VALCOUSTICS
Canada Ltd.
Sound solutions to acoustical challenges
Celebrating over 60 years
30 Wertheim Court, Unit 25
Richmond Hill, Ontario, Canada, L4B 1B9
email • solutions@valcoustics.com
web • www.valcoustics.com
telephone • 905 764 5223
fax • 905 764 6813

March 20, 2023

Tatham Engineering Ltd.
115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario
L9Y 5A6

Attention: Andrew Schoof
aschoof@tathameng.com

VIA E-MAIL

Re: Environmental Noise Study – Addendum #1 (revised and redlined)
655 Hurontario Street
Collingwood, Ontario
VCL File: 116-0451.100

Valcoustics Canada Ltd. (VCL) previously prepared an Environmental Noise Study, dated May 1, 2017, for the proposed residential development at 655 Hurontario Street in the Town of Collingwood. This addendum addresses changes to the mechanical design for the proposed development.

1.0 INTRODUCTION

In the original design, air conditioning of the suites was to be provided by individual suite PTAC units, with each unit interfacing with the outdoors. In accordance with the memo provided by Remy Consulting Engineers Ltd. (dated February 23, 2021), the air conditioning is now to be provided by three "small" fan units on the roof of the building. The memo is attached to this addendum for reference.

This addendum letter provides updated predictions of the noise impacts of the proposed development on the neighbouring properties.

2.0 STATIONARY NOISE IMPACTS

2.1 NOISE SOURCES

As noted above, the proposed development is expected to include 3 "small" fan units on the roof to provide heating and cooling to the suites. Remy Engineering has provided sound level data for City Multi Model PURY-HP240TSNU-A units (see attached memo for sound level data).

2.2 NOISE IMPACT ASSESSMENT

The following procedures were used to assess potential noise impacts of the proposed residential development on the environment:

- A 3-D acoustic model of the relevant sources, identified above, as shown in Figure 1, was developed using CadnaA V2021 MR2 environmental noise modelling software, which follows the protocol of the ISO Standard 9613-2, "Acoustics – Attenuation of Sound During Propagation in Outdoors", to determine the predicted sound exposures at each of the receptor locations. Accounting for distance attenuation, ground attenuation, atmospheric effects and inherent screening, where present, the sound level (1 hour Leq) was calculated.

- Flat topography was used in the analysis.

- A calculation height of 4.5 m was used for the point receptor (R1) to represent the 2nd floor of the existing 2-storey residential developments to the east of the subject site. The noise contours (lines of equal sound level) were calculated at a height of 1.5m above grade which is appropriate for outdoor points of reception.

- The acoustic model includes 3 rooftop "small fan units" as provided by Remy Engineering (sound power of 88 dBA). The noise impacts were assessed based on a 100% duty cycle during the day and evening, and at 50% duty cycle at night. The acoustic model also includes a make-up air unit (assumed to have a sound power of 88 dBA as sound data is not yet available). The make-up air unit is assumed to operate at 100% duty cycle in all hours of the day, evening, or night.

- The exclusion MOE guideline limits of 50 dBA daytime (0700-2300 hours) and 45 dBA nighttime (2300-0700 hours) were used in the assessment. This is considered conservative as there may be traffic on the nearby roads and as a result there may be higher ambient sound levels.

Figure 1 shows the predicted unmitigated sound level contours (50dBA yellow line, 45 dBA green line, and 40 dBA cyan line). For the daytime/evening scenario, the 50 dBA contour does not extend beyond the property line in any direction. For the nighttime scenario, the 45 dBA contour does not extend beyond the property line in any direction. The sound level limits are also met at the 2nd floor point receptor. Additional data for the acoustical model is also appended to this letter (showing sound power data for all sources and duty cycle data).

