SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Sadler's Cat, NOMA

Acoustic planning report

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Summary

Sandy Brown has been commissioned by Standard Practice Ltd to provide acoustic advice in relation to Sadler's Cat, NOMA, Manchester.

Sandy Brown previously undertook an assessment of amplified sound egress and plant noise egress as detailed in our previously issued report 18321-R01-B *Assessment of noise from external building services and amplified music* dated 14 November 2018. This was based on a 2015 noise survey set out in Sandy Brown report 15250-R01-C *Planning noise report* dated 29 July 2015.

A more recent environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was performed between 13:10 on 26 January 2022 and 01:30 on 27 January 2022, the purpose of which is to establish the existing background sound levels in the vicinity of the site and nearby noise sensitive premises.

The lowest daytime background noise level measured during the survey was $L_{A90,5min}$ 54 dB. The lowest night-time background noise level measured during the survey was $L_{A90,5min}$ 47 dB.

Based on the requirements of the Manchester City Council and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed

- $L_{Aeq,5min}$ 52 dB during the daytime (07:00-23:00)
- $L_{Aeq,5min}$ 45 dB during the night-time (23:00-07:00).

An assessment of plant noise egress has been carried out based on noise measurements of the installed plant items. The results of this assessment indicates that noise egress from the installed items of plant is expected to comply with the daytime (07:00-23:00) and night-time (23:00-07:00) plant noise egress criteria.

Based on the requirements of Manchester City Council, amplified sound limits are set for amplified sound egress from the pub and the external seating area.

Assessments of operational noise egress has been carried out based on noise measurements undertaken of the installed amplified sound system operating. The results of this assessment indicates that:

- Operational noise egress from the amplified sound system within the pub is expected to comply with the daytime (07:00-23:00) and night-time (23:00-07:00) operational noise egress criteria
- Operational noise egress from the amplified sound system within the external seating area is expected to exceed the daytime (07:00-23:00) and night-time (23:00-07:00) amplified sound egress criteria.

Guidance on the maximum permissible operational noise levels from the amplified sound system within the external seating area has been provided.

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1 Introduction

Sandy Brown has been commissioned by Standard Practice Ltd to provide acoustic advice in relation to Sadler's Cat, NOMA, Manchester.

Sandy Brown previously undertook an assessment of amplified sound egress and plant noise egress as detailed in our previously issued report 18321-R01-B *Assessment of noise from external building services and amplified music* dated 14 November 2018. This was based on a 2015 noise survey as detailed in Sandy Brown report 15250-R01-C *Planning noise report* dated 29 July 2015.

Further to this, a more recent environmental noise survey has been carried out, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for plant noise egress and operational noise egress.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1 highlighted in blue.

