

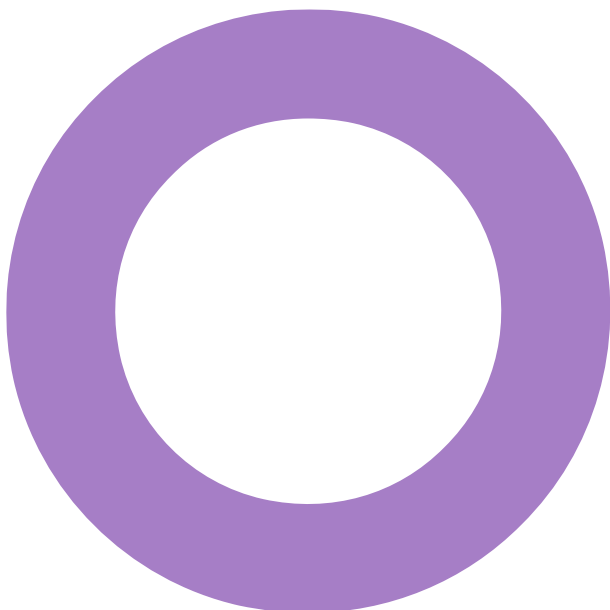
St Michael's - Level 10 sky bar. Manchester.

St Michael's UK Propco
Limited.

ACOUSTICS

PLANNING CONDITION 32 AND 35 ASSESSMENT

REVISION 02 – 02 JANUARY 2024



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	11/03/22	First issue	AP	PM	PM
01	18/03/22	Minor amendments	AP	PM	PM
02	02/01/24	Amended to address EHO comments	AP	PM	PM

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Project number: 10/13972

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Executive summary.

Hoare Lea have been appointed to provide an acoustic assessment in line with Planning Conditions 32 and 35 relating to the proposed Level 10 sky bar at St Michael's, Manchester.

An environmental noise survey was carried out in March 2019 which has been used as the basis for setting appropriate noise limits for entertainment noise outside sensitive receptors in line with Manchester City Council requirements.

3D noise modelling of the proposed scheme and surrounding area has been developed. This includes the modelling of directional loudspeakers within the external terrace area to determine maximum permissible noise levels due to amplified sound within the terrace area.

From the results of the assessment, noise limits within the external terrace area are stipulated to ensure compliance with Planning Condition 32.

An assessment of noise breakout from amplified music within the internal bar area has been carried out to demonstrate compliance with Planning Condition 35.

1. Introduction.

Hoare Lea have been appointed to provide an acoustic assessment in line with the Planning Conditions imposed on the level 10 sky bar at St Michael's, Manchester.

This report presents an assessment of entertainment noise emissions from the Level 10 sky bar in line with Planning Conditions 32 and 35.

An environmental noise survey has been carried out at the site in March 2019 which has informed the assessment. A summary of the noise survey methodology and results is presented in Appendix A.

2. Scheme overview.

2.1 Proposals.

The proposed bar / restaurant unit is to occupy Level 10 of the St Michael's Phase 1 scheme. This includes an internal space and external terrace area as indicated on the plan in Figure 1.

There is provision for amplified music to be played in both the internal and external areas. The premises licence received on 7 March 2022 states that music is permitted between 10:00 and 03:00 each day except Sunday where music is only permitted to 01:00.

The premises licence also states that the external area must close to customers (except smokers) at 23:00 daily with external loudspeakers switched off from 23:00.

