FORMANT.

STRAIGHTFORWARD ACOUSTIC DESIGN

NEW FLEURS, PORTHMANMOOR RD.

NOISE IMPACT ASSESSMEN

Project no. P1346
Report ref. P1346/REP01
Date 20-09-2024
Revision P01

FORMANT.
STRAIGHTFORWARD ACOUSTIC DESIGN

CONTENTS

REVISION HISTORY

Date	Revision	Notes
20/09/2021	P01	For information

EXECUTIVE SUMMARY

Formant has been appointed to assess he noise levels affecting the site of a proposed residential development on the site of the former New Fleurs Sports & Social Club, Porthmanmoor Road, Cardiff. The proposed development involves the demolition of the existing building and its replacement with a new-build block of flats.

SITE NOISE LEVELS

The noise climate at the existing site is dominated by traffic noise on Porthmanmoor Road and Walker Road. Daytime attended measurements outside the site recorded levels of **56-63 dBL_{Aeq}**. An unattended noise logger left on the noisiest front elevation facing Walker Rd recorded levels of around **61 and 53 dBL_{Aeq} during daytime and night-time** respectively. Night-time maximum noise levels were around 74 dBL_{AFmax}. This places the site in Noise Exposure Category B in TAN11 meaning that *"Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.*"

NOISE IMPACTS

Noise levels at the site exceed the BS 8233 guidelines for external amenity space, but all residents will have access to quiet external amenity space within 2 minutes' walk of the proposed development. Mitigation is also proposed to provide the best practicable noise screening of any external amenity spaces, therefore **no adverse noise impacts are predicted as a result of noise in external amenity spaces.**

Under baseline ventilation, the internal noise levels are within the BS 8233 targets for all proposed dwellings. Under boost ventilation via open windows, the predicted levels are within the proposed guideline levels for some spaces but exceed the guidelines for those properties located on the proposed north elevation facing Walker Road. Noise mitigation is proposed to reduce the number of occasions when windows would need to be opened. Furthermore the worst-affected elevation is north-facing and exposed to the lowest solar gain, so thus minimising the number of occasions when windows might need to be opened for boost ventilation. On this basis **no significant adverse noise impacts are predicted as a result of environmental noise break-in.**

Based on the outcome of the noise assessment **we would recommend that the proposed development is acceptable in terms of noise impacts and planning approval may be granted.** If required, a planning condition may be applied relating to the provision of ventilation/glazing upgrades for the locations as identified in this report.

1 INTRODUCTION

Formant has been appointed to assess the noise levels affecting the site of a proposed residential dwelling on the site of the former New Fleurs Social Club, Porthmanmoor Road, Cardiff. The proposed development involves the demolition of the existing building and its replacement with a block of affordable housing flats. The proposed development is not expected to generate any significant noise but the proposed flats will be sensitive to environmental noise.

This report provides:

1) A description of the proposed development and the potential noise impacts
2) A summary of applicable legislation, policy and guidance
3) The results of a baseline noise survey at the site
4) An assessment of the site suitability for residential development
5) Details of noise mitigation measures to be incorporated into the design
6) An assessment of the predicted noise impact of the proposed development

2 PROPOSED DEVELOPMENT

EXISTING SITE

The existing site comprises a former sports and social club on the corner of Walker Road and Porthmanmoor Road. Adjacencies round the site are as follows:

- **West:** Residential properties on the opposite side of Porthmanmoor Lane, a small access lane providing access to a NG Motors, a car repair/servicing garage.
- **North:** Residential properties on the opposite side of Walker Road, plus a small vehicle repair workshop (Alexander Autos) on Ordell Street.
- **East**: Residential properties on the opposite side of Porthmanmoor Road, a dead-end road which provides access to Splott Industrial Estate.
- **South**: Splott industrial estate, with a number of small commercial/light industrial units. We contacted the nearby units during the survey to enquire about operational hours and the units all confirmed that they operate during daytime hours only.

In terms of noise sources, traffic on Walker Road, Porthmanmoor Road and Ordell Road affected the site to varying degrees on the different elevations. Some noise was present from the industrial estate but this was generally not at the same level as the traffic noise. Full details of the contribution of each noise source are provided in Section 4 of this report.

An aerial view of the site showing the location of the measurement positions and surrounding land uses is provided in Figure 1.

PROPOSED DEVELOPMENT

The proposed development comprises a single block of residential apartments. The design of the block is not finalised at this stage, but an initial assessment has been made based on a notional layout with bedrooms on each elevation.

POTENTIAL NOISE IMPACTS

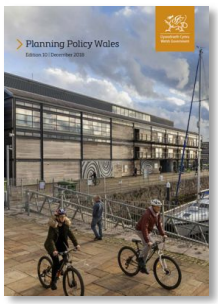
The proposed development will not generate significant operational noise levels and no assessment of the potential noise impact on nearby noise sensitive receptors is required.

Environmental noise from the nearby roads and industrial sites has the potential to cause adverse noise impacts on future residents of the proposed development and this issue is the main focus of this noise impact assessment.

Figure 1: Proposed site plan showing measurement positions

3 LEGISLATION, POLICY AND GUIDANCE

3.1 NATIONAL AND LOCAL POLICY



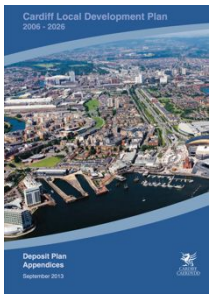
PLANNING POLICY WALES

Planning Policy Wales (PPW) sets out the policy framework for all planning applications in Wales. It provides broad objectives with respect to creating appropriate soundscapes and managing noise pollution. With regards new developments, it states that developers must:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;
- not create areas of poor air quality or inappropriate soundscape; and
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

TECHNICAL ADVICE NOTE 11 (WALES)

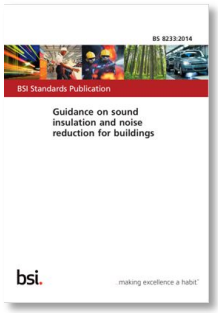
Technical Advice Note (Wales) 11 (TAN11) sets out the Welsh Assembly Government's current policy on noise-related planning issues. TAN11 introduces the concept of Noise Exposure Categories (NECs) and provides recommendations to either approve/refuse planning based on which NEC the site falls into.



