

90 Trippet Lane Sheffield

Environmental Noise Survey and Noise Impact Assessment Report

30859/NIA1

23 October 2023

For:
Zerum
South Central
Suite 4E
11 Peter Street
Manchester
M2 5QR



Hann Tucker Associates

Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595

Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041

(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk



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Document Control

Rev	Date	Comment	Prepared by	Authorised by
1	23/10/2023	Updated to include latest layouts	[REDACTED]	
			James Hardacre Consultant BEng (Hons), AMIOA	Jake Howarth Senior Associate BEng (Hons), MIOA
0	28/07/2023	-	James Hardacre Consultant BEng (Hons), AMIOA	Tom Bonnert Senior Associate BEng (Hons), MIOA

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1.0 Introduction

Hann Tucker Associates Limited (Hann Tucker) has been commissioned by Zerum to undertake a noise assessment for a site in Sheffield, Yorkshire.

The site, which is located on Trippet Lane, is being considered for residential development. The proposals are for the erection of a single 8-storey building providing 82nr student apartments, as well as 4nr resident amenities.

The site is subject to road noise from Trippet Lane, Bailey Lane as well as industrial noise from Fire Hardeners. While entertainment venues were noted along Trippet Lane, on site observations and measurements indicate that while present these did not dominate the prevailing noise climate at the proposed site.

Baseline noise conditions have been established by means of a detailed noise survey, presented herein. The findings have subsequently been used to assess the suitability of the site for residential use. Measures required to mitigate noise impacts for the proposed development (when operational) have been discussed in context with relevant national & local planning policies, design standards and good practice guides.

The site has historical planning permission for a similar scheme. However, due to numerous changes and the time scale between the this application and the original permission being granted this is a new application.

2.0 Objectives

To undertake an environmental noise survey to establish the existing L_{Amax} , L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at selected accessible positions.

To undertake additional manned noise level measurements at the select locations in the vicinity of site to establish incident daytime and evening music and industrial noise levels.

Based on the results of the survey, to undertake a noise assessment to assess the suitability of the site for residential use in accordance with the Noise Policy Statement for England (NPSE), National Planning Policy Framework (NPPF), Planning Practice Guidance (ProPG), British Standard BS8233:2014 and Local Authority requirements.

To discuss noise mitigation and acoustic design solutions to achieve acceptable noise levels in residential areas.



With reference to BS 4142 and other relevant guides, to propose suitable noise limits for plant and commercial operations to protect neighbouring noise sensitive receptors.

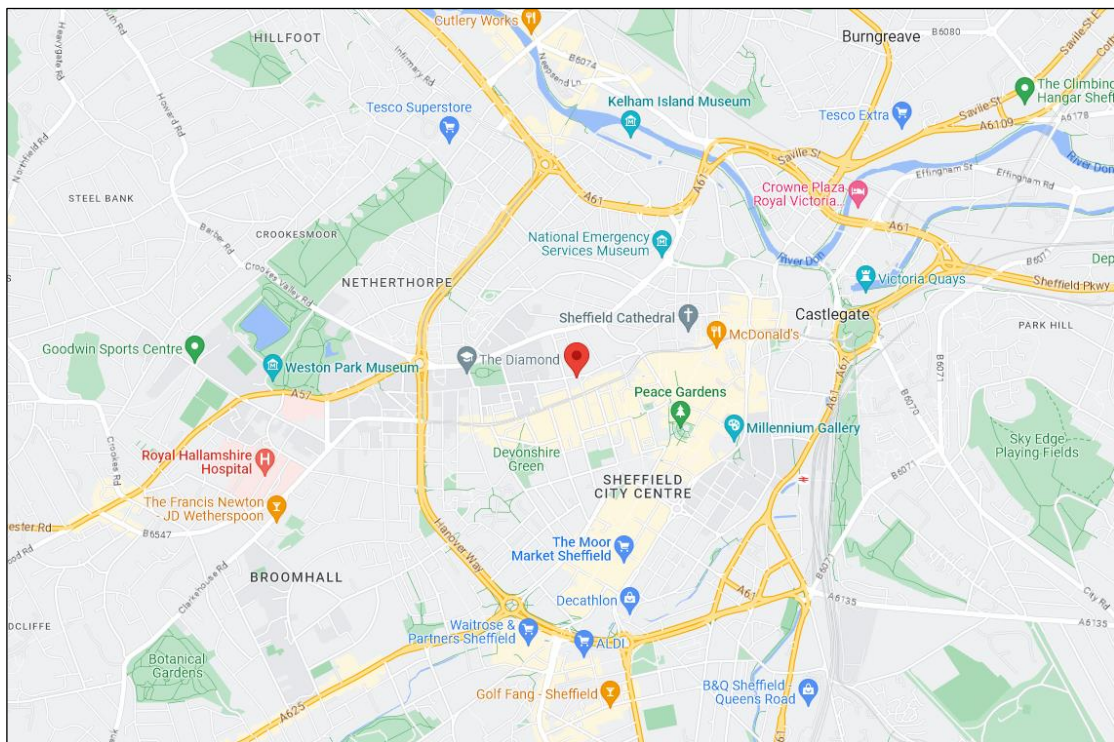
3.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

4.0 Site Description

4.1 Location

The site is located on Trippet Lane, Sheffield. The location is shown in the Location Map below.



Location Map (Map data © 2023 Google)

The site falls within the jurisdiction of Sheffield City Council.



4.2 Description

The site is bounded by an industrial unit to the north on Bailey Lane, there was noted to be residential properties to the west on the opposite side of Bailey lane. To the east on Trippet Lane is The Grapes public house, and to the south also on Trippet Lane is Trippets Lounge Bar. The area is characterised by a mix of private and student residential apartments, along with commercial and entertainment venues along Trippet Lane.

The site is shown in the Site Plan below.



