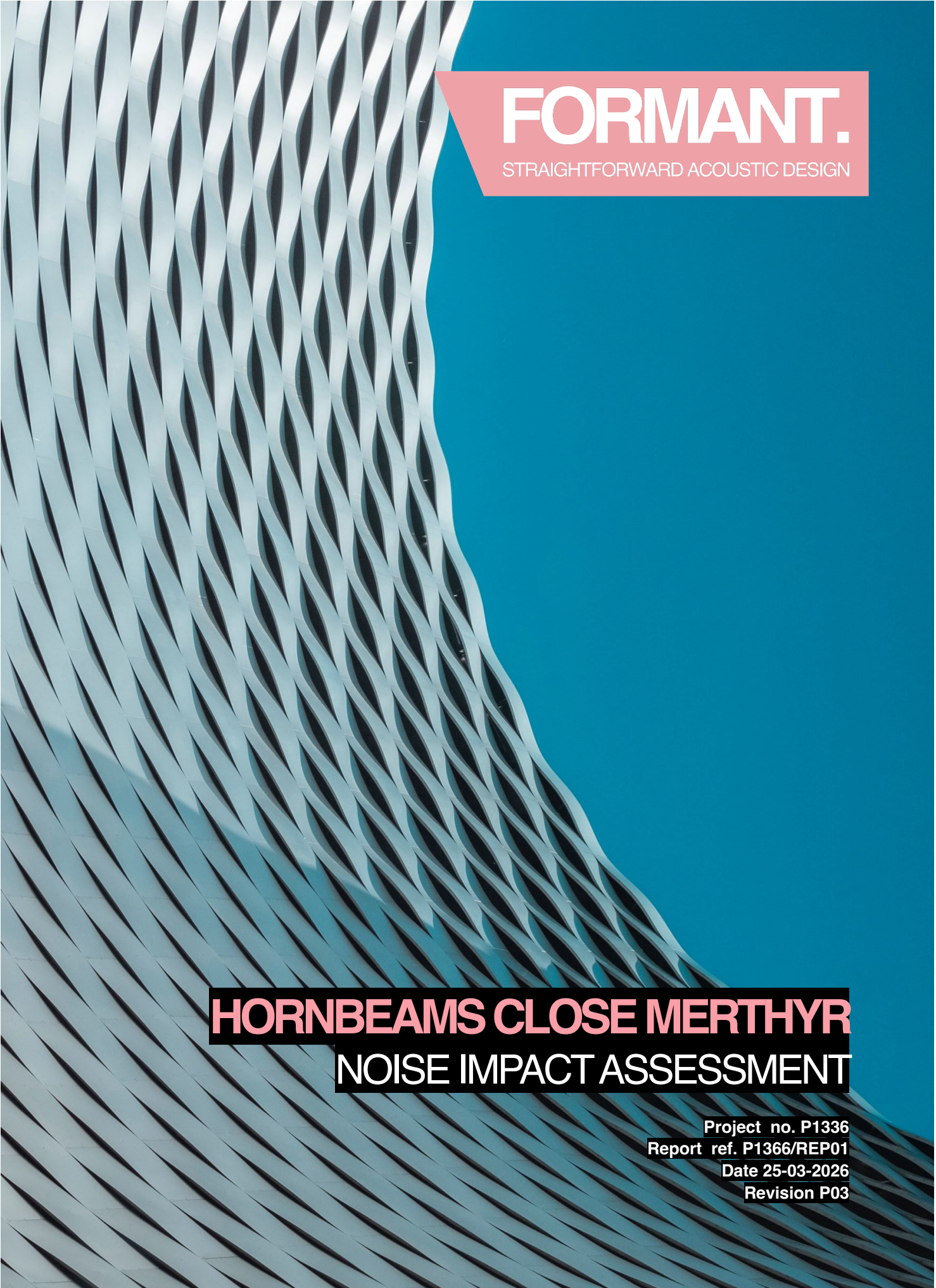




FORMANT.

STRAIGHTFORWARD ACOUSTIC DESIGN

HORNBEAMS CLOSE MERTHYR

NOISE IMPACT ASSESSMENT

Project no. P1336

Report ref. P1366/REP01

Date 25-03-2026

Revision P03



EXECUTIVE SUMMARY

Formant has been appointed to assess the noise levels affecting a proposed residential development at Hornbeam Close, Merthyr Tydfil. The proposed development involves the construction of four single-storey dwellings and the environmental noise impact has been assessed in line with relevant policy and guidance including TAN11 and BS 8233.

SITE NOISE LEVELS

The site is located approximately 40 m to the south of the A465 which has recently undergone a major construction project to dual the road, including the construction of a noise barrier between the site and the new road. A baseline noise survey has been undertaken at the site, recording ambient sound levels of 62/55 dBL_{Aeq} (day/night) and maximum night time levels of 75 dBL_{Amax}.

The measurement results show that the site falls between Noise Exposure Categories B in TAN11, meaning that noise is a material consideration for planning.

