2 Southbourne Grove, Bournemouth

Noise Impact Assessment

attune.

26927REP-1C

1 Document History

Version	Title	Date	Created By	Finalised and Authorised By
A	Initial issue	26/07/2024	David Waidson TechIOA Assistant Consultant 	Andy Hiernaux BSc(Hons) PGDip MIOA Director 
B	Issue with updated information from the client	26/07/2024	-	Andy Hiernaux BSc(Hons) PGDip MIOA Director 
C	Minor corrections to references and in text	01/08/2024	-	Andy Hiernaux BSc(Hons) PGDip MIOA Director 

2 Executive Summary

The Dancing Jug has proposed a new location in Southbourne, Bournemouth. The location would provide a new restaurant and bar to an existing building on Southbourne Grove.

This report addresses the following acoustic considerations relating to the proposal:

1. **External noise from patrons in a proposed Beer Garden to the rear.**
2. **External noise from internal activity (patrons and music).**
3. **External noise from patrons leaving the establishment at the proposed closing time.**

The guidance for the assessment of noise from pubs and clubs is currently lacking, with an outline document published in 2005 in the form of NANR92 *Noise from Pubs and Clubs*.

Whilst the document sets out a number of considerations relating to the issue, it stops short of providing methods to assess noise and instead provides a basis for an assessment framework to be produced.

The assessment framework outlined in the document is reactive (for assessment *following* the opening and operation of premises), rather than proactive (for assessment *before* an establishment is opened) such as this.

Attune has therefore assessed the proposals with the intent and guidance provided in the document in mind, and has used existing techniques that apply to similar types of assessment work.

Attune attended the site and carried out a sound survey over a period of four days, to establish the existing sound climate in the area. The survey also covered Thursday to Sunday, which is anticipated to be the primary period of proposed operation for the Dancing Jug in the week.

A beer garden and outdoor smoking area to the rear of the building (to the north) form part of the proposals.

Attune has used 3D acoustic modelling to assess noise from the proposed beer garden.

The Dancing Jug has committed to provide a ‘shelter building’ or ‘enclosure’ around the beer garden.

Additionally, the beer garden would be closed at 23:00, which coincides with the end of the daytime period and the start of the night time period, for the purposes of acoustic assessment.

The shelter would be comprised of new and existing brick walls, timber fencing and a pitched polycarbonate roof with timber gables.

The acoustic modelling has shown that the noise levels from the beer garden can be controlled to the proposed criterion at the nearest residential dwellings, and in fact could better this standard.

There are a number of recommendations made in relation to the construction of the shelter building that shall be considered by the client and the design team.

How noise from internal activity might affect residential dwellings in the area has also been assessed, based on the ‘worst case’ quietest period of the night, up to 01:30.

This assessment considered noise mitigation measures such as secondary glazing and limiting the sound system in the bar/restaurant such that noise limits are not exceeded at dwellings outside.

The assessment showed that noise levels at the dwellings can be suitably controlled with the use of secondary glazing, with potentially ‘very high’ levels of sound produced inside that could represent a ‘bar with music’ or even a ‘nightclub’ (according to NANR92), up to 01:30.

Limiting sound levels are also provided to control the noise transmitting through the façade, particularly the bass (low) frequencies.

Without secondary glazing, the options for the Dancing Jug are more limited and it may be the case that noise from a large group of patrons chatting inside the bar may be audible outside the building at the later times of the proposed operating period in the morning.

The Dancing Jug has advised that they have repaired the existing sash window units on the building. Further, they will be installing secondary glazing, and will be buying units such that the overall sound reduction values in this report can be met.

Another measure to be employed by the Dancing Jug is the use of an automatic lobbied entrance door which will further reduce noise transfer to the outside.

In terms of noise from patrons leaving the establishment at the proposed closing time of 01:30, this is a difficult item to assess given the lack of a method for this and that noise from patrons can be very hard to predict.

The initial outline findings however show that the background sound level in the area at this time can be 'low', and that it would only take a few people chatting to exceed the proposed noise level at the surrounding dwellings.

This assessment is to be viewed as indicative only however as it is based solely on the background sound level which may not be appropriate.

Noise mitigation for patrons leaving would be provided entirely by the management of people, which is suggested to include, but is not necessarily limited to:

- Crowd management including use of the two exit doors to disperse patrons in to two groups.
- Designated quiet zones.
- Staff training to reduce noise from patrons.
- Signs installed at the premises that remind patrons that they are in a residential area and that they should leave quietly.

It is important to note that Southbourne Grove already houses a number of late night establishments, and that the Dancing Jug is not considered to be a significant addition to the area, following the survey and assessment work.

It is understood that the following nearby existing establishments operate using late licences, including:

- The Fez Bar at 217 Seabourne Road.
- Brewhouse and Kitchen at 147 Parkwood Road.

Considerations for further work have been suggested throughout this report and it has been recommended that all proposals for sound reduction elements be sent to Attune for review.

The uncertainties associated with the survey work and each assessment are also stated in the relevant sections in this report.

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4 Introduction

Attune has been appointed to provide acoustic consultancy services in the proposed development of a new Dancing Jug location in Southbourne.

This report has been prepared as part of the planning and licensing applications to assess the proposals with respect to the likely noise impacts.

4.1 Proposed Development Location

- 2 Southbourne Grove, Bournemouth, BH6 3RP.

4.2 Description of the Proposed Development

- Proposed conversion of an existing high street building in to a Dancing Jug restaurant and bar.
- The conversion would include demolition of existing garages at the rear (north) of the property to provide a new beer garden area.
- It is proposed that the beer garden be enclosed on the north and west elevations and with a roof.
- The east elevation is expected to be bound by an existing brick wall with the neighbouring property.

4.3 Report Scope

- This report discusses the following acoustic aspects:
  - Noise from the proposed beer garden affecting surrounding residential receptors.
  - Noise from the internal restaurant/bar area affecting nearby dwellings at night/early in the morning.
  - Noise from patrons leaving the bar late at night/early in the morning.
- This report does not consider:
  - Noise from building services, either externally or internally.
  - Internal sound insulation within the proposed building.
  - Any other acoustic or vibration consideration other than those stated here.

