parkerjones acoustics

1 Langley Road, Chippenham

PL/2022/08349 / PL/2023/07146

Noise Compliance Assessment

18th October 2023

First Issue

1 Langley Road, Chippenham

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ParkerJones Acoustics Limited

Bristol
11 Bankside Road
Brislington
Bristol
BS4 4LB

London
29 Lincoln's Inn Fields
Holborn
London
WC2A 3EE

Glasgow
126 West Regent Street
Glasgow
G2 2RQ

+44 (0)800 830 3338
+44 (0)117 914 6558
info@parkerjonesacoustics.com
www.parkerjonesacoustics.com

Registered in England and Wales
Company No. 12235614

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Executive Summary and Conclusions

This document, a Noise Compliance Assessment, has been written to assess where the development at 1 Langley Road, Chippenham, SN15 1BP (under application PL/2022/08349 with Wiltshire Council) is compliant with condition no. 2 relating to external noise ingress into the dwellings.

The assessment has been conducted through measurements over a 24-hour period taken inside two of the bedrooms on the 1st floor on either side of the building, with windows closed and trickle ventilators open.

The results have been assessed against the internal noise level targets that the original Noise Impact Assessment and thus the recommended façade specification (with acoustic ratings for windows and ventilators) was based on.

In summary, the results of the monitoring (see Section 4.3) have demonstrated that the tested rooms are compliant with the condition, and thus condition no. 2 should be discharged.

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1.0 Introduction

ParkerJones Acoustics Limited (PJA) has been instructed to undertake a Noise Compliance Assessment as part of the retrospective planning application for the *"Change of use to House in Multiple Occupation (HMO) for up to 6 people (C4)"* at 1 Langley Road, Chippenham, SN15 1BP – under application PL/2022/08349 with Wiltshire Council.

This document has been written to assess whether the completed development at 1 Langley Road, Chippenham, SN15 1BP is compliant with condition no. 2 relating to external noise ingress into the dwellings.

The assessment has been conducted through measurements over a 24-hour period taken inside two of the bedrooms on the 1st floor on either side of the building, with windows closed and trickle ventilators open.

The results have been assessed against the internal noise level targets that the original Noise Impact Assessment and thus the recommended façade specification (with acoustic ratings for windows and ventilators) was based on.

Whilst every attempt has been made to ensure that this report communicates effectively to a reader who might not have much knowledge of acoustics, some parts are necessarily technical. A glossary of acoustic terminology and concepts is provided in Appendix A.

2.0 Site and Development Description

The site of the proposed development is located at no. 1 Langley Road ('Old Clift House'), Chippenham, SN15 1BP. As shown in Figure 2.1, and as described by the following taken from the *Planning Statement* with the application:

"The site is located at the north-eastern corner of the junction of Langley Road, Malmesbury Road, New Road and Park Lane. The building fronts onto Langley Road with a parking area to the rear for 3 spaces.

Adjacent to the north is a takeaway with a flat above. There are commercial premises to the east and a retail park on the opposite side of Foundry Lane to the south. To the west on the opposite side of Langley Road is the Grade II Listed St. Pauls Church and associated graveyard. Opposite the site on the other side of the junction is the Little George which is Grade II Listed. The wider area to the north is mainly residential and to the south lies the commercial areas. The site is on the northern edge of the town centre as defined in the saved North Wiltshire Local Plan."*

The development (which has been carried out) comprises the change of use from offices to a house in multiple occupation (HMO) for up to 6 people (use Class C4). Floor plans and elevations of the proposed development are shown in Figures 2.2, 2.3, and 2.4.

The adjacent takeaway has a considerable amount of extraction and condenser plant located externally between it and the property in question. The applicant (since earlier planning applications for this site) has gone to considerable expense in installing noise mitigation to reduce the impact of this plant, including an acoustic enclosure around the noisiest condenser; an acoustic jacket around the noisiest extract fan; and silencers within the extract fan ducting.

Several noise surveys/impact assessments were carried out in order to obtain planning permission, with monitoring positions outside of 1st floor windows at the front and rear of the property, and also out of a rooflight on the 2nd floor. This resulted in PJA providing recommendations regarding the acoustic performance required of the windows and trickle ventilators, based on the measured external noise levels, to meet internal noise targets. It is understood that the Applicant has carried out works based on these recommendations.