NOISE IMPACT ASSESSMENT

The proposed dwellings are pre-fabricated units which include noise mitigation in the form of high levels of façade insulation and mechanical ventilation however there are no opportunities to provide additional noise mitigation e.g. changing the specification or location of windows. We have worked with the client, design team and the planning officer to develop a site layout which provides the maximum possible screening from road traffic noise but the planning policy requirement for an active frontage onto the Gurnos Ring Road means that options for screening were very limited.

Noise levels in the proposed gardens are predicted to exceed the BS 8233 guidelines but residents will still have access to quiet external amenity space within a short walk of the proposed dwellings, therefore **no significant adverse noise impacts are predicted as a result of noise levels in external amenity spaces.**

The noise levels inside the dwellings are predicted to exceed the BS 8233 noise targets in some rooms but the magnitude of exceedance is generally marginal (typically 2-3 dB) and there are a number of mitigating factors which reduce the likelihood that open windows would be required (e.g. boost ventilation via the MVHR system and high levels of thermal insulation). 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 recommend that the proposed development is acceptable in terms of noise impacts with no acoustic-related planning conditions required.



1 INTRODUCTION

Formant has been appointed to assess the noise levels affecting the site of a proposed residential dwelling on a site at Hornbeam Close, Merthyr Tydfil CF47 9DT. The proposed development involves the construction of four single-storey residential dwellings. The proposed development is not expected to generate significant noise but the proposed dwellings will be sensitive to environmental noise and the site is located fairly close to a significant transportation noise source, the A465 dual carriageway.

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

2.1 EXISTING SITE

The existing site comprises an area of hardstanding to the north of Merthyr Tydfil which is currently used for car parking. The site is located in a predominantly residential area, bounded by Fernhill Close to the west, Hornbeam Close to the south, Gurnos Ring Road to the north and residential properties/gardens to the east.

The A465 trunk road is located in a partial cutting approximately 40 m north of the site with a substantial noise barrier blocking the line of sight from the proposed development site to most of the new road. An aerial photo of the site is shown in Figure 1 overleaf.

2.2 PROPOSED DEVELOPMENT

The proposed development involves the construction of four single-storey residential dwellings which have been oriented to provide screening from the dual carriageway noise. The proposed site layout plan is provided in Figure 2 overleaf.

2.3 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 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.

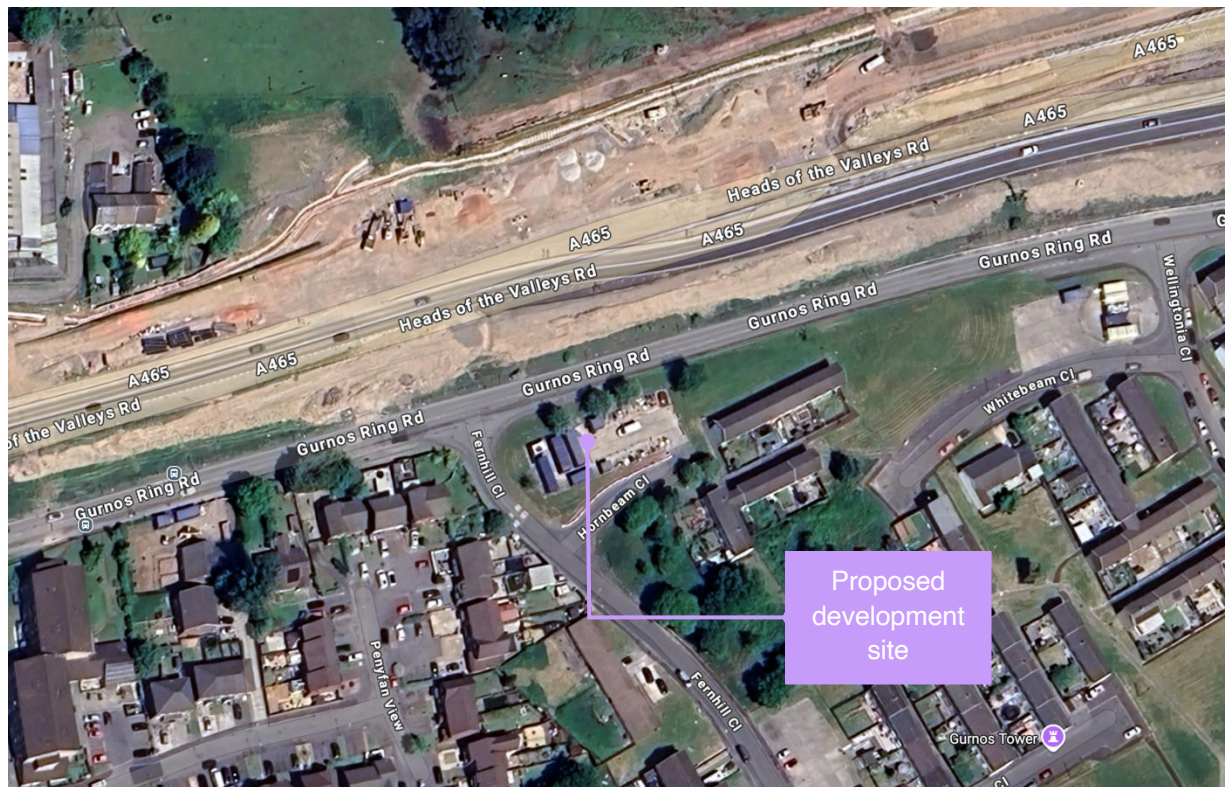


Figure 1: 2025 Google Maps aerial photo of the proposed site plan showing proximity to the A465 roadworks



