

**Noise Assessment Report -
2887 Riverside Drive Phase I**

Project # 160401333



Prepared for:
Youth Services Bureau

Prepared by:
Stantec Consulting Ltd.

September 18, 2017

NOISE ASSESSMENT REPORT - 2887 RIVERSIDE DRIVE PHASE I

Introduction
September 18, 2017

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1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

Stantec Consulting Ltd. has been retained by Youth Services Bureau to prepare an environmental noise assessment for the proposed 4 storey building at 2887 Riverside Drive, located in the City of Ottawa. A site plan control application is being prepared and a Noise Assessment Study is required to address City policies regarding residential development adjacent to an arterial road.

The purpose of this report is to:

- outline the Ministry's guidelines and criteria for noise levels and residential land use;
- apply the noise level standards of the Ontario Ministry of the Environment and Climate Change NPC-300 to the site in conjunction with the City of Ottawa document "Environmental Noise Control Guidelines" dated January 2016;
- determine the extent to which noise level contours will be of concern to future residents of the proposed development, using the computerized version (STAMSON 5.03) of the MOECC's noise model;
- outline recommendations for noise attenuation, as necessary, to achieve acceptable noise levels for future residents of the proposed development.

1.2 LOCATION

The site is located along Riverside Drive, north of Ridgewood avenue and Mooney's Bay Park. The proposed site is illustrated in **Figure 1**. The proposed development consists of 39 units for youth. This report will focus on the rooms with exposure to Riverside Drive.

Surrounding land uses are as follows:

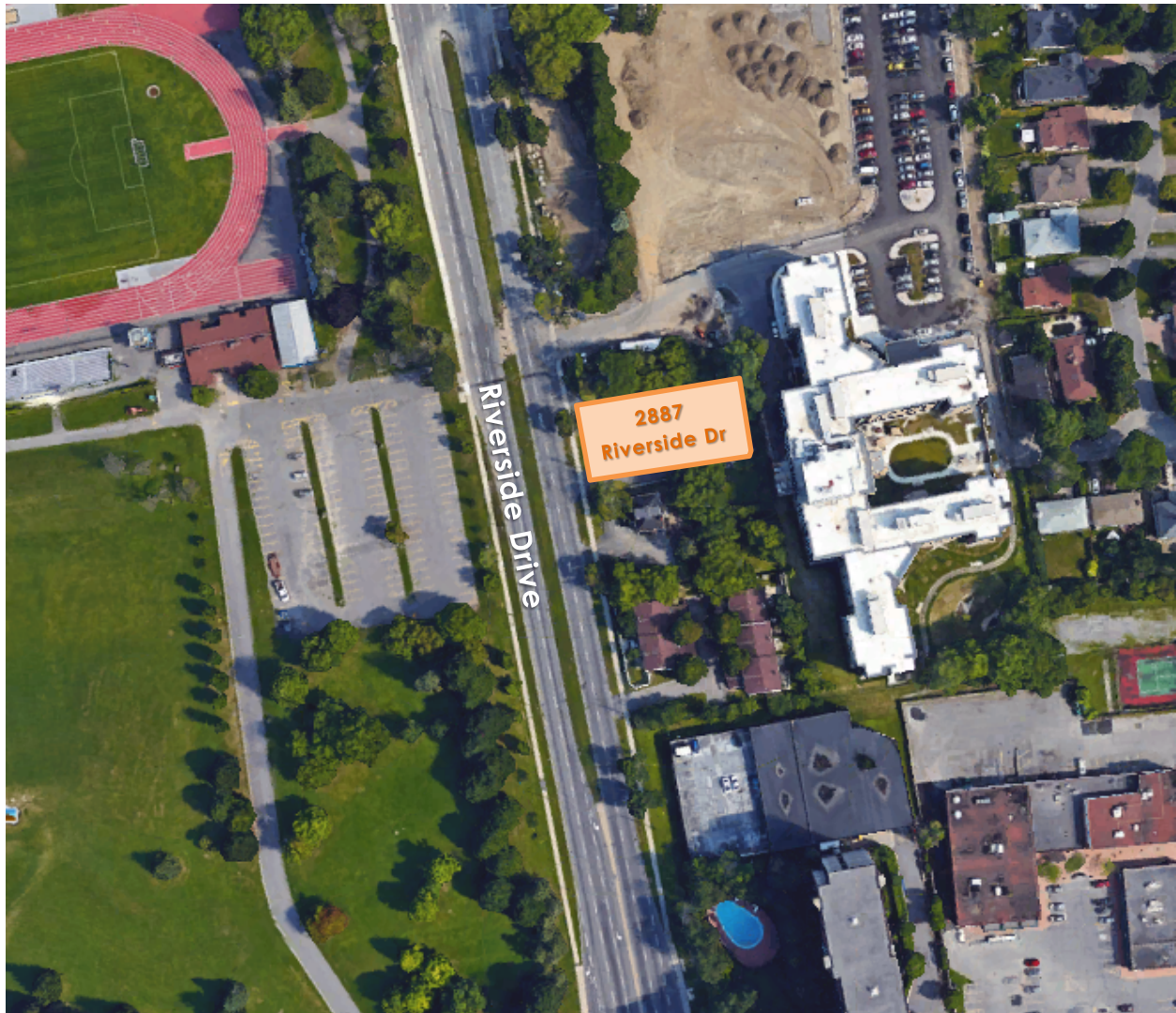
- north – existing commercial and residential;
- east – existing residential;
- south – existing residential;
- west – existing park.

The main potential noise source that may impact the subject site is vehicular traffic from Riverside Drive. The traffic volumes for these roadways are based on the City of Ottawa document "Environmental Noise Control Guidelines".

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Figure 1 - 2887 Riverside Drive Development



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Noise Level Criteria
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2.0 NOISE LEVEL CRITERIA

2.1 GUIDELINES

The Ontario Ministry of Environment and Climate Change (MOECC) has produced guidelines for noise levels for use in noise assessment and land use planning. Noise level criteria for residential land use are summarized in **Table 1** below. Noise levels in excess of the guidelines presented are acceptable under certain conditions and with certain provisions.