Figure 2.1 – Aerial views of the site and surrounding area – Street views (bottom)

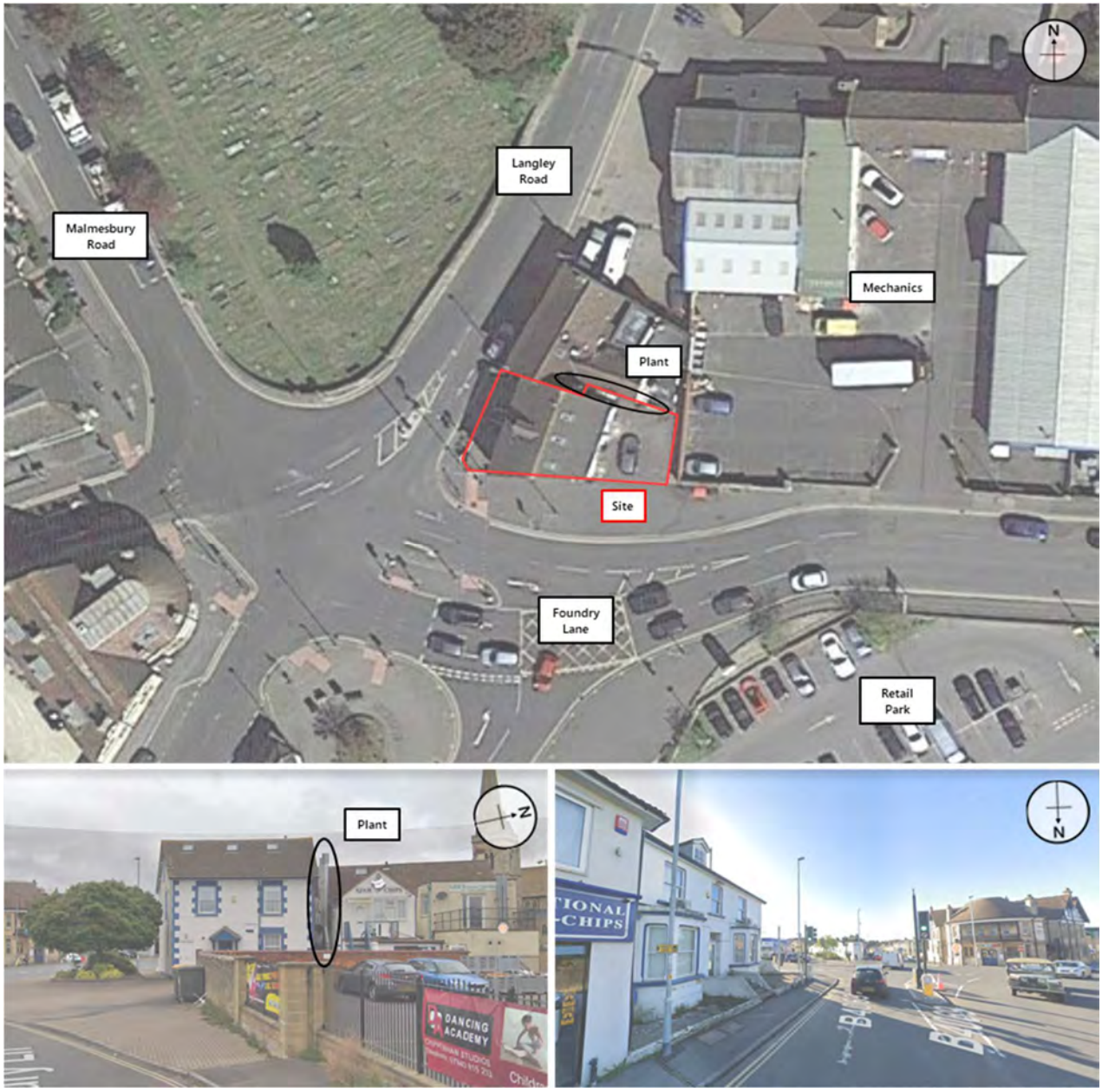


