

Ian Sharland

Noise & Vibration Control Specialists

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Noise & Planning Dim T Restaurant, 32 Charlotte Street, London W1T

Site	Dim T Restaurant, 32 Charlotte Street, London W1T
Ian Sharland Ltd Ref No.	3232/pja
Date	 30th September 2005 Revision 3 [11th August 2006] Plant 1/3rd octave data added, Clarification on plant operating hours & type, BS4142 assessment, Octave band attenuation levels for noise control equipment, BS4142 assessment, 28th February 2007 (Revision 4) Including survey data from 1st February, New Condenser Noise Levels, Speed controlling of kitchen extract fan 10th April 2007 (Revision 5) Including site survey data from 24th March with the kitchen extract fan speed controlled fitted 17th April 2007 (Revision 6) Height of acoustic screen facing Colville Placed increased to 2750mm
Audit carried out by	Peter Ashford BSc MIOA

1.0 Introduction

In the autumn of 2004 the mechanical services plant on the rear first floor roof at the back of 32 Charlotte Street was updated. The plant consists of a Trane package air-handling unit, Daikin a/c unit serving the Function Room on 1st floor, water heater, a kitchen supply fan and a kitchen extract fan with a discharge stack that runs up the rear façade of the building and discharges at high level.

The plant is only required to operate during the operating hours of the restaurant.

The occupier of 15 Colville Place which has windows that overlook the Dim T's rear plant roof complained about the noise coming from the new plant soon after the plant was commissioned. Mr Anthony Snell, the complainant contacted Camden Development Control

Planning Services who after some exchange of correspondence has, we understand, issued a Noise Abatement Notice.

Ian Sharland Ltd was instructed by Boatman Mechanical Services to attend site and under take noise measurements and make recommendations regarding noise control. A survey was carried out on 4th February 2005 which showed that on the edge of the plant roof, closest to the rear façade of the complainant's dwelling the maximum noise level was 73 dB L_{Aeq} (with all plant running). Ian Sharland Ltd then produced the findings and recommendations on 16th February 2005.

Subsequently Boatman Mechanical Services carried out additional works to the plant to reduce noise levels. These works having being completed in January 2007.

A speed controller has now been fitted to the kitchen extract fan and this report sets out the new reduce noise levels from the fan as well as the noise data for the two new condenser units to replace the Trane AHU and the calculated benefit of the acoustic screen.

2.0 Location

The plant is located on a small flat roof section at the rear of the restaurant at 32 Charlotte Street. There are neighbouring restaurants on both sides of No. 32 which have their own external plant. The photograph below shows the rear façade of No. 32, the kitchen extract fan discharge stack, the fresh air inlet hood, wall mounted condenser and in the foreground the Trane packed air-handling unit.



Looking to the right, new plant is being installed on the roof of No. 34 and the photograph below shows this as well as the complainant's windows to the extreme right of the picture.



Dim T's plant is at its closest 5m from the complainant's rear windows, the sitting room on the ground floor and the bathroom on the first floor.

3.0 Current Noise levels

The current plant noise levels were assessed on the early hours on Saturday 24th March 2007 and the results are set out in full in Appendix 1, but summarized in the table below;

Time	Activity	Noise		Comment
		Level		
		L _{Aeq}	L _{A90}	
23,55	Dim T^1 off	51.8	51.1	
	Pied de Terre ² off			
	No. 17 Colville Plant condenser ³ off			
00,10	Dim T ¹ kitchen extract (speed 3) and kitchen	50.7	50.1	Dim T kitchen extract fan barely discernable
	supply on			
	Pied de Terre ² off			
	No. 17 Colville Plant condenser ³ off			
00,35	Dim T off	48.4	47.7	
	Pied de Terre off			
	No. 17 Colville Plant condenser off			
00,45	Dim T off	50.5	50.1	No. 17 condenser clearly discerable
	Pied de Terre off			
	No. 17 Colville condenser on			

¹ Dim T plant consists of kitchen extract fan (running at Speed No. 3) and kitchen supply fan.

² Pied de Terre plant consists of 4 vertical coil condensers and 1 AHU.

³ At the end of the survey it became clear that there is an external condenser in the rear yard of No. 17 Colville place which was running, it was not clear if this was running throughout the survey or not, but when the restaurants' plant was off it could be clearly heard at 00,45 hours. The condenser was some 3 to 4m away from the microphone, but slightly closer to the rear living room window of No. 15 Colville Place.

From this survey I can conclude⁴;

1). Background noise level was 51 dB L_{A90} in the absence of plant noise up to Midnight when Dim T's plant is switched off ,

2). Background noise dropped from 51 to 48 dB L_{A90} in the absence of plant noise by 00,30 hours.

3). Contribution from Dim T plant is approximately 45 dB L_{Aeq} when the background noise before and after are allowed for. No "clean" measurement could be made of Dim T's plant as the background noise was of a similar level to plant noise level.

⁴ the contribution for the condenser at the rear of No. 17 Colville Place is excluded from these figures.

4). The survey has shown that Dim T plant noise levels outside the windows of the dwellings closer to Charlotte Street are lower than those outside No. 15 Colville Place and therefore this should be considered the "nearest sensitive dwelling".

5.0 Acceptability of Plant Noise

The planning consultant Peter Pendleton Associates Ltd have confirmed that all the plant on Dim T's roof requires plant consent and therefore will need to comply with Camden's requirement of new plant noise being limited to background minus 5 dB.