Table 1 Noise Criteria for Residential and Office Land Use

Location	7 a.m. – 11 p.m.	11 p.m. – 7 a.m.
Outdoor Living Areas	55 dBA	N/A
Indoor Living Areas	45 dBA	40 dBA
General offices, reception areas, retail stores, etc.	50 dBA	N/A

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

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Noise Level Criteria
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Table 2 and **Table 3** set out noise levels in excess of the criteria and the required provisions to allow residential activity in locations where noise level criteria are expected.

**Table 2 Combination of Road and Rail Noise
Daytime Outdoor, Ventilation and Warning Clause Requirements**

Location	Leq (16 hr) (dBA)	Ventilation Requirements	Outdoor Control Measures	Warning Clause
Outdoor Living Area	Leq16hr less than or equal to 55 dBA	N/A	None required	Not required
	Leq16hr greater than 55 dBA to less than or equal to 60 dBA	N/A	Control measures (barriers) may not be required but should be considered	Required if resultant Leq exceeds 55 dBA Generic Clause or Extensive mitigation of indoor and outdoor amenity area clause
	Leq16hr greater than 60 dBA	N/A	Control measures (barriers) required to reduce the Leq to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant Leq exceeds 55 dBA Extensive mitigation of indoor and outdoor amenity area clause (Supplied Central Air Conditioning)
Plane of Living Room Window	Leq16hr less than or equal to 55 dBA	None required	N/A	Not required
	Leq16hr greater than 55 dBA to less than or equal to 65 dBA	Provision for central air conditioning	N/A	Required Extensive mitigation of indoor and outdoor amenity area clause
	Leq16hr greater than 65 dBA	Central air conditioning	N/A	Required Extensive mitigation of indoor and outdoor amenity area clause (Supplied Central Air Conditioning)

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

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Noise Level Criteria
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**Table 3 Combination of Road and Rail Noise,
Night-Time Ventilation and Warning Clause Requirements**

Location	Leq (8 hr) (dBA)	Ventilation Requirements	Outdoor Control Measures	Warning Clause
Plane of Bedroom Window	Leq8hr greater than 50 dBA to less or equal to 60 dBA	Provision for central air conditioning	N/A	Required Extensive mitigation of indoor and outdoor amenity area clause
	Leq8hr greater than 60 dBA	Central air conditioning	N/A	Required Extensive mitigation of indoor and outdoor amenity area clause (Supplied Central Air Conditioning)

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016))

The MOECC also specifies building component requirements when indoor noise levels exceed the criteria by certain levels. These requirements are summarized in **Table 4**.

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Noise Level Criteria
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Table 4 Road and Rail Noise – Building Component Requirements

Location		Leq (16 hr) (dBA)	Building Component Requirements
Plane of Living Room Window – Daytime	Road	Less than or equal to 65 dBA	Building compliant with the Ontario Building Code
		Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	Rail	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
		Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

Location		Leq (8 hr) (dBA)	Building Component Requirements
Plane of Bedroom Window - Nighttime	Road	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
		Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
	Rail	Less than or equal to 55 dBA	Building compliant with the Ontario Building Code
		Greater than 55 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

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Observations and Calculations
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3.0 OBSERVATIONS AND CALCULATIONS

3.1 NOISE LEVEL PREDICTIONS

Noise predictions in this report were completed using the computerized version (STAMSON 5.03) of the M.O.E. noise model ORNAMENT to calculate noise levels from various sources. The program accepts variables related to noise sources and receivers, road traffic volumes, and the nature and extent of noise mitigation features, if required.

3.2 ROAD TRAFFIC VOLUMES

Traffic volume data for Riverside Drive was provided by the City of Ottawa document "Environmental Noise Control Guidelines" dated January 2016. The document indicates that the average annual daily traffic volume for Riverside Drive will be 35,000 vehicles per day for a 4-lane urban divided arterial road. Additional information regarding applicable assumptions and ratios for day/night traffic and car/ truck traffic is summarized as follows:

- heavy truck traffic for this segment is estimated to be 5% of total traffic volume;
- medium truck traffic for this segment is estimated to be 7% of total traffic volume; the rest is assumed to be car traffic;
- daytime (7 am – 11 pm) traffic is assumed to be 92%, with the remaining 8% at night (11 pm – 7 am); and
- the speed limit for Riverside Drive is 60 km/hr

Table 5 summarizes the traffic volumes used for calculations in this report.

Table 5 Traffic Volumes – Riverside Drive, 4-Lane Urban Arterial Divided

	Day	Night	Total
Car	28,336	2,464	30,800
Medium Truck	2,254	196	2,450
Heavy Truck	1,610	140	1,750
TOTAL	32,200	2,800	35,000
Speed Limit	60 km/hr		
Gradient	Approx. 1.5 %		
Surface	Asphalt		

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Observations and Calculations
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3.3 PROJECTED NOISE LEVELS