Site Plan (Imagery © 2023 Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data © 2023)

5.0 Planning Policies, Standards & Guidance

In order to provide a suitable assessment a number of national planning policies have been considered, including:

- The National Planning Policy Framework (NPPF), 2021
- The Noise Policy Statement for England (NPSE), 2010
- Planning Practice Guidance – Noise (PPGN), 2019

The above documents highlight the importance of considering the potential noise effects on any new residential development and provide a qualitative approach to assessment. However, each of the above does not provide any quantitative guidance. As such, all quantitative guidance used to form a noise impact assessment is taken from various other standards, guidance, and



Local Authority requirements as summarised below:

- World Health Organisation: 2018
- British Standard BS8233: 2014
- ProPG : Planning & Noise: 2017
- Building Regulations Approved Document O: 2021

Detailed information for relevant planning policies and guidance can be found within Appendix B.

5.1 Local Authority Consultation

Hann Tucker Associates previously contacted Sheffield City Council and received the following guidance:

“Plant and equipment shall be designed to ensure that the total LA_r plant noise rating level (i.e., total plant noise LA_{eq} plus any character correction for tonality, impulsive noise, etc.) does not exceed the LA₉₀ background sound level at any time when measured at positions on the site boundary adjacent to any noise sensitive use.

It is recommended that a noise survey be carried out, to determine if the internal noise levels meet the council’s usual requirements. If not, sound insulation enhancements may be needed.

The residential accommodation hereby permitted shall not be occupied unless a scheme of sound insulation works has been installed and thereafter retained. Such scheme of works shall:

- a) Be based on the findings of an approved noise survey of the application site, including an approved method statement for the noise survey*
- b) Be capable of achieving the following noise levels:*
 - Bedrooms: LA_{eq} (8 hour) - 30dB (2300 to 0700 hours);*
 - Living Rooms & Bedrooms: LA_{eq} (16 hour) - 35dB (0700 to 2300 hours);*
 - Other Habitable Rooms: LA_{eq} (16 hour) - 40dB (0700 to 2300 hours);*



- *Bedrooms: LAFmax - 45dB (2300 to 0700 hours).*

c) *Where the above noise criteria cannot be achieved with windows partially open, include a system of alternative acoustically treated ventilation to all habitable rooms.”*

6.0 Environmental Noise Survey

6.1 Procedure

Fully automated environmental noise monitoring was undertaken by James Hardacre BEng (Hons) AMIOA from approximately 15:00 hours on Thursday 20 July 2023 to 12:00 hours on Monday 24 July 2023 to establish full daytime and night-time noise levels over a typical weekday and weekend period. Measurements were taken continuously of the A-weighted (dBA) L_{90} , L_{eq} , and L_{max} sound pressure levels over discrete 2 and 15-minute periods.

Additional attended measurements were performed between 15:30 hours and 17:00 hours on Thursday 20 July 2023, 19:30 hours and 22:30 hours on Thursday 20 July 2023 and 11:00 hours and 13:00 hours on Monday 24 July 2023 with the purpose of establishing specific noise levels associated with the operation of nearby industrial units and music venues.

6.2 Measurement Positions

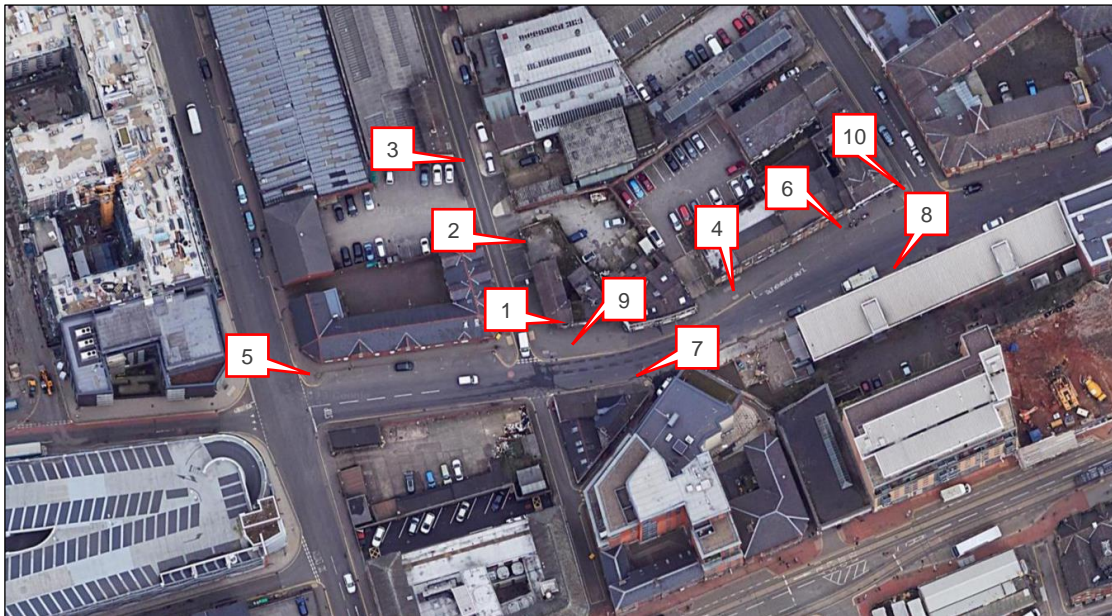
The noise level measurements were undertaken at 10 positions as described in the table below.

Position	Type	Description
1	Unattended	To the South of the site, approx. 8 m from the nearside edge of Trippet Lane. Microphone in free-field conditions approx. 1.5 m above ground.
2	Unattended	To the North of the site, approx. 2 m from the nearside edge of Bailey Lane. Microphone in free-field conditions approx. 1.5 m above ground.
3	Attended	The sound level meter was positioned approximately 8m opposite the roller shutter of Fire Hardners to the north of site in order to determine the source noise level of the industrial unit.
4	Attended	The sound level meter was positioned on the corner between the scout shop car park and Trippet Lane approximately 1.5m above ground level. This position was chosen to obtain noise levels relating to road traffic on Trippet Lane along with any contribution from cars entering/leaving the car park.
5	Attended	The sound level meter was positioned on the corner of Trippet Lane and Rockingham Street approximately 1.5m above ground level. This position was chosen to obtain noise levels relating to both Trippet Lane and Rockingham Street



Position	Type	Description
6	Attended	The sound level meter was positioned approximately 2m west of the external seating area of The Dog and Partridge and was approximately 1.5m above ground level. This position was chosen to determine any music noise egress from the pub along with the levels of external patron noise.
7	Attended	The sound level meter was positioned directly opposite the entrance of The Grapes pub approximately 1.5m above ground level. This position was chosen to determine any music noise egress from the venue.
8	Attended	The sound level meter was positioned directly opposite the entrance of The Dog and Partridge pub approximately 1.5m above ground level. This position was chosen to determine any music noise egress from the venue.
9	Attended	The sound level meter was positioned outside the entrance of Trippets Lounge Bar approximately 1.5m above ground level. This position was chosen to determine any music noise egress from the venue.
10	Attended	The sound level meter was positioned approximately 2m east of the external seating of the Dog and Partridge pub. This position was chosen to determine any music noise egress from the pub along with any patron noise from the external areas.

