ENVIRONMENTAL NOISE ASSESSMENT

19 St. Regis Heights, Fire Crest Drive,

London, NW3 7NE.

PRIVATE AND CONFIDENTIAL

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NOISE ASSESSMENT

19 St. Regis Heights

London NW3 7NE.

Client	*Lowbeck Ltd*
Date	*November 2010*
Issue No	*3*
Report Ref.	*NS17191-003*
Checked	*Liam Elliott*
Name	*J.P. Williams*
Position	*Technical Manager*

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1.0 INTRODUCTION

Nendle Acoustics Company (Southern) Limited were instructed by Lowbeck Ltd to carry out an environmental noise survey on the property 19 St. Regis Heights, Fire Crest Avenue, London NW3 7NE.

This survey was carried out between 14:15 hrs on 7th October 2010 and 14:15 hrs on 8th October 2010. The review of background noise is based on the noise climate recorded over the entire period.

2.0 EXECUTIVE SUMMARY

In order to comply with the local authority requirements with regards to noise emission from new mechanical services plant the following maximum noise levels should not be exceeded when measured at 1 metre from any noise sensitive facade.

(i)	Plant operation 0700 - 1800 hours	35.9 $LAr_{(15)}$
(ii)	Plant operation 1800 - 2300 hours	36.7 $LAr_{(15)}$
(iii)	Plant operation 2300 - 0700 hours.	29.0 $LAr_{(15)}$

$LAr_{(15)}$: Rating level, $LAr_{(15)}$ is the specific noise level plus any adjustment for the character of the noise (tonality or start/stop operation). In the event that the plant is considered to be tonal in nature or contains distinct impulse noise an additional 5 dB(A) should be deducted from the above target noise levels.

With the acoustic mitigation measures proposed within section 8.0, our predicted noise level calculations have indicated that compliance with planning conditions can be demonstrated.

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3.0 SITE DESCRIPTION

The building is a 6 storey residential apartment complex. Number 19 is located on the 5th Floor and roof top of St. Regis Heights, Fire Crest drive, London, NW3 7NE situated off West Heath Road and near Hampstead Heath. The area comprises of predominantly residential properties. It is proposed to add air-conditioning plant on the rooftop.

3.1 Local Noise Climate

3.1.1 Traffic Noise: Noise from road traffic was present during the test was the predominant noise source in the area.

3.1.2 Rail Noise: Noise from surface rail or underground rail traffic was not the predominant noise source in the area but due to the locality of main line stations is likely to be an influence on the recorded noise climate.

3.1.3 Aircraft Noise: Aircraft noise was not predominant during the survey although it is inevitable that aircraft and helicopter noise will have an influence on the general background noise.

3.1.4 Mechanical Services Plant: A small quantity of air conditioning units are located on rooftops and facades of neighbouring properties. They are likely to have had an impact on the recorded noise levels but are not considered the predominant noise source within the area.

4.0 MEASURING EQUIPMENT

The noise data was obtained using a Cirrus Research plc Model CR831B Environmental Noise Meter complying with Type 1 specification of BS EN 60651 : 1994 and BS EN 60804 : 1994.
The meter was calibrated before and after the survey. There was no deviation.

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5.0 MEASUREMENTS

The survey commenced at 14:15 hours on Thursday 7th October until 14:15 hours on Friday 8th October 2010.

The primary microphone monitoring assembly was established on the rooftop of 19 St. Regis Heights, close to rear facade.

The sound pressure level measurements recorded included the following noise percentiles:

LAeq, $_T$ The 'A' weighted equivalent continuous noise level for the duration of the measurement time interval of 15 minutes.
LMAX, $_T$The 'A' weighted maximum sound pressure level recorded during the measurement time interval of 15 minutes.
LA10, $_T$ The 'A' weighted sound pressure level exceeded for 10% of the measurement time interval of 15 minutes.
LA90, $_T$ The 'A' weighted sound pressure level exceeded for 90% of the measurement time interval of 15 minutes.

The main noise percentile which is generally accepted to represent background noise is –

$L_{A90,T}$. It is generally accepted that the noise percentile $L_{A90,T}$ can be described as the mean minimum level and is used to assess background noise level.

5.1 Weather

The weather conditions during the test were mild, with no precipitation and generally light to moderate winds. The results of the noise monitoring are therefore unlikely to have been affected by adverse weather conditions.

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6.0 SUMMARY OF TEST RESULTS

A record of the 15 minute percentile sound pressure level readings is detailed in Appendix (i). Table 1.