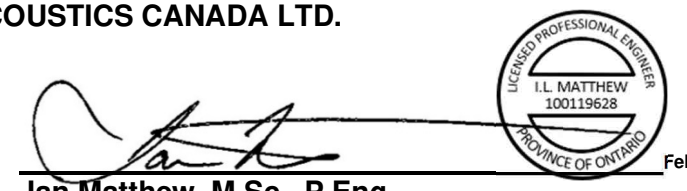
Based on the above, mitigation is not recommended for the updated mechanical design. Note that if the equipment selection or design changes, the analysis should be updated. Also, the analysis should be confirmed once sound data is available for the make-up-air (MUA) unit).

3.0 CONCLUSIONS

The updated mechanical design is expected to meet the sound level limits at the neighbouring properties without the inclusion of additional noise mitigation measures. The analysis should be updated if the mechanical design changes and/or when additional sound data for the equipment becomes available.

Yours truly,

VALCOUSTICS CANADA LTD.

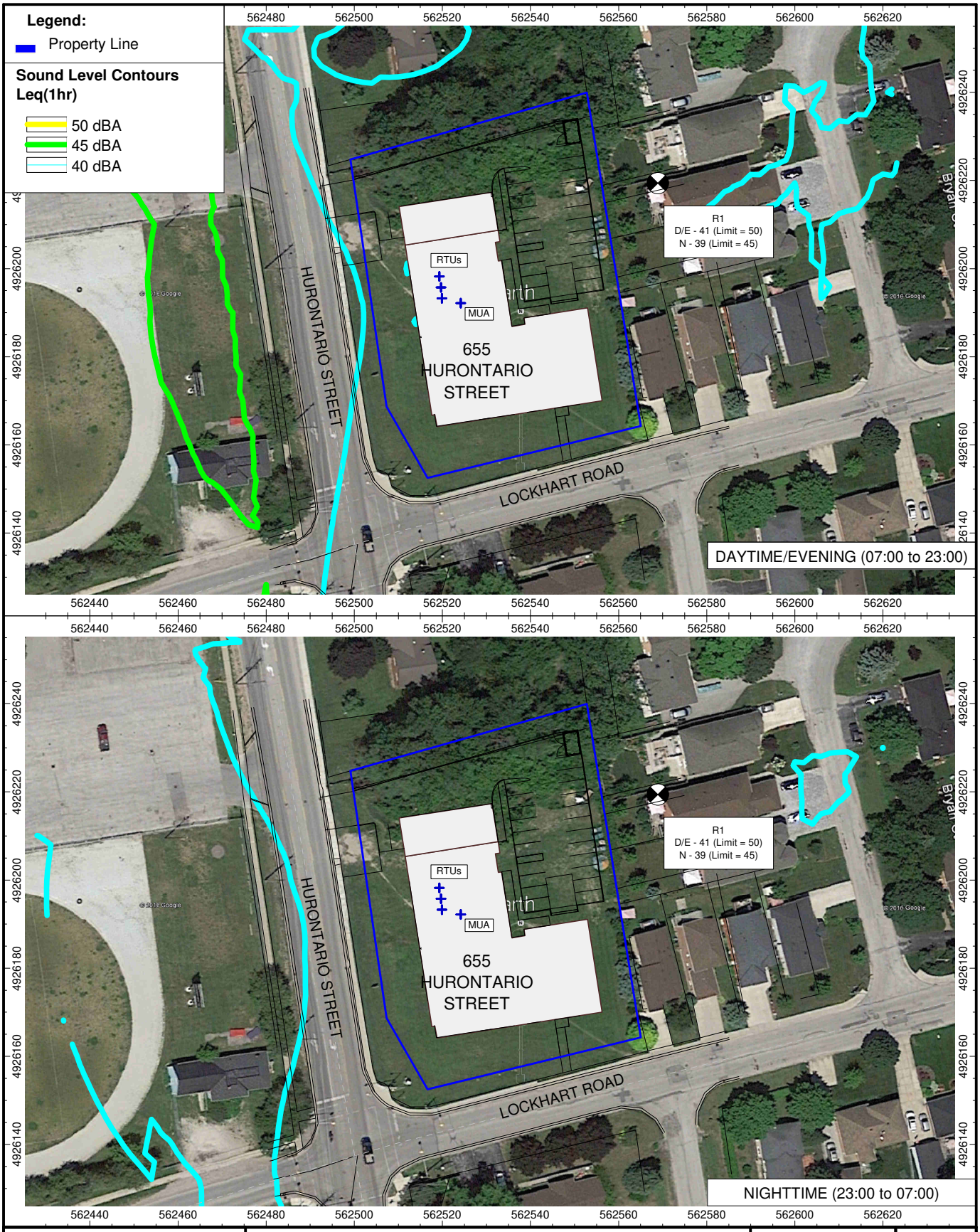
Per: 