Figure 2.2 – Proposed basement and ground floor plans

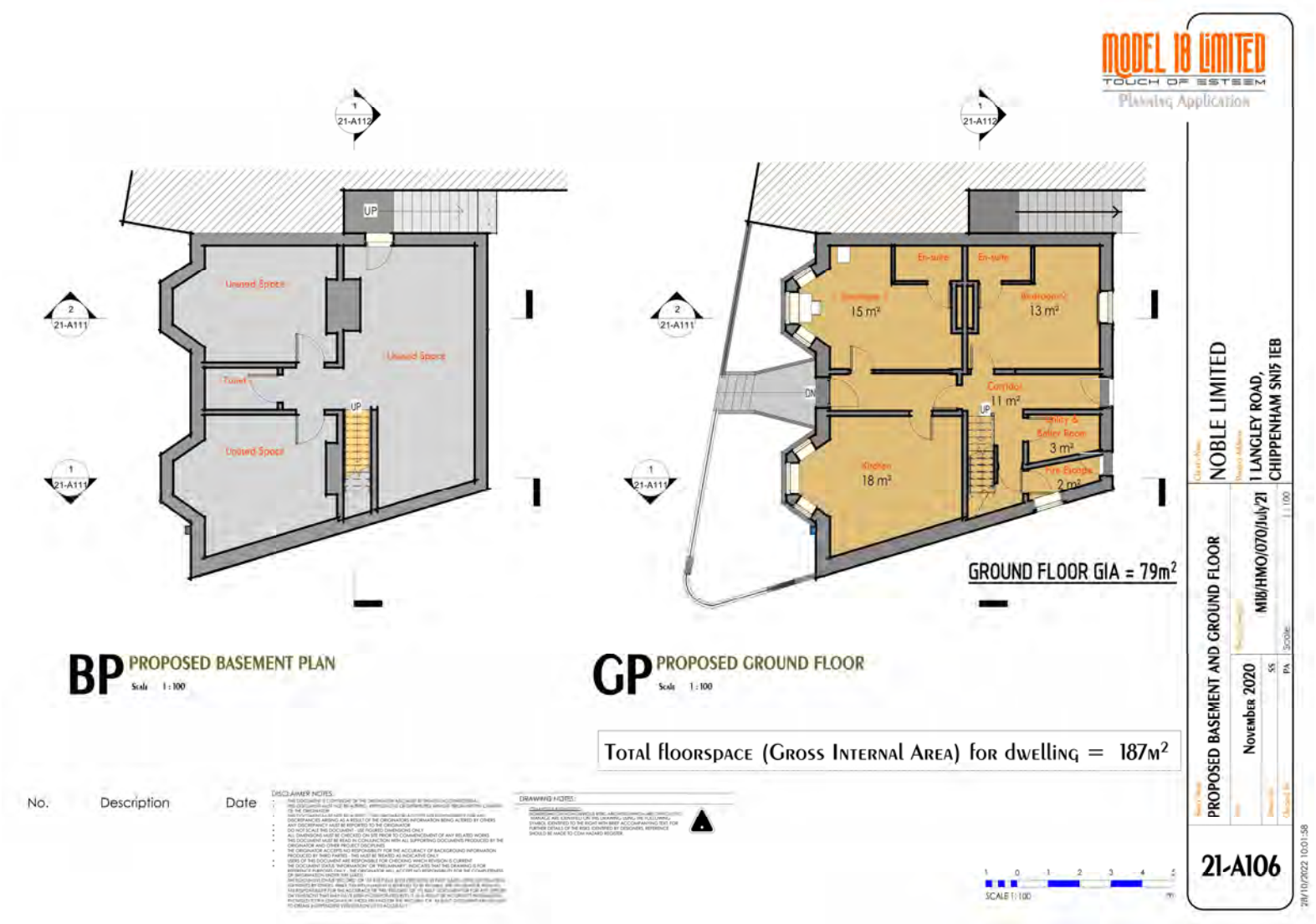