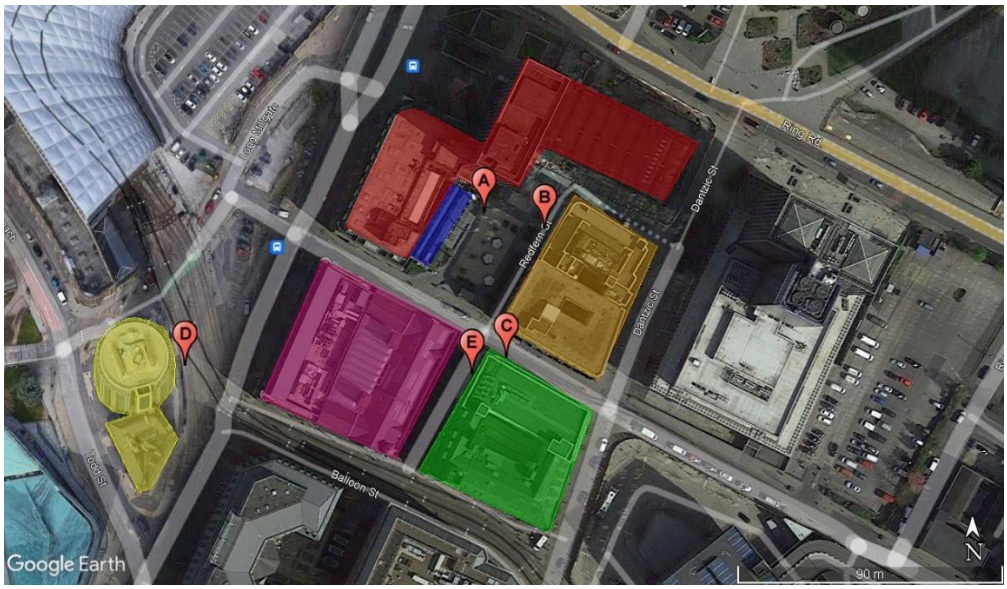

Figure 1 Aerial view of site (courtesy of Google Earth Pro)

2.2 Adjacent premises

The surrounding buildings are being redeveloped as part of the NOMA scheme. These include:

- The Hanover Building highlighted in purple
- The Redfern and Holyoake House buildings highlighted in orange
- The Dantzic Building highlighted in green
- The Old Bank and New Century House buildings highlighted in red.

These are office buildings with some retail/commercial units at ground level.

The Indigo Hotel is highted in yellow.

The nearest noise sensitive receptors during the daytime (07:00-23:00) are considered to be the Old Bank and New Century House buildings highlighted in red in Figure 1.

The nearest noise sensitive receptor during the night-time (23:00-07:00) is considered to be Indigo Hotel is highted in yellow in Figure 1.

3 Development proposals

Sadler's Cat is within the NOMA area, a mixed use redevelopment scheme in the north of Manchester city centre.

The development comprises of a pub with an external seating area. Amplified sound systems are currently installed within the pub as well within the external seating area.

It is understood that the development can operate during both the daytime (07:00-23:00) and night-time (23:00-07:00).

4 Assessment criteria

4.1 Building services noise egress criteria

4.1.1 Standard guidance

BS 4142:2014:+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at nearby noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

4.1.2 Manchester City Council criteria

Manchester City Council set out plant noise egress criteria with the *Planning & Noise Technical Guidance 2015* document which states the following in relation to building services plant noise egress:

> *'The development should be designed so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'*

4.2 Operational noise egress criteria

Manchester City Council *Planning & Noise Technical Guidance 2015*2015 also provides guidance on entertainment noise (operational noise). This guidance states for developments which are structurally detached from other building uses should demonstrate that music noise from the proposed scheme will not be 'audible; in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion is noted as:

> *'Entertainment noise (L_{Aeq}) should be controlled to 10 dB below the background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location'*

5 Survey method

The survey included attended noise measurements.

5.1 Attended measurements

Attended sample measurements were taken by Kane Mitchell at 5 locations around the site. These are indicated in Figure 1 as positions A to E. The attended measurements were carried out on 26 January 2022 and 27 January 2022, over 5 minute periods.

At each position the microphone was mounted on a tripod approximately 1.2 m above the ground level and at least 1 m from any other reflective surface. Details of the equipment used and the noise indices measured are provided in Appendix A.

Dominant noise sources occurring during the measurements were noted.

Photographs of the measurement positions are provided in Figure 2, Figure 3 and Figure 4.

Figure 2 Photographs showing measurement position A (left) and position B (right)

Figure 3 Photographs showing measurement position C (left) and position D (right)

Figure 4 Photograph showing measurement position E

5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Measurement results

6.1 Observations

The dominant noise sources observed at all measurement positions around the site during the survey were:

- Road traffic from the ring road and corporation street, as well as occasional traffic travelling along the side streets surrounding the site
- Tram wheel squeal and horns, particularly at measurement positions D and E
- Construction noise during the daytime from surrounding developments.

Less significant noise sources included pedestrians and distance building services.

Maximum noise levels were typically the result of passing vehicles or vehicle horns.

