ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 2897

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POMONA HOTEL SITE, GORTON

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT ADT 2897/ENIA

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-	04 July 2019	Mark Barnes	Chris Middleton	first issue

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1.0 SUMMARY

The proposal is to develop the site for residential accommodation as shown on the planning application drawings.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the existing ambient noise levels on the site.

Preliminary analysis indicates that compliance with the BS 8233:2014 indoor ambient noise criteria should be achievable with high performance double glazing and acoustic trickle vents or air bricks on the Reddish Lane elevation, and with standard glazing and vents to the more sheltered rear elevations.

Noise levels in outdoor amenity areas should be within the guideline levels in BS 8233:2014 by virtue of the acoustic screening provided by the proposed building.

The site should therefore be acoustically suitable for the proposed development with the noise mitigation measures described in this report.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The site is the location of the former Pomona Hotel on Reddish Lane in Gorton, Manchester. The site has been cleared and is currently empty.

The surrounding area is primarily residential, with houses on the southern boundary of the site and on the opposite side of Reddish Lane to the east. To the west of the site is Gorton Cemetery and further residential properties. There is a bus stop on Reddish Lane on the eastern boundary of the site.

There are also several commercial premises on the ground floors of the nearby terraced properties. The closest include the Cottage Chippy on the northern site boundary, and the Crown King Indian Takeaway opposite the site on Reddish Lane.

Aside from Reddish Lane, the closest major road is Hyde Road (A57), approximately 100 metres north of the site. In addition, the M60 motorway is approximately 1.5km away to the east and Manchester city centre is roughly 4.9km away to the north-west.

Other nearby transport infrastructure includes the Manchester-Sheffield railway around 450 metres away to the south west and Manchester Airport approximately 12km away in the same direction with landing and taking off airplanes typically not passing over the site.

2.2 Proposed Development

The proposal is to develop the site for residential accommodation as shown on the planning application drawings.

2.3 Assessment Criteria

Manchester City Council has adopted the following internal noise limits for residential properties, as set out in Section 3.6.1.1 of the Planning and Noise: Technical Guidance document:-

Area	07:00 – 23:00	23:00 – 07:00
Bedrooms		30 dB $L_{Aeq,\ 8\ hour}$ 45 dB L_{AFmax}*
Living Rooms	35 dB $L_{Aeq,\ 16\ hour}$	

*no more than 15 exceedances per night

The Technical Guidance document also gives a noise limit of 55 dB $L_{Aeq,\ 16\ hour}$ for gardens and terraces, based on the BS 8233:2014 and the World Health Organisation recommendations. Section 7.7.3.2 of BS 8233:2014 provides the following guidance on noise levels in outdoor amenity areas:

> *For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.*
>
> *However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Introduction

An environmental noise survey was undertaken between 05:00 hours and 09:00 hours on Wednesday 26 June 2019, that being a typical sample of worst case rush hour road traffic conditions.

3.2 Instrumentation

The instrumentation used, and the field calibration values before and after the survey are detailed in Appendix A of this report.

3.3 Procedure

Three measurement positions were selected as described below and indicated on the attached site plan 2897/SP1:

i. on the site, at the eastern site boundary and approximately 6 metres south of the bus stop
ii. on the site, approximately 15 metres from the eastern site boundary and centrally between the northern and southern site boundaries
iii. on the site, approximately 30 metres from the eastern site boundary and centrally between the northern and southern site boundaries

At all positions the microphone was mounted on a tripod approximately 1.2 metres above the ground and least 3.5 metres from any other acoustically reflective surface.

Measurements were taken hourly at each position using the Svantek 971 sound level meter set to store the octave band and A-weighted 100ms short-term L_{eq} levels over a 15 minute sample of each hour for subsequent post processing.

3.4 Results

The logged data has been post processed to determine $L_{Aeq,\ 15mins}$, L_{A90} and L_{Amax} levels for each 15 minute period, and these have been summarised in the attached table 2897/T1.

The octave band $L_{eq,T}$ data for each measurement period are set out in the attached table 2897/T2.

Please refer to Appendix B for explanation of the noise units and the A-weighting term used in this report.

3.5 Weather Conditions

For the duration of the survey, the weather conditions were dry with no more than a light wind, with no significant effect on the measured levels.

3.6 Description of Existing Acoustic Environment

The acoustic environment was primarily controlled by road traffic noise. At the beginning of the survey, the $L_{Aeq,T}$ was primarily influenced by traffic on Reddish Lane and the A57. As traffic became heavier over the course of the survey, Reddish Lane became the dominant source.

During lulls in the flow of traffic, noises sources including bird song and pedestrians were noticeable.

The background (L_{A90}) noise levels were controlled by distant traffic.

4.0 PRELIMINARY ASSESSMENT OF EXTERNAL NOISE INTRUSION

4.1 Site Noise Levels

The following sections provide indicative guidance on how to satisfy the local authority requirements relating to external noise affecting the site. The guidance on sound insulation measures is based on the typical performance of generic constructions, and is designed to show how compliance may be achieved, although the performance ratings provided are not intended to be definitive acoustic performance specifications, and the sound insulation properties of the various constructions should be reviewed as part of the detailed design.

