Noise Impact Assessment

Premier Inn Manchester West Didsbury

Whitbread PLC

11/09/2026

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1 Introduction

1.1 Proposals are in place to install air-conditioning equipment serving a newly constructed annexe building at the Premier Inn hotel in West Didsbury, on Derwent Avenue in Christie Fields Business Park, M21 7QS. The annexe building replaces an existing restaurant building at the same location.

1.2 The proposals involve the installation of externally-mounted air-source heat pumps, which have potential to generate noise audible at nearby noise-sensitive properties. This report presents an assessment of potential noise emissions from all proposed plant equipment.

1.3 A noise survey has been conducted at the site to establish existing noise levels in the area and experienced by neighbours. This is detailed in Chapter 3 of this report and results are summarised in chart and table form. Full detailed results are available in electronic format on request.

1.4 This survey has been used as a basis to assess the potential noise impact of proposed building services plant equipment in line with the relevant British Standards and pursuant to discharging a planning condition set by Manchester City Council. This assessment is presented in Chapter 4 of this report.



2 Criteria

2.1 Local Authority

2.1.1 The proposed annexe extension has been granted permission subject to conditions by Manchester City Council. This report concerns the following condition:

> *7) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be 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. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.*

2.1.2 It is assumed that the rating and background sound levels mentioned in the planning condition are those defined in British Standard 4142.

2.2 British Standard 4142:2014 +A1:2019

2.2.1 BS 4142:2014+A1 2019 *Methods for rating and assessing industrial and commercial sound* presents a method for predicting noise impact on noise-sensitive neighbours. This is done by comparing the noise level of a source (the *specific* sound level) with the existing background noise level in the area, in the absence of the source (the *background* sound level).

2.2.2 The methodology requires consideration be given to all aspects of the assessment process and it must also account for any unusual acoustic features, such as tonal, impulsive, and intermittency characteristics. These are accounted for by the addition of various decibel corrections to the specific sound level. This corrected level is the *rating* level.

2.2.3 The greater the positive difference between the rating level and the background level, the greater the magnitude of the impact. BS 4142:2014 gives the following descriptions with regards to the potential impact:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
- A difference of around +5dB or more is likely to be an indication of an adverse impact, depending upon the context.
- Where the rating level does not exceed the background sound level, this is an indication of a low impact, depending upon the context.

3 External noise survey

3.1 Site description

3.1.1 The hotel is located at the corner of Barlow Moor Rd and Princess Way, a 4-way junction with a segregated left-turn lane off Princess Way joining Barlow Moor Rd in front of the hotel.



Figure 3-1 Satellite view of site area showing hotel site and local roads

3.1.2 Traffic on this junction is busy, with constant cars, buses, HGVs and occasional motorbikes noted during daytime (weekday) site visits. The left-turn lane is busy, with traffic lights on the exit onto Barlow Moor Road in front of the existing restaurant/annexe giving rise to vehicles constantly waiting, idling, and accelerating.

3.2 Measurement methodology

3.2.1 Measurements were undertaken generally in accordance with the procedures advised within British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* and British Standard 7445-1:2003 *Description and measurement of environmental noise*.

3.2.2 Continuous, unattended sound level measurements were conducted at a location in the hotel car park as shown in Figure 3-2.



Figure 3-2 Satellite view of site showing hotel, survey, and neighbour locations

3.2.3 Subjective assessments made on site observed similar levels of traffic noise in the hotel car park and at the surrounding neighbours, despite the car park being closer to the roads than the neighbours are. This is likely a result of screening from the hotel buildings, and diffraction of traffic noise over the buildings at greater distances.

3.2.4 Figure 3-3 shows the microphone at the site in the context of the newly constructed annexe building.



Figure 3-3 Site photograph showing measurement microphone and new hotel annexe under construction

3.2.5 Statistical and spectral octave-band data were recorded in 15-minute samples between 13:45 on Thursday 30th July 2026 and 14:00 on Wednesday 5th August 2026. The "fast" (125ms) time constant was used.

