128-134 CLEVELAND STREET
REPLACEMENT OF ROOFTOP PLANT

DESIGN AND ACCESS STATEMENT

October 2021

BAYNESAND**MITCHELL**ARCHITECTS

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1.0 INTRODUCTION

1.1 The applicants are the current occupants of basement, ground, first, second, third and fourth floors of Aradco House, 128-134 Cleveland Street. The VSI Group (Voice and Script International Ltd.) is a successful, major provider of dubbing, subtitle captioning, voice-over, translation and post-production services within the broadcast and corporate communications industries. Founded in London, dubbing, voice-over, subtitling, post-production, account management, mixing, QC, marketing, finance and other operations all take place at their hub in Cleveland Street.

1.2 Many of these activities require environmentally isolated studio spaces - with high air conditioning demands. Satisfying the air conditioning demand has been dealt with over the years in a piecemeal fashion, with additional units being added as and when needed. This has resulted in a rooftop currently accommodating a total of 17 externally mounted air conditioning units.

1.3 The applicant has decided that further addition, upgrade and maintenance of this many individual units is now untenable. The proposal is therefore to consolidate the A/C supply into a more efficient installation comprising just four units.

FIGURE 1. SATELLITE MAP HIGHLIGHTING LOCATION OF 128 - 134 CLEVELAND STREET

FIGURE 2. LOCATION PLAN

2.0 SITE AND CONTEXT

2.1 128-134 Cleveland Street is located on the northern edge of Fitzrovia in Central London. The building forms the corner of Cleveland Street and Warren Street.

2.2 The building is a medium sized, five storey plus basement commercial building, constructed from a structural frame with brick cladding. The Fourth Floor is of mansard form with flat roof.

2.3 The building's use as recording studio requires a high level of air conditioning. This air conditioning demand is serviced by 18 separate air conditioning units located on the flat roof area; and a small number at basement level.

2.4 The immediate surrounding buildings are a mix of both commercial use and residential - as is the area as a whole. The immediately adjacent building in Cleveland Street is of commercial use at Ground Floor, with a mix of residential above. The immediate neighbour on Warren Street is of residential use and is listed Grade II.

2.5 The South and Eastern sides of Warren and Cleveland Street form the boundary of the Fitzroy Square Conservation Area.

