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Common

39-43 Edge Street, Manchester

Environmental Noise Study

June 2009

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PROJECT:	Common, 39-43 Edge Street
CLIENT:	A Place Called Common Limited The Tree House 22 Lever Street Manchester M1 1EA
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1.0 INTRODUCTION

Sol Acoustics has been commissioned by A Place Called Common Limited to provide acoustic advice relating to a proposed extension to an existing ground floor café bar at 39-41 Edge Street, Manchester.

Sol Acoustics has been commissioned to conduct the following assessments:

- Determine the airborne sound insulation between the proposed ground floor extension occupying 43-45 Edge Street, Manchester and the existing first floor office space above the unit and provide guidance on internal noise transfer during daytime periods.

- Determine the prevailing environmental noise conditions at and around the proposed extension and provide guidance on an acceptable level of noise egress during late evening periods to the external environment from music noise and building services plant serving the development.

This report presents the expected level of internal noise transfer from the proposed ground floor extension to the existing first floor office space during typical daytime periods. Remedial measures that may be necessary to minimise disturbance of occupants of adjacent office spaces from general activity noise and music replay within the proposed extension during daytime periods are also identified.

This report also presents the results of the environmental noise surveys conducted around the site and identifies the allowable level of music noise egress from the proposed ground floor extension to nearby noise sensitive receptors during typical late evening/early night periods. The expected noise level at nearby sensitive receptors due to proposed building services plant is compared to the recommended background noise level such that disturbance can be avoided.

2.0 DESCRIPTION OF SITE

The existing bar occupies 39-41 Edge Street, an existing ground floor unit with a shopfront on Edge Street and Hare Street. The proposed extension is on Edge Street directly adjacent to the existing bar. The existing bar and proposed extension sit within a three storey building. Offices occupy the first and second floors of the building.

Figure 1 shows the location of the existing bar, the proposed extension and the surrounding roads and buildings.

Edge Street is a lightly-trafficked side road that provides access to nearby retail units, offices and on-street parking.

The existing buildings around the site comprise mainly of retail units, cafés and offices. Directly adjacent to the site on Edge Street lies an office building. Mixed-use commercial and residential buildings are situated on Hare Street, close to the existing bar, and on Copperas Street. These buildings house the closest residential dwellings to the proposed extension. There are also dwellings on Oak Street.

3.0 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development involves a change of use of 43-45 Edge Street to a café bar (Class A3) and comprises a café/bar at ground floor level only with access provided by a lobbied entrance on Edge Street.

A cellar and toilet are to be located towards the rear of the unit.

The proposals include the installation of an external air conditioning unit in a secure passageway at the rear of the existing bar. This passageway is accessed via a door at the rear of the existing bar and a door on Hare Street.

4.0 ENVIRONMENTAL NOISE SURVEY

Discussions have been held with Anne Orme, Environmental Health Officer at Manchester City Council Council, to determine if there are any particular concerns with regard to the local noise environment. It was agreed that a weekday evening noise survey and longer term noise measurements over a weekend would provide the necessary data to assess the existing external noise climate in the area and at nearby noise sensitive receptors.

A manned evening noise survey and unmanned continuous noise logging measurements have therefore been conducted to determine the existing background noise levels around the site.

Noise monitoring stations were set up at second floor level above the proposed ground floor extension on Edge Street and at first floor level on Hare Street above the existing bar. Noise level measurements were taken in continuous five minute sample periods between 15:00 Thursday 28th June 2009 and 11:00 on Monday 1st June 2009.

The measurement locations used during the noise surveys are shown in Figure 1. Figure 2 is a photograph that shows the location of the continuous noise logging microphone at Position 5. Full survey details are given in Appendix A. Figure A1 shows a graph of the continuous broadband noise logging survey data at position 4. Figure A2 shows a graph of the continuous broadband noise logging survey data at position 5. Weather conditions were noted to be favourable throughout the long-term unmanned measurement period and during the manned survey measurements.

The measured noise climate at Position 4 is deemed to be representative of the noise climate external to nearby receptors and thus provides a good basis for the assessment of environmental noise. However, as shown on Figure 2, the only available secure microphone location at Position 5 was such that the microphone was in close proximity to and had direct line of sight to the passageway at the rear of the existing bar. The glass recycling bins for the existing bar are located in the rear passageway, and thus, due to maximum noise events during the disposal of glass bottles, the measured average noise levels (in terms of L_{Aeq}) will on occasion be greater than those that would prevail at the residential dwellings on Hare Street. The peak L_{Aeq} noise events can be seen on Figure A2.

