PROJECT TECHNICAL MEMORANDUM

JOB TITLE	:	Black Sheep Coffee, 5 – 7 Goodge Street
PROJECT NO	:	HT22727
DATE	:	19 January 2016
FROM	:	Adam Kershaw
ISSUED TO	:	Jonathan Orchid

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RE: BLACK SHEEP COFFEE, 5 – 7 GOODGE STREET PLANT NOISE ASSESSMENT

Further to our ongoing correspondence we are pleased to present our advice with relation to plant noise.

1.0 Introduction

A new retail unit called Black Sheep Coffee is proposed at 5-7 Goodge Street, London. As part of the retail design and fit out new items of air conditioning and ventilation building services plant are proposed.

Hann Tucker Associates have previously undertaken an environmental noise survey and plant noise assessment for the landlord of the building during the design phase of the residential aspect of the building.

During that design phase numerous items of building services plant were proposed at roof level and in order to comply with the requirements of the Local Authority a plant area has been included at roof level. This plant area has an acoustic louvered screen around the perimeter to suitably attenuate plant noise to the nearest residential premises.

During the design phase space was made available for future retail tenant plant and allowance was made in the acoustic calculations for the plant screen, to enable the installation of suitable retail tenant plant to comply with the Local Authority criteria.

This letter details our assessment of the proposed retail tenant plant in accordance with the requirements of the Local Authority.

2.0 Summary of Previous Plant Noise Report

Hann Tucker Associates previously provided a plant noise assessment report dated 21 November 2014 from which planning permission was granted. This report considered the plant noise impact relating to the new residential plant and existing commercial plant items at roof level.

As described in the report we understand the London Borough of Camden plant noise criteria to be as follows:

Noise description and location of measurement	Period	Time	Noise Level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dBA < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dBA < L_{A90}
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dBA < L_{A90}
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB L_{Aeq}

Based on the above criteria and the results of the environmental noise survey we proposed the following plant noise emission criteria, should be achieved (with all relevant plant operating simultaneously) at 1m from the nearest noise sensitive facades based on the minimum measured L_{90} noise level.

Location	Proposed Plant Noise Limit $L_{A90(15min)}$ dBA at Nearest Noise Sensitive Façade	
	Daytime (07:00 – 23:00 hours)	Night Time (23:00 – 07:00 hours)
Goodge Street Facade	42	39
Rear Facade	38	36

There are five noise sensitive window areas to consider in relation to the roof level plant noise.

a) An IQ Sliding openable roof light approximately 2m away from the solid blanked of end of the acoustic louvered screen.

b) A pair of openable Velux windows side by side to the east of the plant area, at a distance of approximately 5m away from the edge of the acoustic louvered plant screen.

c) Another pair of openable Velux windows side by side to the south east of the plant area, at a distance of approximately 8m away from the edge of the acoustic louvered screen.

d) A Flushglaze 1100mm square fixed shut roof light to the south of the plant area, at a distance of approximately 5m away from the edge of the acoustic louvered screen.

e) A Flushglaze 1400mm circular fixed shut roof light to the west of the plant area, at a distance of approximately 5m away from the edge of the acoustic louvered screen.

Using our in-house noise prediction software we calculated the following resultant noise levels at 1m from the five nearest noise sensitive window locations associated with roof mounted plant items.

Window	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1m from Noise Sensitive Window
IQ Sliding Rooflight	31dBA
Pair of Velux at 5m	31dBA
Pair of Velux at 8m	28dBA
Flushglaze 1100mm	32dBA
Flushglaze 1400mm	36dBA

The above values consider the distance loss attenuation, acoustic louvered plant area screening, barrier loss reductions, and directivity effects where necessary. Also it was assumed that the proposed units can be operational 24 hours per day.

3.0 Black Sheep Coffee Plant Noise Assessment

3.1 Proposed Items

We understand the following items of plant are proposed which have will have an external airborne noise component, which needs assessing in accordance with the Local Authority requirements.

Plant Description	Location	Qty	Plant Make	Model Number
AC Condenser Unit	Roof Level Within Acoustic Enclosure	1	Mitsubishi	PUHZ-ZRP140
Kitchen Extract Fan	Ceiling Mounted in Coffee Shop Ducted to Façade Grille	1	Solar Palau	TD800/200
WC Extract Fan	Ceiling Mounted in Coffee Shop Ducted to Façade Grille	1	Solar Palau	TD350/125

The roof level condenser unit is to be assessed to the nearest noise sensitive windows in line with those at roof level already installed as described above. The kitchen and WC extract fans are proposed to discharge through the front Goodge Street façade at ground floor level, and as such the nearest noise sensitive residential windows belong to the apartments above.

We understand the manufacturer's sound pressure level noise data to be as follows:

Fan	Sound Pressure Level (dB re 2x10-5 Pa)
PUHZ-ZRP140	Heat 52dBA / Cool 50dBA at 1m
TD800/200 - INLET	51dBA at 1.5m
TD800/200 - OUTLET	53dBA at 1.5m
TD350/125 - INLET	41dBA at 1.5m
TD350/125 - OUTLET	41dBA at 1.5m

The extract fans will be installed in a ducted system and as such it is necessary to consider the sound power levels. The manufacturer's sound power levels are as follows.

Plant Item	Sound Power Level (dB) @ Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
TD800/200 - INLET	27	40	48	57	61	61	57	50	66
TD800/200 - OUTLET	49	50	51	59	62	62	59	51	67
TD350/125 - INLET	22	28	41	53	49	44	37	30	55
TD350/125 - OUTLET	29	30	43	53	50	45	38	30	56

3.2 Condenser Noise Assessment at Roof Level

Using our in-house noise prediction software we have calculated the following cumulative resultant noise levels at 1m from the five nearest noise sensitive window locations, based on the impact of including the impact of the condenser unit proposed for Black Sheep Coffee.

Window	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1m from Noise Sensitive Window
IQ Sliding Rooflight	33dBA
Pair of Velux at 5m	33dBA
Pair of Velux at 8m	30dBA
Flushglaze 1100mm	34dBA
Flushglaze 1400mm	38dBA

The values in the table above indicate that there would be a 2dBA increase to the cumulative plant noise levels incident at the noise sensitive windows, however, each predicted value would still comply with the requirements of the Local Authority described in Section 2.0.

The above values consider the distance loss attenuation, acoustic louvered plant area screening, barrier loss reductions, and directivity effects where necessary. It should also be noted that the worst effected Flushglaze 1400mm window is fixed shut. This further indicates that the requirements of the Local Authority and suitable internal noise levels should comfortably be achieved.

3.3 Extract Fan Noise Assessment at Front Facade

The kitchen and WC extract fans are proposed to discharge through grilles in the front façade. The grilles are approximately 2m away lower than the nearest residential windows above.

WC Extract - Solar Palau TD350/125

Our calculations are as follows:

Item	Sound Level (dB) @ Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Outlet sound power level	29	30	43	53	50	45	38	30	56
Additional correction factors*	28	24	26	28	27	27	26	26	
Calculated sound pressure level at 1m from residential window	1	6	17	25	23	18	12	4	27

*Additional correction factors are calculated by our in-house software, i.e. distance loss, duct loss, grille effect, directivity, attenuation etc.

Our calculations indicate that without additional mitigation measures the WC extract system would comfortably achieve the requirements of the Local Authority.

Kitchen Extract Solar Palau TD800/200

Our calculations are as follows:

Item	Sound Level (dB) @ Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Outlet sound power level	49	50	51	59	62	62	59	51	67
Additional correction factors*	27.9	24.4	26.2	28.2	27.1	27.1	26.1	26.1	
Calculated sound pressure level at 1m from residential window	21.1	25.6	24.8	30.8	34.9	34.9	32.9	24.9	40

*Additional correction factors are calculated by our in-house software, i.e. distance loss, duct loss, grille effect, directivity, attenuation etc.

Our calculations indicate that the kitchen extract fan system is likely to achieve the requirements of the Local Authority described in Section 2.0 for daytime, and fall short by only 1dBA at night-time. It is possible that the business would be shut from 11pm onwards and therefore night-time criteria would not matter. However, we would suggest 1dBA is a negligible difference, it would be within suitable standard industry measurement tolerance, unperceivable by a human and would likely go un-noticed and therefore be acceptable.

We recommend an attenuator be installed directly to the room side of the fan. This is not a requirement by the Local Authority but would propose this to suitably attenuate noise to the internal space. We suggest NR45 is likely to be achievable and acceptable to the client but is entirely at their discretion.

We recommend an attenuator be connected directly to the room side of the fan with approximate insertion losses as follows:

Minimum Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
1	1	6	10	20	14	8	6

We would expect this level of attenuation to be achievable using a Regaduct 200mm diameter, 500mm long attenuator with 50mm thick wall lining (or acoustically similar product). Example product details can be found here: http://www.regavent.co.uk/assets/regaduct-acoustic.pdf

4.0 Conclusion

Hann Tucker Associates have acoustically review the AC and ventilation plant proposals for Black Sheep Coffee.

Our calculations indicate that the proposed condenser at roof level is likely to achieve the requirements of the Local Authority in the absence of any further mitigation measures.

Our calculations indicate that the proposed WC extract fan is likely to achieve the requirements of the Local Authority in the absence of any further mitigation measures.

Our calculations also indicate that the proposed kitchen extract fan is likely to achieve the requirements of the Local Authority without further mitigation measures.

In addition we have recommended a roomside attenuator be installed to control noise in to the occupied retail space. This is not a requirement of the Local Authority and is entirely at the client's discretion.

For and on behalf of
Hann Tucker Associates

Adam Kershaw