ENVIRONMENTAL NOISE ASSESSMENT R1

A.Y. JACKSON S.S. BUILDING ADDITION OTTAWA, ON

For Edward J. Cuhaci and Associates Architects Inc.

> Prepared by State of the Art Acoustik Inc.

> > Report Date: 2025-04-24



2025-04-24

Xu Feng, OAA | Senior Principal
Edward J Cuhaci and Associates Architects Inc.
171 Slater Street, Suite 100, Ottawa, Ontario K1P 5H7
t 613.236.7135 f 613.236.1944
xuf@cuhaci.com

Cuhaci – OCDSB A.Y. Jackson Secondary School Stationary Noise Study R1

Dear Feng,

This report assesses the environmental noise impact of the proposed addition to A.Y. Jackson Secondary School at 150 Abbeyhill Drive, Kanata onto nearby noise-sensitive residences. The calculations and methodology presented here comply with the 2016 City of Ottawa Environmental Noise Control Guidelines (ENCG) as well as the Ministry of Environment, Conservation and Parks' (MECP) publication NPC-300. It was determined that a traffic noise study was not required for this project per NPC-300 and only a stationary noise assessment was required.

The noise impact from the mechanical and electrical equipment to the surrounding area is not expected to exceed the ENCG limit of 45 dBA at night. No acoustic mitigation measures are required.

Should you have any questions regarding this report, please do not hesitate to contact us.

Sincerely,

Tiffany-Rose Filler, M.Sc. Acoustic Consultant



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1.0 Introduction & Site Description

Edward J. Cuhaci and Associates Architects Inc. has commissioned State of the Art Acoustik Inc. to conduct a noise study for a new two-storey addition to be located southeast of the existing A.Y. Jackson Secondary School at 150 Abbeyhill Drive in Kanata, Ontario. The site is situated in a predominantly residential area. We have assessed the site for traffic noise and environmental noise impact as per the 2016 City of Ottawa Environmental Noise Control Guidelines (ENCG) which are expanded upon in **Sections 2.0 and 3.0**, respectively.

1.1 Scaled Area Location Plan

Figure 1.1 shows a satellite view of the site and surrounding area and **Figure 1.2** shows the site plan for the new development. The site is adjacent to several noise sensitive buildings, primarily detached homes and townhouses.



Figure 1.1 – Surrounding area around the A.Y. Jackson Secondary School (Google Earth Pro)





Figure 1.2 – Site plan of the A.Y. Jackson Secondary School

The A.Y. Jackson Secondary School and its surrounding area will be classified as a Class 2 area according to the 2016 City of Ottawa Environmental Noise Control Guidelines (ENCG).

2.0 Traffic Noise Assessment

Traffic noise sources for this site were identified using the City of Ottawa's geoOttawa website, which highlights roads and railways that should be considered as traffic noise sources. As the baseball diamond is not classified as a noise-sensitive area under ENCG (2016), the traffic noise analysis was conducted solely for the school addition. For the future building addition, the nearby road and rail noise sources are as follows:

Roads and Railways	Road/Rail Classification	Distance to Façade ¹	Exclusionary Distance Limit
Abeyhill Drive	Collector	116 metres	100 meters
Old Colony Road	Collector	220 metres	100 meters
Castlefrank Road	Major Collector	200 metres	100 meters

¹Note: The Distance to the Façade Line is calculated from the façade of the proposed development to the right-of-way of the road/railway.

Table 2.1 – List of nearby road noise sources

The noise source must be analyzed when the listed distance to the property line is lower than the respective exclusionary distance limit. Based on the distances in **Table 2.1**, an analysis of the impact of traffic noise is not required for AY Jackson SS.



3.0 Environmental Noise Assessment

In this section, we provide our environmental noise assessment from the new building addition on both the surrounding residential area and the school itself. We detail the noise limits, noise sources, points of reception used in our modelling, modelling and calculation procedures, and predicted noise levels.

