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Mindel House, Manchester

Noise survey report (rev5)

1 Introduction

Sandy Brown Associates LLP (SBA) have been appointed by Real Estate Venture Capital Management LLP to provide an acoustic report in relation to the planning application for a proposed hostel development at Mindel House, Minshull Street, Manchester.

This report describes the proposals in relation to environmental noise sources and nearby noise sensitive premises. The results from the environmental noise survey are included, together with discussions of acceptable limits for noise ingress to the proposed development and noise egress from building services plant.

Sound insulation measurement results between a basement night club and the proposed development have also been carried out at the site. These are included in the report along with proposed mitigation measures.

2 The site and its surroundings

2.1 Existing

A satellite photograph indicating the existing site is shown in Figure 1.

The site is an existing four storey grade II listed building known as Mindel House located on Minshull Street. There is currently a night club known as Madison Lounge in the basement.

To the north east of the site on the opposite side of Minshull Street is Minshull Street Crown Court. Beyond the court building is Aytoun Street which is a relatively busy main road and a Metrolink line with regular trams serving Piccadilly Station. On the other side of Aytoun Street are the Mercury Buildings, the closest residential premises, which are approximately 90 metres from the site.

To the north west of the site is Bloom Street. To the south east of the site is Richmond Street. Both of these roads serve the Village area of Manchester and have restaurants and night clubs located on them.

To the south west of the site is a small alley. Beyond the alley, there is a commercial building which is understood to be occupied by a textile merchant.

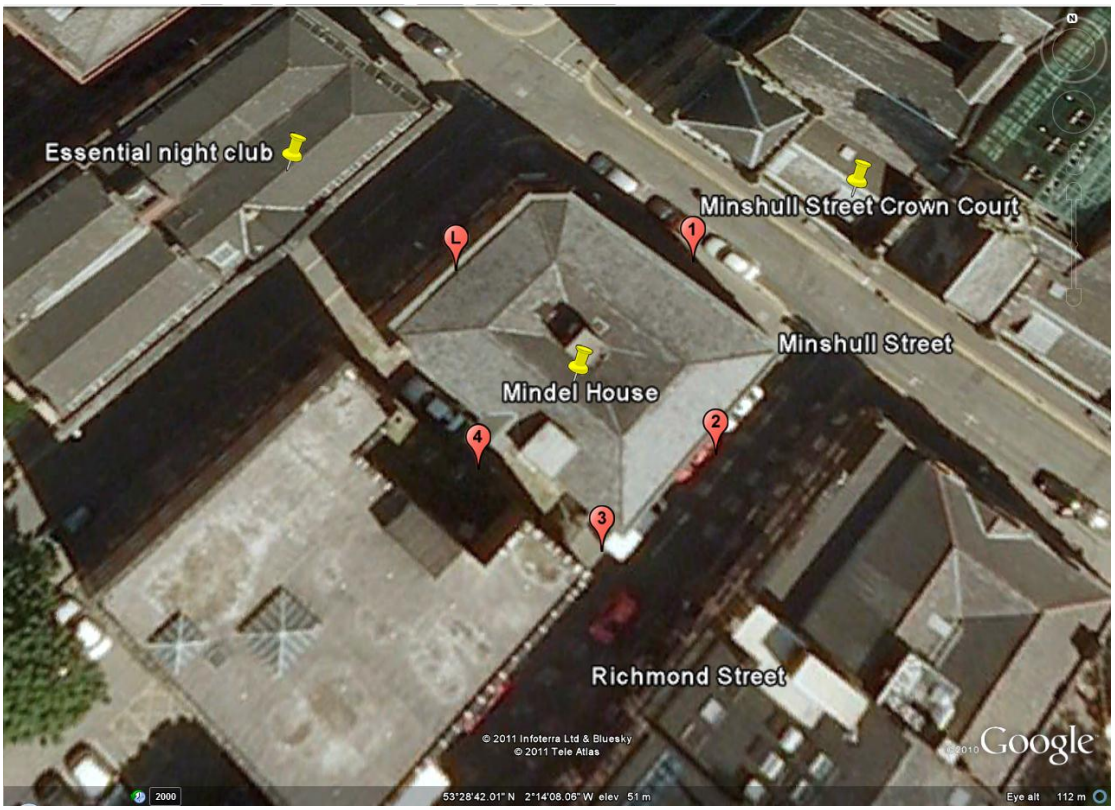


Figure 1 Satellite photograph indicating site location and measurement positions

2.2 Proposals

It is proposed to convert the existing building to a Journeys hostel on floors 1-4 the with a cafe and waiting area and lounge on the ground floor. It is also proposed to convert the basement night club into a baggage storage area.

