** | **51** | **30** | **26** |
| | | **69** | **45** | **29** |

Table 5.2 - Sound insulation estimate using the simple calculation method of BS8233

Following the rigorous calculation method of Annex G of BS 8233:2014, it can be shown that a suitable standard of residential amenity can be achieved with façade sound insulation of standard double glazing (32dB Rw) for the Living Areas and bedrooms.

### 5.2.1 NON-GLAZED ELEMENTS

The non-glazed external building fabric elements of the proposed development would be comprised of blockwork. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality secondary-glazed window configuration, as shown in Section 5.3.

All non-glazed elements of the building facades should provide a sound reduction performance of at least the figures shown in Table 5.2.1 when tested in accordance with BS EN ISO 140-3:1995.

| Element | Octave Band Centre Frequency SRI, dB | | | | | |
|---|---|---|---|---|---|---|
| | 125 | 250 | 500 | 1K | 2K | 4K |
| Non Glazed Element SRI | 41 | 45 | 45 | 54 | 58 | 60 |

Table 5.2.1 Non-glazed elements sound reduction minimum performance

### 5.3 SPECIFICATION OF GLAZED UNITS

The minimum sound reduction index (SRI) value required for the glazed elements to be installed is shown in Table 5.3

| Glazing Configuration – 3mm/10mm /5mm | | | | | | | |
|---|---|---|---|---|---|---|---|
| Frequency, Hz/dB | | | | | Rw | Rw+C | Rw + Ctr |
| 125 | 250 | 500 | 1K | 2K | **32** | 32 | 29 |
| 21 | 25 | 27 | 34 | 39 | | | |

Table 5.3 – Required Glazing Performance

The sound reduction performance stated above must be achieved by the gazing system as a whole in its installed condition. The specification therefore applies to both the glazing element and all seals on any openable part of the system. It should be confirmed with any supplier that the full glazing system supplied complies with the requirements stated in Table 5.3. Data has been used from Guardian Glass. (See Appendix C)

## 5.4 CALCULATION RESULTS

For the daytime assessment for living areas, the desirable limit of BS8233:2014 suggests a guideline of 35 dB LAeq,16hr for resting conditions, and up to 40 dB is considered acceptable for necessary developments.
All results, with the proposed construction, would place the internal levels in kitchen/living areas as below 35 dB, therefore within the desirable category.
For the night-time assessment for bedrooms, BS8233:2014 suggests a desirable guideline of 30 dB LAeq, 8hr for sleeping conditions, with an acceptable limit of 35 dB LAeq, 8hr. Individual noise events (Measured with fast time-weighted Maximum) should not normally exceed 45 dB LAFmax (as in BS8233:1999).
The proposed construction would place the internal continuous levels in bedrooms as below 30 dB and the maximum noise events as typically below 45 dB LAFmax, therefore within the desirable category.

| Monitoring Period | Calculated Internal Noise Levels | Noise Criteria |
|---|---|---|
| 07:00 – 23:00 | 30 dB LAeq(16hr) | 35 dB |
| 23:00 – 07:00 | 23 dB LAeq(8hr) | 30 dB |

Table 5.4 –Internal Noise Levels LAeq Calculations

| Monitoring Period | Noise Criteria $L_{AMAX}$ | No. times exceeded $L_{AMAX}$ |
|---|---|---|
| 07:00 – 23:00 | 55dB | 4 |
| 23:00 – 07:00 | 45dB | 3 |

Table 5.4.1 – Noise Criteria $L_{AMAX}$

## 6.0 VENTILATION

To maintain suitable internal noise levels, the minimum required ventilation should be provided when windows are closed. Windows should not be sealed, but openable for times when purge ventilation is required (examples given in Approved Document F including purging of fumes from burnt food when cooking, or removal of fumes when painting).

To stairwells, no specific acoustic measures would be necessary and standard trickle vents would be appropriate.
Ventilation to habitable rooms will require acoustically treated ventilation.

