STATIONARY SOURCE NOISE STUDY

Elmwood School

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EXECUTIVE SUMMARY

In accordance with City of Ottawa and Ontario Ministry of the Environment, Conservation and Parks (MECP) environmental noise guidelines, this Report presents an assessment of the environmental noise impact predicted due to outdoor noise sources at Elmwood School, 261 Buena Vista Road in Ottawa, Ontario upon neighbouring noise-sensitive properties. There are no significant off-site sources of environmental noise impacting on the Elmwood School property.

The Elmwood School property includes both a Senior School and a Junior School. Two new additions are proposed for the Senior School, which will include new rooftop mechanical equipment to support the indoor spaces. This Report considers the property at 261 Buena Vista Road as a “Stationary Source” within a Class 1 area. Existing and future sources of environmental noise emissions are assessed against the applicable sound level limits at noise-sensitive land uses in its vicinity.

The assessment concludes that sound levels at nearby noise-sensitive Points of Reception will comply with the applicable limits for Stationary Sources, per City of Ottawa and MECP requirements.

1.0 INTRODUCTION

This Noise Study provides an assessment of the environmental noise impact due to Elmwood School at 261 Buena Vista Road in Ottawa, Ontario, upon neighbouring noise-sensitive properties. The Elmwood School property includes both a Junior School and Senior School, collectively referred to as Elmwood School in this Report. Two new additions are proposed for the Senior School building, which will include new sources of environmental noise.

There are no significant off-site sources of environmental noise (transportation noise or adjacent Stationary Sources) impacting on the Elmwood School property.

In accordance with the City of Ottawa Environmental Noise Control Guidelines (ENCG) and Ontario Ministry of the Environment, Conservation and Parks (MECP) Publication NPC-300, the environmental noise impact of Elmwood School is assessed against the applicable sound level limits at noise-sensitive Points of Reception (POR) in its vicinity.

Elmwood School is located in a Class 1 urban area surrounded by residential and institutional spaces. Zoning plans are included in Appendix A. A Site Plan is included as Figure 1 in the Figures section. Views of noise sources on each school building are included as Figures 2 and 3.

1.1 REFERENCES

This Noise Study makes reference to the following documents.

1 Elmwood Senior School Additions Issued For Coordination architectural drawing set, prepared by Farrow Partners Architects., inc. and downloaded 2026-03-05

2 Elmwood Addition Mechanical Drawing M403 “Roof Plan – HVAC New”, prepared by WSP and received 2026-03-12

3 Elmwood Senior School Addition Mechanical & Electrical Design Brief, prepared by WSP, dated 2025-10-09

4 Natural Resources Canada High Resolution Digital Elevation Model (HRDEM) CanElevation series

5 City of Ottawa GeoOttawa map, at URL maps.ottawa.ca/geoottawa

6 City of Ottawa Open Data Building Footprints dataset, at URL https://open.ottawa.ca/datasets/ottawa::building-footprints/about

7 Aerial imagery from Google

8 City of Ottawa Environmental Noise Control Guidelines, dated January 2016 (ENCG). Updated version downloaded on 2025-01-07.

9 Ontario Ministry of the Environment, Conservation and Parks publication NPC-300: Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning, updated 24 August 2017

10 Ontario Ministry of the Environment, Conservation and Parks publication NPC-104: Sound Level Adjustments, dated August 1978

11 ISO Standard 9613: Acoustics – Attenuation of Sound During Propagation Outdoors

1. Part 1: Calculation of the Absorption of Sound by the Atmosphere, First Edition dated 1 June 1993
2. Part 2: Engineering method for the prediction of sound pressure levels outdoors (Edition 2, 2024)

12 ISO Standard 3744: Acoustics – Determination of Sound Power Levels and Sound Energy Levels of Noise Sources Using Sound Pressure – Engineering Methods for an Essentially Free Field Over a Reflecting Plane

13 Egan, M. David. *Architectural Acoustics.* J.Ross Publishing, 2007

In this Report:

- noise levels are reported in terms of sound pressure levels (SPL), in decibels (dB), with the reference sound pressure equal to 2×10^{-5} pascals;
- sound levels described as dBA Leq (1hr) represent the equivalent (average) A-weighted sound pressure level over a 1-hour period; and
- sound power levels are reported in decibels (dB), with the reference sound power equal to 10^{-12} watts.

1.2 PURPOSE

The purpose of this Report is to demonstrate that Elmwood School in its entirety, including two future additions to the Senior School, will meet all Provincial requirements for noise emissions from a Stationary Source per MECP Guideline NPC-300.

1.3 SCOPE

This Report presents a detailed assessment of the issues, as defined by NPC-300. This Report considers only the objective criteria as defined in NPC-300, and does not consider subjective responses to environmental noise.

2.0 STATIONARY SOURCE DESCRIPTION

The property at 261 Buena Vista Road includes two buildings. The original Senior School building is over a century old, and located on the southeast end of the property. Two proposed additions will add a flexible gymnasium and performance hall, a fitness studio, new classrooms, and other supporting spaces. The additions will extend the current building North and West.

A newer Junior School is located on the northwest end of the property.

Environmental noise emissions are generated from multiple individual noise sources to support both school buildings. All significant noise sources provide HVAC functions:

1. mechanical heating;
2. mechanical cooling;
3. heat pumps;
4. exhaust fans (including for chemical labs and the cafeteria kitchen at the Senior School); and
5. makeup air.

Most equipment are located on the roofs of each building, with some on-grade equipment. The Junior School air handlers are located within the building, with intake and exhaust louvres through the building façade.

Refer to Figures 2 and 3, which show the locations in plan of all identified existing and future noise sources associated with Elmwood School.

3.0 NOISE SOURCE SUMMARY

3.1 STEADY AND VARYING SOUND

Refer to Table 1 for the list of significant sources of steady and varying sound at Elmwood School. Noise emissions from some HVAC units are divided into individual components, such as individual condenser fans. Those equipment are identified with a period, followed by a descriptor of the noise generating component (“fan”, or “grill” for condenser grills).

Additional information on all significant noise sources can be found in Appendix B, including octave band sound power levels, the sound power adjustments applied where applicable, elevation above mean sea level, and available identifying information (make, model, serial number, capacity ratings) of individual equipment.

Sound power levels originate either from manufacturers' data or calculations based on sound pressure level measurements by Integral DX Engineering on 30 March 2026. Raw data for measurements performed by Integral DX Engineering, and the basis of sound power level calculations, are provided in Appendix C. Instrumentation details and weather data for these measurements are provided in Appendix D. Noise data from manufacturers are included in Appendix E.

In addition to the equipment listed in Table 1, some Senior School rooftop equipment were identified as insignificant sources of environmental noise emissions, or confirmed to be discontinued during our site visit. This equipment is shown on Figure 2.

3.1.1 Heating and Cooling Equipment

For all equipment that provide both mechanical heating and cooling, cooling mode is considered to generate higher noise emissions.

3.1.2 Nighttime Noise Emissions and Equipment Replacement

It is noted that operation of each of the following equipment is restricted to the hours of 07:00 to 23:00 only. Each are located at the Senior School.

1. EF-3, a chemical lab exhaust fan on the southeast end of the roof (PennBarry, model VCR-122 C1A9);

2. COND-3, remote condenser at the north end of the roof (Carrier, model 38AKS014---121--); and

3. RTU-8, located on-grade on the east side of the building (Carrier, model FIOP-200-501GA).

Time-of-day restrictions are not assumed for any other Elmwood School noise sources.

At the time or preparation of this Report, remote condenser COND-3 is set to be replaced in the near future. The replacement unit has not been assessed, but is expected to be quieter than the current unit.

3.2 IMPULSIVE NOISE AND VIBRATION

There are no sources of impulsive noise at Elmwood School. Elmwood School is not a significant source of vibration.

4.0 POINT OF RECEPTION SUMMARY

Per MECP Guidelines, Points of Reception (PORs) are the points on noise-sensitive land uses in the vicinity of a Stationary Source where sound or vibration originating from the Stationary Source is received. Table 2 lists all PORs included in this Noise Study, which are representative of "predictable worst-case noise impacts" for environmental noise emissions from Elmwood School. Each POR represents either an Outdoor POR (OPOR) or the Plane of Window (POW) of a noise-sensitive indoor space. The POR locations are also shown on Figure 1.

The first character of each POR name identifies its general location relative to Elmwood School: ***N***orth, ***S***outh, ***E***ast, or ***W***est. The number within the POR name refers to the floor assessed (1 for ground floor windows or on-grade OPORs, 2 or 3 for 2nd or 3rd storey windows).

5.0 ASSESSMENT CRITERIA

5.1 AREA CLASS

Elmwood School is located in a Class 1 area, which the MECP defines as “an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as 'urban hum'”.

5.2 STEADY AND VARYING SOUND

Per NPC-300, the following Exclusion Limit values for steady and varying sound apply to Outdoor PORs (OPORs) and Plane of Window (POW) PORs within Class 1 areas.

Table 5.1: Exclusion Limits for Steady and Varying Sound

Time Period	Exclusion Limit for OPOR	Exclusion Limit for POW
Daytime (07:00-19:00)	50 dBA Leq (1hr)	50 dBA Leq (1hr)
Evening (07:00-23:00)	50 dBA Leq (1hr)	50 dBA Leq (1hr)
Nighttime (23:00-07:00)	(n/a)	45 dBA Leq (1hr)

Per NPC-300, the applicable sound level limit for noise from a Stationary Source at a given POR during a given Time Period is set as the higher value between:

- the Exclusion Limit; and
- the representative minimum background sound level, as determined by measurement and/or analysis.

The area surrounding Elmwood School is expected to have one-hour average background sound levels that are less than the Exclusion Limit values. Therefore, the Exclusion Limit values set the sound level criteria for this Noise Study.

Because the daytime and evening sound level limits are identical, this Noise Study considers a single combined “day-evening” Time Period, from 07:00 to 23:00.

6.0 IMPACT ASSESSMENT

6.1 ENVIRONMENTAL NOISE MODEL

An environmental noise model of Elmwood School has been prepared using CadnaA Version 2026 MR 1 (64 Bit) (build 215.5625), configured to conform to ISO Standard 9613 (2024). The model includes features such as the local topography, ground absorption, obstacles (buildings, barriers, etc.), noise sources, and PORs. The following sources were used as inputs to the environmental noise model.

1. Topographical information: Reference 4

2. Ground absorption areas: References 5 and 7

3. The geometry and acoustic properties of Elmwood School buildings, surrounding buildings, and the locations and dimensions of noise sources: References 1, 2, 6, and 7; and on-site observations and measurements by Integral DX Engineering.

4. The sound levels of all noise source objects are included in Appendix B. Sound level data originate from:

   a) measurements by Integral DX Engineering (see Appendix C); and

   b) Sound levels provided by equipment manufacturers (see Appendix E).

5. The locations of PORs: Reference 5, 6, and 7.

Refer to Appendix F for details of the Configuration of Calculation settings in CadnaA. All reported sound level predictions were calculated using the environmental noise model.

6.2 RESULTS

The detailed results are presented as:

- Point of Reception Impact Tables (Tables 3, 4, and 5), which list individual noise source levels at each POR; and

- Table 6: Acoustic Assessment Summary, which shows total noise levels from all significant noise sources at each POR for the day-evening and night Time Periods, compared to the applicable sound level limit.

Day-Evening and Night total POR sound levels are also shown on Figures 4 and 5.

Sound level contours are provided at Figures 6 through 8.

7.0 CONCLUSIONS

The Acoustic Assessment Summary (Table 6) confirms that predicted sound levels at each POR are below the applicable sound level limit in each Time Period. Therefore, Elmwood School in its entirety will comply with all City of Ottawa and MECP requirements for noise emissions from a Stationary Source when the two Senior School additions are completed. No additional noise mitigation is required.

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This Stationary Source Noise Study was prepared by Integral DX Engineering for the accounts of Elmwood School and Farrow Partners Inc., Architects. The material in it reflects Integral DX Engineering's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibilities of such third parties. Integral DX Engineering accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

TABLES

Table 1: Noise Source Summary Table

Source ID [1]	Source Description	Sound Power Level (dBA) [2]	Source Location [3]	Sound Characteristics [4]	Noise Control Measures [5]
COND-1	Senior school rooftop condenser	63.4	O	S	U
COND-2	Senior school server room condenser on-grade	59.9	O	S	U
COND-3.Fan1	Senior school rooftop condenser (remote condenser for RTU-7)	79.7	O	S	U
COND-3.Fan2		79.7	O	S	U
COND-3.Grill		93.2	O	S	U
Cond-4	Junior school rooftop condenser	60.4	O	S	U
EF-1	Senior school rooftop exhaust fan	68.4	O	S	U
EF-2	Senior school rooftop exhaust fan	73.1	O	S	U
EF-3	Senior school rooftop exhaust fan (chemistry lab)	88.7	O	S	U
EF-4	Senior school rooftop exhaust fan	78.1	O	S	U
EF-5	Senior school rooftop exhaust fan	70.9	O	S	U
EF-6	Senior school rooftop exhaust fan	74.5	O	S	U
EF-7	Senior school rooftop exhaust fan (kitchen)	72.3	O	S	U
EF-8	Junior school rooftop exhaust fan	73.2	O	S	U
EX	Junior school air handler - exhaust	79.0	I	S	U
HP-1.Fan1	Junior school on-grade heat pump	68.2	O	S	B
HP-1.Fan2		68.2	O	S	B
HP-2.Fan1	Junior school on-grade heat pump	68.2	O	S	B
HP-2.Fan2		68.2	O	S	B
HP-3.Fan1	Junior school on-grade heat pump	68.2	O	S	B
HP-3.Fan2		68.2	O	S	B
HP-4.Fan1	Junior school on-grade heat pump	68.2	O	S	B
HP-4.Fan2		68.2	O	S	B
HP-5	Junior school rooftop heat pump	61.7	O	S	U
HP-6	Junior school rooftop heat pump	70.2	O	S	U
IN-1	Junior school air handler - intake	71.0	I	S	U
IN-2	Junior school air handler - intake	71.0	I	S	U
RTU-1	Senior school rooftop unit	77.8	O	S	U
RTU-10	Future addition rooftop unit	84.8	O	S	U
RTU-11.Fan1	Future addition rooftop unit	84.8	O	S	U
RTU-11.Fan2		84.8	O	S	U
RTU-12	Future addition rooftop unit	84.8	O	S	U
RTU-13	Future addition rooftop unit	84.8	O	S	U
RTU-2	Senior school rooftop unit	78.7	O	S	U
RTU-3	Senior school rooftop unit	78.7	O	S	U
RTU-4	Senior school rooftop unit	78.7	O	S	U

Source ID [1]	Source Description	Sound Power Level (dBA) [2]	Source Location [3]	Sound Characteristics [4]	Noise Control Measures [5]
RTU-5	Senior school rooftop unit	78.7	O	S	U
RTU-6	Senior school rooftop unit	72.1	O	S	U
RTU-7	Senior school rooftop unit	74.3	O	S	U
RTU-8.Fan1	Senior school on-grade air handler	77.7	O	S	U
RTU-8.Fan2		77.7	O	S	U
RTU-8.Grill		80.6	O	S	U
RTU-9.Fan1	Future addition rooftop unit	84.8	O	S	U
RTU-9.Fan2		84.8	O	S	U

Table 1 Notes

[1] Cond = Condensing unit
EF = Exhaust Fan
EX = air handling unit Exhaust (Junior School)
HP = Heat Pump
IN = air handling unit outside air Intake (Junior School)
RTU = Roof Top Unit
.Fan = represents a single condenser fan
.Grill = represents noise emissions and the condenser grill

[2] Sound power level, including the effect of any installed noise control other than types B or AC. The sound power level shown excludes any adjustments later applied for the acoustic assessment (e.g. for tonality or operating time). Adjustments to sound power levels are shown in Appendix B, Table B.1.