6.1 Background Noise Levels:

The mean minimum background noise levels recorded ($L_{A90\ (15)}$) were –

Daytime :

0700 – 0800	40.9 $LA90_{(15)}$

Evening :

1800 – 2300	41.7 $LA90_{(15)}$

Night-time :

2300 – 0700	34.0 $LA90_{(15)}$

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7.0 REVIEW OF ENVIRONMENTAL NOISE CRITERIA

The area to the rear and sides of the property contains residential properties, additionally the fourth floor and below of the same apartment block contains similar residential apartments. Whilst not identified on-site, it is also possible that commercial properties are located within the area. The two nearest affected windows to the proposed plant have therefore been identified as

1) Windows on the neighbouring roof top garden of the adjacent apartment block within St. Regis Heights.
2) Windows associated with 18 St. Regis Heights (apartment below number 19).

It is important that noise emission from mechanical plant does not cause a noise nuisance or loss of amenity at the adjacent properties.
In order to assess the potential risk the following criterion is considered.

7.1 Residential Design Criteria (BS4142 : 1997)

BS4142 :1997 "Method for rating industrial noise affecting mixed residential and industrial areas" describes a method of determining the level of the noise of a industrial nature together with procedures for assessing whether the noise in question is likely to give rise to complaint from local residents. In general, the likelihood of complaints in response to a noise depends on factors including the margin by which it exceeds the background noise level. The standard states that a difference of +5 dB is of marginal significance whereas a difference of +10 dB is most likely to cause complaints. Additionally reference is made to very low noise level areas: - "For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low."

7.2 Residential Design Criteria 2 (World Health Organisation - Guidelines for Community Noise : 1999 & BS8233 : 1999)

The World Health Organisation (WHO) guidelines for community noise describes target environmental noise levels for residential habitation and critical health issues. Within this document a target noise level of 30 dB (LAeq) is suggested for an internal bedroom during night-time hours and 35 dB (LAeq) for living areas during day-time and evening hours. From BS8233 a partially open window provides a sound insulation level of between 10-15 dB Rw. From the above information, noise levels below 40-45 dB(A) at night-time and 45-50 dB(A) for day-time and evening, when measured at 1.0 metre from an openable residential window are unlikely to cause a loss of amenity.

7.3 Local Authority Requirements.

Camden Council Local Development Framework indicates that the noise policy for planning purposes on new plant is as follows :-

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Table E: Noise levels from plant and machinery at which planning permission will not be granted

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	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90 >60dB	Day, evening and night	0000-2400	55dB $_{LAeq}$

7.3 Summary of Target Environmental Noise Criteria

In order to comply with the relevant codes of good practice, and minimising the risk of justifiable noise complaints from occupants of neighbouring properties the following noise limits should be set.

Maximum recommended accumulative noise level one metre outside the nearest affected window of the nearest affected property should be as follows –

(i) Plant operation 0700 - 1800 hours 35.9 $LAr_{(15)}$

(ii) Plant operation 1800 - 2300 hours 36.7 $LAr_{(15)}$

(iii) Plant operation 2300 - 0700 hours. 29.0 $LAr_{(15)}$

$LAr_{(15)}$: Rating level, $LAr_{(15)}$ is the specific noise level plus any adjustment for the character of the noise (tonality or start/stop operation). In the event that the plant is considered to be tonal in nature or contains distinct impulse noise an additional 5 dB(A) should be deducted from the above target noise levels.

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8.0 REVIEW OF PLANT NOISE EMISSION

There is 1 proposed plant area associated with 19 St. Regis Heights located on the rooftop of the apartment block..

It is intended to add the following equipment:-
3 off Mitsubishi SUZ-KA50VA
(Manufacturer's plant data sheets attached within Appendix IV)

Proposed Plant Location Picture (roof top area):-

It is proposed to locate the 3 new Mitsubishi condensing units on the rooftop of 19 St./ Regis Heights in one group and close the roof top boundary as shown in the picture above and Appendix IIIB.

The nearest affected noise sensitive windows are located at the adjacent roof garden of the neighbouring apartment block nominally 13.5 metres from the nearest plant. Additional noise sensitive windows have been considered associated with the apartment below number 19 and on the 4th floor of the same block located nominally 4.8 metres from the nearest plant and benefitting from the natural screening effect of the property.

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To the rear and on each side of 19 St. Regis Heights additional residential properties have been identified, all are located either farther away and/or benefit from the natural screening effect of the buildings. Please see Appendix IIIA and IIIB for layout.

