



5 November 2018

Our Ref: 16SYA0024 L08_0 Design of Mech Plant & Equip

Your Ref:

Attention: Jane McGarry

Conrad Gargett

Suite C3.18 / 22-36 Mountain Street

Ultimo NSW 2007

Dear Jane,

RE: Smalls Road Public School

Operational Noise – Design of Mechanical Plant and Equipment

TTM has reviewed the design of mechanical plant and equipment for the proposed Smalls Road Public School. The review includes the following:

- Specification and location of all mechanical plant and equipment
- Noise emission levels of all mechanical plant and equipment
- Comparison of emissions levels to the recommendations contained in the Noise Impact Report, prepared by TTM Consulting (Report Ref.: 16SYA0024 R06_0, dated 7 August 2017).

1. Specification and Location of Plant and Equipment

The specification of plant and equipment relevant to this review is summarised in Table 1.

Table 1: Specification of plant and equipment

AC UNIT NO		AC-GL-COM-01/02	AC-L1-143-01	AC-L1-144-01	AC-L1-147-01	AC-L1-154-01
NUMBERS OF		2				
CU UNIT NO		CU-GL-COM-01	CU-L1-143-01	CU-L1-144-01	CU-L1-147-01	CU-L1-154-01
LOCATION (Supplying)		GROUND LEVEL	LEVEL 1	LEVEL 1	LEVEL 1	LEVEL 1
SERVING		G-02	L1-41,42,43	L1-44	L1-47,49	L1-52,53,54
MANUFACTURER		DAIKIN	DAIKIN	DAIKIN	DAIKIN	DAIKIN
TYPE		Wall Mounted VRV IV S	Ducted Split	Ducted Split	Ducted Split	Ducted Split
MODEL	INDOOR	FXAQ63PVE	FDYQN200LBV1	FDYQN160LAV1	FDYQN200LBV1	FDYQN200LBV1
	OUTDOOR	RXYMQ6AV4A	RZQ200LY1	RZQ160LV1	RZQ200LY1	RZQ200LY1
SUPPLY AIR (l/s)		317	750	500	750	750
OUTSIDE AIR (l/s)		NA	225	220	225	225
EXTERNAL STATIC (Pa)		NA	200	200	200	200
TOTAL COOLING CAPACITY (kW)		7.2	17.5	13.6	17.5	17.5
SENSIBLE COOLING CAPACITY (kW)		4.5	12.0	8.0	12.0	12.0
HEATING CAPACITY (kW)		-	9.0	6.5	9.0	9.0
POWER INPUT (kW)		4.1	7.0	4.7	7.0	7.0
APPLICABLE CONTROLS SECTION		COOLING ONLY				
NOTES/COMMENTS			Unit to have provision for interlocking motion sensor e.g. Dry Contact T1/T2 Terminals.	Unit to have provision for interlocking motion sensor e.g. Dry Contact T1/T2 Terminals.	Unit to have provision for interlocking motion sensor e.g. Dry Contact T1/T2 Terminals.	Unit to have provision for interlocking motion sensor e.g. Dry Contact T1/T2 Terminals.

Outdoor condenser units are proposed as follows:

1. Refer to Figure 1: One unit located on Ground floor, North section of the building, adjacent to Room G-02, referenced as follows:
 - CU-GL-COM-01
2. Refer to Figure 2: Four units located on the rooftop, West section of the building, referenced as follows:
 - CU-L1-143-01
 - CU-L1-144-01
 - CU-L1-147-01
 - CU-L1-154-01