[3] Source Location
O: located/installed Outside of the building, including on the roof
I: located/installed Inside the building

[4] Sound Characteristics. Where the sound characteristic is not “Steady”, a sound quality adjustment was applied per MECP publication NPC-104 (but is excluded from the sound power shown in this table). All adjustments to sound power levels are shown in Appendix B, Table B.1.
S: Steady
Q: Quasi steady impulsive
I: Impulsive
B: Buzzing
T: Tonal
C: Cyclic

[5] Noise Control Measures
S: Silencer, acoustic louvre, muffler
A: Acoustic lining, plenum
B: Barrier, berm, screening
L: Lagging
E: acoustic Enclosure
O: Other
U: Uncontrolled
AC: Administrative Controls

Table 2: Points of Reception

POR Name	Type	Height	Description
EA1	OPOR	1.5 m	East home OPOR at 301 Buena Vista Road
EA3	POW	7.5 m	East home POW (3rd floor) at 301 Buena Vista Road
EB1	OPOR	1.5 m	East home OPOR at 444 Springfield Road
EB2	POW	4.5 m	East home POW (2rd floor) at 444 Springfield Road
EC1	OPOR	1.5 m	East home OPOR at 464 Springfield Road
NB1	OPOR	1.5 m	North home OPOR at 241 Hillcrest Road
NB2	POW	4.5 m	East home POW (2nd floor) at 241 Hillcrest Road
NC1	OPOR	1.5 m	North home OPOR at 275 Hillcrest Road
NC2	POW	4.5 m	East home POW (2nd floor) at 275 Hillcrest Road
SC2	POW	4.5 m	South home POW (2nd floor) at 238 Buena Vista Road
SD1	OPOR	1.5 m	South home OPOR at 252 Buena Vista Road
SD2	POW	4.5 m	South home POW (2nd floor) at 252 Buena Vista Road
WA2	POW	4.5 m	West home POW (2nd floor) at 211 Buena Vista Road
WB1	OPOR	1.5 m	West home OPOR at 468 Manor Avenue
WB2	POW	4.5 m	West home POW (2nd floor) at 468 Manor Avenue

Table 3: Point of Reception Noise Impact (Elmwood School Noise @ EA1, EA3, EB1, EB2, EC1)

Source ID	EA1			EA3			EB1			EB2			EC1		
	D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)	
		D-E	N		D-E	N		D-E	N		D-E	N		D-E	N
COND-1	53.5	13.1	13.1	63.0	16.1	16.1	56.2	9.1	9.1	65.8	14.6	14.6	67.1	8.8	8.8
COND-2	90.6	-11.0	-11.0	100.8	-10.4	-10.4	91.8	-11.2	-11.2	101.8	-12.1	-12.1	98.3	-11.8	-11.8
COND-3.Fan1	55.3	28.2		62.4	34.2		49.6	26.7		58.1	30.1		50.4	26.4	
COND-3.Fan2	56.1	27.9		63.3	34.6		50.5	28.3		59.0	30.2		51.3	26.5	
COND-3.Grill	55.6	39.4		62.8	44.9		50.0	38.4		58.5	41.3		50.9	37.6	
Cond-4	142.6	-9.9	-9.9	149.0	-1.7	-1.7	133.8	-9.3	-9.3	140.7	-6.0	-6.0	124.0	3.9	3.9
EF-1	51.2	17.7	17.7	60.6	23.5	23.5	53.8	12.7	12.7	63.4	19.3	19.3	65.0	12.7	12.7
EF-2	43.9	30.9	30.9	53.0	29.7	29.7	46.4	30.2	30.2	55.8	29.2	29.2	58.4	21.3	21.3
EF-3	38.3	38.5		48.1	42.5		44.2	38.2		53.6	40.9		59.8	32.8	
EF-4	59.4	27.6	27.6	67.3	30.8	30.8	55.8	23.1	23.1	64.8	29.9	29.9	58.9	20.7	20.7
EF-5	77.9	15.5	15.5	87.5	23.2	23.2	80.3	9.3	9.3	90.0	12.5	12.5	89.1	7.1	7.1
EF-6	72.1	17.7	17.7	81.8	26.6	26.6	74.8	10.3	10.3	84.5	13.8	13.8	84.2	9.8	9.8
EF-7	64.9	15.2	15.2	74.6	24.6	24.6	68.3	14.0	14.0	77.9	22.0	22.0	79.0	12.0	12.0
EF-8	145.6	6.1	6.1	152.5	15.1	15.1	137.7	5.7	5.7	145.1	9.2	9.2	129.5	9.5	9.5
EX	142.3	8.2	8.2	148.5	9.2	9.2	133.1	10.3	10.3	139.8	11.4	11.4	122.7	18.7	18.7
HP-1.Fan1	157.3	-4.8	-4.8	164.0	-5.2	-5.2	148.5	-4.7	-4.7	155.5	-5.0	-5.0	138.4	-0.2	-0.2
HP-1.Fan2	157.0	-5.3	-5.3	163.7	-5.7	-5.7	148.2	-4.9	-4.9	155.3	-5.4	-5.4	138.2	-0.8	-0.8
HP-2.Fan1	156.1	-6.2	-6.2	162.8	-6.2	-6.2	147.2	-5.4	-5.4	154.2	-5.4	-5.4	137.0	-1.0	-1.0
HP-2.Fan2	155.7	-6.0	-6.0	162.5	-6.3	-6.3	146.9	-5.9	-5.9	153.9	-6.3	-6.3	136.8	-1.6	-1.6
HP-3.Fan1	156.5	-5.4	-5.4	163.3	-5.9	-5.9	147.7	-5.3	-5.3	154.9	-6.1	-6.1	137.9	-2.5	-2.5
HP-3.Fan2	156.1	-5.8	-5.8	162.9	-6.3	-6.3	147.4	-5.6	-5.6	154.6	-6.4	-6.4	137.7	-3.6	-3.6
HP-4.Fan1	155.2	-8.0	-8.0	162.0	-8.2	-8.2	146.4	-6.1	-6.1	153.5	-6.8	-6.8	136.5	-3.5	-3.5
HP-4.Fan2	154.9	-8.3	-8.3	161.7	-8.6	-8.6	146.1	-7.7	-7.7	153.3	-8.6	-8.6	136.3	-5.1	-5.1
HP-5	141.5	-5.7	-5.7	147.8	1.7	1.7	132.6	-4.9	-4.9	139.4	-2.1	-2.1	122.6	6.6	6.6
HP-6	148.8	4.1	4.1	155.9	10.3	10.3	141.4	1.4	1.4	149.0	5.9	5.9	133.9	2.2	2.2
IN-1	133.1	6.7	6.7	139.6	11.2	11.2	124.3	7.9	7.9	131.4	10.3	10.3	114.9	15.4	15.4
IN-2	132.5	6.8	6.8	139.1	11.1	11.1	123.8	7.8	7.8	131.0	10.2	10.2	114.6	15.3	15.3
RTU-1	48.9	26.3	26.3	58.4	29.5	29.5	53.2	28.9	28.9	62.6	28.4	28.4	66.2	20.9	20.9
RTU-10	59.0	32.9	32.9	63.2	36.6	36.6	48.1	33.7	33.7	54.1	35.8	35.8	40.0	32.4	32.4
RTU-11.Fan1	93.1	24.7	24.7	100.8	31.6	31.6	88.1	21.0	21.0	96.5	26.7	26.7	86.0	19.6	19.6
RTU-11.Fan2	95.6	24.2	24.2	103.3	32.3	32.3	90.7	20.7	20.7	99.1	26.5	26.5	88.7	19.7	19.7
RTU-12	71.0	25.8	25.8	76.8	35.3	35.3	62.3	27.2	27.2	69.4	32.1	32.1	56.3	26.8	26.8
RTU-13	87.9	23.5	23.5	94.8	32.8	32.8	81.0	21.5	21.5	88.9	31.0	31.0	76.5	21.3	21.3
RTU-2	47.6	30.1	30.1	57.0	31.0	31.0	50.9	30.7	30.7	60.4	29.6	29.6	63.2	23.1	23.1
RTU-3	72.5	18.9	18.9	81.3	28.5	28.5	70.9	23.6	23.6	80.2	24.8	24.8	75.0	19.7	19.7
RTU-4	60.1	27.0	27.0	68.4	29.8	29.8	57.7	26.7	26.7	66.9	30.8	30.8	62.2	19.7	19.7
RTU-5	69.8	19.9	19.9	78.6	27.6	27.6	68.5	22.6	22.6	77.9	27.5	27.5	73.4	17.2	17.2
RTU-6	55.1	17.2	17.2	63.0	20.4	20.4	51.6	17.8	17.8	60.5	18.7	18.7	55.3	13.3	13.3
RTU-7	60.7	24.0	24.0	67.9	30.9	30.9	54.9	24.4	24.4	63.3	26.4	26.4	54.6	22.1	22.1

Source ID	EA1			EA3			EB1			EB2			EC1		
	D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)	
		D-E	N		D-E	N		D-E	N		D-E	N		D-E	N
RTU-8.Fan1	33.8	35.9		43.9	36.0		36.4	37.3		46.4	35.0		50.1	33.8	
RTU-8.Fan2	34.2	35.9		44.3	36.0		36.9	38.2		47.0	36.1		50.7	34.4	
RTU-8.Grill	34.2	36.3		44.4	39.1		36.8	42.5		46.8	40.8		50.4	38.0	
RTU-9.Fan1	91.5	26.6	26.6	99.4	31.7	31.7	87.2	21.3	21.3	95.8	26.8	26.8	86.3	19.7	19.7
RTU-9.Fan2	94.0	26.1	26.1	101.9	32.4	32.4	89.8	21.3	21.3	98.4	27.0	27.0	89.0	19.4	19.4

Table 4: Point of Reception Noise Impact (Elmwood School Noise @ NB1, NB2, NC1, NC2, SC2)

Source ID	NB1			NB2			NC1			NC2			SC2		
	D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)	
		D-E	N		D-E	N		D-E	N		D-E	N		D-E	N
COND-1	136.6	-1.7	-1.7	147.5	-0.1	-0.1	127.8	-1.5	-1.5	125.4	0.1	0.1	97.6	9.2	9.2
COND-2	120.3	-9.0	-9.0	130.0	-7.5	-7.5	117.0	-8.3	-8.3	119.4	-9.1	-9.1	70.7	19.2	19.2
COND-3.Fan1	116.8	17.2		128.2	21.4		105.4	18.7		101.1	18.2		118.2	23.1	
COND-3.Fan2	116.2	19.5		127.6	22.8		105.0	18.7		100.8	16.1		117.5	24.5	
COND-3.Grill	116.6	28.9		127.9	31.0		105.3	28.5		101.0	28.7		117.8	34.1	
Cond-4	37.3	13.4	13.4	45.5	13.8	13.8	41.1	12.5	12.5	50.8	12.3	12.3	137.8	9.6	9.6
EF-1	137.3	0.7	0.7	148.3	2.4	2.4	128.2	1.2	1.2	125.4	2.7	2.7	99.8	13.1	13.1
EF-2	140.1	6.8	6.8	151.2	10.9	10.9	130.0	6.7	6.7	126.3	10.7	10.7	107.1	19.7	19.7
EF-3	149.5	15.8		160.8	17.9		139.3	16.0		135.4	18.2		108.1	34.9	
EF-4	117.4	18.0	18.0	128.5	21.5	21.5	107.4	19.4	19.4	104.3	19.9	19.9	109.1	22.8	22.8
EF-5	129.5	5.9	5.9	139.4	9.0	9.0	124.3	3.4	3.4	124.7	10.2	10.2	76.6	20.5	20.5
EF-6	131.6	3.1	3.1	141.8	6.6	6.6	125.5	4.4	4.4	125.3	7.6	7.6	80.8	20.2	20.2
EF-7	136.1	9.2	9.2	146.5	9.8	9.8	129.0	5.1	5.1	128.0	8.4	8.4	85.6	22.3	22.3
EF-8	44.4	22.1	22.1	51.0	25.2	25.2	51.0	21.5	21.5	61.3	23.5	23.5	130.0	21.9	21.9
EX	34.4	41.0	41.0	43.3	39.6	39.6	37.1	40.2	40.2	46.7	38.8	38.8	141.0	14.3	14.3
HP-1.Fan1	30.2	22.6	22.6	36.2	22.4	22.4	41.6	22.0	22.0	55.0	21.0	21.0	144.2	-5.1	-5.1
HP-1.Fan2	30.8	23.1	23.1	36.8	24.1	24.1	42.1	23.2	23.2	55.4	22.8	22.8	143.6	-5.5	-5.5
HP-2.Fan1	29.7	23.6	23.6	36.2	22.2	22.2	40.6	21.6	21.6	53.8	19.4	19.4	144.3	-5.1	-5.1
HP-2.Fan2	30.3	24.2	24.2	36.8	22.9	22.9	41.0	22.0	22.0	54.2	19.5	19.5	143.7	-5.3	-5.3
HP-3.Fan1	31.6	23.4	23.4	37.6	24.5	24.5	42.7	23.3	23.3	55.9	22.5	22.5	142.7	-5.7	-5.7
HP-3.Fan2	32.2	24.0	24.0	38.3	24.8	24.8	43.1	23.4	23.4	56.3	22.0	22.0	142.1	-5.8	-5.8
HP-4.Fan1	31.2	24.8	24.8	37.7	23.8	23.8	41.6	22.0	22.0	54.7	22.2	22.2	142.8	-5.4	-5.4
HP-4.Fan2	31.8	24.9	24.9	38.3	24.6	24.6	42.1	22.4	22.4	55.1	22.2	22.2	142.2	-5.5	-5.5
HP-5	37.2	15.5	15.5	45.8	15.8	15.8	40.2	14.7	14.7	49.6	14.2	14.2	138.3	10.6	10.6
HP-6	47.5	18.1	18.1	53.1	21.8	21.8	55.6	17.0	17.0	66.4	19.6	19.6	127.5	16.4	16.4
IN-1	43.5	24.1	24.1	53.2	20.8	20.8	43.4	30.5	30.5	51.0	29.8	29.8	133.2	21.7	21.7
IN-2	44.5	23.5	23.5	54.1	20.1	20.1	44.4	30.1	30.1	51.9	29.6	29.6	132.2	21.8	21.8
RTU-1	142.9	9.9	9.9	153.9	13.7	13.7	133.8	10.3	10.3	130.9	13.2	13.2	99.5	26.6	26.6

Source ID	NB1			NB2			NC1			NC2			SC2		
	D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)	
		D-E	N		D-E	N		D-E	N		D-E	N		D-E	N
RTU-10	110.6	28.5	28.5	122.2	29.1	29.1	96.6	29.0	29.0	89.7	31.3	31.3	137.1	23.1	23.1
RTU-11.Fan1	90.0	30.1	30.1	100.1	30.3	30.3	84.3	30.4	30.4	85.2	31.2	31.2	103.2	31.1	31.1
RTU-11.Fan2	89.0	32.3	32.3	99.0	30.4	30.4	83.9	30.5	30.5	85.3	31.1	31.1	102.0	31.6	31.6
RTU-12	99.1	28.7	28.7	110.4	29.7	29.7	87.1	29.4	29.4	82.5	31.3	31.3	126.0	33.6	33.6
RTU-13	87.2	31.2	31.2	98.0	30.1	30.1	78.9	31.7	31.7	77.8	32.4	32.4	114.3	30.8	30.8
RTU-2	140.6	10.9	10.9	151.6	13.7	13.7	131.1	11.3	11.3	128.0	13.9	13.9	102.1	22.9	22.9
RTU-3	114.4	15.5	15.5	125.0	18.8	18.8	107.2	19.6	19.6	106.3	19.2	19.2	94.8	27.4	27.4
RTU-4	119.6	17.9	17.9	130.6	19.7	19.7	110.2	18.3	18.3	107.5	20.7	20.7	105.1	18.5	18.5
RTU-5	117.3	16.5	16.5	127.9	19.9	19.9	109.8	16.4	16.4	108.6	20.4	20.4	95.0	27.7	27.7
RTU-6	120.5	11.0	11.0	131.7	12.9	12.9	110.1	11.5	11.5	106.4	13.2	13.2	111.7	13.2	13.2
RTU-7	111.8	16.4	16.4	123.2	16.6	16.6	100.9	15.1	15.1	97.0	17.3	17.3	116.5	22.1	22.1
RTU-8.Fan1	143.9	1.5		155.5	1.2		132.6	2.6		128.2	4.2		115.3	7.8	
RTU-8.Fan2	144.1	1.4		155.6	1.1		132.9	3.2		128.5	4.2		114.7	8.1	
RTU-8.Grill	143.6	4.4		155.2	4.3		132.4	5.5		128.0	6.7		114.9	10.4	
RTU-9.Fan1	94.1	28.2	28.2	104.2	29.6	29.6	88.7	28.3	28.3	89.7	30.4	30.4	99.3	34.3	34.3
RTU-9.Fan2	93.2	27.9	27.9	103.1	29.5	29.5	88.4	28.5	28.5	89.8	30.2	30.2	98.0	31.9	31.9

Table 5: Point of Reception Noise Impact (Elmwood School Noise @ SD1, SD2, WA2, WB1, WB2)