The positions are shown on the plan below.



Plan Showing Measurement Positions (Imagery © 2023 Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data © 2023)



6.3 Weather Conditions

For the unattended survey between Thursday 20 July 2023 and Monday 24 July 2023, local weather reports indicated notable periods of prolonged rainfall, with temperatures ranging from 11°C (night) to 19°C (day) and wind speeds less than 6 m/s. During our time on site, skies were overcast, wind conditions were calm and road surfaces were largely dry. Prolonged periods of rain and general adverse weather conditions were noted during Saturday 22 July 2023. As such, this period of data has been excluded from our assessment. The remaining survey data covers a sufficient time period to allow for a suitable assessment.

During the attended surveys on Thursday 20 July 2023 and Monday 24 July 2023, the weather was generally overcast and dry with no periods of rainfall and calm wind conditions.

6.4 Instrumentation

The instrumentation used during the survey is presented in the table below:

Position	Description	Manufacturer	Type	Serial Number	Calibration
1	Type 1 Data Logging Sound Level Meter	Svantek	971	72540	Calibration on 31/05/2023
2	Type 1 Data Logging Sound Level Meter	Larson Davis	LXT	5104	Calibration on 31/05/2023
3-10	Type 1 Data Logging Sound Level Meter	Svantek	971A	121041	Calibration on 31/05/2023
-	Type 1 Calibrator	Larson Davis	CAL200	3083	Calibration on 27/03/2023

Each sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.3 dB).

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. Each microphone was fitted with a windshield.



6.5 Results

The results have been plotted on Time History Graphs 30859/TH1 to 30859/TH2 enclosed presenting the 15 minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

In order to compare the results of our survey with the relevant guidelines it is necessary to convert the measured $L_{Aeq(15\text{ minute})}$ noise levels into single figure daytime $L_{Aeq(16\text{-hour})}$ (07:00-23:00 hours) and night-time $L_{Aeq(8\text{-hour})}$ (23:00-07:00 hours) levels.

A summary of the results, as used to inform subsequent assessments against current guidelines, is presented in the table below. The L_{A90} values presented are the 'representative' levels determined through statistical analysis of the 15-minute readings, in line with BS 4142. L_{Amax} values are the '10th highest' 2-minute value in line with Approved Document O (Part O) requirements.

Position	Day/Period	Daytime (07:00 – 23:00 hrs)		Night-time (23:00 – 07:00 hrs)		
		$L_{Aeq,16hr}$	L_{A90}	$L_{Aeq,8hr}$	L_{A90}	L_{Amax}
1	20/07/2023	56	47	53	42	75
	21/07/2023	59	46	58	43	78
	22/07/2023*	61	44	61	42	78
	23/07/2023	58	43	55	45	77
	24/07/2023	58	49	-	-	-
2	20/07/2023	53	46	49	40	73
	21/07/2023	55	44	53	42	71
	22/07/2023*	57	43	57	41	77
	23/07/2023	50	42	-	-	-
	24/07/2023			-	-	-

*Excluded from assessment due to adverse weather conditions

The above levels are as measured at the measurement positions and include local reflections.

The following table summarises noise levels recorded at each of the attended measurement positions.



Position	Date	Period	Sound Pressure Level (dB)		
			L _{Aeq,T}	L _{A90,T}	L _{Amax,T}
3	20/07/2023	15:30 – 15:35*	62	55	79
		15:45 – 16:00	58	47	88
	24/07/2023	12:00 – 12:15	62	51	86
		13:30 – 13:45	58	50	76
		13:45 – 14:00	61	53	72
4	20/07/2023	16:15 – 16:30	60	50	77
	24/07/2023	12:30 – 12:45	61	49	79
5	20/07/2023	16:45 – 17:00	64	54	92
	24/07/2023	13:00 – 13:15	65	54	86
6	20/07/2023	19:30 – 19:45	58	49	73
7	20/07/2023	20:00 – 20:15*	60	51	76
		20:15 – 20:30	61	52	77
8	20/07/2023	20:45 – 21:00	58	50	75
9	20/07/2023	21:45 – 22:00	58	48	77
10	20/07/2023	21:15 – 22:30	59	50	75

*Period shortened due to interruptions

6.6 Discussion of Noise Climate

Due to the nature of the survey, i.e. unattended, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However, at the beginning and end of the survey period the noise climate was noted to be dominated by road noise from the local traffic network along with significant plant noise associated with the industrial unit on Bailey Lane.

The noise climate noted while carrying out the attended survey are summarised in the following tables.

Position	Notes
3	Industrial unit and associated vehicle/plant noise dominant, forklift reversing alarm was also noted
4	Road traffic noise dominant, local plant noise also noted – exact source unclear due to access limitations
5	Road traffic noise on Rockingham Street dominant.



Venue	Position(s)	Notes
The Dog and Partridge	6, 8, 10	Music was faintly audible from near the entrance, but not bass dominant. Patron noise from the external seating was more dominant.
The Grapes	7	Live music appeared to be acoustic (i.e. no amplification), and only audible when entrance door was open, these were generally shut. When audible the music was mid frequency dominant, dominant instrument noted to be fiddle/violin.
Trippets Lounge Bar	9	Faint drums audible when in direct sight of the entrance door. Cheering audibly louder than music but not dominant.

7.0 Incident Noise Levels

7.1 Environmental Noise

Using the survey data, predicted incident environmental noise levels upon each elevation of the proposed development. The following table outlines the incident noise levels at 1m from the development façade.