3.1 Environmental Noise Control Guidelines

This location and the surrounding environment has been classified as being a Class 2 area. Therefore, to comply with the City of Ottawa's Environmental Noise Control Guidelines (ENCG), the facility must meet the MECP limits for Class 2 daytime permissible Sound Pressure Levels (SPL) at nearby noise-sensitive areas, as indicated in **Table 3.1**.

_	Class 2 Area				
Time of Day	Outdoor Point of Reception Plane of Window				
07:00 - 19:00	50	50			
19:00 - 23:00	45	50			
23:00 - 07:00	-	45			

Table 3.1 – Guidelines for Stationary Noise for Class 2 Area (based on Table 3.2a in the ENCG)

For the school building, an institutional noise-sensitive land use, Table 3.2a in Ottawa's ENCG recommends a target of 50 dBA for stationary noise at the plane of the window during operational hours in a Class 2 Area. This is a recommendation rather than a strict requirement, as the noise sources are located on the same property and the school operates only during the day, consistent with typical institutional use considerations.

It should also be mentioned that the MECP allows emergency equipment, such as generators, to be analyzed separately from all other equipment, permitting a limit of 5 dBA over the sound level limits otherwise applicable to stationary sources during non-emergency daytime use, such as testing. However, as no emergency equipment is part of this development, no analysis of emergency equipment is required.

The points of reception (POR) were chosen at the nearest residential homes and the school itself, which will allow us to calculate the largest noise impact and mitigate it accordingly. These are discussed in further detail below.

3.2 Significant Noise Sources

The noise sources that are being considered for this assessment of the mechanical noise to nearby residences are listed in **Table 3.2** below and are placed at the locations indicated in **Figure 3.1**.

Noise Source	Noise Source ID	Quantity	Location
Packaged Rooftop Unit	RTU-1, RTU-2, RTU-3, and RTU-4	4	Rooftop

 Table 3.2 – Quantity and location of noise sources considered.





Figure 3.1 – Illustration showing locations of mechanical equipment on rooftop of A.Y. Jackson Secondary School addition (contoured in red).

The sound power data for the equipment is listed in **Table 3.3**. Cutsheets of sound data for all equipment analyzed are included in the **Appendix.**

Noise Source ID	Octave Band Sound Power Levels (dB)						dBA		
Noise Source ID	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	UDA
RTU-1: Radiated	85	85	81	78	77	73	70	60	82
RTU-2: Radiated	80	74	76	76	76	75	75	66	82
RTU-3 and RTU-4: Radiated	85	85	81	78	76	71	68	60	81

Table 3.3 – Octave band sound power levels of noise sources



3.3 Points of Reception

Points of reception (PORs) have been selected to evaluate the noise levels at locations of nearby noisesensitive buildings. **Figure 3.2** and **Table 3.4** detail the locations and heights of the PORs used.

For the school, PORs were not placed on the southeastern side of the building despite it being closest to the future addition because it features a brick façade with only stairwell windows, which are not considered noise-sensitive locations. Instead, one POR is positioned at the closest window to a noise-sensitive space on the southwestern side, and another at the closest window to a noise-sensitive space on the northeastern side. Both school PORs are located on the first floor.

POR Number	Height (m)	Address	POR Type (Environment / Building Itself)	Daytime Sound Pressure Level Limit (dBA)	Nightime Sound Pressure Level Limit (dBA)
1	1.5	150 Paddock Way	Environmental		45
2	4.5	62 Stokes Crescent	Environmental	50	45
3	1.5	A.Y. Jackson – School POR A	Duilding Itcolf	50	N/A ¹
4	1.5	A.Y. Jackson – School POR B	Building Itself		N/A-

Note¹: Nighttime limits do not apply to school PORs as the building is operational only during daytime hours.

Table 3.4 – POR Locations and Heights along with Daytime/Nighttime Sound Pressure Level Limit (dBA) (based on Table 3.2a in the ENCG)



Figure 3.2 – Illustration showing locations of points of reception for stationary noise assessment of equipment at the new building addition to A.Y. Jackson Secondary School (in red).