In addition, external air conditioning units in the rear passageway contributed to the measured ambient and background noise levels at Position 5. Again, due to the unavoidable proximity

of the microphone to the passageway, the measured noise levels during the operation of the units will be higher that those at the closest residences. It must be noted that the rear passageway to the existing bar is closed off from Hare Street by a solid door and a solid screen with an approximate total height of 3.5 metres. This screen provides some attenuation of noise from the passageway to Hare Street.

The lowest measured background noise level at position 5 during operation of the air conditioning units in the passageway was 52dB L_{A90}. With the air-conditioning units switched off, this noise level dropped to approximately 37dB L_{A90}. This noise level is considered to be representative of the lowest background noise levels at the closet dwellings on Hare Street to the proposed extension. (As discussed above, the noise level measured at position 5 of 52dB L_{A90} during operation of the air-conditioning units is not representative of the noise level at the nearest dwellings on Hare Street due to the air-conditioning units).

Local road traffic on Edge Street and distant road traffic contributed to the long-term noise environment around the site. The air conditioning units in the passageway to the rear of the existing bar on Edge Street contributed to the measured background noise levels at Position 5. As discussed above, discrete noise events during the disposal of bottles contributed to the measured ambient noise levels at Position 5.

The background noise levels measured on Hare Street varied between 45dB L_{A90} and 49dB L_{A90} in the early evening to 37dB L_{A90} late at night. The background noise levels measured on Edge Street varied between 45dB L_{A90} and 50dB L_{A90} in the early evening to 37dB L_{A90} late at night. The background noise levels measured on Oak Street varied between 48dB L_{A90} and 52dB L_{A90} in the early evening.

5.0 SOUND INSULATION TEST PROCEDURE

Airborne Sound Insulation

To conduct airborne sound insulation tests, a noise source is placed in the "source room" and the resultant noise level is measured. The room on the other side of the party construction is the "receiver room" and the noise transmitted is measured in this room. The difference between source and receiver noise levels is then measured in accordance with BS EN ISO 140: Part 4 "Field Measurements of airborne sound insulation between rooms". The resulting frequency-dependent level differences are converted into a single number characterising the acoustical performance using the method given in BS EN ISO 717 Part 1: "Method for rating the airborne sound insulation in buildings and of interior building elements". This single number rating is the 'Weighted Standardised Level Difference' ($D_{nT,w}$).

Details of the test are given in Appendix B. Appendix C summarises the calculation and rating methods for airborne sound insulation tests.

To assess the potential for the transmission of music and activity noise from the proposed ground floor A3 extension to the existing first floor office space, an airborne sound insulation test was carried out between the ground and first floors of 43 – 45 Edge Street.

6.0 SOUND INSULATION TEST RESULTS & DISCUSSION

Airborne Sound Insulation

The existing party floor construction between the ground and first floors of 43-45 Edge Street is timber floorboarding fixed to timber joists. There is currently no ceiling within the ground floor. The existing sound insulation between the ground and first floor is therefore limited.

Table 1 identifies the airborne sound insulation test result.

Test Description	Test Result
Proposed A3 extension to existing First Floor Office Space	32dB $D_{nT,w}$

Table 1: Airborne Sound Insulation Test Result

To minimise the possibility of disturbance due to music noise, the residual noise in each octave band in an adjacent office space due to noise in the ground floor extension (measured as the equivalent continuous noise level, dB L_{eq}) should not exceed the existing background noise, (measured as dB L_{90}) in each octave band.

On this basis, and given the existing acoustic performance of the party floor, Table 2 shows the maximum noise levels that could be generated in the proposed extension without causing noise nuisance to the offices above.

Sound Pressure Level @ Octave Band Centre Frequency (Hz)						
63	125	250	500	1k	2k	4k
63 dB	62 dB	61 dB	58 dB	56 dB	58 dB	63 dB

Table 2: Maximum allowable daytime noise level in ground floor extension, shell only

The typical operational noise levels generated by the proposed Planning Class use for the unit (A3) is greater than the values given in Table 3. Therefore it is evident that the sound insulation between the ground floor unit and the first floor office must be improved.

It is understood that a double-layer plasterboard ceiling is to be installed within the ground floor to provide suitable fire compartmentation between the ground and first floors. The installation of a double-layer plasterboard ceiling (e.g. two layers of plasterboard of minimum density 830 kg/m^3 with 100 mm mineral wool in the ceiling void) would allow the generation of approximate noise levels in the ground floor extension as stated in Table 3.

Sound Pressure Level @ Octave Band Centre Frequency (Hz)						
63	125	250	500	1k	2k	4k
68 dB	68 dB	68 dB	73 dB	72 dB	77 dB	78 dB

Table 3: Maximum allowable day time noise level in ground floor extension, with ceiling in ground floor

The noise levels in Table 3 are in line with the typical noise levels generated in a café bar that employs background music replay during the day.

If greater noise levels than those given in Table 3 are expected to be generated, then the sound insulation provided by the party floor should be further improved.

It is recommended that a limiting nose level of 30dB L_{Aeq} and a maximum Noise Rating limit of NR25 (measured as an $L_{eq,5\ mins}$) be applied in relation to noise transfer between the ground floor and the adjacent offices during daytime periods.

Other Remedial Items

To minimise structural flanking transmission of music noise in the masonry wall constructions, it is recommended that any wall-mounted loudspeakers located within the proposed extension are fixed to walls using resilient hangers with a maximum natural frequency under load of 15Hz. All screw fixings through the resilient pads should be provided with rubber sleeves and washers to avoid bridging between the loudspeaker fixing plate and the supporting wall construction. Suitable fixings can be supplied by:

- CDM-UK tel: 020 7924 7946; fax: 020 7924 7947 (www.cdm-uk.co.uk)

All calculations have assumed that the office spaces are not occupied during the evening, when music replay noise levels are likely to be greater than those identified in Table 3. If the office spaces are occupied during late evening periods, then residual music and activity noise associated with operation of the ground floor café bar may result in disturbance as music noise levels in the cafe bar are increased. If this is the case, then either the noise levels identified in Table 3 must be adhered to, or improvements to the sound insulation provided by the party floor should be targeted.

7.0 EXTERNAL NOISE LEVELS DUE TO BUILDING SERVICES

The measured background noise levels around the site can be used to establish the acceptable level of noise from plant serving the development. Generally, Manchester City Council seeks to avoid a general increase in the pre-existing background noise level around new development. In particular, it is normally required that noise levels due to new plant should be 5dB below the pre-existing background noise level in each octave band.

It is understood that the current planning application includes three heat pump air conditioning units, manufactured by Mitsubishi Electric (model no. PUHZ-RP100YHA3), to be installed within the passageway to the rear of the existing bar.

Table 4 identifies the lowest background noise levels measured at night time on Hare Street in the absence of noise from the existing air conditioning units at the passageway to the rear of the existing bar.

In addition, Table 4 identifies the expected free-field noise level at the nearest residential facade on Hare Street due to the operation of the three external air conditioning units.

	Sound pressure level (dB) at Octave Band Centre Frequency						
	63 Hz	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**
Lowest night –time measured background noise level on Hare Street	50	42	41	38	36	27	19
Expected noise level due to operation of air conditioning units	43	37	34	33	31	25	19

Table 4: Assessment of plant noise

It can be seen that the expected octave band noise levels at the nearest residential facade due to the operation of the air conditioning units are at least 5dB below the existing background noise levels between 63 Hz and 1 kHz. The expected absolute noise levels at 2kHz and 4kHz, whilst not 5dB below the existing background noise levels, are low enough to be not significant in relation to potential noise nuisance at the nearest dwellings.

8.0 NOISE TO THE EXTERNAL ENVIRONMENT

To minimise disturbance due to music noise egress, the L_{eq} noise level external to the nearest noise sensitive property due to music noise from the café bar should be 5dB below the existing late-evening/early night L_{90} spectrum in all octave bands (63Hz – 4kHz).

Calculations have been carried out to determine the level of noise at nearby residential properties, due to music noise egress from the proposed café bar extension during late evening periods.

Given standard 6 mm glazing to the proposed windows to the extension, Table 5 identifies the L_{eq} music noise levels that could be generated in the extension without causing disturbance to the nearby residential dwellings during late evening/early night periods.

	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**
Allowable late evening L_{eq} music noise level (until 02:00hrs)	83	83	77	82	91	84	78

Table 5: Maximum allowable night-time noise levels in proposed extension

The noise levels stated in Table 5 are in line with those generated within a café/bar with some foreground music replay. These recommended noise levels would not allow the generation of the high music noise levels typical of theme bars or clubs.

To minimise egress of music noise from the proposed café bar, the following remedial treatment is recommended.

Fit entrance doors with good quality acoustic door seals to all perimeters, meeting stiles and thresholds. Suitable acoustic door seals include the Integrity Acoustic Door Seal Range available from Lorient Polyproducts Ltd (Tel: 01626 834 252). Recommended Lorient products are given below.

- IS1212 – Perimeter Batwing Seal
- IS8020i – Automatic Threshold Seal
- IS4130 – Threshold Plate 40mm wide x 4mm high (if required depending on lobby floor finish)

Retain the proposed lobbied entrance door arrangement to prevent intermittent increases in environmental noise during the egress of patrons.

It is also recommended that a music noise limiter is fitted to any primary music system so that the internal music noise levels do not exceed the maximum allowable levels as presented in Table 3 and 5. A suitable product is the Drawmer SP2120 Speaker Protector. Further information on the Drawmer SP2120 is available from http://www.drawmer.com/products /protection/sp2120-speaker-protector.php .

The SP2120 is intended to be inserted in the sound system immediately prior to the amplifier stage. All amplifiers which connect to in house loudspeakers must be permanently installed and hardwired at the café bar unit. There must be no external music amplification systems plugged directly into any loudspeakers on the premises or brought in for use in the café bar. All external sources (visiting DJ's etc.) must be plugged into the house mixing desk only as a line level signal and routed through the Drawmer SP2120 prior to the in-house amplification.

We also recommend that a constant bandwith 1/3rd Octave Band Stereo Graphic Equaliser be inserted in the sound system immediately prior to the Drawmer SP2120. This will allow greater control of low frequency music output levels and improve the subjective quality of the sound system. Suitable products include the BSS FCS-960 and the BSS Opal FCS 966 available from Sound Technology (Tel: 01462 480000). Further information on both products is available from http://www.bssaudio.com/productpg.php?product_id=1 and http:// www.bssaudio.com/productpg.php?product_id=2.

The noise limiter and graphic equaliser must be calibrated after completion of all remedial works to enable maximum allowable music noise levels to be set to the appropriate levels.

It is recommended that the keys that lock the front panels of the Drawmer SP2120's be retained by the bar management and brought to site for calibration purposes only.

It is also recommended that the sound system comprises a larger number of small loudspeakers operating at a lower source level and located throughout the public seating area to provide an even dispersion of music rather than one full range unit operating at a higher source level. Where, practical, the loudspeakers should be located away from the glazed façade and lobbied entrance.

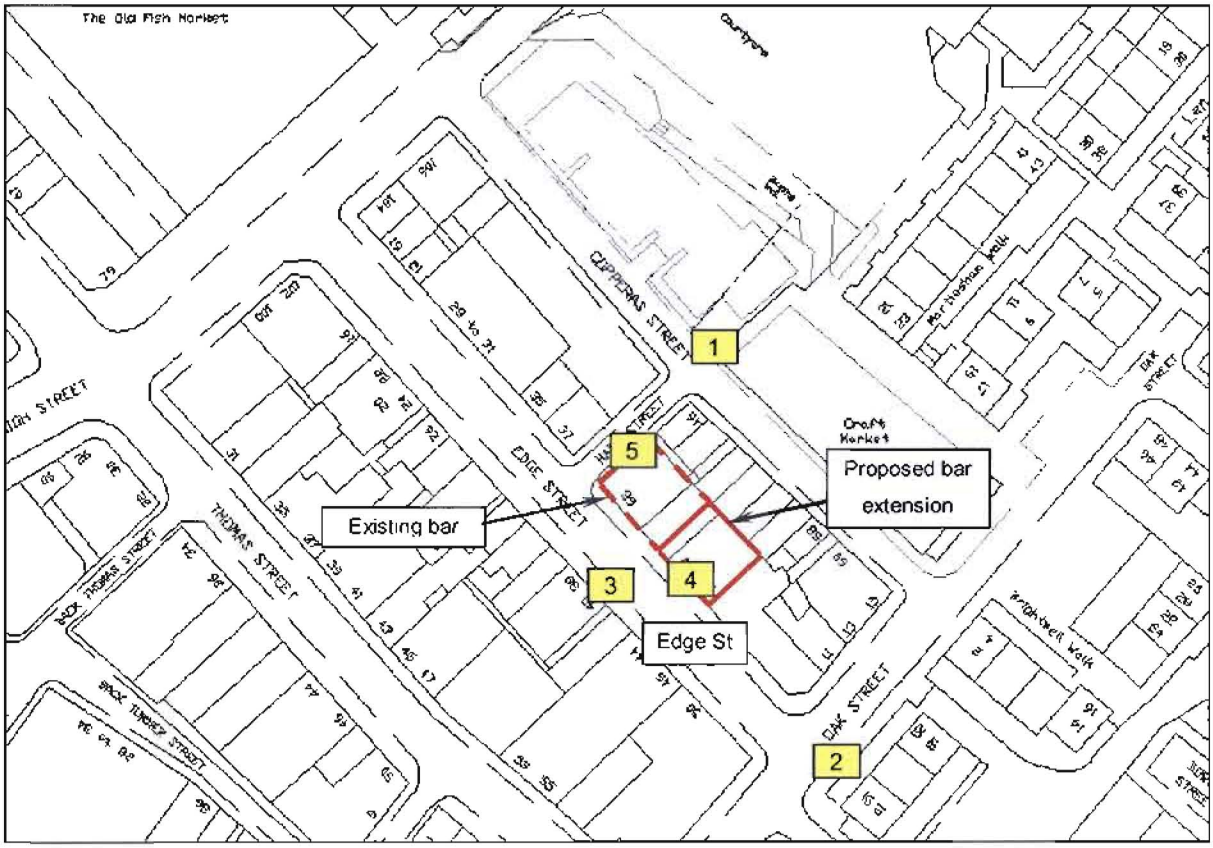


Figure 1: Site Plan & Noise Survey Measurement Locations

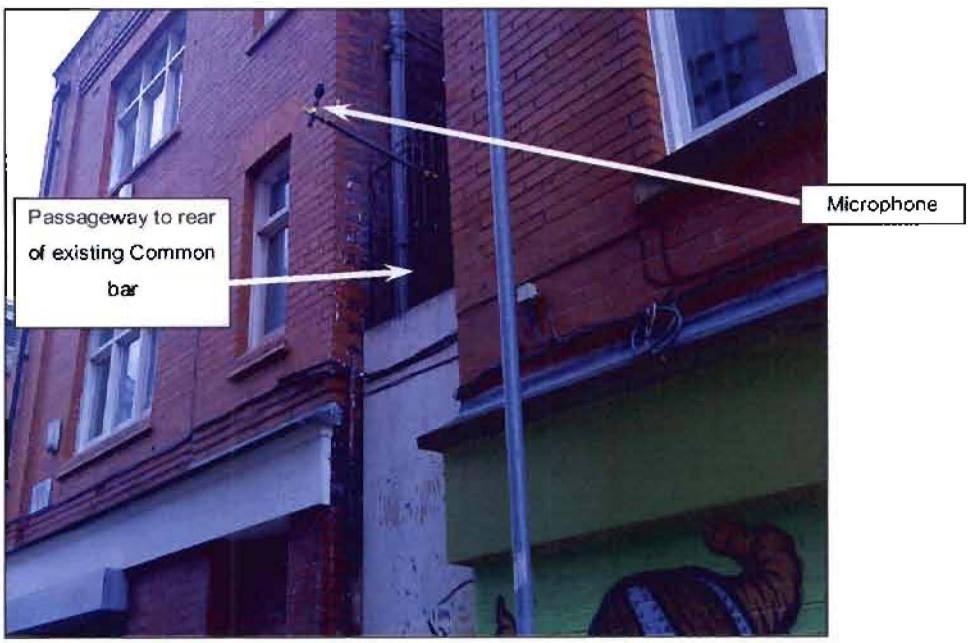


Figure 2: Microphone location at noise survey Position 5

APPENDIX A: NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION

Edge Street & Hare Street, Manchester

DATES AND TIMES

Tues 26th May 2009	18:55 – 20:45 (Manned evening measurements)
Thurs 28th May 2009:	13:30 – 14:00 (Sound Insulation tests)
Thurs 28th May 2009 to Mon 1st June 2009	(Long term noise monitoring)

WEATHER

Tuesday 26th May 2009: 2/8 cloud cover, light breeze, no rain, 16°C

Thursday 28th May 2009 to Mon 1st June 2009: light cloud cover, light breeze, no rain, 14°C to 26°C

PERSONNEL PRESENT DURING MEASUREMENTS

Darren Clucas – Sol Acoustics

INSTRUMENTATION

Norsonic Type 118 IEC 60651 Type 1 Sound Level Meter (serial no. 28116)

Norsonic Type 1253 IEC 60942-1997 Class 1 Sound Calibrator (serial no. 27765)

Norsonic Type 118 IEC 60651 Type 1 Integrating-Averaging Sound Level Meter (serial no. 28260)

Norsonic Type 1251 IEC 60942-1997 Class 1 Sound Calibrator (serial no. 27878)

Mackie SRM450 Active Sound Reinforcement Speaker System

Neutrik Minirator MR1 Noise Generator

CALIBRATION PROCEDURE

The sensitivity of the sound level meter was checked using the acoustic calibrator to an accuracy of ±0.3dB both immediately before and after the surveys - no drift in sensitivity was detected.

MEASUREMENT RESULTS

Tables A1 and A2 summarise the results obtained from the manned daytime survey at positions 1, 2 and 3.

The broadband noise survey data obtained during the long term noise monitoring at positions 4 and 5 are presented graphically in Figures A1 and A2 below.

Measurement Location	Start Time	Measured Noise Levels, dB				Principal noise sources
		L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}	
1	18:53	54.9	69.0	57.7	50.7	Distant traffic
1	18:59	54.0	69.1	57.3	49.3	"
1	19:05	54.1	68.3	56.9	49.5	"
2	19:12	66.1	83.5	67.0	51.8	Distant & local traffic
2	19:17	53.6	64.6	57.4	48.4	Distant traffic
3	19:23	56.2	71.3	58.4	47.6	"
1	19:31	55.5	70.9	57.5	49.4	"
1	19:36	51.2	65.0	52.7	48.9	"
1	19:43	55.3	75.1	55.7	48.6	"
1	19:50	55.9	70.6	59.2	48.5	"
2	19:57	59.9	71.9	63.1	49.5	"
3	20:05	56.4	78.6	60.9	46.5	Distant & local traffic
1	20:14	56.4	80.0	58.4	49.1	"
1	20:20	54.3	68.9	57.2	48.6	Distant traffic
1	20:27	51.6	66.0	53.6	48.6	"
3	20:34	50.8	63.9	52.1	45.1	"

Table A1: Summary Statistical Noise Levels – Evening, Tuesday 26th May 2009

Measurement Location	Start Time	Noise Level, dB L_{Aeq}	Sound Pressure Level (dB Leq) @ Octave Band Centre Frequency (Hz)						
			63	125	250	500	1k	2k	4k
1	18:53	54.9	62.3	56.8	56.2	53.3	49.7	44.1	38.3
1	18:59	54.0	62.4	55.3	54.4	52.3	48.8	44.2	38.8
1	19:05	54.1	65.1	58.8	53.3	51.4	49.2	45.4	38.9
2	19:12	66.1	73.4	66.9	63.6	61.4	61.7	59	53.3
2	19:17	53.6	67.5	56.3	52.0	51.3	48.7	45	38.1
3	19:23	56.2	66.5	59.4	54.6	52.7	51.7	48.4	42.6
1	19:31	55.5	64.3	60.6	55.0	52.4	51.1	45.8	40.0
1	19:36	51.2	58.4	57.7	52.2	48.9	45.1	41.2	36.6
1	19:43	55.3	67.6	61.2	56.8	52.1	48.0	46.8	40.1
1	19:50	55.9	66.4	60.6	55.3	52.7	51.1	47.3	42.9
2	19:57	59.9	68.8	63.8	58.3	56.3	54.8	52.4	48.1
3	20:05	56.4	63.6	56.7	53.9	53.1	53.1	47.2	40.8
1	20:14	56.4	64.7	61.7	53.9	52.8	51.4	48.0	45.1
1	20:20	54.3	63.5	55.3	53.9	52.6	49.3	44.7	39.4
1	20:27	51.6	57.2	53.9	50.8	49.6	47.1	42.2	37.1
3	20:34	50.8	61.3	52.2	48.2	47.1	47.1	41.7	37.7