Figure 2.3 – Proposed first and second floor plans

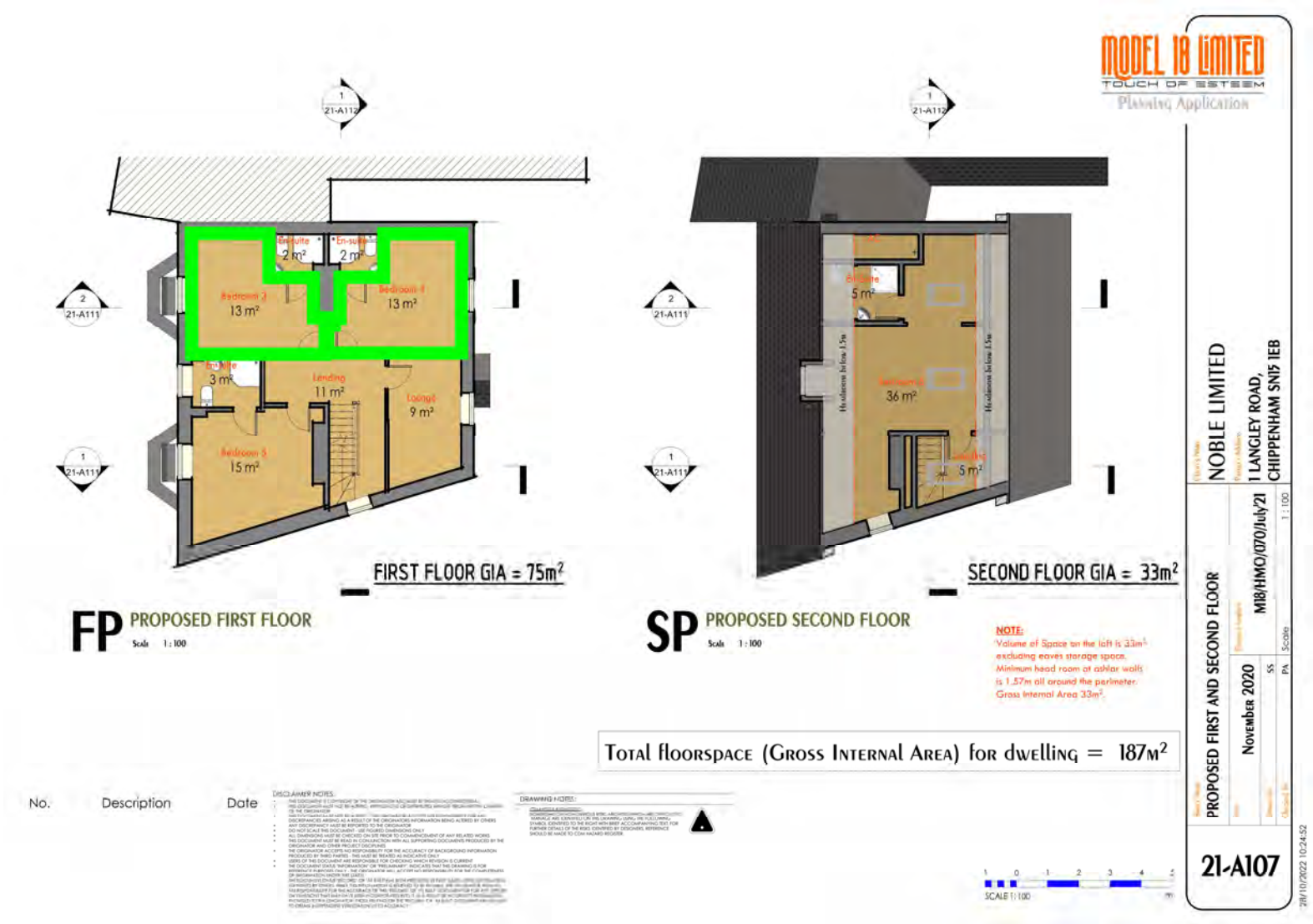
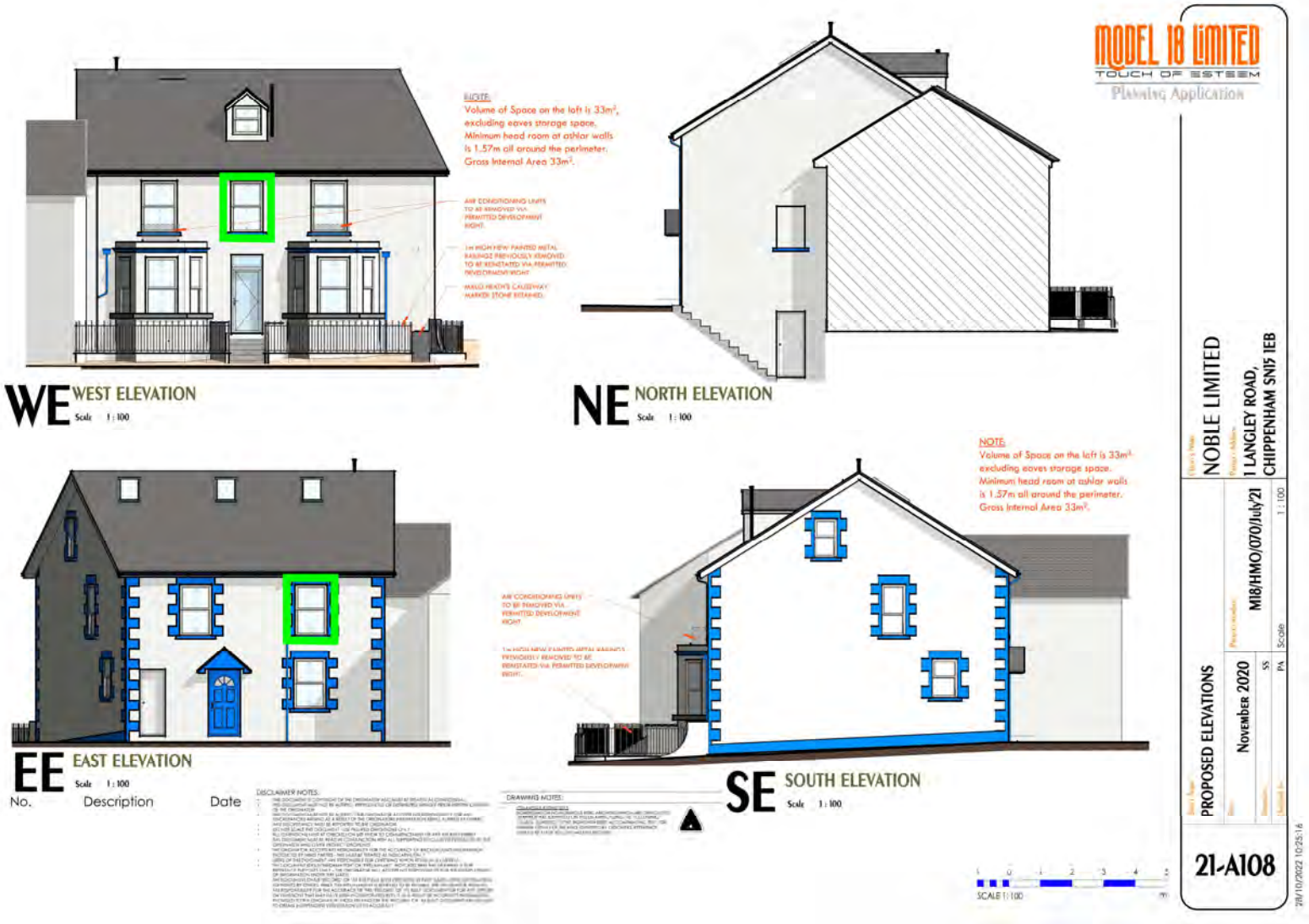