Zone	Daytime (07:00 – 23:00 hrs)	Night-time (23:00 – 07:00 hrs)	
	L _{Aeq} , 16hr	L _{Aeq} , 8hr	10 th Highest L _{Afmax,2min}
A	60	58	76
B	57	53	70

7.2 Entertainment Noise

The source noise measurements of each nearby entertainment premise in conjunction with the low frequency noise levels measured at the unattended positions have been used to evaluate incident noise levels from music noise in the absence of environmental sources.

The following table expands on the attended measurements to show the low frequency components at positions where music noise was audible.

Venue	Sound pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)		dBA
	L _{eq,T} 63	L _{eq,T} 125	
The Grapes	67	62	61
Trippets Lounge Bar	62	60	58
The Dog and Partridge	64	62	58

On the basis of the above levels and the subjective notes taken while on site, it is clear that low frequency music noise should be suitably controlled through traditional glazing and ventilation strategies.



7.3 Industrial Noise

7.3.1 Overview

Our assessment considers assessment methodologies set out within BS 4142:2014 and adopts industry standard acoustic corrections for distance, screening, directionality and reflections between noise sources and noise sensitive receptors.

We understand from online opening hours and notes from site attendance, that there is no industrial noise during the night time period, as such the assessment will only consider daytime impacts. In accordance with BS 4142, assessment periods of 1 hour will be taken during the daytime (07:00 – 23:00). Full calculation data and assumptions are discussed below.

7.3.2 Flame Hardners

To inform an assessment of noise impact from this premises reference has been made to the measured noise data obtained at measurement positions 2 and 3. The microphone at measurement position 2, can be considered to be representative of the worst affected future residential windows.

While measurement position 2 was broadly unattended, it was confirm that Flame Hardners was open and in operation during the Friday and Monday of the survey. Our survey data indicates noise generating activities from this unit occur from approximately 07:30 hr and are intermittently present until approximately 15:30 hrs.

It is therefore considered that noise impact from the industrial premises can be appropriately assessed.

7.3.3 BS 4142 Assessment

The following table presents the results of a BS 4142:2014 assessment for a typical worst-case daytime period for both adjacent industrial premises. Fully detailed calculation sheets are available upon request.

Results		Relevant Clause	Commentary
Specific sound level at receptor	$L_{Aeq,1hour} = 54$ dB	7.3.8 7.3.9 7.3.10	Corrected for 1 hour reference period from several discrete measurements of the industrial premises.
Background sound level	$L_{A90,1hour} = 46$ dB	8.1.1 8.1.3 8.3	The background sound level measured at the proposed development site between the hours of 09:00 and 19:00, and is considered to be uninfluenced by the presence of industrial
Assessment made during the daytime so reference period is 1 hour		7.2	



Results		Relevant Clause	Commentary
Acoustic feature correction	+3 dB	9.2	The noise emanating from the industrial premises was noted to be intermittent due to the opening and closing of the roller shutter. It was also noted to be clearly audible at the proposed development due to proximity lack of regular road traffic.
Rating Level	57 dB	9.2	Calculated by adding acoustic feature corrections to the specific sound level
Excess of rating over background sound level	11 dB	11	
Assessment indicates likelihood of a significant adverse impact to residents without noise mitigation measures.		11	The excess of the rating level over the background level is very high, mitigation measures must therefore be assessed further to ensure good internal acoustic conditions
Uncertainty of the assessment	Low	10	The background sound level is based on repeatable measurements made over the duration of a number of days. The measurements of noise from the industrial unit are taken from a selection of discrete measurements taken directly outside the unit at the start and end of the survey.

7.3.4 Potential Noise Mitigation of Industrial Source

On the basis that adjacent unit is existing and operational, noise mitigation at source is not considered practical in this setting.

Given that the proposed residential development is 9No. storeys high, and consequently overlooks the industrial unit, the presence of an acoustic fence along the boundary of the development would not be considered to provide accountable attenuation of industrial noise.

Furthermore, it is noted in the proposed plans that there are no windows proposed on the façade directly overlooking the industrial unit. As such, a suitably specified façade shall be provided to ensure acceptable internal noise levels are achieved.

8.0 Proposed Design Target Internal Noise Levels

With reference to the acoustic standards and guidelines as reviewed in Appendix B, we propose external noise intrusion levels from environmental sources be controlled so as to not exceed the following criteria.

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 – 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-



Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 – 07:00
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB ^[1] L_{Amax}

[1] regular noise events such as trains, aircraft (10th highest)

Note: For this site the $L_{Aeq,T}$ noise parameter alone is considered to be sufficient given the character of the noise climate we have measured. This is consistent with Section 2.2.2 of The World Health Organisation Environmental Noise Guidelines for the European Region and Note 4 of Section 7.7.2 of BS8233:2014).

Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target noise levels may be relaxed (subject to the requirements of any planning conditions) by up to 5 dB and reasonable internal conditions still achieved.

9.0 Achieving Internal Noise Levels

There are 3 ventilation strategies applicable to proposed residential dwellings. These include Background Ventilation as described in Approved Document F (Part F), Overheating as described in Approved Document O (Part O), and Purge Ventilation.

It should be noted that the internal noise level guidelines are generally not applicable under “*purge ventilation*” conditions as defined by Part F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).

9.1 Background Ventilation Condition

At this stage of the design scheme the precise details of window to be used are not known, nor are the precise details of the ventilation.

Provision exists to provide appropriate sound insulation solutions as required including, where necessary, suitably specified glazing and attenuated ventilators. We have carried out preliminary calculations to determine the likely façade sound insulation performance requirements for the worst affected facade. Our calculation methods follow those outlined in BS 8233:2014. Our calculations are based on the following assumptions:

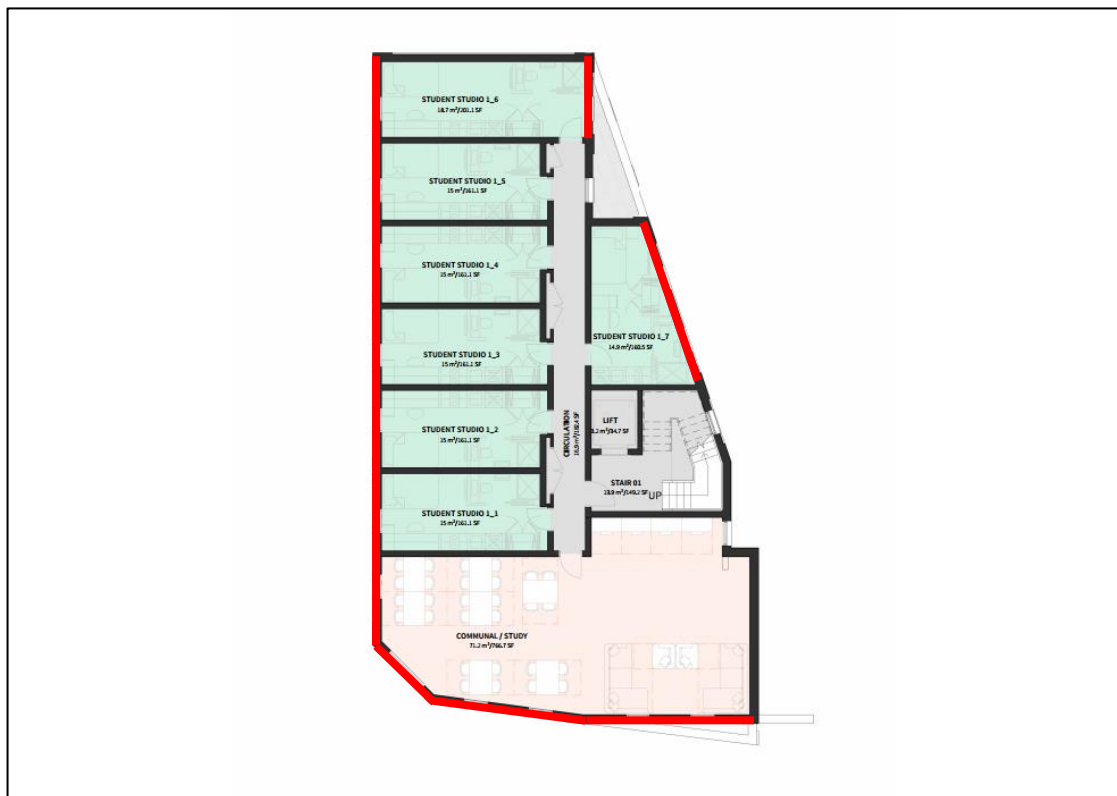
- Standard SFS external wall or equivalent
- Typical room volume as per latest drawings
- Typical window area as per latest drawings
- Typical furnishings including beds, sofas, chairs etc.



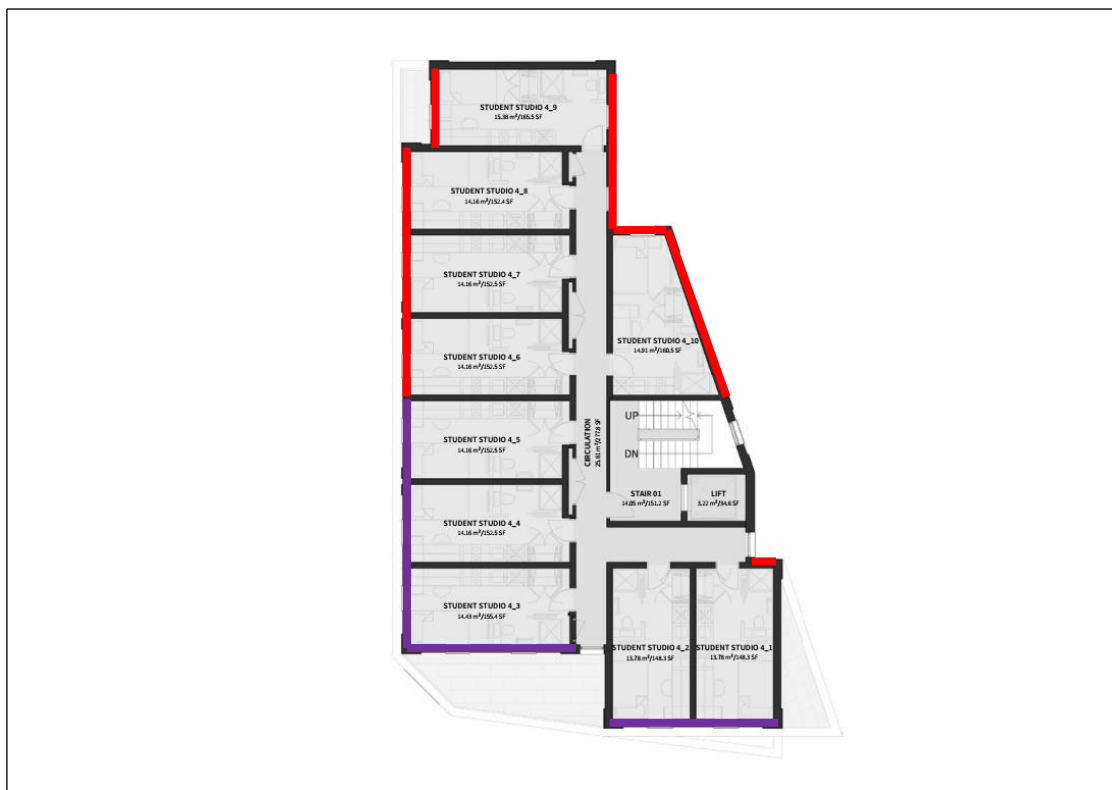
Preliminary sound insulation calculations have been carried out in order to specify the minimum sound insulation performance of windows and ventilators. From the results of our assessment, the following minimum preliminary acoustic performance specifications are recommended. These are intended for planning use only, and detailed design stage octave band acoustic specifications will need to be developed for tender.

Façade Zone		Façade Element	Preliminary Minimum Sound Reduction Specification
A	Purple	Window	35 dB $R_w + C_{tr}$
		Ventilator	42 $D_{new} + C_{tr}$
B	Red	Window	27 dB $R_w + C_{tr}$
		Ventilator	34 $D_{new} + C_{tr}$

The following plans show the location of each façade zone noted in the table above.



First Floor Façade Zone Mark up (c/o Four Architects)



Fourth Floor Façade Zone Mark Up (c/o Four Architects)

9.1.1 Example Glazing Configurations

Example glazing configurations commensurate with achieving the sound insulation performances are given below.