Journeys hostel operates with multi-occupancy rooms which typically has up to 18 beds in each of the dormitories. The average stay at a Journeys hostel is 2.7 nights. At maximum occupancy, there would be 300 guests using the hostel which is more intensive use than a hotel.

The environment that Journeys create is intentionally vibrant and targeted towards a younger demographic who are generally more tolerant of noisier surroundings. Journeys have an obligation to their guests to ensure a satisfactory user experience and therefore distribute ear plugs to minimise disturbance. It is an accepted part of hostelling that privacy and amenity are not the same as a hotel which is reflected in the pricing structure.

3 Environmental noise and vibration criteria

3.1 Noise egress criteria

Manchester City Council (MCC) typically stipulates the following noise related conditions:

> "Before the development hereby approved is occupied, the building, together with any externally mounted ancillary equipment, shall be acoustically insulated in accordance with the scheme submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site/property.
>
> Externally mounted ancillary plant, equipment and servicing shall be acoustically treated in accordance with a scheme designed so as to achieve a noise level of 5dB below the existing background (L_{A90}) in each octave band at the nearest noise sensitive location."

3.2 Noise ingress criteria

Journeys have provided the following noise criteria for environmental noise ingress to the dormitories:

The background noise level in any dormitory with closed windows and background ventilation due to external noise sources shall not exceed the following:

- $L_{Aeq,16hr}$ 45 dB during the day (07:00hrs to 23:00hrs)
- $L_{Aeq,8hr}$ 45 dB during the night (23:00 hrs to 07:00 hrs)
- L_{AFmax} 60 dB 'not regularly exceeded' during the night (23:00 hrs to 07:00 hrs)

It is recognised that the above figures are higher than those recommended in BS8233 for bedrooms. However, as the hostel operates with multi-occupancy dormitories and ear plugs are issued to guests, the BS8233 bedroom standard is not considered appropriate in this case.

There is no definitive guidance provided by BS8233 for the type of use proposed. It therefore falls to be considered on a case-by-case basis, taking into account the local circumstances and the listed status of the building.

4 Noise measurements

Noise measurements have been carried out to establish the existing noise levels around the site.

4.1 Sample measurements

Sample measurements were carried out at four locations around the site. These positions are labelled 1 – 4 in Figure 1.

Measurements were taken over 15 minute periods on 19 August 2011 and were conducted between 15:05 hrs and 16:10 hrs. Measurements were taken over 1 minute periods between 00:30 and 01:00 hours on Sunday 06 November 2011

Measurements were taken at least 1.5 m from ground level and at least 1.5 m from any other reflective surface.

4.2 Logging measurements

A logging meter was used to continuously measure sound levels at the site in position L in Figure 1. Logging noise measurements were carried out between 13:20 hrs on 19 August 2011 and 10:25 hrs on 23 August 2011.

The logging measurements were taken outside level 1 of the existing building with the microphone positioned approximately 0.5 m in front of the window.

A photograph of logging position L is provided shown in Figure 2.



Figure 2 Photograph showing position L

4.3 Measurements of noise transfer from basement

The following measurements relating to noise transfer from the basement were carried out on 25 August 2011 at the site:

1) Internal noise level measurements were taken inside the night-club and in the ground and upper floor levels of Mindel House with the amplified music system in the night club operating at typical volume levels.
2) Sound insulation measurements between the night club and Mindel House using an independent sound source and the night club PA.

4.4 Instrumentation

The following instruments were used to carry out the noise measurements:

- Svantek 949 logging meter with a type SV22 microphone;
- Norsonic N118 sound level meter with a type 1225 microphone;

The microphones were fitted with windshields during the measurements.

The sound level meters and microphones were calibrated at the beginning of the measurements and checked immediately after the measurements. No significant calibration deviation occurred.

4.5 Noise indices

The sample measurements were averaged over 15 minute periods. The logging noise measurements were averaged over 5 minute periods. Noise indices recorded included the following:

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

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'*.

