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Proposed Roof Mounted Air Condensers

Flat 35, Southbury Loudoun Road, NW8

Environmental Noise Assessment

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1. INTRODUCTION

1.1 Acoustics Plus Ltd (APL) is an independent firm of multi-disciplinary acoustic engineers. APL is engaged by both private and public sector clients. APL is a registered member of The Association of Noise Consultants (ANC) and The Institute of Acoustics (IOA).

1.2 APL has been instructed by the architect, Ryan Von Rubben, to consider and advise upon the noise implications of a proposal to install an air conditioning system, part of which will consist of two outdoor air condenser units.

1.3 The proposed outdoor condenser units will be mounted on the flat roof of the property.

1.4 It is understood that the Local Planning Authority (LPA) require further information on noise levels from the proposed installation in order to fully assess the potential noise impact upon the surrounding neighbourhood.

1.5 This report provides the response to the LPA, on behalf of the Applicant.

2. BASELINE SITUATION

2.1 The Application Site (the "site") is situated at Flat 35, Southbury, 144 Loudoun Road, London, NW8 0RY.

2.2 It is understood that the proposal relates to residential use with associated comfort cooling. The area surrounding the site is predominantly residential. There is residential accommodation on the top floor of the site, one apartment of which is the application site. The site and the surrounding area can be seen in Figures 1 to 6. The proposed location of the condenser units is at flat roof level adjacent to a glass roof light belonging to the application site.

2.3 The nearest noise sensitive property to the proposed location of the condensers is located directly below the site and has windows on the western flank wall. This window is approximately 4m from the edge of the flat roof. The condenser units are located a further 4.5m from the edge of the flat roof.

2.4 Information in regard of the noise levels from the proposed air condenser units has been provided by Toshiba HVAC (copy of the information is provided in Appendix A). The units are itemised below:

(a) 2No. Toshiba MCY-MAP0401HT

3. NOISE OUTLINE

3.1 In order to produce an environmental noise assessment, consideration must be given to the prevailing background noise in the locality of the proposed installation. Measurements of background noise were obtained over a 24 hour period on a balcony adjacent to the nearest noise sensitive façade.

3.2 The particulars of the measurement exercise are recorded below:

Date:	15th – 16th February 2007
Start Time:	13:43 hrs
Location:	balcony, Flat35, 144 Loudoun Road, NW8
Weather:	No wind, no rain

3.3 The measurements carried out during the exercise are recorded below:

L_{90} percentile level (dB re 20μPa) at 15 minute intervals

3.4 The measurements obtained during the exercise are presented in Appendix B.

3.5 For the sake of clarity, the lowest measured background noise over the anticipated operational hours of the condenser units is highlighted. As the units will be utilised for climate control on a demand basis, it is anticipated that the operational hours will be over a 24hour period.

3.6 Information regarding the noise levels not to be exceeded by the proposed installation was provided by the LPA (London Borough of Camden).

"The Council considers that for new developments involving noisy plant/equipment or other uses, design measures should be taken to ensure that noise levels predicted at a point 1 metre external to sensitive facades are at least 5dB(A) less than the existing background measurement (LA90) when the equipment is in operation. Where it is anticipated that equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses in the noise (bangs, clicks, clatters, thumps), special attention should be given to reducing the noise levels from plant and equipment at any sensitive facade to at least 10dB(A) below the LA90 level."

3.7 The noise levels of the roof mounted units was established from the information provided (Appendix A) as detailed.

(a) 2No. Toshiba MCY-MAP0401HT @ 50dBA @ 1m (per unit)

4. EQUIPMENT

4.1 All measurements were obtained using the following equipment:

- Svantek Svan 948 Type1
  Serial No. 6988
- Rion Calibrator Type NC-74 Class 1
  Serial No. 00410215

4.2 The relevant equipment carries full and current traceable calibration.

4.3 The equipment, where necessary, was calibrated prior to and after the measurements were carried out.

5. CALCULATIONS

5.1 In order to predict the noise impact of the proposed air conditioning system, consideration has been given to noise egress from the roof mounted condenser units.