LOCAL POLICY

Cardiff Council's Local Development Plan (LDP) was referenced in the Pre-application feedback from the Local Planning Authority. The LDP contains a noise-related policy EN13 which references PPW and TAN11. This assessment is considered to be in line with the requirements of the LDP policy EN13.

3.2 SUPPLEMENTARY GUIDANCE



BS 8233:2014

BS 8233:2014 has been adopted as the method for assessing noise break-in to buildings and noise levels in external amenity areas. It recommends noise limits for different types of buildings and a calculation method to quantify noise break-in levels.

BS 4142: 2014

BS 4142:2014 provides a method for the assessment of potential noise impacts from commercial/industrial land uses. It has been used in this report for the initial assessment of potential noise impacts from the nearby industrial estate.

4 BASELINE NOISE SURVEY

4.1 MEASUREMENT METHODOLOGY

A baseline noise survey was undertaken by Paul Driscoll MIOA of Formant, between 10 and 13 Sept 2024. Attended short-term measurements were undertaken between 10:00 - 11:30 hrs on 10 Sept 2024 and an unattended noise logger was left at the site for the following 3 days/nights. All measurements were taken at approximately 1.5 metres above local ground/floor level. The measurement positions have been overlaid on the proposed site plan in Figure 1 above.

External measurements were made in line with BS 7445:2003 *Description of Environmental Noise*. It was not possible to measure at a distance of 3 metres from the façade of buildings or other reflecting surfaces therefore they do not represent free-field noise levels. Corrections have been applied in the 3D computer noise model of the site to account for this.

4.2 EQUIPMENT

All measurement equipment owned or hired and operated by Formant has annual or bi-annual calibration checks carried out by external companies traceable to UKAS or national standards. Copies of all calibration records are kept and can be provided upon request. The following measurement equipment was used to conduct the survey:

- Nti XL2 Class 1 Sound level meter, SNo. A2A-18665-E0,
- Nti Larson Davies CAL200 Calibrator, SNo. 18652

4.3 DESCRIPTION OF SOUNDSCAPE

The soundscape at the site during the survey was dominated by traffic on Walker Road and to a lesser extent, on Porthmanmoor Road and Ordell Street. Occasional industrial/commercial noise was audible at times and at varying degrees at each measurement position, although it did not dominate the soundscape at any of the measurement positions.

During the survey we spoke to the staff in the nearby industrial/commercial units to check that the activities they were undertaking were typical of their normal business operation and they all confirmed this to be the case, with one exception, JPL Design Engineering to the south who were undertaking temporary construction works inside their unit. The temporary works did not materially affect the measurement results at any of the measurement positions, therefore the soundscape is considered to be representative of 'normal' conditions at the site.

4.4 WEATHER CONDITIONS

The weather conditions during the attended measurements were cool and cloudy with a gentle breeze. The weather conditions for the unattended survey have been taken from publicly available weather data for the nearest weather station and are provided in full in the Appendix to this report.

4.5 NOISE PARAMETERS

A full range of noise data was captured during the survey including the following statistical measurements:

- L_{Amax} The sound pressure level of the single noisiest event during the measurement period.
- L_{Aeq} Time averaged sound pressure level. This is generally considered to be an acceptable representative descriptor of environmental noise.
- L_{A90} Sound pressure level exceeded for 90% of the measurement period, this is generally accepted to be indicative of the continuous background noise level.

4.6 MEASUREMENT RESULTS

A summary of the key noise survey results is provided in Table 1 and the time history graph of the results from the unattended noise logger is provided in Figure 3.

Position	Details	Photo
MP1 SE corner of site, approx. 1.5 m from the corner of the existing building. Soundscape dominated by traffic on Walker Rd, Porthmanmoor Road plus some occasional light industrial noise from nearby commercial units.	10/09/2024 10:15 Duration, T: 15 mins **L_{Aeq} 57 dB** $L_{Amax(F)}$ 74 dB L_{A90} 48 dB	
MP2 NE corner of site, approx. 1.5 m from the corner of the existing building. Soundscape dominated by traffic on Walker Rd and to a lesser extent, Porthmanmoor Road. Some very occasional distant industrial/construction noise audible. Wind speeds slightly higher than desirable.	10/09/2024 10:35 Duration, T: 15 mins **L_{Aeq} 63 dB** $L_{Amax(F)}$ 77 dB L_{A90} 53 dB	

<table>
<tr><th>Position</th><th>Details</th><th>Photo</th></tr>
<tr><td>MP3
NW corner of site, approx. 1.5 m from the corner of the existing building. Soundscape dominated by traffic on Walker Rd. Some very occasional distant industrial/construction noise audible. Wind speeds slightly higher than desirable.</td><td>10/09/2024 10:51
Duration, T: 15 mins
L_{Aeq} 62 dB
$L_{Amax(F)}$ 72 dB
L_{A90} 53 dB</td><td>  </td></tr>
<tr><td>MP4
1st Floor balcony on north elevation existing building, overlooking internal courtyard and partially screened from road traffic by the existing building. Meter was located under a lightweight roof which generated significant rain noise during rainfall. The data therefore excludes periods of rainfall (see weather data in Appendix) and includes a -3 dB correction to account for reflections off surrounding surfaces.</td><td>10/09/2024 to 13/09/2024
DAYTIME 0700-2300 hrs
L_{Aeq} 59-60 dB
$L_{Amax(F)}$ 82 dB
L_{A90} 51 dB*
NIGHT-TIME 2300-0700 hrs
L_{Aeq} 51-52 dB
$L_{Amax(F)}$ 74 dB*
L_{A90} 37 dB*</td><td>  </td></tr>
<tr><td colspan="3">* Night-time $L_{Amax(F)}$ night-time values were determined by considering the data shown in Figure 2 in order to derive the level ‘not normally exceeded’ during night-time hours. L_{A90} values are modal average of the individual 5-minute measurements during each period.</td></tr>
</table>