4.6 Weather conditions

During the logging measurements carried out between 19 and 23 August 2011, weather reports indicated that temperatures varied between approximately 8°C at night and 22°C during the day, occasional light rain occurred and wind speeds were generally less than 4 m/s.

During the sample measurements carried out on 19 August 2011, the weather conditions were generally fine. Weather reports indicated the temperature was 19°C and that wind speeds were generally less than 3 m/s.

During the sample measurements carried out on 06 November 2011, weather reports indicated the temperature was approximately 5°C and that wind speeds were less than 1 m/s. No rain occurred during the measurements.

These conditions were suitable for representative measurements.

5 Results

5.1 External noise source observations

5.1.1 Daytime survey

Sources of external noise noted during the daytime noise survey on 19 August 2011 are provided below.

- Road traffic on the surrounding roads including HGVs, buses, cars, vans and motorbikes;
- Tram noise from nearby Metrolink. This included a high frequency rail screech;
- Existing air extract plant from nearby restaurants/night clubs on Bloom Street and Richmond Street;
- Noises from nearby car park (doors banging);
- Pedestrians passing by and talking;
- Trees occasionally rustling in the breeze.

5.1.2 Night time survey

Sources of external noise noted during the manned night time noise survey on 06 November 2011 are provided below.

- Amplified music egress from Essential night club opposite;
- Amplified music egress from Madison Lounge (in basement of Mindel House) via doors and vents in facade;
- Pedestrians outside Essential night club and Mindel house walking past/smoking and talking/shouting;
- Pedestrians walking past shouting etc;
- Road traffic on Bloom Street;
- Road traffic on Minshull Street.
- Occasional road traffic on Richmond Street.
- Bottles being disposed of at restaurant opposite on Richmond Street;
- Plant noise from hotel and restaurant opposite on Richmond Street;
- Occasional car passes on Richmond Street.

5.2 Logging noise measurements

The results from logging position L are shown graphically in Appendix A.

The averaged L_{Aeq} noise levels measured at position L are provided in Table 1.

Table 1 L_{Aeq} dB noise levels measured at position L

Date	Daytime (07:00 - 23:00) $L_{Aeq,16\ hour}$ (dB)	Night (23:00 - 07:00) $L_{Aeq,8\ hour}$ (dB)
Friday 19/08/2011	-	67
Saturday 20/08/2011	62	73
Sunday 21/08/2011	62	58
Monday 22/08/2011	61	61

The minimum measured L_{90} dB octave band sound pressure levels measured at position L are provided in Table 2.

Table 2 Minimum L_{90} dB octave band sound pressure levels measured at position L

Time period	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	(A)
Daytime 07:00 – 23:00	56	50	47	46	44	40	34	29	49
Night-time 23:00 – 07:00	52	47	44	42	39	37	31	28	45

5.3 Sample noise measurements

The results from the sample measurements carried out on 19 August 2011 are provided in Table 3.

Table 3 Sample measurement results (19 August 2011)

		A-weighted sound pressure level (dB)		
Position	Start time (Hrs)	$L_{Aeq,15mins}$	$L_{A90,15mins}$	$L_{Amax,15mins}$
1	15:05	62	54	78
2	15:35	60	55	75
4	15:55	57	54	71

The results from the sample measurements carried out on 06 November 2011 are provided in Table 4.

Table 4 Sample measurement results (06 November 2011)

		A-weighted Sound Pressure Level (dB)	
Position	Start time (Hrs)	$L_{Aeq,1m}$	$L_{AFmax,1m}$
1	00:44	71	83
	00:45	72	85
	00:46	69	78
	00:47	70	79
	00:48	70	76
	00:49	70	77
	00:50	76	93
2	00:57	71	75
	00:58	73	79
	00:59	74	79
	00:30	72	78
3	00:33	65	71
	00:34	64	69
	00:35	64	70
	00:36	65	71
	00:37	64	70
	00:38	64	71
	00:39	65	69

5.4 Internal noise measurements (amplified music system operating)

The noise levels measured at the site with the night club amplified music system operating at typical volume levels are provided in Table 5.

Table 5 Noise levels measured with night club amplified music system operating

Location	Noise levels measured L_{Aeq} (dB)
Night club - basement	112
Ground floor level	70
First floor level	56
Second floor level	49
Third floor level	48

*Bass noise levels in the region of L_{max} 126 dB were measured at 63 Hz close to the subwoofers.

5.5 Sound insulation test results

The measured sound insulation results are provided in Table 6.