6.1.1 Attended measurement results

The daytime (07:00-23:00) and night-time (23:00-07:00) noise levels recorded during the attended measurements are summarised in Table 1. These measurements are considered to be free field.

Table 1 Noise levels and key noise sources from attended measurements

Position	Start time	Sound pressure levels (dB)		
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$
Daytime measurement results				
A	13:10	60	87	55
A	13:15	59	75	55
A	13:20	58	71	55
B	13:25	60	88	54
B	13:30	57	64	55
B	13:35	57	67	54
C	13:45	63	85	58
C	13:50	63	84	59
C	13:55	63	89	59
D	14:15	72	88	64
D	14:20	70	88	62
D	14:25	75	100	62
E	14:00	60	75	56
E	14:05	62	77	58
E	14:10	65	81	60
A	14:30	61	85	54
A	14:35	62	78	54
A	14:40	60	75	55
B	14:45	62	70	58
B	15:50	61	72	56

Position	Start time	Sound pressure levels (dB)		
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$
B	15:55	60	65	57
C	15:05	64	81	59
C	15:10	68	87	60
C	15:15	65	82	58
D	15:35	70	91	64
D	15:40	73	98	65
D	15:45	71	92	65
E	15:20	62	82	56
E	15:25	63	79	57
E	15:30	65	89	57
Night-time measurement results				
A	23:00	51	69	49
A	23:05	53	65	49
A	23:10	52	67	49
B	23:15	53	72	50
B	23:20	52	62	50
B	23:25	51	60	49
C	23:30	63	91	54
C	23:35	57	76	54
C	23:40	61	78	54
D	00:00	66	84	53
D	00:05	65	82	54
D	00:10	54	67	49
E	23:45	57	73	53
E	23:50	58	74	53
E	23:55	59	74	52
A	00:15	52	60	49

Position	Start time	Sound pressure levels (dB)		
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$
A	00:20	51	58	49
A	00:25	50	66	47
B	00:30	49	60	48
B	00:35	50	58	47
B	00:40	58	72	56
C	00:45	56	64	55
C	00:50	56	61	55
C	00:55	53	59	51
D	01:20	60	79	52
D	01:25	55	70	51
E	01:05	53	65	52
E	01:10	54	69	51
E	01:15	58	76	52

The lowest daytime (07:00-23:00) background noise level measured during the survey was $L_{A90,5min}$ 54 dB.

The lowest night-time (23:00-07:00) background noise level measured during the survey was $L_{A90,5min}$ 47 dB.

The octave band sound pressure levels corresponding to the lowest daytime (07:00-23:00) and night-time (23:00-07:00) background noise levels are given in Table 2.

Table 2 Lowest daytime and night-time octave band background noise levels

Period	Background sound level, $L_{90,5min}$ (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00-23:00)	56	55	52	52	50	45	36
Night-time (23:00- 07:00)	55	48	44	44	43	37	29

6.2 Measurements of noise emissions from existing items of plant

Sample noise measurements of the currently installed items of plant were undertaken on 26 January 2022 by Kane Mitchell. The currently installed items of plant include:

- 2 x condenser units
- 1 x extract fan.

The above items of plant were located within a bin store area to the north of the site. The extract fan was located within the north facade at high level. Photographs of these plant items are provided in Figure 5.

Figure 5 Photographs of currently installed items of plant (condensers – left, extract fan – right)

Noise measurements were undertaken of the currently installed items of plant. These measurements were undertaken for 1 minute durations, as this measurement duration was considered representative of the plant items operation. For the duration of these measurements, the items of plant were operating at a typical design duty. The results of these measurements are set out in Table 3.

Table 3 Noise measurement results of currently installed plant items

Measurement ref.	Sound pressure level at 1 m, $L_{Aeq,\ 1min}$ (dB)
1 – Condenser units	67
2 – Condenser units	67
3 – Condenser units	67
4 – Extract fan	66
5 – Extract fan	66
6 – Extract fan	67

6.3 Measurements of amplified sound system

Sample noise measurements of the installed amplified sound system within the pub and within the external seating area were undertaken on 26 January 2022 by Kane Mitchell.