MVHR would be to provide each dwelling with whole house supply and extract ventilation. This comprises of mechanical unit/s that provide both supply and extract to each apartment individually; whereby inlet and outlet ducts would need to be run to the façade or in a riser to the roof. This type of system can also be incorporated with heat recovery built in if desired.

The units will be designed to achieve appropriate sound levels. At no time shall the ventilation system cause the ambient internal noise levels to exceed the criterion set out in BS8233:2014 shown in table 2.4.1. If heat recovery is to be used, then a summer override switch is advisable.

Some systems switch to boost mode when wet rooms or kitchens within individual flats are in use. This can potentially lead to noise levels in bedrooms increasing above the criteria when the bathroom or kitchen is used and boost mode is operational. To combat this there are three options:

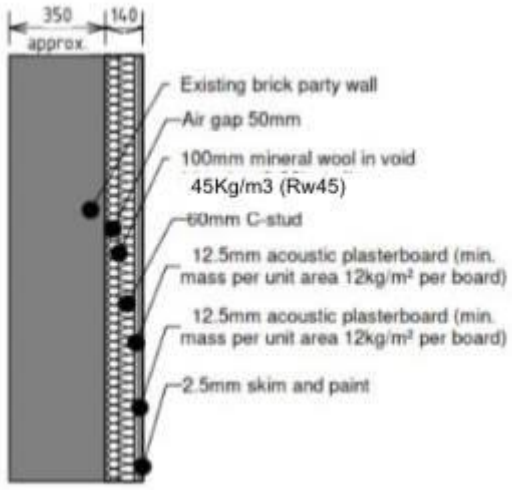
- Use separate fans for bedrooms and bathrooms/kitchens, to avoid increase in noise levels throughout the flat when one room is used and to give greater controllability.
- The system can be designed with a manual override switch to avoid this boost mode occurring at night.
- The system can be designed to achieve the above noise criteria when under the worst case boost mode (though this can be challenging depending on the system proposed).

Acoustic measures relating to the ventilation system will be addressed pre commencement once a ventilation installer has been appointed and design finalised.

## 7.0 RESIDENTIAL SOUND INSULATION REVIEW

The party wall structure may be subject to pre-completion testing in accordance with requirements of The Building Regulations 2010 Approved Document E (2003 Edition & amendments).

## 7.1 PARTY WALLS TO ADJACENT BUILDING




**Existing Party Wall Acoustically Upgraded**

Expected n-Situ Sound Insulation Performance: $D_{nT,W}$ + $C_{tr}$ 48-55dB

## 8.0 EXTERNAL AMENITY AREAS

BS8233:2014 states that "the acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed, and noise levels should ideally not be above the range 50 – 55 dB LAeq,16hr"

Measurement data indicates a noise level of 59dB $L_{Aeq,16hr}$. To achieve the desirable level within the standard of 50dB LAeq,T, Daa Group would advise a 6ft High, 15kg m2 fencing to be erected around the boundary. Calculations indicate with the addition of the barrier a noise level of 29dB in the outdoor amenity areas.

## 9.0 SUMMARY AND CONCLUSIONS

A baseline noise survey has been undertaken by DAA Group to establish the prevailing noise climate in the locality of 10 Grinstead Lane Lancing West Sussex BN15 9DY in support of a planning application for a new residential development.

The measured levels have been assessed against currently available standards and guidance documents including The National Planning Policy Framework 2021 (NPPF), National Planning Practice Guidance (NPPG) and Local Authority requirements.

Appropriate external and internal noise criteria have been considered to minimise adverse impacts on health and quality of life as a result of the new development.

Appropriate mitigation measures have been outlined including double-glazing and mechanical ventilation.