3.4 Methodology Used in Environmental Noise Impact Calculation

The following sections describe the methodology and software used to model the sound pressure levels at the points of reception due to the noise sources while considering parameters such as source levels, distance, topography, barriers, and building geometry.

3.5 Procedure Used to Assess Noise Impact at Each Point of Reception

This environmental noise analysis was done using an environmental noise modeling software called CadnaA which references ISO 9613. CadnaA predicts environmental noise through calculations based on a 3D model which uses geometrical, landscape, and topographical data, combined with details of the proposed construction and the noise source power levels.

We created a 3D rendering of the neighbourhood around the building and placed the noise sources in the model at the appropriate locations and then applied the sound power levels described in this report. The resulting sound pressure levels are then calculated at each point of reception.

3.6 Other Parameters/Assumptions Used in Calculations

ParameterValue/ConditionGround Absorption0Building ReflectionsOnTemperature (°C)10Relative Humidity (%)70

The parameters used in the CadnaA model are described in Table 3.5.

Table 3.5 – Parameters used in CadnaA modelling

3.7 Environmental Noise Levels

This section summarizes the CadnaA noise mapping results. **Section 3.2** shows the sound levels from all noise sources with the current equipment for daytime operations. We analyzed the worst-case scenario with all equipment running at full power, as there is no emergency equipment in the building. This ensures we meet the strictest noise limit, which is 45 dBA for nighttime. Although not all equipment operates continuously or simultaneously most of the time, analyzing this worst-case scenario is required per ENCG (2016).



3.7.1 <u>Results with Current Selections for Daytime and Nighttime Operations</u>

Figure 3.3 presents the predicted noise grid at a 4.5-metre elevation, which reflects the noise map relative to the height of nearby buildings and the impact of rooftop equipment with all outdoor mechanical systems operating. The ENCG (2016) nighttime noise limit of 45 dBA must be met.





ID	Predicted SPL (dBA)	Maximum SPL Limit (dBA)	Acoustic Compliance?
POR-1	42.3	45.0	Yes
POR-2	40.8	43:0	Yes
POR-3	31.3	50.0	Yes
POR-4	29.4	50.0	Yes

Table 3.6 – Comparison of Predicted SPL values at PORs to ENCG (2016) acoustic limits.

Based on our modelling and the results detailed in **Table 3.6**, the planned addition is compliant with the ENCG and NPC-300 acoustical requirements.



4.0 Conclusion

We have completed the environmental noise impact study for the new building addition at A.Y. Jackson Secondary School Addition at 150 Abbeyhill Drive in Kanata, Ontario. The addition has a total of four planned Rooftop Units, which do not generate noise exceeding the 45 dBA limit of ENCG and NPC-300. As such, no acoustical mitigation is required. All nearby traffic noise sources were outside the exclusionary limits, therefore no traffic noise study is required for this site. No traffic study was required for this building addition.

If you have any questions or concerns regarding this report, please let us know.

Sincerely,

Tiffany-Rose Filler, M.Sc., Acoustic Consultant

Approved By:



Donald Buchan, P.Eng Principal Buchan Lawton Parent Ltd.



APPENDIX

Mechanical Equipment Sound Data Cutsheets



Job Information		Technical Data Sheet
Job Name	A Y Jackson SS Addition	
Date	10/29/2024	
Submitted By	Mohammed Sadik	
Software Version	12.83	
Unit Tag	RTU-1	



Unit Overview

Model Number	Voltage	Design Cooling	AHRI 340/360 Standard Efficiency		ASHRAE 90.1-2022	
	V/Hz/Phase	Capacity Btu/hr	EER	IEER	Compliant	
DPSH15B	575/60/3	182935	11.1	19.6	ASHRAE 90.1-2022 compliant	