Figure 2.4 – Proposed elevations



3.0 Planning Condition and Criteria

The relevant planning condition no. 2 (which was granted a 3 month extension under variation application PL/2023/07146) states the following:

"Within 6 months of the date of this planning permission a validation report shall be submitted to the local planning authority for approval in writing. The validation report shall demonstrate compliance with the glazing and ventilation specifications set out within Table 5.5 of Parker Jones Noise Impact Assessment dated 4th April 2023 in order to achieve compliance with the required standards as set out within the assessment.

REASON: To ensure a satisfactory standard of living environment for incoming occupiers."

The "*required standards as set out within the assessment*" are based on the criteria of the ProPG. In summary, internal ambient noise level contributions inside the bedrooms and living rooms of the residential dwellings should be no greater than those in the table below.

Table 3.1 – Internal ambient noise level (IANL) upper limits

Activity	Location	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,F}$ [1]
1 - no more than 10 times a night			

4.0 Assessment

4.1 Methodology

As part of writing this report, PJA were able to attend the site to measure noise levels inside two 1st floor bedrooms at the property over a 24-hour period between Monday the 16th and Tuesday the 17th of October 2023.

Figures 2.3 and 2.4 in Section 2.0 show the location of the 1st floor rooms and affected windows (in green) that have been tested as part of this post completion survey – in Bedroom 3 (west/road facing elevation) and Bedroom 4 (east elevation).

Microphones were placed on a tripod in each room at a height of ≈1.8m, and ≈1m from the window.

The sound level meters were set to log noise levels over continuous 5-minute averaging periods with a 1-second time history rate. The monitoring equipment was left unattended for the majority of the survey with the exception for a short period around the installation and collection of the equipment.

The following noise indices were recorded (amongst others):

- $L_{Aeq,T}$: The A-weighted equivalent continuous noise level over the measurement period T. This parameter is typically considered as a good representation of the average ambient sound level; and
- $L_{AFmax,T}$: The maximum A-weighted noise level during the measurement period T and the best representation of short high noise levels 'events' – i.e., emergency services sirens.

Windows were closed and trickle ventilators were open throughout the survey. The building was unoccupied for the survey.

The roads, neighbouring takeaway/plant, light industrial buildings and retail park all appeared to be open and operating normally.

Appendix B contains further information on the methodology of the survey, including photographs taken from site and the equipment used.