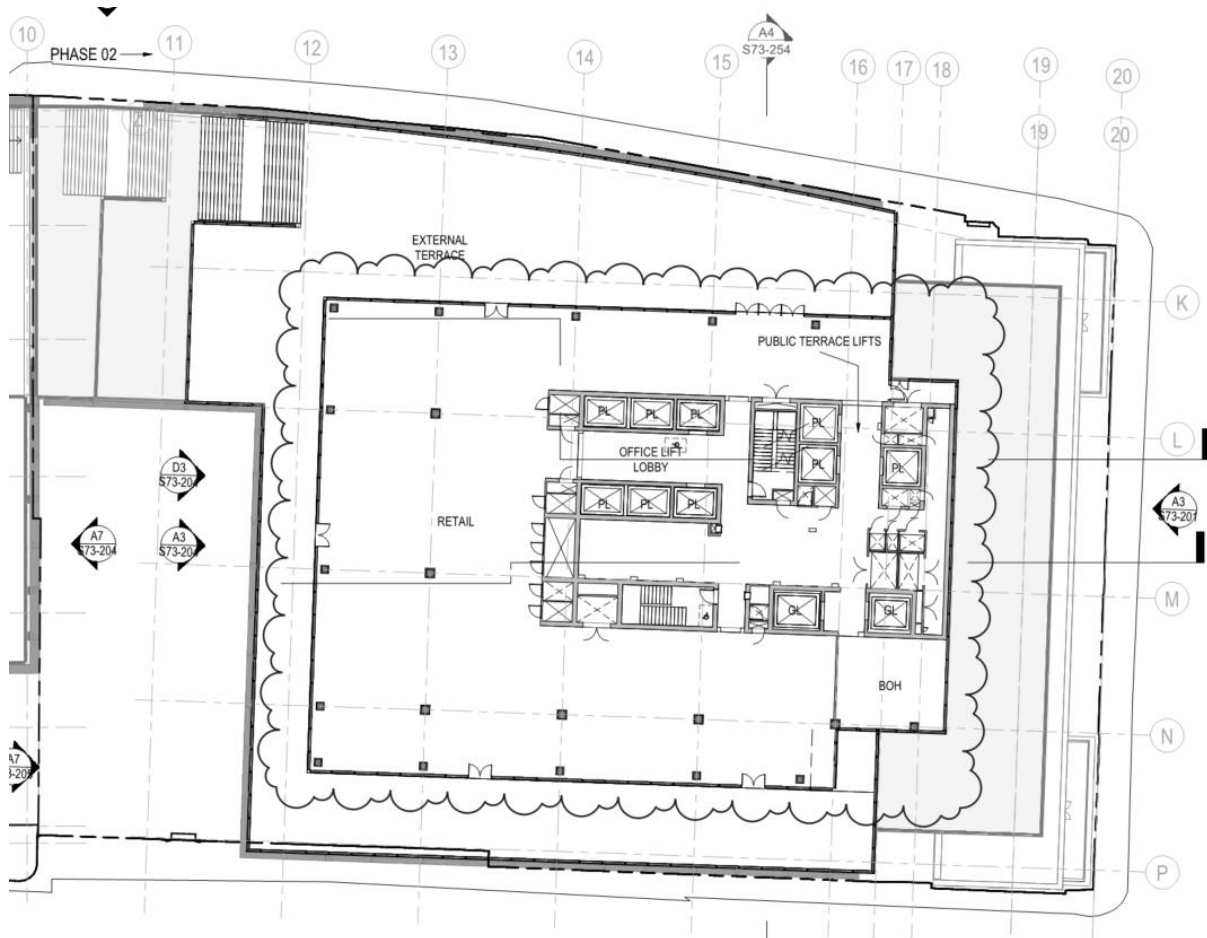


Figure 1 Plan of Level 10 sky bar premises

2.2 Site location and nearby sensitive receptors.

The site in relation to its surroundings is shown in Figure 2. This shows the worst affected nearby residential receptors.

It should be noted that Phase 2 of the St Michael's scheme would introduce a new residential receptor in proximity to the rooftop terrace area. The design of Phase 2 will need to consider suitable building envelope design to ensure that the MCC criteria for entertainment noise within structurally adjoined buildings are achieved.