Feb 16, 2023

Ian Matthew, M.Sc., P.Eng.

ILM
J:\2016\1160451\100\Letters\L1 Hurontario Collingwood - Mechanical Update v2_0.docx

Enclosures



VALCOUSTICS Canada Ltd. consulting acoustical engineers	Title: **Predicted Sound Levels due to HVAC Units**	Date: **May 6, 2022**	Figure: **1**
	Project Name: **655 Hurontario Street (formerly 1 Lockhart Road)**	Project No.: **116-0451-100**	

Date Plotted: 06.05.22

Point Sources

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
RTU1		RTU1	88.0	88.0	88.0	Lw	CityMulti		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	1.80	g	562519.33	4926198.21	15.00
RTU2		RTU2	88.0	88.0	88.0	Lw	CityMulti		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	1.80	g	562519.66	4926195.75	15.00
MUA		MUA	88.0	88.0	88.0	Lw	CityMulti		0.0	0.0	0.0							0.0		(none)	1.80	g	562524.16	4926192.16	15.00
RTU3		RTU3	88.0	88.0	88.0	Lw	CityMulti		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	1.80	g	562519.89	4926193.28	15.00

February 23rd, 2021

Ms. Sandra Sammut
Trade X
#29-5200 Dixie Road
Mississauga, ON L4W 1E4

Lockhart Road Collingwood
Building Heating and Cooling
Variable Refrigerant Flow System

Dear Ms. Sammut;

RCEL has performed the preliminary review of the heating and cooling for his building. For this building RCEL, does not usually consider the older style Packaged Terminal Air Conditioners (PTAC). They are noisy, less efficient, and do not provide an adequate level of precise temperature control. Our recommendation is to design the building heating and cooling using a variable refrigerant flow system to provide simultaneous heating, cooling and ventilation for each dwelling unit. These systems are 25-40% more efficient. The fan coil unit itself will be horizontal and can be hidden in a 12" deep bulkhead within the foyer.

The heating and cooling would be through three "small" fan units located on the roof next adjacent to the make-up air unit. Following the technical memorandum prepared by Valcoustics, dated August 19th, 2019, the proposed split heating and cooling system is keeping with their summary statement *"However, in our experience, these types of units (PTAC) can cause significant noise and vibration issues within the development itself. If possible, suite HVAC units that have a separate outdoor condenser or simple fan coil units connected to a central cooling system should be considered."*

For this development, we anticipate three outdoor condensers, each nominally rated 20 tons. Please refer to **Appendix A** for catalogue information (including sound power level) of the proposed outdoor condenser.

If you require additional information, please contact our office.

Yours truly,

Remy Consulting Engineers Ltd.

Mark Greenhill, P.Eng.
Senior Mechanical Engineer

Cc Mr. Andy Ghadban, Mr. Tim Fanstone

APPENDIX A

CITY MULTI® Model: PURY-HP240TSNU-A

Job Name:

Schedule Reference: | Date:

Minimum Operating Temperature
Heating (Outdoor): -25°F (-32°C) WB
Below -22°F (-30°C) WB, an auxiliary heating source is highly recommended.

ACCESSORIES

☐ Snow/Wind Guards - (See seperate submittal)

Note: Mitsubishi Electric (MESCA) supports the use of only MESCA supplied and approved Snow Guard / Wind Deflectors / Windscreens and accessories for proper functioning of the unit(s). Use of non-MESCA supported Snow Guard / Wind Deflectors / Windscreens and accessories will affect warranty coverage.

Outdoor Model				PURY-HP240TSNU-A	
Indoor Model				Non-Ducted	Ducted
Power source				3-phase 3-wire 208-230 V ±10% 60 Hz	
Cooling capacity *1 (Nominal)			BTU/h	240,000	
			kW	70.3	
		Power input	kW	20.08	
	(208-230)	Current input	A	61.9-56.0	
	(Rated)		BTU/h	228,000	
			kW	66.8	
		Power input	kW	18.72	18.45
	(208-230)	Current input	A	57.7-52.2	56.9-51.4
Temp. range of cooling		Indoor	W.B.	59~75°F (15~24°C)	
		Outdoor	D.B.	23~126°F (-5~52°C)	
Heating capacity *2 (Nominal)			BTU/h	270,000	
			kW	79.1	
		Power input	kW	22.45	
	(208-230)	Current input	A	69.2-62.6	
	(Rated)		BTU/h	258,000	
			kW	75.6	
		Power input	kW	20.64	20.92
	(208-230)	Current input	A	63.6-57.5	64.5-58.3
Temp. range of heating		Indoor	D.B.	59~81°F (15~27°C)	
		Outdoor	W.B.	-22~60°F (-30~15.5°C)	
Indoor unit connectable		Total capacity		50~150% of outdoor unit capacity	
		Model/Quantity		P05~P96/2~50	
Sound pressure level (measured in anechoic room) *3			dB <A>	67.0/68.0	
Sound power level (measured in anechoic room) *3			dB <A>	87.0/88.0	
Refrigerant piping diameter		High pressure	in. (mm)	7/8 (22.2) Brazed (1-1/8 (28.58) Brazed for the part that exceeds 65 m)	
		Low pressure	in. (mm)	1-3/8 (34.93) Brazed	

Set Model

Model			PURY-HP120TNU-A	PURY-HP120TNU-A
Minimum Circuit Ampacity (*)		A	47-44	47-44
Maximum Overcurrent Protection (*)		A	70-60	70-60
FAN	Type x Quantity		Propeller fan x 2	Propeller fan x 2
	Airflow rate	cfm	9,550	9,550
		m3/min	270	270
		L/s	4,500	4,500
	Control, Driving mechanism		Inverter-control, Brushless DC motor	Inverter-control, Brushless DC motor
	Motor output	kW	0.46+0.46	0.46+0.46
*4	External static press.		0 in.WG (0 Pa)	0 in.WG (0 Pa)
Compressor	Type x Quantity		Inverter scroll hermetic compressor x 1	Inverter scroll hermetic compressor x 1
	Manufacture		AC&R Works, MITSUBISHI ELECTRIC CORPORATION	AC&R Works, MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter	Inverter
	Motor output	kW	7.8	7.8
	Case heater	kW	-	
	Lubricant		MEL46	MEL46
External finish			Pre-coated galvanized steel sheet <MUNSELL 5Y 8/1>	Pre-coated galvanized steel sheet <MUNSELL 5Y 8/1>
External dimension H x W x D		in.	71-5/8 x 49-1/4 x 29-3/8	71-5/8 x 49-1/4 x 29-3/8
		mm	1,818 x 1,250 x 745	1,818 x 1,250 x 745
Protection devices	High pressure protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter circuit (COMP./FAN)		Over-heat protection, Over-current protection	Over-heat protection, Over-current protection
	Fan motor		-	-
Refrigerant	Type x original charge		R410A x 23 lbs + 12 oz (10.8 kg)	R410A x 23 lbs + 12 oz (10.8 kg)
	Control		Indoor LEV and BC controller	
Net weight		lbs (kg)	662 (300)	662 (300)
Heat exchanger			Salt-resistant cross fin & copper tube	Salt-resistant cross fin & copper tube
HIC circuit (HIC: Heat Inter-Changer)			-	-
Pipe between unit and distributor	High pressure	in. (mm)	3/4 (19.05) Brazed	3/4 (19.05) Brazed
	Low pressure	in. (mm)	1-1/8 (28.58) Brazed	1-1/8 (28.58) Brazed
Defrosting method			Auto-defrost mode (Reversed refrigerant cycle)	
Optional parts			Outdoor Twinning kit: CMY-R200NCBK Joint: CMY-Y102SS-G2,CMY-Y102LS-G2,CMY-Y202S-G2,CMY-R160-J1 CMY-R201,202,203,204,205,306S-G, CMY-R302,303,304,305S-G1 Main BC controller: CMB-P108,1012,1016NU-JA1,CMB-P1016NU-KA1 Sub BC controller: CMB-P104,108NU-KB1	

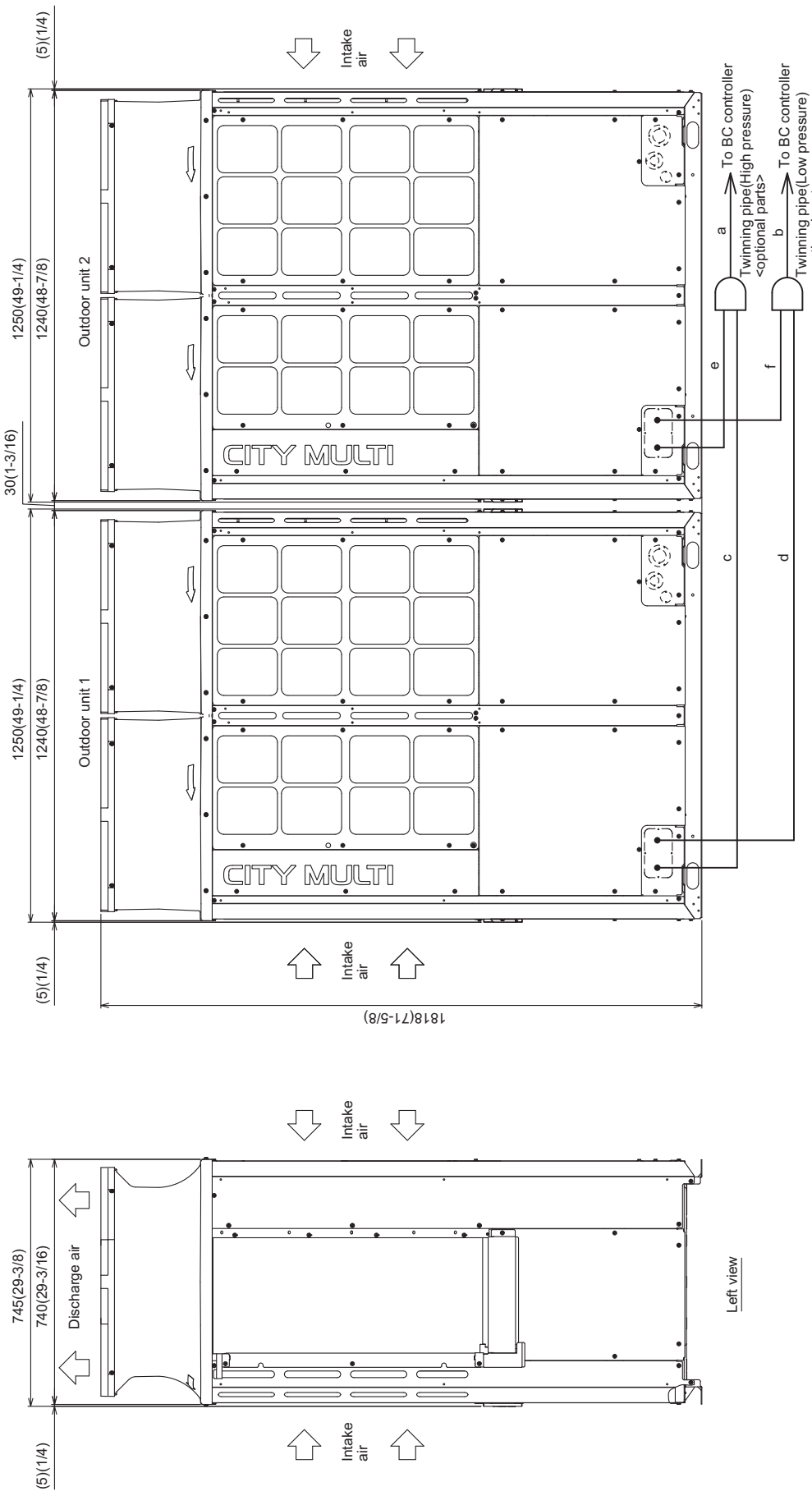
Notes:
1.Nominal cooling conditions (Test conditions are based on AHRI 1230)
Indoor: 80°FD.B./67°FW.B. (26.7°CD.B./19.4°CW.B.), Outdoor: 95°FD.B. (35°CD.B.)
2.Nominal heating conditions (Test conditions are based on AHRI 1230)
Indoor: 70°FD.B. (21.1°CD.B.), Outdoor: 47°FD.B./43°FW.B. (8.3°CD.B./6.1°CW.B.)
3.Cooling mode/Heating mode
4.External static pressure option is available (0.12 in.WG, 0.24 in.WG, 0.32 in.WG/30 Pa, 60 Pa, 80 Pa).

Specifications are subject to change without notice.

* All electrical work shall comply with National (CEC) and local codes and regulations.

Should this document be altered or changed without MESCA's permission, it becomes null and void. MESCA assumes no responsibility for any consequences in such cases.

Module: PURY-HP240TSNU-A - DIMENSIONS



		Unit model	High pressure	Low pressure
			c or e	d or f
Twinning pipe–Outdoor unit		HP72	ø15.88(5/8)	ø19.05(3/4)
		HP96	ø19.05(3/4)	ø22.2(7/8)
		HP120	ø19.05(3/4)	ø28.58(1-1/8)

Unit: mm (in.)

Twinning pipe connection size

Package unit name			PURY-HP144TSNU-A	PURY-HP192TSNU-A	PURY-HP240TSNU-A
Component unit name	Outdoor unit 1		PURY-HP72TNU-A	PURY-HP96TNU-A	PURY-HP120TNU-A
	Outdoor unit 2		PURY-HP72TNU-A	PURY-HP96TNU-A	PURY-HP120TNU-A
Outdoor Twinning Kit(optional parts)			CMY-R100NCBK	CMY-R200NCBK	
BC controller –Twinning pipe	High pressure	a	ø22.2(7/8)	ø22.2(7/8)(ø28.58(1-1/8)) *	
	Low pressure		ø28.58(1-1/8)	ø34.93(1-3/8)	

* When the piping length is 65m(213ft) or longer,
use the ø28.58(1-1/8) pipe for the part that exceeds 65m(213ft).

Note 1. Connect the pipes as shown in the figure above. Refer to the table above for the pipe size.

2. Twinning pipes should not be tilted more than 15 degrees from the horizontal plane.
Be sure to see the Installation Manual for details of Twinning pipe installation.

3. The pipe section before the Twinning pipe (section "a"and "b"in the figure) must have at least 500mm(19-11/16) of straight section
(*including the straight pipe that is supplied with the Twinning pipe).

4. Only use the Twinning pipe by Mitsubishi (optional parts).

Specifications are subject to change without notice.