Source ID	SD1			SD2			WA2			WB1			WB2		
	D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)	
		D-E	N		D-E	N		D-E	N		D-E	N		D-E	N
COND-1	79.5	9.5	9.5	77.6	11.9	11.9	137.1	5.6	5.6	119.8	4.7	4.7	141.0	7.9	7.9
COND-2	52.4	22.1	22.1	58.0	18.3	18.3	99.1	14.9	14.9	82.1	15.5	15.5	103.2	13.6	13.6
COND-3.Fan1	99.7	22.0		100.8	20.1		144.1	23.0		121.9	18.7		144.1	24.9	
COND-3.Fan2	99.0	22.2		100.2	20.2		143.2	22.8		121.0	18.8		143.2	23.3	
COND-3.Grill	99.3	33.3		100.5	30.7		143.6	33.1		121.4	31.0		143.6	34.3	
Cond-4	124.2	8.8	8.8	135.7	5.9	5.9	109.1	5.3	5.3	78.8	2.1	2.1	96.7	4.9	4.9
EF-1	81.7	12.6	12.6	79.6	15.9	15.9	139.4	8.2	8.2	121.9	12.2	12.2	143.1	9.1	9.1
EF-2	89.2	17.5	17.5	86.5	22.1	22.1	147.1	13.8	13.8	129.2	11.8	11.8	150.5	14.0	14.0
EF-3	90.6	33.9		86.2	37.0		152.8	22.5		136.1	24.0		157.2	22.8	
EF-4	90.7	19.6	19.6	92.0	26.0	26.0	136.2	24.5	24.5	115.0	21.0	21.0	137.0	23.9	23.9
EF-5	58.4	20.2	20.2	59.6	22.4	22.4	113.0	15.6	15.6	97.2	15.7	15.7	117.7	15.1	15.1
EF-6	62.6	20.0	20.0	62.7	20.8	20.8	118.7	16.0	16.0	102.6	14.7	14.7	123.3	14.1	14.1
EF-7	67.5	21.5	21.5	66.2	19.1	19.1	126.1	16.1	16.1	110.2	14.5	14.5	130.9	13.7	13.7
EF-8	117.2	19.9	19.9	129.4	19.3	19.3	98.5	19.9	19.9	68.4	19.0	19.0	86.1	20.1	20.1
EX	127.2	14.7	14.7	138.6	12.7	12.7	112.9	12.3	12.3	82.5	14.2	14.2	100.5	12.4	12.4
HP-1.Fan1	131.8	-3.2	-3.2	144.5	-5.2	-5.2	106.9	-4.0	-4.0	76.6	-1.1	-1.1	92.3	-3.0	-3.0
HP-1.Fan2	131.1	-3.3	-3.3	143.8	-5.4	-5.4	106.4	-4.0	-4.0	76.0	-1.0	-1.0	91.9	-3.1	-3.1

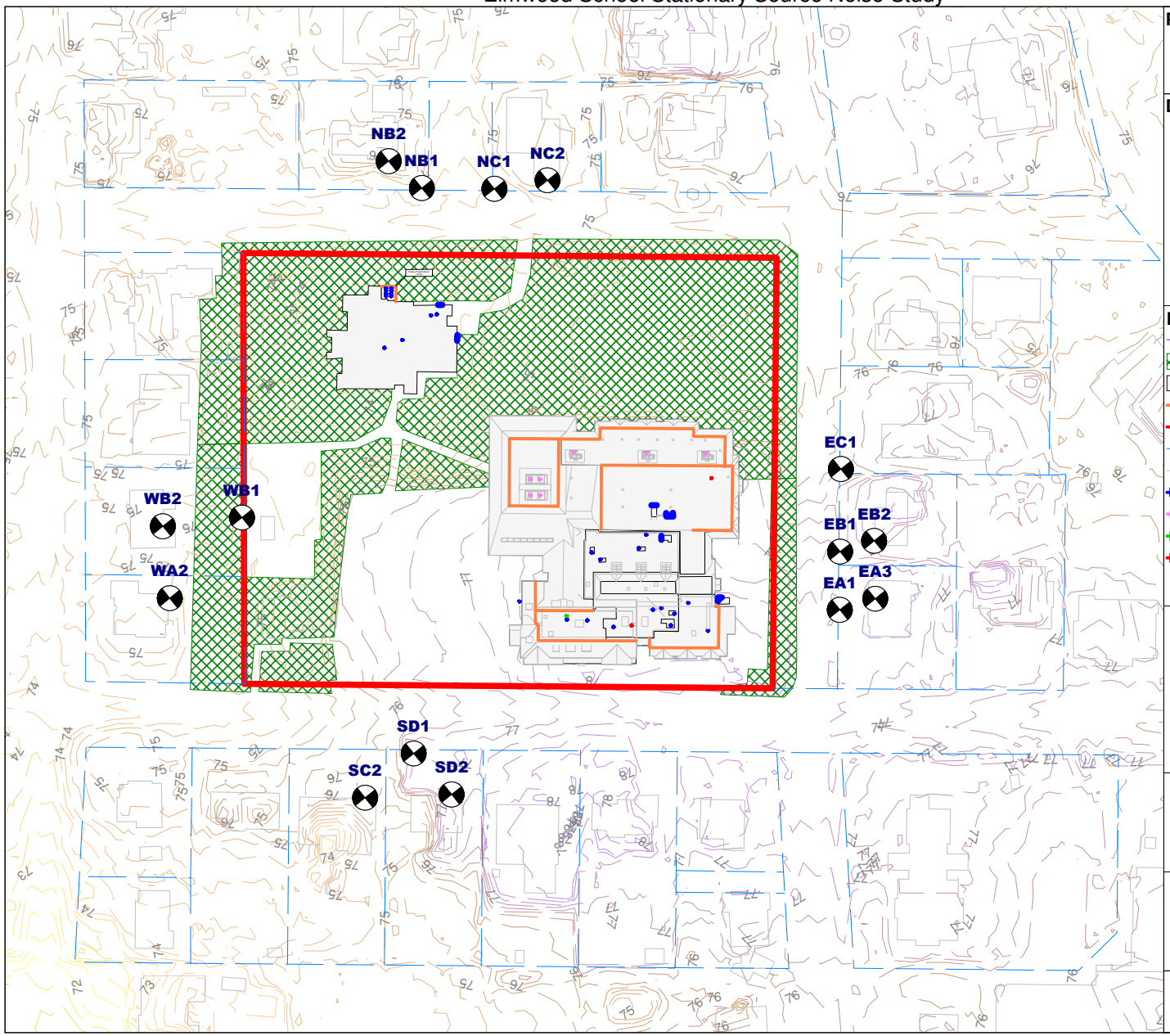
Source ID	SD1			SD2			WA2			WB1			WB2		
	D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)		D (m)	Sound Level (dBA Leq)	
		D-E	N		D-E	N		D-E	N		D-E	N		D-E	N
HP-2.Fan1	131.7	-3.0	-3.0	144.3	-5.2	-5.2	107.8	-3.6	-3.6	77.4	-0.8	-0.8	93.4	-2.5	-2.5
HP-2.Fan2	131.0	-3.2	-3.2	143.6	-5.3	-5.3	107.3	-3.8	-3.8	76.8	-1.0	-1.0	92.9	-2.8	-2.8
HP-3.Fan1	130.3	-3.6	-3.6	143.0	-5.6	-5.6	105.7	-4.1	-4.1	75.3	-1.2	-1.2	91.2	-3.1	-3.1
HP-3.Fan2	129.6	-3.8	-3.8	142.4	-5.8	-5.8	105.2	-4.3	-4.3	74.8	-1.3	-1.3	90.8	-3.3	-3.3
HP-4.Fan1	130.2	-3.4	-3.4	142.8	-5.6	-5.6	106.5	-4.1	-4.1	76.1	-1.4	-1.4	92.3	-3.1	-3.1
HP-4.Fan2	129.5	-3.6	-3.6	142.2	-5.8	-5.8	106.0	-4.2	-4.2	75.6	-1.5	-1.5	91.8	-3.3	-3.3
HP-5	124.5	10.0	10.0	135.9	7.1	7.1	110.4	7.1	7.1	80.1	5.1	5.1	98.1	6.9	6.9
HP-6	115.2	17.3	17.3	127.8	17.2	17.2	93.5	17.4	17.4	63.4	17.2	17.2	80.7	18.0	18.0
IN-1	118.7	23.9	23.9	129.7	22.1	22.1	110.1	8.0	8.0	79.8	10.1	10.1	99.2	6.3	6.3
IN-2	117.7	24.0	24.0	128.7	22.2	22.2	109.4	8.3	8.3	79.2	10.7	10.7	98.6	6.5	6.5
RTU-1	81.8	26.2	26.2	78.5	27.1	27.1	142.3	17.9	17.9	125.6	16.5	16.5	146.7	19.2	19.2
RTU-10	118.7	21.3	21.3	120.4	23.0	23.0	157.3	31.9	31.9	132.9	24.5	24.5	155.1	21.3	21.3
RTU-11.Fan1	86.1	31.7	31.7	93.0	32.1	32.1	110.5	30.6	30.6	86.1	31.3	31.3	108.0	30.6	30.6
RTU-11.Fan2	85.1	32.9	32.9	92.3	35.1	35.1	108.0	30.4	30.4	83.5	32.3	32.3	105.4	30.3	30.3
RTU-12	107.8	28.7	28.7	111.3	24.1	24.1	141.2	27.1	27.1	116.4	25.4	25.4	138.6	26.7	26.7
RTU-13	96.8	30.4	30.4	102.9	31.4	31.4	121.8	29.0	29.0	96.3	27.2	27.2	118.4	28.6	28.6
RTU-2	84.3	23.1	23.1	81.4	26.1	26.1	143.2	16.4	16.4	125.9	17.6	17.6	147.1	20.5	20.5
RTU-3	76.5	28.3	28.3	79.3	27.9	27.9	120.4	22.8	22.8	100.1	25.6	25.6	121.9	24.1	24.1
RTU-4	86.7	23.9	23.9	87.8	25.8	25.8	133.8	25.8	25.8	113.3	23.2	23.2	135.1	24.6	24.6
RTU-5	76.7	27.2	27.2	78.9	27.5	27.5	122.7	22.7	22.7	102.8	26.1	26.1	124.4	23.9	23.9
RTU-6	93.4	11.8	11.8	94.0	14.7	14.7	140.4	18.0	18.0	119.3	14.9	14.9	141.3	17.3	17.3
RTU-7	98.1	21.3	21.3	100.0	20.3	20.3	139.8	16.8	16.8	117.1	16.1	16.1	139.3	19.0	19.0
RTU-8.Fan1	97.3	9.9		94.2	9.4		156.0	1.8		137.5	3.4		159.2	2.0	
RTU-8.Fan2	96.7	9.7		93.6	10.0		155.6	1.9		137.2	3.4		158.9	2.0	
RTU-8.Grill	96.9	12.4		93.8	12.3		155.6	4.7		137.1	6.5		158.8	4.8	
RTU-9.Fan1	82.0	33.2	33.2	88.6	32.8	32.8	109.2	30.7	30.7	85.6	31.5	31.5	107.5	30.9	30.9
RTU-9.Fan2	80.9	33.3	33.3	87.9	32.9	32.9	106.7	30.5	30.5	83.0	32.4	32.4	104.9	30.7	30.7

Table 6: Acoustic Assessment Summary

Point of Reception ID	Point of Reception Description	Time of Day	Sound Level at Point of Reception (dBA Leq)	Performance Limit (dBA Leq)	Compliance with Performance Limit (Yes/No)
EA1	East home OPOR	Day-Evening	45.8	50.0	Yes
EA3	East home POW (3rd floor)	Day-Evening	49.8	50.0	Yes
		Night	44.1	45.0	Yes
EB1	East home OPOR	Day-Evening	47.2	50.0	Yes
EB2	East home POW (2rd floor)	Day-Evening	47.9	50.0	Yes
		Night	41.8	45.0	Yes
EC1	East home OPOR	Day-Evening	43.8	50.0	Yes
NB1	North home OPOR	Day-Evening	43.7	50.0	Yes
NB2	East home POW (2nd floor)	Day-Evening	43.2	50.0	Yes
		Night	42.8	45.0	Yes
NC1	North home OPOR	Day-Evening	43.5	50.0	Yes
NC2	East home POW (2nd floor)	Day-Evening	43.4	50.0	Yes
		Night	43.2	45.0	Yes
SC2	South home POW (2nd floor)	Day-Evening	43.1	50.0	Yes
		Night	41.5	45.0	Yes
SD1	South home OPOR	Day-Evening	42.6	50.0	Yes
SD2	South home POW (2nd floor)	Day-Evening	43.3	50.0	Yes
		Night	41.7	45.0	Yes
WA2	West home POW (2nd floor)	Day-Evening	40.7	50.0	Yes
		Night	39.6	45.0	Yes
WB1	West home OPOR	Day-Evening	40.3	50.0	Yes
WB2	West home POW (2nd floor)	Day-Evening	40.5	50.0	Yes
		Night	38.9	45.0	Yes

FIGURES

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description:
View of the local area surrounding Elmwood School including topography, areas of soft (sound absorptive) ground, buildings, and Points of Reception.

Key:
- 75- Ground elevation (m)
- Soft ground surface
- Building or object
- Barrier object
- Elmwood School Property
- Other Property Line
- Traced feature (transparent)
- Existing Noise Source
- Future Noise Source
- Insignificant Noise Source
- Inactive Noise Source
- EB1 Point of Reception (POR)

Integral dx ENGINEERING LTD.
907 Admiral Avenue
Ottawa, ON K1Z 6L6
613-761-1565
www.integraldxengineering.ca

Figure 1:
Site Plan

N

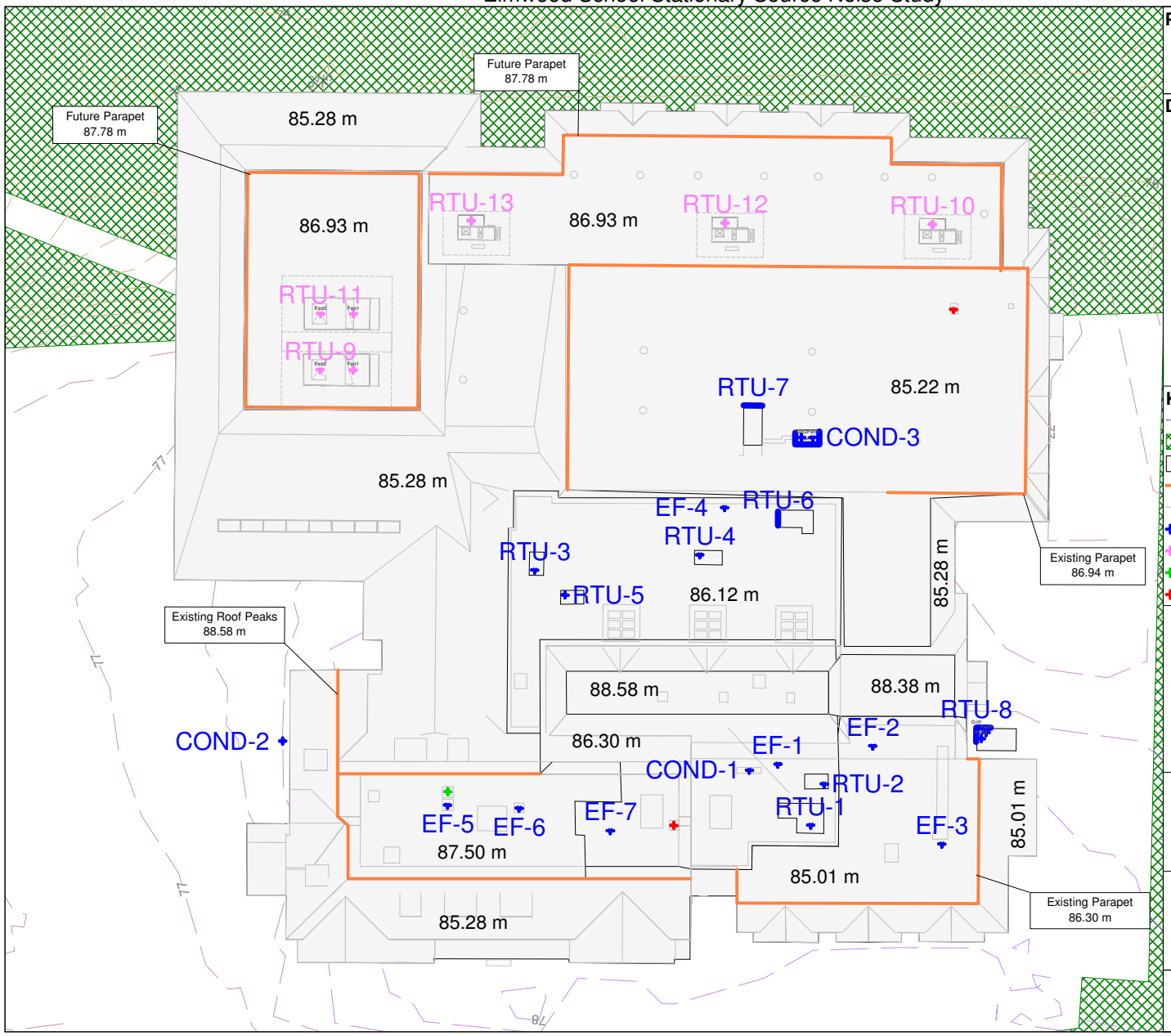
Drawn By: PGL

Date: 2026-04-17

0 10 20 30 40 50 m

1:1750

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description:
Plan view of Elmwood Senior School and its environmental noise sources.

Elevations of roofs and roof features are shown relative to mean sea level.