FIGURE 4. ROOFTOP VIEWS

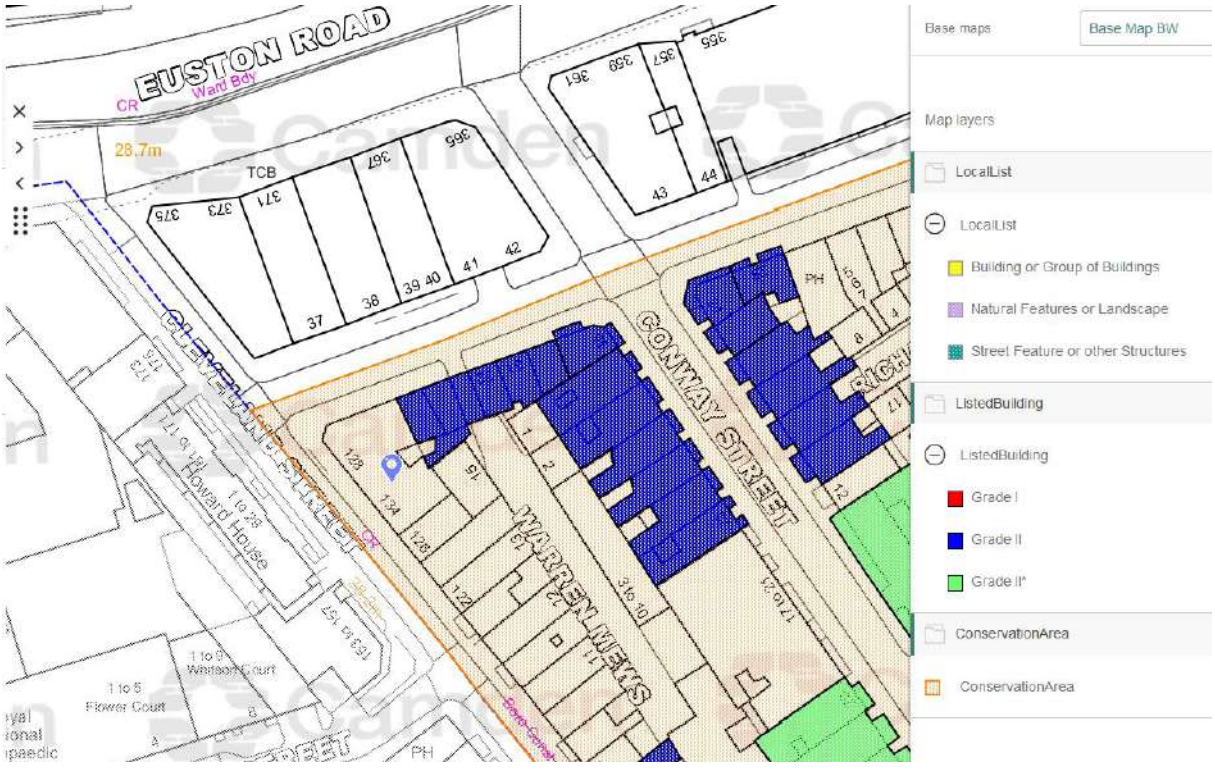


FIGURE 3. CONSERVATION AREA

FIGURE 5. CLEVELAND STREET ELEVATION

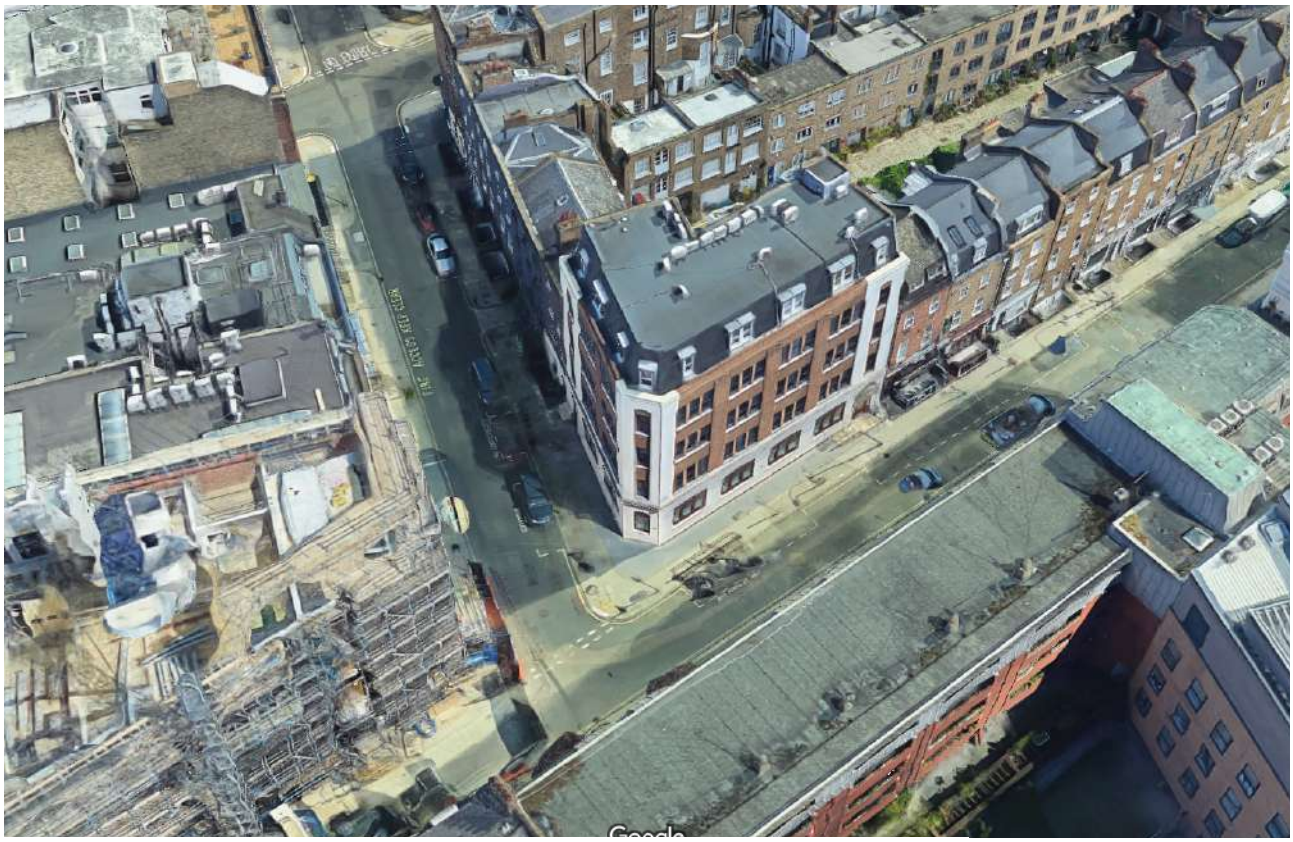


FIGURE 6. AERIAL VIEW FROM NORTH WEST

FIGURE 7. AERIAL VIEW FROM SOUTH WEST

FIGURE 8. AERIAL VIEW FROM NORTH EAST

FIGURE 9. AERIAL VIEW FROM SOUTH EAST

3.0 EXISTING ROOFTOP A/C PLANT INSTALLATION

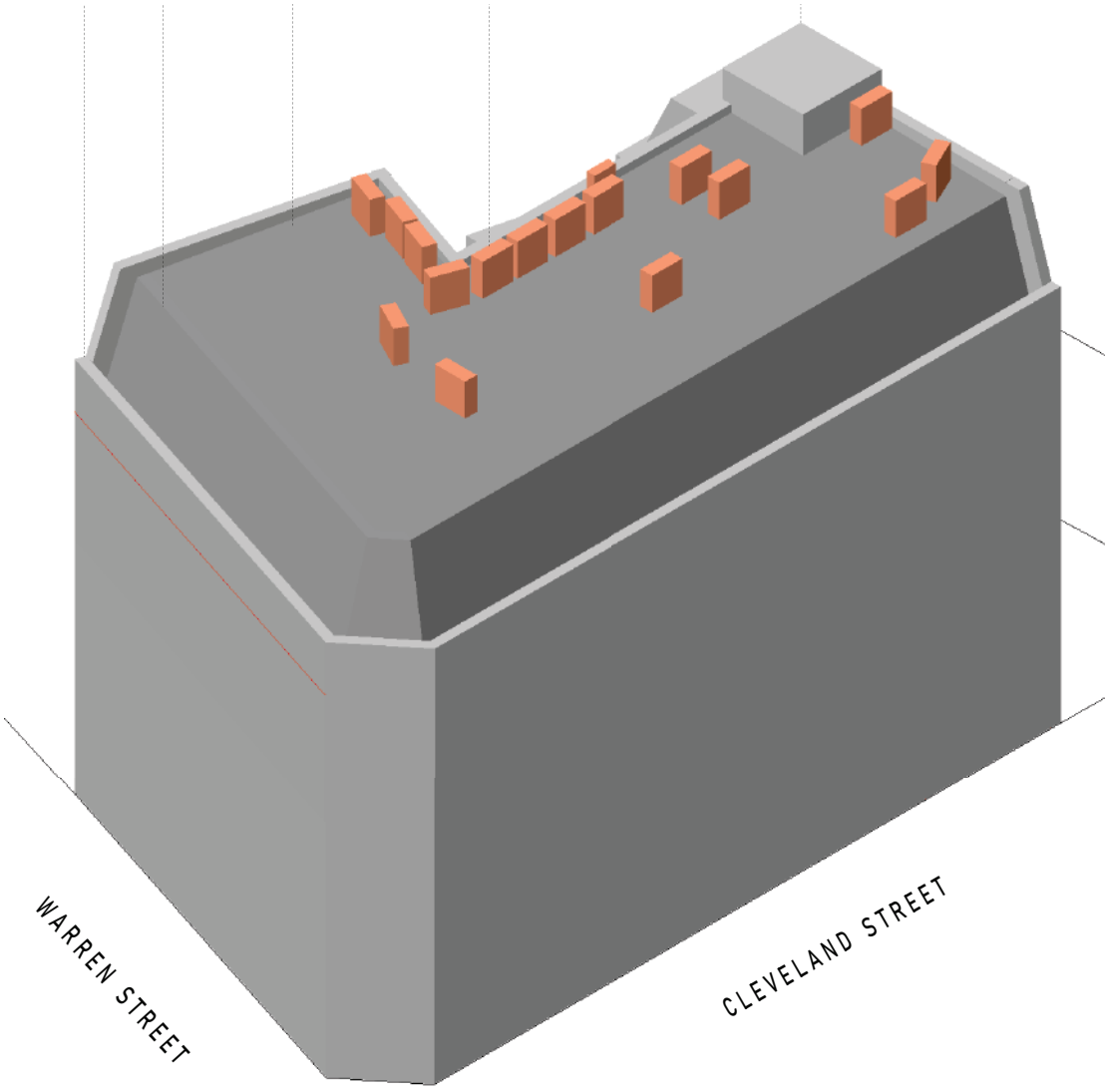


FIGURE 10. EXISTING ROOF-TOP PLANT INSTALLATION

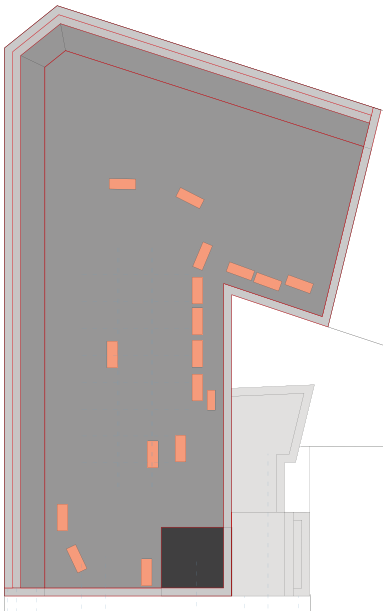
