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Mrs J Dowler
Evuna
277 Deansgate
Manchester
M3 4EW

By email only

Dear Jane

Evuna 2, 79 Thomas Street, Manchester

Our noise assessment to demonstrate compliance with Planning Condition 5 is presented below.

INTRODUCTION

Acoustic & Engineering Consultants Ltd (AEC) have been instructed by Evuna to assess the potential noise impact due to the proposed Evuna 2 restaurant, at 79 Thomas Street Manchester. The restaurant is to be located in the basement and ground levels of the building. The first and second floors of the building are current empty office accommodation. The local Planning Authority are concerned with the potential impact of noise from activities associated with the ground floor use on the nearest residential properties and the first floor office.

During consultation with Gemma McGlone of Manchester City Council's Environmental Health Department it was agreed that background noise levels would be measured at the nearest noise sensitive properties on a Monday or Tuesday night between 2230 and 0000h. It was also agreed that the airborne sound insulation performance of the existing structure would be measured and, based on noise level data measured in the existing Evuna restaurant on Deansgate, the potential impact on the first floor office spaces would be determined.

Acoustic terminology is provided in brief in Appendix A.

BUILDING DESCRIPTION AND SITE LOCATION

Evuna 2 is to be located in a busy area of Manchester's Northern Quarter, on the corner of Thomas Street and Tib Street, see Figure 1.

The proposed restaurant is to have a seating area and a kitchen area on the ground floor and a private dining area along with staff areas in the basement. It is understood that the existing external envelope of the proposed restaurant is solid masonry walls and single pane of 4mm thick glass windows. Based on the external wall envelope the weakest elements are the windows which have been assumed to have a sound insulation performance of around 30dBR_w.

During the site visit it was noted that the only residential properties adjacent to the site are located on the first floor of the adjacent property 25 to 27 Tib Street, as identified on Figure 1. These properties face on to Carpenters Lane. The remainder of the area consists of pubs and clubs on the ground floor with offices above. On Tib Street is Matt & Phreds, a jazz bar which operates from around 1800h to 0030 seven days a week.

NOISE MEASUREMENTS

Environmental Noise Measurements

Noise measurements at a location representative of the nearest noise sensitive receiver, 25 Tib Street, were obtained on Tuesday 14 August 2012, between 2230 and 0000h. The representative location is identified as position A on Figure 1. Full details of the measurement procedure are included in Appendix B and noise level data is presented in Tables B1 with the octave band

frequency noise level data for the lowest background provided in Table B2. As these measurements were made close to the buildings, they are regarded as 'façade' measurements.

Based on these measurements the free field ambient noise level at a location representative of 25 Tib Street ranged from 50 to 56dBL_{Aeq} and the typical background noise level was between 45 and 49dBL_{A90}. During the measurement period the ambient noise level was dominated by road traffic on Carpenter Street and Tib Street and the background noise was due to activities associated with Matt & Phreds.

In this assessment, the background noise level has been based on the quietest measured level of 45dB$L_{A90,5m}$, provided in Table B2.

Sound Insulation Measurements

The airborne sound insulation of the floor between the ground floor and above office space, via the existing floors, were measured on Thursday 23 August 2012. The results are summarised in Table 1 below; details of all measured data and equipment calibration are held on file by AEC.

Table 1 – Summary of Sound Insulation Achieved By Existing Structure

Source Location	Receiving Room	Sound Level Difference, dB							
		At Octave Band Centre Frequency, Hz							
		63	125	250	500	1k	2k	4k	
Seating Area	Office	18	26	34	42	51	53	59	62
Kitchen Area	Office	19	33	39	46	54	56	62	65

Potential Noise Levels In Proposed Bar

AEC measured typical noise levels in Evuna 1 on Tuesday 14 August and Friday 24 August 2012. During the site visit on Tuesday 14 the restaurant was approximately one third full and on Friday 24 August the restaurant was full. An example of maximum noise level data in the seating area during busy and typical periods is presented in Table 2 below, along with a maximum noise level from the kitchen area.

Table 2 –Measured Maximum Noise Level Data in Evuna 1

Area/Period	dBL_{Amax}	Maximum Noise Level L_{max}, dB, at octave band centre frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
Seating/Busy Period	88	74	76	76	82	84	82	75	63
Seating/Typical Period	84	73	76	83	85	77	72	69	60
Kitchen Area/Busy Period	94	76	82	81	84	83	88	90	81

These are considered to be representative of the potential worst-case situation and would represent a robust basis for assessment.

CRITERIA

Information provided by Gemma McGlone states that Manchester City Council require the following is met:

"*The premises and any externally mounted ancillary plant 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 sensitive location.*"

"*In respect of music break-out from the venue it is necessary for us to see the overall noise levels (dBL_{Aeq}) that the music will be played at over each octave band, in particular the 63Hz and 125Hz octave band noise levels. It is necessary for you to prove that the music noise will not be audible inside the residential properties when they have windows open*".