Key:
- 75- Ground elevation (m)
- Soft ground surface
- Building or object
- On-site barrier object
- Traced feature (transparent)
- Existing Noise Source
- Future Noise Source
- Insignificant Noise Source
- Inactive Noise Source

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Figure 2:
Senior School
Noise Sources

N

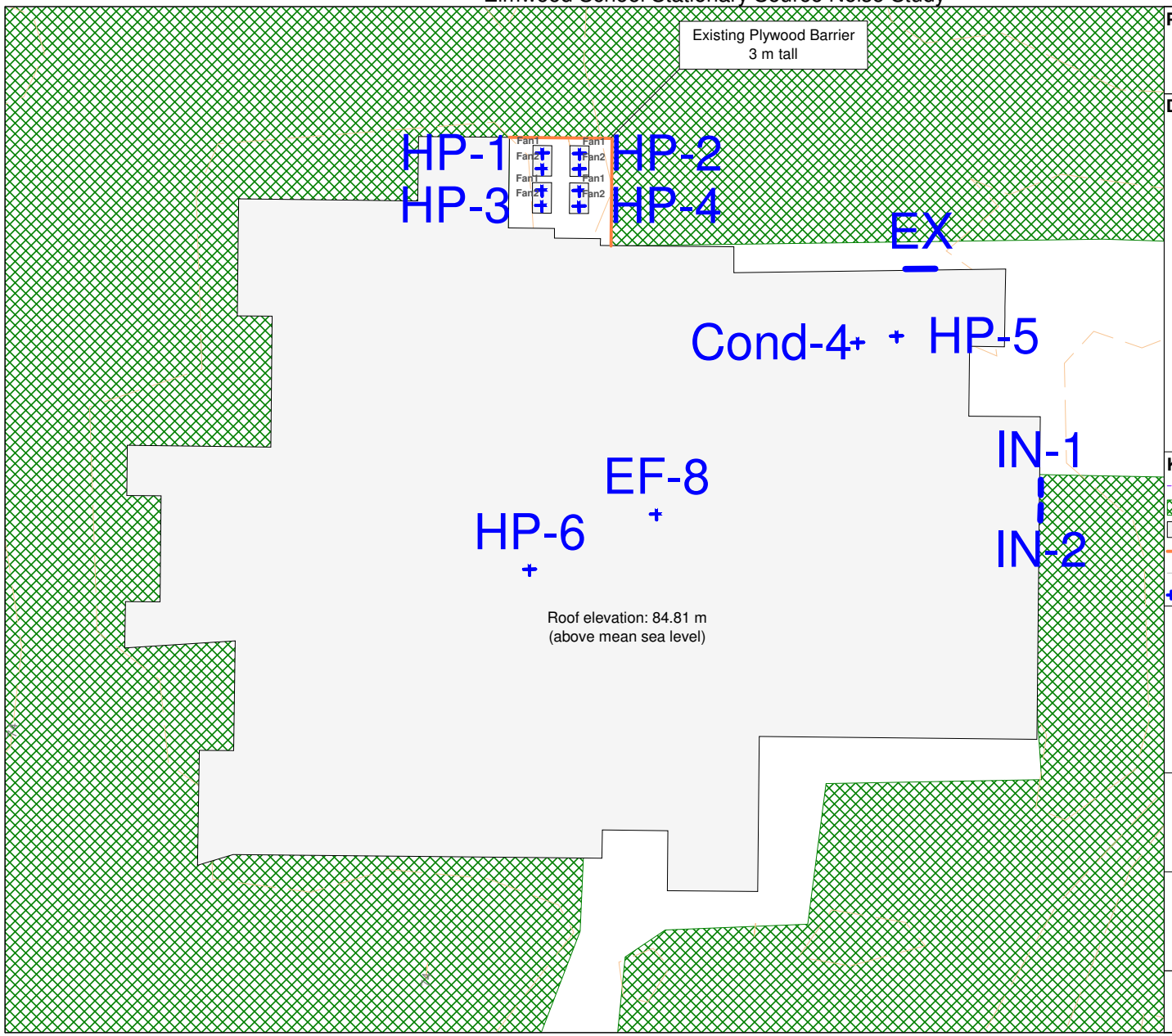
Drawn By: PGL

Date: 2026-04-17

0 2 4 6 8 10 m

1:500

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description:
Plan view of Elmwood Junior School and its environmental noise sources.

Key:
- 75- Ground elevation (m)
- Soft ground surface
- Building or object
- On-site barrier object
- Traced feature (transparent)
- Existing Noise Source

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Figure 3:
Junior School
Noise Sources

N

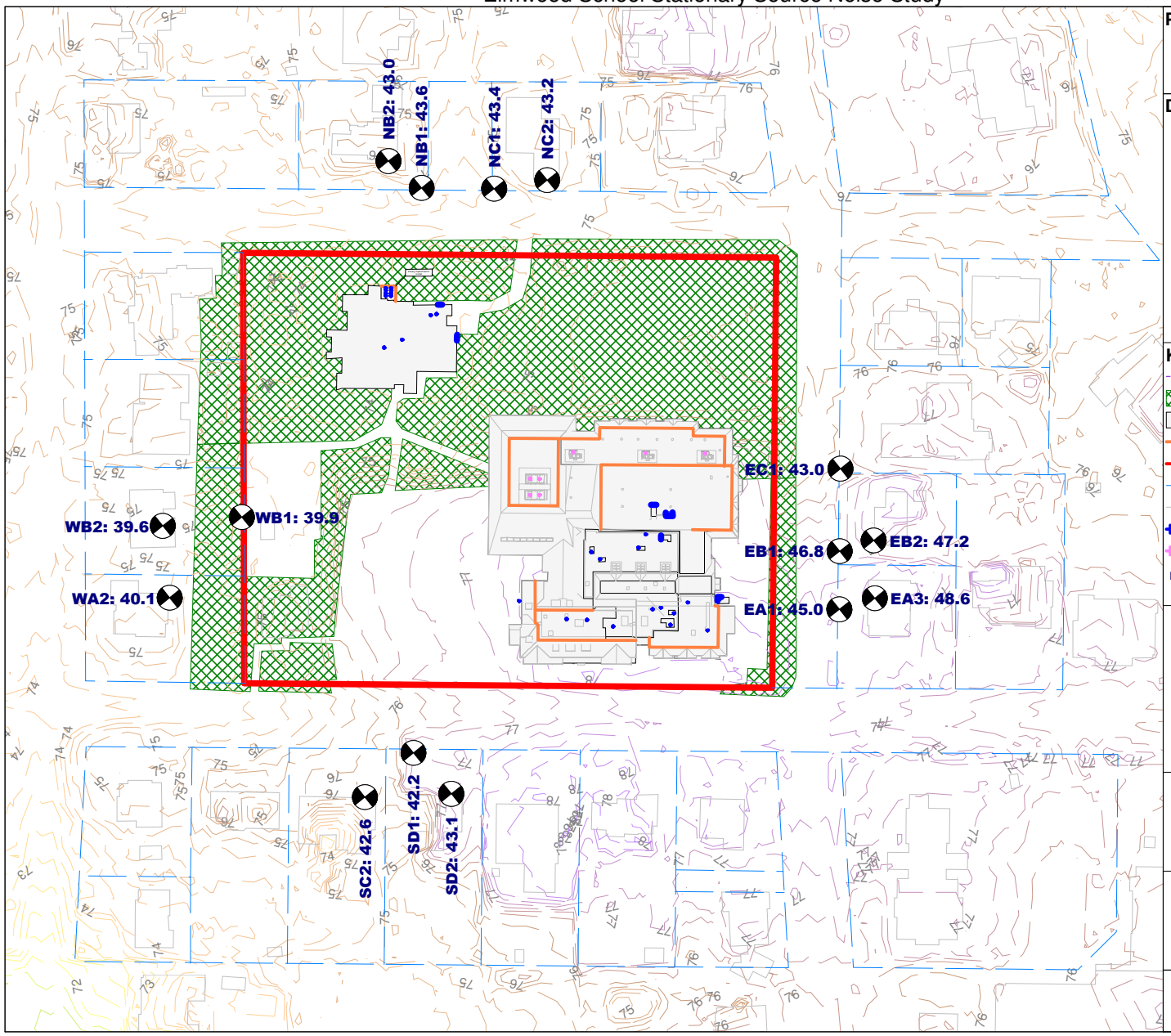
Drawn By: PGL

Date: 2026-04-17

0 1 2 3 4 5 m

1:250

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description:
POR sound levels.

CadnaA Variant:
Noise Levels
Time Period:
Day-Evening

Key:
- 75- Ground elevation (m)
- Soft ground surface
- Building or object
- On-site barrier object
- Elmwood School Property
- Other Property Line
- Traced feature (transparent)
- Existing Noise Source
- Future Noise Source
- EB1 POR and Sound Level (dBA Leq 1hr)

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Figure 4:
POR Noise Levels,
Day-Evening

N

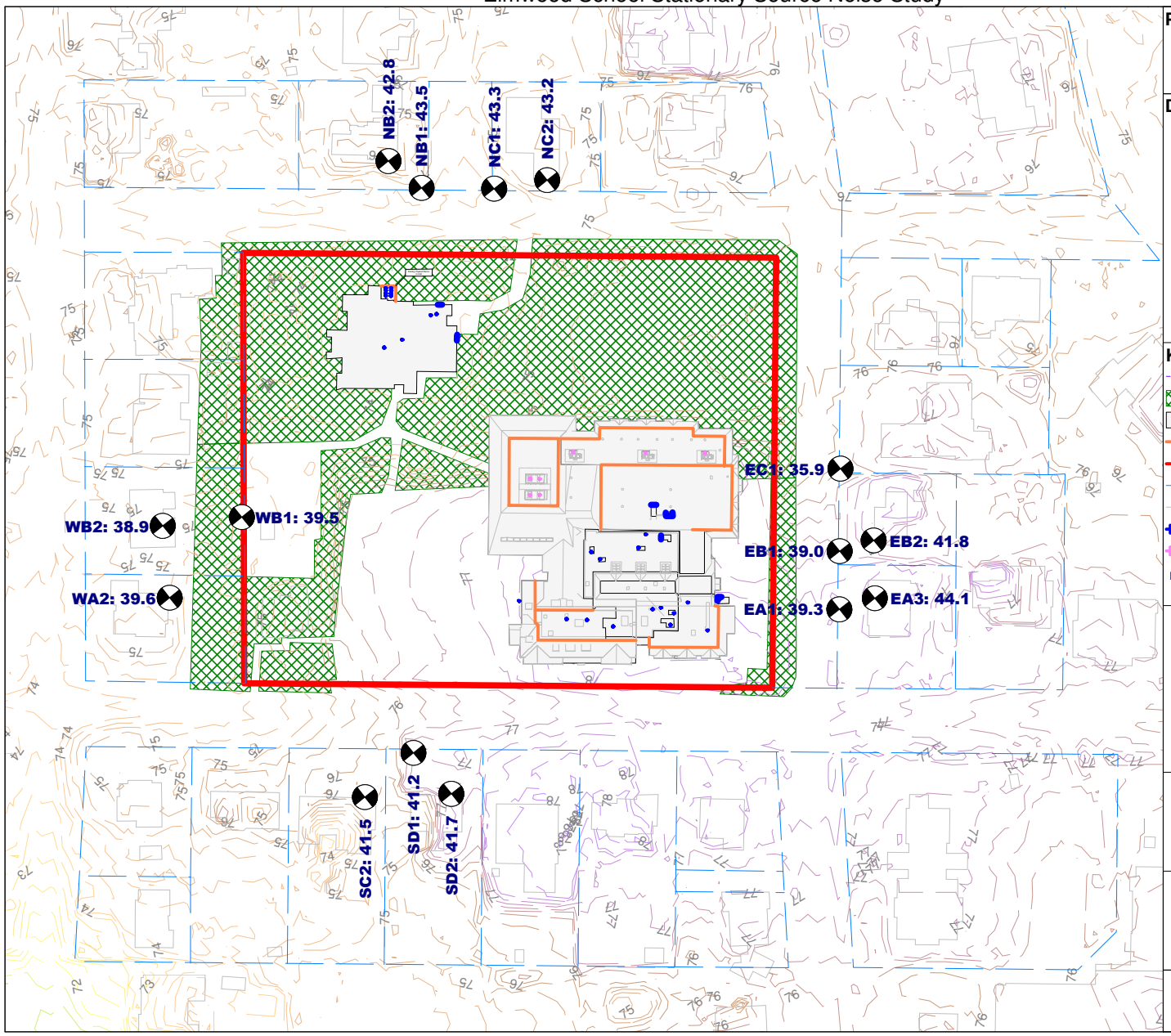
Drawn By: PGL

Date: 2026-04-17

0 10 20 30 40 50 m

1:1750

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description:
POR sound levels.

CadnaA Variant:
Noise Levels
Time Period:
Night

Key:
- 75- Ground elevation (m)
- Soft ground surface
- Building or object
- On-site barrier object
- Elmwood School Property
- Other Property Line
- Traced feature (transparent)
- Existing Noise Source
- Future Noise Source
- EB1 POR and Sound Level (dBA Leq 1hr)

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Figure 5:
POR Noise Levels, Night

N

Drawn By: PGL

Date: 2026-04-17

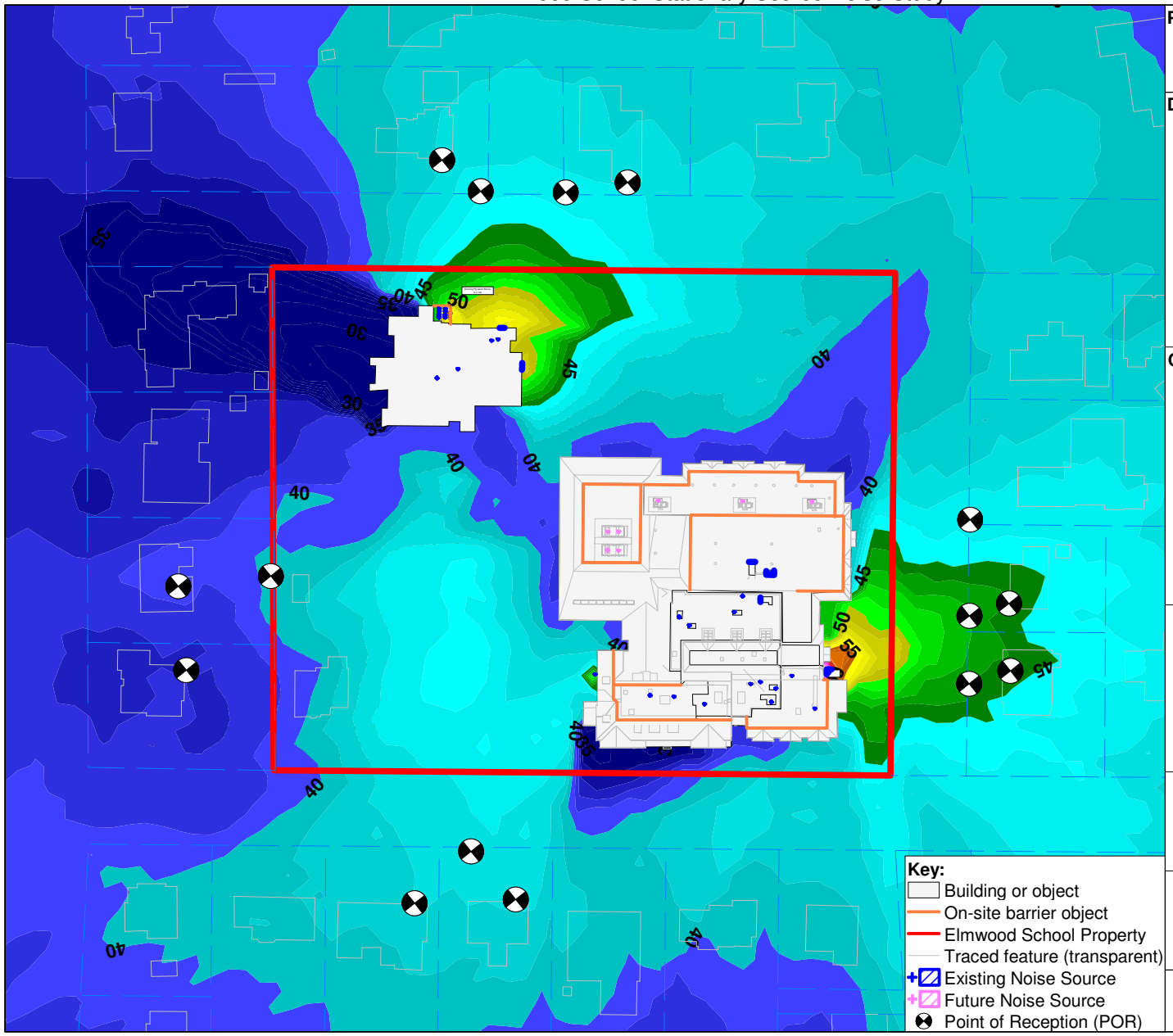
0 10 20 30 40 50 m

1:1750

Elmwood School Additions - V0.cna

CadnaA Version 2026 MR 1 (64 Bit), ISO24

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description
Sound level contours.

CadnaA Variant:
Contours at 1.5 m
Time Period:
Day-Evening

Grid specifications:
Points spaced 4.0 by 4.0 m
1.5 m above grade.