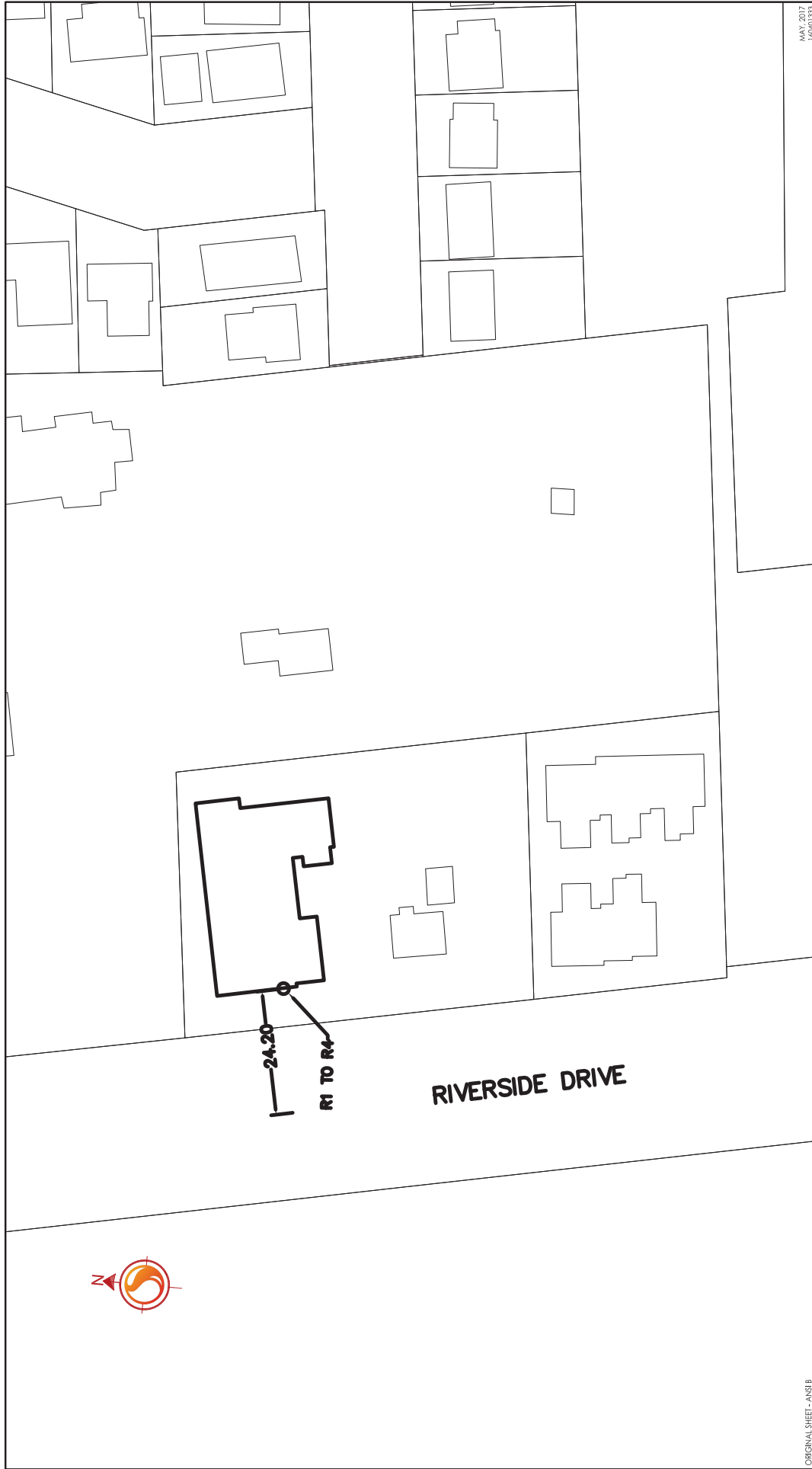
Using the MOECC noise model, ORNAMENT, noise levels were calculated for daytime and nighttime conditions at the point representing the anticipated building location, based on the site plan prepared by Vandenberg & Wildeboer Architects. The resulting receiver site is illustrated in **Figure 2** and **Figure 3**.

The receiver heights for indoor, daytime, and nighttime noise level calculations for the proposed buildings were completed at the mid-height of each floor and the elevation drawings are provided in **Appendix B**.

The unattenuated receiver noise levels have been summarized in **Table 7** and noise level calculations are provided in **Appendix A** for daytime and nighttime building face.

Table 6 Summary of Projected Unattenuated Noise Levels

Receiver Site	Location	Elevation (m)	Daytime-Building Face (dBA)	Nighttime-Building Face (dBA)	Outdoor Amenity Area (dBA)
R1	West Building Face – 1 st Floor	1.5	71.6	64.0	-
R2	West Building Face - 2 nd Floor	5.2	71.6	64.0	-
R3	West Building Face – 3 rd Floor	8.4	71.6	64.0	-
R4	West Building Face – 4 th Floor	11.5	71.6	64.0	-
ROUT	Courtyard/ Patio Area	1.5	-	-	59.4



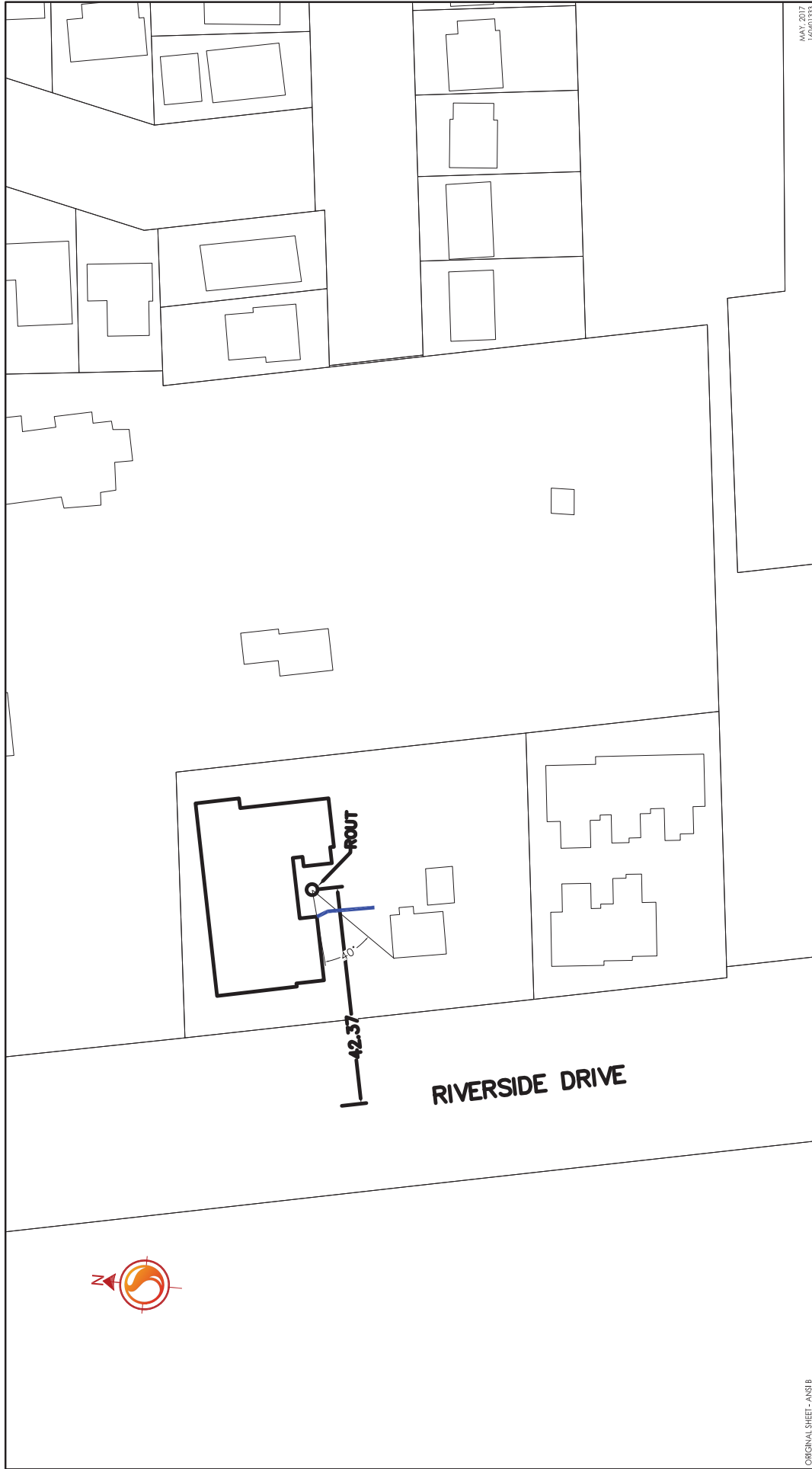
W:\active\160401333_2887 Riverside Drive\report\Noise\160401333 NA.dwg 2017/05/17 10:43 AM By: Rahnasoorya, Thakshika ORIGINAL SHEET - ANSI B MAY 2017 160401333