4.2 Results

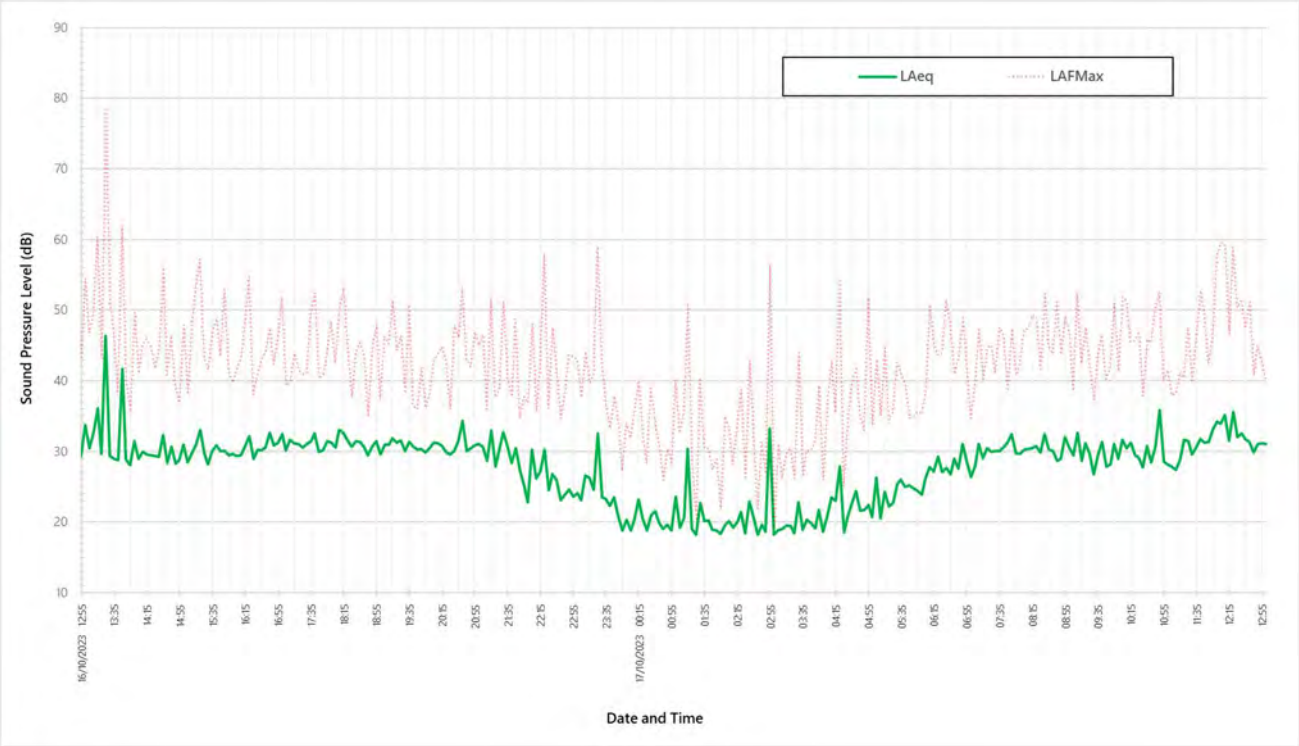
4.2.1 Bedroom 3 (West/Road facing Elevation)

A time history graph of the measured noise levels in Bedroom 3 is given in Figure 4.1 with a summary provided in Table 4.1 below. The relevant results are highlighted (relating to the internal limits of 35 dB $L_{Aeq,16hr}$ during the day, 30 dB $L_{Aeq,8hr}$ at night, and 45 dB L_{AFmax} no more than 10 times per night – confirming compliance during the survey).

Table 4.1 – Summary of measured noise levels - Bedroom 3 (west/road facing elevation)

Period	Logarithmic Average $L_{Aeq,T}$ (dB)	10th Highest L_{AFmax} (dB)
Daytime (07:00 – 23:00)		
Monday 16th October; 12:55 – 23:00	32	N/A
Tuesday 17th October; 07:00 - 12:55	31	
Combined	32	
Night-time (23:00 – 07:00)		
Monday 16th October / Tuesday 17th October; 23:00 – 07:00	24	45

Figure 4.1 – Graph of measured noise levels – Bedroom 3 (west/road facing elevation)



4.2.2 Bedroom 4 (East facing Elevation)

A time history graph of the measured noise levels in Bedroom 3 is given in Figure 4.2 with a summary provided in Table 4.2 below.

It is important to note that the results in this room were (unintentionally) affected by a timed air freshener inside the room. The graph in Figure 4.2 shows a consistent peak in both parameters every 40-minutes. The surveyor did not observe this during setup (as it was setup between sprays) but purposefully remained in the room for an hour after the survey (having observed results via an online portal before attending site again) to subjectively confirm the cause of the noise, confirming it to be the air freshener.