Nendle Acoustics have carried out predicted noise level calculations based on the provided information (see Appendix IV). Our calculations have indicated that in order to comply with the planning conditions as detailed within section 7.2 and relevant codes of good practice each item of A/C plant should be housed within an acoustic louvre/panel work 4-sided screen, the front face being louvred and the sides and rear face being solid acoustic panel work. The front and sides of the screen to extend not less than 300mm higher than the top of the A/C unit with the rear face extending not less than 450mm above the top of the A/C unit. The acoustic treatment products used should provide not less than the following performance:-

Freq (Hz)	63	125	250	500	1K	2K	4K	8K
Louvre DIL (dB)	6	5	7	9	14	18	18	16
Panel SRI (dB)	14	18	22	32	41	45	46	45

It is understood that the proposed plant is to be inverter controlled allowing gradual speed and duty variation to suit the required load of the building and hence is not considered to be intermittent in operation. The proposed acoustic treatment should be designed so as to ensure the plant noise emission is not tonal in nature.

9.0 CONCLUSION

Our predicted noise level calculations have indicated that the noise levels from the newly proposed plant is below the requirements of the local planning authority with suitable acoustic treatment measures applied.

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APPENDIX

(i) TABLE 1: MEASUREMENT DATA

(ii) GRAPH 1: TIME HISTORY

(iii) SITE PLANS

(iv) MANUFACTURER'S DATA SHEETS

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Appendix I – Measurement Data

Time	Leq	LA01	LA10	LA90
14:15	50.10	52.80	50.30	47.30
14:30	53.00	59.30	52.80	47.60
14:45	52.30	56.10	54.00	47.80
15:00	50.70	60.30	51.80	46.60
15:15	51.40	60.00	53.70	46.90
15:30	49.80	57.50	50.70	46.70
15:45	49.40	55.70	50.70	46.70
16:00	48.90	52.90	50.40	46.60
16:15	57.20	69.60	58.70	47.50
16:30	52.60	64.60	52.00	45.60
16:45	51.40	63.60	50.20	45.50
17:00	53.00	64.70	54.50	45.30
17:15	52.30	64.90	52.40	44.90
17:30	48.40	55.20	50.80	44.80
17:45	51.90	61.80	53.90	45.40
18:00	52.10	63.00	54.10	44.60
18:15	47.50	53.40	48.60	44.70
18:30	48.30	54.50	50.30	45.40
18:45	49.40	58.40	51.90	44.20
19:00	54.70	67.80	53.40	44.30
19:15	58.90	72.10	54.90	45.10
19:30	51.90	63.80	51.80	44.80
19:45	53.50	66.80	50.60	44.80
20:00	46.80	52.10	48.60	44.20
20:15	49.10	58.20	51.00	44.20
20:30	53.90	68.30	52.40	44.20
20:45	46.90	53.90	49.40	43.30
21:00	56.00	70.00	53.90	43.80
21:15	47.40	55.70	48.70	43.30
21:30	50.90	63.30	51.10	43.10
21:45	55.70	69.10	53.90	42.70
22:00	52.60	63.70	55.30	42.70
22:15	59.40	73.50	56.90	42.40
22:30	58.10	72.10	58.30	42.10
22:45	62.40	75.60	63.30	**41.70**
23:00	54.60	66.80	56.80	41.80
23:15	46.40	57.90	46.00	40.70
23:30	43.80	50.80	45.40	40.80
23:45	46.10	58.30	45.60	40.40
00:00	42.60	49.70	43.80	39.80
00:15	42.90	48.70	44.60	39.70
00:30	42.00	48.60	43.40	39.30