Table 1: Noise survey results summary

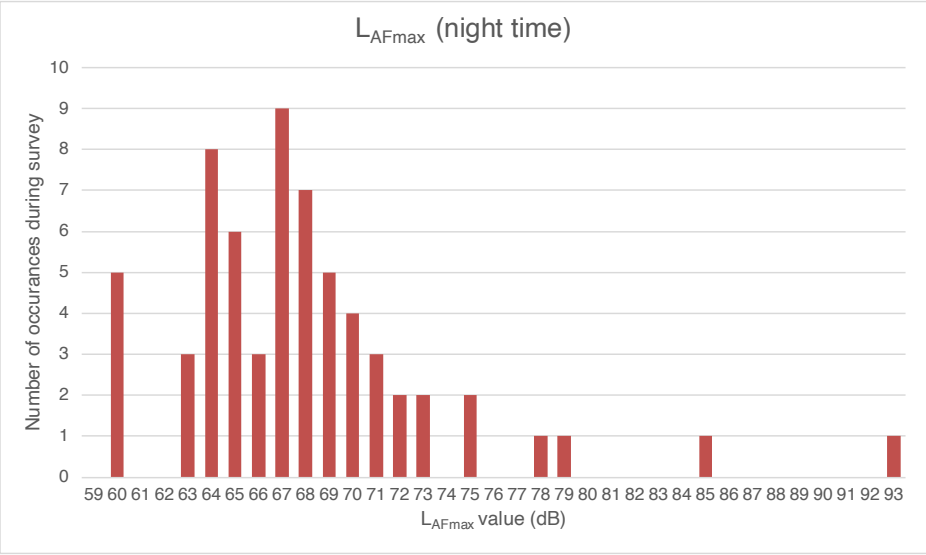


Figure 2: Analysis of night-time $L_{Amax(F)}$ values for each 15-minute sample period during the survey

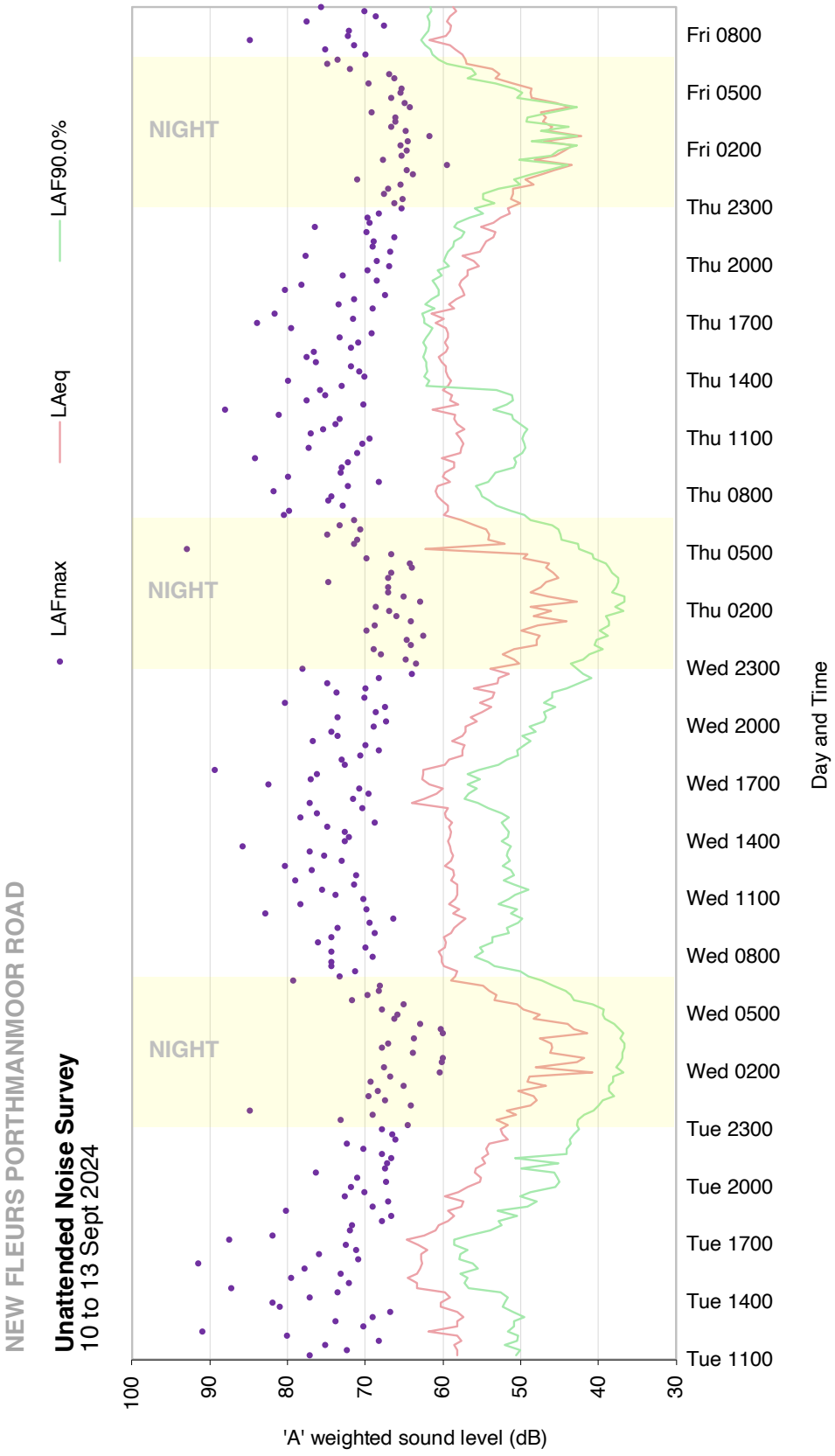


Figure 3: Time history graph for unattended logger

4.7 SUMMARY OF NOISE SURVEY RESULTS

The results show the following key information:

- Daytime noise levels are around 62 dBL_{Aeq} at the front of the building and 57 dBL_{Aeq} towards the rear elevation.
- The difference between the daytime and night-time noise levels is around 8 dBA, i.e. around 54 dBL_{Aeq} at the front of the building and 49 dBL_{Aeq} towards the rear elevation
- The night-time maximum noise levels at the front of the site are expected to be around 74 dBL_{Amax} (including a correction for the location of the noise logger) and around 69 dBL_{Amax} at the rear.