A photograph of a loudspeaker within the pub is provided in Figure 6. A photograph of the external loudspeakers within the external seating area is provided in Figure 7.

There was a total of 6 loudspeakers within the pub, and two loudspeakers within the external seating area.

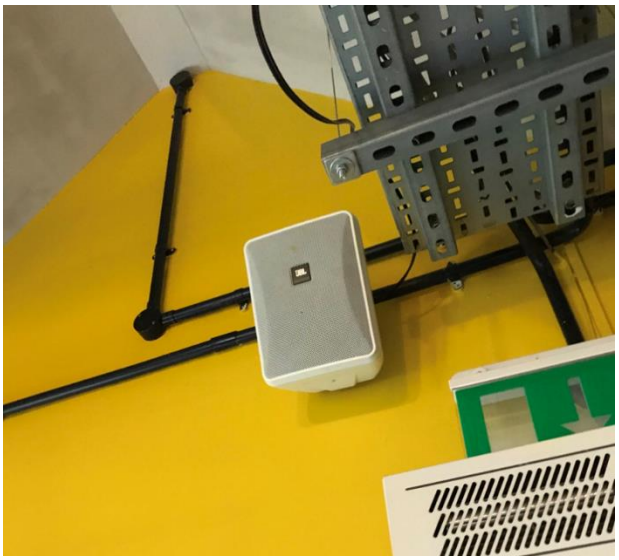

Figure 6 Photograph of internal loudspeaker within the pub

Figure 7 Photograph of external loudspeakers on the external seating area

The results of the amplified sound measurements are provided in Table 4. Whilst internal amplified sound measurements were being undertaken, the external loudspeakers were turned off and vice versa. It was confirmed by staff that the loudspeaker systems were operating at typical levels and the type of music being played was also typical.

The measurements were each undertaken at approximately 2 m from a loudspeaker and for a 5 minute duration in order to ensure representative noise measurements were achieved due to the varying noise levels resulting from the music being played.

The internal amplified sound measurements ranged between $L_{Aeq,5min}$ 70-72 dB. The external amplified sound measurements ranged between $L_{Aeq,5min}$ 76-78 dB.

Table 4 Noise measurements of existing amplified sound systems

	Sound pressure level, $L_{eq,\ 5min}$ (dB) at 2 m Octave-band centre frequency (Hz)						
Measurement ref.	63	125	250	500	1000	2000	4000
Internal amplified sound measurements							
1	64	74	74	65	65	63	57
2	77	72	73	67	66	64	58
3	72	78	71	64	65	67	61
4	70	76	72	66	63	63	58
External amplified sound measurements							
1	63	65	71	71	71	72	70
2	63	70	71	69	70	70	67

7 Plant noise egress assessment

7.1 Plant noise egress limits

Based on the plant noise egress criteria set out in Section 4.1.2 and the attended measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 5.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. These have been corrected relative to the measured free-field background noise levels by the addition of 3 dB.

Table 5 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,5min}$ (dB)
Daytime (07:00-23:00)	52
Night-time (23:00-07:00)	45

[1] The limits set out in Table 5 do not include any attention catching features. Penalty corrections for attention catching features are discussed in Appendix B.

The above plant noise egress limits are less onerous than those set in our previous assessment which were based on the background noise levels measured during our previously undertaken survey.

7.2 Assessment of plant noise egress

Calculations predicting levels of plant noise egress have been undertaken based on the plant noise measurements as per Section 6.2. These calculations consider attenuation due to distance and screening.

The noise from the plant contained no attention catching features (tonal or intermittency). When the items plant started / stopped operating, they did not produce any distinctive noises. As such, no penalties for attention catching features have been applied.