When assessing external noise intrusion into new dwellings and noise levels in gardens it must be borne in mind that the noise climate may change in the future. The following discussion is by necessity based on the results of the environmental noise survey described in Section 3.0 above.

The survey results at position 1 and 3 have been averaged for the surveyed portions of the day (07:00 – 23:00) and night (23:00 – 07:00) periods as a basis for assessing noise on the Reddish Lane and the more sheltered elevations, with the worst case measured night time L_{Amax} extracted from the same data sets as typical night time L_{Amax}.

For the Reddish Lane elevation, line source analysis has been used to calculate a distance correction of -1 dB. For the other elevations the proposed building should provide substantial acoustic screening, although more distant traffic from other directions will come into play. An indicative noise reduction of -6 dB has been applied.

The predicted incident noise levels on the building elevations are as follows:-

Location	Incident noise levels		
	Day (07:00 - 23:00) $L_{Aeq, 16\ hour}$ dB	Night (23:00 - 07:00) $L_{Aeq, 8\ hour}$ dB	Night L_{Amax} dB
East (Reddish Lane) Elevation	68	66	83
All other elevations	<=50	<=50	<=60

4.2 Noise Criteria

The Manchester City Council internal and external noise criteria from Section 2.3 above are summarised as follows:

Area	07:00 – 23:00	23:00 – 07:00
Bedrooms	-	30 dB $L_{Aeq, 8\ hour}$ 45 dB L_{AFmax}*
Living Rooms	35 dB $L_{Aeq, 16\ hour}$	-
External amenity areas	55 dB $L_{Aeq, 16\ hour}$	

*no more than 15 exceedances per night

4.3 Assessment

Based on the incident noise levels set out in Section 4.1 above and the noise criteria set out in Section 4.2 above, the following table provides the resulting overall noise reduction requirements for each elevation:

Location	Noise reduction of $L_{Aeq,T}$ required dB		Noise reduction of L_{Amax} required dB
	Day (07:00 - 23:00)	Night (23:00 - 07:00)	
East (Reddish Lane) Elevation	33	36	38
All other elevations	15	20	15

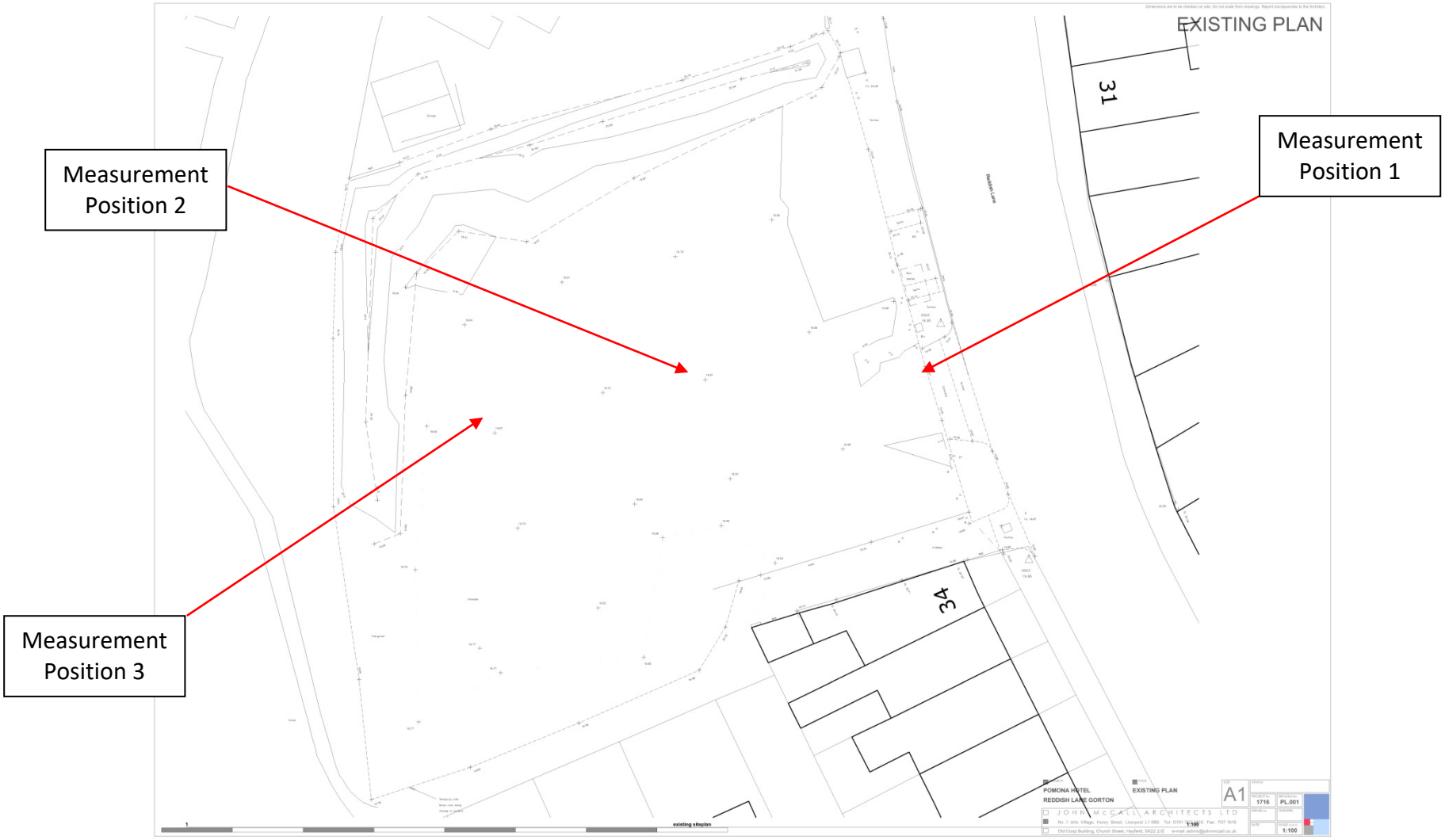
It is generally accepted that a typical residential facade with windows open for ventilation provides 10 to 15 dB noise reduction, and it should be apparent from the figures in the above table that this would not be sufficient, as is typical of most suburban areas. The required noise levels would therefore only be achievable with windows closed and trickle vents or air bricks providing Approved Document F 'whole dwelling ventilation' rates, in line with the guidance in Pro PG: Planning & Noise.