5 INITIAL NOISE RISK ASSESSMENT

5.1 TAN11 NOISE EXPOSURE CATEGORIES

The site falls into NEC A at the rear elevation and NEC C at the front elevation as shown in the table below:

Noise Source	Time period	Noise Exposure Category (NEC)			
		A	B	C	D
Road traffic noise	Daytime (0700-2300 hrs)	<55	55-63	63-72	>72
	Night-time (0700-2300 hrs)	<55	45-57	57-66	>66

Table 2: Noise levels corresponding to the TAN11 Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ (dB)

TAN11 states that for sites in NEC B, *"Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection."*

The following section details the noise mitigation measures which should be incorporated into the design of the proposed development in order to minimise the risk of adverse noise impacts.

5.2 BS 4142 INITIAL ASSESSMENT

The method in BS 4142 compares the specific level of the industrial/commercial noise to the background sound level at the location of the noise sensitive receptor.

Three noise parameters are relevant to the assessment:

1) The **background sound level**, ($L_{A90,T}$), defined as the sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T.
2) The **specific sound level** ($L_s = L_{Aeq,Tr}$), defined as the sound pressure level produced by the specific sound source at the assessment location.
3) The **rating level** ($L_{Ar,Tr}$), defined as specific sound level plus any adjustment for the characteristic features of the sound.

BS 4142 states that an initial estimate of the impact can be obtained by subtracting the measured background sound level from the rating level and considering the following:

a) "*Typically, the greater this difference, the greater the magnitude of the impact.*
b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
d) *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."*

A detailed BS 4142 noise assessment has not been undertaken at this stage, but the initial assessment is as follows:

- Industrial/commercial noise was audible at some of the measurement locations (MP1-3) but it did not dominate the soundscape and was secondary to the traffic noise at these locations.
- Night-time industrial/commercial noise is not expected to be an issue because none of the nearby industrial premises operate overnight.
- As described in Section 5.1, noise mitigation is required for environmental noise (i.e. traffic noise) and this mitigation will also help to mitigate industrial/commercial noise. It is important that the proposed mitigation takes account of the industrial/commercial noise as well as the traffic noise.
- The site is in a predominantly residential area and is located further from the industrial/commercial units than its residential neighbours, therefore the site should be less exposed than the existing residential properties.
- Although a detailed BS 4142 assessment might indicate an adverse noise impact, once the site context and proposed mitigation are taken into account, it is unlikely that this would be a significant adverse impact, therefore a detailed BS 4142 assessment is not considered to be necessary.

5.3 GOOD ACOUSTIC DESIGN

The proposed development is located in a predominantly residential area, therefore there is a precedent for residential development in the location of the proposed development. There are many other residential properties neighbouring the site, which are exposed to similar noise levels, however it is important to ensure that the proposed design takes all practicable measures to reduce the impact of noise on future residents. The following measures are proposed:

Acoustic issue	Description	Proposed noise mitigation
Noise levels in external amenity spaces	Daytime noise levels exceed 55 dBL_{Aeq16h}.	We have explored opportunities to use building massing to 'self-screen' external amenity spaces from nearby noise sources. Unfortunately the size of the plot and the presence of noise sources on all sides prevent this from being a practicable solution. We have identified a large public amenity space in proximity to the site, Moorland Park, which is within 0.1 miles (circa 2 minutes walk) of the site. Moorland Park is fully screened from nearby roads therefore we expect it to be a quiet space. If the proposed development does incorporate private external amenity space, screening e.g. in the form of solid ballustrades or solid fences/walls should be incorporated into the design. Such mitigation will offer the best practicable reduction in noise.
Noise break-in via baseline ventilation openings	Baseline ventilation via trickle vents could result in internal noise levels exceeding the BS 8233 indoor target levels.	To meet the BS 8233 internal noise limits, ventilation and glazing upgrades are required as follows: Flats on the Walker Road elevation (front): Either a) Acoustic trickle vents (min. $D_{ne,w}$ 37 dB) and Rw 36 dB glazing or b) Mechanical ventilation and Rw 35 dB glazing. Flats on rear facing elevations: Either standard trickle vents or mechanical ventilation. No glazing upgrades are required. Given the potential for industrial/commercial noise on this elevation, mechanical ventilation would be the preferred option.
Noise break-in for 'boost' ventilation during hot weather	Windows may need to be opened during periods of hot weather to control overheating.	Detailed design of the development should include all practicable measures to minimise solar gain (particularly on south facing elevations) and to reduce the risk of overheating, in order that windows do not need to be opened regularly for thermal comfort. Options such as amended internal space planning, noise barriers, mechanical cooling or attenuated façade vents have been considered but they would unacceptably compromise other design constraints such as daylighting, energy consumption or usable internal space, therefore they have been ruled out as practicable mitigation options.

Table 3: Mitigation measures which have been incorporated into the design

The above mitigation measures are considered to represent a holistic set of design proposals to address potential noise issues.

5.4 ASSESSSMENT CRITERIA

EXTERNAL AMENITY AREAS

BS 8233 provides guidance on suitable levels in external amenity spaces as follows:

> *"…it is desirable that the external noise level does not exceed **50 dB $L_{Aeq,T}$,** with an upper guideline value of **55 dB $L_{Aeq,T}$** which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."*

INTERNAL SPACES

The internal noise levels have been compared with the target levels for bedrooms set out in BS 8233:

1. **35 dB$L_{Aeq,16h}$ (daytime)**
2. **30 dB$L_{Aeq,16h}$ (night-time)**

With regard to noise from individual events, BS 8233 states that:

> *"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."*

We have therefore adopted a **guideline value of 45 dBL_{AFmax}** to assess short term noise events.

The above noise criteria apply under baseline ventilation conditions, but do not apply under 'boost' ventilation (e.g. to reduce overheating during hot weather) or 'purge' ventilation (e.g. to clear smells or fumes in the short term). **We propose a 10 dB relaxation as a guideline level to assess the suitability for occasional boost ventilation via open windows**.