Based on the above, it is expected that plant noise egress is predicted to be:

- L_{Aeq} 52 dB at the nearest office premises during the daytime (07:00-23:00)
- L_{Aeq} 22 dB at Indigo Hotel during the night-time (23:00-07:00).

The above levels of plant noise egress comply with the plant noise egress criteria set out within Section 7.1.

8 Operational noise egress assessment

8.1 Operational noise egress limits

Based on the criteria set out in Section 4.2, the cumulative noise level resulting from amplified sound egress at 1 m from the most affected windows of the nearest noise sensitive premises should not exceed 10 dB below the existing background sound level in octave bands. These limits are set out in Table 6. These have been corrected relative to the measured free-field background noise levels by the addition of 3 dB.

Table 6 Maximum operational noise limits at 1 m from noise sensitive premises

Period	Maximum operational noise limits at 1 m from noise sensitive premises, L_{eq} (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00 – 23:00)	49	48	45	45	43	38	29
Night-time (23:00 – 07:00)	48	41	37	37	36	30	22

8.2 Assessment of operational noise egress

Calculations predicting levels of amplified sound egress have been undertaken based on the amplified sound measurements as per Section 6.3. These calculations have been undertaken for:

- Operational noise egress from the amplified sound system within the pub
- Operational noise egress from amplified sound system in the external seating area.

These calculations consider attenuation due to distance and screening.

8.2.1 Assessment of operational noise egress from sources within the pub

The following section sets provides our assessment of operational noise egress from the amplified sound system (loudspeaker sources) within the pub.

This assessment is based on the building envelope to the pub achieving the following minimum overall sound insulation performances:

- Facades – R_w+C_{tr} 28 dB (eg, standard thermal double glazing 6 mm glass/ 12 mm airgap/ 6 mm glass)
- Roof – R_w+C_{tr} 32 dB.

Based on the above, the predicted levels of noise egress from the amplified sound system within the pub are provided in Table 7.

Table 7 Predicted levels of noise egress from the amplified sound system within the pub

Time period	Predicted sound pressure level at 1 m from noise sensitive premises, L_{eq} (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Office premises during daytime (07:00-23:00)	39	39	37	26	14	5	0
Indigo Hotel during night-time (23:00-07:00)	19	19	17	6	0	0	0

The predicted levels of noise egress within Table 7 from the amplified sound system within the pub comply with the daytime (07:00-23:00) and night-time (23:00-07:00) operational noise egress limits as per Section 8.1.

8.2.2 Assessment of operational noise egress from external sources

The following section provides our assessment of operational noise egress from the external amplified sound system (loudspeaker sources) located within the external seating area.

The predicted levels of noise egress from the amplified sound system within the pub are provided in Table 8.

Table 8 Predicted levels of noise egress from the external amplified sound sources

Time period	Predicted sound pressure level at 1 m from noise sensitive premises, L_{eq} (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Office premises during daytime (07:00-23:00)	47	51	55	54	55	56	53
Indigo Hotel during night-time (23:00-07:00)	28	33	36	35	36	37	34

The predicted levels of noise egress within Table 8 from external amplified sound sources exceed daytime (07:00-23:00) and night-time (23:00-07:00) operational noise egress limits as per Section 8.1 within certain octave bands.

Guidance on the maximum permissible amplified sound levels from external sources within the external seating area is given in Section 8.3.

8.3 Guidance on maximum external amplified sound levels

8.3.1 Daytime operation

To meet the amplified sound limits at the surrounding office premises during the daytime (07:00-23:00), the external speakers will need to be limited to approximately L_{Aeq} 65 dB measured at 1 m per loudspeaker, on the basis that there are two loudspeakers in total.

Octave band limits for external speakers, based on meeting the daytime limits at the surrounding office premises are given in Table 9. Maximum noise levels (L_{AFmax}) should be limited to 10 dB above the limits set out.

These limits would be considered applicable during normal office hours, which for the purpose of this assessment are considered to be 09:00-17:00 though this will need to be agreed with Manchester City Council.