Figure 2: Site layout proposal



3 LEGISLATION, POLICY AND GUIDANCE

3.1 NATIONAL AND LOCAL POLICY

3.1.1 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.



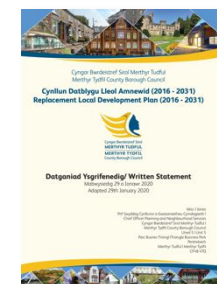
3.1.2 TECHNICAL ADVICE NOTE 11 (WALES)

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.



3.1.3 LOCAL POLICY

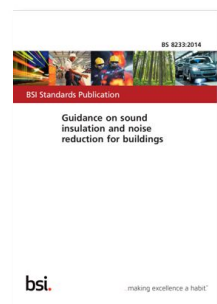
Merthyr Tydfil Replacement Local Development Plan (LDP) 2016-2031, adopted on January 29, 2020 provides the Local Planning Authorities noise policy. The document does not contain any specific guidance which affects this noise assessment, instead providing a broader environmental and development framework referencing noise protection as one of its key principles.



3.2 SUPPLEMENTARY GUIDANCE

3.2.1 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.



4 BASELINE NOISE SURVEY

4.1 MEASUREMENT METHODOLOGY

A baseline noise survey was undertaken by Paul Driscoll MIOA of Formant, with a continuous noise logger running between 1600 hrs on 06 Jun 2025 and 11:00 hrs on 07 June 2025. The site is not secure, so it was not practicable to leave the logger for multiple days, but the survey duration was selected to capture a full night time period as well as full weekday morning and evening rush-hours. The noise logger location is shown in Figure 3.



Figure 3: Noise logger photo, showing A465 noise barrier in the distance.

External measurements were made in line with BS 7445:2003 *Description of Environmental Noise*. Unless otherwise stated in the results measurements were made at a distance of at least 3 metres from the façade of buildings or other reflecting surfaces and are representative of free field results.

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 around the site during the survey was dominated by traffic noise on Gurnos Rd and to a lesser extent on the A465. The barrier appears to be providing a very good level of noise attenuation for traffic on the A465. No other significant noise sources were noted.



4.4 WEATHER CONDITIONS

The weather conditions during the survey were warm and sunny with no perceptible wind. The weather conditions are considered suitable for undertaking noise measurements.

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 4.

Time period T	Ambient sound level $L_{Aeq,T}$ (dB)	Maximum sound level* $L_{Amax(F)}$ (dB)
Daytime (0700-2300 hrs)	62	n/a
Night time (2300-0700 hrs)	55	75
* L_{Amax} results are the 95 th percentile of the individual L_{Amax} results representing the 'level not normally exceeded'.		

Table 1: Predicted noise levels at nearby buildings.