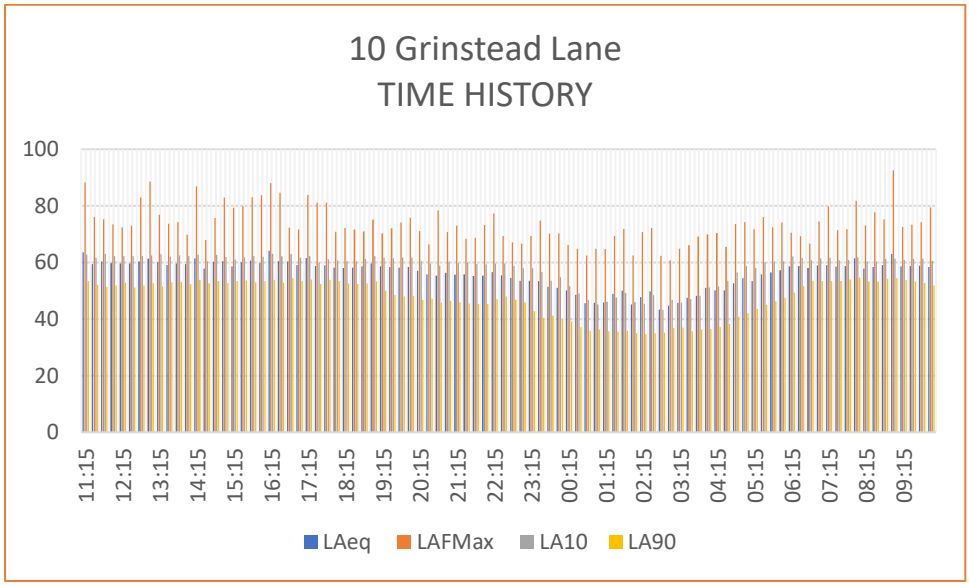
A sound insulation scheme has been included.

ProPG assessment levels indicate a medium noise risk.

It is concluded that, on noise grounds, the proposed development will not prejudice the amenities of any future occupants provided the above points are taken into consideration.

**APPENDIX A – MEASUREMENTS**





## APPENDIX B - ACOUSTIC TERMINOLOGY

### B.1 WEIGHTED DECIBEL, dB(A)

The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. An increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.

### B.2 EQUIVALENT CONTINUOUS SOUND LEVEL, LAeq

Another index for assessment for overall noise exposure is the equivalent continuous sound level, $L_{Aeq}$. This is a notional steady level which would, over a given period, deliver the same sound energy as the actual time-varying sound over the same period.

### B.3 MAXIMUM NOISE LEVEL, LAmax

The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125 ms in duration.

### B.4 NOISE RATING, NR

Noise ratings are used as a single figure criterion for specifying services noise in buildings. Each noise rating value has an associated spectrum of defined values in each third or octave frequency band. To determine the noise rating of a room the measured spectrum is compared to a set of noise rating curves. The highest NR curve that crosses any single frequency band of the measurement determines the noise rating for the room. The single figure noise rating is read at the 1 kHz band.

### B.5 SOUND LEVEL DIFFERENCE (D)

The sound insulation required between two spaces may be determined by the sound level difference needed between them. A single figure descriptor which characterises a range of frequencies, the weighted sound level difference, D, is sometimes used (BS EN ISO 717-1). This parameter is not adjusted to reference conditions.

The standardized level difference, Dn, T is a measure of the difference in sound level between two rooms, in each frequency band, where the reverberation time in the receiving room has been normalised to 0.5 s. This parameter measures all transmission paths, including flanking paths.

The weighted standardized level difference, DnTw, is a measure of the difference in sound level between two rooms, which characterises a range of frequencies and is normalised to a reference reverberation time

### B.6 SOUND REDUCTION INDEX (R)

The sound reduction index (or transmission loss) of a building element is a measure of the loss of sound through the material, i.e. its attenuation properties. It is a property of the component, unlike the sound level difference which is affected by the common area between the rooms and the acoustic of the receiving room. The weighted sound reduction index, Rw, is a single figure description of sound reduction index characterising a range of frequencies, which is defined in BS EN ISO 717-1: 1997. The Rw is calculated from measurements in an acoustic laboratory

## B.7 STATISTICAL NOISE LEVELS ($L_{A90}$, (T) $L_{A1}$, (T) $L_{A10}$, (T) etc.)

For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The $L_{A10}$ is the level exceeded for ten per cent of the time under consideration, has historically been
adopted in the UK for the assessment of road traffic noise. The LA90 is the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The $L_{A1}$ the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted LA10, dB LA90, dB. etc. The reference time (T) is normally included, e.g. LA10, (5min), & LA90, (8hr).