In relation to internal noise levels in the first floor offices, it was agreed with Gemma McGlone that maximum noise levels in the offices, due to restaurant activities, would not exceed $NR35L_{max}$.

ASSESSMENT

The proposed operating times for the restaurant are 1200 to 2300h, Monday to Saturday, and that there will be no external plant operating after 2300h.

Noise Breakout – External Noise

The four potential noise sources which could impact on the nearest residential properties are noise breaking out from the restaurant seating and kitchen areas and the external plant associated with the kitchen.

During the two site visits to Evuna 1 it was noted that whilst there is amplified music played through speakers, the music is for background purposed only and during the busier periods it was barely audible. Therefore, it has not been assessed independently from the rest of the noise sources associated with the restaurant activities.

The restaurant seating area faces on to Tib Street and Thomas Street with the entrance doors opening on to the corner of the two streets. Calculations have been carried out of noise breaking out from the restaurant based on the maximum internal noise levels the airborne sound insulation performance of the windows, the distance from the external façade to the properties on Carpenters Lane and the acoustic screening provided by the building. The calculations demonstrate that the external noise level at the nearest properties would be significantly below the measured background noise level in each octave bands.

The kitchen area is located in a small room on the corner of Tib Street and Carpenters Lane. The residential properties on Carpenters Lane are 5m away from the external envelope. In order to meet the requirement of 5dB below the measured background noise level in each octave band the sound insulation performance of the glazing in the kitchen area would need to be improved to $42dBR_w$. This performance can be achieved by installing an additional 10mm thick pane of glass at least 50mm from the existing glazing. Ideally with the deepest cavity possible, with acoustic absorption in the rebates, this could be in the form of ceiling tiles cut to size.

Plant Noise

It is understood that there will be two items of plant serving the kitchen area of the proposed restaurant, an air intake fan locatesd on the Tib Street elevation and an extract fan on the Carpenter Lane elevation (identified on Figure 1). Based on the information provided it is understood that the proposed units are: Inlet: JMP35 and Extract: JMP 45. The octave band sound power levels for these two items are presented in Table 3 below.

Table 3 – Octave Band Spectrum Noise Levels for Inlet and Extract Fans

Unit	Octave Band Centre Frequencies, Hz							
	63	125	250	500	1k	2k	4k	8k
Inlet	61	73	67	66	63	61	57	51
Extract	80	80	76	77	74	70	67	64

Due to the location of the inlet fan on the Tib Street elevation, calculations indicate that the distance attenuation and screening provided by the existing building will reduce the noise from the inlet fan would be reduced to below the requirement of 5dB below the background noise level in each octave band.

The extract fan located on Carpenter Lane elevation, is 5m from the nearest residential properties. The calculated noise level from the Extract fan at the properties facing Carpenters Lane is presented in Table 4 below.

Table 4 – Calculated Extract Fan Noise Level at Nearest Residential Properties

Location	Octave Band Centre Frequencies, Hz							
	63	125	250	500	1k	2k	4k	8k
Total Noise Level	55	55	51	52	49	45	42	39
Noise Level Limit (Background – 5dB)	44	43	39	39	33	29	21	9
Difference	11	12	12	13	16	16	21	30

The above demonstrates that the extract fan would exceed the criteria for each octave band at the nearest residential properties. Therefore mitigation measures are required to reduce the noise level from this item of plant. In order to reduce noise levels from the extract fan, a combination of an acoustic louver and silencer achieving the spectrum present in Table 5 would need to installed.

Table 5 – Required Attenuation

Octave Band Centre Frequencies, Hz							
63	125	250	500	1k	2k	4k	8k
11	12	12	13	16	16	21	30

Noise Breakout – To Offices

In order to provide a robust assessment of the potential impact of the restaurant on the first floor office calculations, based on the maximum noise levels presented in Table 2 and the airborne sound insulation of the separating floor presented in Table 3, indicate that the council's requirement of NR35L_{max}, will be meet in each octave band.

CONCLUSIONS

It has been demonstrated that with noisy activity in the proposed restaurant seating area would not impact on the nearest residential properties or the first floor flats.

Mitigation measures are required to control breakout noise from the kitchen area and noise from the extract fan but these are no onerous. In order to reduce the breakout noise from the kitchen area the glazing would need to be improved to at least 42dBR_w. In relation to the extract fan a combination of an acoustic lourve and a silencer would need to be installed.