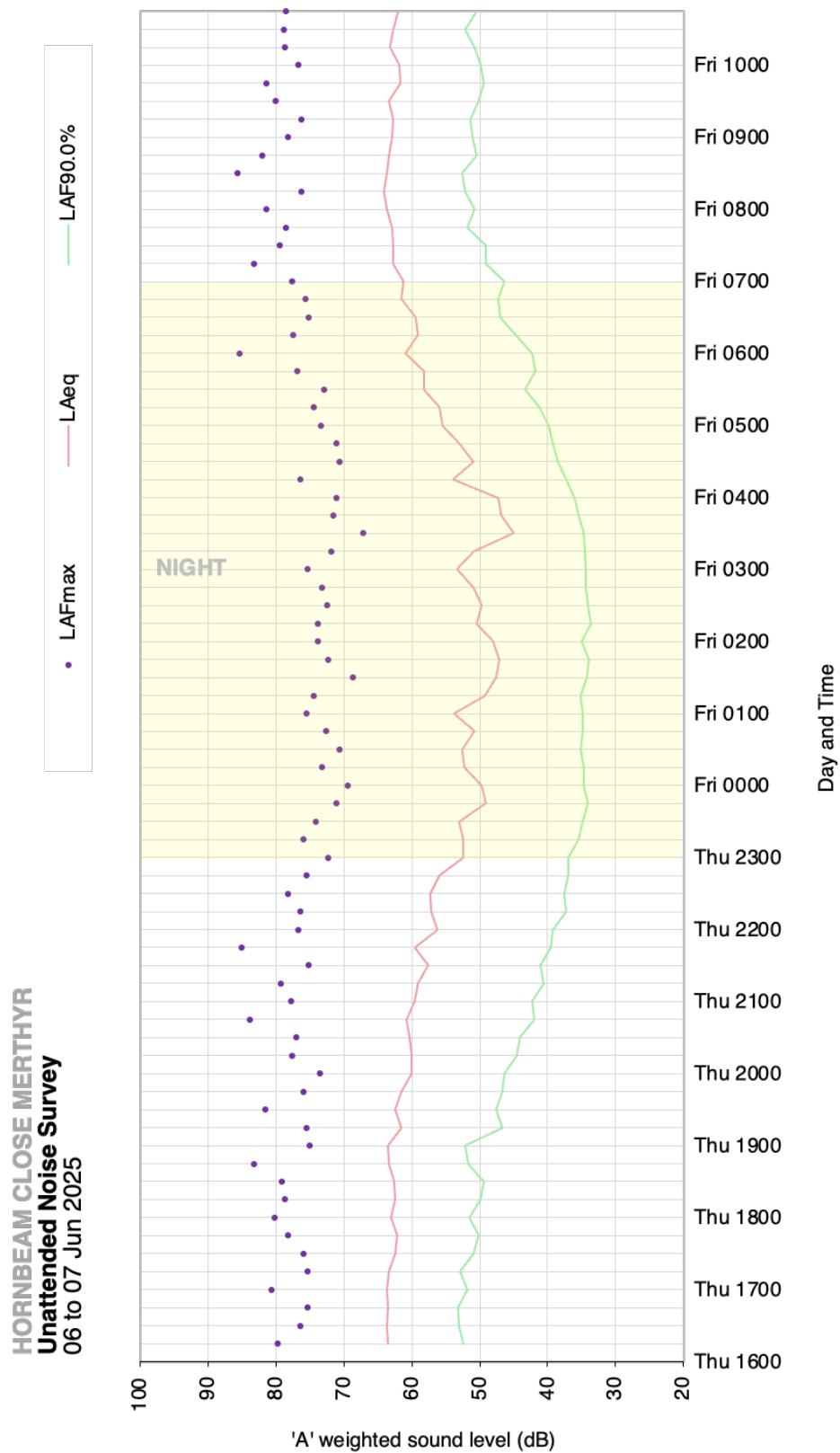


Figure 4: Time history graph from the noise logger

5 NOISE IMPACT ASSESSMENT

5.1 TAN11 NOISE EXPOSURE CATEGORIES

The facades to the south fall into NEC A and the other elevations fall into NEC B, as shown below:

Noise Source	Time period	Noise Exposure Category (NEC)			
		A	B	C	D
Road traffic	Daytime (0700-2300 hrs)	<55	55-63	63-72	>72
	Night-time (0700-2300 hrs)	<45	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 NEC B, “Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.”

5.2 FAÇADE AND AMENITY SPACE NOISE LEVELS

We have marked up a proposed site plan in Figure 5 to show the predicted façade noise levels which have been used for the noise impact assessment.