3.2.6 The following equipment was used to carry out the measurements:

Equipment	Manufacturer/model	Serial no.
Sound level meter	Norsonic 131	1313605
Weather enclosure	Norsonic 1218	12182684
Portable sound calibrator	Norsonic 1251	34926

Table 3-1 Equipment used for noise survey

3.2.7 Construction of the new hotel annexe was underway during the survey, approx. 30m from the microphone. This survey included a weekend so as to obtain daytime noise levels with no influence from construction.

3.2.8 The microphone was installed c.3m above local ground level, and with no other large reflecting surfaces nearby, the results are considered to represent free-field sound levels.

3.2.9 The calibration of the sound level meter and associated microphone were checked prior to and on completion of the survey in accordance with recommended practice. No significant drift in calibration occurred during the survey. The accuracy of the calibrator can be traced to National Physical Laboratory Standards.

3.2.10 The weather conditions during the survey are believed to have been generally dry, with little rain. The wind speeds are believed to have been generally under 5ms^{-1} for the duration of the survey, and therefore the weather conditions are not believed to have meaningfully affected the results of the survey or subsequent assessments.

3.3 Results & commentary

3.3.1 Level-history graphs of the measurement data are presented in Figure 3-4.

3.3.2 The lowest measured background levels ($L_{AF90,15min}$) for day and night assessment periods are presented in Table 3-2.

Description	Period	Level	Measurement time
Lowest measured background level	Night (23:00-07:00)	37 dB $L_{AF90,15mins}$	03/08/2026 02:30
Lowest measured background level	Day (07:00-23:00)	43 dB $L_{AF90,15mins}$	02/08/2026 08:00