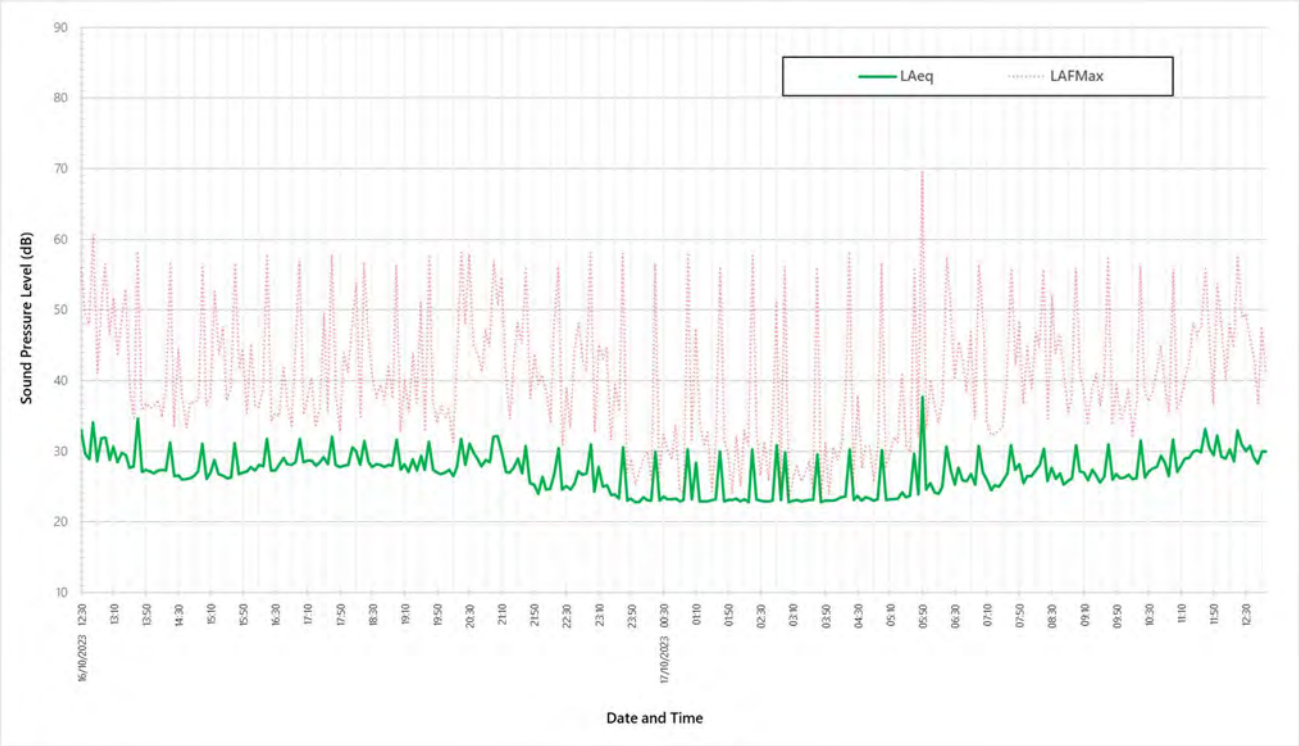
The results in Table 4.2 reflect the values with the 5-minute periods in which the air freshener spray removed.

The relevant results are highlighted (relating to the internal limits of 35 dB $L_{Aeq,16hr}$ during the day, 30 dB $L_{Aeq,8hr}$ at night, and 45 dB L_{AFmax} no more than 10 times per night – confirming compliance during the survey).

Table 4.2 – Summary of measured noise levels - Bedroom 4 (east facing elevation)

Period	Logarithmic Average $L_{Aeq,T}$ (dB)	10th Highest L_{AFmax} (dB)
Daytime (07:00 – 23:00)		
Monday 16th October; 12:39 – 23:00	28	N/A
Tuesday 17th October; 07:00 - 12:55	28	
Combined	28	
Night-time (23:00 – 07:00)		
Monday 16th October / Tuesday 17th October; 23:00 – 07:00	25	43

Figure 4.2 – Graph of measured noise levels – Bedroom 4 (east facing elevation)



4.3 Conclusions

The results (summarised in Table 4.3 below) demonstrate that noise levels measured inside the two 1st floor bedrooms during the survey were within the target internal ambient noise limits.

Table 4.3 – Summary of measured noise levels against the internal noise limits

Room	Internal noise level			Compliant?
	Daytime average (07:00 – 23:00) dB $L_{Aeq,16hr}$	Night-time average (23:00 – 07:00) dB $L_{Aeq,8hr}$	Night-time maximum (23:00 – 07:00) dB L_{AFmax}	
Bedroom 3	32	24	45	Yes
Bedroom 4	28	25	43	Yes
Criteria	≤35	≤30	≤45	-