## B.8 TYPICAL NOISE LEVELS

Typical noise levels are given in the following table.

| Noise Level dB(A) | Example |
|---|---|
| 130 | Threshold of pain |
| 120 | Jet aircraft take-offs at 100 m |
| 110 | Chain saw at 1 m |
| 100 | Inside disco |
| 90 | Heavy lorries at 5 m |
| 80 | Kerbside of busy street |
| 70 | Loud radio (in typical domestic room) |
| 60 | Office or restaurant |
| 50 | Domestic fan heaters at 1m |
| 40 | Living room |
| 30 | Ventilation Noise in Theatre |
| 20 | Remote countryside on still night |
| 10 | Sound insulated test chamber |
| 0 | Threshold of hearing. |

GUARDIAN GLASS

# Acoustic Performance

## Glazing Configuration

**3mm Float Glass**
10mm Cavity
**5mm Float Glass**

## Sound Reduction Indices

| Frequency, Hz / dB | | | | | | Rw | C | Ctr | OITC | STC |
|---|---|---|---|---|---|---|---|---|---|---|
| 125 | 250 | 500 | 1000 | 2000 | 4000 | 32 | 0 | -3 | 27 | 32 |
| 21 | 25 | 27 | 34 | 39 | 25 | | | | | |

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, Rw, and adaptation terms, C and Ctr, should typically be considered to be accurate within ±2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information please consult Assumptions and Terminology section in Guardian Acoustic Assistant. <P>By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.<P>

Monday, October 24, 2022 | Acoustic database 20210629

07:00 - 23:00 to Living Area

| | | Octave Band Centre Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| ***Noise Source*** | | | | | | | | | | |
| Noise Source - 07:00 - 23:00 | | | | | | | | | | |
| **Noise Levels** | | **56.0** | **62.0** | **63.0** | **56.0** | **53.0** | **49.0** | **44.0** | **39.0** | **59.3 dBA** |
| ***Composite SRI*** | | | | | | | | | | |
| Facade Width (m) | 6.0 | | | | | | | | | |
| Facade Height (m) | 4.0 | | | | | | | | | |
| Main Element - External Wall | | | | | | | | | | |
| SRI | | - | 41.0 | 43.0 | 48.0 | 50.0 | 55.0 | 55.0 | - | Rw 51 |
| Window Width (m) | 2.0 | | | | | | | | | |
| Window Height (m) | 2.0 | | | | | | | | | |
| No. of Windows (no) | 2.0 | | | | | | | | | |
| Glazed Element - 32Rw | | | | | | | | | | |
| SRI | | - | 21.0 | 25.0 | 27.0 | 34.0 | 39.0 | 25.0 | - | Rw 33 |
| | | - | *-25.69* | *-29.64* | *-31.70* | *-38.56* | *-43.56* | *-29.76* | - | |
| ***10 log (S/A)*** | | | | | | | | | | |
| Internal Receiver - Living Area | | | | | | | | | | |
| | | - | *-0.5* | *-0.5* | *-0.5* | *-0.5* | *-0.5* | *-0.5* | - | |
| ***+3*** | | | | | | | | | | |
| | | - | *3.0* | *3.0* | *3.0* | *3.0* | *3.0* | *3.0* | - | |
| ***Internal Receiver Noise*** | | | | | | | | | | |
| Internal Receiver Noise - Living Area | | | | | | | | | | |
| **Reverberant Field, LPrev** | | **-** | **38.9** | **35.9** | **26.8** | **17.0** | **8.0** | **16.8** | **-** | **30.3 dBA** |