Figure 1: Location of Condenser Units on Ground floor

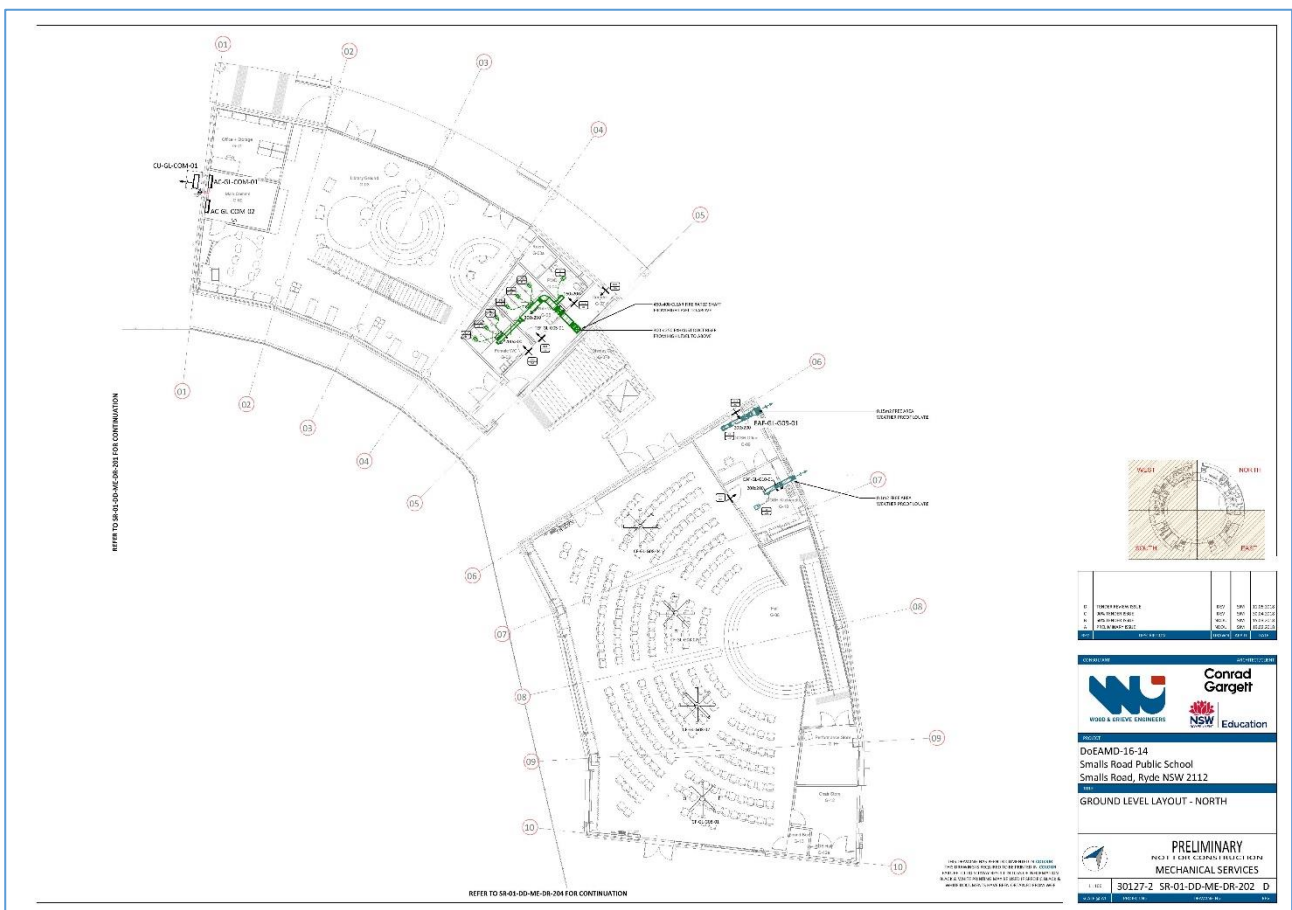
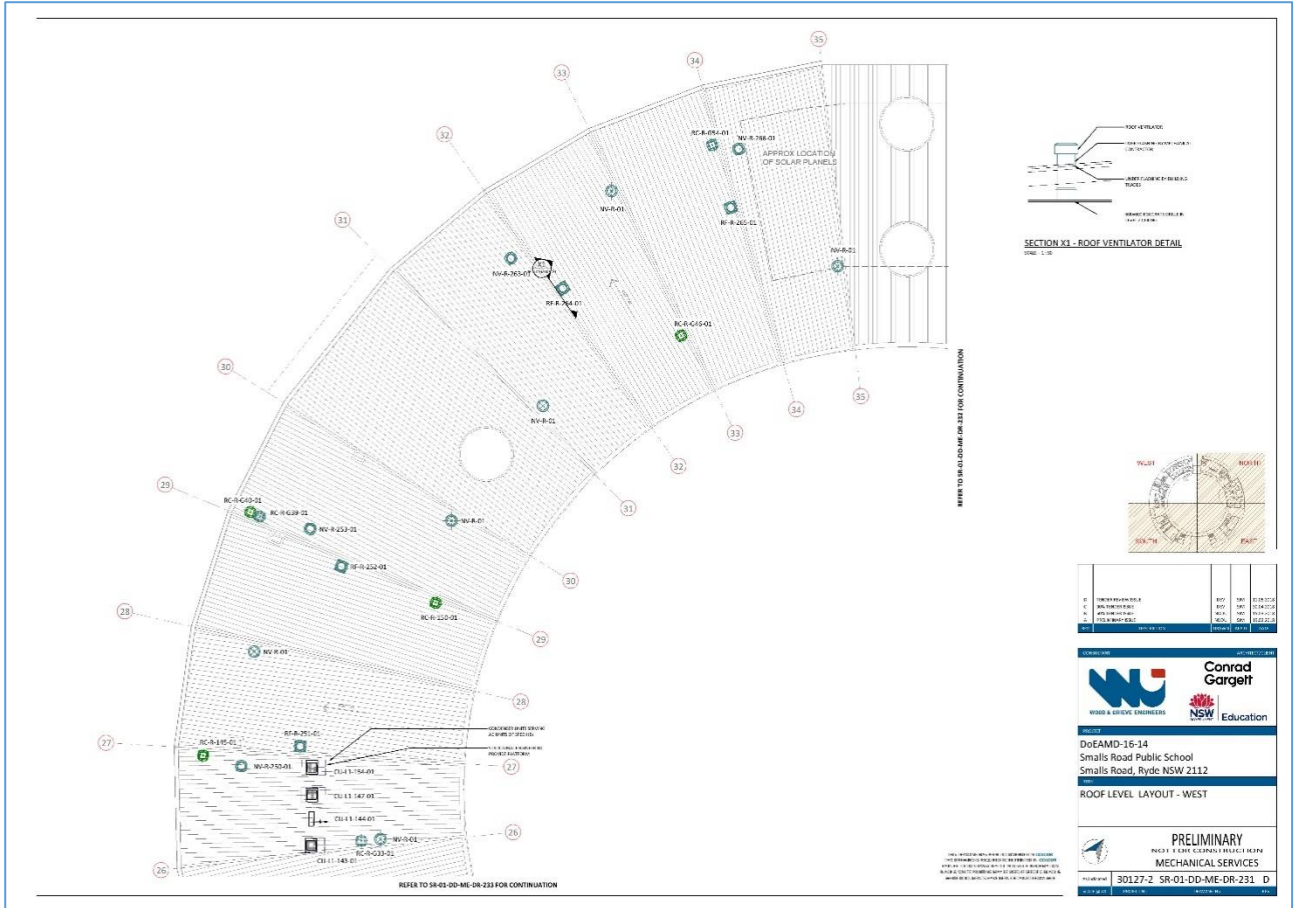