Unit	
Model Number:	DPSH15B
Model Type:	Heat Pump
Heat Type:	Gas
Hot Gas Reheat:	MHGRH
Energy Recovery:	ERW-Med Cab-Econ: 2835 cfm max, 100% OA: 5145 cfm max
Application:	Variable Air Volume, Single Zone (Mixed Air or 100% OA)
Controls:	Refrigeration only
Outside Air:	0-100% Economizer with Drybulb Control
Altitude:	370 ft
Approval	cETLus

Physical **Dimensions and Weight** Length Height Width Weight 121.6 in 85.9 in 73.4 in 3287 lb **Corner Weights** L1 L2 L3 L4 1100 lb 726 lb 880 lb 581 lb Construction Exterior **Insulation and Liners** Air Opening Location Return Supply 1" Injected Foam, R-7, Painted Galvanized Steel Bottom Bottom Galvanized Steel Liner

Electrical					
Unit FLA	MCA	MROPD	SCCR		
43.6 A	49.9 A	70 A	10 kAIC		
Note: Use only copper supply wires with ampacity based on 75° C conductor rating. Connections to terminals must be made with copper lugs and copper wire.					

Unit Discharge Condition	ons				
		AirTemperature			
Motor Heat Btu/hr	Moisture Removal lb/h	Unit Leaving Dry Bulb °F	Unit Leaving Wet Bulb °F	Unit Leaving Dewpoint °F	
16233	25.5	57.8	55.7	54.6	
		Minimum Airflows			
Notes: Refer to fan curve for applicability of approximate airflows					

Condensing Section	on						
			Comp	ressor			
Туре	Qua	ntity R	efrigerant Charge Ib	Total Power	Capacity C	control Co	ompressor Isolation
Inverter Scroll	1	L	33.7	11.04 kW	Mod Contr Inverter Con	R	ubber in Shear
			Compress	sor Amps:			
	Compr	essor 1			25.	4 A	
Compressor O	Compressor Options: Suction and Discharge Isolation Valve						
			Conder	iser Coil			
	Туре		Fins po	per Inch Fin Material			
Copper Tub	e - Aluminum	Fin	2	23 Aluminum			
			Condenser	Fan Motors			
	Number o	of Motors		Full Load Current (Total)			
	2	2		2.8 A			
		AHRI 340/3	60 Certified Data at A	HRI 340/360 Standar	d Conditions		
Net Capacity	EER	IEER	Heat Net Capacity at 47°F	COP at 47°F	Heat Net Capacity at 17°F	COP at 17°F	COP at 5°F
165427 Btu/hr	11.1	19.6	158630 Btu/hr	3.54	114573 Btu/hr	2.27	Pending

Internal Pressure Drop Calculat	ion
External Static Pressure:	0.50 inH₂O
Filter:	0.30 inH₂O
Dirty Filter:	0.50 inH₂O
Outside Air:	0.40 inH ₂ O
Energy Recovery:	1.26 inH ₂ O
DX Coil:	0.63 inH₂O
Gas Heat:	0.21 inH ₂ O
Total Static Pressure:	3.79 inH₂O

Sound								
				Sound Po	wer (db)			
Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	82	84	92	89	92	91	88	83
Discharge	82	84	92	89	92	91	88	83
Radiated	85	85	81	78	77	73	70	60

Options	
	Electrical
Field Connection:	Single Disconnect
Powered Receptacle:	Field powered 115V GFI outlet
Power Options:	Phase Failure Monitor



Job Name	A Y Jackson SS Addition
Date	10/29/2024
Submitted By	Mohammed Sadik
Software Version	12.83
Unit Tag	RTU-2



Unit Overview

Model Number	Voltage	Design Cooling	AHRI 340/360 Sta	andard Efficiency	ASHRAE 90.1-2022
	V/Hz/Phase	Capacity Btu/hr	EER	IEER	Compliant
DPSH16B	575/60/3	202924	10.8	20.3	ASHRAE 90.1-2022 compliant