Client/Project
 YOUTH SERVICES BUREAU
 2887 RIVERSIDE DRIVE
 NOISE ASSESSMENT REPORT
 Figure No.

Title
 2.0
 INDOOR RECEIVERS
 PLAN VIEW



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W:\active\160401333_2887 Riverside Drive\design\report\Noise\160401333 NA.dwg
2017/05/25 8:46 AM By: Rathi\soorija.Thakshika



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Conclusions and Recommendations
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4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 OUTDOOR NOISE IMPACTS

Predicted noise levels are above City of Ottawa and MOECC criteria at the outdoor living areas for potential units with exposure to Riverside Drive.

The following summarizes the measures required by the City of Ottawa and MOECC criteria for the development to occur within accepted standards:

- A sensitivity analysis was conducted and warning clause "extensive mitigation for outdoor amenity areas" (**Appendix C**) are required for the exterior patio and courtyard located south of the proposed building. Noise walls are required in the location shown on **Figure 3** and shall have a minimum surface density of 20kg/m².
- Warning clause "aircraft noise" (**Appendix C**) is required for outdoor activities as the proposed development falls within 1 kilometer of the Airport Vicinity Development Zone (AVDZ).
- Barrier heights were selected to reduce the noise levels as close to 55 dBA or below where possible. The barrier heights are specified from the centerline elevation of the adjacent roadways. Noise walls should be considered when designing the entrance to the underground parking garage. The results are summarized in **Table 7**.

Table 7 Summary of Projected Attenuated Outdoor Living Area Noise Levels

Receiver	Unit	Unattenuated Noise Level (dBA)	Noise Wall Height (m)	Attenuated Noise Level (dBA)	Δ Noise Level (dBA)
ROUT	Courtyard/ Patio Area	59.4	2.2	53.2	6.2

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4.2 NOISE IMPACTS

Predicted noise levels are above City of Ottawa and MOECC criteria at the daytime building face and the nighttime building face for potential units with exposure to Riverside Drive.

The following summarizes the measures required by the City of Ottawa and MOECC criteria for the development to occur within accepted standards:

- Forced central air conditioning system is to be installed for all units within 2887 Riverside Drive Phase 1.
- Noise Warning Clause "extensive mitigation of indoor area" is to be included in all offers of purchase and sale for 2887 Riverside Drive Phase 1.
- Warning clause "aircraft noise" is to be included for all indoor activities as the proposed development falls within 1 kilometer of the AVDZ.

Noise warning clauses are provided in **Appendix C**.

4.3 INDOOR NOISE MITIGATION – AIF METHOD

The following building components will apply based on the Acoustical Insulation Factor (AIF) method, as per "Environmental Noise Assessment in Land Use Planning Manual", 1999. The AIF value and minimum building component were based off the preliminary unit floor plans. The calculated noise levels requiring mitigation were 71.6 dBA at the west side of the building during the daytime and 64.0 dBA during the nighttime. These noise levels were used to determine the typical building components required for the building façade.

Table 8 summarizes the AIF values and minimum building components and **Appendix B** provides the floor plans and sample calculations.

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Table 8 AIF Summary

Floor	Room	Wall	AIF Value	Type of Window Glazing	Type of Exterior Wall	Type of Door
Ground Floor	Reception	1	35	3(40)3	EW2	-
		2	32	2(18)2	EW1	D3
	Lounge/Vestibule	1	33	2(18)2	EW1	-
	Recycling	1	32	2(18)2	EW1	-
	Office 1 to 8	2	29	2(15)2	EW1	-
	Office 9	2	29	2(13)2	EW1	-
	Activity 1	2	29	2(6)2	EW1	-
	Activity 3	4	29	2(6)2	EW1	-
	Life Skills	4	30	2(18)2	EW1	D1
2 nd to 4 th Floor	Unit 1	1	35	2(28)2	EW1	-
		4	33	2(6)2	EW1	-
	Unit 2	1	35	2(6)2	EW1	-
		2	33	2(13)2	EW1	-
	Unit 3 to 9	2	30	2(6)2	EW1	-
	Unit 13	4	30	2(6)2	EW1	-
	Corridor	1	32	2(6)2	EW1	-

As the noise levels exceed the MOECC Criteria, building components including walls and windows are to be designed so the indoor sound levels comply with MOECC noise criteria by using EW1 and EW2 as illustrated above. In this situation, double glazed windows with 2mm and 3mm thickness and various spacing outlined above would be required. The building windows with an equivalent AIF may be substituted for the recommended thickness, glazing and spacing. E.g. a double glazed 3mm pane with 6mm spacing may be substituted for double glazed 2mm panes with 15mm spacing.