Glazing Specification, $R_w + C_{tr}$ (dB)	Example Configuration
35	Up-rated double glazed system e.g. 6/16/8.8 mm.
27	double glazed system e.g 6/16/6 mm.

9.1.2 Example Ventilation Solutions

Example ventilation solutions commensurate with achieving the sound insulation performances are discussed below.

Ventilator Specification, $D_{new} + C_{tr}$ (dB)	Example Configuration
42	High performance in-wall acoustic ventilator, or a mechanically assisted supply & extract solution (e.g. local MVHR).
34	1 x 2,500mm ² standard hit-miss trickle vent per habitable room, or a mechanically assisted supply & extract solution (e.g. local MVHR).



The preliminary performance specifications included above are based on the provision of either full MVHR for rooms or 1no. ventilator only per habitable room as required. If additional numbers of ventilators are required to achieve the ventilation rates, the performance requirement for the individual ventilators will need to increase.

The table below provides guidance on the increase in performance specification required for additional numbers of ventilators.

Number of Ventilators	Performance Increase on Ventilator Specifications Stated Above
1	+0 dB
2	+3 dB
3	+5 dB

9.2 Overheating Assessment

With regard to Building Regulations Approved Document O, Sections 3.2 to 3.4 of this document relate to noise and state the following:

“In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. $40\text{dB } L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- b. $55\text{dB } L_{AFmax}$, more than 10 times a night (between 11pm and 7am).”

9.2.1 Predicted Internal Noise Levels

As Sheffield is considered a moderate risk zone for overheating and noise, a 9dB loss can be considered for open windows. As such, the predicted the internal noise levels at the 2 façade zones are set out in the following table.



Zone	Daytime (07:00 – 23:00 hrs)	Night-time (23:00 – 07:00 hrs)	
	L _{Aeq} , 16hr	L _{Aeq} , 8hr	10 th Highest L _{Afmax,2min}
A	51	49	67
B	48	44	61

9.2.2 ADO Assessment

The assessment in Section 9.2.1 indicates that the noise levels are above the limits for which Approved Document O states windows are likely to be closed during sleeping hours (2300 - 0700 hours). Approved Document O advises that further guidance can be found in the The Acoustics Ventilation and Overheating Residential Design Guide (AVO).

With reference to the aforementioned Part O guidance, habitable rooms should be designed so as to avoid the reliance on openable windows to satisfy overheating targets. This can be achieved by use of solar rated glazing, black out blinds, or through fenestration design. In addition, the AVO guide (Table B-5) suggests mitigation measures in the form of attenuated or plenum windows, attenuated louvres or vents for overheating and sound attenuating balconies. This can be assisted with mechanical ventilation too, such as MVHR with a manual summer boost function. Air conditioning can also be considered. However, the introduction of mechanical solutions should be considered carefully; not only with regard to cost and maintenance, but sustainability and the environment.

10.0 Operational Noise Impacts

10.1 Fixed Plant & Equipment

Building services plant external noise emission levels will need to comply with local planning authority requirements and statutory noise nuisance legislation.

We understand that the requirements imposed by Sheffield City Council states as follows:

“Plant and equipment shall be designed to ensure that the total L_{Ar} plant noise rating level (i.e., total plant noise L_{Aeq} plus any character correction for tonality, impulsive noise, etc.) does not exceed the L_{A90} background sound level at any time when measured at positions on the site boundary adjacent to any noise sensitive use.”

On the basis of the above and the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential window.



Position	Noise Emission Limit (dBA)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
1	48	44
2	47	40

The above criteria are to be achieved with all of the proposed plant operating simultaneously.

Penalties may need to be applied for attention catching characteristics in line with BS 4142:2014 when selections have been made.

It should be noted that the above are subject to the final approval of the Local Authority.

10.2 Amenity Unit Operations

Across ground to second floors there are 4No. amenity units proposed as part of the development. These units are proposed as communal lounge/study areas. As such, we do not expect noise egress from these spaces to be an issue.

10.3 Commercial Unit Operations

At ground floor there are 2No. retail units proposed as part of the development, however, the exact uses of these units have not yet been confirmed. Considering the prevailing environmental noise climate at the site, we would expect that noise egress via the unit frontage from most general commercial uses (e.g. restaurant, café, shop) should be readily controllable. However, for completeness we advise that the operational noise break-out from any proposed use is controlled to no more than 5dB below the existing background noise level as follows:

Period	Commercial noise break-out Limit, L_{Aeq} (dB)
Daytime (07:00 – 23:00)	39
Night-time (23:00 – 07:00)	35

¹Should the operation include music noise, we advise that the above limits are reduced by a further 5 dB

² Established based on achieving suitable internal noise levels within noise sensitive premises.

Furthermore, noise transfer through the separating floor structure (and associated flanking paths) from the ground floor commercial units to first floor apartments shall be considered. Once final uses have been confirmed for each unit, an assessment of noise transfer to structural connected habitable rooms shall be carried out which considers typical noise levels within the commercial unit and the sound insulation performance of the separating construction.



For noise transfer to apartments above, the design intent should be to ensure operation L_{max} noise transfer to apartments does not exceed a level at least 5dB lower than the anticipated L_{90} noise level in each octave band.

11.0 Conclusions

A detailed environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

The environmental noise impact upon the proposed dwellings has been assessed in the context of building regulations, and national and local planning policies.

Appropriate target internal noise levels have been proposed. These are achievable using conventional mitigation measures.

Preliminary acoustic performance specifications for the external building fabric elements have been recommended such that appropriate internal noise levels should be achieved. These are intended for planning use only, and detailed design stage octave band acoustic specifications will need to be developed for tender.

The assessment shows the site, subject to appropriate mitigation measures, is suitable for residential development in terms of noise.

Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. $30\text{dB} + 30\text{dB} = 33\text{dB}$, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

L_{90,T} L₉₀ is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

L_{eq,T} L_{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

L_p Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

L_w Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Appendix B

B. Planning Policies, Standards & Guidance

B.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is to:

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

That vision is supported by the following NPSE noise policy aims which are reflected in three of the four aims of planning policies and decisions in paragraph 123 of the NPPF (see paragraph 8.2 (b) below):

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level

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

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time

of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development.”* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

B.2 National Planning Policy Framework (NPPF)

The following paragraphs are from the NPPF (published July 2021):

185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

Paragraph 185 also references the Noise Policy Statement for England (NPSE). This document does not refer to specific noise levels but instead sets out three aims:

- “Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

B.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Perception	Examples of Outcomes	Increasing effect level	Action
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

B.4 World Health Organisation

The current Environmental Noise Guidelines 2018 for the European Region (ENG) supersede the Guidelines for Community Noise from 1999 (CNG). Nevertheless, the ENG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) remain valid.

A summary of the guidance from the ENG and CNG is shown in the table below.

Source	CNG guideline indoors all sources	ENG guideline outdoors noise from specific source only
Road traffic noise	35 $L_{Aeq, 16h}$	53 dB L_{den}
	30 $L_{Aeq, 8h}$	45 dB L_{night}
Railway noise	35 $L_{Aeq, 16h}$	54 dB L_{den}
	30 $L_{Aeq, 8h}$	44 dB L_{night}
Aircraft noise	35 $L_{Aeq, 16h}$	45 dB L_{den}
	30 $L_{Aeq, 8h}$	40 dB L_{night}

With regard to single-event noise indicators, Section 2.2.2 of the WHO Environmental Noise Guidelines 2018 state:

“In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ($L_{A,max}$) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by $L_{A,max}$. Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.”

B.5 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

Internal Areas

BS8233:2014 Section 7.7.2 titled "Internal ambient noise levels for dwellings" states:

"In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Note 1 The above table provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

Note 2 The levels shown in the above table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the above table.

Note 3 These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.

Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.

If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment.

Note 6 Attention is drawn to the Building Regulations.

Note 7 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.”

External Amenity Areas

BS8233:2014 Section 7.7.3.2 titled “Design criteria for external noise” states:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}^1$, 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.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens, and terraces, which might be intended to be used for relaxation. In high-noise areas consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

B.6 ProPG : Planning & Noise : 2017

The primary goal of the ProPG is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise. It is applicable to noise from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is “not dominant”.

This ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

The two sequential stages of the overall approach are:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

- Element 1 – demonstrating a “Good Acoustic Design Process”;
- Element 2 – observing internal “Noise Level Guidelines”;
- Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
- Element 4 – consideration of “Other Relevant Issues”.

The ProPG considers suitable guidance on internal noise levels found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”. Table 4 in Section 7.7.2 of the standard suggests that “in general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The standard states (Section 7.7.1) that “occupants are usually more tolerant of noise without a specific character” and only noise without such character is considered in Table 4 of the standard.

Activity	Location	07:00 – 23:00 Hours	23:00 – 07:00 Hours
Resting	Living Room	35dB $L_{Aeq,16hr}$	-
Dining	Dining Room / Area	40dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,16hr}$ 45dB $L_{Amax,F}$

NOTE 1 the Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10dB, they are likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (See Section 3.D).

Figure 2. ProPG Internal Noise Level Guidelines (additions to BS8233:2014 shown in blue).

B.7 Building Regulations Approved Document O

Building Regulations Approved Document O relates to setting standards for overheating in new residential buildings. It aims to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

Requirement O1 of Approved Document O is met by designing and constructing the building to achieve both of the following:

- a. Limiting unwanted solar gains in summer.
- b. Providing an adequate means of removing excess heat from the indoor environment.

Sections 3.2 to 3.4 of this document relate to noise and state the following:

“In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. $40\text{dB } L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- b. $55\text{dB } L_{AFmax}$, more than 10 times a night (between 11pm and 7am).

Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants’ Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

NOTE: *Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants’ Acoustics, Ventilation and Overheating: Residential Design Guide (2020).*

B.8 BS 4142: 2014 + A1:2019

When setting plant noise emission criteria reference is commonly made to BS 4142:2014 “Methods for rating and assessing industrial and commercial sound”.

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains “a tone, impulse or other characteristic”

then various corrections can be added to the specific (source) noise level to obtain the “rating level”.

BS 4142 states that: *“The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs”*. An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:

- *“Typically, the greater this difference, the greater the magnitude of the impact.”*
- *“A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.”*
- *“A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.”*
- *“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.”*

The determination of the “rating level” and the “background level” are both open to interpretation, depending on the context.