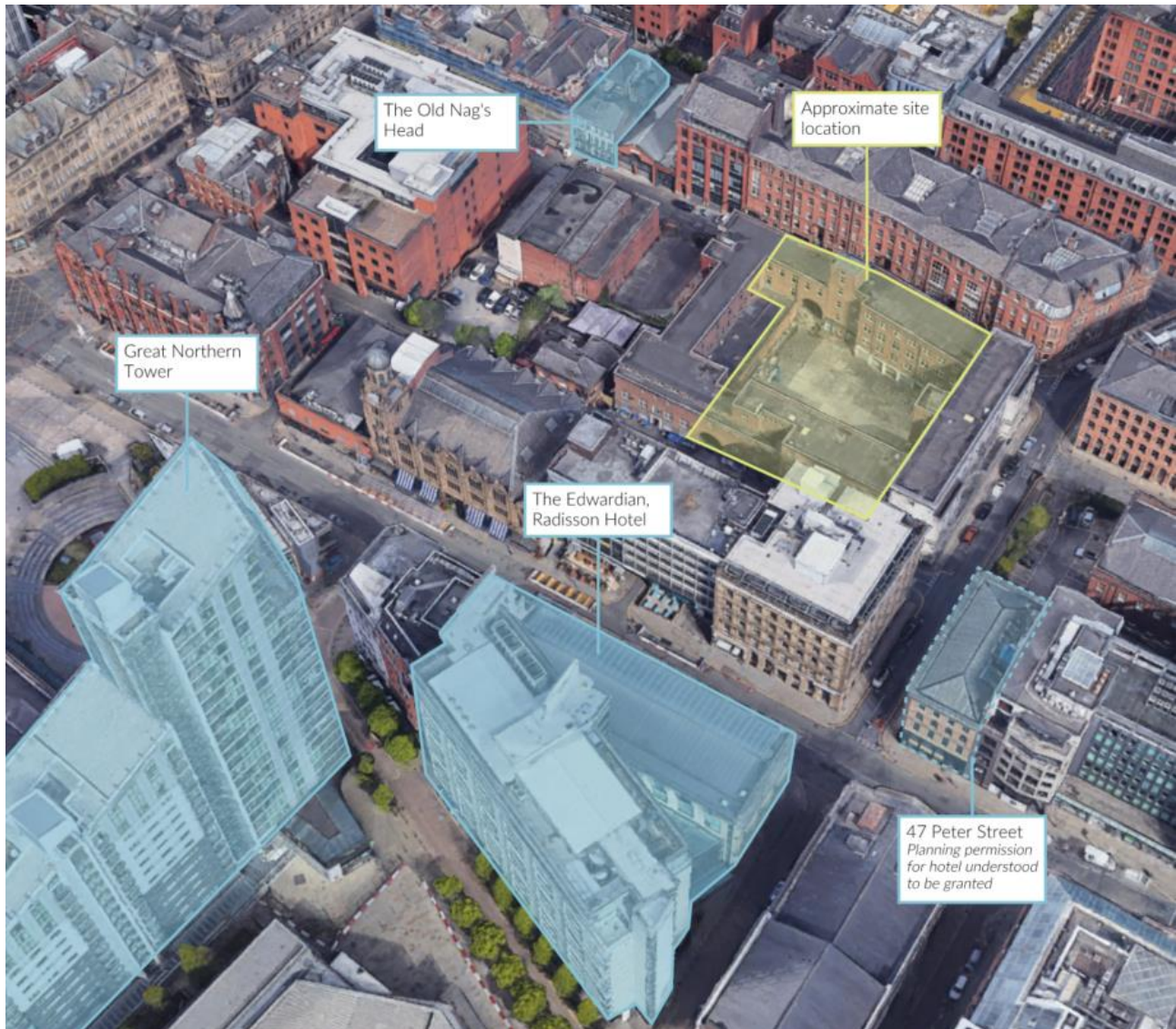


Figure 2 Annotated 3D aerial render image showing the site location and nearby noise sensitive receptors (courtesy of Google Earth)

2.3 Environmental noise survey.

An environmental noise survey was carried out at the site between 1 to 8 March 2019, full details of which are presented in Hoare Lea report *REP-1011173-5A-PM-20190705-Stage 2 acoustics report-F*. The relevant results from the noise survey are provided in Appendix A for reference.

3. Local Authority requirements.

The following Planning Conditions have been imposed on the scheme by Manchester City Council (MCC) in relation to noise from the Level 10 sky bar.

3.1 Planning Condition 32.

Planning Condition 32 states the following:

'No amplified sound or any music shall be produced or played in any part of external areas in the development, other than in accordance with a scheme detailing the levels at which any music shall be played and the hours during which it shall be played which has been submitted to and approved in writing by the City Council as local planning authority.'

Reason - In interests of residential amenity in order to reduce noise and general disturbance in accordance with saved policy DC26.1 of the Unitary Development Plan for the City of Manchester and policies SP1 and DM1 of the Core Strategy.'

No specific criteria are stated within the Condition. In lieu of specific noise limits, the below guidance has been considered.

Typical occasions.

MCC stipulate the following with regards to the control of noise emissions from amplified music/entertainment sound as detailed in the Planning & Noise Technical Guidance document dated December 2015:

'Entertainment noise (LAeq) should be controlled to 10dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location'.

Occasional events.

The Code of Practice on 'Environmental Noise Control at Concerts' document, last revised in June 2004 and Manchester City Councils Guidance on Noise Control for Open Air Concerts and Events dated October 2018, sets out best practice noise limits for the control of the environmental noise impact of music events from indoor and outdoor venues at the nearest noise sensitive premises.