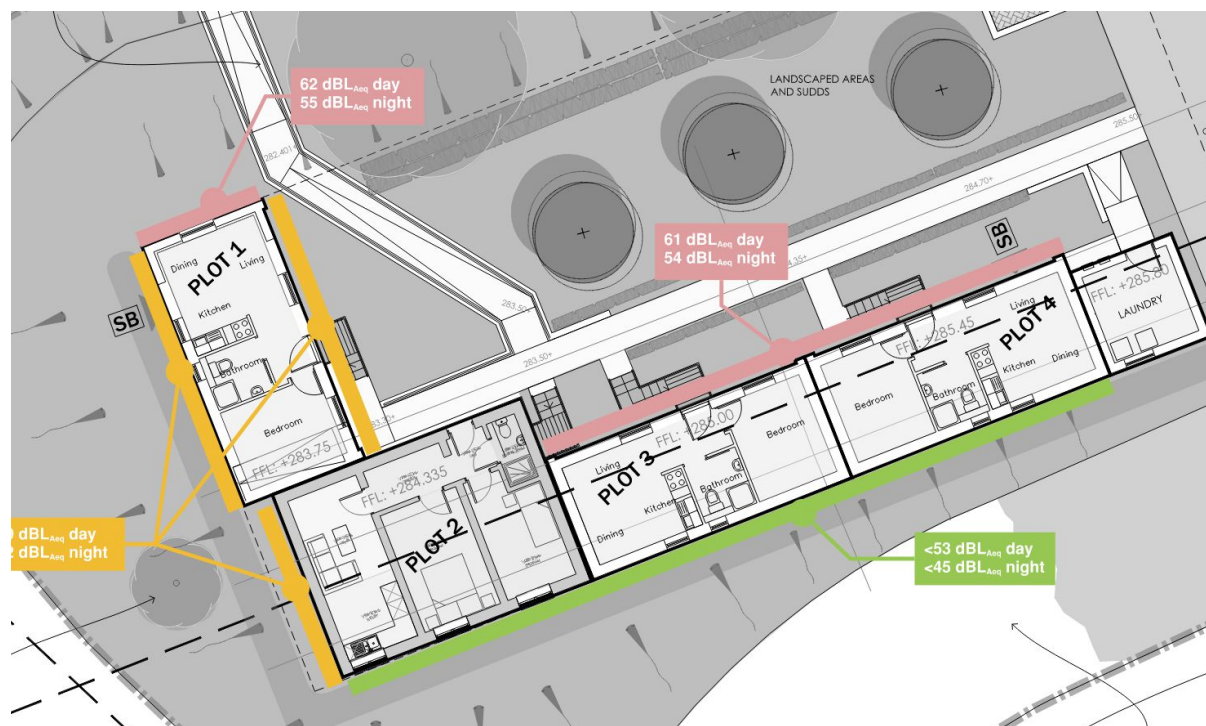


Figure 5: Predicted ambient sound levels at each façade



5.3 NOISE IN EXTERNAL AMENITY SPACES

We have worked closely with the client, design team and planning department at MTCBC to develop a site layout which meets the various planning policy requirements. Unfortunately the planning requirement for active frontage onto the Gurnos Ring Road means that the only acceptable site layout has the gardens on the north side of the site where the daytime noise levels will be around 60-62 $\text{dBL}_{\text{Aeq}18\text{h}}$.

The predicted levels are above the BS 8233 55 $\text{dBL}_{\text{Aeq}16\text{h}}$ upper limit. However residents will have access to a fully screened, quiet public park around 100 m southwest of the site and the provision of gardens are still considered to be a benefit to residents, despite the higher-than-desirable noise levels.

On this basis, **no significant adverse impacts are predicted as a result of noise levels in external amenity spaces.**

5.4 INTERNAL NOISE LEVELS

5.3.1 ASSESSMENT CRITERIA

The internal noise levels have been compared with the 'desirable' target levels in BS 8233:

1. **35 $\text{dBL}_{\text{Aeq},16\text{h}}$ daytime (bedrooms and living rooms)**
2. **30 $\text{dBL}_{\text{Aeq},16\text{h}}$ night-time (bedrooms only)**

For sites which are exposed to higher noise levels, BS 8233 states: "*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.***"

BS 8233 also provides guidance on noise from short-term events (i.e. L_{Amax} noise levels) suggesting a target of 45 dBL_{Amax} inside bedrooms at night. The survey data shows that the night time L_{Amax} values are 20 dB higher than the ambient $L_{\text{Aeq},8\text{h}}$ therefore the night time noise assessment considers the L_{Amax} values.

The noise criteria apply under baseline ventilation conditions as defined in Approved Document F, 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 to the BS 8233 'desirable' criteria to assess occasional boost ventilation via open windows.**

5.3.2 NOISE BREAK-IN – BASELINE VENTILATION

We have assessed noise break-in to the proposed development in line with the method in BS 8233 and the building specifications provided by the applicant:

- Baseline ventilation provided via a mechanical ventilation heat recovery (MVHR) system.
- Triple-glazed windows (assumed to be R_w 31 dB, e.g. 4/12/4/12/4 mm glass)
- Single ply membrane/timber frame roof buildup (calculated to be R_w 47 dB)
- Rainscreen cladding and timber frame walls (calculated to be R_w 52 dB)



The initial calculation results are summarised in the table below alongside the BS 8233 'desirable' ambient sound levels.

Plot a	Time period & noise metric	Indoor ambient noise level	BS 8233 'desirable' target	Compare to target	Compliant?
Plot 1 living room	Day $L_{Aeq,16h}$	38	35	+3	No (Marginal)
Plot 1 Bedroom	Day $L_{Aeq,16h}$	32	35	-3	Yes
	Night L_{Amax}	45	45	0	Yes
Plot 2 Bedroom/living room	Day $L_{Aeq,16h}$	26	35	-9	Yes
Plot 2 Bedroom	Night L_{Amax}	37	45	-7	Yes
Plot 3/4 Living room/bedroom	Day $L_{Aeq,16h}$	35	35	0	Yes
Plot 3/4 Bedroom	Night $L_{Aeq,8h}$	48	45	+3	No (Marginal)

Table 3: Predicted internal noise levels (dBA) and comparison with BS 8233 criteria

The results show that the predicted internal noise levels are mostly compliant with the BS 8233 'desirable' indoor noise levels with the exception of the bedrooms in Plots 1, 3 and 4 which are predicted to exceed the L_{Amax} targets by 2-3 dB. BS 8233 states that a 5 dB relaxation of the noise criteria may be considered 'acceptable' in noisier environments, so whilst this exceedance is considered an adverse impact, it is not a significant impact because it is only a marginal exceedance.