Figure 2: Location of Condenser Units on rooftop



2. Comparison of Noise Emissions Levels and Criteria

The noise emissions levels of the condenser units have been compared to the applicable environmental noise criteria and are summarised in Table 2.

Table 2: Comparison of Noise Emissions Levels and Criteria

CU UNIT NO	CU-GL-COM-01	CU-L1-143-01	CU-L1-144-01	CU-L1-147-01	CU-L1-154-01
LOCATION (Refer to Figure 1 & Figure 2)	Ground Level	Rooftop	Rooftop	Rooftop	Rooftop
OUTDOOR SOUND PRESSURE LEVEL @1m*	57 dB(A)	57 dB(A)	59 dB(A)	57 dB(A)	57 dB(A)
NOISE LIMIT @1m#	72 dB(A) L_{eq}				
COMPLIANCE ACHIEVED?	✓	✓	✓	✓	✓
Note: *Refer to Appendix A - Specification Sheet # Refer to Section 7.3 of the Noise Impact Report prepared by TTM Consulting, dated 7 th August 2017 (Report Ref.: 16SYA0024 R06_0)					

The noise emission levels are all less than the noise limit of 72 dB(A) by 13-15 dB. No additional noise mitigation measures are required in the design.

3. Conclusion

Based on the review of the proposed outdoor condenser units contained in this letter, noise emissions are not expected to exceed the noise criteria derived in the Noise Impact Report, prepared by TTM Consulting (Report Ref.: 16SYA0024 R06_0, dated 7 August 2017).