4.4 Figures

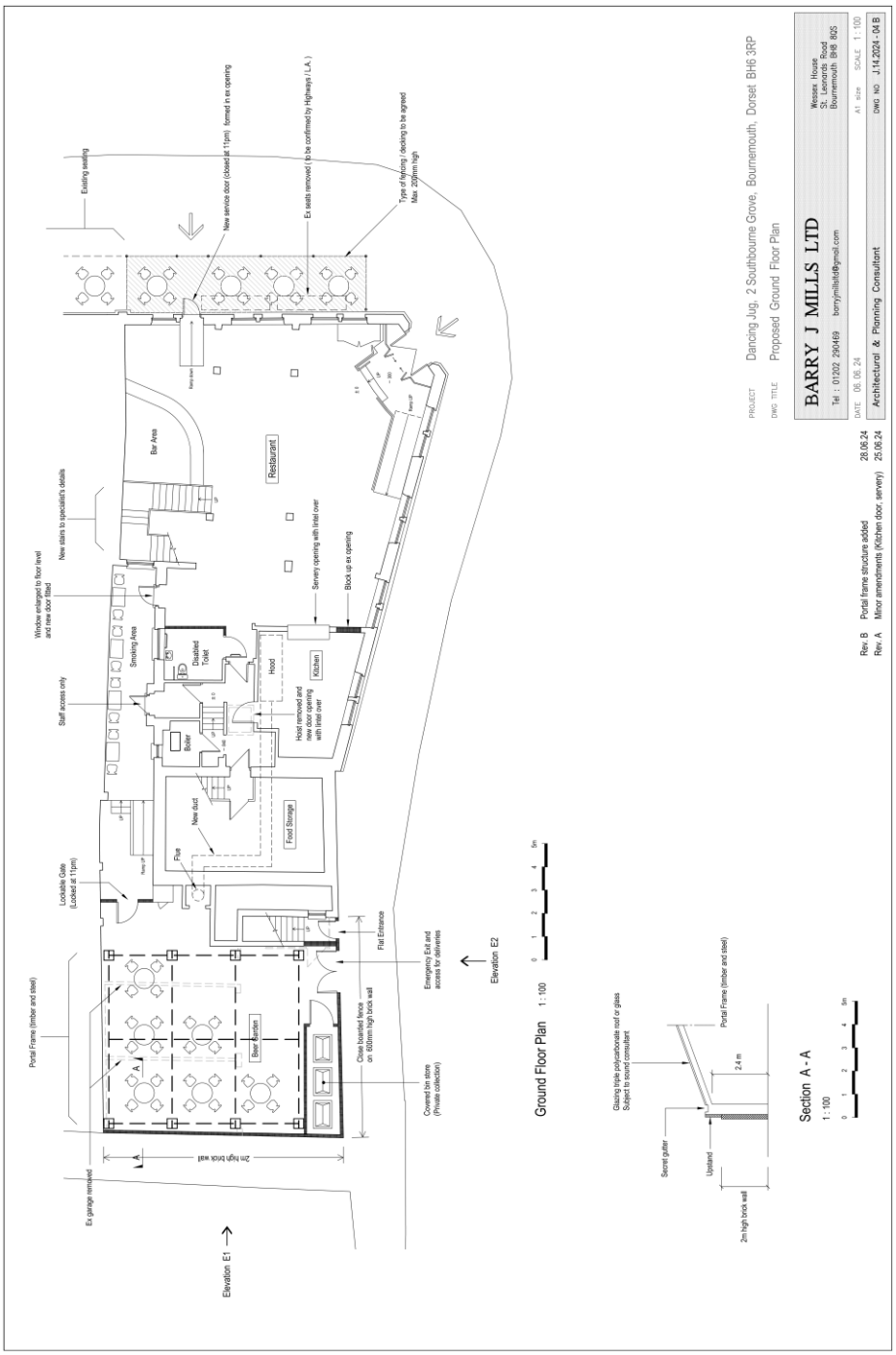

Figure 1: Ground floor of proposed development

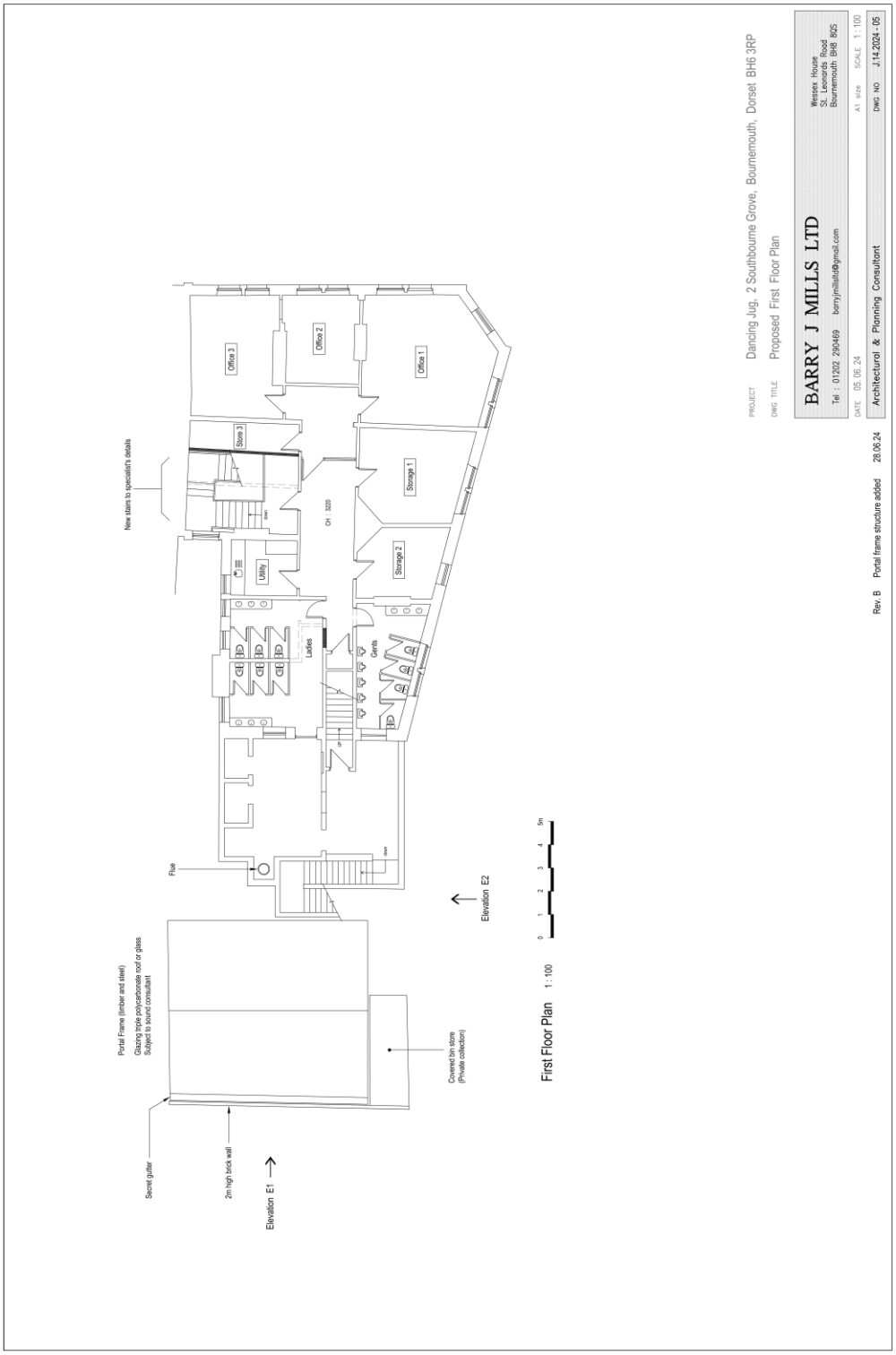

Figure 2: First floor of proposed development

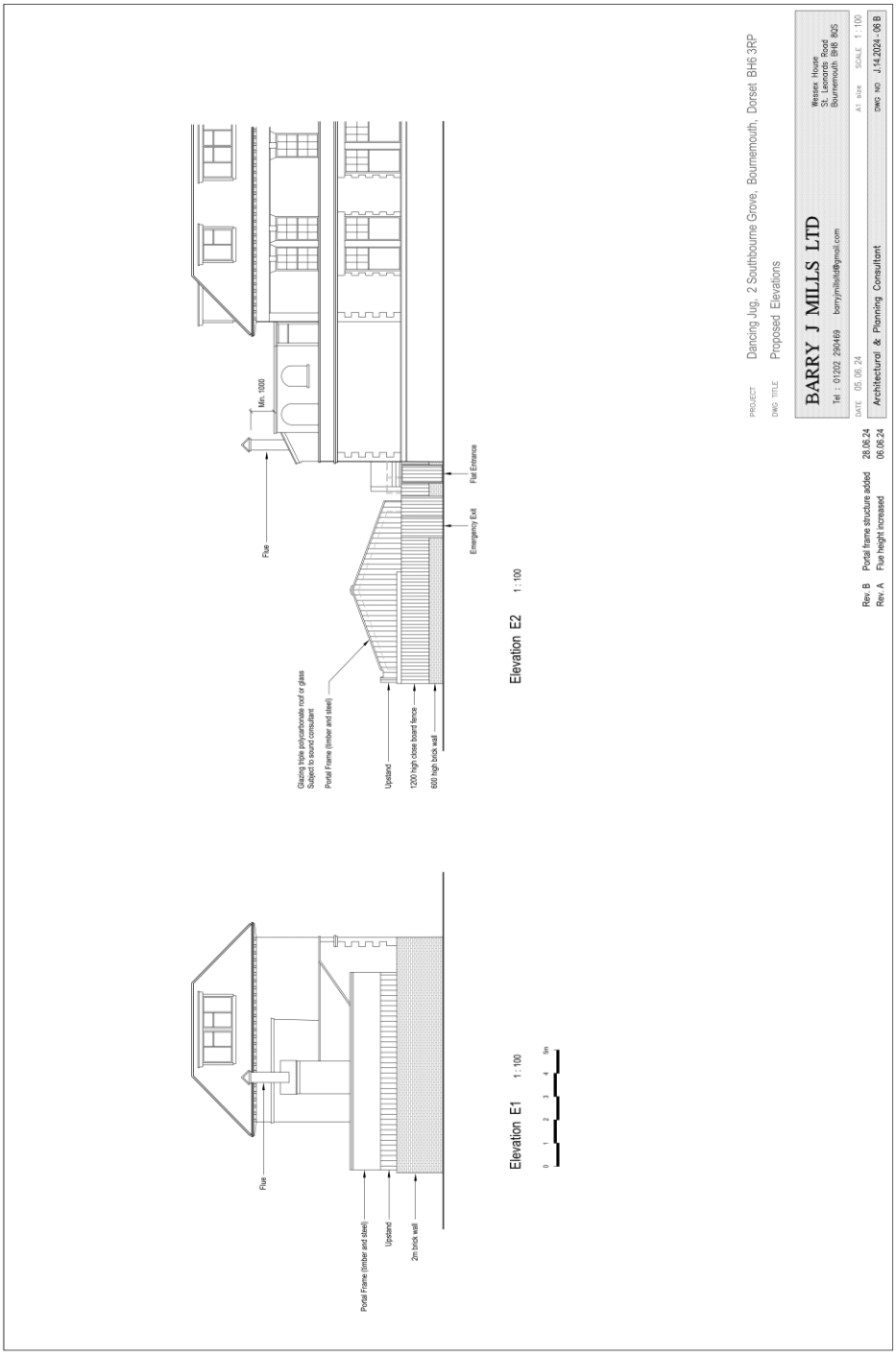

Figure 3: Rear elevations of proposed development

End of section.

5 Local Authority Requirements

The responsible Local Authority is Bournemouth, Christchurch and Poole Council (BCP).

Email contact was made by Attune with Andrew Hill on the 1st July 2024 to confirm the scope of the acoustic work.

5.1 Contact with BCP

- The following scope of work was proposed by Attune:
  - Sound survey in the vicinity of the proposed development site, to obtain background sound levels for assessment, with a focus on the rear of the property. The continuous survey would be for a minimum three day period and to capture a whole weekend.
  - Either assessment of noise from patrons in a proposed beer garden at the rear of the property, or creation of a noise map to assess the same, to test potential noise mitigation measures in the form of shielding structures around the garden.
  - Noise breakout through the building's façade, with assessment resulting in:
    - Limiting sound levels for the internal bar area to limit noise breaking out through the façade.
    - Recommendations for secondary glazing for sound reduction enhancement, if deemed required.
  - Assessment of noise from patrons leaving the proposed bar, assuming a time of up to 01:30. Provision of recommendations to reduce the noise impact of this event on local residential properties.
- Andrew Hill (Environmental Health Officer (EHO) at BCP) responded with the following:
  - "*Dancing Jug venues can be a bit BASSY and therefore consideration must be given to acoustic glass which will control low frequency noise*".
- Attune responded to state that the assessment of the glazing would be determined hand-in-hand with the internal limiting noise levels for the sound system.

End of section.

6 Relevant Guidance

There are no definitive methods available for the assessment of noise from Pubs and Clubs.

Instead, the guidance document NANR92 discusses the factors around noise and assessment, and provides information on the current limitations when considering noise from these premises, and the potential for further work on the subject.

6.1 Primary Applicable Guidance

Document	Applies to
NANR92 *Noise from Pubs and Clubs Final Report*, 2005	Noise from patrons and music in pubs and clubs
Prediction of Crowd Noise, Proceedings of Acoustics (Australia), 2006	Calculation of noise from gathered crowds

6.1.1 NANR92 *Noise from Pubs and Clubs*

- This document considers the following noise sources:
  - Entertainment noise (music and activities inside pubs and clubs).
  - Mechanical services equipment noise (HVAC systems, refrigeration units).
  - Noise from customers arriving and leaving.
  - Noise from deliveries to the venue.
  - General people noise.
- The document provides the following outline noise levels for differing activities, which are the result of a number of measurement studies:

Noise Source	Level, dB $L_{Aeq,T}$
Quiet periods in bars/restaurants	65-70
Busy periods in bars without music	≤88
Bars with music	90-95
Dance floors in nightclubs	105
Low-frequency noise levels in nightclubs	115 in the 63 Hz octave band and 110 in the 125 Hz octave band

- The document concludes that there is a need for a single, rigorous UK assessment method for pub and club noise.