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00:45	41.00	46.50	42.50	38.70
01:00	40.80	46.90	42.20	38.50
01:15	40.60	45.50	42.40	38.20
01:30	40.10	45.30	41.60	37.90
01:45	40.30	45.90	41.70	37.90
02:00	40.40	46.60	42.20	37.40
02:15	39.30	44.70	41.10	36.90
02:30	39.20	44.10	40.90	36.70
02:45	38.40	44.10	40.10	36.00
03:00	37.80	42.40	39.30	35.80
03:15	37.80	42.60	39.70	35.20
03:30	39.10	46.20	41.40	35.20
03:45	38.70	44.20	41.30	35.50
04:00	38.70	44.80	41.10	35.40
04:15	38.90	44.90	41.60	35.60
04:30	38.30	44.90	40.40	34.60
04:45	38.60	45.10	39.80	**34.00**
05:00	37.00	41.30	38.90	34.30
05:15	38.10	45.00	39.90	34.80
05:30	39.00	46.00	41.00	35.20
05:45	38.90	43.70	40.90	36.50
06:00	38.50	42.70	39.90	36.20
06:15	40.20	46.30	42.00	37.10
06:30	41.40	46.80	43.20	38.20
06:45	46.00	55.10	49.10	39.90
07:00	48.20	58.80	49.20	41.20
07:15	45.80	54.20	46.30	**40.90**
07:30	46.70	57.10	48.00	41.80
07:45	46.30	56.50	47.60	41.90
08:00	45.50	51.80	47.30	42.70
08:15	49.60	63.30	46.40	42.50
08:30	45.40	48.70	45.80	42.20
08:45	48.00	57.50	49.70	42.90
09:00	46.40	52.50	48.10	43.60
09:15	47.00	52.10	49.70	43.50
09:30	51.50	62.30	52.70	45.80
09:45	47.30	51.50	49.20	44.00
10:00	52.00	64.40	50.60	44.00
10:15	46.70	51.30	48.20	44.30
10:30	51.70	63.10	51.90	45.00
10:45	51.10	63.50	50.20	44.50
11:00	46.80	51.80	48.30	44.50
11:15	49.00	58.20	50.30	45.50
11:30	52.00	64.50	52.10	45.00
11:45	57.70	70.30	56.50	44.20
12:00	49.20	59.70	49.90	44.70
12:15	60.00	73.80	59.20	45.30

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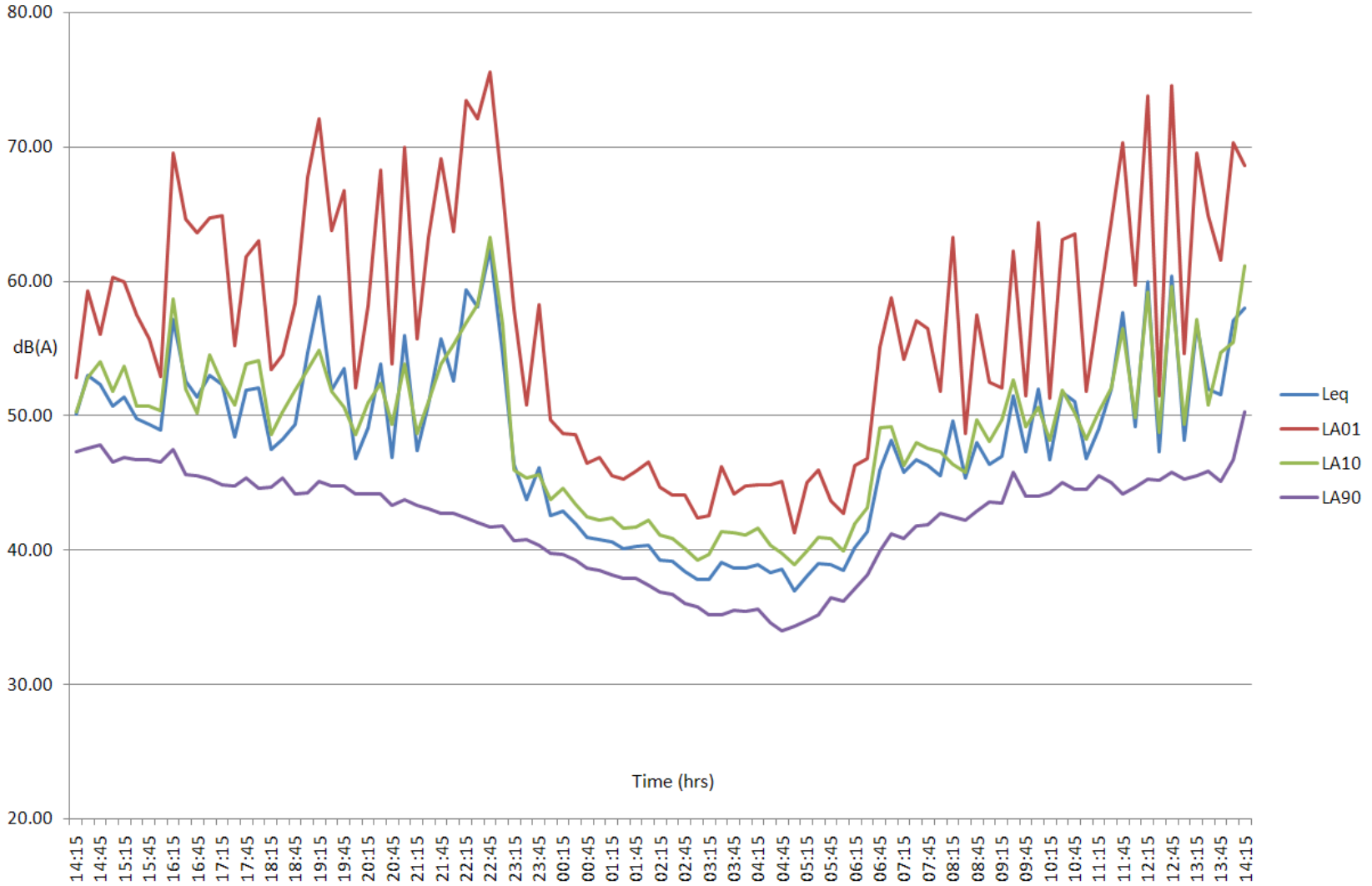
12:30	47.30	51.50	48.80	45.20
12:45	60.40	74.60	59.60	45.80
13:00	48.20	54.60	49.40	45.30
13:15	56.80	69.60	57.20	45.50
13:30	52.00	64.90	50.80	45.90
13:45	51.60	61.60	54.70	45.10
14:00	57.10	70.30	55.50	46.70
14:15	58.00	68.60	61.20	50.30