The document proposes maximum permissible levels for music noise levels associated with venues at the nearest residential elevations for a range of venue sizes, local environments and event frequency. These are presented within Table 1 of the Code, reproduced below and applicable 'at 1 metre from the façade of any noise sensitive premises for events held between the hours of 09:00 and 23:00':

Concert days per calendar year, per venue	Venue Category	Guidelines
1 to 3	Urban Stadia or Arenas	The MNL ^[1] should not exceed 75dB(A) over a 15 minute period
1 to 3	Other Urban and Rural Venues	The MNL ^[1] should not exceed 65dB(A) over a 15 minute period
4 to 12	All Venues	MNL ^[1] should not exceed the background noise level ^[2] by more than 15dB(A) over a 15 minute period

[1] Music Noise Level

[2] The value used should be the arithmetic average of the hourly LA90,T measured over the last four hours of the proposed music event or over the entire period of the proposed music event if scheduled to last for less than four hours.

For all events, guideline 3.4 of the Code states that *"It has been found that it is the frequency imbalance that causes disturbance. Consequently there is less of a problem from the low frequency content of the music noise near to an open air venue than further away."*

A level up to 70dB in either of the 63Hz or 125Hz octave frequency band is satisfactory; a level of 80dB or more in either of those, octave frequency bands causes significant disturbance."

3.2 Planning Condition 35.

Planning Condition 35 states the following:

'Before any A1, A3 A4 or A5 use hereby approved commences, the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the development and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences.

Where entertainment noise is proposed the LAeq (entertainment noise) should be controlled to 10dB below the LA90 (without entertainment noise) at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

Reason - To safeguard the amenities of the occupiers of the building and occupiers of nearby properties, pursuant to policies SP1 and DM1 of the Core Strategy.'

4. Assessment.

4.1 Noise limits outside noise sensitive receptors.

In line with the results from the environmental noise survey and Manchester City Council requirements set out in Section 3.1, the following noise limits due to amplified sound emissions are to apply outside the nearby sensitive receptors for typical operation of the sky bar.

Table 1 Permissible amplified sound noise limits at the nearest sensitive receptors

Sensitive receptor & time period	Noise limit for entertainment noise at the worst affected façade of the sensitive receptor, Leq,15min (dB)								
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	LAeq
Radisson Blu Hotel / Great Northern Tower / 47 Peter Street									
Daytime typical (07:00 - 23:00)	48	48	45	42	40	35	28	22	45
Night (23:00 - 07:00)	48	48	44	41	39	33	26	20	44
The Old Nag's Head									
Daytime typical (07:00 - 23:00)	50	46	44	42	41	35	26	14	45
Night (23:00 - 07:00)	47	44	43	40	38	32	24	12	43

4.2 3D acoustic modelling & assessment basis.

A 3D acoustic model of the site has been developed using the industry standard software package CadnaA by Datakustik to assess the predicted levels of amplified music noise emissions from the Level 10 sky bar.

The following conditions have been included in the noise modelling:

- 3 m high solid screening is to be provided around the perimeter of the terrace area in line with current design proposals.
- Loudspeakers have been modelled based on the loudspeaker layouts *CMM_T_210* received on 8 November 2023, provided in Appendix B for reference. The loudspeakers have been modelled using typical loudspeaker directivity at 2 m above terrace floor level and angled downwards by 20°, except where it is stated that the speakers are to be mounted at low level. In these instances, the loudspeakers have been modelled at 1 m above the terrace floor level with speakers facing horizontally.

A screenshot from the model is provided below.