Table 9 External amplified sound limits for external speakers during daytime office hours (09:00-17:00)

Time period	Sound pressure level at 1 m (each loudspeaker), L_{eq} (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime office hours (09:00-17:00)	67	67	64	64	62	57	48

These above levels are low and playing music during the daytime may be impracticable.

8.3.2 Out of office hours operation

For out of office hours (17:00-09:00) when the nearest noise-sensitive premises is Indigo Hotel (shown in yellow in Figure 1), the daytime (17:00-23:00) and night-time (23:00-09:00) limits for the external loudspeakers would be greater.

Octave band limits for these periods are given in Table 10. Maximum noise levels (L_{AFmax}) should be limited to 10 dB above the limits set out.

These correspond to levels of L_{Aeq} 85 dB and L_{Aeq} 83 dB for daytime out of office hours (17:00-23:00) and night-time out of office hours (23:00-09:00) respectively, which will allow for typical background music levels. These limits are either equal to or less onerous than the limits set in our previous assessment due to the background noise levels measured being higher than those previously measured.

Table 10 Amplified sound limits for external speakers out of office hours

Time period	Sound pressure level at 1 m (each loudspeaker), L_{eq} (dB) Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00-23:00)	87	86	85	83	82	78	70
Night-time (23:00-07:00)	87	83	83	85	84	79	70

Calculations have been undertaken to ensure that the cumulative noise levels from internal amplified sound breakout from within the pub as per Section 8.2.1 and amplified sound egress from the external seating area as per Table 9 and Table 10 comply with the amplified sound egress limits as per Section 8.1.

9 Conclusion

An environmental noise survey has been carried out to determine the existing sound levels in the area.

The lowest daytime background noise level measured during the survey was $L_{A90,5min}$ 54 dB. The lowest night-time background noise level measured during the survey was $L_{A90,5min}$ 47 dB.

Based on the requirements of the Manchester City Council and on the results of the noise

Based on the requirements of the Manchester City Council and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed:

- $L_{Aeq,5min}$ 52 dB during the daytime (07:00-23:00)
- $L_{Aeq,5min}$ 45 dB during the night-time (23:00-07:00).

These limits are cumulative and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

An assessment of plant noise egress has been carried out based on noise measurements of the installed plant items. The results of this assessment indicates that noise egress from the installed items of plant is expected to comply with the daytime (07:00-23:00) and night-time (23:00-07:00) plant noise egress criteria.

Based on the requirements of Manchester City Council, amplified sound limits are set for amplified sound egress from the pub and the external seating area.

Assessments of operational noise egress has been carried out based on noise measurements undertaken of the installed amplified sound system operating. The results of this assessment indicates that:

- Operational noise egress from the amplified sound system within the pub is expected to comply with the daytime (07:00-23:00) and night-time (23:00-07:00) operational noise egress criteria
- Operational noise egress from the amplified sound system within the external seating area is expected to exceed the daytime (07:00-23:00) and night-time (23:00-07:00) amplified sound egress criteria.

Guidance on the maximum permissible operational noise levels from the amplified sound system within the external seating area has been provided.

Appendix A

Survey details

Equipment

The attended noise measurements were taken using a BK2250 sound level meter.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	2250/3011964	Brüel & Kjær	8 Sep 23	UCRT21/2089, UCRT21/2090
Microphone	4189/3100176	Brüel & Kjær	8 Sep 23	UCRT21/2089, UCRT21/2090
Pre-amp	ZC0032/26376	Brüel & Kjær	8 Sep 23	UCRT21/2089, UCRT21/2090
Calibrator	4231/3019123	Brüel & Kjær	8 Sep 23	UCRT21/2086

[1] Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meter used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Weather conditions

During the attended noise measurements, the weather was generally clear and dry and little rain occurred. Wind speeds were measured at each position and varied between 0 m/s and 5 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible.

For noise which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.