Table 3-2 Sound levels established from unattended noise survey

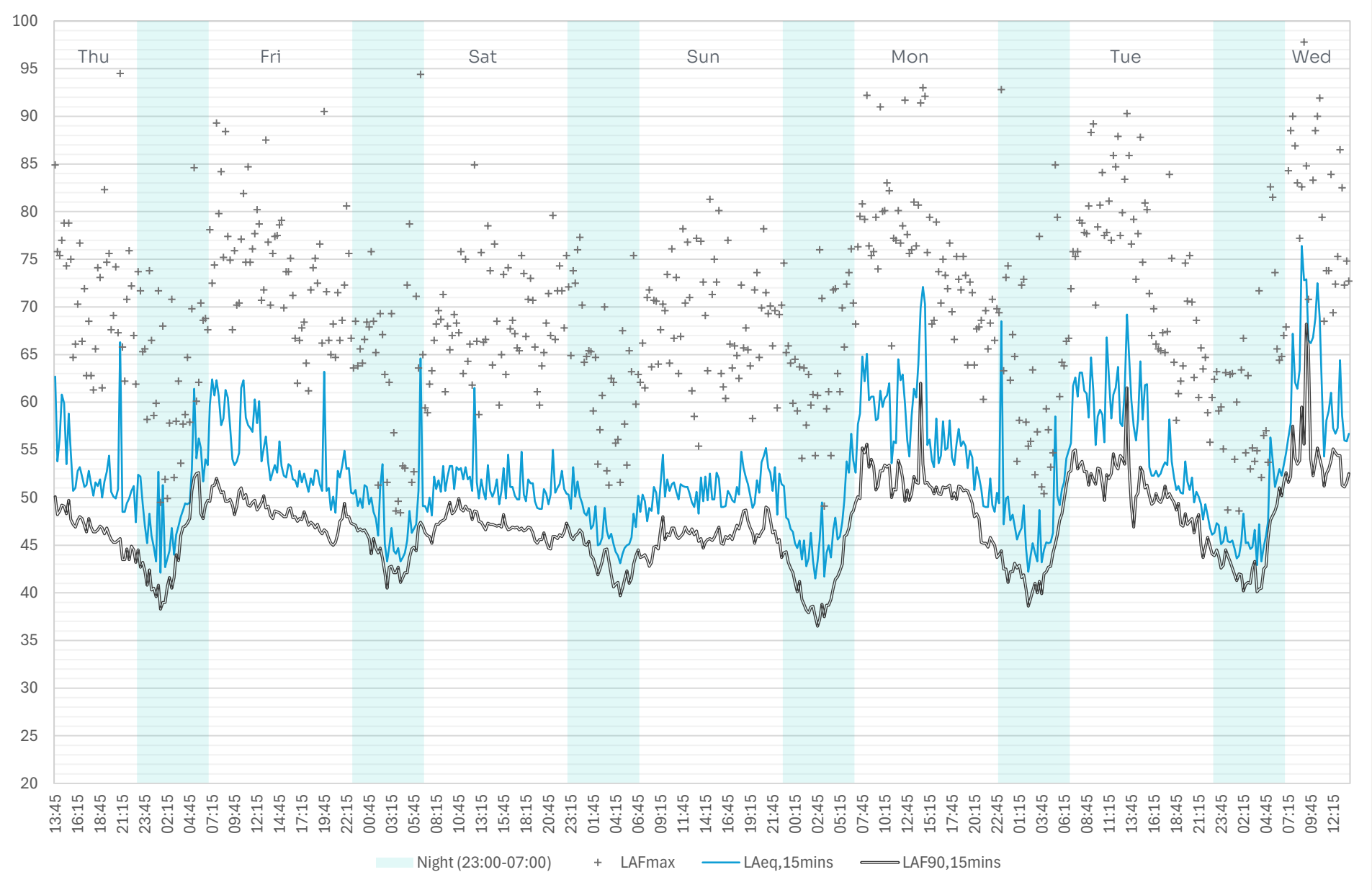


Figure 3-4 Level-history graph for noise survey period, Thursday 30th July – Wednesday 5th August 2026

4 Noise emission assessment

4.1 Nearest noise-sensitive receivers (NNSRs)

4.1.1 The commercial properties surrounding the hotel to the south and west are the nearest noise-sensitive premises. However, these are not considered noise-sensitive overnight; the NNSR overnight is expected to be the closest residential property, some 120m to the west of the hotel extension.

4.1.2 The following image shows the four noise-sensitive receivers used for the noise emission assessment.



Figure 4-1 Satellite view showing receiver locations used in noise emission assessment. Dashed lines show direct lines of sight to closest new noise-generating equipment.

1. Office blocks to the south of the hotel
2. 'Joshua House' to the west of the hotel (Kids Planet day nursery)
3. Residential dwellings to the west (on Derwent Close)
4. Residential dwellings to the south (on Christie Way)

4.1.3 Noise survey results are considered representative of background sound levels at all above receivers, as verified during (daytime) site walk-arounds.

4.2 Building services equipment

4.2.1 Proposed plant comprises the following:

- 1 no. hot water heat pump (Mitsubishi QTON ESA30EH-25)
- 2 no. bedroom AC condenser (Mitsubishi PURY-P250TNW)
- 1 no. front-of-house AC condenser (Mitsubishi MXZ-6F120VF)
- 1 no. kitchen extract fan (Systemair MUB/T-S)
- 1 no. restaurant supply fan (Systemair Prio 400)

4.2.2 In line with typical Premier Inn designs, the PURY-P250 units are to operate with a duty reduction to 70% of maximum capacity during the day and 50% overnight.

4.2.3 Proposed external building services plant is as follows, with manufacturer-provided sound power levels:

Item		Sound power level (dB) / Octave-band frequency (Hz)									Type
	Qty.	63	125	250	500	1k	2k	4k	8k	dBA	
QTON	1	68	63	57	57	60	55	51	45	63	L_W
PURY-P250YNW	2	81	79	76	75	71	66	67	61	77	L_W (per unit) Heating, 70% duty
		76	70	64	63	61	57	61	57	67	L_W (per unit) Heating, 50% duty
MXZ-6F120VF	1	60	65	56	54	53	47	30	29	57	L_w
MUB/T-S (kitchen extract fan)	1	78	92	87	84	81	78	74	68	87	L_w (outlet)
		56	74	58	50	50	48	40	31	60	L_w (casing)
Prio 400 (restaurant supply air fan)	1	78	84	80	78	77	74	65	57	81	L_w (inlet)
		52	56	64	62	56	52	47	33	66	L_w (casing)

Table 4-1 Equipment sound power data from manufacturers' literature. All spectral values are unweighted (linear)

4.2.4 Extract and supply fans are to be installed externally with ducts running to inlet/outlet points at roof level. In-duct attenuators are to be installed between the fan and the terminus in both systems to control noise to atmosphere. The following table shows the calculated performance requirements for each attenuator.

