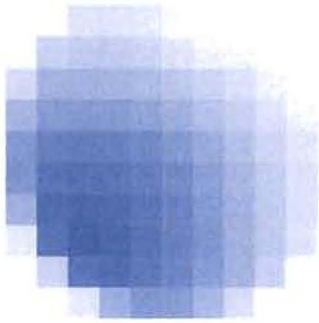
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Unit E, 111 Piccadilly, Manchester

Noise Assessment for Change of Use

P1211-REP01-IE

February 2009

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PROJECT:	Unit E, 111 Piccadilly, Manchester Noise Assessment for Change of Use
CLIENT:	Bruntwood Limited 24th Floor City Tower Manchester M1 4BD
DOCUMENT REFERENCE:	P1211-REP01-IE
SIGNED:	_____ IAN ETCHELLS
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DATE:	February 2009

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1.0 INTRODUCTION

Sol Acoustics has been commissioned by Bruntwood Limited to carry out a noise assessment in support of a planning application to change the use of retail Unit E at 111 Piccadilly in Manchester from A1 to A3.

The key areas requiring consideration as part of the assessment are as follows:

- Transmission between the unit and adjacent uses within the same building
- Noise breakout from the shop front
- Noise produced by mechanical building services plant

As there is currently no tenant for Unit E this assessment has involved determining the maximum operational noise levels that can be accommodated within the unit's shell without causing intrusion to neighbouring occupants of the building. These noise levels have then been compared with those typically encountered within other A3 uses. The operational noise level limits have also been reviewed with respect to levels of noise egress via the shop front that they may cause.

Noise surveys conducted at the site have enabled daytime and night-time noise limits to be proposed for any external building services plant that may be fitted by a future tenant. The proposed noise limits are compatible with Manchester City Council's planning criteria for plant items and should be adhered to when selecting building services plant. The limits could be imposed by a suitably worded planning condition should permission for change of use be granted.

2.0 DESCRIPTION OF PREMISES

Unit E is a single storey retail unit located within a mixed use building at 111 Piccadilly. The building comprises a 17 storey office tower and an attached low rise 'podium' area containing retail units at ground floor with two levels of office accommodation above (currently occupied). Unit E lies next to a unit occupied by a travel agent on one side and the ground floor lobby of the office tower on the other. An access corridor is situated to the rear of the unit. Figure 1 shows a photograph of the unit's shop front.



Figure 1 Unit E Shop Front

As there is currently no tenant for the unit there is no associated building services equipment installed for which noise emissions may be assessed. However, if the unit is granted A3 permission then it is possible that air handling, air conditioning and refrigeration plant may be installed by a future tenant. It is understood that this equipment would be installed upon the roof of podium section of the building. The roof already contains a variety of building services plant, primarily split condensers units, serving the other retail units and office accommodation.

Unit E is separated from the offices above by an exposed ribbed concrete slab that is understood to be approximately 200mm thick. The unit is separated from the neighbouring retail unit and lobby area of the office tower by concrete blockwork walls.

The shop front of Unit E comprises areas of butt-jointed single glazed panels and a glass entrance door with threshold and head seals but no seals to the jambs.

The nearest noise sensitive premises to Unit E are the neighbouring retail unit and offices above within the same building. The Malmaison Hotel and the Abode hotel on Piccadilly are the nearest noise sensitive buildings to the retail unit, although the lower floors within the office tower are closer to and overlook the roof area on which tenant building services plant is likely to be installed.

3.0 NOISE SURVEYS

Noise surveys have been carried out during daytime and night-time periods in order to determine the noise climate outside at the nearest sensitive receptors to Unit E. Measurements were undertaken during daytime on 27th January and 5th February 2009 and during night-time on 3rd February 2009.

The measurement locations were as follows:

Position 1 Pavement outside Malmaison Hotel – opposite side of Piccadilly to Unit E

Position 2 Pavement outside Abode Hotel – opposite side of Lena Street to 111 Piccadilly

Position 3 Podium roof of 111 Piccadilly – near windows of office tower

The locations of the noise measurement positions are shown in Figure 2 below.