No additional noise mitigation measures are required in the design.

Yours sincerely,



Keshav Dhayam

Lead Consultant

TTM Consulting Pty Ltd



Appendix A Specification Sheet

MODEL		RXYMQ6AV4A	
Power Supply			1-phase, 230-240 V, 50 Hz
Cooling Capacity		kcal/h	13,800
		Btu/h	54,600
		kW	16
Heating Capacity		kcal/h	15,500
		Btu/h	61,400
		kW	18
Power Consumption	Cooling	kW	4.14
	Heating		4.07
Capacity Control		%	16 to 100
Casing Colour			Ivory white (5Y7.5/1)
Compressor	Type		Hermetically sealed swing type
	Motor Output	kW	3.5
Airflow Rate		l/s	1,767
		m ³ /min	106
Dimensions (HxWxD)		mm	1,345 x 900 x 320
Machine Weight		kg	104
Sound level (Cooling/Heating)		dB(A)	55/56
Sound power		dB(A)	73
Operation Range	Cooling	°CDB	-5 to 46
	Heating	°CWB	-20 to 15.5
Refrigerant	Type		R-410A
	Charge	kg	3.6
Piping connections	Liquid	mm	ø9.5 (Flare)
	Gas		ø19.1 (Flare)
Connectable Units			Up to 9

PRODUCT SPECIFICATION

Standard Inverter - Single + Three Phase



INDOOR UNIT OUTDOOR UNIT	SINGLE PHASE											THREE PHASE		
	RYQV17LB RZQ17LB	RYQV100LB RZQ100L	RYQV125LB RZQ125L	RYQV180LB RZQ180L	RYQV280LB RZQ280L	FDYQV17LA RZQ17LA	FDYQV100LA RZQ100LA	FDYQV125LA RZQ125LA	FDYQV180LA RZQ180LA	FDYQV280LA RZQ280LA	RYQV280LB RZQ280LB	RYQV420LB RZQ420LB	RYQV560LB RZQ560LB	
Rated Capacity	7.1	10.0	12.5	14.0	15.5	18.0	20.0	22.4	26.8	30.0	20.0	23.5		
Capacity Range	3.2-7.1	5.0-10.0	5.7-12.5	6.2-14.0	7.5-15.5	10.0-18.0	12.0-20.0	13.2-22.4	15.0-23.5	18.0-26.8	12.0-20.0	15.0-23.5		
Power Input (Rated)	3.5-7.5	5.1-12.5	6.0-15.0	6.7-16.5	7.3-18.0	12.0-20.0	13.2-22.4	15.0-23.5	18.0-26.8	21.0-29.0	12.0-20.0	15.0-23.5		
Power Input (Range)	2.2-4.8	3.5-9.5	4.1-10.0	4.5-11.0	5.0-12.0	8.0-16.0	9.0-18.0	10.0-20.0	12.0-24.0	14.0-28.0	8.0-16.0	10.0-20.0		
EEER (COP)	3.15/2.27	3.21/2.46	3.02/2.35	3.01/2.08	3.12/2.73	3.02/2.25	3.11/2.70	2.98/2.16	3.12/2.70	3.11/2.70	2.98/2.16	3.11/2.70		
Airflow Rate (Rated)	566	800	840	1000	1120	1180	1200	1400	1600	1800	1200	1400		
Airflow Rate Level (H @ 1.5m)	41	44	45	46	48.5	50.5	45	44	48.5	50	44	48.5		
Pipe Length (ft)	50		75											
Indoor Fan Speeds	H/M/L													
Dimensions (HxWxD)	300x330x663	350x145x686	350x145x686	350x145x686	350x145x686	500x170x670	500x170x670	500x145x670	500x145x670	500x145x670	500x145x670	500x145x670		
Weight	40	44	51	61	61	79	86	86	92	100	80	92		
Power Supply	1 Phase, 220-240V, 50Hz													
Compressor Type	Hermetically Sealed Scroll Type													
Refrigerant Type	R410A													
Pipe Sizes	Liquid (mm)	9.5 (3/8")												
	Gas (mm)	15.9 (3/4")												
	Drain (mm)	10.25 (3/8")												
Supply Air Opening	mm (HxW, Flange)	185x652	246x852	246x852	243x1152	376x827	376x827	376x827	376x827	376x827	376x827	376x827		
Return Air Opening	mm (HxW, Flange)	1400 (Dual)	1400 (Dual)	1400 (Dual)	1400 (Dual)	1500 (18 Flange)	1500 (18 Flange)	1500 (18 Flange)	1500 (18 Flange)	1500 (18 Flange)	1500 (18 Flange)	1500 (18 Flange)		
Outdoor Operating	Heat (COP)	5 to 46												
	Heat (COP)	-15 to 16												
EPA Sound Power Level	dBA	69	69	69	69	69	69	69	69	69	69	69		
Outdoor Sound Level (H @ 1m)	dBA (CH)	49/51	51/53	54/56	57/59	57/59	57/59	57/59	57/59	57/59	57/59	57/59		