System	Minimum insertion loss required (dB *R*) / Octave-band frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Supply	0	7	15	18	25	25	19	19
Extract	2	5	11	20	24	17	12	9

Table 4-2 Attenuator performance requirements for supply and extract fan ducts

4.2.5 Allowance has been made for attenuators of length 950mm and 600mm, for supply and extract ducts respectively. Based on performance data for similar attenuators, these lengths are expected to be comfortably sufficient to achieve the performances in Table 4-2 above, taking into account duct dimensions and flow rates from the fans.

4.2.6 The heat pumps/condensers (QTON, MURY and MXZ units) are to be located on the north of the new annexe, and the kitchen fans located on the south, as shown below:

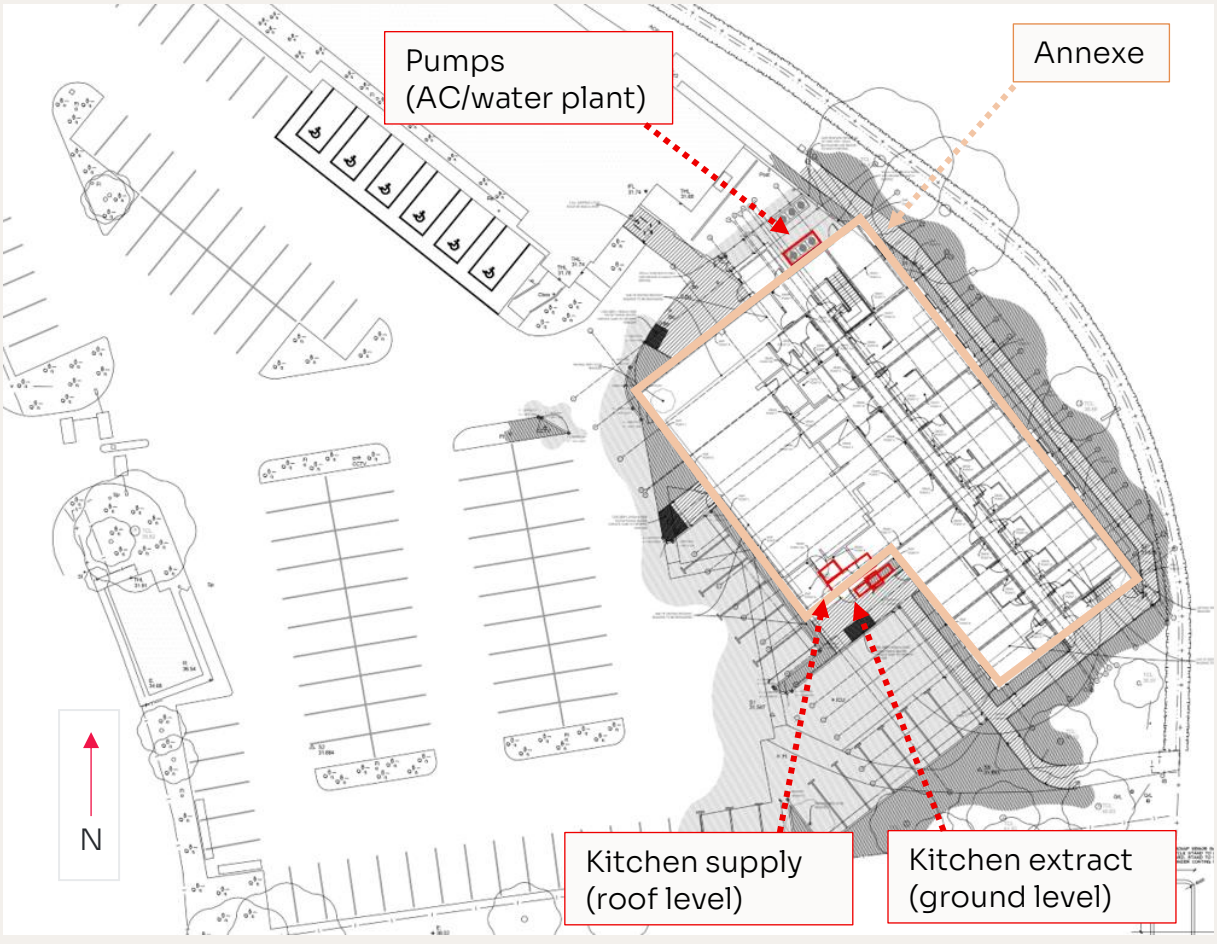


Figure 4-2 Site plan showing new extension and building services plant

4.3 Calculation of noise propagation

4.3.1 Noise propagation has been calculated in general accordance with CIBSE Guide B4 taking into account noise travelling through and out of ductwork systems, and BS 9613:2024 taking into account geometric divergence, local acoustic reflections, and screening from noise travelling between source and receiver points.

4.3.2 At all receiver points, at least one of the two plant locations is screened by the annexe building itself or by intermediary buildings.

4.4 Predicted specific sound levels

4.4.1 Specific sound levels at receivers have been calculated as follows:

Location	Time	Predicted specific level	Background sound level	Difference
1 (Offices)	Daytime	31 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-12
2 (Joshua House)	Daytime	31 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-12
3 (Residential	Daytime	26 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-17
	Night-time	20 dB L_{Aeq}	37 dB $L_{AF90,15mins}$	-27
4 (Residential)	Daytime	26 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-17
	Night-time	24 dB L_{Aeq}	37 dB $L_{AF90,15mins}$	-13

Table 4-3 Summary of specific levels and corresponding background levels at noise-sensitive receivers

4.5 Predicted rating levels