Unit	
Model Number:	DPSH16B
Model Type:	Heat Pump
Heat Type:	Gas
Energy Recovery:	ERW-Large Cab-Econ: 5145cfm max, 100% OA: 8820 cfm max
Application:	Variable Air Volume, Single Zone (Mixed Air or 100% OA)
Controls:	Refrigeration only
Outside Air:	0-100% Economizer with Drybulb Control
Altitude:	370 ft
Approval	cETLus

Physical				
	Dimensions	and Weight		
Length	Height	Width	Weight	
222.5 in	72.1 in	76.5 in	4553 lb	
	Corner	Weights		
11	L2	L3	L4	
1650 lb	1501 lb	668 lb	734 lb	
	Constr	ruction		
Exterior	Insulation and Liners	Air Openir	ng Location	
		Return	Supply	
Painted Galvanized Steel	2" Injected Foam, R13, Galvanized Steel Liner	Bottom	Bottom	

Electrical			
Unit FLA	MCA	MROPD	SCCR
42.0 A	47.2 A	60 A	10 kAIC
Note:	Use only copper supply wires with control of the second seco	ith ampacity based on 75° C cond opper lugs and copper wire.	uctor rating. Connections to

nit Discharge Co	nations							
			AirTemp	perature				
Motor Heat Btu/hr		Moisture Removal lb/h	al Unit Leaving Dry Bulb °F		Unit Leaving Wet Bulb °F		Unit Leaving Dewpoin °F	
15912		45.5	57	.2	54.4		52.8	
			Minimum	n Airflows				
	Notes: Ref	er to fan curve	for applicability of	approximate air	flows			
ondensing Section	on							
			Comp	ressor				
Туре	Qua	intity	Refrigerant Charge Ib	Total Power	Capacity Co	ontrol	Compressor Isolation	
Inverter Scroll		1	34.3	14.56 kW	Mod Contr Inverter Com		Rubber in Shear	
			Compress	sor Amps:				
	Compi	essor 1			20.9	ЭA		
Compressor C	options: Sucti	on and Dischar	ge Isolation Valves					
			Conden	iser Coil				
	Туре		Fins pe	er Inch		Fin Ma	aterial	
Copper Tub	e - Aluminum	Fin	2	3		Alum	inum	
Coil C	ptions: Vand	al Guard						
			Condenser	Fan Motors				
	Number	of Motors			Full Load Cur	rent (Total)		
		2			6.4	A		
		AHRI 340/	360 Certified Data at A	HRI 340/360 Standa	ard Conditions			
Net Capacity	EER	IEER	Heat Net Capacity at 47°F	COP at 47°F	Heat Net Capacity at 17°F	COP at 17	7°F COP at 5°F	
94000 Btu/hr	10.8	20.3	0 Btu/hr	0	0 Btu/hr	0	Pending	

Internal Pressure Drop Calculat	ion
External Static Pressure:	1.25 inH₂O
Filter:	0.10 inH ₂ O
Dirty Filter:	0.50 inH₂O
Outside Air:	0.21 inH ₂ O
Energy Recovery:	0.96 inH₂O
DX Coil:	0.26 inH ₂ O
Gas Heat:	0.21 inH ₂ O
Total Static Pressure:	3.49 inH₂O

	Sound Power (db)							
Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	76	75	83	75	70	69	64	61
Discharge	82	81	86	81	79	76	71	66
Radiated	80	74	76	76	76	75	75	66

Options			
	Electrical		
Field Connection:	Single Disconnect		
Powered Receptacle: Field powered 115V GFI outlet			
Power Options:	Phase Failure Monitor		



Job Information		Technical Data Sheet
Job Name	A Y Jackson SS Addition	
Date	10/29/2024	
Submitted By	Mohammed Sadik	
Software Version	12.83	
Unit Tag	RTU-3, RTU-4	



Unit Overview

Model Number	Voltage	Design Cooling	AHRI 340/360 Sta	andard Efficiency	ASHRAE 90.1-2022				
	V/Hz/Phase	Capacity Btu/hr	EER	IEER	Compliant				
DPSH07B	575/60/3	99301	13.3	20.7	ASHRAE 90.1-2022 compliant				