For a building envelope formed in a cavity masonry wall or a lightweight internal frame with a masonry outer leaf, the sound insulation performance will be controlled by the glazing and the ventilation openings. Preliminary calculations indicate that in order to achieve the noise reductions required on the Reddish Lane elevation the glazing would need to be high performance (e.g. 10 / 12 / 6.4 or similar R_w 40 unit to bedrooms, and R_w 37 to living rooms), with acoustic trickle vents (nominally $D_{ne,w}$ 40 dB). For the rear elevations, the incident noise levels would be low enough for standard thermal double glazing and vents to comfortably provide the required performance.

The primary outdoor amenity area is the shared garden space towards the western end of the site. This area will be screened by the proposed buildings and, as shown in Section 4.1, incident noise levels are expected to be well within the requirement of 55 dB $L_{Aeq,16\ hour}$.

The Manchester City Council indoor and external noise criteria for dwellings are therefore achievable with suitable mitigation as indicated above.

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Notes	**Description** Site Plan Showing Noise Monitoring Locations	
	Project Pomona Hotel Site, Gorton	
	Survey Date 26 June 2019	**Drawing No.** 2897/SP1

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SURVEY RESULTS (A WEIGHTED TIME HISTORY)

Measurement Position	Period	$L_{Aeq, 15mins}$ dB	L_{Amax} dB	L_{A90} dB
1	05:00 – 06:00	64	80	43
	06:00 – 07:00	68	84	51
	07:00 – 08:00	70	86	57
	08:00 – 09:00	67	84	58
2	05:00 – 06:00	56	73	42
	06:00 – 07:00	62	73	52
	07:00 – 08:00	62	82	52
	08:00 – 09:00	61	73	51
3	05:00 – 06:00	54	67	43
	06:00 – 07:00	57	69	51
	07:00 – 08:00	55	65	49
	08:00 – 09:00	56	72	47

Table 2897/T1

SURVEY RESULTS (OCTAVE BAND $L_{EQ,T}$)

Measurement position	Period	$L_{eq,\ 15\ min}$ (dB) Octave band centre frequency (Hz)								$L_{Aeq,\ T}$ (dB)
		63	125	250	500	1k	2k	4k	8k	
1	05:00 – 06:00	63	57	57	58	61	58	51	46	64
	06:00 – 07:00	69	63	62	63	65	62	55	49	68
	07:00 – 08:00	73	66	66	65	67	63	57	53	70
	08:00 – 09:00	74	68	65	62	63	60	56	52	67
2	05:00 – 06:00	62	56	51	51	53	50	44	37	56
	06:00 – 07:00	69	60	56	56	58	55	48	40	62
	07:00 – 08:00	71	65	61	57	57	55	53	49	62
	08:00 – 09:00	68	63	59	56	57	54	47	41	61
3	05:00 – 06:00	63	54	50	48	50	48	41	38	54
	06:00 – 07:00	67	60	55	52	54	50	45	39	57
	07:00 – 08:00	67	59	55	50	51	48	43	37	55
	08:00 – 09:00	67	60	55	51	52	49	43	37	56

Table 2897/T2

APPENDIX A - INSTRUMENTATION

Manufacturer	Type and / or Model	Serial Number	Last Laboratory Calibration	Calibrator Output (dB)	Free Field Correction (dB)	Initial reading (dB)	Final reading (dB)
Svantek	Svan 971 Class 1 Sound Level Meter	34392	October 2017				
ACO	7052E ½ inch Microphone	54655	October 2017		-0.13	114.05	114.09
Svantek	SV18 Preamplifier	32179	October 2017				
Norsonic	Nor1251 Calibrator (Cal 5)	34220	February 2019	114.18			

APPENDIX B

Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

A-weighting — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} — L_{10}, being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} — L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ — $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

L_{max} — L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period