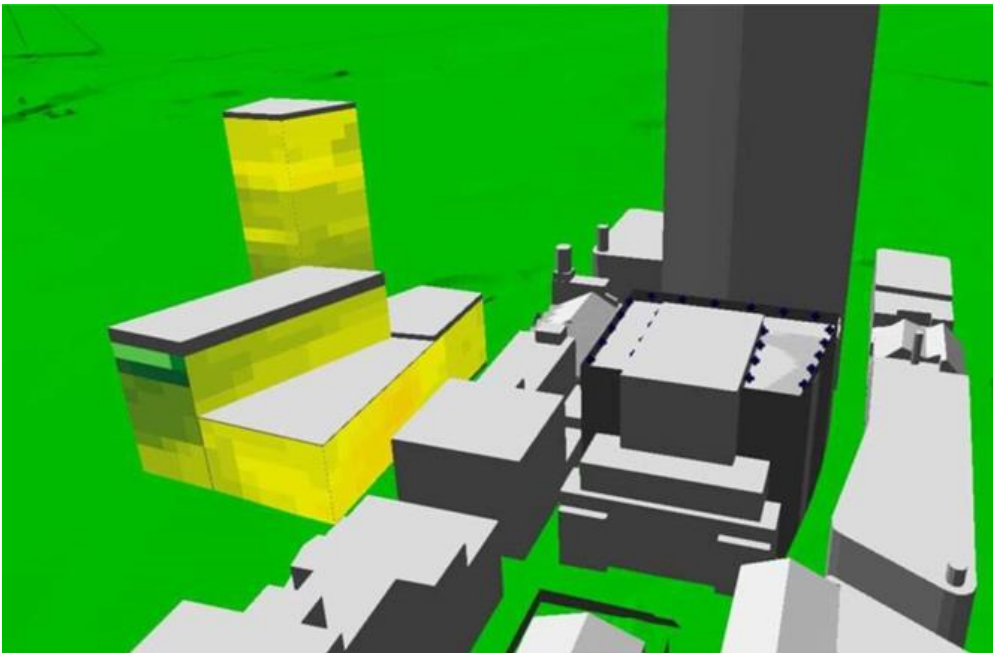


Figure 3 Screenshot from 3D acoustic model

4.3 Assessment of permissible noise levels within external terrace area.

Based on the results from the 3D modelling and criteria set out within this report, maximum permissible noise levels within the terrace area are presented in Table 2.

The noise levels are presented as a range as the noise level will naturally vary across the external space depending on proximity to the loudspeaker. The levels presented are based on those predicted within the general customer areas shown on the proposed layout.

Table 2 Maximum permissible amplified sound levels in terrace area

Time period	Proposed amplified sound limit	Comments on subjective impression
Daytime typical (07:00 - 23:00)	$L_{Aeq,15min}$ 64-69 dB; L_{eq} 70-73 dB in the 63 Hz and 125 Hz octave bands respectively	This would allow for music levels that are typical of those found in bars where the music is intended to be background – i.e. clearly audible but does not require occupants to raise their voices to hold a conversation. Limited bass frequencies would be expected to be required to ensure compliance during more bass heavy music.
Night (23:00 - 07:00)	N/A - Loudspeakers understood to be switched off from 23:00.	

The use of noise limiters and sound level meters is recommended on the house PA and any external equipment brought in by guests to control amplified music levels within the terrace area.

4.4 Patron noise.

To review the potential noise level from patrons within the external area, speech noise sources have been modelled within the external terrace area based on the following:

- The external terrace assumed to be fully occupied with the maximum capacity understood to be 336 people.
- 50% of the occupants talking at a given time.

This is considered to represent a worst case scenario.

As the resulting noise level will be dependent on the level at which the occupants are speaking, the patron noise has been modelled based on all speech at 'raised' and 'normal' levels. This is intended to indicate the range of noise levels that the above scenario may generate. For reference, the corresponding sound power levels for 'raised' and 'normal' speech are presented below, as defined in American Standard ANSI 3.5-1997 and Odeon Application Note – Restaurants issued by Odeon Room Acoustic Software, 2012.

Table 3 Speech spectra for 'normal' and 'raised' vocal effort

Vocal effort	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	L_{Aeq}
Normal speech, L_w (dB)	45	55	65	69	63	56	50	45	68
Raised speech, L_w (dB)	48	59	70	75	72	64	57	48	76

Based on this, the resulting noise level due to patrons talking for different receptors is as presented below.

Table 4 Predicted patron noise levels

Receptor	Predicted patron noise level
Raddison Blu Hotel	40 – 47 dB L_{Aeq}
Great Northern Tower	40 – 47 dB L_{Aeq}
47 Peter Street	42 – 49 dB L_{Aeq}
The Old Nag's Head	36 – 43 dB L_{Aeq}

All predicted patron noise levels are below the 55 dB L_{A90} and 53-54 dB L_{A90} background noise levels measured during daytime and night time respectively.

4.5 Assessment of noise emissions from internal bar area.

The Mainer Associates Stage 4 acoustics report *63068-MAI-ZZ-XX-RP-Y-0100* dated 26 May 2023 states the following noise limits within the internal area of the L10 sky bar.

Table 5 Proposed internal noise limits within the internal sky bar space

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	L_{Aeq}
During office occupation (08:00 – 18:00), $L_{eq,1min}$ (dB)	75	71	64	69	72	73	76	75	81
Outside office occupation (18:00 – 03:30), $L_{eq,1min}$ (dB)	90	95	90	90	90	90	90	90	97

From the information in the Mainer Associates Stage 4 acoustics report, it is understood that the following building envelope constructions are proposed:

- Cladding – Glazed curtain walling with minimum sound insulation performance of R_w+C_{tr} 34 dB.
- Roof – 350 mm post-tensioned concrete slab.

Calculations of noise emissions via the building envelope in conjunction with the 3D noise modelling indicate that the proposed acoustically rated double glazing will be capable of controlling noise emissions to the nearby sensitive receptors in line with the requirements of Condition 35 (set out in Section 3.2). This assumes minimum sound insulation performance at 63 Hz of R 23 dB.