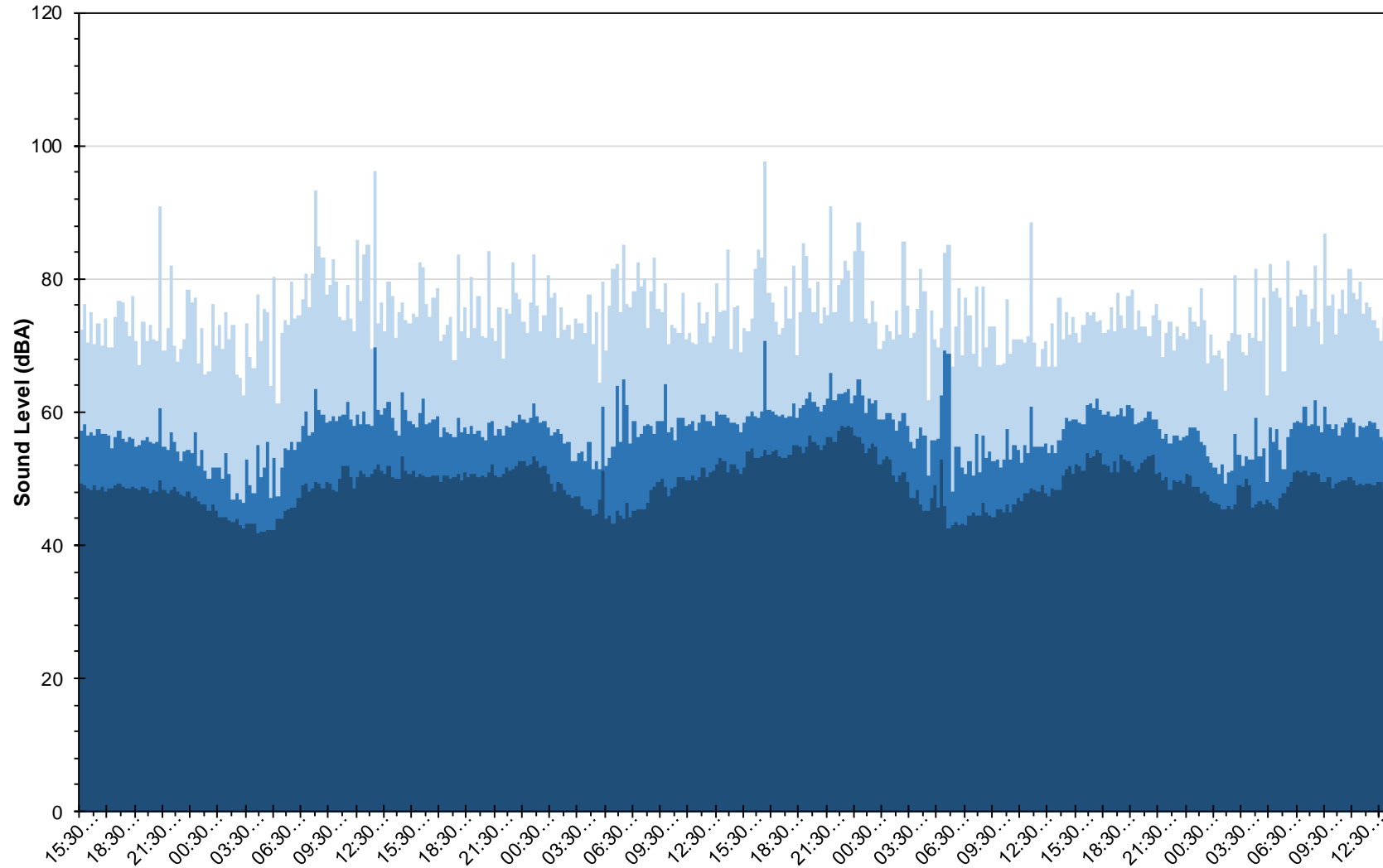
90 Trippet Lane

Position 1

L_{eq} , L_{max} and L_{90} Noise Levels

Thursday 20 July 2023 to Monday 24 July 2023

- LAmax
- LAeq
- LA90



Date and Time

30859/TH1

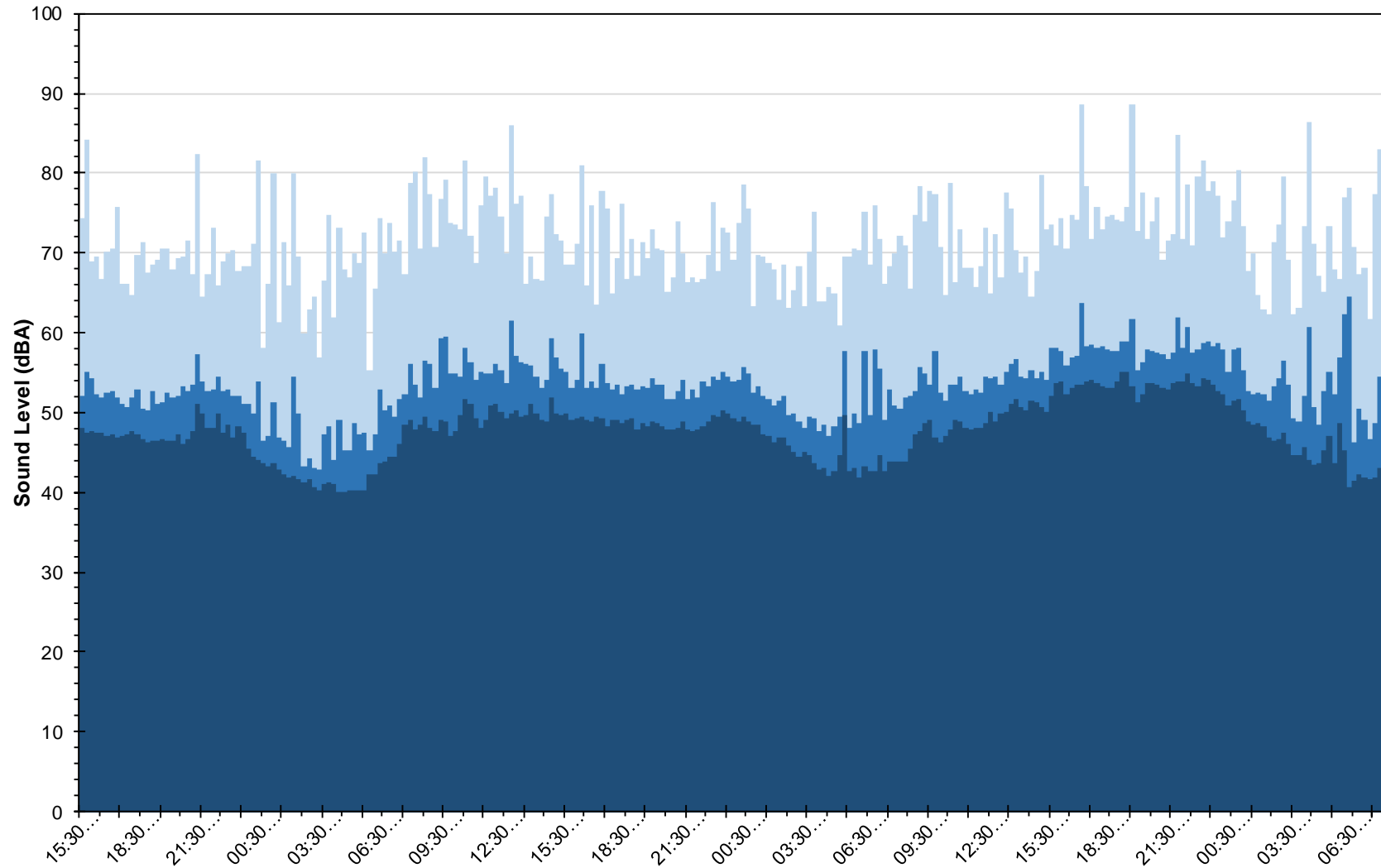
90 Trippet Lane

Position 2

L_{eq} , L_{max} and L_{90} Noise Levels

Thursday 20 July 2023 to Sunday 23 July 2023

- LAmax
- LAeq
- LA90



Date and Time

30859/TH2