Colour Key:

- <= 35 to 40 dBA
- 40 to 45 dBA
- 45 to 50 dBA
- 50 to 55 dBA
- 55 to 60 dBA
- 60 to 65 dBA
- 65 to >=70 dBA

Intermediate colours show
1 dB level changes.

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Figure 6:
Sound Level Contours at 1.5 m, Day-Evening

N

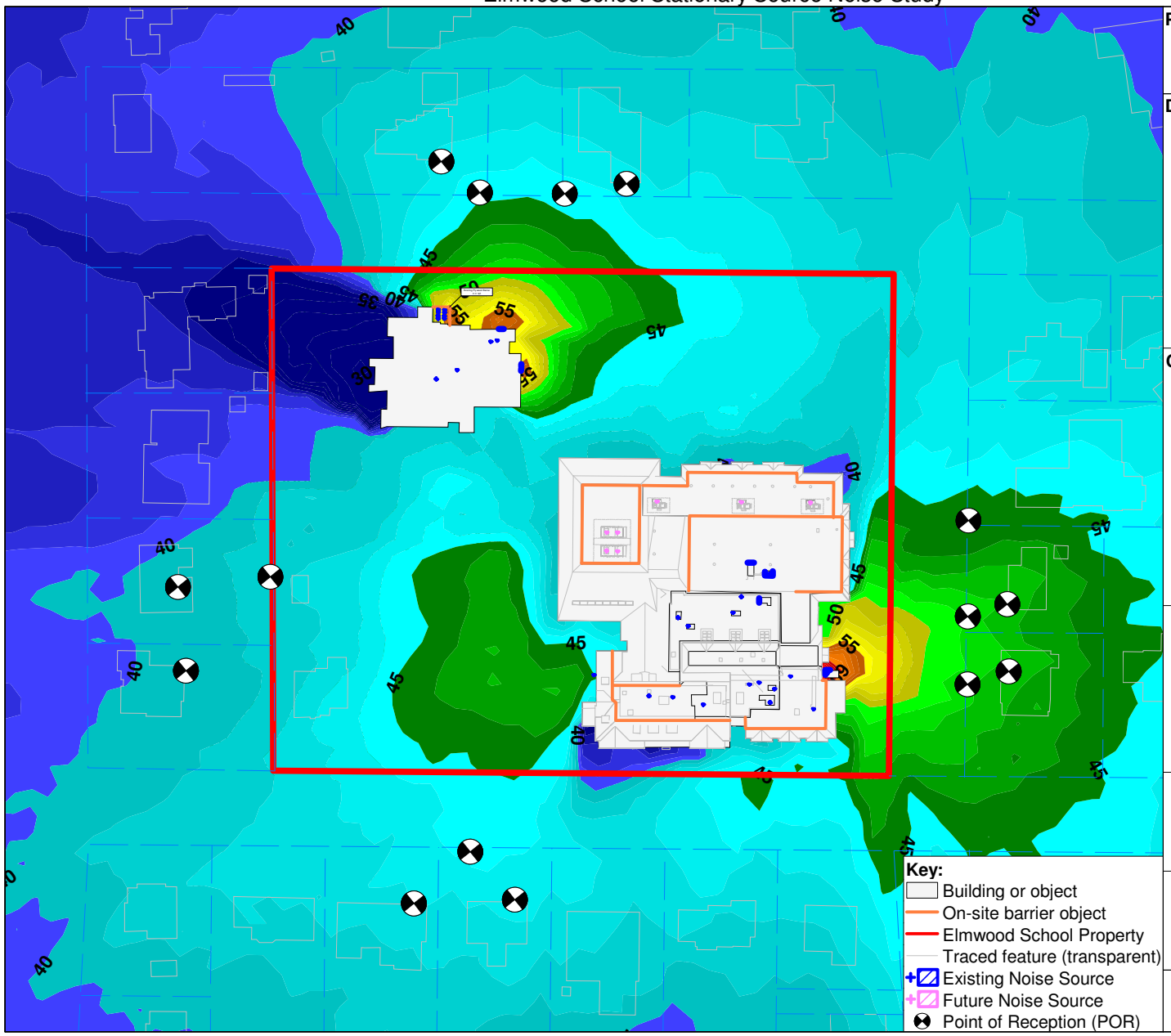
Drawn By: PGL

Date: 2026-04-17

0 10 20 30 40 50 m

1:1500

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description
Sound level contours.

CadnaA Variant:
Contours at 4.5 m
Time Period:
Day-Evening

Grid specifications:
Points spaced 4.0 by 4.0 m
4.5 m above grade.

Colour Key:

- <= 35 to 40 dBA
- 40 to 45 dBA
- 45 to 50 dBA
- 50 to 55 dBA
- 55 to 60 dBA
- 60 to 65 dBA
- 65 to >=70 dBA

Intermediate colours show
1 dB level changes.

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Figure 7:
Sound Level Contours at 4.5 m, Day-Evening

N

Drawn By: PGL

Date: 2026-04-17

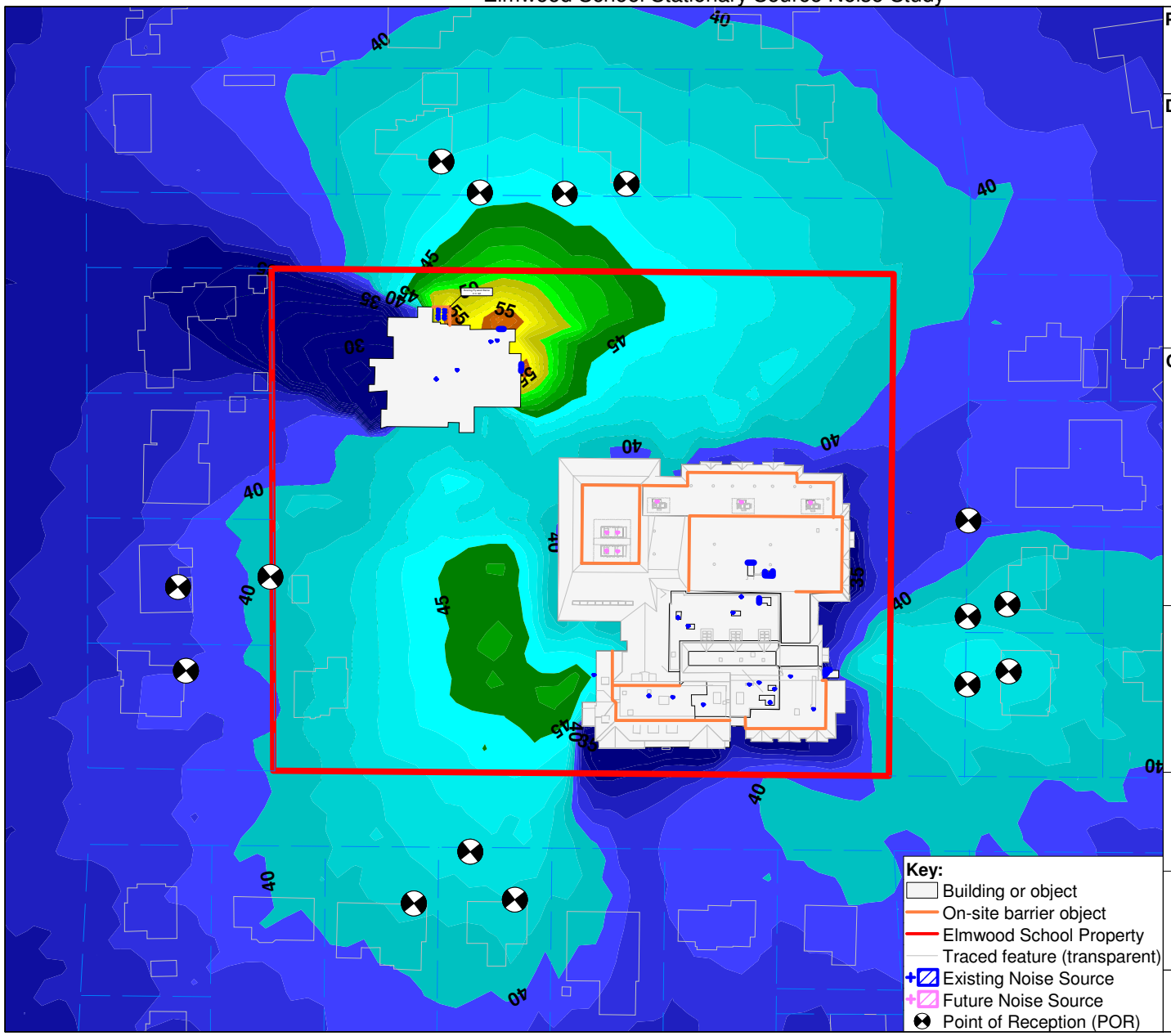
0 10 20 30 40 50 m

1:1500

Elmwood School Additions - V0.cna

CadnaA Version 2026 MR 1 (64 Bit), ISO24

Elmwood School Stationary Source Noise Study



Project and Location:
Elmwood School Additions
261 Buena Vista Road
Ottawa, ON K1M 0V9

Description
Sound level contours.

CadnaA Variant:
Contours at 4.5 m
Time Period:
Night

Grid specifications:
Points spaced 4.0 by 4.0 m
4.5 m above grade.

Colour Key:

- <= 35 to 40 dBA
- 40 to 45 dBA
- 45 to 50 dBA
- 50 to 55 dBA
- 55 to 60 dBA
- 60 to 65 dBA
- 65 to >=70 dBA

Intermediate colours show
1 dB level changes.

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Figure 8:
Sound Level Contours at 4.5 m, Night

N

Drawn By: PGL

Date: 2026-04-17

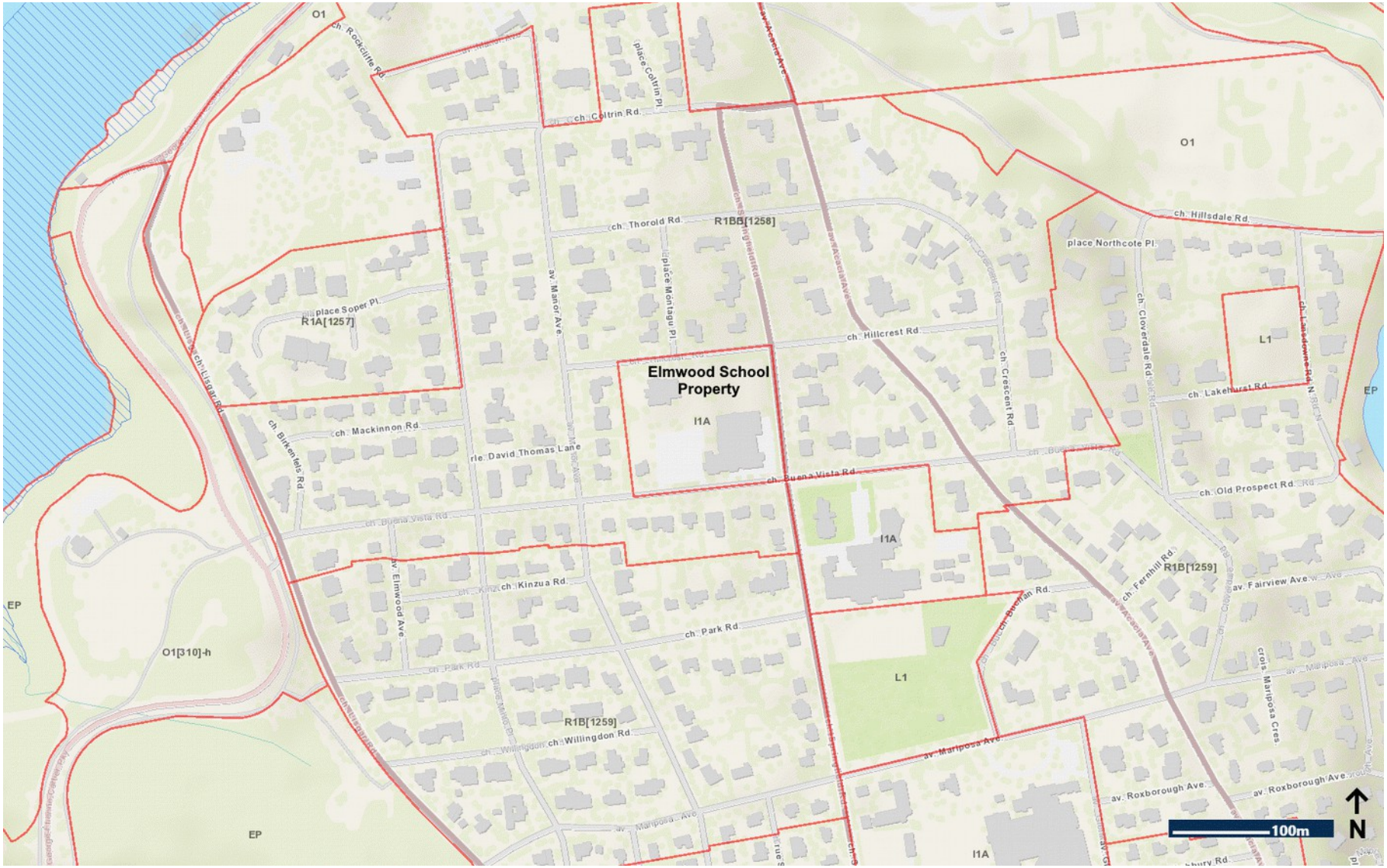
0 10 20 30 40 50 m

1:1500

APPENDICES

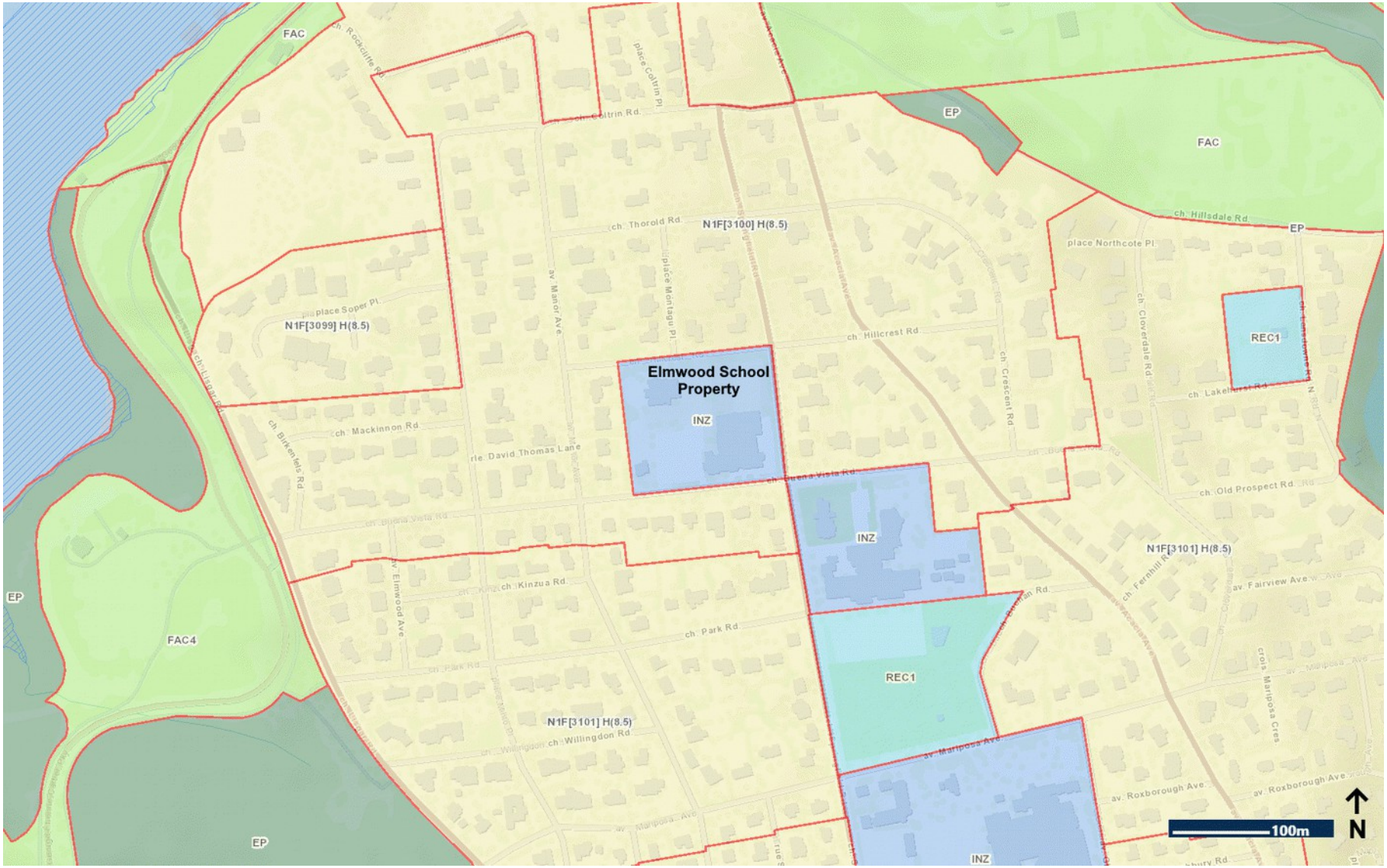
APPENDIX A: LAND USE ZONING DESIGNATION PLANS

Land use zoning designation plans for the area surrounding Elmwood School are located on the following page, per City of Ottawa Zoning By-laws 2008-250 (Consolidated) and 2026-50. These have been prepared using GeoOttawa (Reference 5) on 2026-04-15.