On this basis the proposed development meets the relevant planning policy requirements and **no significant adverse impacts are predicted as a result of noise break-in under baseline ventilation.**

5.3.5 NOISE BREAK-IN – BOOST VENTILATION

Boost ventilation in periods of hot weather is typically provided by open windows, although the proposed dwellings do have MVHR units which are capable of providing boost ventilation by increasing the fan speed. We have worked with the design team and planning officer to try and arrange the buildings such that most rooms are able to open windows on a fully screened elevation, however the planning policy requirement for an active frontage on the Gurnos Ring Road, combined with the fixed layouts of the pre-fabricated dwellings means it is unavoidable that the bedroom windows on some of the units are located on noisy elevations.

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 and assuming that if residents have access to windows on two elevations, they would choose to open the window on the quiet elevation:



Dwelling	Time period & noise metric	Type of room	Indoor ambient noise level	Proposed target	Compare to target	Compliant?
Plot 1	Day L _{Aeq,16h}	Living room	47	45	+2	No (Marginal)
	Day L _{Aeq,16h}	Bedroom	47	45	+2	No (Marginal)
	Night L _{Aeq,8h}		40	40	0	Yes
Plot 2	Day L _{Aeq,16h}	Bedroom and Living room	<41	45	-4	Yes
	Night L _{Aeq,8h}	Bedroom	33	40	-7	Yes
Plot 3/4	Day L _{Aeq,16h}	Bedroom and Living room	49	45	+4	No
	Night L _{Aeq,8h}	Bedroom	42	40	+2	No (Marginal)

Table 4: Predicted internal noise levels (dBA) with open windows and comparison with guideline targets

The results of the calculations show that the predicted internal noise levels with open windows are likely to be compliant in those rooms where the building orientation enables screening from the A465, but for Plots 1, 3 and 4 this is not possible and the bedrooms are predicted to exceed the proposed targets by 5 dB. The following mitigation should be factored into the noise assessment:

- 1) The proposed boost ventilation noise targets are not covered by any national/local planning policy, building regulations, nor British Standards, therefore compliance is not a mandatory requirement and the assessment is just best practice.
- 2) The proposed dwellings have MVHR units which can provide boost ventilation during periods of hot weather by increasing the fan speed, thus reducing the need to open windows for ventilation.
- 3) The proposed dwellings have very high levels of thermal insulation and the elevations which are most exposed to noise are north facing (exposed to less solar gain than the quiet south-facing elevations). As a result, the risk of overheating on the noisy elevations may be reduced.
- 4) The proposed development is in a residential area, adjacent to existing 2-storey dwellings which have first floor bedroom windows exposed to higher traffic noise levels and are unlikely to have comparable levels of thermal insulation or mechanical ventilation. As such, the proposed dwellings would be less likely to need to open windows due to overheating than the existing dwellings and if they did, the noise levels would be lower than it is in the existing dwellings.

Whilst the proposed noise targets are predicted to be exceeded in some rooms, once the above mitigation is factored into the assessment, **no significant adverse impacts are predicted as a result of noise break-in during boost ventilation.**



6 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 including TAN11 and BS 8233.

Noise levels at the location of the proposed dwellings have been measured via a baseline noise survey and the results place the site in Noise Exposure Category B in TAN11.

The site noise assessment shows that the noise levels in the proposed gardens will exceed the BS 8233 guideline targets but the residents will still have access to quiet external amenity space in close proximity to the proposed dwellings, therefore **no adverse noise impacts are predicted as a result of noise levels in external amenity spaces.**

An assessment of noise levels inside the proposed dwellings under baseline ventilation shows that the internal noise levels are may exceed the desirable indoor noise levels under baseline and boost ventilation (e.g. during periods of hot weather) in Plots 1, 3 and 4. The margin of exceedance is generally marginal and there are a number of mitigating factors which reduce the likelihood that open windows would be required (e.g. boost ventilation via the MVHR system and high levels of thermal insulation), therefore **no significant adverse noise impacts are predicted as a result of environmental noise break-in.**

6.1 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 with no requirement for any noise related planning conditions.



APPENDIX A: NOISE BREAK-IN CALCULATIONS

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
File ref I:\Users\pauldriscoll\Documents\Format\1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 1

ROOM 1 Plot 1 Living room

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency								LAeq
				63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	North Daytime LAeq,16h	69	62	57	57	60	52	44	32	62

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	6.5
S _r	Area of the roof (m²)	9.4
S _{ew}	Area of the external wall (m²)	23.7
S	Area of facade and roof	39.6
x	Room Dimension x	5.0
y	Room Dimension y	2.8
z	Room Dimension z	2.6
RT	Receiving Room RT	0.8
K	Façade correction	0.0

Internal Level 38 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		$\frac{A_b}{S} 10^{\frac{-D_{b,e}}{10}}$		2.5E-11	2.5E-11	2.5E-11	2.5E-11	2.5E-11	2.5E-11	2.5E-11	2.5E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		5.2E-03	1.6E-03	2.1E-03	2.6E-04	1.0E-05	3.3E-06	3.3E-05	3.3E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		3.0E-03	3.0E-04	1.9E-04	6.0E-07	1.5E-07	4.8E-08	7.5E-08	7.5E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		9.4E-04	9.4E-04	2.4E-05	4.7E-06	3.0E-06	4.7E-06	4.7E-07	4.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-36	-49	-51	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$	6	7	7	7	7	7	7	7
G		10log(S/A)		8	8	7	7	7	7	7	7