5.5 PREDICTED EXTERNAL AMENITY NOISE LEVELS

The results of the survey have been assessed against the BS 8233 recommended levels for external amenity space. The noise levels from Walker Road and Porthmanmoor Road may prevent the BS 8233 'desirable' target of 50 dBA of being met in all private amenity space, but with provision of noise mitigation as described above, it is likely that some residents will benefit from external amenity space below the upper 55 dBA target and all residents will also benefit from access to quiet public amenity space within 0.1 miles of the proposed development.

As such, all residents will have access to quiet external amenity space and **no significant adverse impacts are predicted as a result of noise levels in external amenity spaces.**

5.6 PREDICTED INTERNAL NOISE LEVELS

BASELINE VENTILATION

With the incorporation of the proposed mitigation, we have calculated the internal noise levels within the bedrooms in a selection of sample dwellings in line with the method in BS 8233. The results are summarised in the table below alongside the BS 8233 'target' levels for ambient noise levels in bedrooms. The full calculations are provided in the appendix to this report.

Location	Internal noise levels (trickle vents open)		
	Daytime $L_{Aeq,16h}$	Night-time $L_{Aeq,8h}$	Night-time $L_{AF,max}$
BS 8233 guideline levels	35	30	45
Front elevation (facing Walker Road)	**32**	**25**	**43**
Rear elevation	**31**	**24**	**44**

Table 4: Predicted internal noise levels and comparison with BS 8233 criteria

The results of the calculations show that the BS 8233 indoor ambient noise level targets can be met in all rooms. As such, **no significant adverse impacts are predicted as a result of noise break-in under baseline ventilation.**

BOOST VENTILATION

Boost ventilation is typically provided by opening the windows. Internal noise levels with an open window are typically around 12 dB lower than the external levels. The assessment of noise levels with windows open is provided below, based on a 12 dB reduction of the external noise levels:

Location	Internal noise levels (window open)		
	Daytime $L_{Aeq,16h}$	Night-time $L_{Aeq,8h}$	Night-time L_{AFmax}
Guideline levels (BS 8233 + 10 dB)	45	40	55
Front elevation (facing Walker Road)	**50**	**43**	**62**
Rear elevation	**44**	**37**	**56**

Table 5: Predicted internal noise levels with open windows and comparison with guideline targets

In order to assess the subjective effect of any potential exceedance the following guidance is offered:

- ±1 dB is widely accepted to be the *smallest perceptible difference* one could perceive ('**negligible**')
- ±3 dB is widely considered to be a *just perceptible change* in noise levels ('**marginal**')
- ±10 dB is widely considered to correlate to a *doubling or halving of loudness* ('**significant**').

Therefore a summary of the internal noise levels with open windows is as follows:

- For rear (south) facing windows:
  - ambient noise levels are predicted to be within the guideline levels.
  - maximum noise levels are predicted to exceed the guidelines by 1 dB.
- For front (north) facing windows (overlooking Walker Road):
  - ambient noise levels are predicted to exceed the guidelines by 3 dB at night and 5 dB during daytime.
  - maximum noise levels are predicted to exceed the guidelines by 7 dB.

It is important to note that the potential impact depends on not just the *magnitude* of the exceedance but also the *number of times in a year* when residents may require the windows to be open. As described in the Table 3 above, the design of the proposed flats will ensure all practicable measures are taken to reduce the risk of overheating and reduce the need for residents to open their windows to control overheating. Furthermore, the flats where the highest noise levels are predicted are also the flats on the north-facing elevation, which is much less likely to overheat due to solar gain.

In summary, the indoor noise levels may exceed the guideline noise values when windows are open for boost ventilation, but the proposed development will incorporate mitigation to reduce the likelihood of overheating and the rooms with the worst-case noise exposure are also the rooms which are least likely to require boost ventilation via open windows. On this basis **no significant adverse impacts are predicted as a result of noise break-in for boost ventilation via open windows.**

5.7 SUMMARY OF NOISE IMPACT ASSESSMENT

The impact of environmental noise on the proposed development has been assessed in line with industry standard guidance and policy. Mitigation has been proposed for incorporation into the design to reduce the impact of noise in external amenity spaces and inside dwellings under baseline and boost ventilation.

All residents will have access to quiet external amenity space within 2 minutes' walk from the site. Any any private external amenity space e.g. balconies would still considered a benefit to residents, despite the fact that some spaces may be exposed to higher than the guideline noise levels. Therefore **no adverse noise impacts are predicted as a result of noise levels in external amenity spaces.**

Under baseline ventilation, the internal noise levels are within the BS 8233 targets for all proposed dwellings. Under boost ventilation via open windows, the predicted levels are within the proposed guideline levels in some spaces, but exceed the guidelines for those properties located on the north-facing elevation. This elevation will be the least exposed to solar gain, therefore the likelihood of residents needing to open windows for boost ventilation is reduced. On this basis **no significant adverse noise impacts are predicted as a result of environmental noise break-in.**

6 RECOMMENDATION TO THE DECISION MAKER

Based on the outcome of the noise assessment we would recommend that the proposed development is acceptable in terms of noise impacts and planning approval may be granted, subject to a condition relating to the provision of suitable glazing and ventilation for the properties as identified in this report, if required.