Note:
 1. The Rated Capacity, Power Input and Running Current are measured in accordance with AS/NZS 3823.2
 Cooling Indoor Temp. 27°C (81°F) CWB, Outdoor Temp. 35°C (95°F) CWB
 Heating Indoor Temp. 20°C (68°F) CWB, Outdoor Temp. 7°C (45°F) CWB
 ii. Indoor and outdoor sound levels are determined in an anechoic chamber and may differ once the unit is installed due to ambient conditions

PRODUCT SPECIFICATION

FBO - Single + Three Phase



INDOOR UNIT OUTDOOR UNIT	SINGLE PHASE					THREE PHASE				
	FBO100E RZQ5100A	FBO150E RZQ550A	FBO200E RZQ590A	FBO300E RZQ571A	FBO500E RZQ5100A	FBO100E RZQ5100A	FBO150E RZQ550A	FBO200E RZQ590A	FBO300E RZQ571A	FBO500E RZQ5100A
Rated Capacity	5.0	5.8	7.0	7.1	10.0	5.0	5.8	7.0	7.1	10.0
Capacity Range	6.0	7.0	8.0	8.0	11.2	6.0	7.0	8.0	8.0	11.2
Power Input (Rated)	3.2-5.6	3.2-5.6	3.2-5.6	3.2-5.6	5.0-11.2	3.2-5.6	3.2-5.6	3.2-5.6	3.2-5.6	5.0-11.2
Power Input (Range)	1.35-3.5	1.35-3.5	1.35-3.5	1.35-3.5	1.99-5.12	1.35-3.5	1.35-3.5	1.35-3.5	1.35-3.5	1.99-5.12
EEER (COP)	1.43	1.39	1.36	1.36	2.73	1.43	1.39	1.36	1.36	2.73
Airflow Rate (Rated)	270/230	365/320	357/310	357/310	265/237	270/230	365/320	357/310	357/310	265/237
Airflow Rate Level (H @ 1.5m)	380	380	380	380	383	380	380	380	380	383
Pipe Length (ft)	35	35	35	35	38	35	35	35	35	38
Indoor Fan Speeds	H/M/L									
Dimensions (HxWxD)	265x300x680	265x300x680	265x300x680	265x300x680	265x300x680	265x300x680	265x300x680	265x300x680	265x300x680	265x300x680
Weight	37	37	37	37	47	37	37	37	37	47
Power Supply	1 Phase, 220-240V, 50Hz									
Compressor Type	Hermetically Sealed Scroll Type									
Refrigerant	R410A									
Pipe Sizes	Liquid (mm)	9.5 (3/8")								
	Gas (mm)	15.9 (3/4")								
	Drain (mm)	10.25 (3/8")								
Supply Air Opening	mm (HxW, Flange)	176x292								
Return Air Opening	mm (HxW, Flange)	208x352								
Outdoor Operating	Heat (COP)	5 to 46								
	Heat (COP)	-15 to 16								
EPA Sound Power Level	dBA	65	65	65	65	69	69	69	69	69
Outdoor Sound Level (H @ 1m)	Pressure (dBA, CH)	48/50	48/50	48/50	48/50	56/52	56/52	56/52	56/52	56/52

Note:
 1. The Rated Capacity, Power Input and Running Current are measured in accordance with AS/NZS 3823.2
 Cooling Indoor Temp. 27°C (81°F) CWB, Outdoor Temp. 35°C (95°F) CWB
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 ii. Indoor and outdoor sound levels are determined in an anechoic chamber and may differ once the unit is installed due to ambient conditions