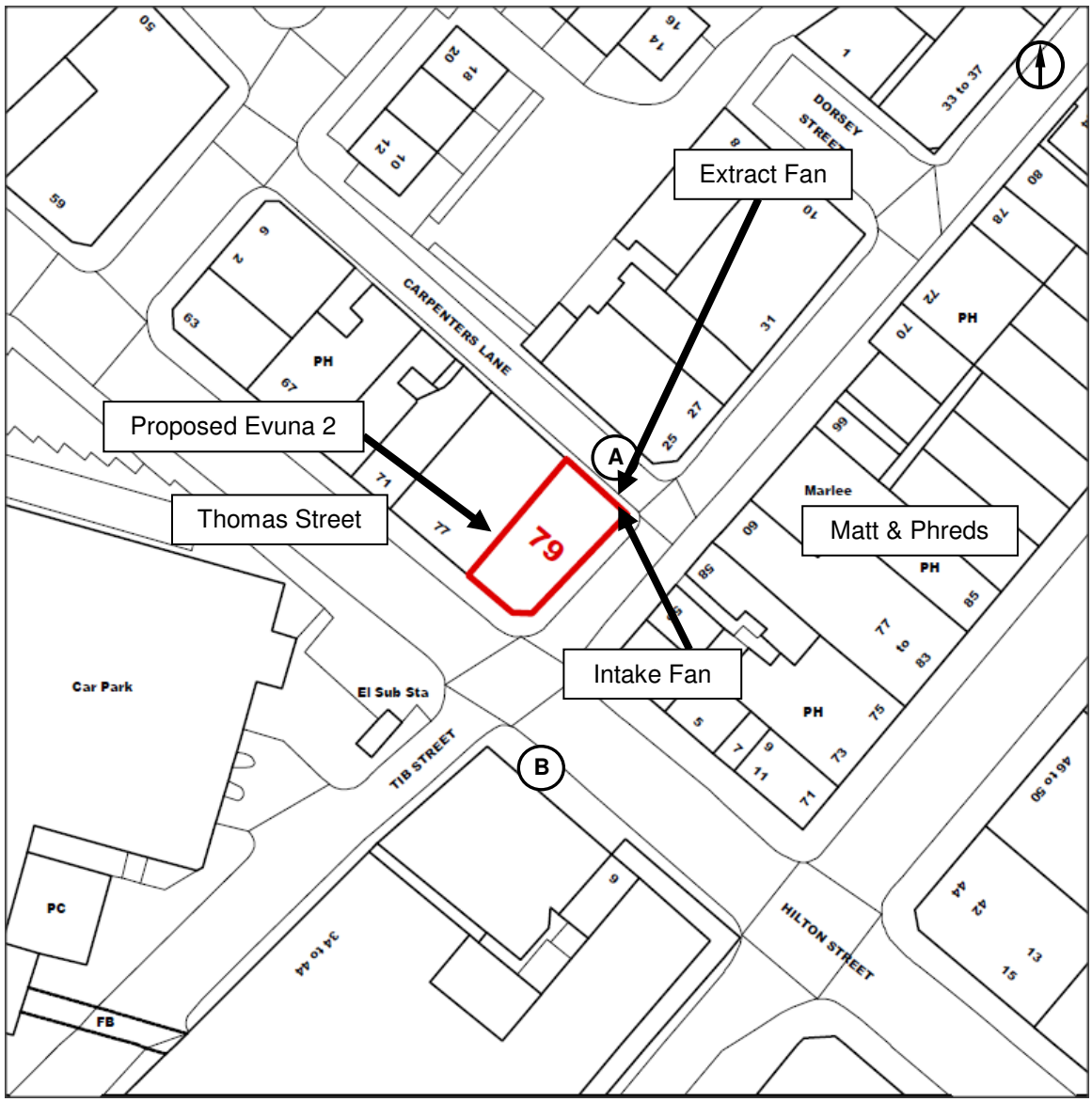
I trust the above is clear and of assistance at this stage. Should you have any questions, please do not hesitate to contact me.

Yours sincerely

Paul Knowles (pjk@aecltd.co.uk)