To date the following background noise levels have been recorded outside the closest "sensitive window";

Date	Day	Time	Background noise
			level
16 th December 2004	Thursday	$?^{1}$	43 dB L _{A90}
1 st February 2007	Thursday	23,36 hours	45 dB L _{A90}
23 rd March 2007	Friday	Midnight	51 dB L _{A90}

¹ background noise level reported by Mr Casey of Camden EHO

Dim T have confirmed that their plant is switched off by no later than midnight, even over the weekend, the only item of their plant which is left running is a very small "heat dump" radiator which has a fan mounted on the back of it. The most recent survey data suggest that the noise generated by the "heat dump" is > 40 dB L_{Aeq} when measured outside the "nearest sensitive window".

Clearly Dim T's plant noise will be most intrusive when the background noise level is at its lowest. Based on the most recent survey data the mid week minimum background noise level, up to midnight, is assumed to be 45 dB L_{A90} .

To meet Camden Council's planning criterion Dim T's plant noise should be limited to background minus 5 dB, namely 40 dB L_{Aeq} .

Currently Dim T's plant noise is so close to the background noise level that it is not possible to give a precise or un-coloured plant noise level.

Plant Condition	Time	Noise Level	
		L _{Aeq}	L _{A90}
Background noise	00,00 hours	51.8	51.1
All Dim T's plant running	00,15 hours	50.7	50.1
Background noise	00,35	48.4	47.7

What the most recent survey did show is;

Although the recorded plant noise levels were very close to the background the survey demonstrated that Dim T's plant was just perceivable.

If it is assumed that the background noise level at 00,15 hours falls between that recorded at midnight and that at 00,35 hours, namely 49.5 dB L_{A90} and the plant noise level was 50.7 dB L_{Aeq} the corrected background noise level would be in the order of 45 dB L_{Aeq} .

It must be noted here that the separation between "source" or plant noise and background noise levels is so small their extrapolation can only be viewed as indicative.

The graph below plots the un corrected Dim T plant noise level recorded at 00,15 hours with the background noise level recorded at 00,35 hours.



Graph 3232/G1 Levels recorded o/s "nearest sensitive window" 24th March 2007

The graph demonstrates (63 & 125 Hz) the subjective impression that Dim T's generates a just perceivable "air rush" noise.

5.0 Recommendations for Noise Control

The survey has demonstrated that the current plant noise level, making no allowance for the benefit of the proposed acoustic screen have now been reduced to a level of approximately 45 dB L_{Aeq} when measured outside the "nearest sensitive window", at a level equal or below the background noise level even when assessed in the last minute of the last hour of operation of the plant leading up to mid night shut down.

The contribution from Dim T's plant up to midnight is not easily measurable due to noise generated by Pied de Terre chillers, some of which run through the night and Elenas L' Etoile kitchen extract fan as well as the external air conditioning plant of No. 17 Colville Place.

Dim T have now removed the Trane packaged air-conditioning unit from their roof and proposed to replace this with two Daikin condenser units which will be housed in acoustic hoods.

The proposed Daikin Units are;

2 No. Daikin RZQ125B8V3 in Evironmodula Acoustic Housings

Manufacturer's rated noise level 52 dB L_{Aeq} at 1m each Envion's rating level within their housing 27 dB L_{Aeq} at 1m each¹

1 No. existing Daikin RXS60B in Evironmodula Acoustic Housing

Manufacturer's rated noise level 49 dB L_{Aeq} at 1m each Envion's rating level within their housing 24 dB L_{Aeq} at 1m¹

¹ see Environ's Technical Information sheet 1.1.25AC a copy of which is enclosed

Assuming that the condensers will be no closer than 5m from the "nearest sensitive window" the predicted overall condenser noise is 23 dB L_{Aeq} (this incorporates a + 2.5 dB façade reflection correction factor) and is more than 10 dB below the measured kitchen supply and extract fan noise level and therefore will not add to this level.

The proposal is to erect an acoustic screen (see Boatman Air conditioning Ltd drawing No. 5964/2 Rev B) to provide the final 5 dB of attenuation required to meet Camden's Planning Criterion.



The drawing extract below shows the acoustic screen plant and the "nearest sensitive windows".

The proposed screen will give approximately 293mm path difference to the top floor window and 1706 mm to the rear ground floor window of 15 Colville Place compared with the direct lines of sight to the kitchen extract fan. The theoretical attenuation this would give is set out below;

	Octave band centre frequency Hz						
	125	250	500	1000	2000	4000	
Path difference of 229mm	9	10	11	13	15	18	
Path difference of 1706mm	14	17	20	23	26	27	

The screen will have a fully absorptive internal face to minimise reflections.

Even when façade reflection is considered it can be seen that this screen will provide at least the additional 5 dB attenuation required to meet Camden's Planning Criterion even from the higher level windows over looking the plant.

6.0 Summary

A detailed noise assessment within the complainant's dwelling was not permitted during the course of the two pre-arranged appointments with the complainant at 15 Colville Place and therefore measurements have had to be taken at arms length from the edge of the roof of No. 34 Charlotte Street.

The survey has shown that Dim T's plant noise has been reduced from 73 dB L_{Aeq} down to 45 dB L_{Aeq} .

The survey data has shown the current minimum background level up to midnight at the rear façade of the "closest sensitive windows" falls in the range of 45 to 50 dB L_{A90} . Working on the "worst case" or quietest background level Dim T's plant will need to be reduced to background minus 5 dB or 40 dB L_{Aeq} .

Manufacturer's data has been presented that shows there will be no additional noise contribution from the proposed two new Daikin condenser units in their acoustic housings, the existing Daikin unit will also be protected by an acoustic housing as well. Therefore the combined proposed plant noise level will be no higher than 45 dB L_{Aeq} at the "nearest sensitive windows".

It is proposed to erect an acoustic screen around the plant and this has been shown in this report that it will be more than capable of providing the additional 5 dB attenuation required for compliance, even from the windows on the high floors of Colville Place which overlook the plant. The section of the screen facing Colville Place has been increased in height to 2750mm above the parapet wall and the longer section facing away from Charlotte Street remains at 2250mm as originally proposed.

These works will therefore control plant noise to meet the planning stipulation of Camden Council.

7.0 Distribution

Client: Mr John Boatman Miss Nikki Fenner boatman@btconnect.com nkf@pendleton-assoc.com

Date	Time	What's Running?	Location	LARG	LAGO
23/3/07	23.55	Meter Calibration		113.7	-7.50
24/4/07	,	All off (b/a)	o/s rear window of No. 15 Colville Place	51.8	51.1
			o/s closest residential window Colville Place	51.0	50.1
		Just Dim T kitchen extract	o/s rear window of No. 15 Colville Place	52.7	51.3
		fan at full speed			
		•	o/s closest residential window Colville Place	51.8	49.9
		Just Dim T kitchen extract	o/s rear window of No. 15 Colville Place	50.3	49.9
		fan at No. 4 speed			
			o/s closest residential window Colville Place	49.6	49.1
		Just Dim T kitchen extract	o/s rear window of No. 15 Colville Place	50.4	50.1
		fan at No. 3 speed			
			o/s closest residential window Colville Place	50.5	48.7
		Just Dim T kitchen extract	o/s rear window of No. 15 Colville Place	51.1	50.6
		fan at No. 2 speed			
			o/s closest residential window Colville Place	51.8	50.0
		Just kitchen Supply fan	o/s rear window of No. 15 Colville Place	48.7	48.3
			o/s closest residential window Colville Place	49.4	47.8
		Both kitchen extract (Speed	o/s rear window of No. 15 Colville Place	50.7	50.1
		No. 3) and supply fan			
			o/s closest residential window Colville Place	49.9	49.4
		Daikin Condenser unit only	o/s rear window of No. 15 Colville Place	49.6	47.9
			o/s closest residential window Colville Place	48.5	48.0
		Wall mounted radiator fan	o/s rear window of No. 15 Colville Place	49.9	48.4
		for chiller cabinet			
			o/s closest residential window Colville Place	50.5	48.3
	00,35	All off (b/g)	o/s rear window of No. 15 Colville Place	48.4	47.7
			o/s closest residential window Colville Place	48.1	46.6
	00,45	All Dim T off but condenser		50.5	50.1
		unit at 17 Colville Place			
		running			
		Meter Calibration		113.7	

Appendix 2



Environ Technologies Ltd Regus House, 1010 Cambourne Business Park Cambourne, Cambridgeshire, UK CB3 60P Tel: +44 (0)870 383 3344 Fax: +44 (0)1223 598001 www.environ.co.uk

environmodula 1.1.25AC Technical Information (November 2006)

Noise Measurement Information:

Test: Environ Modula Acoustic Enclosure—1650mm W x 1150mm D x 11800mm H

Test Standard:

ISO 717/1 Acoustics - Rating of Sound Insulation in Buildings and of Building Elements - Part 1: Airborne Sound Insulation

Sound Level Measuring Equipment:

CEL 593 C1R Precision Sound Analyser - Type 1 CEL 284/2 Acoustic Calibrator Type 1 JBL Loudspeaker driven by CEL White Noise Source

Transmission Loss Data:

		Octave Freq	uency in Hert	z (dB ref 2 x	10 ⁻⁵ Pascal's)		
63	125	250	500	١K	2K	4K	8K
12	13	20	29	36	37	39	39
			Sum	mary			

Support Information:

Monitoring was carried out using the BS3740 technique, insofar as measurements were taken in each quadrant and the results averaged. Internal Test Room: 6m W x 12m L x 4m H. Background noise in the semi-reverberant test room was such as not to interfere with the practical measurements

ww.environ.co.uk

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----- Original Message -----
>
      From: Scott McGavin
>
      Sent: 04/12/2007 12:41 PM
>
>
      To: Anthony Beal
>
      Subject: Re: Fw: Acoustic Enclosures
>
> Anthony
>
> We have had no reported issues with the Frogbox product, the
Warranty
> of the product is not affected y it's use. Frogbox are ultimately
> responsible for any operational problems which occur due to the use
of
> their
enclosure.
>
> Scott McGavin
> UK Application and Engineering Manager
> DAIKIN AIRCONDITIONING UK LTD
> Tel 01932 879255
> Mob 07810 502826
> www.daikin.co.uk
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Nikki,

I have left answer phone messages with Lee Casey last week and also today has I would like to try and resolve his on going queries directly, however I have not been able to talk with him and hence this email.

I set out the following in an attempt to resolve Lee's queries;

1). The performance of the acoustic screen has been estimated using the geometric path difference (see Boatman's dr'g 5964/2 Rev B) and using Maekewa's "Noise Reduction by screens" published in 1965. The minimum attenuation given by the acoustic screen, when view from the high level windows, is 9 dB at 125 Hz. Taking the worse case of all the plant noise emanating from the kitchen extract fan and all of it at 125 Hz then the attenuation given by Maekewa is 9 dB, which is higher than the 5 dB required and therefore is sufficient.

2). The Daikin (unattenuated noise levels are stated on the Environ data sheet) however for clarity I enclose the information produced by Daikin themselves as well as Environ.

The table below shows the predicted noise level of the three un-attenuated Daikin Units at the upper rear windows of the house closest to Charlotte screen on Colville Place (apprx' 10m from the plant). In my report I referred to the nearest sensitive window being at 5m from the plant however this is in effect too pessimistic and scaling from Boatmans drawing the distance is closer to 10m.

	SPL at 1m	Sound	Distance to	path	screening	distance	Upper
Roof Plant Noise Levels		Power Level	nearest receptor	difference	attenuation	attenuation	window Colville
No Environ Boxes			m	m	dB		Place dBA
Daikin RZQ125	52	60	10	0	5	28	27
Daikin RZQ125	52	60	10	0.1	9	28	23
Daikin R XS60	49	57	10	0	5	28	24
Overall							30
Façade correction							3

Corrected overall SPL

This shows that without the benefit of the Environ boxes Daikin max' noise levels will only be 32 dBA and therefore it should be seen that when the Environ boxes are fitted the noise level at the nearest sensitive façade will be at least 10 dB below the design criterion of 40 dBA.

3).The level of attenuation that the proposed acoustic screen will provide, for the kitchen extract fan, was set out in my report Section 5, both the location of the nearest "sensitive overlooking window", the geometric path difference (see attached drawing) and the attenuation provided by the screen have been set out in Section 5 of my report revised on 17th April 2007. The Specific noise from the Daikin equipment is address in para 2 above.

I would hope that the foregoing will provide the additional information required by Mr Casey and would trust that if he has more queries he would contact me directly as clearly these matters need to be resolved before the planning application can be determined.

Best regards,

Peter Ashford



1.2 Heat Pump

230V, 50Hz

and the second	Indoor Units		FLXS50BVMB				
Model	O Marcall Str	1.1.2 C 1.1.	RXS	Heating			
and a state	Outdoor Units		Cooling	(1/00.75)			
and the second second		kW	4.9 (0.9-5.3)	6.1 (0.8×7.3)			
Capacity		Btu'h	16,730 (3,070~18,090)	20,830 (3,070~25,610)			
Rated (MinMa	x.)	kcal/h	4,210 (770-4,560)	5,250 (770~6,450)			
Moisture Domo	al	L/h	2.9	-			
Punning Current	(Batad)	A	7.6	8.0			
Hunning Curren	tion	-	4 700 (450 4 050)	1.820 (310-3.540)			
Rated (MinMi	X.)	W	1,720 (450~1,850)				
Power Factor		%	98.4	98.9			
COP		WW	2.85	3.35			
	Liquid	mm		¢6.4			
Piping	Gas	mm		12.7			
Connections	Drain	mm	¢18.0				
Heat Inc. Inf.	Ladin		Both Liquid	and Gas Pipes			
meat insulation	and the second second	Concession Management	FLXS	50BVMB			
Indoor Unit	A DESCRIPTION OF DESCRIPTION OF	Contraction of the second	Alm	and White			
Front Panel Co	or		41.4 (40%)	12.1 (427)			
	- and the second se	H	11,4 (402)	9.8 (346)			
Air Flow Bate	m²/min	M	10.0 (353)	7.5 (265)			
An Flow Haid	(cfm)	L	8.5 (300)	6.9 (240)			
		SL	7.5 (265)	0.0 (240)			
	Туре		Sire	occo Fan			
Fan	Motor Output	W		34			
1943B	Speed	Steps	5 Steps, 5	Silent and Auto			
Air Direction Or	loutrol		Right, Left, Hori	zontal and Downward			
Air Filter		P	Removable / Washable / Mildew Proof				
Bunning Curre	nt (Raled)	A	0.45	0.45			
Power Consum	otion (Bated)	W	96	96			
Power Factor	the second second	%	92.8 92.8				
Temperature C	loated		Microcor	nputer Control			
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Daniensions (H		mm	200	1 100×566			
Fackaged Dim	ensions (nxwxD)	ha	2004	17			
weight		ng		24			
Gross Weight	L	NG					
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Sound Douror	H	ARb	63	32			
Outdoor Helt	10	UUM	DY4	SOBVMB			
Casing Calc	and the second second	ALC: NO DE LE COM	nos lut	White			
Casing Color	1.		LinemationIII.	Cooled Suine Tune			
-	Type		nermetically	Coolury Coolur			
Compressor	Model	1	21	6.200			
	Motor Output	W		1,500			
Befrigerant Of	Model		F	VCBUK			
in a start of the	Charge	L		0.65			
Refrigerant	Model			R410A			
rienngeranit	Charge	kg	and the second second second second second	1.20			
Air Flow Rate	m?/min	C. C	47.7/44.1	44.1/44.1			
(H/L)	dm		1,684/1,557	1,557/1,557			
	Type		P	ropeler			
Fan	Motor Output	W		53			
Bunning Curre	nt (Bated)	A	7.20	7.60			
Power Coneur	notion (Rated)	W	1.624	1.724			
Power Eactor	about francos	9/	98.0	98.6			
Starting Curro	at	A	00.0	76			
Dimensions //	LAMA DA	-	702	0825-2300			
Dimensions (F		mm	/30				
Packaged Din	ensions (HxWxD)	mm	/84	x900x390			
Weight		kg	interest and the second second second	49			
Gross Weight	and the second sec	kg	Contraction of the second second second	53			
Operation	н	dBA	47	48			
Sound Power	н	dBA	63	FA			
Drawing Min	10	UDA	00	acentro			
Litawing No.			31X40826				

Notes:

	MAX.	interunit	nining	length: 30m	
_	144.9.1	a store de sta	Sector 138	ten dan te entre	
	MAX	intenuit	height	difference: 20m	

		and the second se
Cooling	Heating	Piping Length
Indoor ; 27°CDB/19°CWB Outdoor ; 35°CDB/24°CWB	Indoor ; 20°CDB Outdoor ; 7°CDB/6°CWB	7.5m

Conversion Formulae kcal/h=kWx860 Btu/h=kWx3414 cfm=m³/mirx35.3

2.2 RZQS71, 100 and 125 (single phase)

Technical

The table below contains the technical specifications.

sp	ecif	icat	ions
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Specification		RZQS7187V3B	RZQS100B7V3B	RZQ512587V38	
Casing	Colour	100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	Ivory white	and a state of the	
Cooning	Material		Painted galvanized steel plat	e	
the state of the s	Packing Height	RZQS7187V3B RZQS10957V3B RZQS12 Nory while Peinted galvanized steel plate 900 mm 900 mm 420 mm 420 mm 1 770 mm 1348 900 mm 320 mm 320 mm 68 kg 100 900 mm 1 770 mm 1348 900 mm 320 mm 141 0 68 kg 100 1 2 1.40 mm 2 1.40 mm 51.13 0.641 m² 1.13 64 0 1.13 64 0 1.13 64 0 1.13 64 0 1.13 64 0 1.13 64 0 1.13 64 1 2 1.13 2 Anti-consolar treatment (PE) 1.13 1 2 1.2 54.5 m²lmin 55.8 m²lmin 100.0 m 1 2 1.2 <t< td=""><td>1475 mm</td></t<>	1475 mm		
	Colour Material Packing Height Packing Depth Unit Height Unit Width Unit Width Unit Oppth Machine weight Gross weight Length Nr. of axws Fin pitch Nr. of stages Empty tubeplate hole Tube type Fin treatment Typo Discharge direction Cuantity Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor quantity Fan motor quantity Fan motor speed (nominal at 230 V) nooling Motor speed (nominal at 230 V) nooling Motor speed (nominal at 230 V) heating Motor routput Motor routput mak. <t< td=""><td></td><td>980 mm</td><td></td></t<>		980 mm		
Dimensions	Packing Depth	RZQS71B7V3B leight 900 mm Vidin 900 mm vidin 900 mm reph 770 mm t 770 mm t 72 kg s 34 oplate 34 oplate hole 34 oplate hole 34 oplate hole 34 oplate hole 1 es 34 oplate hole 1 ent An direction 1 e (nominal at 230 V) cooling 54.5 m²min guantity 1 model 1 d(nominal at 230 V) heating 48.1 m²min d(nominal at 230 V) heating 816 rpm d(nominal at 230 V) heating 715 rpm of 2YC838XD uit 1800 W ng method	420 mm		
Contraction of Contraction	ation tion Colour Material Packing Height Packing Width Packing Depth Durit Height Unit Height Unit Height Unit Width Unit Depth Amonine weight Coross weight Length Nr. of nows Fin pitch Nr. of nows Fin pitch Nr. of stages Face area Nr. of stages Face area Nr. of stages Face area Nr. of stages Fin treatment Type Discharge direction Couentby Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor quantBy Fan motor quantBy Fan motor model Motor speed (nominal at 230 V) heating Fan motor dupt Motor speed (nominal at 230 V) heating Fan motor cuput Motor speed (nominal at 230 V) heating Motor speed (nominal at 230 V) heating Motor speed (nominal at 230 V) heating Fan motor cuput Motor cu	770) mm	1345 mm	
	Unit Width		900 mm	The second second	
	Unit Depth	100 A 100	320 mm		
Malaht	Machine weight	65	lkg	108 km	
weight	Material Packing Height Packing Width Packing Depth Unit Height Unit Height Unit Width Unit Depth Machine weight Gross weight Length Nr. of sows Fin pitch Nr. of sases Face area Nr. of stages Empty tubeplate hole Tube type Fin type Fin treatment Type Discharge direction Quantity Air flow rate (nominal at 230 V) cooling Motor speed (nominal at 230 V) heating Fan motor quantity Fan motor model Motor speed (nominal at 230 V) heating Motor Drive Quantity Motor model Motor cutput Motor routput Motor routput Motor routput Motor cutput Mot	72	ka	111 kg	
Contraction of the	Length		857 mm		
	Nr. of rows		2		
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			3	1 5	
and the provide		0.64	i m²	5 I I I I I	
ficat exchanger	Nr. of stages	0.04	14	1.131 m.	
	Empty tubeplate hole		0	60	
	Tube type		LL Veeres		
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ecification sing Colour Meterial Activation Meterial Packing Height Packing Depth Packing Depth Packing Depth Unit Weight Unit Weight Unit Weight Unit Weight Unit Weight Unit Weight Interpretect Inter		Anti complete land anti (DE)			
and the second second	Тура		Anti-contosion treatment (PE)		
	Fin treatment Type Discharge direction Quantity Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor quantity		Propeater		
In the second se		-			
	Air flow rate (nominal at 230 V) cooling	54.5 million cr. o		2	
	49.4 milimin	55,8 m/min	nim\fm 0.99		
	Fan motor quantity	40.1 mamin	55.8 m/imin	100.0 m\/min	
an	Fan motor model			2	
	Motor speed (nominal at 220.10 Mr. of stars		KFD-325-70-8A		
	Motor speed (nominal at 230 V) Nr. of Steps		8		
	Motor speed (nominal at 230 V) cooling	818 rpm	850 rpm	782 rpm	
	Motor speed (nominal at 230 V) heating	715 rpm	850 rpm	767 rpm	
	Make Data		70 W		
	Ourselite		direct drive		
	Matasanda		1		
	tion Colour Colour Meterial Colour Meterial Packing Height Packing Width Packing Width Packing Dopth Unit Height Unit Wetth Unit Wetth Unit Dopth Coross weight Gross weight Length Nr. of sows Fin pitch Nr. of souse Emoty tuboptate hole Tube type Fin type Fin type Fin type Discharge direction Quantity Air flow rate (nominal at 230 V) eating Fan motor model Motor output Motor speed (nominal at 230 V) heating Motor output Motor reded Motor output Motor speed (nominal at 230 V) heating Fan motor model Motor speed (nominal at 230 V) heating Fan motor model Motor output Motor reded Motor output Motor reded Motor output Motor reded Motor output Motor starting method Motor clankcese heater Cooling sound pressure (nominal) Cooling sound pressure (nominal) Fuesting maix. Cooling sound pressure (notor low Fuesting Notor Countput Notor starting method Notor Clankcese heater Cooling sound pressure (nominal) Kooling sound pressure Fuesting maix. Cooling sound pressure (nominal) Kooling sound pressure Control Nr. of circults	2708	38XD	JT100G-VD	
ompressor	Molor type	Hermetically sealed	swing compressor	Hermetically sealed scro	
an annanan a	Colour Material Packing Height Packing Depth Packing Depth Unit Height Unit Width Machine weight Gross weight Length Nr. of stages Empty tubeplate hole Tube type Fin treatment Type Discharge direction Quantity Ar flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor model Motor speed (nominal at 230 V) heating Motor speed (nominal at 230 V) heating Motor output Motor output Motor cutput Motor cutput Motor cutput Motor cutput Motor cutput Motor cutput <	1400	w	compressor	
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	Material Packing Height Packing Depth Unit Height Unit Width Unit Depth ght Machine weight ges Empth Nr. of rows Fin pltch Nr. of passes Face area Nr. of stages Empth blobplate hela Tube type Fin type Fin type Discharge direction Quantity Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor quantity Fan motor routed Motor speed (nominal at 230 V) heating Motor output Motor routput Motor routput Motor		inverser unven		
	Cooling min.		5.010 00	33 W	
	sor Unit Vatur Unit Depth Unit Depth Machine weight Gross weight Length Nr. of nows Fin pitch Nr. of passes Face area Nr. of stages Empty tubeplate hole Tube type Fin type Fin type Fin treatment Type Discharge direction Quantity Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor quantity Fan motor rudel Motor speed (nominal at 230 V) heating Motor cutput Motor cu		-5.0 C DB		
Type Discharge direction Quantity Air flow rate (nominal at 230 V) cooling Air flow rate (nominal at 230 V) heating Fan motor quantity Fan motor quantity Fan motor quantity Motor speed (nominal at 230 V) Nr. of steps Motor speed (nominal at 230 V) heating Motor speed (nominal at 230 V) heating Motor speed (nominal at 230 V) heating Motor output Motor output Motor output Motor routput Motor routput Motor routput Motor output		46.0 % 08			
	Heating max.		-10.0°C WB		
	Cooling sound power	65.0 dBA	15.5°C WB		
ound level (nominal)	Cooling sound pressure	40.0 404	67.0 dBA	67.0 dBA	
	Heating sound pressure	49.0 08A	51.0 dBA	51.0 dBA	
ound level (night quiet)	Cooling sound pressure	51.0 db4	55.0 dBA	53.0 dBA	
	Type	47.0 0BA	49.1	D BA	
	Charpe		R-410A		
ofrigerant	Control	2.80	kg	4.30 kg	
	Nr. of circuits		Expansion valve (electronic type)	
Contraction of the	Nr. of circuits		1		



Environ Technologies Ltd Regus House, 1010 Cambourne Business Park Cambourne, Cambridgeshire, UK CB3 6DP Tel: +44 (0)870 383 3344 Fax: +44 (0)1223 598001 www.environ.co.uk

environmodula 1.1.25AC Technical Information (November 2006)

DYNAMIC ACOUSTIC TECHNOLOGY

Noise Measurement Information:

Test: Environ Modula Acoustic Enclosure—1650mm W x 1150mm D x 11800mm H

Test Standard:

ISO 717/1 Acoustics - Rating of Sound Insulation in Buildings and of Building Elements - Part 1: Airborne Sound Insulation

Sound Level Measuring Equipment:

CEL 593 C1R Precision Sound Analyser - Type 1 CEL 284/2 Acoustic Calibrator Type 1 JBL Loudspeaker driven by CEL White Noise Source

Transmission Loss Data:

Transmission Loss—Environ Modula 1.1.25AC Octave Frequency in Hertz (dB ref 2 x 10 ⁻⁵ Pascal's)											
12	13	20	29	36	37	39	39				
	Traosmi	ssion Loss F	Sum	mary D Overall Re	duction of :	as dB(A)					

Support Information:

Monitoring was carried out using the BS3740 technique, insofar as measurements were taken in each quadrant and the results averaged. Internal Test Room: 6m W x 12m L x 4m H. Background noise in the semi-reverberant test room was such as not to interfere with the practical measurements



Tel: 0870 383 3344 www.environ.co.uk

SELECTION MATRIX

environmodula 1.1.25AC

Acoustic enclosures for Small units with Medium Air Flow

(Use 'Tab' Key to Navigate)

16 January 2007

CUSTOMER:	Sector Constants	SITE / LOCATION / RE	FERENCE						
Bostman AC		Charlotte Street							
MAKE		MODEL:		ARIN	AIR OUT				
Daikin		RZQ12588V3		H	H				
	Insert Equip	oment Make, Model, Dim	ensions, Airflew Orien	tation & dB(A)	Provide and the second second				
WIDTH (MM)	DEPTH (MM)	DEPTH (MM) HEIGHT (MM) AIRFL		DISTANCE (N)	SPL HRIAL				
900	380	1345	1.66	1	52				
	UNIT TO BE ENCLOS	SEO ANTI ANTI ANTI ANTI		ENCLOSURE DETAIL	and the second				
1050	430	1545	1650	1030	1595				
WIDTH (MM)	DEPTH (MM)	HEIGHT IMM	WIDTH (MM)	DEPTH (MM)	HEICHT (MM)				
1.00	1.0	52	1.66	1.0	27				
AND LOW IM S 7	DISTANCE (M)	SPL (IE(A)	MRI LOW (M's')	DISTANCE (M)	SPI. OB(A)				
	INLET AIRWAYS	a and a second	Service and the service of the servi	DESIGN CRITERIA	CONTRACTOR OF STREET, S				
250	1620	1	OK	OK	OK				
WIDTH (RM)	HEIGHT (MM)	HQ.	UNIT SIZE	OUTLET	INLET				
1000	OUTLET AIRWAYS	5	A	RELOW INFORMATIO	N				
1620	250	1	20	4.1	4.1				
WIDTH (MM)	HEICHT (MM)	NO	PD (NM ²)	OUTLET (MS ¹)	INLET (NS")				

elect Inlet & Outlet Duct Sizes to Ensure Airflows are kept Below 6.0m/s

QUOTE INFORMATION	WERTH (MM)	DEPTH (MM)	HEIGHT (MM)
INLET AIRWAY	250		1620
OUTLET AIRWAY	1620		250
EXTERNAL SIZE (W. D. H)	1650	1030	1645
NOISE LEVEL & 1 M (SOUND PRESSURE)	27	SPL dB(A)	

ENCLOSURE DETAILS



The Environ Modula, Integra and Lite acoustic designs are protected under patent The information contained in the Slection matrix is Confidential and shall not be disclosed or used for any unauthorised purposes

Nicola Kim Fenner

From: Peter Ashford [peter@iansharland.co.uk]

Sent: 10 May 2007 13:59

To: 'Casey, Lee'

Cc: Nicola Kim Fenner

Subject: Dim T Charlotte Street, London - Plant Noise Levels

Lee,

Following our telephone conversation yesterday I have prepared two tables which show the likely plant noise levels at the third floor window of No. 13 Colville Place as well outside the rear living room window of 15 Colville Place along with the data used for the calculations;

Source Data					
	dB Laeq	location 15	distance	estimated	
		Colville		SPL	
		Place	m	at 1m	
kitchen extract fan system noise	45		11	68	measured 24th March 2007
estimated contribution from	45		11	68	
fan case breakout	44		11	67	
stack break out & terminal noise	36		11	59	
kitchen supply fan noise	35		11	58	measured 24th March 2007
refrigeration radiator Daikin RZQ125 with Environ	43		11	66	estimated value
Boxes Daikin RZQ125 with Environ	27				manufacturer's data
Boxes Daikin R XS60 with Environ	27				manufacturer's data
Boxes	24				manufacturer's data

Overall Mitigated Plant Noise outside the rear ground floor living room window at 15 Colville Place

	SPL at		Distance				
	1m	Sound	to	path	screening	distance	living
Roof Plant Noise Levels		Power	nearest	difference	attenuation	g distance living room 15 Colville Place dBA 28 2 28 -2 28 -2 28 -1 28 34 30 35 30 29 27 26 38	
		Level	receptor		(at 500Hz)		Colville
with Environ Boxes			m	m	dB		Place dBA
Daikin RZQ125 with Environ							
Boxes	27	35	10	0.00	5	28	2
Daikin RZQ125 with Environ							
Boxes	27	35	10	0.10	9	28	-2
Daikin R XS60 with Environ			4.0		_		
Boxes	24	32	10	0.00	5	28	-1
kitchen extract fan case b/o	67	75	10	0.23	11	28	34
kitchen extract stack/terminal	59	67	12	0.00	0	30	35
kitchen supply fan	58	66	12	0.00	5	30	29
refrigeration radiator	66	74	9	1.20	18	27	26
Overall							38
Design Criteria							40

-

Overall Mitigated Plant Noise outside the rear third floor living room window at 13 Colville Place
--

Roof Plant Noise Levels	SPL at 1m	Sound Power Level	Distance to nearest receptor	path difference	screening attenuation (at 500Hz)	distance attenuation	Upper window 13 Colville
with Environ Boxes					uБ		dBA
Daikin RZQ125 with Environ							
Boxes Daikin RZQ125 with Environ	27	35	10	0.00	5	28	2
Boxes Daikin R XS60 with Environ	27	35	10	0.10	9	28	-2
Boxes	24	32	10	0.00	5	28	-1
kitchen extract fan case b/o	67	75	10	0.23	11	28	34
kitchen extract stack/terminal	59	67	8	0.00	0	26	38
kitchen supply fan	58	66	12	0.10	9	30	25
refrigeration radiator	66	74	9	1.10	18	27	26
Overall							40
Design Criteria							40
Attenuation Required							0

You will see from this that I have stated the screening effect for each item of plant for both receiver points and I have also divided the noise contribution for the kitchen extract fan into fan case breakout noise (which will be shielded by the proposed acoustic screen) as well as that emanating from the ductwork rise/terminal noise. The split between the two I have had to guessimated as it is not possible to measure them separately.

I hope this will provide the additional information you require but if there is anything further please do not hesitate to call.

Yours sincerely,

Peter Ashford Ian Sharland Ltd 01392 469090 Dear Peter,

Thank you for the table detailing the predicted plant noise level result in your email 10th May 2009 below. I note that only the 500Hz frequency is detailed in the table.

However, for clarity I would be grateful if you could provide the an Excel spreadsheet calculations at the various octave band frequencies e.g. 63 to 8KHz as well as the relevant equations and any assumption made in arriving at the noise prediction at the respective noise sensitive facades.

Please note that I will be away from Friday 18 May and back in the office on Monday and Tuesday before going on leave.

Regards

Lee

Lee,

I attached spreadsheet calculation which sets out the octave band data, screening losses etc for each of the plant noise sources for two positions, firstly o/s the rear sitting room window of 15 Colville Place and the second at high level (3rd floor) of what I believe to be 13 Colville Place, the building closest to Charlotte Street. I hope this now going you the detail you require to consider the Planning Application. I am in the office for the rest of the afternoon but out of the office all day tomorrow but I can be contracted on my mobile 07966 234148.