EW1 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as sheathing and wood siding or metal siding and fibre backer board.

EW2 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as rigid insulation(25-30mm) and wood siding or metal siding and fibre backer board.

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Should the actual floor plans differ from the plans shown in **Appendix B**, updated calculations must be performed prior to the issuance of building permits.

The inclusion of these measures will allow the residential development to proceed in accordance with MOECC criteria with respect to environmental noise.

Respectfully submitted by:



Darren Scott, P.Eng.,
Project Manager

A handwritten signature in black ink, appearing to read "Dustin Thiffault".

Dustin Thiffault, P.Eng.,
Project Engineer

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Appendix A Noise Level Calculations
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Appendix A NOISE LEVEL CALCULATIONS

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Appendix A Noise Level Calculations
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A.1 INDOOR RECEIVER STAMSON REPORTS

Results segment # 1: RIVERSIDE DR (day)

Source height = 1.50 m

SubSeq

---	-90	90	0.00	73.68	0.00	-2.
	71.60					
---						---

0
0
•
4
-

•
5^a
0
4

3
:
0
:
:
3
0
0

Results segment # 1: RIVERSIDE DR (night)

ROAD (0.00 + 64.00 + 0.00) = 64.00 dBA

SubLeg	90	0.00	66.08	0.00	-2.

Segment Lea : 64.00 dBA

Total Leq All Segments: 64.00 dBA

TOTAL Leg FROM ALL SOURCES (DAY) : 71.60
(NIGHT) : 64.00

STANSON 5.0 NORMAL REPORT Date: 15-05-2017 11:10:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: R4.te
Description: 4TH FLOOR - INDOOR Time Period: Day/Night 16/8 hours

Road data, segment # 1: RIVERSIDE DR (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT) : 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: RIVERSIDE DR (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 24.20 / 24.20 m
Receiver height : 11.50 / 11.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: RIVERSIDE DR (day)

Source height = 1.50 m

ROAD (0.00 + 71.60 + 0.00) = 71.60 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 73.68 0.00 -2.08 0.00 0.00 0.00 0.00
71.60

Segment Leq : 71.60 dBA
Total Leq All Segments: 71.60 dBA

Results segment # 1: RIVERSIDE DR (night)

Source height = 1.50 m

ROAD (0.00 + 64.00 + 0.00) = 64.00 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 66.08 0.00 -2.08 0.00 0.00 0.00 0.00
64.00

Segment Leq : 64.00 dBA
Total Leq All Segments: 64.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 71.60
(NIGHT) : 64.00

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Appendix A Noise Level Calculations
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A.2 OUTDOOR RECEIVER STAMSON REPORT

STAMSON 5.0 NORMAL REPORT Date: 15-05-2017 11:32:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ROUT.te Time Period: Day/Night 16/8 hours
Description: OUTDOOR

Road data, segment # 1: RIVERSIDE DR (day)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT) : 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: RIVERSIDE DR (day)

Angle1 Angle2 : 0.00 deg 40.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 42.37 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: RIVERSIDE DR (day)

Source height = 1.50 m

ROAD (0.00 + 59.42 + 0.00) = 59.42 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- 0 40 0.66 73.68 0.00 -7.49 -6.77 0.00 0.00 0.00
59.42

Segment Leq : 59.42 dBA

Total Leq All Segments: 59.42 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 59.42

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Appendix A Noise Level Calculations
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A.3 MITIGATED OUTDOOR RECEIVER STAMSON REPORT

STANSON 5.0 NORMAL REPORT Date: 15-05-2017 11:41:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: ROUTM.te Time Period: Day/Night 16/8 hours
Description: OUTDOOR MITIGATED

Road data, segment # 1: RIVERSIDE DR (day)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT) : 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: RIVERSIDE DR (day)

Angle1 Angle2 : 0.00 deg 40.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 42.37 m
Receiver height : 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 0.00 deg Angle2 : 40.00 deg
Barrier height : 2.20 m
Barrier receiver distance : 8.00 m
Source elevation : 82.18 m
Receiver elevation : 82.50 m
Barrier elevation : 82.50 m
Reference angle : 0.00

Results segment # 1: RIVERSIDE DR (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

1.50 ! 1.50 ! 1.44 ! 83.94

ROAD (0.00 + 53.20 + 0.00) = 53.20 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- 0 40 0.53 73.68 0.00 -6.89 -6.72 0.00 0.00 -6.86
53.20

Segment Leq : 53.20 dBA

Total Leq All Segments: 53.20 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 53.20

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Appendix B FLOOR PLANS AND AIF CALCULATIONS
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Appendix B FLOOR PLANS AND AIF CALCULATIONS

2887 Riverside Drive - Ground Floor

Source: Road Traffic

Predicted free-field day time sound level: 71.6 dBA

Predicted free-field night time sound level: 64.0 dBA

Table 1.1 - Sound level at building façade

	Day (Living Area)				Night (Bedroom)			
	Wall 1	Wall 2	Wall 3	Wall 4	Wall 1	Wall 2	Wall 3	Wall 4
Source 1	71.6	71.6	71.6	71.6	64	64	64	64
Shielding Correction	0	-3	-15	-3	0	-3	-15	-3
Resultant Sound Level	71.6	68.6	56.6	68.6	64	61	49	61

Table 1.2 - Number of Components

Room	Wall 1			Wall 2			Wall 3			Wall 4			Total Number of Components
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Reception	1	1		1	1								4
Lounge/ Vestibule	1	1	1										3
Recycling	1	1											2
Office 1 to 8				1	1								2
Office 9				1	1								2
Activity 1				1	1								2
Activity 3										1	1		2
Life Skills										1	1	1	3