4.5.1 Up to 6dB may be applied to account for noticeable tonality. Noise from air-source heat pumps (i.e. Qton and PURY) is sometimes known to be tonal at close distances, but where this does arise it typically becomes less noticeable with distance and without direct line-of-sight. Receivers are not expected to be close enough to hear obvious tonal noise from heat pumps. However, a precautionary +2dB correction has been applied as a worst-case assumption, to account for the potential that neighbours may hear a 'just tonal' noise. Extract and supply fans are not expected to be heard as tonal.

4.5.2 A 3dB correction may be applied to account for intermittency. Air-source heat pumps vary their duty continuously in response to the demand placed on the system (i.e. how many occupants use heating/cooling and hot water at any one time). While this is typically gradual and units may overlap, there is potential for cumulative noise to be experienced as intermittent. Extract and supply fans will also turn on and off in accordance with restaurant/kitchen operating hours, which may be noticeable as intermittent. A +3dB correction has therefore been applied for intermittency.

4.5.3 A 9dB correction may be applied to account for impulsivity. All equipment will operate with a gradual stop and start, so no correction is considered necessary.

4.5.4 Rating levels will therefore be +5dB higher than specific sound levels at all assessment locations and times.

4.5.5 BS 4142 rating sound levels during typical worst-case operation (i.e. with all ASHPs running at design duty including temporary ASHPs) are predicted at each receiver as follows:

Location	Time	Predicted rating level	Background sound level	Difference
1 (Offices)	Daytime	36 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-7 dB
2 (Joshua House)	Daytime	36 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-7 dB
3 (Residential	Daytime	31 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-12 dB
3 (Residential)	Night-time	25 dB L_{Aeq}	37 dB $L_{AF90,15mins}$	-12 dB
4 (Residential)	Daytime	31 dB L_{Aeq}	43 dB $L_{AF90,15mins}$	-12 dB
4 (Residential)	Night-time	29 dB L_{Aeq}	37 dB $L_{AF90,15mins}$	-8 dB

Table 4-4 Summary of rating levels during typical worst-case operation

4.6 Context & Uncertainty

4.6.1 The acoustic environment at the site was observed to comprise primarily road traffic noise, during daytime visits. Assessments of the survey data suggest that traffic noise decreases overnight but remains dominant and there is no indication of nearby building services noise (this may be shown by 'flattening out' of noise level over time during low periods).