Table A2: Measured Octave Band L_{eq} Noise Levels – Evening, Tuesday 26th May 2009

FIGURE A1: Position 4, Edge Street, long term noise survey data

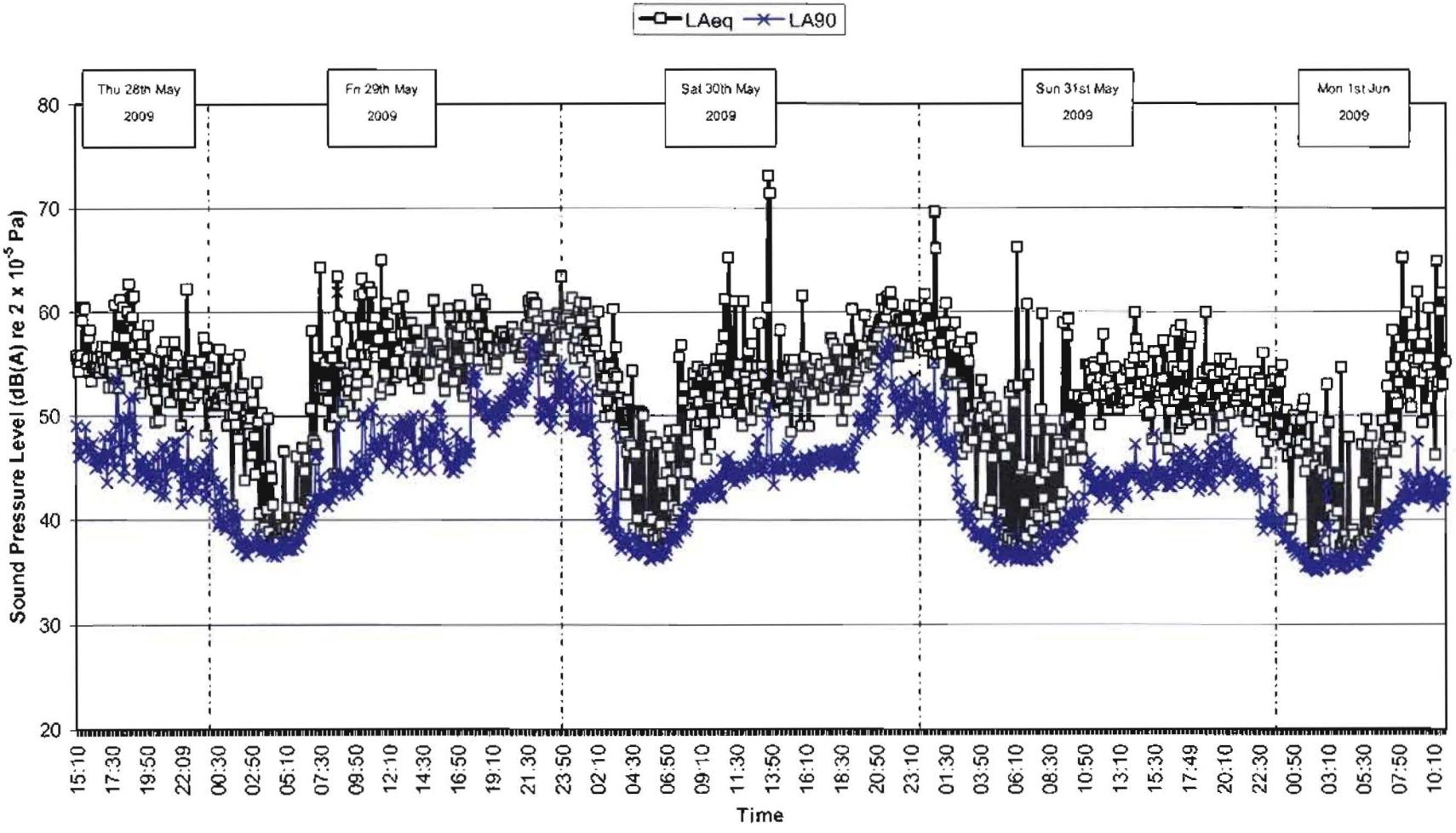


FIGURE A2: Position 5, Hare Street, long term noise survey data