5.2 The calculation exercise utilised information provided by Toshiba HVAC (copy of the information provided is in Appendix A).

5.3 The total attenuation was calculated by considering distance attenuation from the location of the condensers to the nearest noise sensitive façade. Given the proposed location of the condensers against a reflecting plane, a correction of +3 dB has been added to the calculated noise output of the condensers.

5.4 Noise leaving the condenser units was propagated to the nearest noise sensitive façade using point source propagation. A distance of eight and half metres (8.5m) was used for calculation purposes which was determined from scaled geometric plans. The final figure was adjusted by –8dB to reflect the elevated nature of the units and the fact that the noise sensitive façade would benefit from sound reduction through diffraction.

5.5 The calculation exercise provided the following results at a distance of 8.5m:

Source(s)	L_p dBA @ 8.5 metres
2No. Toshiba MCY-MAP0401HT	**29** [53-20Log_{10}(8.5)+3-8]

Table 1 – Results at 8.5m

5.6 In order to comply with the requirements of the LPA, any noise from the installation of two external air condenser units should not exceed a level of 37 dBA (5 dB below the lowest measured background noise over the anticipated operational hours of the condenser units) at the nearest noise sensitive façade.

6. CONCLUSION

6.1 The foregoing assessment indicates that the proposed installation will meet the requirements imposed by the LPA. Mitigation measures will not be required.

Figures

Figure 1

Figure 2

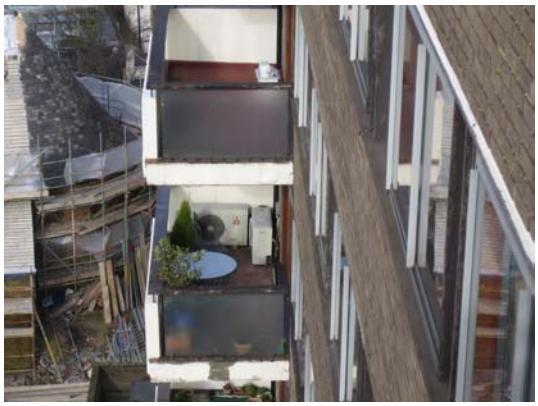

Figure 3

Figure 4

Figure 5

Figure 6

Appendix A

TOSHIBA

Mini SMMS - 2 Pipe Heat Pump Outdoor Units

Size (HP)	Model	Nominal Capacity (kW)		Running Current	Suggested Fuse Size	Dimensions (mm)			Weight	Sound Pressure Level (dBA)
		Cooling	Heating		230V / 50Hz / 1Ph	Width	Height	Depth	(kg)	
4	MCY-MAP0401HT	12.1	12.5	13.2A	20A	900	1340	320	117	50
5	MCY-MAP0501HT	14.0	16.0	18.3A	25A	900	1340	320	117	52
6	MCY-MAP0601HT	15.5	18.0	22.2A	32A	900	1340	320	117	53

SMMS - 2 Pipe Heat Pump Outdoor Units

Size (HP)	Model	Modules (HP)					Nominal Capacity (kW)		Running Current Per Phase	Suggested Fuse Size	Dimensions (mm)			Weight	Sound Pressure Level (dBA)
		5	6	8	10	12	Cooling	Heating		400V / 50Hz / 3Ph (TPNE)	Width	Height	Depth	(kg)	
5	MMY-MAP0501HT8	1					14.0	16.0	6.1A	1 x 16A	990	1800	750	228	55
6	MMY-MAP0601HT8		1				16.0	18.0	7.3A	1 x 16A	990	1800	750	228	56
8	MMY-MAP0801HT8			1			22.4	25.0	8.9A	1 x 16A	990	1800	750	258	57
10	MMY-MAP1001HT8				1		28.0	31.5	12.0A	1 x 20A	990	1800	750	258	58
12	MMY-MAP1201HT8					1	33.5	37.5	18.3A	1 x 25A	990	1800	750	258	59
14	MMY-MAP1401HT8		1	1			38.4	43.0	17.1A	2 x 16A	2000	1800	750	486	59.5
16	MMY-MAP1601HT8			2			45.0	50.0	18.7A	2 x 16A	2000	1800	750	516	60
18	MMY-MAP1801HT8			1	1		50.4	56.5	21.6A	1 x 16A & 1 x 20A	2000	1800	750	516	60.5
20	MMY-MAP2001HT8				2		56.0	63.0	24.8A	2 x 20A	2000	1800	750	516	61
22	MMY-MAP2201HT8		1	2			61.5	69.0	26.4A	3 x 16A	3010	1800	750	744	61.5
22	MMY-MAP2211HT8				1	1	61.5	69.0	31A	1 x 20A & 1 x 25A	2000	1800	750	516	61.5
24	MMY-MAP2401HT8			3			68.0	76.5	28.0A	3 x 16A	3010	1800	750	774	62
24	MMY-MAP2411HT8					2	68.0	76.5	38A	2 x 25A	2000	1800	750	516	62
26	MMY-MAP2601HT8			2	1		73.0	81.5	31.2A	2 x 16A & 1 x 20A	3010	1800	750	774	62
28	MMY-MAP2801HT8			1	2		78.5	88.0	34.0A	1 x 16A & 2 x 20A	3010	1800	750	774	62.5
30	MMY-MAP3001HT8				3		84.0	95.0	37.0A	3 x 20A	3010	1800	750	774	63
32	MMY-MAP3201HT8			4			90.0	100.0	37.4A	4 x 16A	4020	1800	750	1032	63
32	MMY-MAP3211HT8				2	1	90.0	100.0	43.1A	2 x 20A & 1 x 25A	3010	1800	750	774	63
34	MMY-MAP3401HT8			3	1		96.0	108.0	40.3A	3 x 16A & 1 x 20A	4020	1800	750	1032	63.5
34	MMY-MAP3411HT8				1	2	96.0	108.0	50.3A	1 x 20A & 2 x 25A	3010	1800	750	774	63.5
36	MMY-MAP3601HT8			2	2		101.0	113.0	43.5A	2 x 16A & 2 x 20A	4020	1800	750	1032	63.5
36	MMY-MAP3611HT8					3	101.0	113.0	57.1A	3 x 25A	3010	1800	750	774	64
38	MMY-MAP3801HT8			1	3		106.5	119.5	46.4A	1 x 16A & 3 x 20A	4020	1800	750	1032	64
40	MMY-MAP4001HT8				4		112.0	126.5	49.7A	4 x 20A	4020	1800	750	1032	64
42	MMY-MAP4201HT8				3	1	118.0	132.0	55.2A	3 x 20A & 1 x 25A	4020	1800	750	1032	64.5
44	MMY-MAP4401HT8				2	2	123.5	138.5	62.3A	2 x 20A & 2 x 25A	4020	1800	750	1032	64.5
46	MMY-MAP4601HT8				1	3	130.0	145.0	69.3A	1 x 20A & 3 x 25A	4020	1800	750	1032	65
48	MMY-MAP4801HT8					4	135.0	150.0	75.5A	4 x 25A	4020	1800	750	1032	65

Note: Outdoor units 14HP or greater require RBC-BT13E outdoor connection kits - number required is dependent upon model

SHRM - 3 Pipe Heat Recovery Outdoor Units

Size (HP)	Model	Modules			Nominal Capacity (kW)		Running Current Per Phase	Suggested Fuse Size	Dimensions (mm)			Weight	Sound Pressure Level (dBA)
		8	10	12	Cooling	Heating		400V / 50Hz / 3Ph (TPNE)	Width	Height	Depth	(kg)	
8	MMY-MAP0802FT8	1			22.4	25.0	9.6A	1 x 16A	990	1800	750	263	57
10	MMY-MAP1002FT8		1		28.0	31.5	13.4A	1 x 20A	990	1800	750	263	58
12	MMY-MAP1202FT8			1	33.5	35.5	19.9A	1 x 25A	990	1800	750	263	59
16	MMY-MAP1602FT8	2			45.0	50.0	19.9A	2 x 16A	2000	1800	750	526	60
18	MMY-MAP1802FT8	1	1		50.4	56.5	23.5A	1 x 16A & 1 x 20A	2000	1800	750	526	60.5
20	MMY-MAP2002FT8		2		56.0	63.0	27.0A	2 x 20A	2000	1800	750	526	61
24	MMY-MAP2402FT8	3			68.0	76.5	29.9A	3 x 16A	3010	1800	750	789	62
26	MMY-MAP2602FT8	2	1		73.0	81.5	33.4A	2 x 16A & 1 x 20A	3010	1800	750	789	62
28	MMY-MAP2802FT8	1	2		78.5	88.0	37.0A	1 x 16A & 2 x 20A	3010	1800	750	789	62.5
30	MMY-MAP3002FT8		3		84.0	95.0	40.6A	3 x 20A	3010	1800	750	789	63

Note: Outdoor units 16HP or greater require RBC-BT13FE outdoor connection kits - number required dependent upon model

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Appendix B

Background Noise Measurements

File	Date	Start	Filter	Detect	Time	units	Peak	Min	Max	Spl	Leq	L90
@APL001	15/02/2007	13:43'00	A	Fast	00:00'13	dB	83	53	62	55	56	54
@APL002	15/02/2007	13:43'16	A	Fast	00:15'00	dB	104	49	86	58	58	52
@APL003	15/02/2007	13:58'16	A	Fast	00:15'00	dB	88	48	74	54	56	51
@APL004	15/02/2007	14:13'16	A	Fast	00:15'00	dB	82	49	65	54	55	52
@APL005	15/02/2007	14:28'16	A	Fast	00:15'00	dB	84	51	69	57	56	53
@APL006	15/02/2007	14:43'16	A	Fast	00:15'00	dB	90	50	72	59	56	53
@APL007	15/02/2007	14:58'16	A	Fast	00:15'00	dB	90	50	72	56	56	53
@APL008	15/02/2007	15:13'16	A	Fast	00:15'00	dB	94	49	86	57	61	53
@APL009	15/02/2007	15:28'16	A	Fast	00:15'00	dB	91	49	81	55	57	53
@APL010	15/02/2007	15:43'16	A	Fast	00:15'00	dB	85	51	69	54	56	53
@APL011	15/02/2007	15:58'16	A	Fast	00:15'00	dB	91	49	73	58	56	53
@APL012	15/02/2007	16:13'16	A	Fast	00:15'00	dB	84	49	66	58	55	52
@APL013	15/02/2007	16:28'16	A	Fast	00:15'00	dB	90	49	69	53	55	52
@APL014	15/02/2007	16:43'16	A	Fast	00:15'00	dB	73	48	62	58	54	51
@APL015	15/02/2007	16:58'16	A	Fast	00:15'00	dB	79	50	69	53	55	52
@APL016	15/02/2007	17:13'16	A	Fast	00:15'00	dB	78	50	66	54	55	53
@APL017	15/02/2007	17:28'16	A	Fast	00:15'00	dB	77	50	66	57	55	52
@APL018	15/02/2007	17:43'16	A	Fast	00:15'00	dB	92	50	78	54	57	53
@APL019	15/02/2007	17:58'16	A	Fast	00:15'00	dB	75	50	63	56	55	53
@APL020	15/02/2007	18:13'16	A	Fast	00:15'00	dB	77	51	69	54	56	53
@APL021	15/02/2007	18:28'16	A	Fast	00:15'00	dB	74	50	63	57	55	53
@APL022	15/02/2007	18:43'16	A	Fast	00:15'00	dB	79	50	65	55	55	52
@APL023	15/02/2007	18:58'16	A	Fast	00:15'00	dB	80	51	69	55	55	53
@APL024	15/02/2007	19:13'16	A	Fast	00:15'00	dB	89	50	71	57	54	52
@APL025	15/02/2007	19:28'16	A	Fast	00:15'00	dB	74	50	63	54	55	52
@APL026	15/02/2007	19:43'16	A	Fast	00:15'00	dB	75	49	65	53	54	51
@APL027	15/02/2007	19:58'16	A	Fast	00:15'00	dB	81	50	69	55	55	51
@APL028	15/02/2007	20:13'16	A	Fast	00:15'00	dB	74	50	62	55	54	52
@APL029	15/02/2007	20:28'16	A	Fast	00:15'00	dB	79	48	66	54	54	50
@APL030	15/02/2007	20:43'16	A	Fast	00:15'00	dB	80	48	68	53	53	50
@APL031	15/02/2007	20:58'16	A	Fast	00:15'00	dB	71	48	60	56	53	50
@APL032	15/02/2007	21:13'16	A	Fast	00:15'00	dB	78	47	62	52	52	49
@APL033	15/02/2007	21:28'16	A	Fast	00:15'00	dB	72	47	59	52	52	49
@APL034	15/02/2007	21:43'16	A	Fast	00:15'00	dB	74	47	64	51	52	49
@APL035	15/02/2007	21:58'16	A	Fast	00:15'00	dB	71	47	60	58	52	49
@APL036	15/02/2007	22:13'16	A	Fast	00:15'00	dB	82	48	73	50	54	50
@APL037	15/02/2007	22:28'16	A	Fast	00:15'00	dB	71	47	61	53	52	49
@APL038	15/02/2007	22:43'16	A	Fast	00:15'00	dB	77	47	67	51	53	49
@APL039	15/02/2007	22:58'16	A	Fast	00:15'00	dB	78	47	68	53	53	49
@APL040	15/02/2007	23:13'16	A	Fast	00:15'00	dB	71	46	61	51	51	48
@APL041	15/02/2007	23:28'16	A	Fast	00:15'00	dB	71	46	62	50	51	48
@APL042	15/02/2007	23:43'16	A	Fast	00:15'00	dB	73	45	61	56	50	47
@APL043	15/02/2007	23:58'16	A	Fast	00:15'00	dB	74	45	66	52	51	47
@APL044	16/02/2007	00:13'16	A	Fast	00:15'00	dB	78	45	67	55	52	47
@APL045	16/02/2007	00:28'16	A	Fast	00:15'00	dB	72	44	60	53	50	46
@APL046	16/02/2007	00:43'16	A	Fast	00:15'00	dB	72	43	60	45	50	45
@APL047	16/02/2007	00:58'16	A	Fast	00:15'00	dB	69	42	57	47	47	44
@APL048	16/02/2007	01:13'16	A	Fast	00:15'00	dB	69	41	58	46	48	44