Unit	
Model Number:	DPSH07B
Model Type:	Heat Pump
Heat Type:	Gas
Energy Recovery:	ERW-Med Cab-Econ: 2835 cfm max, 100% OA: 5145 cfm max
Application:	Variable Air Volume, Single Zone (Mixed Air or 100% OA)
Controls:	Refrigeration only
Outside Air:	0-100% Economizer with Drybulb Control
Altitude:	370 ft
Approval	cETLus

Physical								
Dimensions and Weight								
Length	Height	Width	Weight					
121.6 in	85.9 in	73.4 in	3069 lb					
Corner Weights								
L1	L2 L3		L4					
1036 lb	676 lb	536 lb	822 lb					
	Constr	ruction						
Exterior	Insulation and Liners	Air Openin	g Location					
			Supply					
Painted Galvanized Steel	1" Injected Foam, R-7, Galvanized Steel Liner	Bottom	Bottom					

Electrical								
Unit FLA	MCA	MROPD	SCCR					
29.8 A	34.1 A	50 A	10 kAIC					
Note: Use only copper supply wires with ampacity based on 75° C conductor rating. Connections to terminals must be made with copper lugs and copper wire.								

Condensing Section									
Compressor									
Туре	Quan	tity f	Refrigerant Charge Ib	Total Power	Capacity C	ontrol Co	ompressor Isolation		
Inverter Scroll	1		14.9	5.64 kW	Mod Contr Inverter Con	F	Rubber in Shear		
			Compress	sor Amps:					
	Compre	essor 1			17.3	2 A			
Compressor Op	tions: Suctio	n and Dischar	ge Isolation Valves						
			Conder	nser Coil					
	Гуре		Fins po	er Inch		Fin Materia	al		
Copper Tube	- Aluminum I	in	2	23 Aluminum					
Coil Op	tions: Vanda	l Guard							
			Condenser	Fan Motors					
	Number o	f Motors		Full Load Current (Total)					
	2				2.8	3 A			
AHRI 340/360 Certified Data at AHRI 340/360 Standard Conditions									
Net Capacity	EER	IEER	Heat Net	COP at 47°F	Heat Net	COP at 17°F	COP at 5°F		
,			Capacity at 47°F		Capacity at 17°F				

Internal Pressure Drop Calculation						
External Static Pressure:	1.25 inH ₂ O					
Filter:	0.09 inH₂O					
Dirty Filter:	0.50 inH ₂ O					
Outside Air:	0.12 inH ₂ O					
DX Coil:	0.44 inH ₂ O					
Gas Heat:	0.04 inH ₂ O					
Total Static Pressure:	3.18 inH ₂ O					

Sound								
	Sound Power (db)							
Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	83	81	89	84	86	80	75	69
Discharge	83	84	92	89	92	86	83	77
Radiated	85	85	81	78	76	71	68	60

Options

Electrical					
Field Connection:	Single Disconnect				
Powered Receptacle:	Field powered 115V GFI outlet				
Power Options:	Phase Failure Monitor				

Sensors				
Control Point	Installed By	Signal Type	Signal Value	As Shown on Wiring Diagram
Compressor Capacity - Command	Daikin	AI	0-10 VDC	Comp_CAP
Compressor Capacity – Current Capacity	Daikin	AO	0-10 VDC	Comp_Actual_CAP
Compressor Capacity – Status	Daikin	DO	Dry Contact	Inv_Comp_RDY_STATUS
Supply Fan - S/S	Daikin	DI	Dry Contact	SAF_Start_Stop
Supply Fan – Capacity	Daikin	AI	0-10 VDC	SAF_CAP
Exhaust Fan - S/S	Daikin	DI	Dry Contact	EAF_Start_Stop
Exhaust Fan – Capacity	Daikin	AI	0-10 VDC	EAF_CAP