- The document makes a call for:
  - More extensive research on people noise and other sources.
  - Development of an optimal method through controlled experiments and validation against subjective listener responses.
- In terms of criteria, while the document sets out a number of candidate methods for assessment of noise from Pubs and Clubs, it concludes that robust criteria and methods of assessment are required and that there is no 'one-size-fits-all' approach currently available.
- The candidate methods include:

Name	Parameter	Type
IoA working group annex	LAeq vs LA90 plus L10 vs L90 in 40-160 Hz 1/3 octave bands	Relative
BS 4142 / Noise Act 1996	LAeq vs. background (LA90, LA99, etc.)	Relative
Noise Rating curve	1/3 octave (Leq, L10 or Lmax) vs. NR curve	Absolute
Absolute LAeq	LAeq	Absolute
DIN 45680 / Moorhouse	10 – 160 Hz 1/3 octave Leq vs reference curve	Absolute
Inaudibility	Subjective	Relative

- It needs to be remembered that this document was published in 2005, and that a significant amount of work has been carried out on other standards that dovetail with the guidance in this document.
- For instance, BS 4142 was updated in 2014 and 2019, and specifically excludes assessment of noise from:
  - *b) music and other entertainment;*
  - *f) people;*
- This is not to say that the outline candidate assessment method provided in BS 4142 is not applicable or useful, however.

6.1.2 Prediction of Crowd Noise

- This document proposes an objective means of determining the level of noise from a crowd of people.
- Its content has been considered in relation to the noise from people in the proposed beer garden and in the restaurant/bar area.

End of Section.

7 Site Description

7.1 Site Surroundings

- The site is located at the westernmost end of Southbourne Grove at the junction with Seabourne Road and Beresford Road.
- The surrounding area is predominantly urban in character.
- Seabourne Road and Southbourne Grove form a traditional high street composed predominantly of small, ground floor commercial properties with some private residences above.
- Beresford Road and other surrounding roads leading off the high street are predominantly residential.
- The site is bounded by:
  - Residential properties on Beresford Road to the north.
  - Commercial properties on with residences above on Southbourne Grove to the east.
  - Southbourne Grove with commercial properties and residences directly opposite to the south.
  - Beresford Road with commercial properties and residences directly opposite to the west.

7.2 Main Noise Sources Affecting the Site

- The dominant noise source affecting the site is road traffic from Southbourne Grove, Seabourne Road, and Beresford Road.

7.3 Lesser Noise Sources Affecting the Site

- Other noise sources identified through audio recording of several discreet events during the survey period include:
  - Late night conversation from passing pedestrians presumed to be leaving nearby licensed venues.
  - Music from an unknown source on the afternoon of Saturday 13th July.
  - Noise associated with the European Championships football final on the evening of Sunday 14th July, possibly from the neighbouring Larder House Restaurant / Library Cocktail Bar.
  - Waste collection on the morning of Monday 15th July.
  - Natural sources including birdsong and seagulls.
- Although scaffolding was present at the site, no audio consistent with sustained construction works was recorded during the survey period.

7.4 Primary Noise Sensitive Receptors (NSRs)

  - Neighbouring residences at number 7 Beresford Road.
  - Numbers 4 and 6 Southbourne Grove, the upper floors of which are assumed to be residences.

7.5 Figures

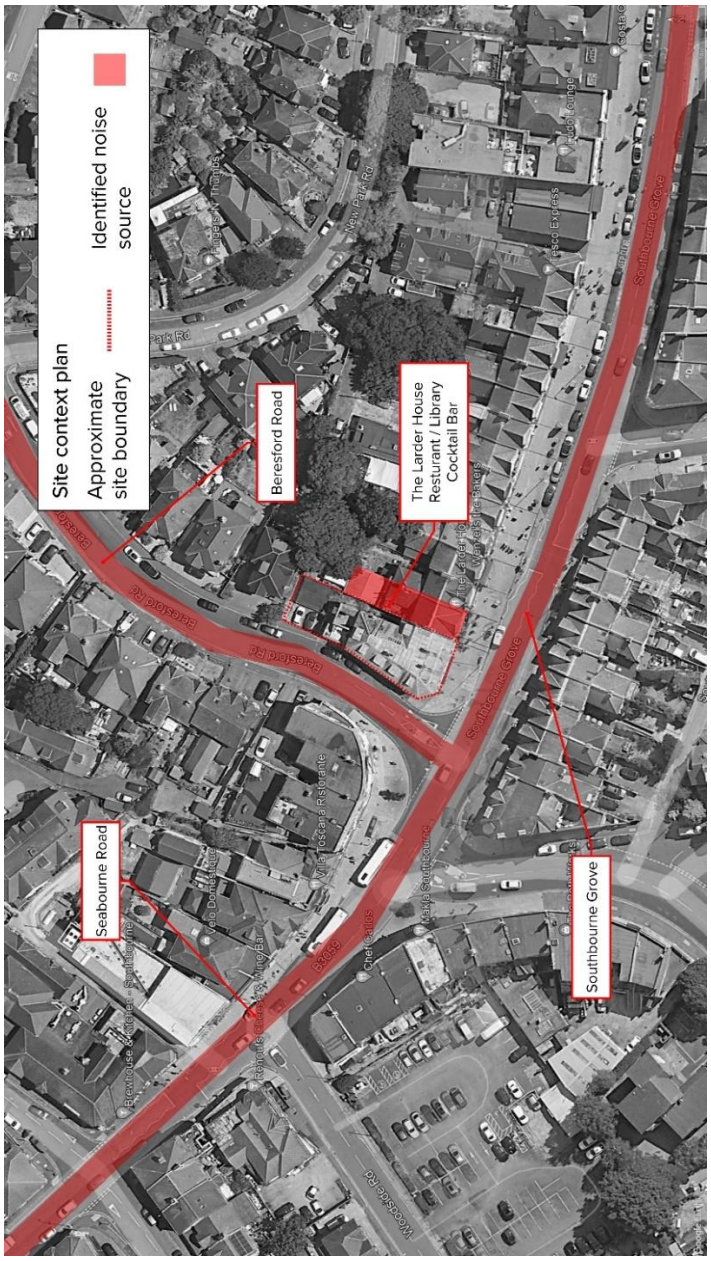

Figure 4: Site context plan

End of Section.

8 Site Sound Survey

A single sound survey was carried out on site in a single position.

The monitor was installed for a period of four days, and covered a weekend period.

8.1 Primary Applicable Standards

Standard	Applies to
BS EN 61672-1:2013 *Electroacoustics. Sound level meters. Specifications.*	The performance characteristics of the sound level meter used in the survey
BS 7445: *Description and measurement of environmental noise*	Noise measurement results

8.2 Surveys

Position	What Three Words Location	Survey Start Date	Survey End Date	Number of Days
A	///flames.deputy.drum	Thursday 11/07/2024	Monday 15/07/2024	4

8.3 Strategy and Rationale

- The purpose of the survey was to measure the existing sound levels to the north end of the site at the location of the proposed garden seating area.
- It was assumed that road traffic noise from Southbourne Grove would be the primary contributor to the background sound level at this location with further contributions from pedestrians travelling to and from nearby licensed venues during the evening and night time periods.
- The survey was carried out over the weekend from Thursday to Monday as this is the period where the contribution to the local noise environment from sources associated with the local night time economy are expected to be at their greatest.
- The microphone was therefore positioned on temporary scaffolding at the north west corner of the site with a clear line of sight to Southbourne Grove.
- For security reasons the equipment was set up on this scaffolding at first floor level.
- A drawing of the site showing the survey position and nearby sensitive receptors, and photographs of the survey equipment at position A can be found in this section.

8.4 Survey Sampling Periods

- Continuous, repeating 2-minute sampling periods were recorded.
- A logger period of 1 second was used.
- The logger data was manipulated to provide results for different time periods.

8.5 Free-field Correction

- The measurement position was more than 3 m from the nearest façade of the building.
- Measurements are therefore considered to have been taken in the 'free-field'.
- No corrections have therefore been applied to measured levels.

8.6 Sound Survey Equipment

Equipment	Model Name	Serial Number	Calibration Expiry Date
Sound Level Meter	Svantek SV 977A	92147	10/05/2026
Calibrator	Svantek SV 33B	100012	10/05/2025

- The meter used in the survey has been calibrated in the preceding 24 months by a UKAS accredited Laboratory.
- The calibrator used in the survey has been calibrated in the preceding 12 months by a UKAS accredited Laboratory.
- The instrumentation used in the survey conforms to Type 1 accuracy as defined within BS EN 61672-1:2013 *Electroacoustics. Sound level meters - Specifications.*
- The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory (NPL), and certificates are available upon request.

8.7 Survey Personnel

Position	Name of Surveyor	Surveyor Qualifications
A	David Waidson	Acoustic Technician, Bloc Consulting, April 2020 – November 2023 Assistant Consultant, Attune, November 2023 – Present Technician Member of the Institute of Acoustics (TechIOA) Certificate of Competence in Environmental Noise Measurement (CCENM)

8.8 Field Calibration

- The sound level meter was fitted with a windshield, and the instrumentation was calibrated before and after use in accordance with the manufacturer's instructions. Calibrated pre- and post- measurement correction values can be found in Table 1.
- No significant drift in calibration was observed (<0.2 dB).

Table 1: Pre and post measurement field calibration values

Position	Start Calibration Correction, dB	End Calibration Correction, dB	Drift, dB
A	0.15	0.27	0.12

8.9 Weather Conditions During the Surveys (from timeanddate.com)

Temperature	Range 14-21 °C Mean 18 °C Average high 20 °C Average low 15 °C
Precipitation	Largely dry with very light rain (≤ 1 mm/hour) during the following periods: July 12th: 10 PM to midnight July 13th: 9 AM to 10 AM July 14th: 8 PM to 10 PM July 15th: 7 AM to 8 AM
Cloud Cover	Range 40-80%
Humidity	Range 70-100%
Wind Speed	Between 2 and 4 ms^{-1}
Wind Direction	Predominantly from the south and south-west.

8.10 Uncertainty in Measurements of Sound

Table 2: Standard uncertainties for a Class 1 SLM, using allowable tolerances minus test laboratory tolerances given in IEC 61672-1, all values in dB

Frequency Weighting	Directional Response	Level linearity	Toneburst Response	Calibrator (IEC 61672)	Supply voltage	Combined standard uncertainty
0.5	0.5	0.4	0.25	0.125	0.05	0.9

- A continuous and short length survey has a low probability of presenting results that are within 1 dB of the annual level (according to *A Good Practice Guide on the Sources and Magnitude of Uncertainty Arising in the Practical Measurement of Environmental Noise*, Craven, Kerry, 2007)
- According to the document, random sampling periods throughout the year should be used for a greater probability of presenting results that are within 1 dB of the annual level.
- In a commercial context however, this is not practical.
- Survey periods at different times of the year may show greater variability in the sound climate.
- However, the proximity of the survey position to the contributing road traffic noise sources is expected to reduce the uncertainty, and to likely provide a relatively representative ambient noise level.