APPENDIX – WEATHER CONDITIONS AND NOISE BREAK-IN CALCULATIONS

Date Time	Temp (°C)	Precip (mm)	Wind gust (m/s)	Wind speed (m/s)	Conditions
2024-09-10 11:00:00	15.7	0	51.8	33.6	Par ially cloudy
2024-09-10 12:00:00	15.2	0	48.2	31.9	Par ially cloudy
2024-09-10 13:00:00	15.8	0	50	32	Overcas
2024-09-10 14:00:00	15.9	0	51.8	33.3	Par ially cloudy
2024-09-10 15:00:00	15	0	50	31	Overcas
2024-09-10 16:00:00	15.6	0	55.4	32.2	Overcas
2024-09-10 17:00:00	15.5	0	58.5	32.1	Overcas
2024-09-10 18:00:00	14	0	41.8	26.8	Par ially cloudy
2024-09-10 19:00:00	12.7	0	27	19.3	Par ially cloudy
2024-09-10 20:00:00	11.2	0.091	18.7	12.6	Rain
2024-09-10 21:00:00	10.2	0.017	16.6	12.8	Rain
2024-09-10 22:00:00	11.1	0	24.7	14.7	Par ially cloudy
2024-09-10 23:00:00	10.2	0	21.5	15.8	Clear
2024-09-11 00:00:00	10.1	0	23.6	15.2	Clear
2024-09-11 01:00:00	9.2	0	24.6	15.1	Clear
2024-09-11 02:00:00	10	0	30.4	23.2	Par ially cloudy
2024-09-11 03:00:00	10.1	0	28	21.2	Clear
2024-09-11 04:00:00	9.9	0	31.4	22	Clear
2024-09-11 05:00:00	9.2	0	32.5	18.6	Clear
2024-09-11 06:00:00	9.2	0	32.5	22.8	Clear
2024-09-11 07:00:00	9.9	0	32.2	19.4	Clear
2024-09-11 08:00:00	10.1	0	37.5	24.1	Clear
2024-09-11 09:00:00	11.8	0	40.8	28.7	Clear
2024-09-11 10:00:00	12	0	46.6	33.5	Clear
2024-09-11 11:00:00	13	0	44.9	31.4	Par ially cloudy
2024-09-11 12:00:00	13.9	0	47.8	31.6	Par ially cloudy
2024-09-11 13:00:00	13.9	0	46.5	34.3	Par ially cloudy
2024-09-11 14:00:00	14.8	0	47.2	31.8	Par ially cloudy
2024-09-11 15:00:00	13.1	0	43.1	31.4	Par ially cloudy
2024-09-11 16:00:00	12.9	0	47.8	30.7	Par ially cloudy
2024-09-11 17:00:00	13.2	0.306	46.1	25.4	Rain, Par ially cloudy
2024-09-11 18:00:00	9.3	0.729	37.9	32.1	Rain, Overcas
2024-09-11 19:00:00	10	0.455	28.4	19.9	Rain
2024-09-11 20:00:00	9	0.057	17.5	12.8	Rain, Par ially cloudy
2024-09-11 21:00:00	8.1	0	16.7	16.3	Clear
2024-09-11 22:00:00	8.2	0	22.4	14.1	Clear
2024-09-11 23:00:00	8.9	0.023	18.2	13.3	Rain, Par ially cloudy
2024-09-12 00:00:00	7.7	0	10.5	11.3	Clear

Date Time	Temp (°C)	Precip (mm)	Wind gust (m/s)	Wind speed (m/s)	Conditions
2024-09-12 01:00:00	7.3	0	24	16.4	Clear
2024-09-12 02:00:00	7.2	0	17.8	15.4	Clear
2024-09-12 03:00:00	7.2	0.023	15.4	12.5	Rain
2024-09-12 04:00:00	6.3	0	14.5	12.2	Clear
2024-09-12 05:00:00	6.4	0	13.5	14.6	Clear
2024-09-12 06:00:00	6.6	0	16.7	13	Clear
2024-09-12 07:00:00	6.4	0.014	17.9	15	Rain
2024-09-12 08:00:00	8.2	0.029	22.1	16.2	Rain
2024-09-12 09:00:00	10.2	0.23	24.9	20.3	Rain
2024-09-12 10:00:00	11.8	0.023	24	22.2	Rain
2024-09-12 11:00:00	12.7	0.069	28	25.6	Rain, Par ially cloudy
2024-09-12 12:00:00	11.4	2.303	43.7	24	Rain, Par ially cloudy
2024-09-12 13:00:00	13	0.584	33.3	17.9	Rain, Par ially cloudy
2024-09-12 14:00:00	12.2	0.729	30	23.4	Rain, Par ially cloudy
2024-09-12 15:00:00	13.5	0	37.6	24	Par ially cloudy
2024-09-12 16:00:00	13.5	0.126	37	27.5	Rain, Par ially cloudy
2024-09-12 17:00:00	11.6	0.086	29	23.7	Rain, Par ially cloudy
2024-09-12 18:00:00	11.7	0	24.8	21.7	Clear
2024-09-12 19:00:00	10.9	0	19.5	12.9	Clear
2024-09-12 20:00:00	9.8	0	10.7	13.8	Clear
2024-09-12 21:00:00	7.5	0	14.7	8	Clear
2024-09-12 22:00:00	7.2	0	6.7	10.5	Clear
2024-09-12 23:00:00	7.1	0	14.8	10.8	Clear
2024-09-13 00:00:00	7.8	0	13.3	10.8	Clear
2024-09-13 01:00:00	5.3	0	11.9	12.1	Clear
2024-09-13 02:00:00	6.1	0	12.2	12	Clear
2024-09-13 03:00:00	6	0	11.5	8.2	Clear
2024-09-13 04:00:00	6	0	11.5	11.5	Clear
2024-09-13 05:00:00	5	0	11.5	9	Clear
2024-09-13 06:00:00	6	0	11.2	8.2	Par ially cloudy
2024-09-13 07:00:00	5.4	0	7.6	9	Clear
2024-09-13 08:00:00	7	0	7.9	5.2	Par ially cloudy
2024-09-13 09:00:00	10	0	7.2	5	Par ially cloudy
Da a in red has been excluded from he assessmen as i was affec ed by rain noise on he ligh weigh roof above he logger.					

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
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ROOM 1

Front Bedroom (trickle vent)

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Front Night time LAmax	84	77	74	70	68	65	62	58	74

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	6.1
S	Area of facade and roof	7.8
x	Room Dimension x	3.5
y	Room Dimension y	3.0
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Level 43 dB(A)

BREAK-IN CALC

				63	125	250	500	1000	2000	4000	8000
	$D_{n,e}$	Insulation of the trickle vent	BS8233 Example - Sound attenuated trickle vent	100	37	36	35	36	34	100	100
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		1.3E-10	2.6E-04	3.2E-04	4.1E-04	3.2E-04	5.1E-04	1.3E-10	1.3E-10
	R_{wi}	SRI of the window	10 (15) 6 mm double glazing	33	27	29	35	41	35	46	46
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		1.1E-04	4.3E-04	2.7E-04	6.9E-05	1.7E-05	6.9E-05	5.4E-06	5.4E-06
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.3E-04	1.3E-04	7.1E-06	1.2E-06	9.4E-08	2.1E-08	8.7E-09	7.0E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-36	-31	-32	-33	-35	-32	-53	-53
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$	6	7	7	7	7	7	7	7
G		10log(S/A)		1	1	0	0	0	0	0	0