Appendix II – Noise Climate Recorded at 19 St. Regis Heights - Graph



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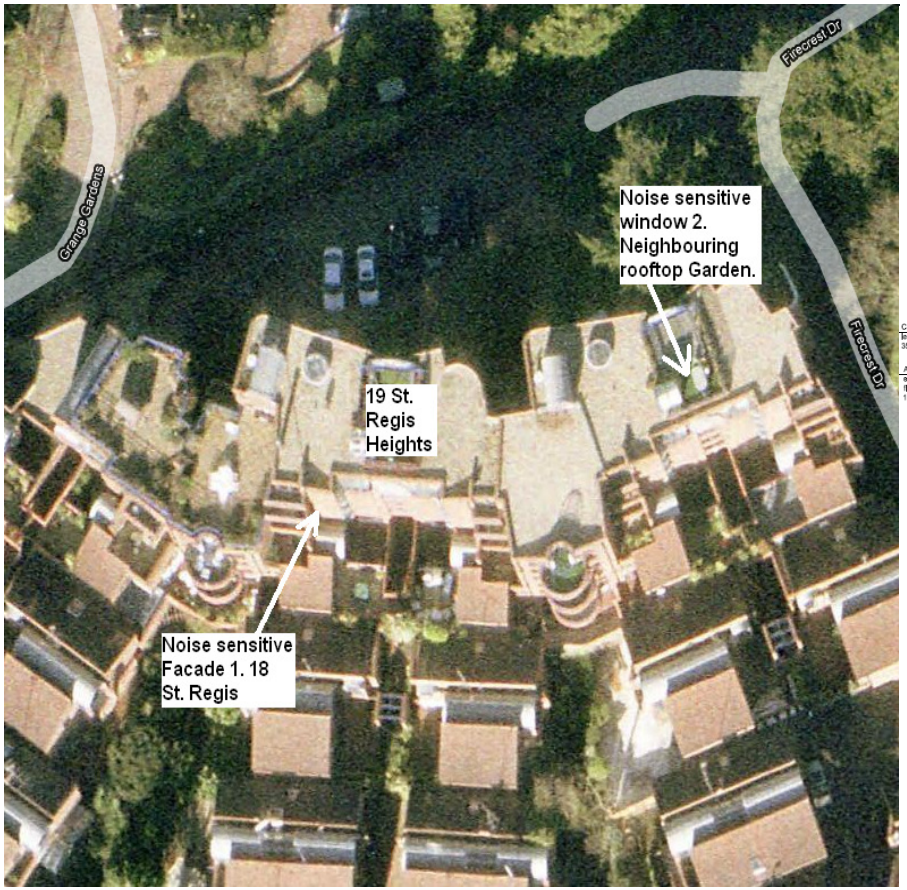
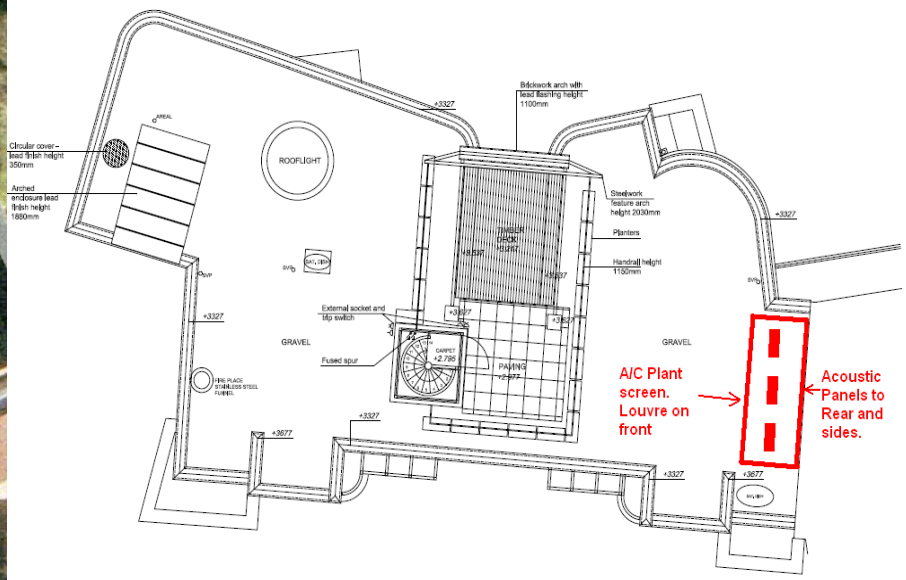
Appendix IIIA - Site Plan (Location)



Appendix IIIB – Site Plan



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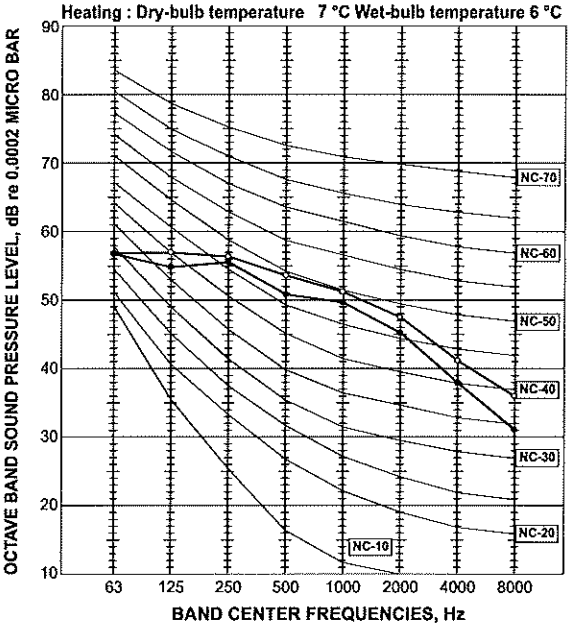
MUZ-GE50VA
MUZ-GE50VAH

OUTDOOR UNIT

FUNCTION	SPL(dB(A))	LINE
COOLING	54	●—●
HEATING	56	○—○

Test conditions,
Cooling : Dry-bulb temperature 35 °C
Heating : Dry-bulb temperature 7 °C Wet-bulb temperature 6 °C

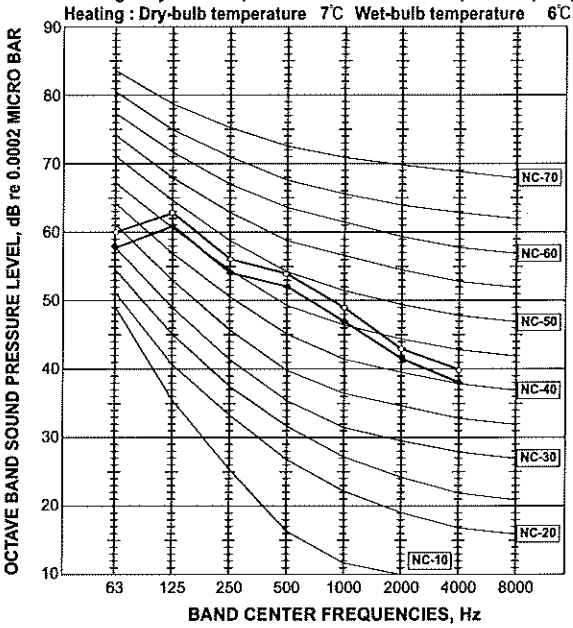


MUZ-GA60VA
MUZ-GA71VA

OUTDOOR UNIT

FAN SPEED	FUNCTION	SPL(dB(A))	LINE
High	COOLING	53	●—●
	HEATING	55	○—○

Test conditions,
Cooling : Dry-bulb temperature 35℃ Wet-bulb temperature (24℃)
Heating : Dry-bulb temperature 7℃ Wet-bulb temperature 6℃

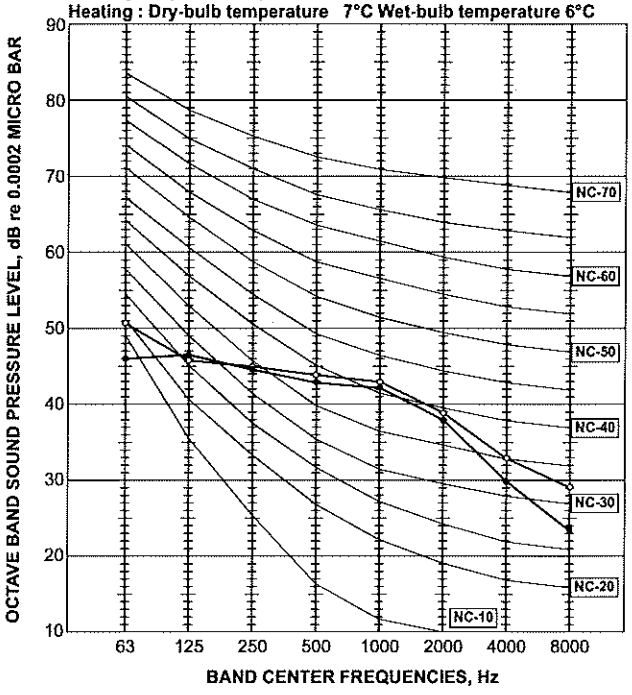


MUZ-HC25VA

OUTDOOR UNIT

FUNCTION	SPL(dB(A))	LINE
COOLING	46	●—●
HEATING	47	○—○

Test conditions,
Cooling : Dry-bulb temperature 35°C
Heating : Dry-bulb temperature 7°C Wet-bulb temperature 6°C

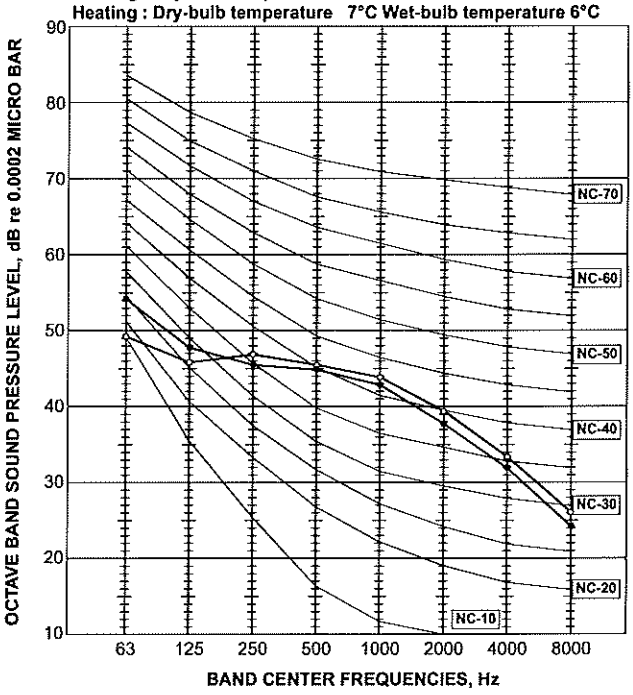


MUZ-HC35VA

OUTDOOR UNIT

FUNCTION	SPL(dB(A))	LINE
COOLING	47	●—●
HEATING	48	○—○

Test conditions,
Cooling : Dry-bulb temperature 35°C
Heating : Dry-bulb temperature 7°C Wet-bulb temperature 6°C



MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

MFZ-KA50VA

Inverter Heat Pump

R410A Floor Mounted System

This series is extremely versatile and is designed for wall attached installation at floor level. The auto swing vane provides a more natural and comfortable airflow throughout the room and the lightweight, compact design makes installation Easy.