Appendix A – Acoustic Terminology and Concepts

A.1 – Glossary

Table A.1 – Glossary of acoustic terminology

Term	Description
Airborne sound	Airborne sound is sound that is transmitted through the air. Airborne sound can be transmitted through elements, by causing the element to vibrate (imperceptible to the eye), in turn transmitting vibrations into the air on the other side. Most noise in a typical acoustic assessment is 'airborne' sound and is generated by sources such as speech, music and transport.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio of the root-mean-square pressure of the sound and a reference pressure (2x10-5 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e., 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
C_{tr}	A weighting curve applied to level differences to account for low-frequency noise, typically associated with traffic noise. This is often applied as an addition to $D_{nT,w}$ and R_w ratings used to describe levels of sound insulation.
D_w / $D_{nT,w}$	The D_w weighted level difference used to characterize the sound insulation between rooms in a building as they are. Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions. A $D_{nT,w}$ is a D_w which is then 'normalised' to account for the reverberation time of the room (the 'nT'), recognising that the level difference is dependent on how reverberant the receiver room is and that every room will have a slightly different reverberation time, hence the $D_{nT,w}$ *is* adjusted to reference conditions.
Flanking	Transmission of sound energy through paths adjacent to the building element being considered. For example, when considering a separating wall, as well as transmitting directly through the wall, sound can also travel around the wall by the floor, ceiling, corridor wall, and external wall.
Frequency	Sound is generally assessed over the frequency range of 63 Hz to 4000 Hz (4 kHz), although humans can potentially hear between 20 Hz and 20 kHz. Frequency is often divided into ('first') octave bands for analysis, with the range above considered within 7-octave bands with centre frequencies at 63 Hz, 125 Hz, 250 Hz, 1 kHz, 2 kHz and 4 kHz. 'Third' octave bands split this further into smaller frequency bands.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period. This parameter is typically considered as a good representation of the 'average' overall noise level. It is referred to technically as the A-weighted equivalent continuous sound level and is a dB(A).
$L_{A90,T}$	The A-weighted noise level that is exceeded for 90% of the measurement period T. This parameter is often considered as the 'average minimum level'.
$L_{A10,T}$	The A-weighted noise level that is exceeded for 10% of the measurement period T. This parameter is often considered as the 'average maximum level' and a good representation of traffic noise contributions.
$L_{AFmax,T}$	The maximum A-weighted noise level during the measurement period T.
R_w	Weighted sound reduction index. A single number rating of the sound insulation performance of a specific building element. R_w is measured in a laboratory. R_w is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete.
Sound insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to the ability of a material to stop sound travelling through it.
Structure-borne sound	Transmission of sound energy as vibrations inside the structure of a building. Can be used an alternative term to impact sound, however, structure-borne will usually refer to noise transmitted into a structure from mechanical sources, rather than human sources.

A.2 – Subjective Changes in Sound Level

Table A.2 – Subjective loudness from an increase or decrease in sound pressure level

Change in sound pressure level	Relative change in sound power energy (multiplier)		Change in apparent subjective loudness (for mid-frequency range)
	Decrease	Increase	
3 dB	1/2	2	'Just perceptible'
5 dB	1/3	3	'Clearly noticeable'
10 dB	1/10	10	'Half or twice as loud'
20 dB	1/100	100	'Much quieter, or louder'

Appendix B – Noise Survey Details

B.1 – Survey Equipment

The monitoring equipment used for the baseline noise survey is detailed in the table below. The sound level meter was calibrated before and after the survey, with no significant drifts of greater than 0.5 dB observed. The sound level meter has been calibrated to a traceable standard within the 24 months preceding the survey, and the calibrators have been calibrated to a traceable standard within the 12 months preceding the survey. The equipment complies with the standards of as BS EN 60942:2003 Class 1 device.

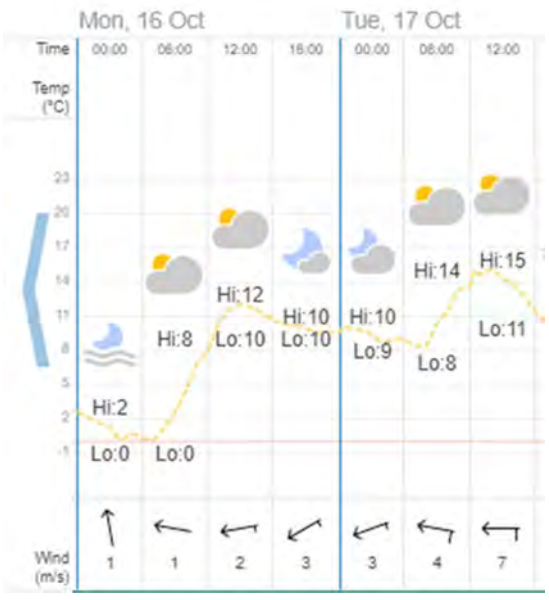
Table B.1 – Equipment used for the noise survey

Name	Serial Number	Last Calibrated	Calibration Due
SVAN 949 Class 1 Sound Level Meter	9720	Nov-21	Nov-23
SV22 Class 1 Microphone	4012386	Nov-21	Nov-23
SVAN 949 Class 1 Sound Level Meter	9719	Nov-21	Nov-23
SV22 Class 1 Microphone	4011862	Nov-21	Nov-23
Cirrus CRL511E Class 1 Acoustic Calibrator	035235	May-23	May-24

B.2 – Meteorological Conditions

During the 2021 survey, weather conditions were dry and mild with wind speeds to a maximum of 7 m^{s-1}. The weather data below has been sourced from https://www.timeanddate.com/weather/@7299823/historic?month=10&year=2023.

Figure B.1 – Meteorological conditions



B.3 – Photographs

Figure B.2 – Photographs of the monitoring positions



ParkerJones Acoustics Limited

Bristol
11 Bankside Road
Brislington
Bristol
BS4 4LB

London
29 Lincoln's Inn Fields
Holborn
London
WC2A 3EE

Glasgow
126 West Regent Street
Glasgow
G2 2RQ

+44 (0)800 830 3338
+44 (0)117 914 6558
info@parkerjonesacoustics.com
www.parkerjonesacoustics.com

Registered in England and Wales
Company No. 12235614