A lobbied door arrangement is recommended to all access routes from outside the building to any internal space with provision for amplified sound.

4.6 Assessment of noise transfer from internal bar to offices below.

The Mainer Associates Stage 4 acoustics report *63068-MAI-ZZ-XX-RP-Y-0100* dated 26 May 2023 states that music noise transfer from the Level 10 bar should not exceed the below limits in the offices below.

Table 6 Proposed internal noise for music noise transfer within the office spaces

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	L_{Aeq}
Ambient level, $L_{eq,1min}$ (dB)	51	39	31	24	20	17	14	13	30

The report also states that a 335 mm post-tensioned concrete slab ($\geq 2200 \text{ kg/m}^3$) is proposed. This is expected to control music noise from the Level 10 bar in line with the limits provided in Table 6 based on the music not exceeding the office hours noise limits (08:00 – 18:00) stated in Table 5.

Appendix A - Environmental noise survey details.

Noise survey summary.

An environmental noise survey has been carried out at the site over a period of 7 days between 1 March and 8 March 2019. Spectral noise data was recorded in 5 minute intervals as well as audio data which was recorded for 15 seconds every 10 minutes.

Noise monitoring equipment was installed on the roof of the existing former police headquarters building on both north and south sides of the site, with one overlooking Albert Hall and one overlooking The Venue. An additional noise logger was installed out of an upper level window facing Southmill Street.

In addition to the long term monitoring positions, an attended noise survey was carried out at ground level between 08:05 and 09:40 on 8 March 2019. The measurements at the attended positions were synchronised with the noise monitoring equipment to capture the level differences across the site. The noise monitoring locations are indicated in Figure A1 and A2.



Figure A1 Annotated aerial image summarising noise monitoring locations during noise survey (daytime period)