Note: Ignore if sound level below 60 dBA

* Component AIF exceeds required value by 10 or more and has been ignored as a component

Table 1.3 - AIF

	Wall 1	Wall 2	Wall 3	Wall 4
Reception	35	32		
Lounge/ Vestibule	33			
Recycling	32			
Office 1 to 8		29		
Office 9		29		
Activity 1		29		
Activity 3				29
Life Skills				30

Note: Max AIF selected between Day and Night

Table 1.4 - Adjustment for Geometry

	Wall 1	Wall 2	Wall 3	Wall 4
Exposure Angle	0-90	0-90		0-90
Adjustment	0	1		1

Table 1.5 - Required AIF

	Wall 1	Wall 2	Wall 3	Wall 4
Reception	35	33		
Lounge/ Vestibule	33			
Recycling	32			
Office 1 to 8		30		
Office 9		30		
Activity 1		30		
Activity 3				30
Life Skills				31

Table 2.1 - Component Area (ft²)

Room	Wall 1			Wall 2			Wall 3			Wall 4			Room Floor Area
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Reception	63	148		31	124								269
Lounge/ Vestibule	69	205	46										549
Recycling	39	153											280
Office 1 to 8				20	80								97
Office 9				20	80								140
Activity 1				27	172								646
Activity 3										81	271		922
Life Skills										182	224	34	980

Note: Susan D. Smith Architect Layout

Table 2.2 - Component Percentages per Room Floor Area (%)

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Reception	23	55		12	46								
Lounge/ Vestibule	13	37	8										
Recycling	14	55											
Office 1 to 8				21	82								
Office 9				14	57								
Activity 1				4	27								
Activity 3										9	29		
Life Skills										19	23	3	

Table 2.3 - Component Selection

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Reception	3 (40) 3	EW2		2 (18) 2	EW1								
Lounge/ Vestibule	2 (18) 2	EW1	D3										
Recycling	2 (18) 2	EW1											
Office 1 to 8				2 (15) 2	EW1								
Office 9				2 (13) 2	EW1								
Activity 1				2 (6) 2	EW1								
Activity 3										2 (6) 2	EW1		
Life Skills										2 (18) 2	EW1	D1	

Note 1: Use Tables 7.2 - 7.4, "Topic 7, Environmental Noise Assessment in Land Use Planning Manual"

Note 2: Windows are based on 2 mm and 3mm glass thickness (Double Glaze Windows)

2887 Riverside Drive- 2nd to 4th Floor

Source: Road Traffic

Predicted free-field day time sound level: 71.6 dBA

Predicted free-field night time sound level: 64.0 dBA

Table 1.1 - Sound level at building façade

	Day (Living Area)				Night (Bedroom)			
	Wall 1	Wall 2	Wall 3	Wall 4	Wall 1	Wall 2	Wall 3	Wall 4
Source 1	71.6	71.6	71.6	71.6	64	64	64	64
Shielding Correction	0	-3	-15	-3	0	-3	-15	-3
Resultant Sound Level	71.6	68.6	56.6	68.6	64	61	49	61

Table 1.2 - Number of Components

Room	Wall 1			Wall 2			Wall 3			Wall 4			Total Number of Components
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Unit 1	1	1								1	1		4
Unit 2	1	1		1	1								4
Unit 3 to 9				1	1								2
Unit 13										1	1		2
Corridor	1	1											2

Note: Ignore if sound level below 55 dBA

* Component AIF exceeds required value by 10 or more and has been ignored as a component

Table 1.3 - AIF

	Wall 1	Wall 2	Wall 3	Wall 4
Unit 1	35			32
Unit 2	35	32		
Unit 3 to 9		29		
Unit 13				29
Corridor	32			

Note: Max AIF selected between Day and Night

Table 1.4 - Adjustment for Geometry

	Wall 1	Wall 2	Wall 3	Wall 4
Exposure Angle	0-90	0-90		0-90
Adjustment	0	1		1

Table 1.5 - Required AIF

	Wall 1	Wall 2	Wall 3	Wall 4
Unit 1	35			33
Unit 2	35	33		
Unit 3 to 9		30		
Unit 13				30
Corridor	32			

Table 2.1 - Component Area (ft²)

Room	Wall 1			Wall 2			Wall 3			Wall 4			Room Floor Area
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Unit 1	88	223								20	217		642
Unit 2	14	277		28	111								398
Unit 3 to 10				28	111								398
Unit 13										14	311		816
Corridor	20	47											388

Note: Susan D. Smith Architect Layout

Table 2.2 - Component Percentages per Room Floor Area (%)

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Unit 1	14	35								3	34		
Unit 2	4	70		7	28								
Unit 3 to 9				7	28								
Unit 13										2	38		
Corridor	5	12											

Table 2.3 - Component Selection

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
Unit 1	2 (28) 2	EW1								2 (6) 2	EW1		
Unit 2	2 (6) 2	EW1		2 (13) 2	EW1								
Unit 3 to 9				2 (6) 2	EW1								
Unit 13										2 (6) 2	EW1		
Corridor	2 (6) 2	EW1											

Note 1: Use Tables 7.2 - 7.4, "Topic 7, Environmental Noise Assessment in Land Use Planning Manual"

Note 2: Windows are based on 2 mm glass thickness (Double Glaze Windows)