3.1 The existing rooftop air conditioning plant installation totals 18 individual units. These comprise:

Schedule of Existing AC Units and Sound Output

6 no.	Fujitsu	Sound Power Level	70dBa
1 no.	LG	Sound Max	65dBa
1 no.	Daikin	Sound Power Level	63dBA
5 no.	Mitsubishi	Sound Pressure Level	51dBa
5 no.	Details not known		

total 18 no. units

FIGURE 11. EXISTING ROOF-TOP PLANT - VIEWS ACROSS ROOF TO NORTH



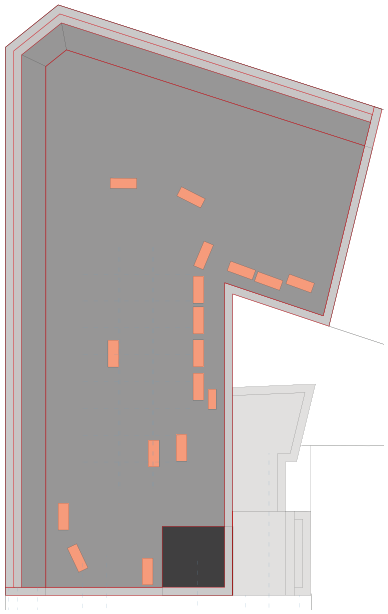
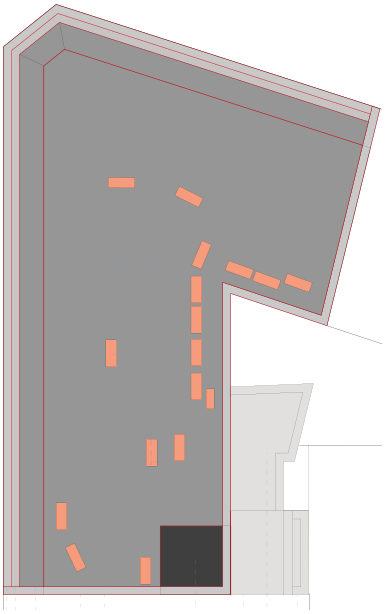


FIGURE 12. EXISTING ROOF-TOP PLANT - VIEWS ACROSS ROOF TO SOUTH

FIGURE 13. EXISTING ROOF-TOP PLANT - VIEWS ACROSS ROOF TO EAST

FIGURE 14. EXISTING ROOF-TOP PLANT - VIEWS ACROSS ROOF TO WEST

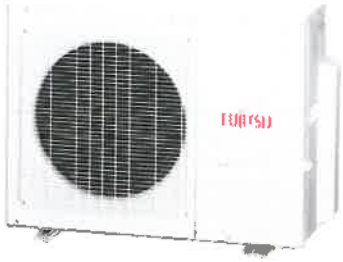


Schedule of Existing AC Units and Sound Output

6 no. Fujitsu Sound Power Level **70dBa**

Multi Split Systems (Air Conditioner) 2 & 3-4 Rooms Multi

AOYG24LAT3



Features

- Space-saving installation
- Wide range of indoor units with various models
- Flexible installation

Capacity

6.8 kW 8.0 kW

Find a Distributor

ALL DC

Outdoor Unit :
AOYG24LAT3

Download :
Catalogue

1 no. LG Sound Max **65dBa**

LG A18RK.NSC/S18AK.UE1 ARTCOOL MIRROR 5.2KW 18,000btu full system

Indoor Unit	**A18RK.NSC**
Outdoor Unit	**S18AK.UE1**
Cooling Capacity (Min/Rating/Max) (kW)	0.9 ~ 5.2 ~ 6.0
Heating Capacity (Min/Rating/Max) (kW)	0.9 ~ 6.3 ~ 9.0
Low Temp. Heating Capacity(-7°C) (kW)_	5.4
Power Input Cooling/Heating (W)	1.5 / 1.65
EER (W/W)	3.47
SEER	5.7
P design C (kW)	5.2
COP	3.82

SCOP	3.4
P design H (kW)	6.3
Annual Energy Consumption Cooling/Heating (kWh)	319/2,594
Energy Label Cooling/Heating	A+ / A
Power Supply (Ø / V / Hz)	1 / 220-240 / 50
Air Flow Rate Indoor,Max (m3/min)	19
Outdoor,Max (m3/min)	50
Sound Pressure Level Indoor,H/M/L/SL (dB(A)±3)	42/40/35/29
Outdoor,Max (dB(A)±3)	54

18rk-nsc-s18ak-ue1-artcool-mirror-5-2kw-18-000btu-full-system

1 no. Daikin Sound Power Level **63dBA**

2-1 Technical Specifications						FTXS20J2V1B	FTXS35J2V1B	FTXS25J2V1B	FTXS42J2V1B	FTXS50J2V1B
Power input	Cooling	Nom.		kW		0.018	0.026	0.018	0.024	0.026
	Heating	Nom.		kW		0.021	0.028	0.021	0.030	0.032
Casing	Colour					White				
Dimensions	Unit	Height		mm		295				
		Width		mm		800				
		Depth		mm		215				
	Packed unit	Height		mm		366				
		Width		mm		870				
		Depth		mm		289				
Weight	Unit			kg		9	10	9	10	
	Packed unit			kg		13	14	13	14	
Heat exchanger	Length			mm		605	605 602.7	605	605 602.7	605 602.7
	Rows	Quantity				2				
	Fin pitch			mm		1.2				
	Stages	Quantity				18				
	Tube type					ø6.35 Hi-XU tube				
	Fin	Type				ML fin (Multi louver)				
Heat exchanger 2	Rows	Quantity				-	1	-	1	
	Fin pitch			mm		-	1.6	-	1.6	
	Stages	Quantity				-	12	-	12	
Fan	Type					Cross flow fan				
	Air flow rate	Cooling	High		m^3/min	9.4	11.4	10.8	11.3	11.6
					cfm	332	403	381	399	410
			Nom.		m^3/min	7.4	8.7	7.9	9.0	9.2
					cfm	261	307	279	318	325
			Low		m^3/min	5.5	5.8	5.2	6.8	7.0
					cfm	194	205	184	240	247
			Silent operation		m^3/min	4.1	4.4	3.7	5.9	6.0
					cfm	145	155	131	208	212
		Heating	High		m^3/min	9.9	12.4	11.9	12.2	12.1
					cfm	350	438	420	431	427
			Nom.		m^3/min	8.2	9.5	9.1	9.7	9.8
					cfm	290	335	321	343	346
			Low		m^3/min	6.6	6.8	6.4	7.3	7.6
					cfm	233	240	226	258	268
			Silent operation		m^3/min	6.2	6.0	5.9	6.4	6.7
					cfm	219	212	208	226	237
Fan motor	Model					KFD-280-23-8A				
	Speed	Steps				5 + silent, + auto				
		Cooling	High		rpm	1,150	1,480	1,320	1,480	1,530
			Medium		rpm	950	1,190	1,030	1,250	1,290
			Low		rpm	750	900	750	1,020	1,060
			Silent operation		rpm	600	760	600	930	960
		Heating	High		rpm	1,200	1,550	1,430	1,550	
			Medium		rpm	1,030	1,260	1,150	1,300	1,320
			Low		rpm	870	980	870	1,050	1,090
			Silent operation		rpm	820	900	820	960	1,000
	Output	High			W	23				
Sound power level	Cooling	Nom.			dBA	54	61	57	61	62
	Heating	Nom.			dBA	54	61	58	61	63

5 no. Mitsubishi Sound Pressure Level **51dBa** '11 • PAC-T-160

Adapted to **RoHS** directive

Item \ Model		FDF140VSVD	
		Indoor unit **FDF140VD**	Outdoor unit **FDC140VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~14.5 (Max.)]	16.0 [4.0 (Min.)~16.5 (Max.)]
Power consumption	kW	5.15	5.31
Running current	A	7.6 / 8.0	7.9 / 8.2
Power factor	%	98	97/98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	83
Refrigerant equipment Compressor type & Q'ty		—	RMT5126MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil		—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/Uϕ9.52 (3/8")	
		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	See page 43
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.
(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

4.0 PROPOSALS

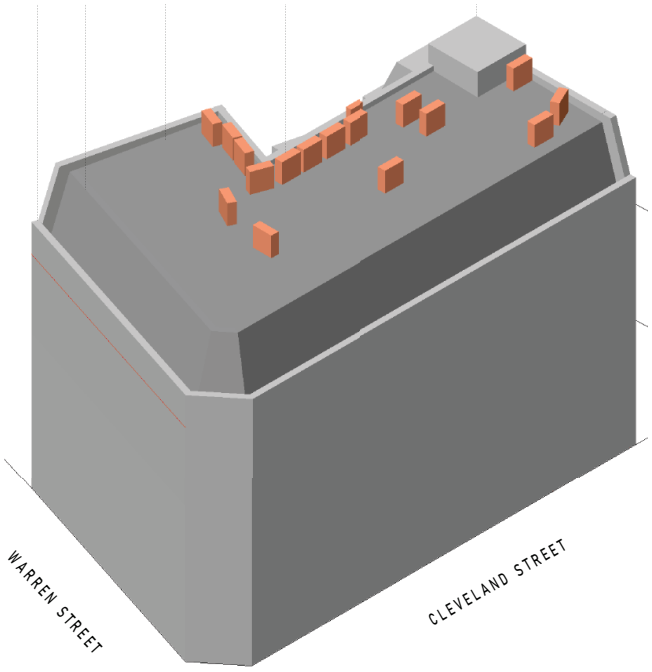


FIGURE 15. EXISTING ROOFTOP PLANT

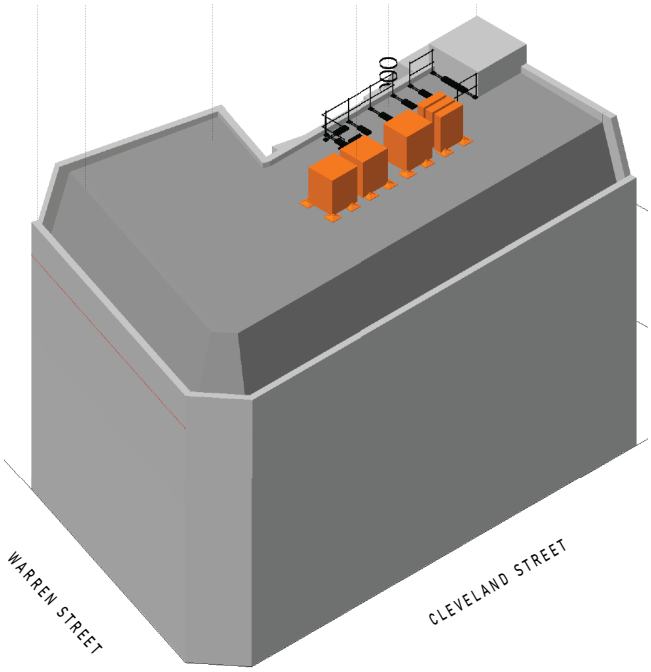


FIGURE 16. PROPOSED ROOFTOP PLANT

4.1 The proposal is to consolidate the roof-top air conditioning installation from 18 separate units down to just four units.

4.2 The four units will be centrally located on the flat roof portion of the fourth floor mansard roof enclosure.

4.3 The existing units are not within acoustic housings. The new units have a lower sound pressure index than the majority of the existing units.

4.4 Acoustic levels can be further reduced when used in silent running mode out of regular business hours.

4.5 The units are located centrally on the flat roof to reduce both acoustic and visual intrusion.

4.6 Technical details of the units follow

Schedule of Proposed AC Units and Sound Output

4 no. Midea Sound Pressure Level **64dBa** with the following sound reduction in silent running mode:

Mode	Description	Sound reduction (dBA)
0	Night silent time 6h/10h	4 dB(A) lower
1	Night silent time 6h/12h	4 dB(A) lower
2	Night silent time 8h/10h	4 dB(A) lower
3	Night silent time 8h/12h	4 dB(A) lower
4	No silent mode	-
8	Silent mode	4 dB(A) lower
A	Super silent mode	8 dB(A) lower
F	Set silent mode via central controller	

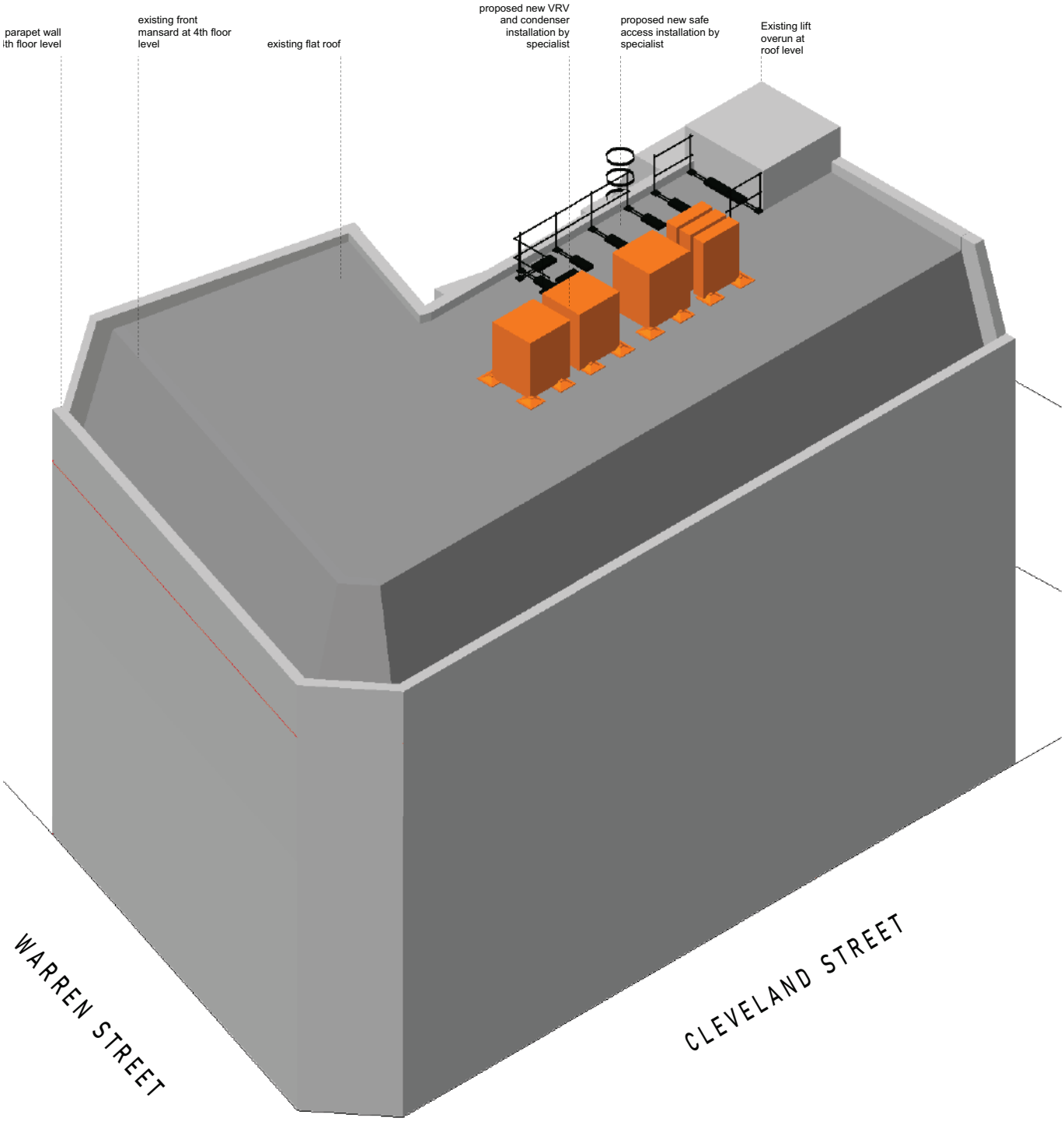


FIGURE 17. PROPOSED ROOFTOP PLANT

5.0 PROPOSED AC PLANT TECHNICAL INFORMATION

V6R VRF 50Hz

Midea

11 Sound Levels

11.1 Overall

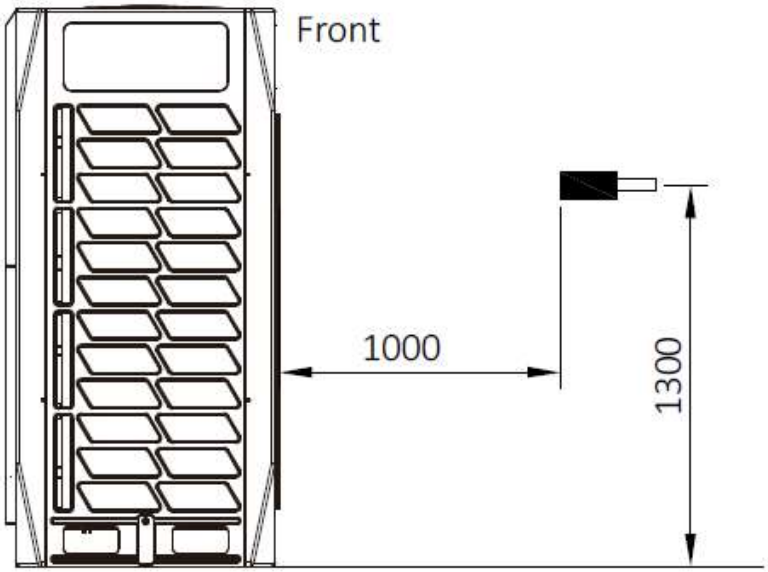
Table 2-11.1: Sound pressure level

Model	dB(A)	Model	dB(A)	Model	dB(A)
8HP	58	24HP	63	40HP	67
10HP	58	26HP	64	42HP	67
12HP	60	28HP	65	44HP	68
14HP	61	30HP	66	46HP	68
16HP	64	32HP	67	48HP	69
18HP	65	34HP	68	50HP	69
20HP	61	36HP	68	52HP	69
22HP	62	38HP	65	54HP	70

Notes:

1. Sound pressure level is measured at a position 1m in front of the unit and 1.3m above the floor in a semi-anechoic chamber. During in-situ operation, sou pressure levels may be higher as a result of ambient noise.

Figure 2-11.1: Sound pressure level measurement (unit: mm)



16-20HP

Table 2-1.2: 16-20HP specifications

HP			14	16	18	20
Model name			MV6-R400WV2GN1	MV6-R450WV2GN1	MV6-R500WV2GN1	MV6-R560WV2GN1
Power supply		V/N/Hz	380-415/3/50(60)			
Cooling[1]	Capacity	kW	40	45	50	56
	Power input	kW	9.83	12.00	13.81	17.39
	EER		4.07	3.75	3.62	3.22
Heating[2](Rated)	Capacity	kW	40	45	50	56
	Power input	kW	8.26	9.78	11.90	14.77
	COP		4.84	4.60	4.20	3.79
Heating[2](Max)	Capacity	kW	45	50	56	63
	Power input	kW	9.78	12.26	14.77	18.33
	COP		4.60	4.08	3.79	3.44
Connected indoor unit	Total capacity		50-200% of outdoor unit capacity[3]			
	Maximum quantity		64	64	64	64
Compressor	Type		DC inverter			
	Quantity		1			
	Oil type		FV68H			
	Start-up method		Soft start			
Fan	Type		Propeller			
	Motor type		DC			
	Quantity		2			
	Motor output	kW	0.92×2	0.92×2	0.92×2	0.92×2
	Static pressure	Pa	0,20,40,60,80(Selectable)			
	Air flow rate	m^3/h	14000	14900	15800	15800
	Drive type		Direct			
Refrigerant	Type		R410A			
	Factory charge	kg	10	10	10	10
Pipe connections[4]	Liquid pipe	mm	Φ15.9	Φ15.9	Φ15.9	Φ15.9
	Low pressure gas	mm	Φ28.6	Φ28.6	Φ28.6	Φ28.6
	High pressure gas	mm	Φ22.2	Φ22.2	Φ22.2	Φ22.2
Sound pressure level[5]		dB(A)	61	64	65	65
Sound power level[5]		dB(A)	81	88	88	88
Net dimensions (W×H×D)		mm	1340×1635×825	1340×1635×825	1340×1635×825	1340×1635×825
Packed dimensions (W×H×D)		mm	1405×1805×910	1405×1805×910	1405×1805×910	1405×1805×910
Net weight		kg	300	300	300	300
Gross weight		kg	325	325	325	325
Ambient temp. operation range	Cooling[6]	°C(DB)	-15 ~ 52			
	Heating	°C(WB/DB)	-25 ~ 19/-25~27			
	Domestic hot water	°C(DB)	-20 ~ 43			

Notes:

1. Indoor air temperature 27°C DB, 19°C WB; outdoor air temperature 35°C DB; equivalent refrigerant piping length 7.5m with zero level difference.
2. Indoor air temperature 20°C DB; outdoor air temperature 7°C DB, 6°C WB; equivalent refrigerant piping length 7.5m with zero level difference.
3. Refer to table 1-5.1: Indoor and outdoor unit combination ratio limitations in Part 1.
4. Diameters given are those of the unit's stop valve.
5. Sound pressure level is measured at a position 1m in front of the unit and 1.3m above the floor in a semi-anechoic chamber.
6. -15°C to -5°C low temperature cooling operation is just available for MS01.

VSI - Midea Air Conditioning Equipment List

Item Code	Item Description	Qty
LG /GRD System		
MV6-R450WV2GN1	Midea Heat Recovery VRF V6R 3ph Outdoor Unit	1
MS04N1-D	Midea 4 Way MS Box	1
MS06N1-D	Midea 6 Way MS Box	2
FQZHN-02SB	Midea 3-Pipe Un-Insulated Branch Joint	1
FQZHN-03SB	Midea 3-Pipe Un-Insulated Branch Joint	1
MI2-22GDN1	Midea Wall Mounted Unit	2
MI2-28GDN1	Midea Wall Mounted Unit	1
MI2-22Q4CDN1	Midea Compact 4-Way Roundflow Cassette	2
MI2-28Q4CDN1	Midea Compact 4-Way Roundflow Cassette	3
MI2-36Q4CDN1	Midea Compact 4-Way Roundflow Cassette	3
MI2-52Q4CDN1	Midea Compact 4-Way Roundflow Cassette Available APRIL	1
MI2-56Q4DN1	Midea 4-Way Roundflow Cassette	1
MI2-71Q4DN1	Midea 4-Way Roundflow Cassette	1
CE-MBQ-03C4 Panel	Midea Fasica Panel	9
T-MBQ4-01E	Midea Fasica Panel	2
WDC-120G	Midea Wired Remote Controller with 7 Day Timer VRF	13
1,2nd Floor System		
MV6-R450WV2GN1	Midea Heat Recovery VRF V6R 3ph Outdoor Unit	1
MS04N1-D	Midea 4 Way MS Box	1
MS06N1-D	Midea 6 Way MS Box	1
FQZHN-03SB	Midea 3-Pipe Un-Insulated Branch Joint	1
MI2-28GDN1	Midea Wall Mounted Unit	2
MI2-36GDN1	Midea Wall Mounted Unit	1
MI2-36Q4CDN1	Midea Compact 4-Way Roundflow Cassette	2
CE-MBQ-03C4 Panel	Midea Fasica Panel	1
MI2-45Q4CDN1	Midea Compact 4-Way Roundflow Cassette	2
MI2-100Q4DN1	Midea 4-Way Roundflow Cassette	2

Item Code	Item Description	Qty
T-MBQ4-01E	Midea Fasica Panel	4
WDC-120G	Midea Wired Remote Controller with 7 Day Timer VRF	7
Servers (Two on LG, one on 4th)		
MB-18N8D0-I	Midea Mission Wall Mounted c/w Infra Red Controller Max Cool: 6.21 kW / Max Heat: 6.97 kW	3
MB-18N8D0-O	Midea Mission Heat Pump R32 1ph Outdoor Unit - Comes with Wi Control	3
KJR-29B1/BK-E	Midea Wired Remote Controller High Wall - R32 Only	3
System 3rd,4th Floors		
MV6-R450WV2GN1	Midea Heat Recovery VRF V6R 3ph Outdoor Unit	1
MS04N1-D	Midea 4 Way MS Box	2
FQZHN-03SB	Midea 3-Pipe Un-Insulated Branch Joint	1
MI2-100Q4DN1	Midea 4-Way Roundflow Cassette	2
MI2-71Q4DN1	Midea 4-Way Roundflow Cassette	3
T-MBQ4-01E	Midea Fasica Panel	5
MI2-36Q4CDN1	Midea Compact 4-Way Roundflow Cassette	1
CE-MBQ-03C4 Panel	Midea Fasica Panel	1
WDC-120G	Midea Wired Remote Controller with 7 Day Timer VRF	4

6.0 ACCESS

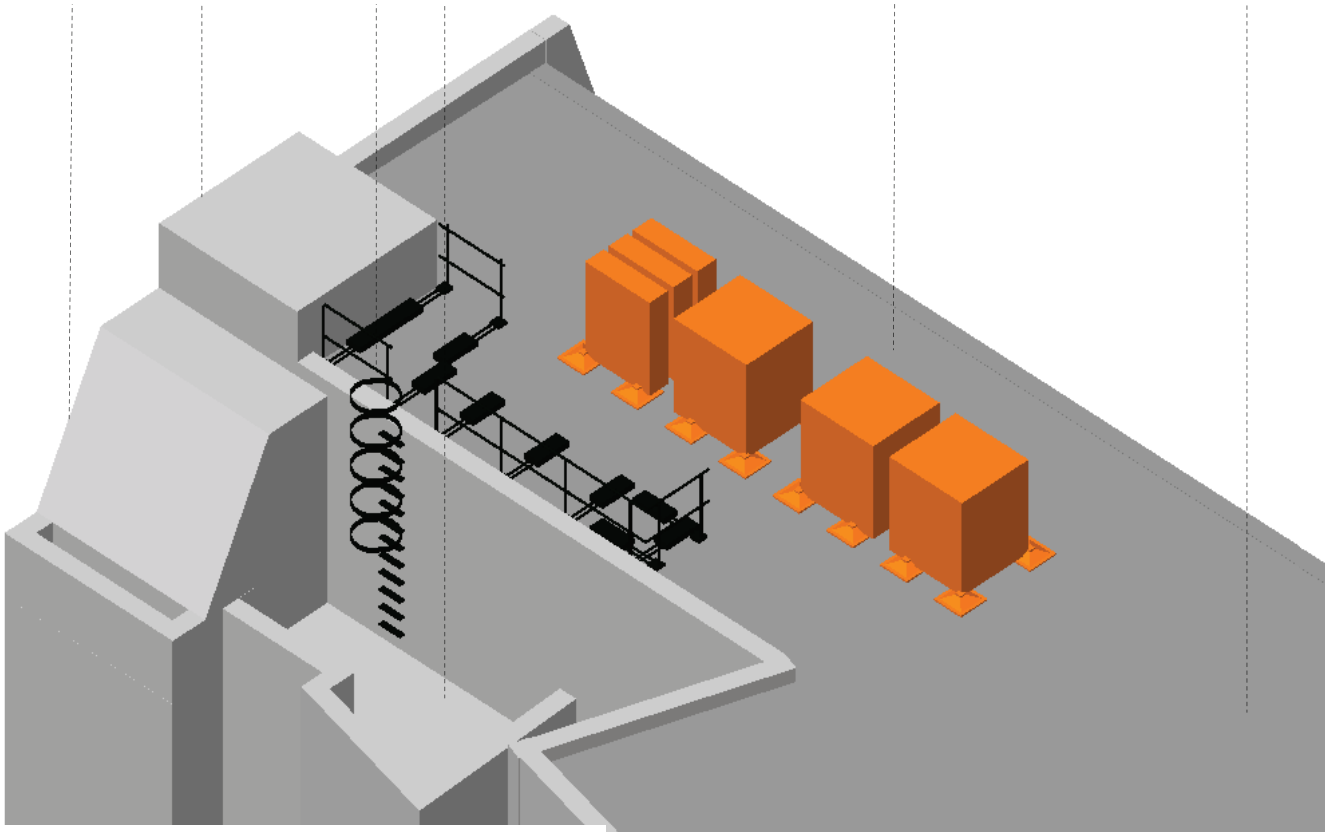


FIGURE 18. PROPOSED ROOFTOP PLANT ACCESS

6.1 This proposed units are located in the centre of the existing flat roof. Safe maintenance access will be provided by the installation of a new cat ladder and perimeter guarding

7.0 SUMMARY AND CONCLUSIONS

7.1 The applicant's successfull business requires an upgrade to the building's A/C installation.

7.2 The proposed new A/C plant installation will consolidate the number of existing rooftop units from 18no. to 4no.

7.3 The new units will be quieter than the majority of the existing units.

7.4 The units are located in the centre of the flat roof area to reduce acoustic and visual impact.

FIGURE 19. STREET LEVEL VIEWS