8.11 Figures

Figure 5: Survey site plan

Figure 6: Survey equipment mounted on scaffolding at position A

Figure 7: Survey equipment at position A

End of Section.

9 Site Survey Results

9.1 Ambient Sound Level Results

9.1.1 Result ranges, $L_{Aeq,T}$, dB

Position	Day $L_{Aeq,5min}$ 07:00-23:00	Night $L_{Aeq,5min}$ 23:00-07:00
A	52.2 - 76.9	35.2 - 74.2

9.1.2 Day, evening, night, ambient sound level summary, $L_{Aeq,T}$

Day	Period and sound pressure level, dB			
	Day $L_{Aeq,12hour}$ 07:00-19:00	Day $L_{Aeq,16hour}$ 07:00-23:00	Evening $L_{Aeq,4hour}$ 19:00-23:00	Night $L_{Aeq,8hour}$ 23:00-07:00
Thursday 11/7/2024*	60	59	58	53
Friday 12/7/2024	61	61	60	53
Saturday 13/7/2024	61	61	60	52
Sunday 14/7/2024	60	61	61	59
Monday 15/7/2024*	61	-	-	-

* Not full day measurements

9.1.3 Average $L_{Aeq,T}$, dB

Position	Period and sound pressure level, dB			
	Day $L_{Aeq,12hour}$ 07:00-19:00	Day $L_{Aeq,16hour}$ 07:00-23:00	Evening $L_{Aeq,4hour}$ 19:00-23:00	Night $L_{Aeq,8hour}$ 23:00-07:00
A	60.6	60.3	60.1	55.3

9.1.4 $L_{Aeq,16hour}$ day octave band results, each day, dB

	Sound pressure level, dB, per octave band centre frequency, Hz							
Day	63	125	250	500	1000	2000	4000	8000
Thursday 11/7/2024*	64	60	57	54	55	52	48	44
Friday 12/7/2024	65	61	58	56	56	53	50	46
Saturday 13/7/2024	66	64	60	57	56	52	49	44
Sunday 14/7/2024	63	60	57	55	56	55	51	46

* Not full day measurements

9.1.5 $L_{Aeq,8hour}$ night octave band results, dB

	Sound pressure level, dB, per octave band centre frequency, Hz							
Day	63	125	250	500	1000	2000	4000	8000
Thursday 11/7/2024*	54	49	48	47	48	47	44	40
Friday 12/7/2024	55	53	50	47	48	46	43	37
Saturday 13/7/2024	55	49	47	47	48	46	43	35
Sunday 14/7/2024	57	53	53	52	54	52	52	47

* Not full day measurements

9.2 Background Sound Level Results

9.2.1 Result ranges, $L_{A90,T}$, dB

Position	Day $L_{A90,5min}$ 07:00-23:00	Night $L_{A90,5min}$ 23:00-07:00
A	37.4 - 61.6	29.3 - 58

9.2.2 Overall lowest background sound levels, $L_{A90,T}$, dB

Position	Day $L_{A90,5min}$ 07:00-23:00	Night $L_{A90,5min}$ 23:00-07:00
A	37	29

9.2.3 Overall 'representative' background sound levels, $L_{A90,T}$, dB

Position	Day $L_{A90,5min}$ 07:00-23:00	Night $L_{A90,5min}$ 23:00-07:00
A	52	36

9.2.4 'Representative' background sound level summary, $L_{A90,T}$, dB

Day	Period and sound pressure level, dB	
	Day $L_{A90,5min}$ 07:00-23:00	Night $L_{A90,5min}$ 23:00-07:00
Thursday 11/7/2024*	53	34
Friday 12/7/2024	53	36
Saturday 13/7/2024	53	36
Sunday 14/7/2024	52	34
Monday 15/7/2024*	54	-

9.2.5 Hourly $L_{Aeq,1hour}$, dB

	Hour period start			
Day	22:00	23:00	00:00	01:00
Thursday	57	52	50	46
Friday	58	55	54	51
Saturday	57	55	53	49
Sunday	65	58	53	50

9.2.6 Differences from overall day and night time averages, dB

	Hour period start			
Day	22:00	23:00	00:00	01:00
Thursday	-3	-3	-5	-9
Friday	-2	0	-2	-4
Saturday	-3	0	-2	-6
Sunday	5	3	-2	-5

9.2.7 Hourly Background sound levels $L_{A90,T}$ dB– minimum values

	Hour period start			
Day	22:00	23:00	00:00	01:00
Thursday	40	37	34	33
Friday	46	41	37	35
Saturday	45	42	41	35
Sunday	49	43	34	30

9.2.8 Hourly Background sound levels, $L_{A90,1hour}$ dB – average (mean) values

	Hour period start			
Day	22:00	23:00	00:00	01:00
Thursday	45	39	36	34
Friday	48	44	38	37
Saturday	47	45	42	37
Sunday	51	47	38	35

9.2.9 Hourly Background sound levels, $L_{A90,1hour}$ dB– median values

	Hour period start			
	22:00	23:00	00:00	01:00
Thursday	45	39	36	34
Friday	48	44	42	37
Saturday	47	45	42	37
Sunday	52	47	39	35

9.3 Figures

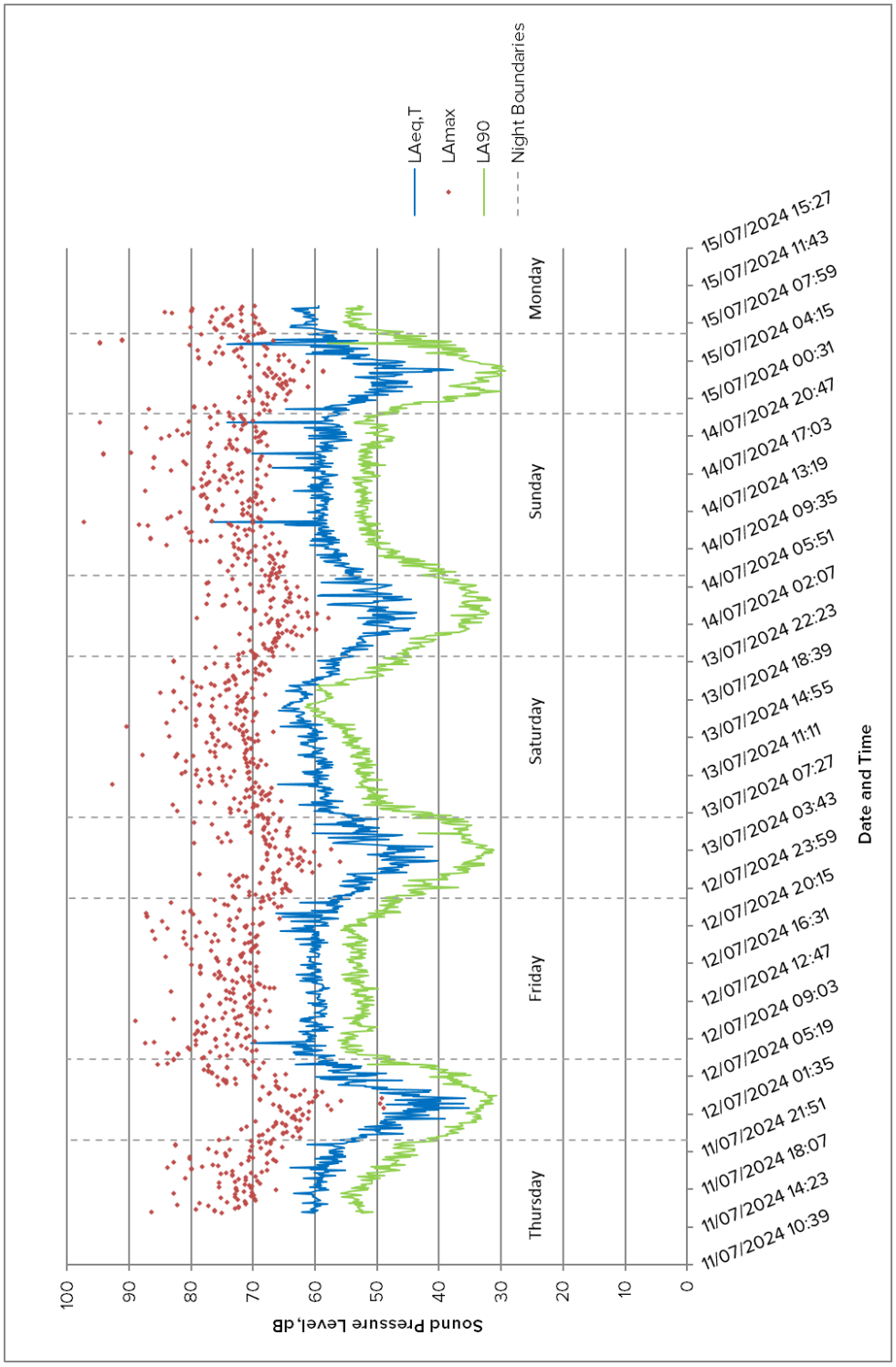

Figure 8: Chart showing the overall results trace through the survey period.