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{b,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	60	47	41	31	22	12	10	0	60
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	34	31	32	28	22	13	11	0	38

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
File ref I:\users\pauldriscoll\Documents\Format1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 2

ROOM 1 Plot 1 Bedroom

EXTERNAL NOISE

Term	Term Description	Description	Octave Band Centre Frequency								LAeq
			63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	West Daytime LAeq,16h								59

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	2.2
S _r	Area of the roof (m²)	4.2
S _{ew}	Area of the external wall (m²)	6.1
S	Area of facade and roof	12.5
x	Room Dimension x	2.4
y	Room Dimension y	2.6
z	Room Dimension z	2.6
RT	Receiving Room RT	0.5
K	Façade correction	0.0

Internal Level 32 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		$\frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}}$		8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		6.5E-03	1.7E-03	2.2E-03	2.8E-04	1.1E-05	3.5E-06	3.5E-05	3.5E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		2.5E-03	2.5E-04	1.6E-04	4.9E-07	1.2E-07	3.9E-08	6.2E-08	6.2E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		1.3E-03	1.3E-03	3.4E-05	6.7E-06	4.2E-06	6.7E-06	6.7E-07	6.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-35	-48	-50	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$ (includes increase at low frequency)	4	5	5	5	5	5	5	5
G		10log(S/A)		5	4	4	4	4	4	4	4

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	54	41	35	25	16	6	4	0	54
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	28	25	26	22	16	7	5	0	32

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
Calc checked by: 0
File ref: J:\Users\pauldriscoll\Documents\Format\1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 3

ROOM 1 Plot 1 Bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency								LAeq
				63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	West Night time LAmax	79	72	67	67	70	62	54	42	72

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	2.2
S _r	Area of the roof (m²)	4.2
S _{ew}	Area of the external wall (m²)	6.1
S	Area of facade and roof	12.5
x	Room Dimension x	2.4
y	Room Dimension y	2.6
z	Room Dimension z	2.6
RT	Receiving Room RT	0.5
K	Façade correction	0.0

Internal Level 45 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		$\frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}}$		8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		5.5E-03	1.7E-03	2.2E-03	2.8E-04	1.1E-05	3.5E-06	3.5E-05	3.5E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		2.5E-03	2.5E-04	1.6E-04	4.9E-07	1.2E-07	3.9E-08	6.2E-08	6.2E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		1.3E-03	1.3E-03	3.4E-05	6.7E-06	4.2E-06	6.7E-06	6.7E-07	6.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-35	-48	-50	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$ (includes increase at low frequency)	4	5	5	5	5	5	5	5
G		10log(S/A)		5	4	4	4	4	4	4	4

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	67	54	48	38	29	19	17	4	67
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	41	38	39	35	29	20	18	3	45

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
Calc checked by: 0
File ref I:\users\pauldriscoll\Documents\Formant\1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 4

ROOM 1 Plot 2 bedroom

EXTERNAL NOISE

Term	Term Description	Description	Octave Band Centre Frequency								LAeq
			63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	South Daytime LAeq,16h								53

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	2.2
S _r	Area of the roof (m²)	4.2
S _{ew}	Area of the external wall (m²)	6.1
S	Area of facade and roof	12.5
x	Room Dimension x	2.4
y	Room Dimension y	2.6
z	Room Dimension z	2.6
RT	Receiving Room RT	0.5
K	Façade correction	0.0

Internal Level 26 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		$\frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}}$		8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		6.5E-03	1.7E-03	2.2E-03	2.8E-04	1.1E-05	3.5E-06	3.5E-05	3.5E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		2.5E-03	2.5E-04	1.6E-04	4.9E-07	1.2E-07	3.9E-08	6.2E-08	6.2E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		1.3E-03	1.3E-03	3.4E-05	6.7E-06	4.2E-06	6.7E-06	6.7E-07	6.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-35	-48	-50	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$ (includes increase at low frequency)	4	5	5	5	5	5	5	5
G		10log(S/A)		5	4	4	4	4	4	4	4

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	48	35	29	19	10	0	0	0	48
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	22	19	20	16	10	1	1	0	26

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
File ref J:\Users\pauldriscoll\Documents\Formant\1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 5

ROOM 1 Plot 2 bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency								LAeq
				63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	South Night time LAmax	72	65	60	60	63	55	47	35	65

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	2.2
S _r	Area of the roof (m²)	4.2
S _{ew}	Area of the external wall (m²)	6.1
S	Area of facade and roof	12.5
x	Room Dimension x	2.4
y	Room Dimension y	2.6
z	Room Dimension z	2.6
RT	Receiving Room RT	0.5
K	Façade correction	0.0