Pictures not to scale

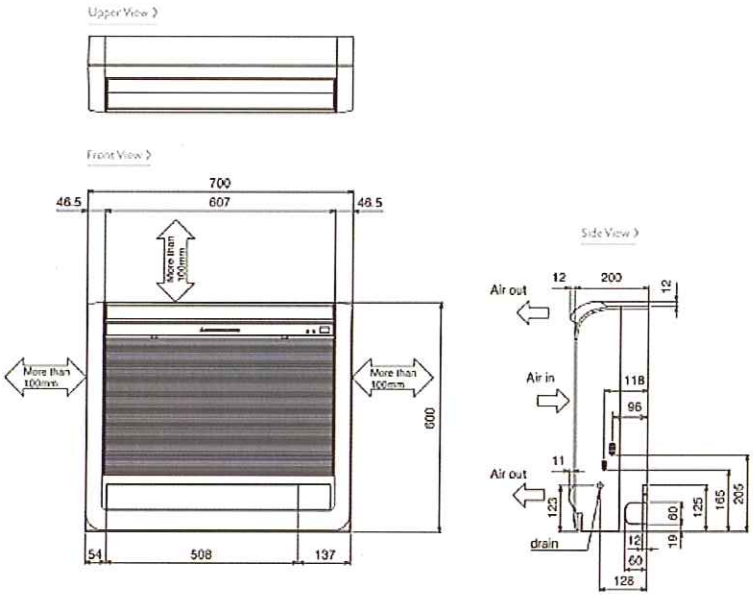
Product Details

MFZ-KA50VA Indoor Unit	
Capacity (kW):	
Heating (Nominal) (Low - High)	6.00 (0.90 - 7.90)
Cooling (Nominal) (Low - High)	4.80 (0.90 - 5.40)
Heating (UK) (Low - High)	5.00 (0.75 - 6.55)
Cooling (UK) (Low - High)	4.75 (0.90 - 5.35)
SHF R410A (Nominal)	0.63
COP / EER (Nominal)	3.23 / 3.1
Energy Label Heating / Cooling	C / B
Width - mm	700
Depth - mm	200
Height - mm	600
Weight - kg	14
Airflow (m3/min) (Heating /Cooling) - Lo-Mi-Hi-SupHi	7.4-8.8-9.8-11.8 /7.1-7.9-9.2-10.7
Noise (dBA) (Heating /Cooling) - Lo-Mi-Hi-SupHi	32-35-39-44 /32-35-39-43
Pipe Size Gas mm (in)	12.7 (1/2)
Pipe Size Liquid mm (in)	6.35 (1/4)
Electrical Supply	Fed by Outdoor Unit
Phase	Single
Fuse Rating (BS88) - HRC (A)	6
Interconnecting Cable No. Cores	4

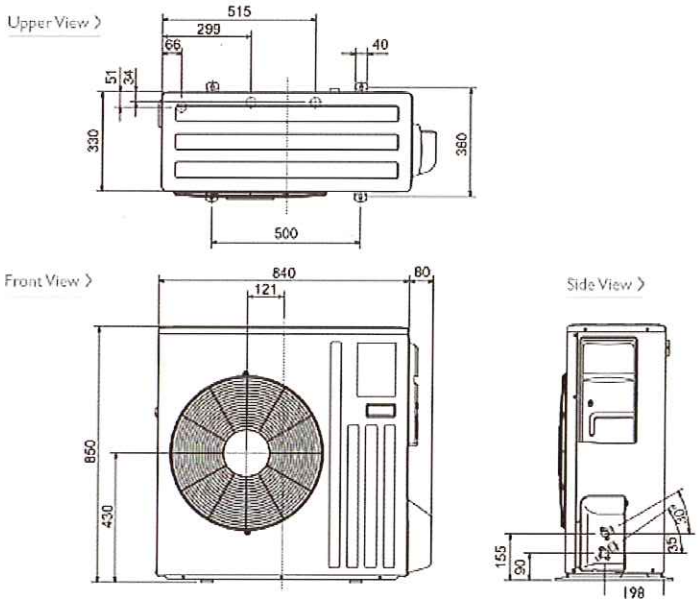
SUZ-KA50VA Outdoor Unit	
Width - mm	840
Depth - mm	330
Height - mm	850
Weight - kg	53
Noise (dBA) (Heating /Cooling) - Lo-Hi	53-55 /51-53
Electrical Supply	220-240v, 50Hz
Phase	Single
Fuse Rating (BS88) - HRC (A)	20
SystemPower Input (kW) - Heating (Nominal)	1.86
SystemPower Input (kW) - Cooling (Nominal)	1.55
SystemPower Input (kW) - Heating (UK)	1.69
SystemPower Input (kW) - Cooling (UK)	1.24
Starting Current (A)	8.3
SystemRunning Current (A) - Heating / Cooling	8.5 / 7
Mains Cable No. Cores	3
Max Pipe Length (m)	30
Max Height Difference (m)	30
Charge (kg) - 7m	1.6

Dimensions

MFZ-KA50VA



SUZ-KA50VA



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AIR CONDITIONING SYSTEMS

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