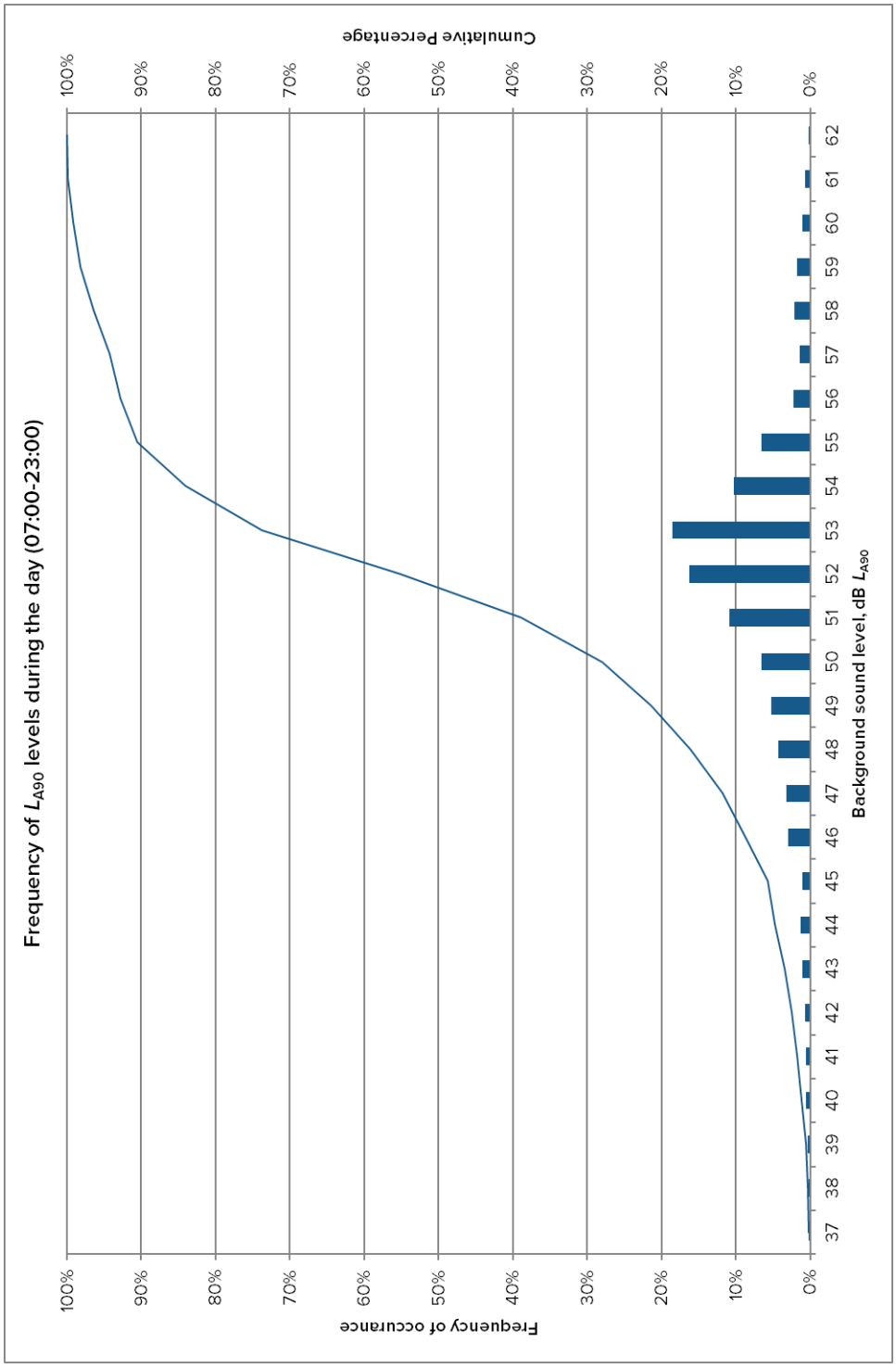

Figure 9: Histogram showing the frequency of background sound levels measured during the day

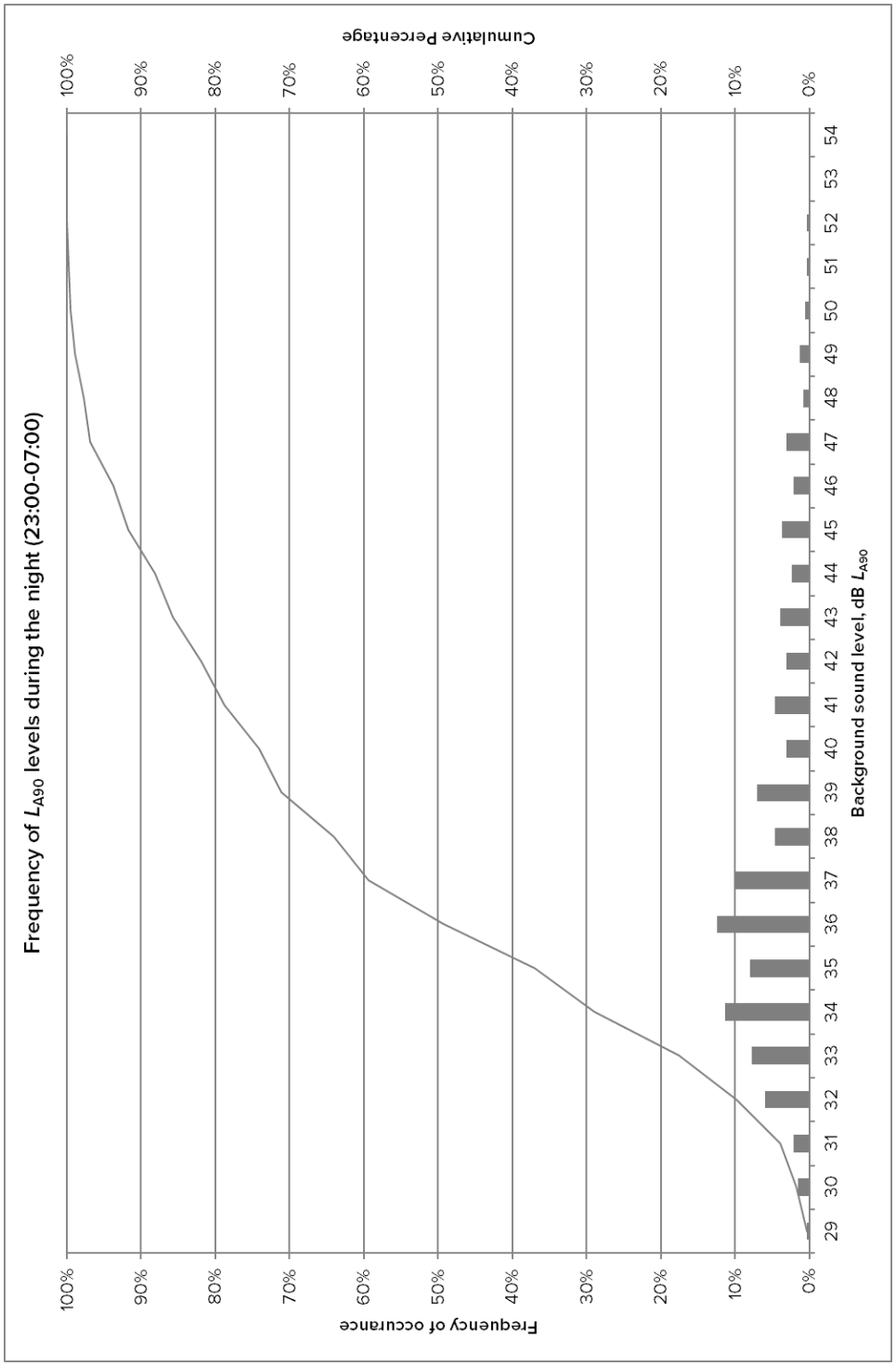

Figure 10: Histogram showing the frequency of background sound levels measured during the night

10 External Noise Mapping

A noise map has been produced to assess the impact of the beer garden.

This has allowed the investigation in to the possible constructions of the 'shelter' or 'enclosure' to the garden.

10.1 Software Used

Software	Used for	Version
CadnaA (by Datakustik)	Noise mapping	2024 MR1

10.2 Input Information

Parameter	Value
Calculation Standard	ISO 9613-2:2024
Ground Absorption	G = 0.05 (hard ground) for paved areas G = 0.70 (soft ground) for grassy areas
Reflection Order	2
Building Reflection Loss (dB)	1
Barrier Reflection Loss (dB)	1
Ground Elevation Contour Source	Open Access LIDAR maps supplied by DEFRA
Grid Height(s)	4 m

10.3 Primary Source and Receiver Positions Used

Element	Source/Receiver	Type	Height (m)
Beer Garden	Source	Area	1.5 m
Smoking Area	Source	Area	1.5 m
7 Beresford Road	Receiver	Façade	N/A
2 Southbourne Grove	Receiver	Façade	N/A
4 – 6 Southbourne Grove	Receiver	Façade	N/A

10.4 Outline Method

- Topographical and building locations information was obtained from the open source Open Street Map and processed using the QGIS platform for the area surrounding the development site.
- The information was imported to CadnaA to generate a model of the site environs.
- The existing garage was removed and replaced with the an area noise source representing the proposed garden, and reflective barriers around the north, east, and west of the proposed garden, using drawings from the Architect.
- Façade assessments of combined levels from both sources were then carried out for the nearest sensitive receptors.

10.5 Assumptions

- Drawings provided by the Architect show a partially enclosed shelter covering the majority of the garden.
- Based on these drawings it was assumed that:
  - This barrier will be physically connected to barriers around the site boundary along its north side.
  - The south side will be fully open to allow access and to comply with smoking regulations.
  - The roof will be composed at a minimum of twin-wall polycarbonate sheeting.
  - The proposed construction of the barrier to the east of the garden is not stated in the drawings, but was assumed to be at least equivalent to the close boarded fence proposed for the west side of the garden.
- To simulate a hypothetical ‘worst case scenario’ where the garden would be at full capacity, it was assumed that:
  - The maximum capacity of the garden would be approximately 50 people, based on:
    - drawings from the Architect showing seating for 24 people and
    - assuming approximately the same number of people standing in addition to this.
  - An average speech sound pressure level of 66 dB(A) at 1 m for a single person speaking in a raised voice was assumed based on *M.J. Hayne, R.H. Rumble, and D.J. Mee (2006): Prediction of Crowd Noise*.

  - A logarithmic multiplication of the calculated average speech sound power level for a single person by 50 gave an estimated average sound level of 91 dB(A) for the garden when full.
  - This figure was verified by comparing with the maximum recorded level for busy bars without music (i.e., customer noise only) given in *NANR92*, with which it was found to align closely.
- The octave band spectrum representing the sound power level of human speech at 'raised vocal effort' shown in Table 3 was applied to the area source, and a correction applied to calibrate the sound power level of the source to 91 dB(A).
- The same process was applied to an area source representing the seating in the smaller smoking area of the garden, with the level calibrated to 85 dB(A) to represent 12 people occupying this area.
- Amplified music has not been considered in this assessment.
- Attenuation indices given in Table 4 were then applied to the larger of the two area sources to approximate the effect of the proposed shelter, which was estimated to provide a weighted sound reduction index of 14 dB R_w based on available data for twin-wall polycarbonate sheeting.

Table 3: Octave band spectrum for human speech at a 'raised vocal effort', single voice

Sound power level, dB at octave band centre frequency, Hz							
63	125	250	500	1000	2000	4000	8000
58	64	70	74	70	65	59	51

Table 4: Estimated garden shelter octave sound reduction indices

Sound reduction index, R dB, at octave band centre frequency, Hz							
63	125	250	500	1000	2000	4000	8000
-3	-6	-9	-12	-14	-15	-16	-16

10.6 Figures

- See Section 11.5.

End of Section.

11 Proposed Beer Garden to Rear

A new beer garden is proposed to the rear of the property. It would replace existing garages.

Noise from patrons using the beer garden could affect surrounding residents.