4.6.2 Noise from the proposed building services equipment is expected to be broad-band, steady and anonymous. While not the same as road traffic noise, it is considered in-keeping with the nature of constant or steady man-made noise sources and is not expected to be noticeably different from, or distinguishable against, the road traffic noise at its lowest level.

4.6.3 Care has been taken to minimise uncertainty in this assessment but there is potential for unavoidable uncertainty to arise in several areas, for example from variance in background sound levels at the neighbours, inconsistencies in manufacturers' data, and/or simplifications in noise propagation calculations.

4.6.4 The noise survey was undertaken across 7 days including a weekend, and background levels have been taken as the lowest measured day/night results rather than selecting a 'typical' level by statistical analysis, as suggested by the planning condition. This is expected to allow a margin for conditions and assessment outcomes to vary between calculation and on-site testing.

4.6.5 Manufacturers' sound power data represents the equipment operating at maximum design duty. This represents a theoretical worst-case scenario, however it is unlikely that this will occur; in reality, equipment will vary in noise level continuously and as such the cumulative noise is expected to be lower than predicted.

4.7 Assessment of noise impact

4.7.1 No adjustment for context is judged to be necessary. It is therefore concluded that the proposed equipment will be compliant with the planning condition as the rating level is shown to be below the representative background sound level by at least 7 dB at all assessment times and locations.

5 Conclusion

5.1 A noise survey has been conducted at the Premier Inn Manchester (West Didsbury) site to establish existing background sound levels against which to assess noise from new building services equipment serving a newly-constructed hotel annexe building in place of the demolished restaurant.

5.2 The level of noise from the proposed equipment has been calculated at the most affected noise-sensitive receivers in accordance with BS 9613 and assessed in accordance with BS 4142. Sound insertion loss performance requirements for induct attenuators have been calculated and are provided within Chapter 4 of this report.

5.3 It has been concluded that the building services equipment, when installed in accordance with proposals (including attenuators), is expected to be compliant with the relevant planning condition set by Manchester City Council, which reads as follows:

> *7) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be 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. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority*

Appendix A: Glossary

This appendix provides an explanation of some of the terms used in this report.

A-weighting **L_A or L_{pA}, L_{WA},**	Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would actually hear. The A-weighting is an electronic filter that matches the response of a sound level meter to that of the human ear. When A-weighted the Sound Pressure Level L_p becomes L_{pA} (or L_A) and the Sound Power Level L_W becomes L_{WA}.
L_p	*The instantaneous sound pressure level* (L_p)
L_{pA} (or L_A)	*The A-weighted instantaneous sound pressure level* (L_{pA} or L_A). This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125s (FAST time constant) or the previous 1s (SLOW time constant).
L_{AF}, L_{AS}	The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them.
L_{max}	*The maximum instantaneous sound pressure level* (L_{max}),
L_{Amax}	*The A-weighted maximum instantaneous sound pressure level* (L_{Amax})
L_{AFmax}	*The A-weighted maximum instantaneous sound pressure level with a FAST time constant* (L_{AFmax}).
$L_{N,T}$	*The percentage exceedance sound pressure level* ($L_{N,T}$),
$L_{AN,T}$ $L_{AFN,T}$ **N = %age value, 0-100** **T = measurement time** **e.g. L_{A90}, L_{A10}, $L_{AF90,\,5\,min}$**	*The A-weighted percentage exceedance sound pressure level* ($L_{AN,T}$), *the A-weighted percentage exceedance sound pressure level with a FAST time constant* ($L_{AFN,T}$). This is the sound pressure level exceeded for *N*% of time period *T*. e.g. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as $L_{A10,1hr}$ = x dB. L_{A0} (the level exceeded for 0 % of the time) is equivalent to the L_{Amax} and L_{A100} (the level exceeded for 100 % of the time) is equivalent to the L_{Amin}. It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value.
$L_{eq,T}$	The *equivalent continuous sound pressure level over period T* ($L_{eq,T}$),
$L_{Aeq,T}$ **T = measurement time** **e.g. $L_{Aeq,5min}$**	*The A-weighted equivalent continuous sound pressure level over period T* ($L_{Aeq,T}$). This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the L_{eq} is not a simple arithmetic mean value. The L_{eq} is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation.