

## PLANT NOISE ASSESSMENT

For the 3<sup>rd</sup> Floor Roof Condenser Plant



Site address:

Lloyds Bank Plc  
Kilburn High Road  
Kilburn  
London  
NW6 4HY



On behalf of:

Arthur McKay Building Services Ltd  
Unit B6 & 7 Poplar Business Park  
10 Preston Road  
London  
E14 9RL



Report Ref: P5112-03

Date: 5th August 2014

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dated 7<sup>th</sup> & 31<sup>st</sup> July 2014
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## **1.00 Noise Assessment**

Following on from the review of the revised Condenser Plant and Equipment layout on the second floor roof; where it was clearly established that the plant noise was being reduced and would therefore have no impact on the nearest residential properties Nos. 33 & 42 Birchington Road.

It is proposed to fit two new Condenser Plant units to the third floor flat roof.

This is new plant and requires to be selected so that it has no impact to the combined site plant noise level.

Plant operation is daytime only with peak running 0900 hours to 1900hrs.

## **2.0 Historical Data**

**Also refer to Report P5112 dated 7<sup>th</sup> July 2014**

### Assessment of Plant Noise

To minimise the risk of justifiable noise complaints and provide guidance as to the allowable noise level we have assessed the situation using British Standard BS 4142. This method of assessment provides a procedure to determine whether noise from industrial or similar fixed installations, measured externally, is likely to give rise to complaints from occupants of residential properties in the area. It is often used to provide guidance on whether such noise might be considered a nuisance in law, under the Environmental Protection Act.

The rating method is based on the difference between the 'rating level' (the noise level produced by the source under investigation weighted, if necessary, for character) and the background level (the commonly occurring minimum noise level with no contribution from the noise source). The rating level is expressed as the continuous noise level (dB  $L_{AeqT}$ ) and the background noise level expressed as the noise level exceeded for 90% of the measurement period (dB  $L_{A90T}$ ).

The background noise level is subtracted from the rating level and if the difference is 10 dB or more, it is considered that complaint would be likely. A difference of approximately 5 dB is considered 'marginal', whilst below 5 dB the lower the value, the less likelihood there is that a complaint will occur.

A 5 dB penalty is applied to the rating level if the noise under investigation contains distinguishable discrete continuous notes, i.e. (whines, hisses,



screeches, hums, bangs, clicks, clatters or thumps) this penalty typically applies to refrigeration and condenser noise.

### Originally fitted Plant Noise Assessment

Based on the plant manufactures stated noise level listed in section 8.01 we have calculated the noise level at the nearest residential property 21 m from the plant using the parallel piped surface method. The predicted accumulative level shown in the table below has then been corrected to take into account the site conditions.

Predicted plant noise levels			
Item	Plant	Distance	dB(A)
1	RXS25 CVMB	20	23
2	RXS25 CVMB	20	23
3	RXS25 CVMB	20	23
4	RXS50 BVMB	20	25
5	Mitsubishi PUH 2VKA	20	26
6	Mitsubishi PUH 5YKSA	20	33
Accumulative Free Field Noise level			35
Location correction			9
Predicted noise level at the nearest residential property			44

The predicted accumulative plant noise level detailed above has been used in the following BS 4142 assessment to determine the likelihood of complaints.

Predicted Specific Plant noise level      44dB(A)  
 Character Correction                              0dB  
 Rating Level    44dB

LA90 Background level                              48dB

Assessment level    48 - 44= - 4

Conclusion: complaints are unlikely.

The conclusion drawn above is based on historical data including the early morning background noise level.



Collectively the six air conditioning condensers are unlikely to operate simultaneously at their maximum noise output at any one time so in practice a rating level less than 44dB could be expected in relation to the existing plant.

The background noise level used in the forgoing BS4142 assessment is the lowest recorded on the 14.07.08. The background level was seen to steadily increase from 07.00 onwards. The plant is unlikely to be in full operation until after 09:00 hrs once the staff arrive. After 9:00hrs the L<sub>A90</sub> measured background noise level had increased by at least 2dB.

Proposed Plant for 2<sup>nd</sup> Floor

In selecting replacement plant collectively the accumulative plant noise level at 1m as calculated from the manufactures data should not exceed **58dB(A)** This will insure that the existing plant noise levels are not exceeded.

New and Retained Plant Data Sheets

CONDENSER UNIT REF		CU R/01
MANUFACTURER		DAIKIN
CONNECTED INDOOR UNIT REF		FCU 0/01
MODEL		RXS50L
ELECTRICAL DETAILS	POWER SUPPLY - (Ø, Hz, V)	1, 50, 230
	RUNNING CURRENT - (A)	6.30
	STARTING CURRENT - (A)	6.80
	FUSE RATING - (A)	20
UNIT DIMENSIONS	HEIGHT - (mm)	735
	WIDTH - (mm)	825
	DEPTH - (mm)	300
WEIGHT - (kg)		47
SOUND - (dBa)		48
PIPEWORK CONNS	LIQUID	1/4"
	GAS	1/2"



CONDENSER UNIT REF		CU R/02
MANUFACTURER		DAIKIN
CONNECTED INDOOR UNIT REF		FCU 0/02
MODEL		RXS20L
ELECTRICAL DETAILS	POWER SUPPLY - (Ø, Hz, V)	1, 50, 230
	RUNNING CURRENT - (A)	2.30
	STARTING CURRENT - (A)	2.80
	FUSE RATING - (A)	10
UNIT DIMENSIONS	HEIGHT - (mm)	550
	WIDTH - (mm)	765
	DEPTH - (mm)	285
WEIGHT - (kg)		34
SOUND - (dBa)		46
PIPEWORK CONNS	LIQUID	1/4"
	GAS	3/8"

CONDENSER UNIT REF		CU R/03
MANUFACTURER		DAIKIN
CONNECTED INDOOR UNIT REF		FCU 0/03 & 04
MODEL		RZQG140L7V1
ELECTRICAL DETAILS	POWER SUPPLY - (Ø, Hz, V)	1, 50, 230
	RUNNING CURRENT - (A)	27.20
	STARTING CURRENT - (A)	4.00
	FUSE RATING - (A)	32
UNIT DIMENSIONS	HEIGHT - (mm)	1430
	WIDTH - (mm)	940
	DEPTH - (mm)	320
WEIGHT - (kg)		102
SOUND - (dBa)		52
PIPEWORK CONNS	LIQUID	3/8"
	GAS	5/8"

Plant Details			
Item	Model	Free Field Noise level at 1m	
1	Daikin RXS 25 CVMB	47 dB(A)	Existing
2	Daikin RXS 25 CVMB	47 dB(A)	Existing
3	Daikin RXS 25 CVMB	47 dB(A)	Existing
4	Daikin RXS 50 BVMB	47 dB(A)	Existing
5	Daikin RXS 50L	48 dB(A)	New
6	Daikin RXS 20L	49 dB(A)	New
7	Daikin RZQ 140L7V1	52 dB(A)	New



Cumulative total assuming all plant operational at 100% = 56dB(A)

The predicted operational duty will typically be 50-80% giving an operational cumulative total of 53-54dB(A)

Position of 2 new condensers 3<sup>rd</sup>  
Floor Roof



View of the existing plant on the side of the second floor of the bank



### 3.0 New Plant Details for the 3<sup>rd</sup> Floor Flat Roof details supplied by client



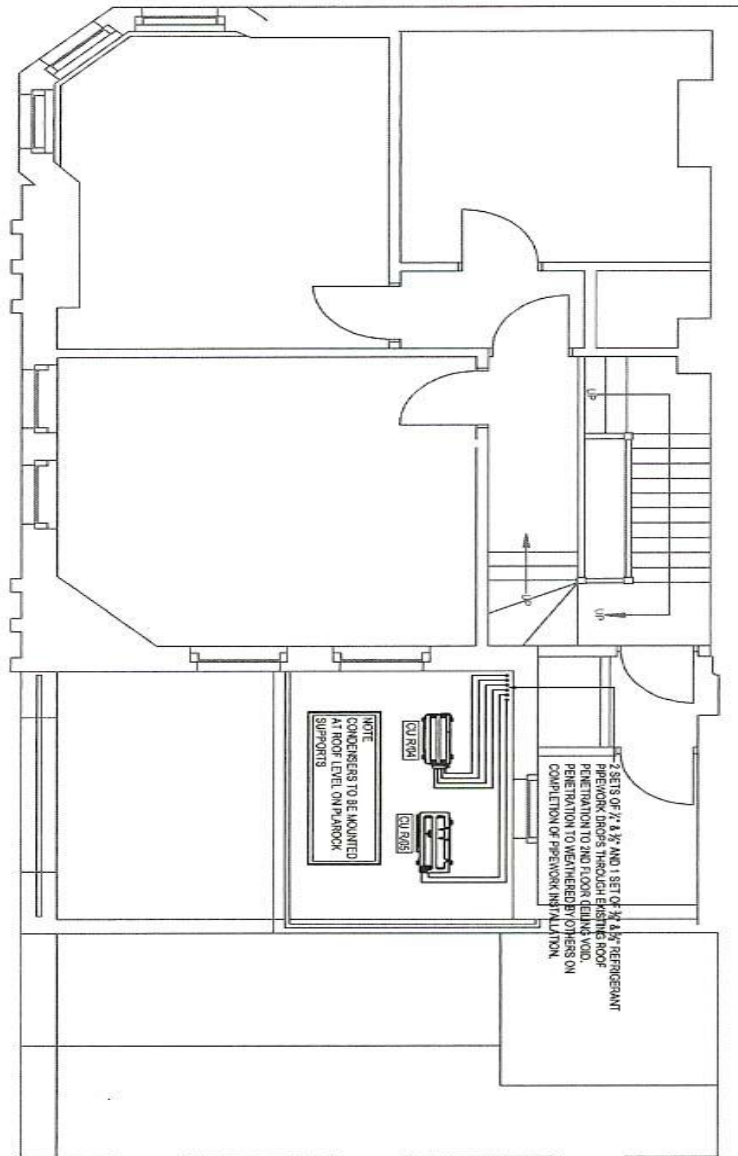
Outdoor Unit			RZQG71L7V1	RZQG100L7V1	RZQG71LY1	RZQG100LY1
Dimensions	Height x Width x Depth	mm	990 x 940 x 320	1430 x 940 x 320	990 x 940 x 320	1430 x 940 x 320
Weight		kg	78	99	80	101
Operation Range	Cooling Min~Max	°CDB	-15°C to +50°C		-15°C to +50°C	
	Heating Min~Max	°CWB	-20°C to +15.5°C		-20°C to +15.5°C	
Sound Power	High	dBA	64	66	64	66
Sound Pressure	Nominal	dBA	48	50	48	50
Refrigerant		Type	R410A		R410A	
Power Supply			1~ / 50Hz / 220 - 240v		3~ / 50Hz / 400v	
Piping connections	Liquid (OD)/Gas	inches	3/8 / 5/8		3/8 / 5/8	
Piping Length (Maximum)		m	50	75	50	75
Max Installation Height Difference		m	30		30	

OUTDOOR UNIT							RXS20K
Dimensions	Unit	HeightxWidthxDepth		mm	Only available in multi model application		550x765x285
Weight	Unit			kg			34
Fan - Air flow rate	Cooling	High/Low		m <sup>3</sup> /min			33.5/30.1
	Heating	High/Low		m <sup>3</sup> /min			28.3/25.6
Sound power level	Cooling	Nom./High		dBA			-/61
Sound pressure level	Cooling	High/Low/Silent operation		dBA			46/-/43
	Heating	High/Low/Silent operation		dBA			47/-/44
Operation range	Cooling	Ambient	Min.~Max.	°CDB			-10~46
	Heating	Ambient	Min.~Max.	°CWB			-15~18
Refrigerant	Type/GWP						R-410A/1,975
Piping connections	Piping length	OU - IU	Max.	m			20
	Level difference	IU - OU	Max.	m		15	
Power supply	Phase / Frequency / Voltage			Hz / V		1~ / 50 / 220-240	
Current - 50Hz	Maximum fuse amps (MFA)			A		10	





## 4.0 Site Plan





## 5.0 Plant Noise Assessment

The Condensers will be located 1,5m from the flat roof edge which increase distance and partial screening by the roof edge.

Plant Details				
Item	Model	Free Field Noise level at 1m	Distance	dB(A)
1	Daikin RXS 25 CVMB	47 dB(A)	20	23
2	Daikin RXS 25 CVMB	47 dB(A)	20	23
3	Daikin RXS 25 CVMB	47 dB(A)	20	23
4	Daikin RXS 50 BVMB	47 dB(A)	20	23
5	Daikin RXS 50L	48 dB(A)	20	24
6	Daikin RXS 20L	49 dB(A)	20	25
7	Daikin RZQ 140L7V1	52 dB(A)	20	28
	3rd Floor Roof			
8	RZQG100LY1	50dB(A)	23	24
	RXS20K	46dB(A)	23	20
Accumulative Free Field Noise				34
Location Correction				9
Predicted Noise Level at the nearest Residential property				43

The predicted accumulative plant noise level detailed above has been used in the following BS 4142 assessment to determine the likelihood of complaints.

Predicted Specific Plant noise level      43dB(A)  
 Character Correction                              0dB  
 Rating Level                                         43dB

LA90 Background level                         50dB

Assessment level    50– 43 = - 7

Conclusion: complaints are unlikely.

The conclusion drawn above is based on historical data including the early morning background noise level of 48-50dB(A).



Collectively the nine air conditioning condensers are unlikely to operate simultaneously at their maximum noise output, especially as the new plant has inverter drives and lower noise output at reduced load, at any one time so in practice a rating level less than 43dB could be expected in relation to the new and existing plant.

The background noise level used in the forgoing BS4142 assessment is the levels recorded on the 14.07.08. The background level was seen to steadily increase from 07.00 hrs @48 dB(A) onwards. The plant is unlikely to be in full operation until after 09:00 hrs once the staff arrive. After 9:00hrs the  $L_{A90}$  measured background noise level had increased by at least 2dB.

Also from the previous report the operational noise level was also set at a maximum permissible noise level of 58dB(A)

Resultant noise level for the 3<sup>rd</sup> Floor plant is 52dB(A)

The conclusion is that the proposed new plant will not have any impact to the nearest residential properties or on site noise levels.