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	52	50	45	40	37	36	12	8	**55**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	26	34	36	37	37	37	13	7	**43**

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
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ROOM 1

Front Bedroom (trickle vent)

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Front Night time LAeq,8h	63	56	53	50	52	47	40	34	55

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	6.1
S	Area of facade and roof	7.8
x	Room Dimension x	3.5
y	Room Dimension y	3.0
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Level 25 dB(A)

BREAK-IN CALC

	$D_{n,e}$	Insulation of the trickle vent	BS8233 Example - Sound attenuated trickle vent	100	37	36	35	36	34	100	100
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		1.3E-10	2.6E-04	3.2E-04	4.1E-04	3.2E-04	5.1E-04	1.3E-10	1.3E-10
	R_{wi}	SRI of the window	10 (15) 6 mm double glazing	33	27	29	35	41	35	46	46
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		1.1E-04	4.3E-04	2.7E-04	6.9E-05	1.7E-05	6.9E-05	5.4E-06	5.4E-06
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.3E-04	1.3E-04	7.1E-06	1.2E-06	9.4E-08	2.1E-08	8.7E-09	7.0E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-36	-31	-32	-33	-35	-32	-53	-53
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	6	7	7	7	7	7	7	7
G		10log(S/A)		1	1	0	0	0	0	0	0

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	31	28	24	20	21	18	0	0	**34**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	5	12	15	17	21	19	1	0	**25**

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
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ROOM 1

Front Bedroom (trickle vent)

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Front Daytime LAeq,16h	70	63	60	57	59	54	47	41	62

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	6.1
S	Area of facade and roof	7.8
x	Room Dimension x	3.5
y	Room Dimension y	3.0
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Level 32 dB(A)

BREAK-IN CALC

	$D_{n,e}$	Insulation of the trickle vent	BS8233 Example - Sound attenuated trickle vent	100	37	36	35	36	34	100	100
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		1.3E-10	2.6E-04	3.2E-04	4.1E-04	3.2E-04	5.1E-04	1.3E-10	1.3E-10
	R_{wi}	SRI of the window	10 (15) 6 mm double glazing	33	27	29	35	41	35	46	46
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		1.1E-04	4.3E-04	2.7E-04	6.9E-05	1.7E-05	6.9E-05	5.4E-06	5.4E-06
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.3E-04	1.3E-04	7.1E-06	1.2E-06	9.4E-08	2.1E-08	8.7E-09	7.0E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-36	-31	-32	-33	-35	-32	-53	-53
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	6	7	7	7	7	7	7	7
G		10log(S/A)		1	1	0	0	0	0	0	0

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	38	35	31	27	28	25	0	0	**41**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	12	19	22	24	28	26	1	0	**32**

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
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ROOM 1

Rear Bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Rear Night time LAmax	78	71	68	64	62	59	56	52	68

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	13.0
S	Area of facade and roof	14.7
x	Room Dimension x	5.0
y	Room Dimension y	3.2
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Level 44 dB(A)

BREAK-IN CALC

				63	125	250	500	1000	2000	4000	8000
	$D_{n,e}$	Insulation of the trickle vent	Standard trickle vent in window	20	23	26	29	30	33	33	35
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		6.8E-03	3.4E-03	1.7E-03	8.6E-04	6.8E-04	3.4E-04	3.4E-04	2.2E-04
	R_{wi}	SRI of the window	4 (12) 4 mm double glazing	13	23	18	26	38	44	38	38
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		5.8E-03	5.8E-04	1.8E-03	2.9E-04	1.8E-05	4.6E-06	1.8E-05	1.8E-05
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.4E-04	1.4E-04	8.0E-06	1.3E-06	1.1E-07	2.4E-08	9.9E-09	7.9E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-19	-24	-25	-29	-32	-35	-34	-36
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	9	10	11	11	11	11	11	11
G		10log(S/A)		2	2	1	1	1	1	1	1

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	64	52	48	39	35	29	25	20	**65**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	38	36	39	36	35	30	26	19	**44**

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
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ROOM 1

Rear Bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Rear Night time LAeq,8h	57	50	47	44	46	41	34	28	49

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	13.0
S	Area of facade and roof	14.7
x	Room Dimension x	5.0
y	Room Dimension y	3.2
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Level 24 dB(A)

BREAK-IN CALC

				63	125	250	500	1000	2000	4000	8000
	$D_{n,e}$	Insulation of the trickle vent	Standard trickle vent in window	20	23	26	29	30	33	33	35
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		6.8E-03	3.4E-03	1.7E-03	8.6E-04	6.8E-04	3.4E-04	3.4E-04	2.2E-04
	R_{wi}	SRI of the window	4 (12) 4 mm double glazing	13	23	18	26	38	44	38	38
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		5.8E-03	5.8E-04	1.8E-03	2.9E-04	1.8E-05	4.6E-06	1.8E-05	1.8E-05
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.4E-04	1.4E-04	8.0E-06	1.3E-06	1.1E-07	2.4E-08	9.9E-09	7.9E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-19	-24	-25	-29	-32	-35	-34	-36
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	9	10	11	11	11	11	11	11
G		10log(S/A)		2	2	1	1	1	1	1	1

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	43	30	27	19	19	11	4	0	**43**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	17	14	18	16	19	12	5	0	**24**

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
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ROOM 1

Rear Bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Rear Daytime LAeq,16h	64	57	54	51	53	48	41	35	56

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	13.0
S	Area of facade and roof	14.7
x	Room Dimension x	5.0
y	Room Dimension y	3.2
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Level 31 dB(A)