Checked by. AST

FIGURE 1 – Proposed Site Layout Showing Monitoring Locations



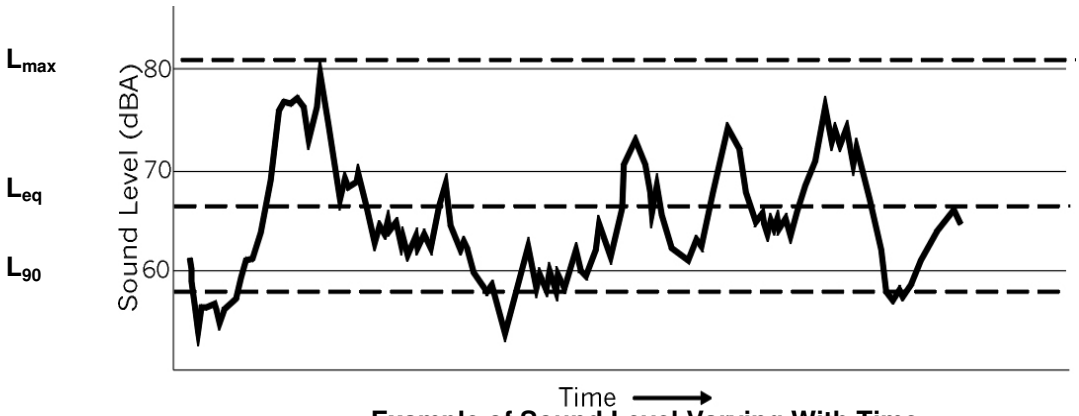
APPENDIX A – Acoustic Terminology in Brief

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz *(Hz)*, that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discreet frequency - a 'pure tone' - most noise is made up of many different frequencies. The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA,* normally used to assess the effect of noise on people. The dBA weighting emphasises or reduces the importance of certain frequencies within the audible range.

Noise Units

In order to assess environmental noise, measurements are carried out by sampling over specific periods of time, such as fifteen minutes or one hour, the statistically determined results being used to quantify various aspects of the noise.

The figure below shows an example of sound level varying with time. Because of this time variation the same period of noise can be described by several different levels. The most common of these are described below.



Example of Sound Level Varying With Time

$L_{Aeq,T}$ The equivalent continuous (A-weighted) sound level. May be thought of as the "average" sound level over a given time, T. It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises and can be considered as the "ambient" noise level.

L_{A90} The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value used to describe the "background" noise.

L_{Amax} The maximum (A-weighted) sound level during a measurement period.

Free-field Level This refers to the sound level measured outside, away from reflecting surfaces.

D_w Single number rating used to describe the on site airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.

APPENDIX B – Measurement Procedure

Dates & Times of Survey	Tuesday 14 August 2012, 2230 to 0000h
Personnel Present	Paul Knowles (AEC)
Equipment Used	B&K 2260 Real Time Analyser (AEC Kit 2)
Weather Conditions	12℃, clear skies, calm.
Measurement Procedure	Ambient and background noise levels were measured at a single location, identified as A on Figure 1 and described below.

He shone

A – 1m from the southern elevation of the Military Kit shop on Carpenters Street.

Location A were selected to measure background noise levels, which were measured in terms of L_{Aeq}, LA_{90} and L_{Amax} (fast response) typically over 5 to 15 minute periods.

All the measurements were taken at a height of 1.5m above ground unless stated and all were facade measurements.

The sound level analyser, which conforms to BS EN 61672-12003 *'Electro acoustics – sound level meters - Part1Specifications'* for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration.

Measured Data — A summary of the results are presented in Tables B1.

TABLE B1 –Measured Noise Levels

Location	Period, h	Noise Level, dB			Comments
		L_{Aeq}	L_{A90}	$L_{Amax, F}$	
A	2248-2253	59.1	52.3	72.2	Background noise level due to breakout noise from Matt & Phreds, maximum noise level due to taxis on Tib Street.
	2253-2258	56.8	50.8	67.2	
	2300-2305	58.4	52.3	76.0	
	2326-2331	55.3	50.1	69.7	Background noise level due to breakout noise from Matt & Phreds, door open, maximum noise levels due to people talking and taxis on Tib Street.
	2332-2337	54.8	49.5	66.4	
	2339-2344	53.3	48.1	64.5	
	2344-2349	54.0	48.8	67.2	
B	2314-2319	62.2	51.8	82.0	Background noise level due to road traffic, maximum noise levels due to road traffic.
	2319-2324	61.8	55.8	76.4	

Appendix C – Breakout of Kitchen to First Floor Office

AEC Ltd **Date:** 28 August 2012

Contract No: P2595
Client: Evuna
Project: Evuna 2

Consultant: PJK

NOISE BREAK IN FROM ADJACENT SPACE

Noise Source/Location: plant room

Element Floor
Area 7.5 m^2 Width= 2.5 Depth= 3 m

Description Kitchen Area

Receiving Room Office
Volume 23 m^3 Width= 2.5 m Length= 3 m Height= 3 m
Reverberation Time 0.5 seconds

Calculation

Frequency,Hz	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
L1	76	82	81	84	83	88	90	81	**94**
10log(S)	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	
10log(A), A=T/0.16V	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	-8.6	
Element SRI	19	33	39	46	54	56	62	65	
L2	57	49	42	39	29	32	28	16	**41**
Criterion: NR (enter at 1kHz)	63	52	45	39	35	32	30	28	
Difference	-6	-3	-3	0	-6	0	-2	-12	
	57.06	48.96	41.74	38.344	29.05	32.0405	27.741	16.09	