Background Noise Measurements

File	Date	Start	Filter	Detect	Time	units	Peak	Min	Max	Spl	Leq	L90
@APL049	16/02/2007	01:28'16	A	Fast	00:15'00	dB	72	41	59	48	47	43
@APL050	16/02/2007	01:43'16	A	Fast	00:15'00	dB	67	40	54	48	46	43
@APL051	16/02/2007	01:58'16	A	Fast	00:15'00	dB	72	41	60	46	47	43
@APL052	16/02/2007	02:13'16	A	Fast	00:15'00	dB	68	40	56	44	46	42
@APL053	16/02/2007	02:28'16	A	Fast	00:15'00	dB	77	41	56	47	46	42
@APL054	16/02/2007	02:43'16	A	Fast	00:15'00	dB	68	40	56	45	46	42
@APL055	16/02/2007	02:58'16	A	Fast	00:15'00	dB	71	40	63	48	47	42
@APL056	16/02/2007	03:13'16	A	Fast	00:15'00	dB	69	41	58	46	47	43
@APL057	16/02/2007	03:28'16	A	Fast	00:15'00	dB	78	40	66	47	48	42
@APL058	16/02/2007	03:43'16	A	Fast	00:15'00	dB	66	40	54	43	46	42
@APL059	16/02/2007	03:58'16	A	Fast	00:15'00	dB	73	41	63	45	48	43
@APL060	16/02/2007	04:13'16	A	Fast	00:15'00	dB	71	41	59	46	47	43
@APL061	16/02/2007	04:28'16	A	Fast	00:15'00	dB	65	41	55	46	46	43
@APL062	16/02/2007	04:43'16	A	Fast	00:15'00	dB	73	41	59	46	47	43
@APL063	16/02/2007	04:58'16	A	Fast	00:15'00	dB	73	41	61	46	47	42
@APL064	16/02/2007	05:13'16	A	Fast	00:15'00	dB	72	41	60	48	48	43
@APL065	16/02/2007	05:28'16	A	Fast	00:15'00	dB	76	43	63	49	50	45
@APL066	16/02/2007	05:43'16	A	Fast	00:15'00	dB	74	43	60	53	49	45
@APL067	16/02/2007	05:58'16	A	Fast	00:15'00	dB	70	43	57	47	49	45
@APL068	16/02/2007	06:13'16	A	Fast	00:15'00	dB	73	44	61	51	50	46
@APL069	16/02/2007	06:28'16	A	Fast	00:15'00	dB	73	45	61	54	52	48
@APL070	16/02/2007	06:43'16	A	Fast	00:15'00	dB	76	46	63	57	53	49
@APL071	16/02/2007	06:58'16	A	Fast	00:15'00	dB	75	46	63	52	54	49
@APL072	16/02/2007	07:13'16	A	Fast	00:15'00	dB	84	48	73	56	56	51
@APL073	16/02/2007	07:28'16	A	Fast	00:15'00	dB	79	49	68	54	55	51
@APL074	16/02/2007	07:43'16	A	Fast	00:15'00	dB	78	49	67	56	55	52
@APL075	16/02/2007	07:58'16	A	Fast	00:15'00	dB	92	48	76	56	55	52
@APL076	16/02/2007	08:13'16	A	Fast	00:15'00	dB	81	49	65	56	56	53
@APL077	16/02/2007	08:28'16	A	Fast	00:15'00	dB	80	51	68	58	56	53
@APL078	16/02/2007	08:43'16	A	Fast	00:15'00	dB	78	51	65	54	55	53
@APL079	16/02/2007	08:58'16	A	Fast	00:15'00	dB	78	50	67	57	55	53
@APL080	16/02/2007	09:13'16	A	Fast	00:15'00	dB	78	49	67	67	55	52
@APL081	16/02/2007	09:28'16	A	Fast	00:15'00	dB	78	50	67	53	56	52
@APL082	16/02/2007	09:43'16	A	Fast	00:15'00	dB	85	49	71	56	55	52
@APL083	16/02/2007	09:58'16	A	Fast	00:15'00	dB	89	48	69	56	55	51
@APL084	16/02/2007	10:13'16	A	Fast	00:15'00	dB	86	48	72	55	55	51
@APL085	16/02/2007	10:28'16	A	Fast	00:15'00	dB	75	49	64	56	54	51
@APL086	16/02/2007	10:43'16	A	Fast	00:15'00	dB	84	48	67	54	56	52
@APL087	16/02/2007	10:58'16	A	Fast	00:15'00	dB	79	50	68	56	56	52
@APL088	16/02/2007	11:13'16	A	Fast	00:15'00	dB	86	49	75	53	58	52
@APL089	16/02/2007	11:28'16	A	Fast	00:15'00	dB	93	50	77	58	61	53
@APL090	16/02/2007	11:43'16	A	Fast	00:15'00	dB	87	48	73	56	58	52
@APL091	16/02/2007	11:58'16	A	Fast	00:15'00	dB	88	49	74	56	58	52
@APL092	16/02/2007	12:13'16	A	Fast	00:15'00	dB	91	49	80	54	60	52
@APL093	16/02/2007	12:28'16	A	Fast	00:15'00	dB	86	49	77	53	58	52
@APL094	16/02/2007	12:43'16	A	Fast	00:15'00	dB	90	49	79	53	59	52
@APL095	16/02/2007	12:58'16	A	Fast	00:15'00	dB	87	50	76	70	59	53
@APL096	16/02/2007	13:13'16	A	Fast	00:15'00	dB	83	50	72	55	57	53