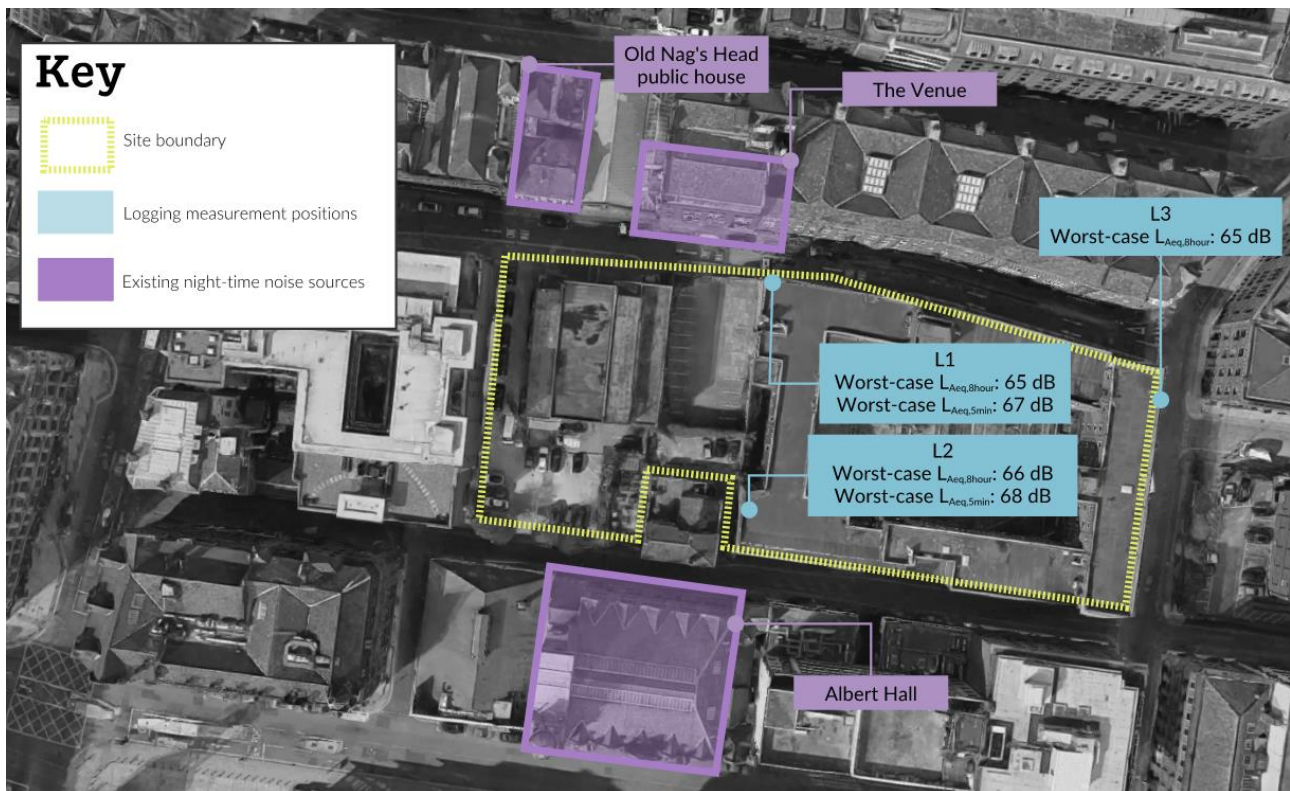


Figure A2 Annotated aerial image summarising measured noise levels captured during the night and key noise sources

Summary of unattended noise monitoring results.

Position L1.

The results of the unattended noise measurements at Position L1 are presented to follow.

Table 7 Ambient noise levels measured during unattended measurements at Position L1

Date	Ambient sound pressure levels measured (dB) at position L1	
	Daytime (07:00 - 23:00) $L_{Aeq, 16hr}$	Night (23:00 - 07:00) $L_{Aeq, 8hr}$
01/03/2019	60 ¹	63
02/03/2019	60	65
03/03/2019	58	58
04/03/2019	59	56
05/03/2019	60	57
06/03/2019	59	57
07/03/2019	60	63
08/03/2019	61 ¹	N/A

[1] – Measurement not made over full period.

For the purpose of analysis and establishing representative background noise levels during the periods of interest, the background noise levels have been quantified using the method set out in Appendix A of MCC's Planning & Noise Technical Guidance document dated December 2015.

From the analysis carried out, the representative background noise levels measured during the survey were as follows:

- Daytime (07:00 - 23:00) - $L_{A90,5min}$ 55 dB
- Saturday afternoon (12:00 - 17:00) - $L_{A90,5min}$ 56 dB
- Night-time (23:00 - 07:00) - $L_{A90,5min}$ 53 dB.

The octave band values for these levels are presented in Table 10.

Table 8 Position L1 - Octave band representative background noise level

Octave band background noise level	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Daytime (07:00 - 23:00), L_{eq} (dB)	60	56	54	52	51	45	36	24
Saturday afternoon (12:00 - 17:00)	61	57	55	53	52	46	37	25
Night (23:00 - 07:00), L_{eq} (dB)	57	54	53	50	48	42	34	22

Position L2.

The results of the unattended noise measurements at Position L2 are presented to follow.

Table 9 Ambient noise levels measured during unattended measurements at Position L2

Date	Ambient sound pressure levels measured (dB) at position L2	
	Daytime (07:00 - 23:00) $L_{Aeq, 16hr}$	Night (23:00 - 07:00) $L_{Aeq, 8hr}$
01/03/2019	61 ¹	61
02/03/2019	62	66
03/03/2019	58	58
04/03/2019	58	57
05/03/2019	58	58
06/03/2019	58	58
07/03/2019	59	60
08/03/2019	60 ¹	N/A

[1] – Measurement not made over full period.

For the purpose of analysis and establishing representative background noise levels during the periods of interest, the background noise levels have been quantified using the method set out in Appendix A of MCC's Planning & Noise Technical Guidance document dated December 2015.

From the analysis carried out, the representative background noise levels measured during the survey were as follows:

- Daytime (07:00 - 23:00) - $L_{A90,5min}$ 55 dB
- Saturday afternoon (12:00 - 17:00) - $L_{A90,5min}$ 56 dB
- Night-time (23:00 - 07:00) - $L_{A90,5min}$ 54 dB.

The octave band values for these levels are presented in Table 10.

Table 10 Position L2 - Octave band representative background noise level

Octave band background noise level	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Daytime (07:00 - 23:00), L_{eq} (dB)	58	58	55	52	50	45	38	32
Saturday afternoon (12:00 - 17:00)	60	59	56	53	51	46	39	33
Night (23:00 - 07:00), L_{eq} (dB)	58	58	54	51	49	43	36	30

Survey methodology and equipment details.

Unattended noise monitoring positions.

Unattended noise measurements were carried out between 11:00 on 1 March 2019 and 10:00 on 8 March 2019 at locations L1 to L3 as indicated in Figure A1.

At positions L1 and L2 the microphones were installed on the rooftop of the existing police station building with direct line of sight to the street level below. Measurements were conducted over 5 minute periods. The microphone was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted. Photographs showing the unattended monitoring positions are provided in Figure B1 and B2. The microphones were fitted with windshields. The meters were calibrated before and after the survey and no significant drift was noted.