Zoning By-law 2008-250 Consolidation – Codes

I1: Minor Institutional Zone
L1: Community Leisure Facility Zone
EP: Environmental Protection Zone
R1: Residential First Density Zone
O1: Parks and Open Space Zone



Zoning By-law 2026-50 – Codes

INZ: Institutional Zone
N1F: Neighbourhood Zone 1
REC: Recreation Zone
FAC: Open Space Facility Zone
EP: Environmental Protection Zone

APPENDIX B: SIGNIFICANT NOISE SOURCE SPECIFICATIONS

Table B.1: Significant Noise Source Sound Power Levels

Source ID	CadnaA Noise Sources			Un-Adjusted Sound Power Level (dB) at Frequency (Hz) [3]												Adjustments [5]		
	Name	Type [1]	MASL [2]	SRC [4]	31.5	63	125	250	500	1000	2000	4000	8000	Total dB	Total dBA	SQ (dB)	OT (mins)	Total (dB)
COND-1	COND-1	Point	87.6	MFC		65.7	75.7	64.0	58.7	55.2	51.2	46.7	41.2	76.5	63.4			0.0
COND-2	COND-2	Point	78.4	MFC		71.9	62.4	59.0	56.9	54.9	50.9	47.9	39.4	72.8	59.9			0.0
COND-3	COND-3.Fan1	Point	86.5	IDX	68.9	89.2	79.2	76.0	77.2	74.3	71.9	68.1	64.7	90.3	79.7		D-E:60 N:0	D-E:0.0 N:X
	COND-3.Fan2	Point	86.5	IDX	68.9	89.2	79.2	76.0	77.2	74.3	71.9	68.1	64.7	90.3	79.7		D-E:60 N:0	D-E:0.0 N:X
	COND-3.Grill	VArea	86.4	IDX	77.1	79.4	92.1	90.1	81.9	79.4	75.2	83.9	77.4	95.3	88.7		D-E:60 N:0	D-E:0.0 N:X
Cond-4	Cond-4	Point	85.3	MFC		57.5	58.5	57.0	59.5	55.0	50.5	48.0	47.0	65.1	60.4			0.0
EF-1	EF-1	Point	87.3	IDX	76.7	75.4	78.1	66.0	65.1	63.1	56.8	54.6	49.8	81.9	68.4			0.0
EF-2	EF-2	Point	88.4	IDX	75.0	75.1	78.8	75.0	71.3	65.3	63.7	59.4	53.1	82.8	73.1			0.0
EF-3	EF-3	Point	85.7	IDX	77.1	79.4	92.1	90.0	81.9	79.4	75.2	83.9	77.4	95.2	88.7		D-E:60 N:0	D-E:0.0 N:X
EF-4	EF-4	Point	87.1	IDX	78.9	76.0	82.0	75.0	77.4	72.1	69.3	63.5	56.3	85.9	78.1			0.0
EF-5	EF-5	Point	88.5	IDX	69.3	68.4	79.4	69.0	69.2	64.4	60.7	57.3	51.4	80.9	70.9			0.0
EF-6	EF-6	Point	88.0	IDX	75.1	75.1	75.7	72.0	70.8	65.9	67.7	67.1	62.3	81.7	74.5			0.0
EF-7	EF-7	Point	87.8	IDX	74.8	72.0	77.9	74.0	71.2	64.9	60.8	58.0	50.2	81.8	72.3			0.0
EF-8	EF-8	Point	85.8	IDX	70.8	78.1	80.7	71.0	73.0	64.9	62.5	58.5	51.5	83.7	73.2			0.0
EX	EX	VArea	83.8	IDX	89.3	87.4	84.6	79.9	76.2	72.5	71.3	62.5	54.4	92.7	79.0			0.0
HP-1	HP-1.Fan1	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
	HP-1.Fan2	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
HP-2	HP-2.Fan1	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
	HP-2.Fan2	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
HP-3	HP-3.Fan1	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
	HP-3.Fan2	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
HP-4	HP-4.Fan1	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
	HP-4.Fan2	Point	76.8	MFC		79.1	77.6	71.0	65.6	60.6	53.1	47.1	42.1	81.9	68.2			0.0
HP-5	HP-5	Point	85.4	MFC		65.0	69.0	62.0	61.0	54.0	51.0	44.5	35.5	71.6	61.7			0.0
HP-6	HP-6	Point	85.8	MFC		81.2	75.1	71.0	66.9	65.5	60.1	54.4	46.8	82.7	70.2			0.0
IN-1	IN-1	VArea	81.8	IDX	82.6	73.8	80.0	77.7	62.5	59.0	52.9	50.2	47.6	85.7	71.1			0.0
IN-2	IN-2	VArea	81.8	IDX	82.6	73.8	80.0	77.7	62.5	59.0	52.9	50.2	47.6	85.7	71.1			0.0
RTU-1	RTU-1	Point	87.9	MF		86.0	83.0	76.0	76.0	72.0	68.0	65.0	63.0	88.5	77.8			0.0
RTU-10	RTU-10	Point	88.2	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0
RTU-11	RTU-11.Fan1	Point	89.7	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0
	RTU-11.Fan2	Point	89.7	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0
RTU-12	RTU-12	Point	88.2	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0

Source ID	CadnaA Noise Sources			Un-Adjusted Sound Power Level (dB) at Frequency (Hz) [3]												Adjustments [5]		
	Name	Type [1]	MASL [2]	SRC [4]	31.5	63	125	250	500	1000	2000	4000	8000	Total dB	Total dBA	SQ (dB)	OT (mins)	Total (dB)
RTU-13	RTU-13	Point	88.2	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0
RTU-2	RTU-2	Point	87.7	MF		85.6	84.7	81.0	76.0	72.4	68.0	62.8	59.3	89.3	78.7			0.0
RTU-3	RTU-3	Point	87.7	MF		85.6	84.7	81.0	76.0	72.4	68.0	62.8	59.3	89.3	78.7			0.0
RTU-4	RTU-4	Point	87.9	MF		85.6	84.7	81.0	76.0	72.4	68.0	62.8	59.3	89.3	78.7			0.0
RTU-5	RTU-5	Point	87.7	MF		85.6	84.7	81.0	76.0	72.4	68.0	62.8	59.3	89.3	78.7			0.0
RTU-6	RTU-6	VArea	87.6	IDX	82.3	78.2	81.9	71.0	63.4	66.4	64.1	60.9	52.1	86.2	72.1			0.0
RTU-7	RTU-7	VArea	86.7	IDX	79.2	80.7	80.2	74.6	70.1	68.8	65.0	64.1	48.6	85.5	74.3			0.0
RTU-8	RTU-8.Fan1	Point	80.1	IDX	80.8	88.1	79.5	75.0	74.8	73.7	68.7	62.6	53.7	89.8	77.7		D-E:60 N:0	D-E:0.0 N:X
	RTU-8.Fan2	Point	80.1	IDX	80.8	88.1	79.5	75.0	74.8	73.7	68.7	62.6	53.7	89.8	77.7		D-E:60 N:0	D-E:0.0 N:X
	RTU-8.Grill	VArea	80.0	IDX	83.9	91.2	82.5	77.8	77.8	76.8	71.7	65.7	56.8	92.9	80.7		D-E:60 N:0	D-E:0.0 N:X
RTU-9	RTU-9.Fan1	Point	89.7	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0
RTU-9	RTU-9.Fan2	Point	89.7	MF		94.0	90.0	83.0	83.0	79.0	75.0	72.0	71.0	96.1	84.8			0.0

Table B.1 Notes

[1] CadnaA noise source object type: Point, Line, Area (horizontal), or VArea (vertical area)
[2] Noise source elevation in Metres Above Sea Level (MASL)
[3] All sound power level data are shown without adjustments
[4] Source of the sound power level data.
IDX: calculated from sound pressure level measurements performed by Integral DX Engineering. The raw measurement data and basis of sound power level calculations are included in Appendix C. Sound power level conversions were completed in general conformance with ISO Standard 3744.
MF: Manufacturer sound power level (without adjustments). Extracts of manufacturer documentation are included in Appendix E.
MFC: Manufacturer sound level data, with additional calculations to determine the representative sound power level. Details of the adjustments are included in Appendix E.
[5] Sound power level adjustments per NPC-104
SQ: Sound Quality
5.0 dB for Tonality or Cyclic Variations
10.0 dB for Quasi-Steady Impulsive Sound
OT: worst-case Operating Time, in minutes per hour in each Time Period (D=Daytime, E=Evening, N=Nighttime). The Operating Time is used to determine sound power adjustments for Intermittence:

- 60 minutes/hour equals no adjustment for Intermittence.
- 30 minutes/hour equals -3 dB adjustment per octave band.
- 15 minutes/hour equals -6 dB adjustment per octave band.
- 0 minutes/hour indicates that the source does not operate in a Time Period.

Where no values are provided, no adjustment is applied for Intermittence in any Time Period.

Total: the final adjustment incorporating Sound Quality and Intermittence adjustments, per Time Period. The Total adjustment is applied to each Octave Band.

“X” denotes Time Periods for which the source does not operate (and thus produces no noise).

Table B.2: Significant Noise Source Specifications

Source ID	Description	Make	Model	Serial	Capacity or Other
COND-1	Senior school rooftop condenser	Mitsubishi	PUY-A42NKA8		
COND-2	Senior school server room condenser on-grade	Mitsubishi	PUY-A24NHA4		
COND-3	Senior school rooftop condenser (remote condenser for RTU-7)	Carrier	38AKS014---121--		
Cond-4	Junior school rooftop condenser	Mitsubishi	PUY-A18NHA6		
EF-1	Senior school rooftop exhaust fan	Domex	BB45		
EF-2	Senior school rooftop exhaust fan	PennBarry	DX11R		
EF-3	Senior school rooftop exhaust fan (chemistry lab)	PennBarry	VCR-122 C1A9		
EF-4	Senior school rooftop exhaust fan	Carnes			
EF-5	Senior school rooftop exhaust fan	PennBarry	BB45		
EF-6	Senior school rooftop exhaust fan	PennBarry	BB45		
EF-7	Senior school rooftop exhaust fan (kitchen)	FloAire	BDU15		
EF-8	Junior school rooftop exhaust fan	Greenheck	6B-161-5		
EX	Junior school air handler - exhaust				
HP-1	Junior school on-grade heat pump	Daikin	RXYQ144XBYCA		
HP-2	Junior school on-grade heat pump	Daikin	RXYQ144XBYCA		
HP-3	Junior school on-grade heat pump	Daikin	RXYQ144XBYCA		
HP-4	Junior school on-grade heat pump	Daikin	RXYQ144XBYCA		
HP-5	Junior school rooftop heat pump				
HP-6	Junior school rooftop heat pump	Mitsubishi	PUMY-P60NKMU4		
IN-1	Junior school air handler - intake				
IN-2	Junior school air hanlder - intake				
RTU-1	Senior school rooftop unit	AAON	RN-007-8-0-EA09-3LB		
RTU-10	Future addition rooftop unit	AAON	RNA-008		
RTU-11	Future addition rooftop unit	AAON	RNA-026		
RTU-12	Future addition rooftop unit	AAON	RNA-008		
RTU-13	Future addition rooftop unit	AAON	RNA-008		
RTU-2	Senior school rooftop unit	Carrier	48GEFM06		
RTU-3	Senior school rooftop unit	Carrier	48FEFM07		
RTU-4	Senior school rooftop unit	Carrier	48FEFM14		
RTU-5	Senior school rooftop unit	Carrier	48GEFM06		
RTU-6	Senior school rooftop unit	Engineered Air	DJE-20-0		
RTU-7	Senior school rooftop unit	Trane	GRAA40G		
RTU-8	Senior school on-grade air handler	Carrier	FIOP-200---501GA		
RTU-9	Future addition rooftop unit	AAON	RNA-026		

APPENDIX C: NOISE SOURCE MEASUREMENT DATA

Table C.1: Measurement Data and Basis of Sound Power Calculations

Noise Source	Instrument	Date	D [1] (m)	Basis of Sound Power Calculation		Measured Sound Pressure Level (dB) at Octave Band (Hz)											Measurement Notes
				Description	Area (m²)	Pos ID	31.5	63	125	250	500	1000	2000	4000	8000	Total dBA	
COND-3.Fan1	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	9	68.9	89.2	79.3	76.4	77.2	74.3	71.9	68.1	64.7	79.7	
COND-3.Fan2	Sound power set as equal to identical measured noise source COND-3.Fan1																
COND-3.Grill	BK Type 2270	2026-03-30	0	Average of measurement on area source	2.914	010 011	80.3 81.0	94.2 97.4	86.3 85.7	86.0 82.1	81.1 82.8	81.0 80.6	77.2 77.2	73.4 72.9	67.2 67.7	85.5 85.5	
EF-1	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	1	68.7	67.4	70.2	58.1	57.1	55.1	48.8	46.6	41.8	59.9	
EF-2	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	2	67.0	67.1	70.8	67.0	63.3	57.3	55.7	51.4	45.1	64.8	
EF-3	BK Type 2270	2026-03-30	1	Average of measurements on control surface	25.395	3 4 5	65.6 63.1 65.3	66.1 65.5 65.7	80.0 78.1 78.1	74.4 76.1 72.3	69.6 67.9 67.5	65.0 65.4 62.5	60.3 61.2 58.7	59.9 69.9 59.7	53.7 63.4 55.2	72.2 74.5 70.4	
EF-4	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	8	70.9	68.0	74	67.2	69.4	64.1	61.3	55.5	48.3	69.9	
EF-5	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	13	61.3	60.5	71.4	60.8	61.2	56.4	52.7	49.3	43.5	62.7	
EF-6	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	14	67.1	67.2	67.7	64.5	62.8	58.0	59.8	59.2	54.3	66.7	
EF-7	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	15	66.8	64	69.9	65.7	63.2	57.0	52.9	50.0	42.2	64.4	
EF-8	BK Type 2270	2026-03-30	1	Hemispherical radiation	6.28	19	62.8	70.1	72.8	62.6	65.0	56.9	54.5	50.5	43.6	64.8	
EX	BK Type 2270	2026-03-30	9	Hemispherical radiation	508.9	21	62.2	60.3	57.5	52.8	49.1	45.4	44.2	35.4	27.3	51.9	
IN-1	BK Type 2270	2026-03-30	3.5	Hemispherical radiation from two sources	76.97	23	63.7	54.9	61.1	58.8	43.6	40.1	34.1	31.3	28.7	51.8	Half of sound power assigned to each of IN-1 and IN-2
IN-2	Sound power set as equal to identical measured noise source IN-1																
RTU-6	BK Type 2270	2026-03-30	0	Measurement on area source	0.55	6	82.3	78.2	81.9	71.0	63.4	66.4	64.1	60.9	52.1	71.9	
RTU-7	BK Type 2270	2026-03-30	0	Measurement on area source	1.65	12	77.0	78.6	78.0	72.4	68.0	66.6	62.8	61.9	46.5	72.0	

Noise Source	Instrument	Date	D [1] (m)	Basis of Sound Power Calculation		Measured Sound Pressure Level (dB) at Octave Band (Hz)										Measurement Notes
				Description	Area (m^2)	Pos ID	31.5	63	125	250	500	1000	2000	4000	8000	Total dBA	
RTU-8. Fan1	BK Type 2270	2026-03-30	0	Average of 2 measurement on area source (Grill)	1.98	016 017	80.9 80.8	89.8 85.6	78.8 80.2	74.7 75.0	74.7 74.9	74.0 73.5	69.4 68.0	63.4 61.8	54.9 52.3	77.7 77.3	Grill measurement data. Total sound power from both fans set as equal to grill sound power (applied -3 dB to each fan)
RTU-8. Fan2	Sound power set as equal to identical measured noise source RTU-8.Fan1															
RTU-8. Grill	BK Type 2270	2026-03-30	0	Average of 2 measurement on area source	1.98	016 017	80.9 80.8	89.8 85.6	78.8 80.2	74.7 75.0	74.7 74.9	74.0 73.5	69.4 68.0	63.4 61.8	54.9 52.3	77.7 77.3	

Table C.1 Notes

[1] D: Distance between noise source and measurement position.

APPENDIX D: INSTRUMENTATION AND WEATHER DATA

Instrumentation

The instrument used for each sound level measurement is listed in Appendix C. The instrumentation details are provided below.