Table 6 Sound insulation test results

	Measured sound insulation $D_{nT,w}$ + C_{tr} (dB)	
Test location	With SBA equipment	With night club PA
Night club to ground floor	46	42
Night club to first floor circulation	67	60
Night club to first floor room	64*	58
Night club to second floor circulation	66*	61
Night club to second floor room	68*	60
Night club to third floor circulation	69*	65

*Result limited by background noise.

5.6 Observations noted during sound insulation tests

The following observations were noted during the sound insulation tests between the night club and Mindel House:

- Significant bass and mid frequency noise transfer via the separation floor constructions and external walls;
- Amplified music noise transfer was audible on every floor tested;
- Vibration in the floors was noticeable on every floor tested;
- Significant noise transfer via lift shaft;
- Significant noise transfer via fire escape stair case;

- Noise transfer was noted in the partitions, floors and the structural columns on every floor tested. Structural elements of Mindel House were resonating and rattling during the measurements;
- A weakness was noted between the main staircase and the night club entrance.

6 Construction upgrades

The following construction upgrades are proposed as part of the hostel development. As Mindel House is a grade II listed building, the proposals take into account the conservation of existing features.

It is understood that building control have agreed that the sound insulation values between the dormitories are not required to meet the Approved Document E standards, providing sound insulation tests are carried out.

6.1 Floor/ceiling upgrades

The following floor upgrades are indicated on McCormick Architects drawing A(500)01 dated 07 July 2010:

Ground floor: 1 x Promat Supalux board to the top of the existing floor. This board has been assumed to be 12 mm thick.

Other floors: 2 x layers of Glasroc F Multiboard to the underside of the existing floors. These boards have been assumed to be 12.5 mm thick.

6.2 Rear stairwell

Drawing A(300)01 indicates a new door to the stairwell at ground floor level.

6.3 Columns

It is understood that it is not possible to cover the columns as this has been perceived to be harmful to the character of the building by the City Council Conservation Officer. Please refer to the Planning Statement as this explains the conservation parameters that have been imposed by the City Council.

6.4 Risers

It is recommended that all continuous risers be closed off with 3 x 15 mm thick SoundBloc at ground floor slab level.

6.5 Secondary glazing

Secondary glazing is proposed to enhance the facade sound insulation to dormitories. As Mindel House is a grade II listed building, the existing windows are to be retained.

6.6 Ventilation

Ventilation to the dormitories is to be provided by small gaps in the existing primary glazing and trickle ventilators to the secondary glazing. Purge ventilation that utilises open windows is proposed to the dormitories during the daytime. Therefore, the façade sound insulation would reduce significantly as a result of this and internal noise levels would increase. The operator is aware of this and has stated that nobody would be

sleeping in the dormitories during daytime purge ventilation and that the secondary glazing would have locks, only openable by staff during the day outside sleeping hours.

Mechanical ventilation is to be kept to a minimum with small fans for bathroom and kitchen extracts.

7 Noise transfer from basement night club

It is recognized that the levels of noise transfer to Mindel House from the existing basement night club are incompatible with hostel use. It understood that the owners of Mindel House therefore intend to terminate the night club tenants lease on the grounds of default or Under section 30 of the LL&T act 54.

8 Noise ingress assessment

8.1 Facade noise levels

The noise levels expected at each facade of the building have been deduced from the measurements and are provided in Table 7. These exclude noise transfer from the existing basement night club. These have been based on the worst-case day and night-time results measured over the duration of the survey. The night time levels represent the facade noise levels expected on a Friday or Saturday night.

Table 7 Expected facade noise levels (Friday/Saturday)

	Predicted maximum facade sound pressure level (dB)		
Location	Daytime $L_{Aeq,16hr}$	Night -time $L_{Aeq,8hr}$ (Friday/Saturday)	Night time L_{AFmax} 'not regularly exceeded'
Minshull Street	62	73	91
Bloom Street	62	73	91
Richmond Street	60	71	84
South west (Alley)	57	68	86

The facade noise levels expected on a typical weekday and night have also been predicted from the measurements and are provided in Table 8.