Best regards,

Peter Ashford Ian Sharland Ltd 01392 469090

Ian Sharland Ltd

 Spread Sheet Ref:
 3232/pja/SS1

 Project:
 Dim T, 32 Cha

 Date:
 21/05/2007

 Subject:
 Calculation of at the G cf fir

3232/pja/SS1 Dim T, 32 Charlotte Street, London 21/05/2007 Calculation of Attenuated Plant Noise (using Environ Boxes & Plant Acoustic Screen) at the Grd fir living room room window of 15 Colville Place

Saura Data						Centre frequency Hz								
Source Data	dB Laeq at 15 Colville Place	distance (source to receiver)	estimated SPL		dBA @1m	Hz	63	125	250	500	1K	2K	4K	8K
kitchen extract fan system noise o/a	45	m 11	at 1m 63	measured 24th March 2007	63		70	66	61	60	59	54	49	41
fan case breakout stack break out & terminal noise	44 36	11 11	62 54		62 54		69 61	65 57	60 52	59 51	58 50	53 45	48 40	40 32
kitchen supply fan noise refrigeration radiator Daikin RZ0125 with Environ Boxes Daikin RZ0125 with Environ Boxes Daikin R XS60 with Environ Boxes	35 43	11 9	53 60 52 52 49	measured 24th March 2007 estimated value manufacturer's data manufacturer's data manufacturer's data	53 60 52 52 49		55 52 55 55 52	60 55 60 60 57	53 56 53 53 50	52 57 46 46 43	46 56 45 45 42	41 53 43 43 40	35 44 41 41 38	33 33 37 37 34
Environmodule 1.1.25AC acoustic box	TL dB						12	13	20	29	36	37	39	39
Overall Mitigated Plant Noise outsid	le the rear Gro	I floor living re	oom window	w at 15 Colville Place										
No. 1 Daikin RZQ125 SPL at 1m Environ Boxes TL dB Attenuated Daikin RZQ125 at 1m					52 32		55 12 43	60 13 47	53 20 33	46 29 17	45 36 9	43 37 6	41 39 2	37 39 -2
distance loss to	10	m					20	20	20	20	20	20	20	20
screening lost (path difference)	0.00	m					5	5	5	5	5	5	5	5
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Attenuated Daikin RZQ125 at façade		dB			10		21	25	11	-6	-14	-17	-21	-25
No. 2 Daikin RZQ125 SPL at 1m Environ Boxes TL dB Attenuated Daikin RZQ125 at 1m					52 32		55 12 43	60 13 47	53 20 33	46 29 17	45 36 9	43 37 6	41 39 2	37 39 -2
distance loss to	10	m					20	20	20	20	20	20	20	20
screening lost (path difference)	0.10	m					6	7	8	9	11	13	16	18
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Attenuated Daikin RZQ125 at façade		dB			7		20	23	8	-10	-20	-25	-32	-38
No. 3 Daikin RXS60 SPL at 1m Environ Boxes TL dB Attenuated Daikin RZQ125 at 1m					49 29		52 12 40	57 13 44	50 20 30	43 29 14	42 36 6	40 37 3	38 39 -1	34 39 -5
distance loss to	10	m					20	20	20	20	20	20	20	20
screening lost (path difference)	0.00	m					5	5	5	5	5	5	5	5
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Attenuated Daikin RXS60 at façade		dB			7		18	22	8	-9	-17	-20	-24	-28
kitchen extract fan case b/o at 1m					62		69	65	60	59	58	53	48	40
distance loss to	10	m					20	20	20	20	20	20	20	20
screening lost (path difference)	0.23	m					8	9	10	11	14	17	19	21
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
kitchen extract fan case b/o at façade		dB			32		44	39	33	31	27	19	12	2
Kitchen stack break out & terminal noi	se				54		61	57	52	51	50	45	40	32
distance loss to	12	m					22	22	22	22	22	22	22	22
screening lost (path difference)	0.00	m					0	0	0	0	0	0	0	0
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Kitchen stack break out & terminal not	ise at façade	dB			35		42	38	33	32	31	26	21	13
Kitchen supply fan at 1m					53		55	60	53	52	46	41	35	33
distance loss to	12	m					22	22	22	22	22	22	22	22
screening lost (path difference)	0.00	m					5	5	5	5	5	5	5	5
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Kitchen supply fan at facade		dB			29		31	36	29	28	22	17	11	9
refrigeration radiator at 1m					60		52	55	56	57	56	53	44	33
distance loss to	9	m					19	19	19	19	19	19	19	19
screening lost (path difference)	1.20	m					13	14	17	19	21	25	28	31
Façade reflection correction		dB					2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
refrigeration radiator at façade		dB			23		22	24	22	21	18	11	-1	-15
Summary of individual plant noise leve	els													
Attenuated Daikin RZO125 at façade Attenuated Daikin RZO125 at façade Attenuated Daikin RXS60 at façade kitchen extract fan case b/o at façade Kitchen stack break out & terminal noi Kitchen supply fan at facade	ise at façade				10 7 32 35 29		21 20 18 44 42 31	25 23 22 39 38 36	11 8 33 33 29	-6 -10 -9 31 32 28	-14 -20 -17 27 31 22	-17 -25 -20 19 26 17	-21 -32 -24 12 21 11	-25 -38 -28 2 13 9
rerrigeration radiator at façade					23		22	24	22	21	18	11	-1	-15
Overall Plant Noise Level at rear fag	ade of 15 Col	dPLA	ouna floor)		38		46	43	37	35	33	27	22	15
Additional attenuation Required		dB LARD			40 0									
		20			9									

Dear Peter,

Further to your email dated 21st May 2007 and my telephone call to you this afternoon, I confirm that I have had the opportunity to consider the Excel spread sheet you provided detailing the overall plant noise level calculations and I confirm that it appears satisfactory in it's prediction of noise at the nearest noise sensitive premises.

Therefore, I will recommend to the Planning Development Control Officer to validate the application in order to progress the application.

I trust this proves useful. Please contact me if you have any further queries.

Regards

Lee H Casey