Table D.1: Instrumentation for Sound Level Measurements

Instrument	Type 1 Sound Level Meter		Attached Type 1 Microphone	
as identified in Table C.1	Make and Model	Serial Number	Make and Model	Serial Number
BK Type 2270	Brüel and Kjær Type 2270	3007495	Brüel and Kjær Type 4189	2920230

Windscreens were fitted to the microphone for the measurements. Calibration was checked before and after the measurements with a Brüel and Kjær calibrator Type 4231, serial number 2122924.

Proof of calibration for these instruments is available upon request.

Weather Data

The nearest Environment Canada weather reporting station details and weather data are listed in the following tables. All measurements were completed between 10:00 and 14:00 local time. Weather conditions were suitable for noise measurements. No adjustments to the measured values were made to account for wind noise nor any other environmental influence.

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time.

Table D.2: Weather Reporting Station Information (Ottawa Intl A)

Latitude:	45°19'21.000" N	**Longitude:**	75°40'09.000" W	**Elevation:**	114.00 m
Climate ID:	6106001	**WMO ID:**	71628	**TC ID:**	YOW

Table D.3: Weather Data

Time	Temp °C	Dew Point °C	Rel Hum %	Wind Dir 10's deg	Wind Spd km/h	Visibility km	Stn Press kPa	Weather
08:00	6.1	-3.8	49	22	18	24.1	99.95	N/A
09:00	8.8	-3.4	42	22	19	24.1	99.90	N/A
10:00	10.9	-2.4	39	23	25	24.1	99.85	Mostly Cloudy
11:00	13.4	-1.5	35	21	24	24.1	99.77	N/A
12:00	14.6	-0.6	35	23	29	24.1	99.73	N/A
13:00	15.0	0.1	36	23	20	24.1	99.69	Mostly Cloudy
14:00	15.6	0.2	35	24	28	24.1	99.69	N/A

APPENDIX E: SUPPORTING INFORMATION

Included information:

- Sound absorption coefficients
- Manufacturer sound level data

Sound Absorption Coefficients

The following table lists all sound absorption coefficients included in the acoustic model.

Table E.1: Sound Absorption Coefficients

ID: Description	Sound Absorption Coefficient at Octave Band									Application
	31.5	63	125	250	500	1000	2000	4000	8000	
C1: Unglazed brick	0	0	0.02	0.02	0.03	0.04	0.05	0.07	0	Buildings and roof walls
C2: 9.5 mm plywood panelling			0.28	0.22	0.17	0.09	0.10	0.11		Noise barrier north of the Junior School around Heat Pumps HP-1, HP-2, HP-3, HP-4.

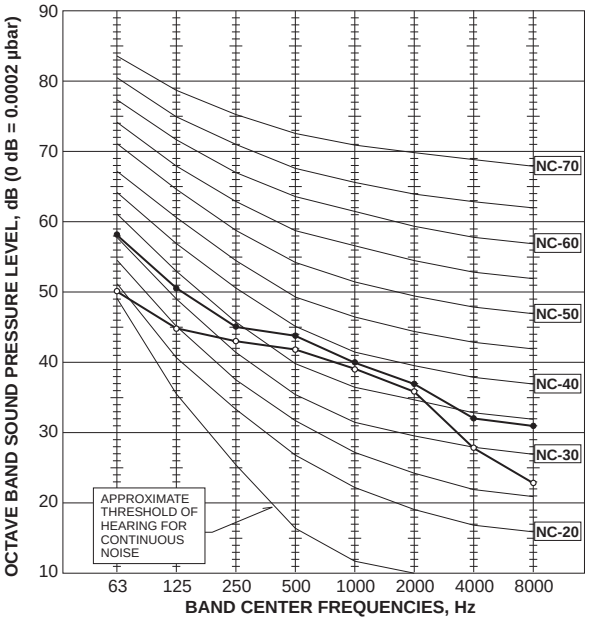
The above sound absorption coefficients originate from Architectural Acoustics, M. David Egan (Reference 13).

COND-1

5-3. NOISE CRITERION CURVES

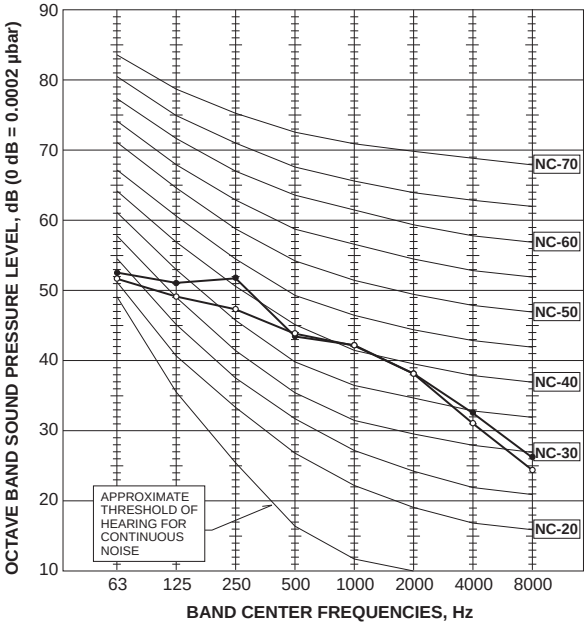
PUZ-A12/18NKA8
PUY-A12/18NKA8

MODE	SPL(dB)	LINE
COOLING	44	○—○
HEATING	46	●—●



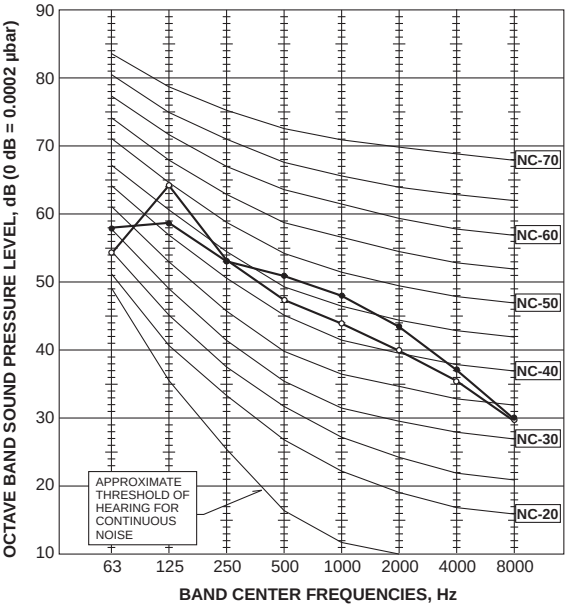
PUZ-A24/30NHA8
PUY-A24/30NHA8

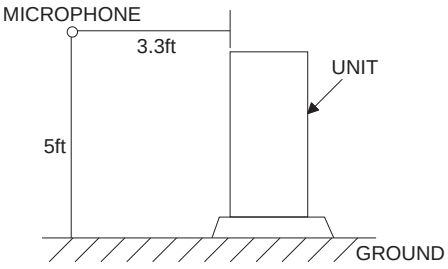
MODE	SPL(dB)	LINE
COOLING	47	○—○
HEATING	48	●—●



PUZ-A36/42NKA8
PUY-A36/42NKA8

MODE	SPL(dB)	LINE
COOLING	52	○—○
HEATING	53	●—●





Cooling mode only.
Basis of Sound Power Calculation:

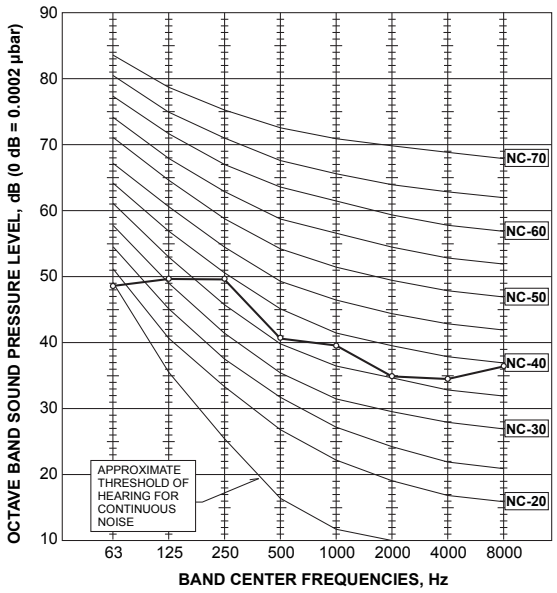
Hemispherical spreading from point source at centre of unit (unit width = 0.33 m)

COND-2

6. SOUND PRESSURE LEVELS

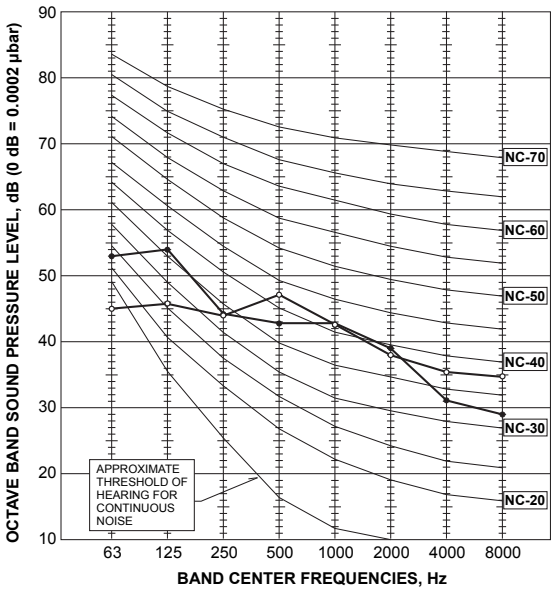
PUY-A12NHA4
PUY-A12NHA4-BS

MODE	SPL(dB)	LINE
COOLING	46	



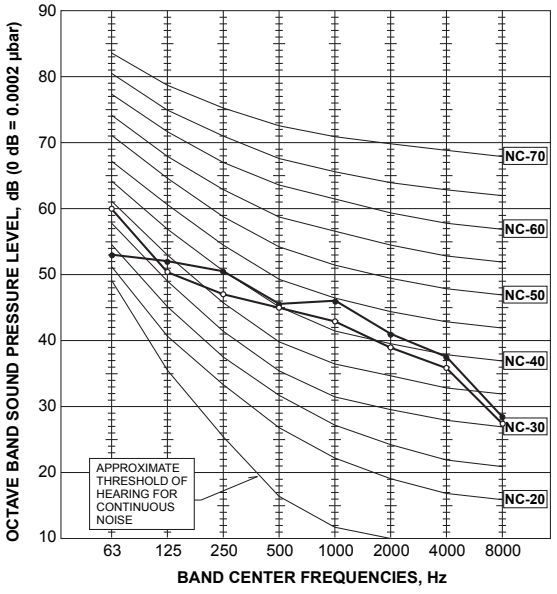
PUY-A18NHA4
PUY-A18NHA4-BS

MODE	SPL(dB)	LINE
COOLING	48	
HEATING	47	



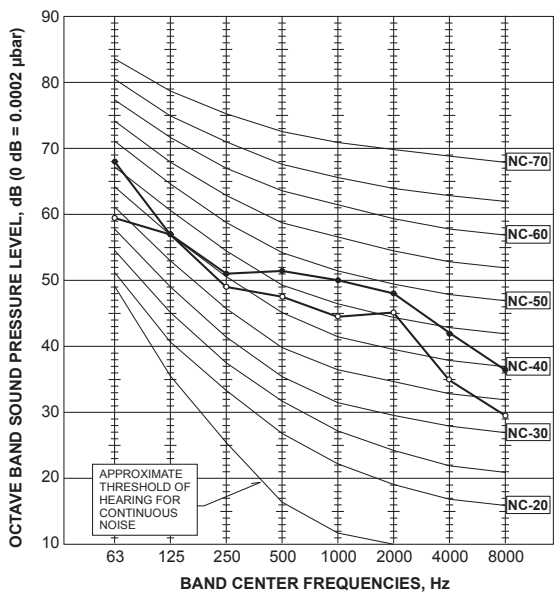
PUY-A24/30/36NHA4
PUY-A24/30/36NHA4-BS

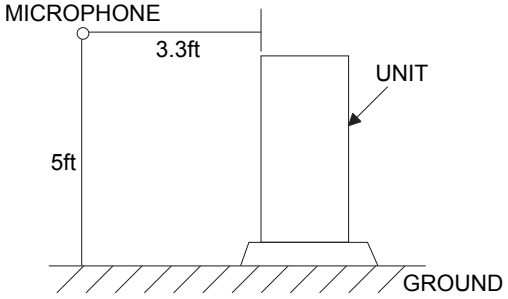
MODE	SPL(dB)	LINE
COOLING	48	
HEATING	50	



PUY-A42NHA5
PUY-A42NHA5-BS

MODE	SPL(dB)	LINE
COOLING	51	
HEATING	55	





Cooling mode only.
Basis of Sound Power Calculation:

Hemispherical spreading from point source at centre of unit (unit width = 0.33 m)

Due to continuing improvement, above specification may be subject to change without notice.

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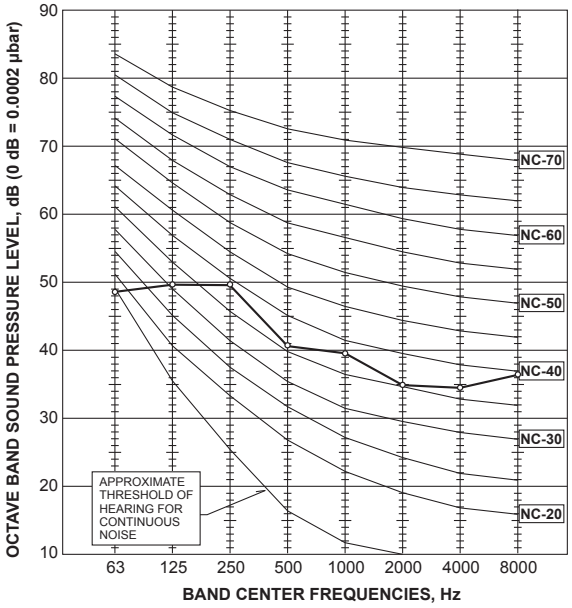
11. NOISE CRITERION CURVES

11-2. OUTDOOR UNIT

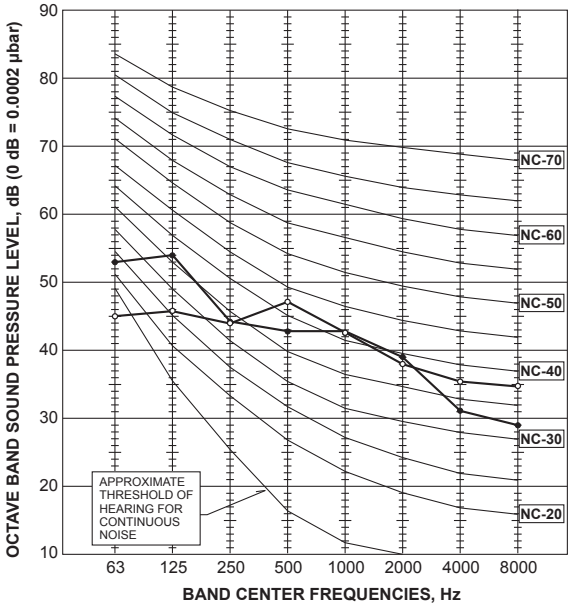
PUY-A12NHA6
PUY-A12NHA6-BS

MODE	SPL(dB)	LINE
COOLING	46	○—○



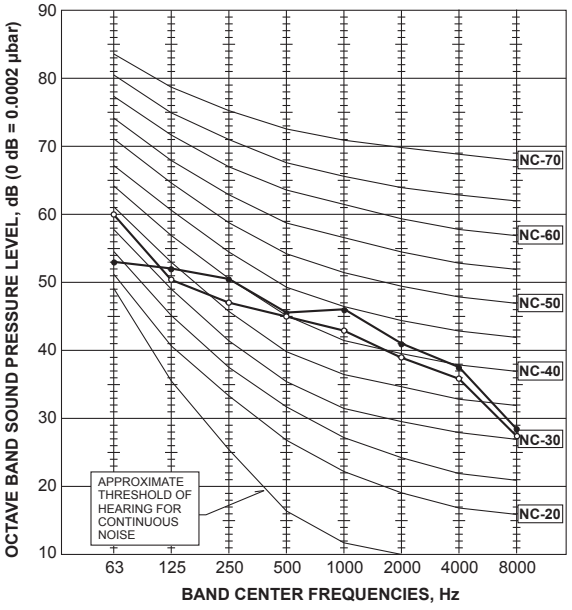
PUY-A18NHA6
PUY-A18NHA6-BS
PUZ-A18NHA6
PUZ-A18NHA6-BS

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



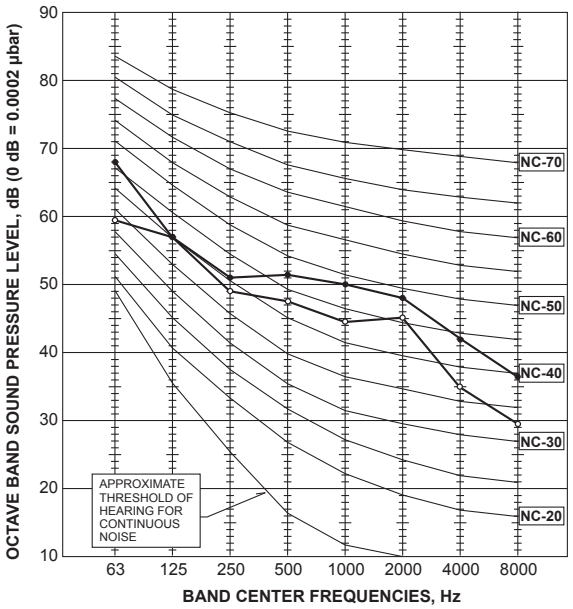
PUY-A24/30/36NHA6
PUY-A24/30/36NHA6-BS
PUZ-A24/30/36NHA6
PUZ-A24/30/36NHA6-BS

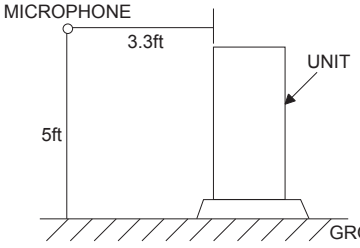
MODE	SPL(dB)	LINE
COOLING	48	○—○
HEATING	50	●—●



PUZ-A42NHA6
PUY-A42NHA6

MODE	SPL(dB)	LINE
COOLING	51	○—○
HEATING	55	●—●





Cooling mode only.
Basis of Sound Power Calculation:

Hemispherical spreading from point source at centre of unit (unit width = 0.30 m)

Due to continuing improvement, above specification may be subject to change without notice.