Internal Level 38 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		$\frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}}$		8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		6.5E-03	1.7E-03	2.2E-03	2.8E-04	1.1E-05	3.5E-06	3.5E-05	3.5E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		2.5E-03	2.5E-04	1.6E-04	4.9E-07	1.2E-07	3.9E-08	6.2E-08	6.2E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		1.3E-03	1.3E-03	3.4E-05	6.7E-06	4.2E-06	6.7E-06	6.7E-07	6.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-35	-48	-50	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$ (includes increase at low frequency)	4	5	5	5	5	5	5	5
G		10log(S/A)		5	4	4	4	4	4	4	4

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	60	47	41	31	22	12	10	0	60
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	34	31	32	28	22	13	11	0	38

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
File ref I:\users\pauldriscoll\Documents\Format\1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 5

ROOM 1 Plot 3/4 Bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency								LAeq
				63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	North Daytime LAeq,16h	69	62	57	57	60	52	44	32	62

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	2.2
S _r	Area of the roof (m²)	4.2
S _{ew}	Area of the external wall (m²)	6.1
S	Area of facade and roof	12.5
x	Room Dimension x	2.4
y	Room Dimension y	2.6
z	Room Dimension z	2.6
RT	Receiving Room RT	0.5
K	Façade correction	0.0

Internal Level 35 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		$\frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}}$		8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		6.5E-03	1.7E-03	2.2E-03	2.8E-04	1.1E-05	3.5E-06	3.5E-05	3.5E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		2.5E-03	2.5E-04	1.6E-04	4.9E-07	1.2E-07	3.9E-08	6.2E-08	6.2E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		1.3E-03	1.3E-03	3.4E-05	6.7E-06	4.2E-06	6.7E-06	6.7E-07	6.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-35	-48	-50	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$ (includes increase at low frequency)	4	5	5	5	5	5	5	5
G		10log(S/A)		5	4	4	4	4	4	4	4

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	57	44	38	28	19	9	7	0	57
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	31	28	29	25	19	10	8	0	35

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

Project Name: Hornbeam Close, Merthyr
Project Number: 1366
Description: Noise break-in calculation
Calc made by: PD
Calc checked by 0
File ref J:\Users\pauldriscoll\Documents\Formant\1 Projects\03 Completed projects\1300-1399\1366 Hornbeams Close Merthyr\Internal\Noise break-in calc - Hornbeam Close Rev B.xls\input data
Page no: 5

ROOM 1 Plot 3/4 Bedroom

EXTERNAL NOISE

	Term	Term Description	Description	Octave Band Centre Frequency								LAeq
				63	125	250	500	1000	2000	4000	8000	
A	L _{eq,ff}	Free-field L _{eq} outside room	North Night time L _A max	82	75	70	70	73	65	57	45	75

ROOM PARAMETERS

Term	Term Description	Value
S _{wl}	Area of the windows (m²)	2.2
S _r	Area of the roof (m²)	4.2
S _{ew}	Area of the external wall (m²)	6.1
S	Area of facade and roof	12.5
x	Room Dimension x	2.4
y	Room Dimension y	2.6
z	Room Dimension z	2.6
RT	Receiving Room RT	0.5
K	Façade correction	0.0

Internal Leq 48 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		$\frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}}$		8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11	8.0E-11
	R _{wl}	SRI of the window	4 (12) 4 (12) 4 triple glazing	15	20	19	28	42	47	37	37
C		$\frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}}$		6.5E-03	1.7E-03	2.2E-03	2.8E-04	1.1E-05	3.5E-06	3.5E-05	3.5E-05
	R _{ew}	SRI of the external wall	Hornbeam Close external wall buildup	23	33	35	60	66	71	69	69
D		$\frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}}$		2.5E-03	2.5E-04	1.6E-04	4.9E-07	1.2E-07	3.9E-08	6.2E-08	6.2E-08
	R _r	SRI of roof/ceiling	Hornbeam Close roof buildup	24	24	40	47	49	47	57	57
E		$\frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}}$		1.3E-03	1.3E-03	3.4E-05	6.7E-06	4.2E-06	6.7E-06	6.7E-07	6.7E-07
F		Composite SRI of façade	10log(B + C + D + E)	-20	-25	-26	-35	-48	-50	-45	-45
	A	Equivalent Absorption Area	$\frac{0.161 V}{RT}$ (includes increase at low frequency)	4	5	5	5	5	5	5	5
G		10log(S/A)		5	4	4	4	4	4	4	4

L_{eq} RESULTS

	$L_{eq,2} \approx L_{eq,ff} + 10 \log \left\{ \frac{A_b}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wl}}{S} 10^{\frac{-R_{wl}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right\} + 10 \log \left\{ \frac{S}{A} \right\} + 3$	Octave Band Centre Frequency								Broadband
		63	125	250	500	1000	2000	4000	8000	
L _{eq,2}	Level in the receiver room (includes façade correction K)	70	57	51	41	32	22	20	7	70
	A-weighting	-26	-16	-9	-3	0	1	1	-1	
L _{Aeq,2}	A-weighted Level in the receiver room	44	41	42	38	32	23	21	6	48