To reduce the risk of disturbance to the surrounding properties, the Dancing Jug proposes that:

1. **The beer garden operates until 23:00 only.**
2. **The garden is enclosed using brick walling, close-boarded fencing and a minimum of a polycarbonate roof structure.**

11.1 Criterion Used in Assessment

- It is suggested that using inaudibility as the target criterion at the nearest residential properties in the assessment of the beer garden is unreasonable.
- This is for the following reasons:
  - By its nature, the beer garden is intended to be an external amenity area, and some noise could be expected from these areas at nearby receptors.
  - Being an outdoor space, it would not benefit from full, high sound reducing homogenous structures or enclosures.
  - The Dancing Jug has proposed the use of an enclosure using fencing and a form of roof to reduce noise transmission from the area as far as is possible.
  - There appear to be other venues in the area that employ outdoor spaces for patrons, including the adjacent Larder House.
  - The intended use of the beer garden would not extend in to the night-time period.
- The proposed criterion in this instance therefore is to not exceed the mean or median background sound level between the 'worst-case' final hour of intended use, between 22:00 and 23:00.
- Where this criterion would be applied throughout the daytime, it would be expected that the surrounding receivers would be suitably protected.
- The selected value has been obtained from the lowest of the background levels measured on all four days in the 22:00 to 23:00 time period, which was on the Thursday, and was 45 dB $L_{A90,1hour}$.

Proposed Criterion $L_{Aeq,1hour}$ dB, Daytime, until 23:00
45

11.2 Assessment Results

- This table shows the noise levels expected at the elevations with living spaces at the surrounding receptors from the beer garden.
- The levels shown are the combination of noise from the beer garden and the smoking area, both at full capacities.

Noise Sensitive Receptor	Modelled Noise Level, $L_{Aeq,1hour}$ dB
7 Beresford Road	36
Residential dwellings above the Larder House	44

11.3 Assessment Outcomes

- The Cadna model corroborates the use and form of the wall, fencing and roof structure shown in the Architect's drawings.
- While greater noise levels are indicated on the model output for the southern façade of 7 Beresford Road, this elevation is not expected to contain windows to living spaces including bedrooms.
- Bedrooms and living rooms are expected to be located to the east and west elevations of 7 Beresford Road.
- It is expected that the proposed criterion can be achieved at the adjacent residential receptors with the use of:
  - A 2 m high brick wall to the northern elevation.
  - Use of what is expected to be an existing brick wall to the east elevation at the boundary with the Larder House, with the upper gable section closed as the proposed west elevation.
  - Solid, close-boarded fencing providing a minimum mass per unit area of 10 kg/m^2 and a minimum sound reduction of 24 dB R_w to the western and eastern elevations, installed above brick walling.
  - Clear polycarbonate roofing with a minimum mass per unit area of 1.7 kg/m^2 and a minimum sound reduction of 14 dB R_w.
- It is imperative that gaps between the wall, fencing and the 'roof' are closed where possible.
  - This will reduce the risk of noise 'bleed' through the joints of the structure that would undermine its sound reduction.
  - The nature and construction of the 'secret gutter' section shall therefore not undermine the overall sound reduction.
- The model assumes that the garden is enclosed on:
  - Three vertical elevations, north, west and east.
  - The roof.
- The exception is that the vertical elevation of the beer garden structure facing the proposed Dancing Jug building is open except for the section formed by the enclosed external stairwell.

11.4 Next Actions/Further Work

- The recommendations made here shall be incorporated to the design of the enclosure.
- Product proposals shall be reviewed by an acoustician to determine compliance with the specifications set out in this report.

11.5 Figures

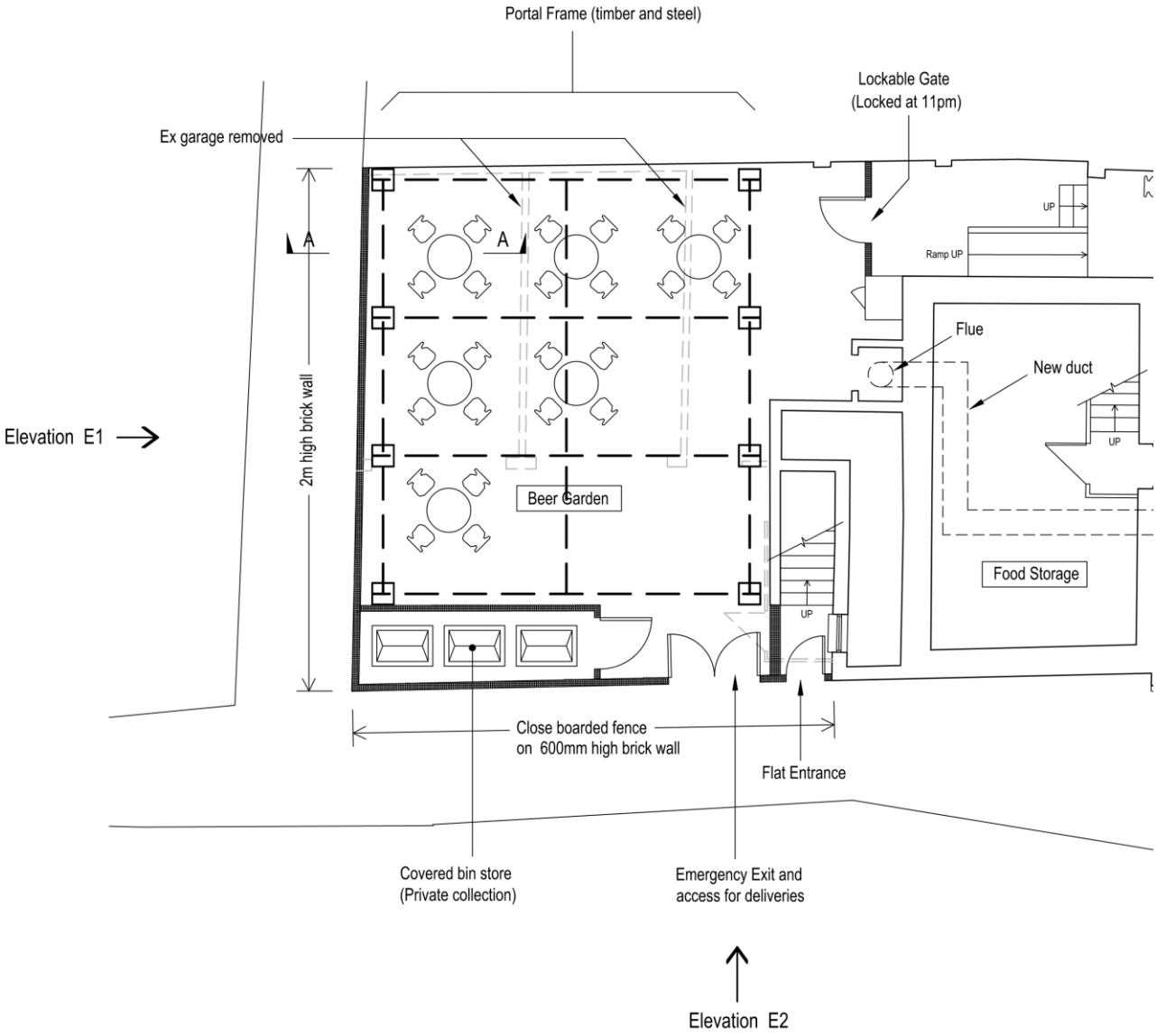

Figure 11: Architect's plan detail showing the proposed beer garden and structure to rear of main building