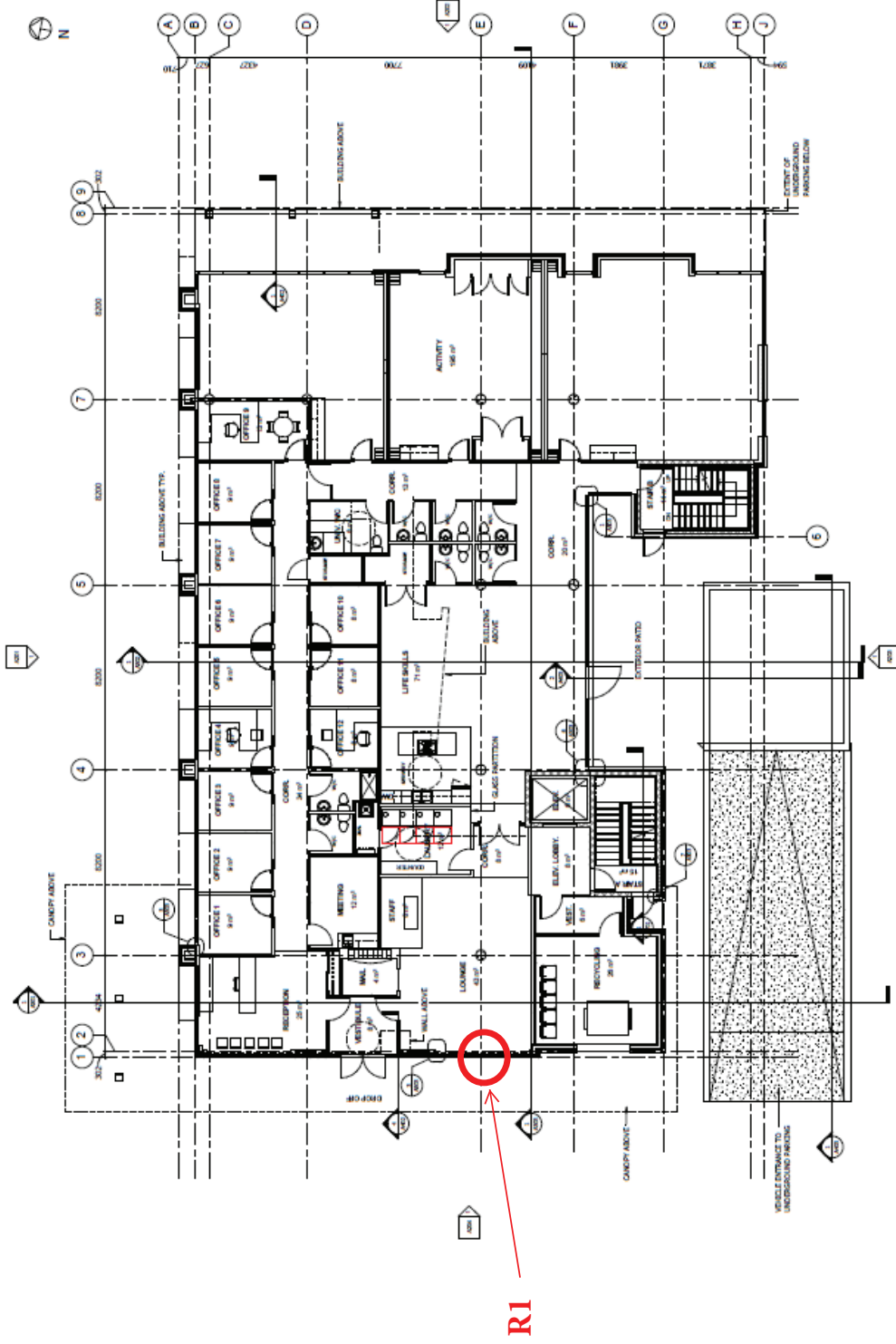
Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613-724-4420
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YOUTH SERVICES BUREAU
2887 RIVERSIDE DRIVE
NOISE ASSESSMENT REPORT