23:00 - 07:00 to Bedroom

| | | Octave Band Centre Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| ***Noise Source*** | | | | | | | | | | |
| Noise Source - 23:00 - 07:00 | | | | | | | | | | |
| **Noise Levels** | | **48.0** | **54.0** | **55.0** | **48.0** | **45.0** | **41.0** | **36.0** | **31.0** | **51.3 dBA** |
| ***Composite SRI*** | | | | | | | | | | |
| Facade Width (m) | 6.0 | | | | | | | | | |
| Facade Height (m) | 4.0 | | | | | | | | | |
| Main Element - External Wall | | | | | | | | | | |
| SRI | | - | 41.0 | 43.0 | 48.0 | 50.0 | 55.0 | 55.0 | - | Rw 51 |
| Window Width (m) | 2.0 | | | | | | | | | |
| Window Height (m) | 1.0 | | | | | | | | | |
| No. of Windows (no) | 1.0 | | | | | | | | | |
| Glazed Element - 32Rw | | | | | | | | | | |
| SRI | | - | 21.0 | 25.0 | 27.0 | 34.0 | 39.0 | 25.0 | - | Rw 33 |
| | | - | *-31.34* | *-35.09* | *-37.43* | *-43.73* | *-48.73* | *-35.74* | - | |
| ***10 log (S/A)*** | | | | | | | | | | |
| Internal Receiver - Bedroom | | | | | | | | | | |
| | | - | *5.6* | *5.6* | *5.6* | *5.6* | *5.6* | *5.6* | - | |
| ***+3*** | | | | | | | | | | |
| | | - | *3.0* | *3.0* | *3.0* | *3.0* | *3.0* | *3.0* | - | |
| ***Internal Receiver Noise*** | | | | | | | | | | |
| Internal Receiver Noise - Bedroom | | | | | | | | | | |
| **Reverberant Field, LPrev** | | **-** | **31.2** | **28.5** | **19.1** | **9.8** | **0.8** | **8.8** | **-** | **22.8 dBA** |

LAMAX to Bedroom

| | | Octave Band Centre Frequency (Hz) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| ***Noise Source*** | | | | | | | | | | |
| Noise Source - LAMAX | | | | | | | | | | |
| **Noise Levels** | | **66.0** | **72.0** | **73.0** | **66.0** | **63.0** | **59.0** | **54.0** | **49.0** | **69.3 dBA** |
| ***Composite SRI*** | | | | | | | | | | |
| Facade Width (m) | 6.0 | | | | | | | | | |
| Facade Height (m) | 4.0 | | | | | | | | | |
| Main Element - External Wall | | | | | | | | | | |
| SRI | | - | 41.0 | 43.0 | 48.0 | 50.0 | 55.0 | 55.0 | - | Rw 51 |
| Window Width (m) | 2.0 | | | | | | | | | |
| Window Height (m) | 1.0 | | | | | | | | | |
| No. of Windows (no) | 1.0 | | | | | | | | | |
| Glazed Element - 32Rw | | | | | | | | | | |
| SRI | | - | 21.0 | 25.0 | 27.0 | 34.0 | 39.0 | 25.0 | - | Rw 33 |
| | | - | *-31.34* | *-35.09* | *-37.43* | *-43.73* | *-48.73* | *-35.74* | - | |
| ***10 log (S/A)*** | | | | | | | | | | |
| Internal Receiver - Bedroom | | | | | | | | | | |
| | | - | *5.6* | *5.6* | *5.6* | *5.6* | *5.6* | *5.6* | - | |
| ***+3*** | | | | | | | | | | |
| | | - | *3.0* | *3.0* | *3.0* | *3.0* | *3.0* | *3.0* | - | |
| ***Internal Receiver Noise*** | | | | | | | | | | |
| Internal Receiver Noise - Bedroom | | | | | | | | | | |
| **Reverberant Field, LPrev** | | **-** | **49.2** | **46.5** | **37.1** | **27.8** | **18.8** | **26.8** | **-** | **40.8 dBA** |