Figure 12: Plan view of beer garden model results output

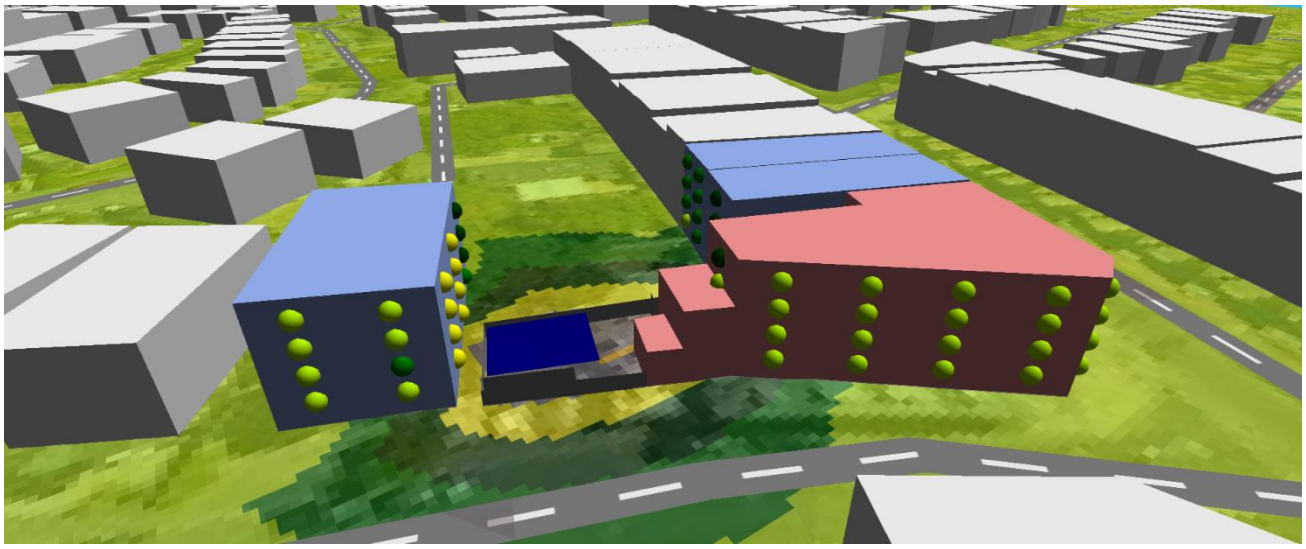

Figure 13: Model view of beer garden from the west

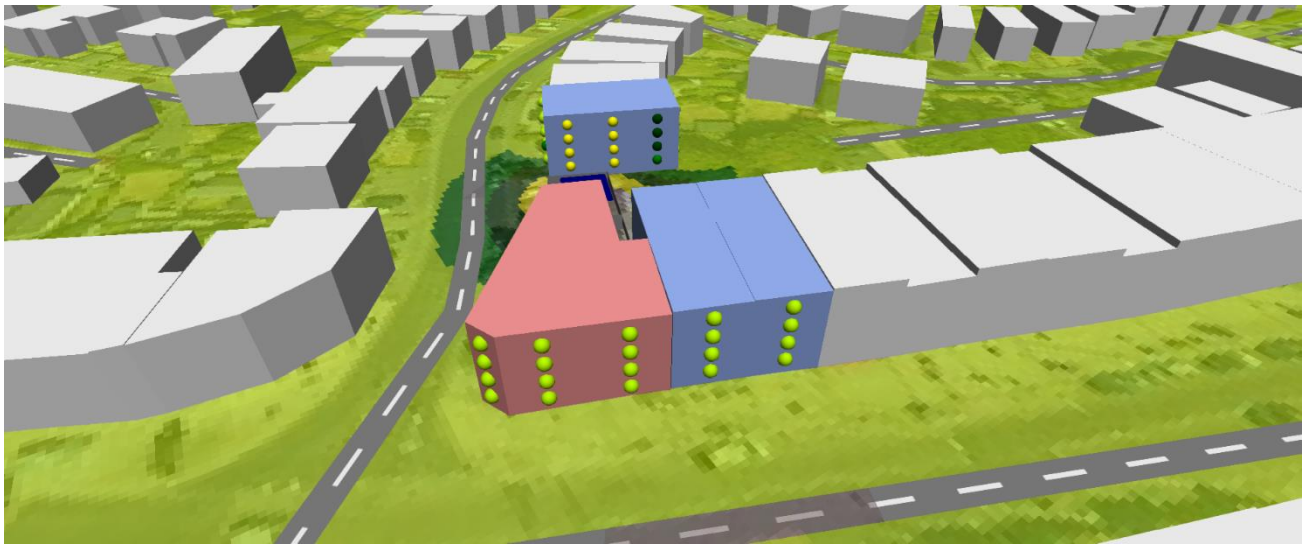

Figure 14: Model view of beer garden from the south

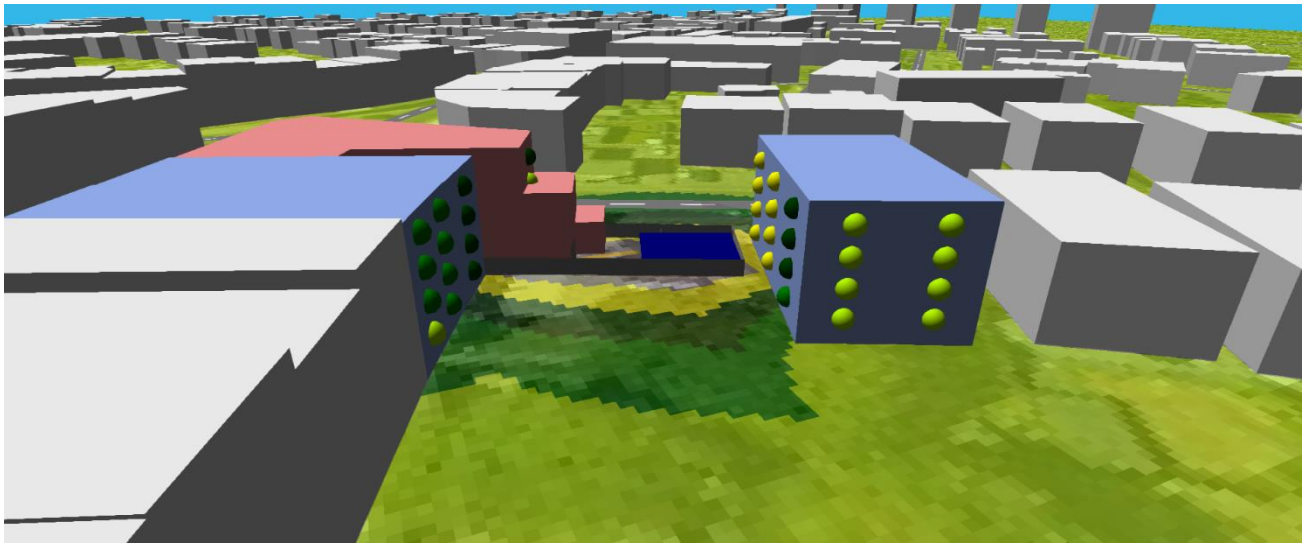

Figure 15: Model view of beer garden from the east

11.6 Uncertainty

- Uncertainties in the model primarily relate to:
  - The validity of the input vocal data, which assumes a single, constant value for every person in the beer garden, all talking at the same time which may or may not represent the likely reality.
  - The values for speech have been treated as averages and don't account for variability such as maximum events caused by intermittent shouts.

End of Section.

12 Internal Noise Breakout

Noise transmitting through the façade of the building from inside to outside has been assessed.

This has resulted in recommendations relating to:

1. **Likely limiting sound levels for the internal sound system.**
2. **Possible improvements to the sound reduction of the building's façade using secondary glazing.**

12.1 Software Used

Software	Used for	Version
APP127 Internal Noise Breakout (Attune)	Calculation of the transmission of internal noise levels through the façade, at distance and in free space	v2.21
Insul (Marshall Day)	Modelling of the sound reduction of glazing and building façade elements	v10

12.2 Primary Applicable Standards

Standard	Applies to	Mandatory
British Standard BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings*	Internal noise level criteria in bedrooms, and the reduction of an open window	No
BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*	Consulted in relation to the derivation of criteria relative to background	No

12.3 Criteria Used in Assessment

- Two different criteria have been considered in this assessment, to enable comparison of different options for mitigation that are available to the Client.
- The criteria considered in the assessments are shown below.

Nature of criterion	Criterion $L_{Aeq,1hour}$ dB at 1 m from the façade of the receptor
Relative value to the background sound level	24
Absolute value assuming open windows	30

- The criterion in relation to background relates to the mean and median measured $L_{A90,T}$ values shown in section 9.2.
- Where these values are in good agreement, the lowest value of 34 has been used, with a criterion 10 dB below the background selected.
- This is considered to be a very onerous criterion, based on the 'worst case' time of the night relating to the proposed opening hours between 00:30 and 01:30.
- The background sound level of 34 dB $L_{A90,5min}$ is also considered to be the 'representative' background sound level for the night-time period based on the histogram shown in Figure 10.
- The absolute value criterion is based on the following rationale:
  - An overlooking resident might need to open their windows for rapid ventilation through the night-time period for the relief of overheating.
  - The internal noise criterion in a bedroom is 30 dB $L_{Aeq,8hour}$, derived from BS 8233: 2014.
  - To not increase noise levels in a bedroom from this extraneous noise source, a resulting internal level of 20 dB $L_{Aeq,8hour}$ from the bar/restaurant would be targeted.
  - A façade with an open window provides a reduction of between 10 to 15 dB, according to BS 8233.
  - With the addition of the lower end of this range, the external absolute criterion shown in the table has been derived.
- To provide some consideration to tonality, the additional criterion of NR 15 at 1 m from the receptor's façade has been observed in the assessment.

12.4 Assessment Rationale

- Two assessments have been carried out:
  - An assessment assuming that the existing single glazing is in place in all units exposed to the bar/restaurant.
  - An assessment assuming that secondary glazing is installed over the existing secondary glazing.
- The outcomes of the assessments include:
  - Recommendations for limiting sound levels internally.
  - Possible sound reduction specifications for secondary glazing.
- The time period considered is the latest possible period up to 01:30 in the morning.
- The differing assessments have been provided to assist in the selection of a method of mitigation that considers the needs of all Stakeholders, including the Client, the Local Authority and the surrounding residents.
- The assessments assume that the internal noise levels are comprised of the combination of:
  - Noise from patrons, predominantly raised voices.
  - Noise from music through the internal sound system.
- The limiting sound pressure levels presented are expected to:
  - Apply in locations in the room 1 m from the internal façade.
  - Be the average through the space and the maximum sound levels measured at any point along the façade.
- For the purposes of the assessment:
  - The bar/restaurant has been assumed to have an occupation level of at least 60 standing people, which affects the reverberation time in the large space and also affects the resulting levels.
  - The assessment distance from the façade of the bar/restaurant to the opposite side of the street is 15 m.
  - It is expected that there would be directional losses associated with noise transmission to the dwellings located above the bar/restaurant, such that the direct sound level to the opposite side of the street would be representative of the levels that could be expected at both locations.
- The masonry and glazing building façade elements have been based on the following descriptions and sound reduction values.

	Sound reduction, R dB per octave band centre frequency, Hz						
Element	63	125	250	500	1000	2000	4000
48 dB R_w Brick, double skin, laid long, 204 mm	42	45	43	47	43	57	62
30 dB R_w Single glazing (modelled), 4 mm	15	17	21	26	30	33	30
49 dB R_w 10 mm secondary pane, 200 mm gap, minimum 4 mm external pane	30	35	46	46	46	56	65

- The assessments assume that all glazing would be closed at all times, with means of ventilation or cooling supplied to the bar/restaurant that is an alternative to relying on natural ventilation.

12.5 Assessment Representation

- To summarise the nature of the assessment basis:
  - The bar/restaurant is assumed to be at at least 50% capacity.
  - Music system is operating.
  - All windows are closed, including the secondary glazing, in that scenario.
  - Based on achieving external sound levels with the above operation between the hours of 00:30 and 01:30, which is considered to be the 'worst case'.
- Note that the lobbied door arrangement at the corner of the building has been assumed to not undermine the rest of the structure.
- Where the assessment only reviews this early morning period, it is therefore expected that the effects of noise from the bar/restaurant at other times of the night and during the daytime will be much less reduced, with the noise being:
  - Less noticeable outside.
  - Less of a risk of disturbance to neighbours.

12.6 Limiting Level Assessment Results

- The assessments yielded the following internal limiting sound pressure levels, noting again that the assessments are based on the 'worst case' 00:30 to 01:30 time period.

12.6.1 Limiting levels with no secondary glazing installed

Sound level, dB per octave band centre frequency, Hz						
63	125	250	500	1000	2000	4000
94	84	80	78	77	78	73

12.6.2 Limiting levels with secondary glazing installed

Sound level, dB per octave band centre frequency, Hz						
63	125	250	500	1000	2000	4000
107	100	94	91	83	93	97

12.7 Assessment Outcomes

12.7.1 With no secondary glazing installed

The resulting internal limiting levels with no secondary glazing are:

- In the order of 83 dB $L_{Aeq,1hour}$.
- 'Low' when compared with a likely speech spectrum for a number of raised voices such as that shown in section 10.2.
- This would imply that the level of music could not be greater than the volume from people speaking in that space.
- This results in:
  - Low permitted levels of music from the sound system.
  - Relatively low levels of low frequency (or bass) from the sound system.
  - Limited flexibility in terms of management of the sound system.