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HP-1, HP-2, HP-3, HP-4

RXYQ144 / 168 / 192AATJB

Outdoor unit model No.			RXYQ144AATJB	RXYQ168AATJB	RXYQ192AATJB
Power supply			3 phase, 60 Hz, 208/230 V	3 phase, 60 Hz, 208/230 V	3 phase, 60 Hz, 208/230 V
★1 Cooling capacity	Nominal	Btu/h (kW)	144,000 (42.2)	162,000 (47.5)	192,000 (56.3)
	Rated		138,000 (40.4)	156,000 (45.7)	184,000 (53.9)
★2 Heating capacity	Nominal	Btu/h (kW)	162,000 (47.5)	189,000 (55.4)	216,000 (63.3)
	Rated		138,000 (40.4)	156,000 (45.7)	184,000 (53.9)
Casing color			Ivory white (5Y7.5/1)	Ivory white (5Y7.5/1)	Ivory white (5Y7.5/1)
Dimensions: (H × W × D)		in. (mm)	65-3/8 × 48-13/16 × 30-1/8 (1660 × 1240 × 765)	65-3/8 × 48-13/16 × 30-1/8 (1660 × 1240 × 765)	65-3/8 x 68-7/8 x 30-1/8 (1660 x 1750 x 765)
Heat exchanger			Cross fin coil	Cross fin coil	Cross fin coil
Compressor	Type		Hermetically sealed scroll type	Hermetically sealed scroll type	Hermetically sealed scroll type
	Volume	m^3/h	11.5 + 17.4	12.8 + 19.5	15.4 + 16.4
	Number of revolutions	r/min	5,424 + 5,124	6,066 + 5,766	4,542 + 4,842
	Motor output × Number of units	kW	(3.31 + 5.34) × 1	(3.71 + 6.01) × 1	(4.73 + 5.04) × 1
	Starting method		Soft start	Soft start	Soft start
Fan	Type		Propeller fan	Propeller fan	Propeller fan
	Motor output	kW	0.65 × 2	0.65 × 2	0.95 × 2
	Airflow rate	cfm (m^3/min)	9,935 (281.3)	9,935 (281.3)	13,665 (386.9)
	Drive		Direct drive	Direct drive	Direct drive
Connecting pipes	Liquid pipe	in. (mm)	ϕ1/2 (12.7) C1220T (Brazing connection)	ϕ5/8 (15.9) C1220T (Brazing connection)	ϕ5/8 (15.9) C1220T (Brazing connection)
	Gas pipe	in. (mm)	ϕ1-1/8 (28.6) C1220T (Brazing connection)	ϕ1-1/8 (28.6) C1220T (Brazing connection)	ϕ1-1/8 (28.6) C1220T (Brazing connection)
Weight		lbs (kg)	750 (340)	750 (340)	904 (410)
Sound pressure level (reference data)		dB(A)	65	65	67
Sound power level (reference data)		dB	85	85	88
Safety devices			High pressure switch, Fan driver overload protector, Overcurrent fuse, Inverter overload protector, Leak detecting device	High pressure switch, Fan driver overload protector, Overcurrent fuse, Inverter overload protector, Leak detecting device	High pressure switch, Fan driver overload protector, Overcurrent fuse, Inverter overload protector, Leak detecting device
Defrost method			Deicer	Deicer	Deicer
Capacity control		%	3 - 100	2 - 100	4 - 100
Refrigerant	Refrigerant name		R410A	R410A	R410A
	Charge	lbs (kg)	25.8 (11.7)	25.8 (11.7)	25.8 (11.7)
	Control		Electronic expansion valve	Electronic expansion valve	Electronic expansion valve
Standard accessories			Installation manual, Operation manual, Connection pipes, Clamps	Installation manual, Operation manual, Connection pipes, Clamps	Installation manual, Operation manual, Connection pipes, Clamps

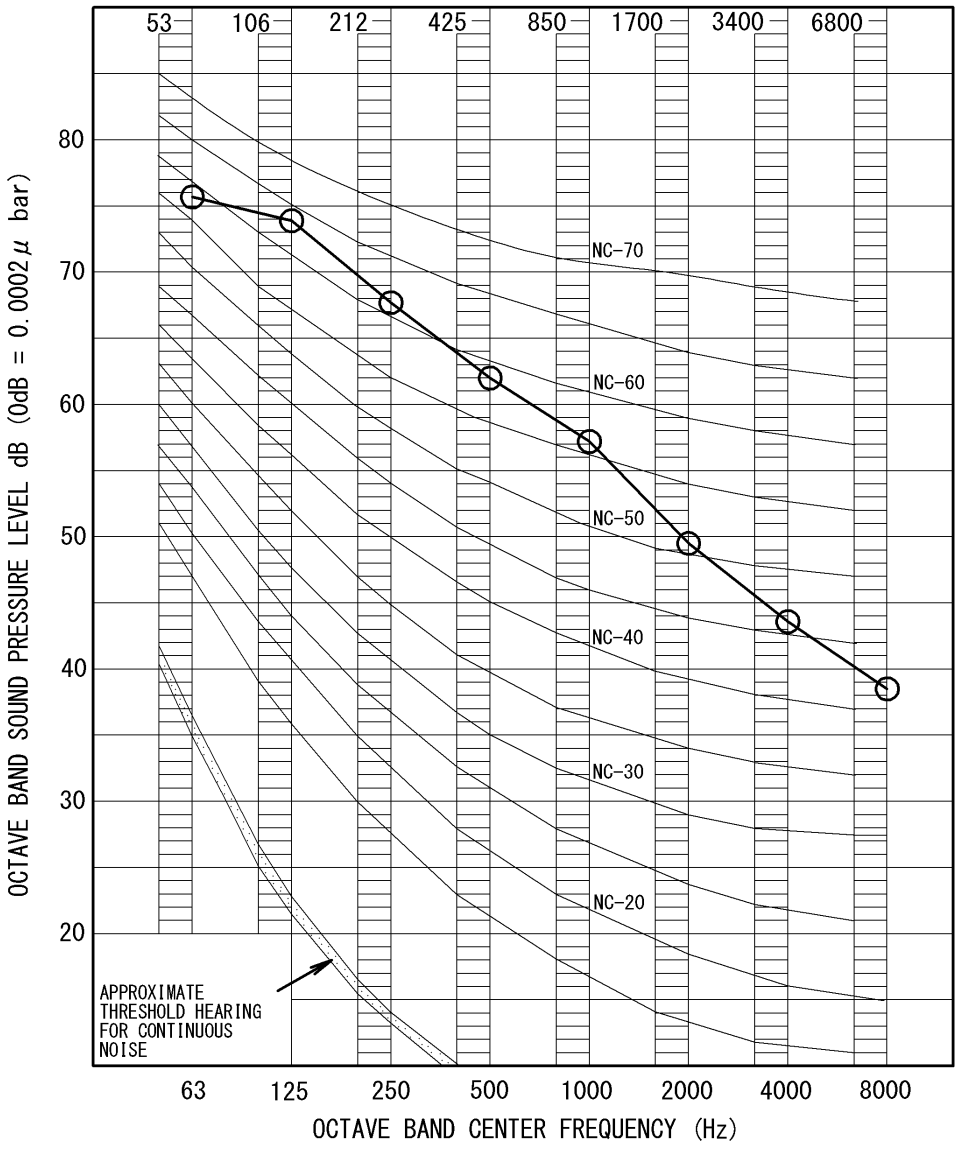
Note: ★1. Indoor temp.: 80° FDB (26.7° CDB), 67° FWB (19.4° CWB) / Outdoor temp.: 95° FDB (35.0° CDB) / Rated capacity is certified under AHRI standard 1230.

★2. Indoor temp.: 70° FDB (21.1° CDB) / Outdoor temp.: 47° FDB (8.3° CDB), 43° FWB (6.1° CWB) / Rated capacity is certified under AHRI standard 1230.

HP-1, HP-2, HP-3, HP-4

RXYQ144AATJB / AAYDB

The reported 85 dB sound power level was used, with relative octave band levels set based on a constant adjustment to these octave band sound pressure level data.



OVER ALL (dB)

SCALE	60Hz
A	65

(B.G.N IS ALREADY RECTIFIED)

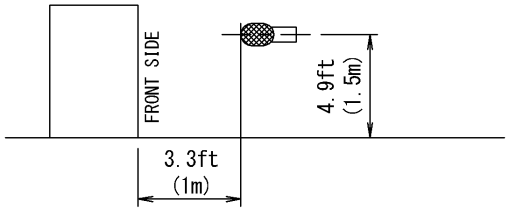
OPERATING CONDITIONS

POWER SOURCE	208/230V	60Hz
	460V	60Hz

MEASURING PLACE

ANECHOIC CHAMBER(CONVERSION VALUE)

LOCATION OF MICROPHONE



NOTE : THE OPERATING SOUND IS MEASURED IN ANECHOIC CHAMBER, IF IT IS MEASURED UNDER THE ACTUAL INSTALLATION CONDITIONS, IT IS NORMALLY OVER THE SET VALUE DUE TO ENVIRONMENTAL NOISE AND SOUND REFLECTION.

AAON Standard Condenser Fan Radiated Sound Levels

RTU-1, RTU-10, RTU-11, RTU-12, RTU-13

Updated 10/26/2018

Sound Pressure Level in a Hemispherical Free Field — Dist (ft): 15

		Fans	Dia	RPM	Sound Power Level 63	125	250	500	1000	2000	4000	8000	LwA	Sound Pressure Level 63	125	250	500	1000	2000	4000	8000	dBA
RQ 2 & 3 Ton	Inlet	1	30	850	79	74	72	70	66	62	59	59	72	58	53	51	48	44	41	38	38	50
	Outlet				81	77	71	71	67	62	59	58	73	60	56	49	50	46	41	38	37	51
	Total				83	79	74	73	69	65	62	61	75	62	58	53	52	48	44	41	40	54
RQ 4-6 Ton & RN 6 & 7 Ton	Inlet	1	30	1085	85	79	77	75	71	68	65	64	77	63	58	56	54	50	46	44	43	56
	Outlet				86	83	76	76	72	68	65	63	78	65	62	55	55	51	46	44	42	57
	Total				89	84	80	79	75	71	68	67	80	67	63	58	57	53	49	47	46	59
RN 8 & 10 Ton	Inlet	1	30	1085	92	86	85	82	78	75	72	71	84	71	65	63	61	57	54	51	50	63
	Outlet				94	90	83	83	79	75	72	71	85	72	69	62	62	58	54	51	49	64
	Total				96	91	87	86	82	78	75	74	88	75	70	66	65	60	57	54	53	66
RN 09 & 11 Ton	Inlet	2	30	1085	88	82	80	78	74	71	68	67	80	66	61	59	57	53	49	47	46	59
	Outlet				89	86	79	79	75	71	68	66	81	68	65	58	58	54	49	47	45	60
	Total				92	87	83	82	78	74	71	70	83	70	66	61	60	56	52	50	49	62
RN 13-20 Ton	Inlet	2	30	1085	95	89	88	85	81	78	75	74	87	74	68	66	64	60	57	54	53	66
	Outlet				97	93	86	86	82	78	75	74	88	75	72	65	65	61	57	54	52	67
	Total				99	94	90	89	85	81	78	77	91	78	73	69	68	63	60	57	56	69
RN 25 & 30 Ton	Inlet	3	30	1085	97	91	89	87	83	80	77	76	89	75	70	68	66	62	58	55	55	68
	Outlet				98	95	88	88	84	80	77	75	90	77	73	67	67	63	58	55	54	69
	Total				101	96	92	91	86	83	80	79	92	79	75	70	69	65	61	58	57	71
RN 26,31 & 40 Ton	Inlet	4	30	1085	98	92	91	88	84	81	78	77	90	77	71	69	67	63	60	57	56	69
	Outlet				100	96	89	89	85	81	78	77	91	78	75	68	68	64	60	57	55	70
	Total				102	98	93	92	88	84	81	80	94	81	76	72	71	66	63	60	59	72
RN 50,60 & 70 Ton	Inlet	6	30	1085	100	94	92	90	86	83	80	79	92	78	73	71	69	65	61	58	58	71
	Outlet				101	98	91	91	87	83	80	78	93	80	76	70	70	66	61	58	57	72
	Total				104	99	95	94	89	86	83	82	95	82	78	73	72	68	64	61	60	74
RN E 55,65 & 75 Ton LN & LZ 45-60 Ton RZ 45-75	Inlet	4	30	1170	92	86	87	87	86	85	85	78	92	71	65	66	66	65	64	64	57	71
	Outlet				92	86	87	87	86	85	85	78	92	71	65	66	66	65	64	64	57	71
	Total				95	89	90	90	89	88	88	81	95	74	68	69	69	68	67	67	60	74
RN E 90-140 Ton LN & LZ 75-140 Ton RZ 90-140	Inlet	8	30	1170	95	89	90	90	89	88	88	81	95	74	68	69	69	68	67	67	60	74
	Outlet				95	89	90	90	89	88	88	81	95	74	68	69	69	68	67	67	60	74
	Total				98	92	93	93	92	91	91	84	98	77	71	72	72	71	70	70	63	77
RZ 145-180	Inlet	12	30	1170	97	91	92	92	91	90	90	83	97	76	70	71	71	70	69	69	62	76
	Outlet				97	91	92	92	91	90	90	83	97	76	70	71	71	70	69	69	62	76
	Total				100	94	95	95	94	93	93	86	100	79	73	74	74	73	72	72	65	79
	Inlet		30	1170	98	92	93	93	92	91	91	84	98	77	71	72	72	71	70	70	63	77
	Outlet				98	92	93	93	92	91	91	84	98	77	71	72	72	71	70	70	63	77
	Total				101	95	96	96	95	94	94	87	101	80	74	75	75	74	73	73	66	80

RTU-1

RTU-10, 12, 13

RTU-9, 11
Data is for 4 fans.
-6 dB for one fan, applied to 2 fans.

Tested in Accordance with AMCA 300 - Updated 6-15-15

APPENDIX F: ENVIRONMENTAL NOISE MODEL ASSUMPTIONS

The environmental noise model is set as follows in the CadnaA Configuration of Calculation settings. Unless otherwise specified, the CadnaA default settings were used for calculations conforming to ISO Standard 9613-2 (2024).

Ground Absorption

- The default ground absorption in the acoustic model is set at G=0 (sound reflective). Ground absorption area objects set with G=1 (sound absorptive) have been added for soft ground surfaces (lawns on school grounds at at adjacent homes).

- The resolution for ground absorption is set at 2.0 m.

Reflections

- "Maximum order of reflections" is set at 3, i.e. the sound level calculations at each POR accounts for sound paths which include sound reflections off of up to 3 surfaces for each noise source.

- Sound reflections are determined based on a search within 100 m of the noise source and 100 m of the POR.

- POR sound levels only account for reflections off of surfaces at least 15 m from the POR. This ensures that POR sound levels exclude reflections from buildings on the same property. In all cases, relevant sound-reflective surfaces are more than 5 m from the POR.

- Sound reflections are computed for surfaces at least 0.10 m from a noise source. Where vertical or horizontal noise sources are flush with a hard surface, they are typically modelled at a distance of 0.05 m from the surface. The sound power level for the source accounts for the fact that the environmental noise model will not include sound reflections off of the flush surface.

- Where included in the model, equipment cabinets are set as perfectly sound-reflective.

Meteorology

- No corrections were applied for meteorological conditions. The sound level calculations apply to downwind conditions as described in ISO 9613-2 (2024), section 5.