Figure B1 Photograph denoting unattended monitoring position L1



Figure B2 Photograph denoting unattended monitoring position L2

At position L3 the microphone was installed at approximately 1 m from the façade of the existing police station building with direct line of sight to the street level below. The microphone was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted. Measurements were carried out over 15 minute periods. A photograph showing the unattended monitoring positions are provided in Figure B3. The meters were calibrated before and after the survey and no significant drift was noted.



Figure B3 Photograph denoting unattended monitoring position L3

Attended noise monitoring positions.

Attended noise measurements were carried out around the site on 1 May 2019; the measurement locations are indicated as Positions A1 to A2 in Figure A1.

Measurements were conducted over 5 minute periods. The Sound Level Meter (SLM) was mounted on a tripod approximately 1.2m above ground level and at approximately 1.5m from the existing building facade. The microphone of the SLM was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted. An example photograph of attended position A3 is presented in Figure B4.



Figure B4 Photograph denoting attended monitoring position A

Equipment details.

Table B1 summarises the details of the equipment used during the environmental noise survey. All equipment used was within dates of calibration and calibration certificates are available on request.

Table B1 Equipment used during environmental noise survey

Item	Description	Serial Number	Calibration Date
Positions A1 – A5	B&K - Sound Level Meter: 2250 B&K - Microphone: 4189 B&K - Pre-amplifier: ZC 0032	3003815 2887159 19781	12/10/2017
Position L1	Rion - Sound Level Meter: NL-52 Rion - Microphone: UC-59 Rion - Pre-amplifier: NH-25	00732162 05354 32190	17/11/2017
Position L2	Rion - Sound Level Meter: NL-52 Rion - Microphone: UC-59 Rion - Pre-amplifier: NH-25	00632044 05211 32072	10/10/20
Position L3	Rion - Sound Level Meter: NL-31 Rion - Microphone: UC-53A Rion - Pre-amplifier: NH-21	00610338 320324 36703	24/11/2017

Appendix B: Loudspeaker layout.

Proposed Speaker Layout

THIS DRAWING IS NOT TO BE SCALED. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. DISCREPANCIES BETWEEN THIS DRAWING AND INFORMATION GIVEN ELSEWHERE MUST BE IMMEDIATELY REPORTED TO THIS OFFICE FOR CLARIFICATION BEFORE PROCEEDING.

CONSTRUCTION LEGEND

- Existing Wall
- Proposed Blockwork
- Proposed Brickwork
- Door Label
- External Door Label

LEGEND

- FFL: Finished Floor Level
- CH: Ceiling Height
- BA: Banquette
- W: Window
- PL: Planter
- GU-L: Guest Lift
- GO-L: Goods Lift
- P-L: Private Lift

NOTES

- Wall & Floor Finishes - Refer to Proposed Plan for further details.
- Ceiling and Soffit Finishes - Refer to RCP for further detail.
- Allow for SS trim in between all the finishes transitions.
- All finishes must be installed and/or applied strictly in accordance with the manufacturers details. All to be on suitable substrates.
- Finishes schedule for full finish specifications.
- Refer to Mechanical Eng. Documentation for extent and details of mechanical & hydraulic systems.
- Refer to Catering Consultant's drawings for FOH and BOH kitchen equipment details and ensure full co-ordination of requirements.
- Refer to Lighting Designer documentation for lighting details.
- Refer to AV specialist for AV details.
- Fire protection when required.
- Grid lines are for reference purposes only.
- All dimensions to be checked on site.

Speaker Legend

- Surface Mount speaker
Martin Audio CDD 8W7X
Dims HxWxD (MM)
410x256x252
- Surface Mount speaker
Martin Audio CDD 6
Dims HxWxD (MM)
325x210x210
- Surface Mount speaker
B&W AM-1
Dims HxWxD (MM)
310x180x210
- Floor Mount subwoofer
speaker
Martin Audio SX210
Dims HxWxD (MM)
718 x 295 x 465
- Floor Mount subwoofer
speaker
Martin Audio SX110
Dims HxWxD (MM)
417 x 297 x 348
- Floor Mount subwoofer
speaker
Martin Audio SX118
Dims HxWxD (MM)
662 x 530 x 640

marquee AV
AUDIO | VISUAL | LIGHTING

① General Arrangement & Key Plan
Scale 1:100

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Revision
05/10/2023

Rev. A

First Submission

Revision

Date

Issue

Notes

Mounted low level on structural element

Chotto Matte
Manchester, UK

Project

Scale
1:100 @ A1

Date
October 2023

Drawing name

L10 General Arrangement & Keyplan

Drawing number
CMM_T_210

Revision
A



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