12.7.2 With secondary glazing installed

The resulting internal limiting levels with secondary glazing are:

- In the order of 101 dB $L_{Aeq,1hour}$.
- Expected to provide a more suitable internal environment for music played at a level that is more consistent with 'a bar playing music' and even approaching 'a night club', according to the *Noise from Pubs and Clubs* document.
- Allowance for the combination of noise from voices and music.
- Allowance for greater levels of low frequency (bass) from music than without secondary glazing.

12.8 Next Actions/Further Work

- As the Client has indicated that they will be installing secondary glazing to all window units in the bar/restaurant on the ground floor, the proposed secondary glazing types shall be reviewed by an acoustician.
- The proposals for the automatic lobbied door arrangement shall also be reviewed by an acoustician.
- Internal limiting sound levels provided here are for general information and would need to be calibrated on site with a Sound Engineer adjusting the system and setting the monitors correctly by carrying out acoustic measurements in the specified locations.

12.9 Uncertainty

- The uncertainties in this assessment relate to:
  - Assumptions in the room finishes and the resulting reverberation time in the bar/restaurant.
  - The level of occupation of the room and how an increasing occupation might change the outcome of the assessment.
  - The performance of the actual walling and glazing present in the existing building.
- The risk of these factors significantly changing the outcome of the assessment is however considered to be low.
- The time period used to assess the music transmission to outside is one hour, with consideration of the recorded values for the 15 and 5 minute periods.
  - Given the variability of music, the assessment time period could arguably be shorter.
- No corrections for either tonality or intermittency have been applied to the assessment results.
  - These corrections would be considered in a BS4142 assessment and music will be tonal and varied in nature.
  - This is expected to be somewhat offset by the consideration of an upper external NR result that has resulted in the internal limiting noise levels, and that the assessment considers the 'worst case' time of the early morning only.
- This assessment only considers the very end of the proposed operating period at night. This is expected to:
  - Have provided a result biased to the 'worst case' quietest time of the operating period.
  - Overstated the need for secondary glazing where ambient and background sound levels are much greater during the day and at other operating times of the night.

12.10 Figures

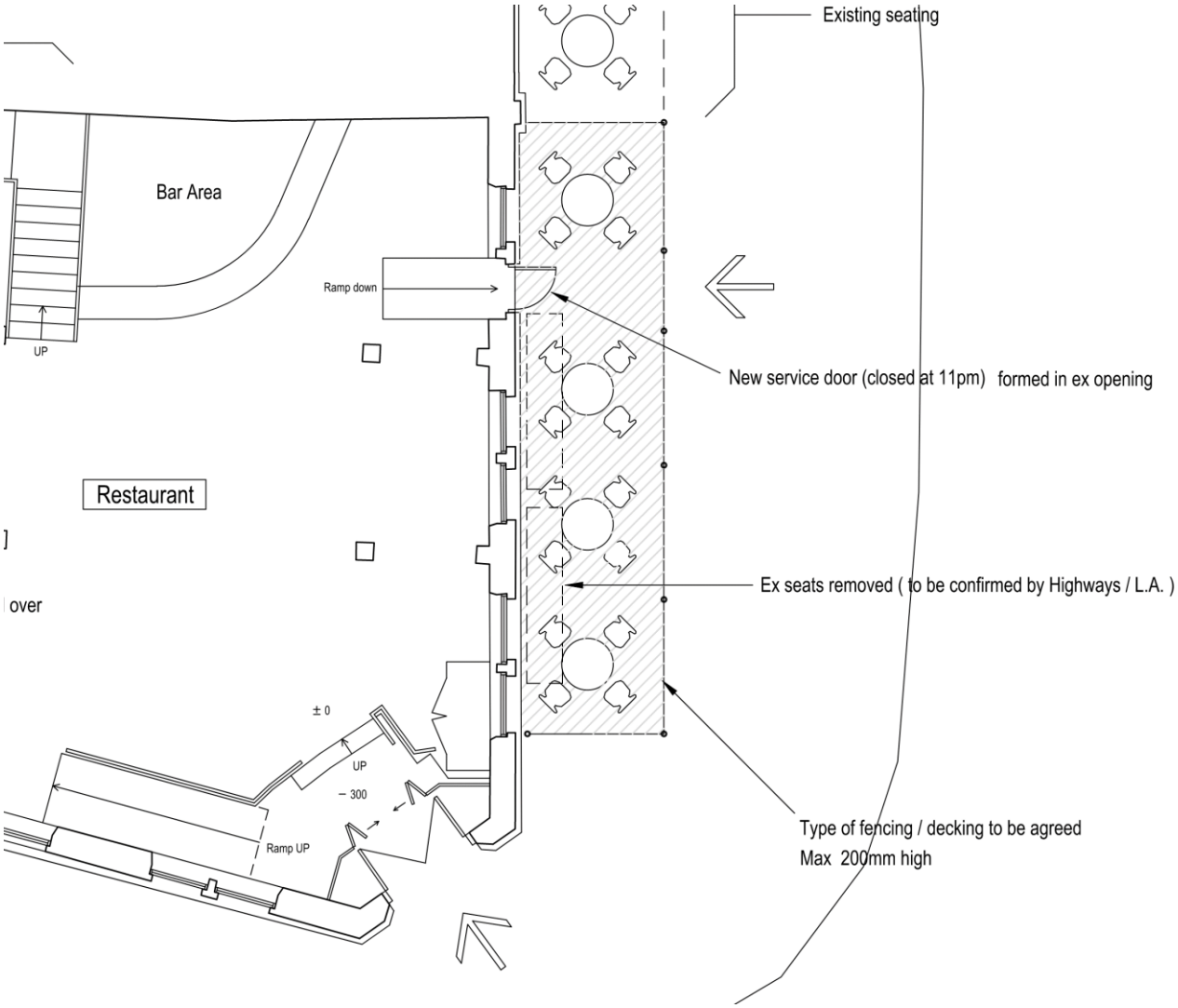

Figure 16: Architect's plan view showing the new lobbied door arrangement at the corner and the new door in place of the original Lloyds Bank Automatic Telling Machine (ATM), and the glazing units to one elevation.

End of Section.

13 Noise from Patrons Leaving

Noise from Patrons leaving the establishment at night has been highlighted as an issue that also requires acoustic review.

This is mostly in relation to the proposed closing time of 01:30 when background sound levels are expected to be 'low', when compared to earlier hours of the night and in the daytime.

13.1 Primary Applicable Standards

Standard	Applies to	Mandatory
NANR92 *Noise from Pubs and Clubs Final Report*, 2005	Noise from patrons and music in pubs and clubs	No

13.1.1 NANR92 Noise from Pubs and Clubs

- The document identifies noise from patrons arriving and leaving as a significant issue, particularly in urban areas, but notes that a comprehensive assessment method is currently not available.
- The document highlights the need for further data and research to develop a robust assessment method for this type of noise.
- It states that noise from patrons includes talking, shouting, laughing, and other sounds associated with groups of people.
- This noise is less controllable by the establishment compared to internal entertainment noise or mechanical noise.
- There is a lack of comprehensive data and established methods specifically for assessing noise from patrons.
- The suggested approach for assessment that is provided in NANR92 is a retrospective method as opposed to a proactive one, with assessment during and after the event.
- The approach includes:
  - Observations and logs.
  - Interviews and surveys.
  - Noise monitoring of Patrons leaving.
  - Focussing on critical time periods, such as early morning.
- Mitigation measures provided by the document include crowd management, designated quiet zones, and staff training to reduce noise from patrons.

13.2 Criterion Used in Assessment

Nature of criterion	Criterion $L_{Aeq,5min}$ dB at 1 m from the façade of the receptor
Relative value to the background sound level	39

- This criterion is based on that suggested in the NANR92 document of +5 dB over the background sound level.
- The criterion relates to the mean or median background sound level measured between 01:00 and 01:30.
- The background sound level of 34 dB $L_{A90,5min}$ is also considered to be the 'representative' background sound level for the night-time period based on the histogram shown in Figure 10.
- A shorter time period has been used for the criterion than that for music, given the nature of the noise source which could be very variable in character and time period, however this period could be further reduced to better represent the source.
- This is an onerous criterion and may not be representative of the conditions experienced on site at the assessment time, particularly where there may be a great deal of variability and patrons from other establishments leaving at the same or at a similar time.

13.3 Assessment Rationale

- A very broad assessment has been undertaken.
- A hemi-point source propagation calculation has been carried out to review the expected noise levels at the surrounding facades from:
  - One person with a relaxed, normal speaking voice.
  - Increasing the number of people speaking, until the criterion is exceeded.
- This assessment approach is limited, but provides an indication at least of the likely 'tipping point' where noise from patrons could be considered to be excessive, based on the suggested criterion.

13.4 Assessment Results

- The assessment shows that the suggested criterion is exceeded with four people talking normally and simultaneously in the street.

13.5 Assessment Outcomes

- The assessment has shown that the level of activity in the street does not have to be excessive to exceed the suggested criterion.

- Considering a raised voice, the criterion is exceeded with only one person speaking.
- Following the consumption of alcohol, it is not unreasonable to assume that regulation of speech level would be difficult for patrons leaving the establishment.
- This assessment does not consider shouts or other maximum noise events.
- Again, the criterion employed in this assessment is considered to be onerous, and may be inappropriate for application to this type of noise source.
- As per the recommendations in NANR92, the following mitigation measures would be suggested to control noise from patrons:
  - Crowd management.
  - Designated quiet zones.
  - Staff training to reduce noise from patrons.
  - Signs installed at the premises that remind patrons that they are in a residential area and that they should leave quietly.
- As for dispersal of patrons, it would be recommended that both entrance doors are used to:
  - Create two dispersal points instead of one, which would reduce the size of any group leaving and therefore the potential for noise from any one point along the façade of the establishment.

13.6 Further Work

- Further work could include acoustic monitoring of patrons at the site.
- This work would be coordinated with the client, with reviews of the measured levels against the criteria.
- Interviews with surrounding residents could be carried out to understand any impacts that they might experience.

13.7 Uncertainty

- There are a number of uncertainties related to this assessment:
  - There is no pre-defined method nor standard that relates to this assessment, and the assessment provided here is therefore outline and indicative only.
  - The time period for assessment is not concrete.
  - The criterion used at the receptors may not be appropriate, and comparison with another metric might be more appropriate, such as comparison with the ambient sound level and the respective change in that level.
  - An arbitrary level for speech has been used; this may differ in reality.
  - The assessment does not account for maximum noise events.

End of Section.