Table 8 Expected facade noise levels (typical weekday)

	Predicted maximum facade sound pressure level (dB)		
Location	Daytime $L_{Aeq,16hr}$	Night -time $L_{Aeq,8hr}$	Night time L_{AFmax} 'not regularly exceeded'
Minshull Street	61	61	80
Bloom Street	61	61	80
Richmond Street	59	59	73
South west (Alley)	56	56	75

8.2 Facade sound insulation

Mindel House is a grade II listed building and enhancements to the facade are to have minimal visual impact. The existing windows are to be retained and secondary glazing is proposed to enhance facade sound insulation to dormitories. In addition mechanical ventilation is to be minimised. Trickle ventilators installed to the secondary glazing are proposed to provide background ventilation to the dormitories.

The existing non-glazed areas of the facades are understood to be solid brick masonry at least 200 mm thick to approximately 30% of the facade to guestrooms. The existing glazing has been assumed to be 6 mm glass. This has been used as the basis for the glazing performances recommended below.

Facade performances have been based on meeting the Journeys internal noise criteria with the Friday/Saturday facade night noise levels. On typical weekdays when nearby pubs and clubs are not open late, the internal noise levels at night would be expected to be 11 dB lower than on Friday/Saturday nights.

An overall facade performance of $R_w + C_{tr}$ 31 dB is recommended to all facades to meet the Journeys hostels internal noise criteria in hostel dormitories.

To achieve this, the following glazing and attenuated ventilator performances would be required:

- $R_w + C_{tr}$ 30 dB secondary glazing performance
- $D_{n,e,w} + C_{tr}$ 34 dB trickle ventilator performance

The ventilator performance has been based on 3 vents to each dormitory. Note that if more ventilators are required then performance of the vents would need to be increased to account for this.

8.2.1 Example glazing configurations and trickle ventilators

A glazing configuration of 8 mm secondary glazing with a minimum cavity of 100 mm to the primary glazing is recommended to dormitory facades. This glazing configuration is capable of achieving the required performances.

Example trickle ventilators capable of providing the required performance are listed below:

- Renson Sonoslot 700mm;
- Velfac Acoustic Vent;
- Titon SF Sound Attenuator Ventilator.

9 Noise egress assessment

9.1 Building services plant

The design of the building services is currently not at a stage where details of mechanical plant and equipment are available. However, it is expected to comprise of in-line extract fans to provide ventilation to kitchens and bathrooms with ducts that terminate at roof level.

To comply with MCC criteria provided in section 3.1, building services plant is to be controlled to achieve the criteria given in Table 9, 1 m from facades of the nearest noise sensitive buildings.

These criteria have been determined by subtracting 5 dB from minimum measured L_{90} octave band values.

Table 9 External noise criteria 1 m from nearest noise sensitive premises

Time period	Octave band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Daytime 07:00 – 23:00 hrs	51	45	42	41	39	35	29	24
Night time 23:00 – 07:00 hrs	47	42	39	37	34	32	26	23

Appropriate measures will be adopted to ensure that the noise criterion outside the nearest affected premises is achieved. Measures that will be considered include:

- Low noise fans;
- In-duct atmosphere side attenuation to ventilation plant;
- Screening/acoustic louvres;
- Acoustic lagging and lining to ductwork;
- Use of timers to switch off equipment when not required.

In order to control the transmission of vibration from building services, suitable anti-vibration mountings will be installed along with flexible couplings to vibration generating plant and ductwork/pipework, where appropriate. Ductwork/pipework connected to this plant will be supported from resilient brackets.