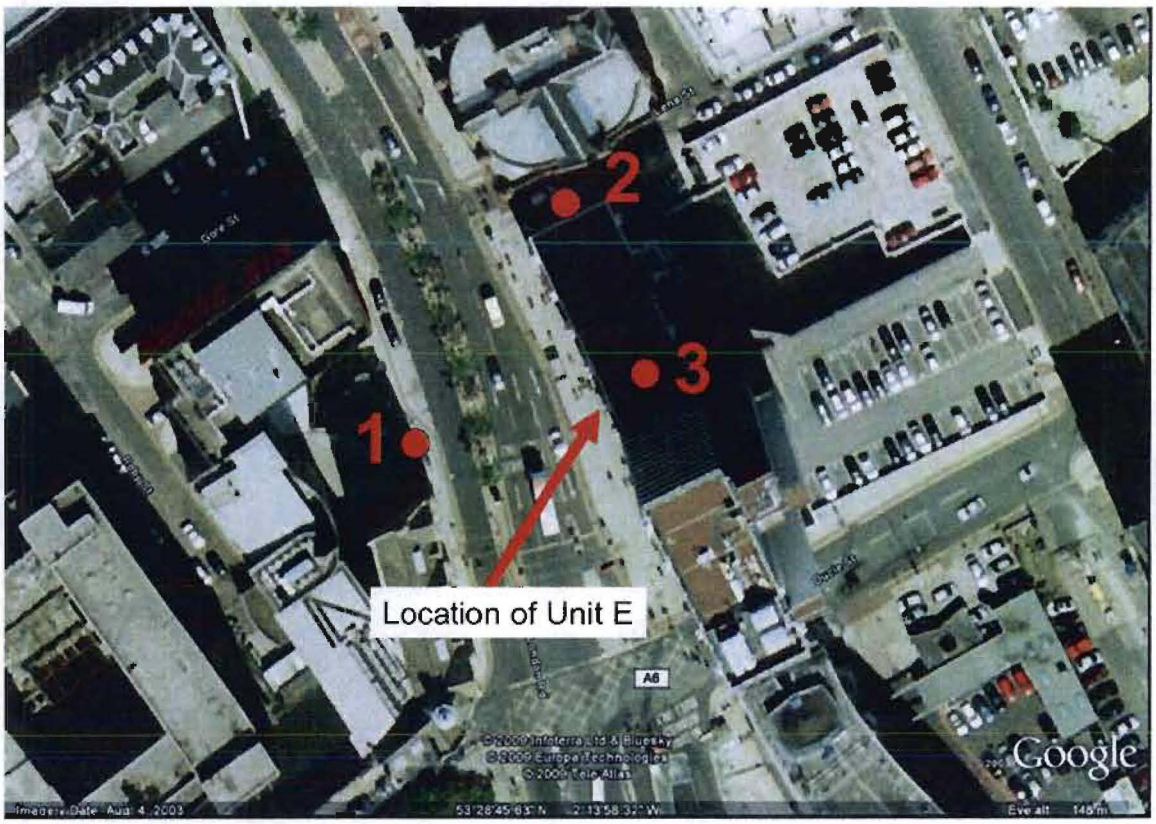


Figure 2 Noise measurement locations (image © Google Earth)

Although Position 3 represents the location of the nearest noise sensitive receptor to the location of any plant items that will be associated with the unit, the receptor is office accommodation and therefore will only be sensitive during business hours. Therefore only daytime noise levels were surveyed at this location.

Each noise level measurement was typically 15 minutes in duration during daytime and 5 minutes in duration at night.

A summary of the noise survey results is provided in Table 1. Full survey details and results are presented in Appendices A and B respectively.

Measurement Location	Daytime Noise Survey		Night-time Noise Survey	
	Average Ambient Noise Level dB L_{Aeq}	Minimum Background Noise Level dB L_{A90}	Average Ambient Noise Level dB L_{Aeq}	Minimum Background Noise Level dB L_{A90}
Position 1 – Outside Malmaison Hotel	70	61	62	52
Position 2 – Outside Abode Hotel	61	56	58	52
Position 3 – Podium Roof	63	57	-	-

Table 1 Summary of Noise Survey Results

As the noise surveys were undertaken during cold weather conditions there was little activity observed from the existing air conditioning units located on the podium roof. Therefore the background noise levels measured at Position 3 are considered to be representative of the lowest likely background noise levels occurring during daytime on the podium roof.

4.0 INTERNAL SOUND TRANSMISSION FROM UNIT E

In order to avoid potential noise intrusion to workers within the offices immediately above Unit E and the adjacent retail unit, assessments of the likely level of noise transfer from Unit E have been carried out.

It is suggested that in order to avoid potential noise intrusion in the offices and adjacent retail unit a limiting noise level of NR25 (measured as an $L_{eq,1\ min}$) is applied to noise transfer from Unit E, subject to a more stringent requirement of 60dB in the 63Hz octave band. The corresponding octave band noise limits are given in Table 2.

Sound Pressure Level @ Octave Band Centre Frequency (Hz)						
63	125	250	500	1k	2k	4k
60dB	55dB	44dB	35dB	29dB	25dB	22dB

Table 2: Maximum allowable noise levels in office and adjacent retail unit due to operations in Unit E

The party floor construction between Unit E and the office above is a 200mm (approx) ribbed concrete slab. The floor is expected to achieve a minimum weighted sound reduction index of 55dB R_w. With a basic plasterboard suspended ceiling fitted by a tenant the weighted sound reduction index would be expected to increase to more than 60dB R_w.

The separating wall between Unit E and the adjacent retail unit is constructed using solid concrete blockwork. It is estimated that the this wall, plus lining fitted in the adjacent retail unit, will achieve a sound reduction index of at least 50dB R_w.

Therefore, if transmitted operational noise from Unit E satisfies the criteria in Table 2 within the adjacent retail unit it wall also satisfy the criteria with the office above.

Table 3 contains calculated operational noise levels that could be generated within the shell of Unit E without exceeding the noise limits given in Table 2 and therefore avoid causing intrusion.

Sound Pressure Level @ Octave Band Centre Frequency (Hz)						
63	125	250	500	1k	2k	4k
90 dB	91 dB	86 dB	83 dB	83 dB	85 dB	88 dB

Table 3: Maximum allowable noise level in Unit E, shell only

The above noise level limits would be compatible with the operation of a busy café or restaurant with background music replay. In such premises the range of operational noise levels typically produced would be 65dB L_{Aeq} to 75dB L_{Aeq}. It is therefore expected that operational noise levels arising from the use of Unit E as an A3 premises will be adequately contained by the shell and avoid causing disturbance to neighbouring users within the building.

5.0 NOISE BREAKOUT TO STREET

Noise breakout from the shop front of Unit E must be adequately controlled so as to avoid excessive noise ingress to adjacent offices and retail units within 111 Piccadilly and the Malmaison Hotel on the opposite side of Piccadilly.

The single glazed areas of the shop front are expected to achieve a sound reduction index of approximately 33dB R_w. If the noise levels given in Table 2 are produced within Unit E the resultant noise levels calculated on the pavement immediately outside the unit will be in the order of 50dB L_{Aeq} and therefore well below current daytime and night-time ambient noise levels. Noise egress from Unit E affecting the Malmaison Hotel will be around 10dB lower than this level due to additional propagation distance. However, with anticipated internal operational noise levels of up 75dB L_{Aeq} the corresponding level of noise egress immediately outside the unit is expected to be less than 40dB L_{Aeq}.

It is therefore considered that noise breakout from the shop front of Unit E is likely to have negligible impact upon neighbouring sensitive premises.

6.0 NOISE CRITERIA FOR EXTERNAL PLANT

Any building services plant installed by a future tenant of Unit E will be mounted on the roof of the podium section of the building shown in Figure 3. During daytime the nearest noise sensitive location to the plant will be the office windows in the tower overlooking the roof (shown on right hand side of photograph). At the night, when these offices are unoccupied, the nearest noise sensitive receptors to the plant location are the Malmaison Hotel and Abode Hotel, which lie approximately 30m to the west and north of the roof area shown in Figure 3 respectively.



Figure 3 Proposed plant location for Unit E

It is understood that Manchester City Council requires noise from new plant installations to be 5dB or more below the prevailing background noise level (in terms of L_{90}) in each whole octave band, outside the nearest noise sensitive premises in order safeguard amenity. This criterion applies to the total noise level due to the operation of all mechanical plant operating simultaneously. The allowable individual

contribution from all plant items and atmosphere terminations must be determined based on these noise limits.

The background noise levels measured at the site have therefore been used to formulate the daytime and night-time noise criteria for building services plant given in Table 4 below.

Assessment Period/Location	L_{Aeq}	Plant Noise Level Limit (dB L_{eq}) @ Octave Band Centre Frequency (Hz)						
		63	125	250	500	1k	2k	4k
Daytime - 1m from nearest office windows in tower	52	57	53	50	48	48	45	37
Night-time – 1m from nearest facade of Malmaison / Abode Hotels	47	52	51	46	43	41	38	33

Table 4: Environmental noise limits for building services plant

The criteria for plant noise at night given in Table 4 equates to a level of approximately 67dB L_{Aeq} at a distance of 3m from any installed equipment on the podium roof. This represents a practicable noise level limit for plant such as split air conditioning units and small attenuated air handling units.

The noise limits given in Table 4 may be incorporated into a suitably worded planning condition requiring future tenants of Unit E to size and specify their building services equipment to satisfy those limits, thereby helping to protect the amenity of occupants within the adjacent office tower and neighbouring hotels.

7.0 CONCLUSIONS

An assessment has been undertaken in order to review the potential noise impact associated with changing the use of retail unit E, 111 Picadilly, from class A1 to A3. The assessment has considered internal sound transmission to an adjacent retail unit and office accommodation within the building, noise egress from the unit's shop front and potential noise emissions from tenant fitted building services plant.

The assessment has determined that the shell of Unit E provides sufficient sound insulation to contain the range of operational noise levels associated with A3 uses such as restaurants and cafes. Any fitout works implemented by a future tenant that involve installing wall linings or suspended ceilings will increase the sound insulation between the unit and adjacent spaces within the building, although such works are not considered necessary to protect the amenity of neighbouring occupants.

Noise egress from the shop front of Unit E is expected to be significantly lower than prevailing traffic noise levels along Piccadilly. It is therefore concluded that operational noise egress from the premises is unlikely to have any significant impact upon other occupants within 111 Piccadilly and the Malmaison Hotel opposite.

Daytime and night-time noise limits for external tenant-fitted plant associated with Unit E have been specified within this document. The limits are aimed at achieving compliance with Manchester City Council's criteria for noise emissions from new plant items and should be adhered to by future tenants when specifying and installing building services equipment. It is envisaged that these limits could be imposed within a suitably worded planning condition should permission for the change of use be granted.

APPENDIX A: SURVEY DETAILS

LOCATION

111 Piccadilly, Manchester

DATES OF SURVEYS / WEATHER CONDITIONS

Daytime – 27th January 2009 – Cool, dry, calm

Daytime – 5th February 2009 – Cool, damp, calm

Night – 3rd February 2009 – Cool, dry, calm

MEASUREMENTS CONDUCTED BY

Ian Etchells - Sol Acoustics Limited

Darren Clucas – Sol Acoustics Limited

INSTRUMENTATION

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

Norsonic Type 1253 IEC 60942-1997 Class 1 Sound Calibrator (serial no. 29917)

CALIBRATION PROCEDURE

Before and after each measurement period the Norsonic Type 118 was check calibrated to an accuracy of ±0.3dB using the Norsonic Type 1251 Sound Calibrator. The calibrator produces a sound pressure level of 114 dB re $2x10^{-5}$ Pa @ 1kHz.

APPENDIX B: SURVEY RESULTS

Measurement Location	Start Time	Parameter	Overall Noise Level, dB	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
				63	125	250	500	1k	2k	4k
1 Pavement outside Malmaison Hotel	12:30	L_{eq}	69	78	71	68	65	64	62	58
		L_{90}	61	68	62	59	57	57	54	45
	12:45	L_{eq}	68	76	69	67	64	64	61	56
		L_{90}	61	68	62	59	58	57	54	44
	13:00	L_{eq}	71	80	72	69	68	67	64	59
		L_{90}	63	70	64	61	60	58	56	48
2 Pavement outside Abode Hotel, Lena Street	13:42	L_{eq}	60	67	62	59	57	56	53	46
		L_{90}	56	62	58	55	53	52	48	41
	13:57	L_{eq}	63	69	63	60	58	59	56	50
		L_{90}	56	63	59	55	53	52	48	42
	14:12	L_{eq}	60	68	63	59	56	56	52	46
		L_{90}	56	63	59	54	52	51	48	41
	15:00	L_{eq}	61	69	65	60	57	56	53	47
		L_{90}	56	62	60	55	53	52	48	42
	15:15	L_{eq}	60	68	63	59	57	56	52	45
		L_{90}	56	62	59	55	53	51	47	40
	15:30	L_{eq}	60	66	63	58	56	55	52	45
		L_{90}	56	61	59	55	52	51	47	40
3 Podium Roof, 1m from office windows	12:50	L_{eq}	61	68	63	60	57	57	54	48
		L_{90}	58	62	58	55	54	53	50	42
	13:05	L_{eq}	66	68	62	59	68	58	55	48
		L_{90}	57	62	58	55	53	53	50	42
	13:20	L_{eq}	62	69	64	60	59	58	55	50
		L_{90}	58	63	59	55	54	53	50	43
	13:35	L_{eq}	62	68	63	60	57	57	55	50
		L_{90}	58	63	59	55	54	53	51	45
	15:50	L_{eq}	63	70	63	60	58	58	57	52
		L_{90}	59	63	59	55	54	54	52	46
	16:05	L_{eq}	63	69	64	61	58	58	57	52
		L_{90}	59	63	60	56	54	54	52	47

Table B1 Daytime Noise Survey Results

Measurement Location	Start Time	Parameter	Overall Noise Level, dBA	Sound Pressure Level (dB) @ Octave Band Centre Frequency (Hz)						
				63	125	250	500	1k	2k	4k
1 Pavement outside Malmaison Hotel	00:10	L_{eq}	64	68	67	64	60	59	58	51
		L_{90}	60	63	61	57	56	54	53	46
	00:20	L_{eq}	63	68	64	61	60	58	55	53
		L_{90}	60	63	61	58	57	55	52	46
	00:25	L_{eq}	62	69	65	61	58	57	55	47
		L_{90}	56	60	56	54	53	50	48	40
	00:30	L_{eq}	60	68	60	58	56	56	53	45
		L_{90}	52	58	52	51	49	47	44	35
	01:05	L_{eq}	62	67	66	61	57	57	55	49
		L_{90}	54	58	54	52	50	48	47	37
	01:10	L_{eq}	60	68	64	60	56	55	53	47
		L_{90}	52	57	53	51	49	47	45	35
	01:15	L_{eq}	60	68	60	58	56	56	54	45
		L_{90}	52	58	52	51	49	46	45	35
	01:40	L_{eq}	63	70	64	60	58	58	56	51
		L_{90}	55	60	56	54	52	49	47	39
2 Pavement outside Abode Hotel, Lena Street	23:40	L_{eq}	58	64	60	57	54	53	50	43
		L_{90}	53	59	56	52	50	48	45	39
	23:45	L_{eq}	57	63	59	55	53	52	51	46
		L_{90}	52	58	56	51	49	47	44	39
	23:50	L_{eq}	61	66	62	59	57	57	54	46
		L_{90}	55	59	58	55	51	49	47	40
	23:55	L_{eq}	58	64	59	56	54	53	50	43
		L_{90}	54	59	57	53	51	49	47	39
	00:00	L_{eq}	58	66	60	58	54	53	50	43
		L_{90}	54	59	56	52	50	49	46	39
	00:40	L_{eq}	57	63	59	56	54	53	50	43
		L_{90}	53	58	56	52	50	48	45	39
	00:45	L_{eq}	57	63	59	57	53	52	50	43
		L_{90}	54	58	56	52	50	49	46	39
	00:50	L_{eq}	58	67	60	56	55	53	51	45
		L_{90}	55	61	57	53	52	51	48	41
	01:25	L_{eq}	54	61	58	53	51	50	47	41
		L_{90}	52	57	56	51	48	46	43	38
	01:30	L_{eq}	57	65	59	55	52	52	50	42
		L_{90}	52	59	56	51	49	47	45	39

Table B2 Night-time Noise Survey Results