BREAK-IN CALC

				63	125	250	500	1000	2000	4000	8000
	$D_{n,e}$	Insulation of the trickle vent	Standard trickle vent in window	20	23	26	29	30	33	33	35
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		6.8E-03	3.4E-03	1.7E-03	8.6E-04	6.8E-04	3.4E-04	3.4E-04	2.2E-04
	R_{wi}	SRI of the window	4 (12) 4 mm double glazing	13	23	18	26	38	44	38	38
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		5.8E-03	5.8E-04	1.8E-03	2.9E-04	1.8E-05	4.6E-06	1.8E-05	1.8E-05
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.4E-04	1.4E-04	8.0E-06	1.3E-06	1.1E-07	2.4E-08	9.9E-09	7.9E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-19	-24	-25	-29	-32	-35	-34	-36
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	9	10	11	11	11	11	11	11
G		10log(S/A)		2	2	1	1	1	1	1	1

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	50	37	34	26	26	18	11	3	**50**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	24	21	25	23	26	19	12	2	**31**

BS8233 Multi-room noise break-in calc v.1.0

Project Name: Sullivan House
Project Number: 1147
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
File ref /Users/pauldriscoll/Documents/Formant/1 Projects/02 Live projects/1346 New Fleurs Porthmanmoor Rd/Internal work/[Noise break-in calc - New Fleurs.xls]Input data
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ROOM 1

Front Bedroom (mech vent)

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Front Night time LAmax	84	77	74	70	68	65	62	58	74

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	13.0
S	Area of facade and roof	14.7
x	Room Dimension x	3.0
y	Room Dimension y	3.0
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Leq 45 dB(A)

BREAK-IN CALC

				63	125	250	500	1000	2000	4000	8000
	$D_{n,e}$	Insulation of the trickle vent	Ignore Trickle Vent	100	100	100	100	100	100	100	100
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11
	R_{wi}	SRI of the window	8 (12) 6 mm double glazing	18	21	21	35	42	35	49	49
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		1.8E-03	9.1E-04	9.1E-04	3.6E-05	7.3E-06	3.6E-05	1.4E-06	1.4E-06
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.4E-04	1.4E-04	8.0E-06	1.3E-06	1.1E-07	2.4E-08	9.9E-09	7.9E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-27	-30	-30	-44	-51	-44	-58	-58
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	5	6	6	6	6	6	6	6
G		10log(S/A)		4	4	4	4	4	4	4	4

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	65	55	50	33	24	28	10	6	**65**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	39	39	41	30	24	29	11	5	**45**

BS8233 Multi-room noise break-in calc v.1.0

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ROOM 1

Front Bedroom (mech vent)

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Front Night time LAeq,8h	63	56	53	50	52	47	40	34	55

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	13.0
S	Total façade area (incl. window) (m^2)	14.7
x	Room Dimension x	3.0
y	Room Dimension y	3.0
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Leq 24 dB(A)

BREAK-IN CALC

	$D_{n,e}$	Insulation of the trickle vent	Ignore Trickle Vent	100	100	100	100	100	100	100	100
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11
	R_{wi}	SRI of the window	8 (12) 6 mm double glazing	18	21	21	35	42	35	49	49
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		1.8E-03	9.1E-04	9.1E-04	3.6E-05	7.3E-06	3.6E-05	1.4E-06	1.4E-06
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.4E-04	1.4E-04	8.0E-06	1.3E-06	1.1E-07	2.4E-08	9.9E-09	7.9E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-27	-30	-30	-44	-51	-44	-58	-58
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	5	6	6	6	6	6	6	6
G		10log(S/A)		4	4	4	4	4	4	4	4

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	44	33	29	12	7	10	0	0	**44**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	18	17	20	9	7	11	1	0	**24**

BS8233 Multi-room noise break-in calc v.1.0

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ROOM 1

Front Bedroom (mech vent)

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	LAeq
A	$L_{eq,ff}$	Free-field L_{eq} outside room	Front Daytime LAeq,16h	70	63	60	57	59	54	47	41	62

ROOM PARAMETERS

Term	Term Description	Value
S_{wi}	Area of the windows (m^2)	1.7
S_{rr}	Area of the roof (m^2)	0.0
S_{ew}	Area of the external wall (m^2)	13.0
S	Area of facade and roof	14.7
x	Room Dimension x	3.0
y	Room Dimension y	3.0
z	Room Dimension z	2.6
RT	Receiving Room RT	0.6
K	Façade correction	0.0

Internal Leq 34 dB(A)

BREAK-IN CALC

	$D_{n,e}$	Insulation of the trickle vent	Ignore Trickle Vent	100	100	100	100	100	100	100	100
B		$\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}}$		6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11	6.8E-11
	R_{wi}	SRI of the window	4 (12) 4 mm double glazing	13	23	18	26	38	44	38	38
C		$\frac{S_{wi}}{S}10^{\frac{-Rwi}{10}}$		5.8E-03	5.8E-04	1.8E-03	2.9E-04	1.8E-05	4.6E-06	1.8E-05	1.8E-05
	R_{ew}	SRI of the external wall	Double Leaf 1400kg/m3 100mm blockwork + 50mm cavity, plastered either side	38	38	50	58	69	76	80	80
D		$\frac{S_{ew}}{S}10^{\frac{-\mathrm{Re}\,w}{10}}$		1.4E-04	1.4E-04	8.0E-06	1.3E-06	1.1E-07	2.4E-08	9.9E-09	7.9E-09
	R_{rr}	SRI of roof/ceiling	Ignore roof	100	100	100	100	100	100	100	100
E		$\frac{S_{rr}}{S}10^{\frac{-Rrr}{10}}$		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
F		Composite SRI of façade	10log(B + C + D + E)	-22	-31	-27	-35	-47	-53	-47	-47
	A	Equivalent Absorption Area	$\frac{0.161\ V}{RT}$ (includes increase at low frequency)	5	6	6	6	6	6	6	6
G		10log(S/A)		4	4	4	4	4	4	4	4

L_{eq} RESULTS

$$L_{eq,2} \approx L_{eq,ff} + 10\log\left\{\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right\} + 10\log\left\{\frac{S}{A}\right\} + 3$$

		Octave Band Centre Frequency 63	125	250	500	1000	2000	4000	8000	Broadband
$L_{eq,2}$	Level in the receiver room (includes façade correction K)	55	38	39	28	18	8	7	0	**55**
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
$L_{Aeq,2}$	A-weighted Level in the receiver room	29	22	30	25	18	9	8	0	**34**