10 Summary

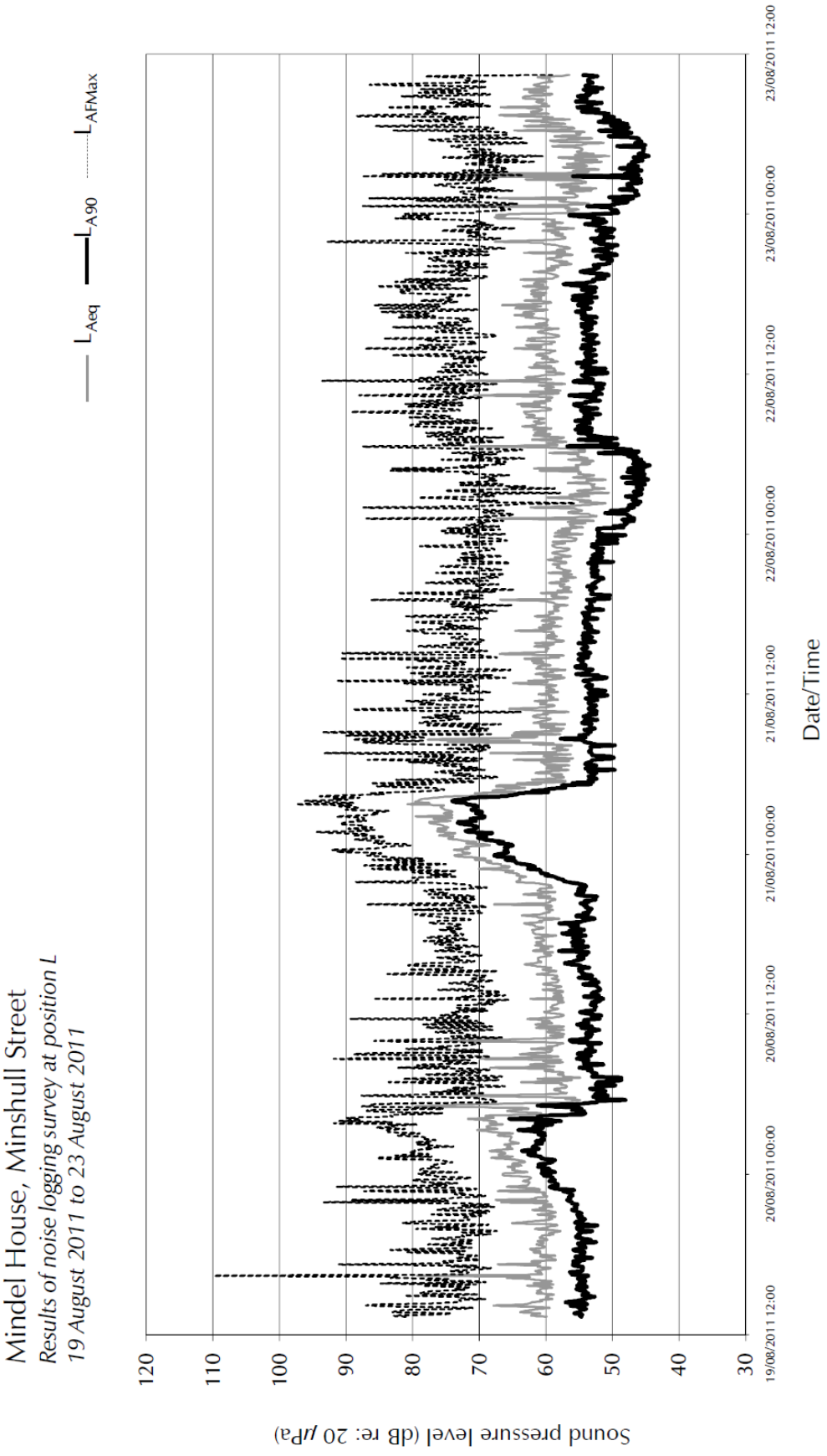
A hostel development is proposed at Mindel House which is a grade II listed building located on Minshull Street in Manchester.

Noise measurements have been carried out around the site to determine the existing noise climate. An assessment of noise ingress to the proposed development has been carried out in accordance with the hostel operator's requirements. The assessment indicates that secondary glazing systems and trickle ventilators will be required to control external noise to provide the required indoor ambient noise levels.

The measurements have also been used to develop appropriate criteria for noise egress from building services in accordance with the requirements typically stipulated by Manchester City Council. Mitigation measures that will be considered to control noise egress from ventilation plant include low noise fans, in-duct attenuators, screening, acoustic louvres, acoustic lagging/lining to ductwork and timers to switch equipment off when not required.

Sound insulation and internal noise measurements have been carried out in the basement night club and the ground and upper floor levels of Mindel House. The results of these measurements indicate that noise transfer from the basement night club would not be compatible with a hostel. It is therefore proposed that the night club tenants lease will be terminated on the grounds of default or Under section 30 of the LL&T act 54.

Appendix A
Results from logging position L


Mindel House, Minshull Street
Results of noise logging survey at position L
19 August 2011 to 23 August 2011
LAeq
LA90
LAFMax
120
110
100
90
80
70
60
50
40
30
Sound pressure level (dB re: 20 μPa)
19/08/2011 12:00
20/08/2011 00:00
20/08/2011 12:00
21/08/2011 00:00
21/08/2011 12:00
22/08/2011 00:00
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