Figure No.
B.1
Title
FLOOR PLAN
LAYOUTS

MAY 2017
160401333

GROUND FLOOR



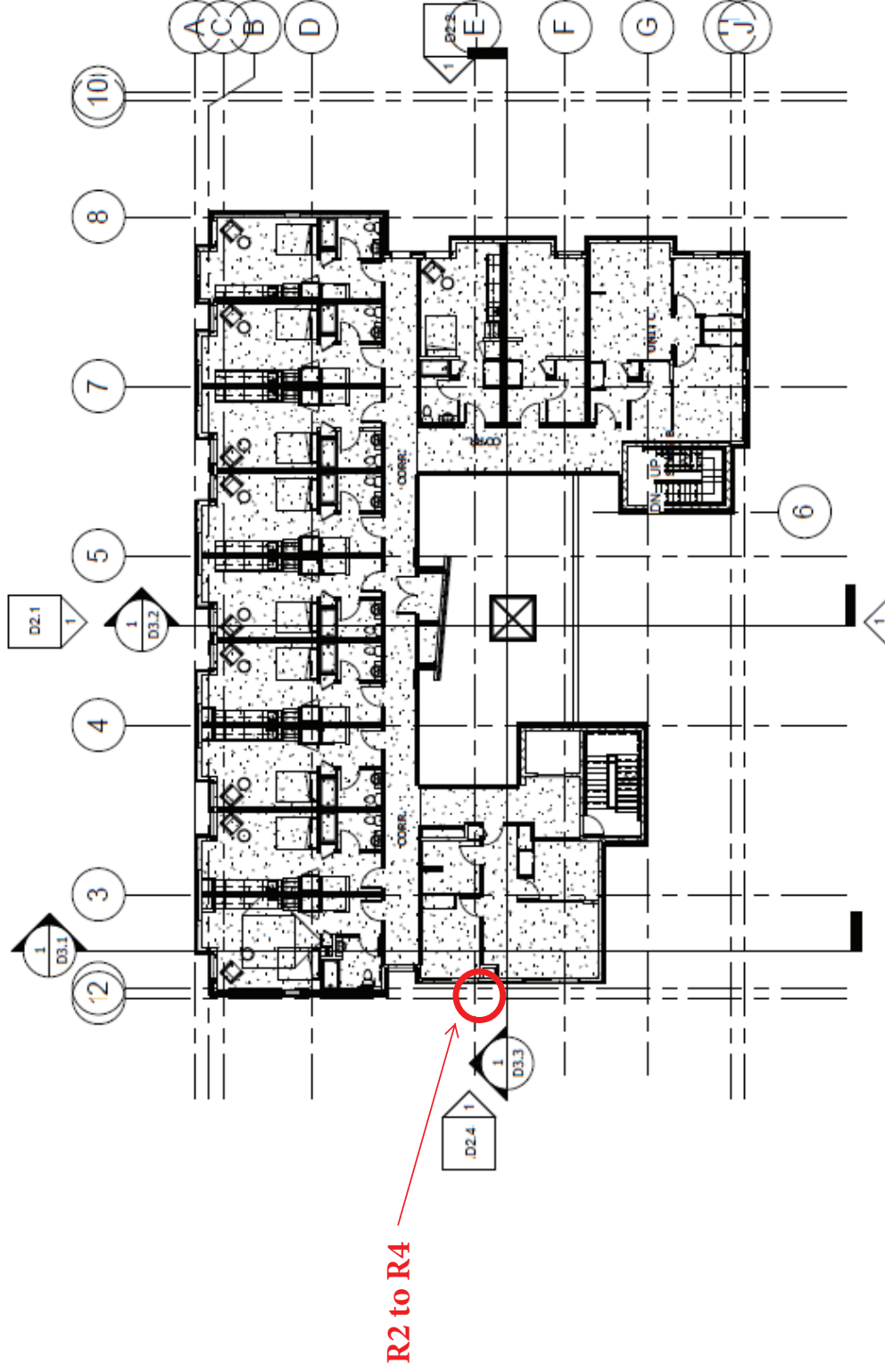


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2887 RIVERSIDE DRIVE
NOISE ASSESSMENT REPORT
Figure No.
B.2
Title
FLOOR PLAN
LAYOUTS

MAY 2017
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TYPICAL FLOOR





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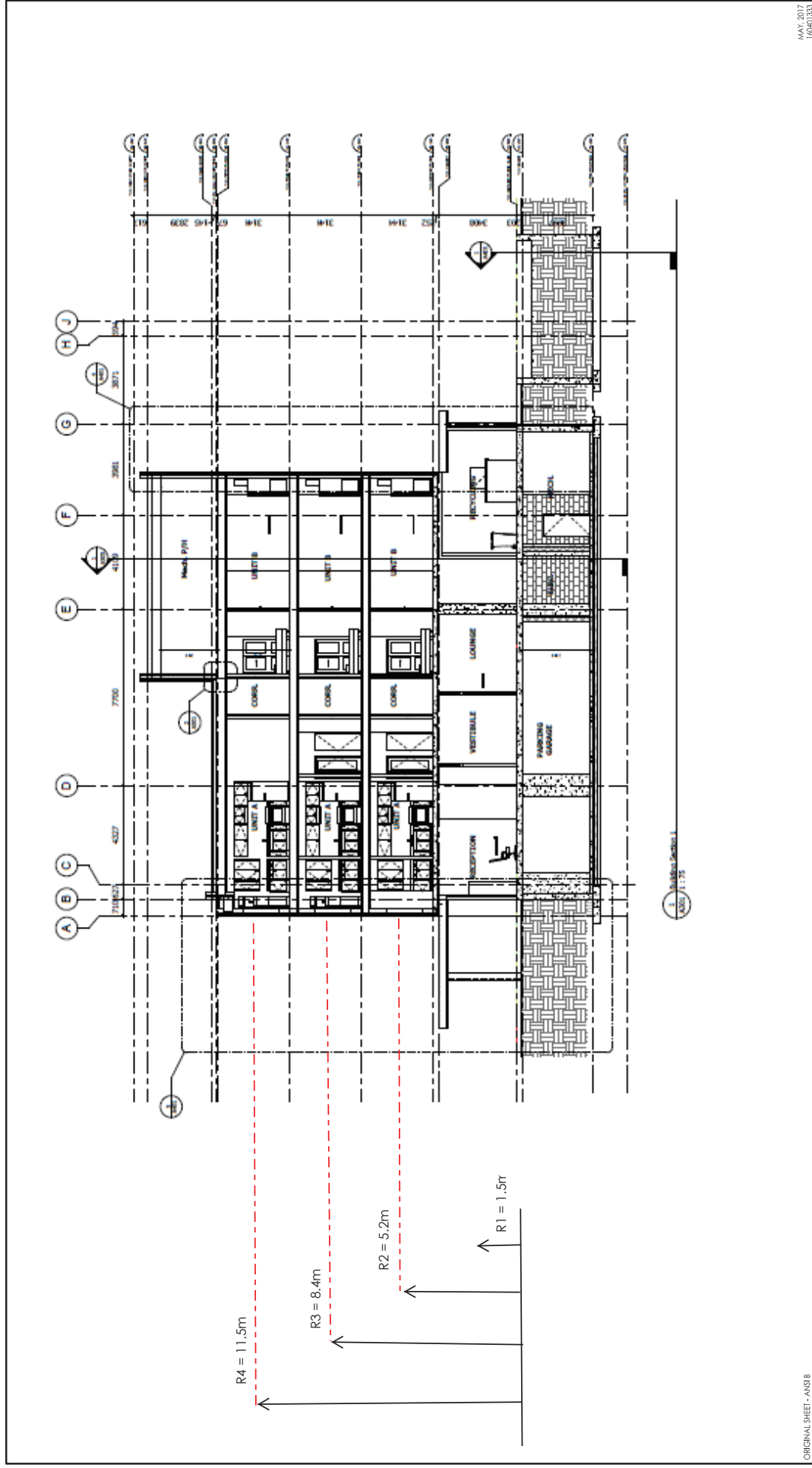
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2887 RIVERSIDE DRIVE
NOISE ASSESSMENT REPORT

Figure No.

B.3

Title

FLOOR PLAN
LAYOUTS



**NOISE ASSESSMENT REPORT -
2887 RIVERSIDE DRIVE PHASE I**

Appendix C NOISE WARNING CLAUSE
September 18, 2017

Appendix C NOISE WARNING CLAUSE

NOISE ASSESSMENT REPORT - 2887 RIVERSIDE DRIVE PHASE I

Appendix C NOISE WARNING CLAUSE
September 18, 2017

WARNING CLAUSES

The following warning clauses may be used individually or in combination:

Extensive Mitigation of Indoor Area (MI):

Indoor environment - $L_{eq}(16)$ greater than 65 dBA or $(L_{eq}(8))$ greater than 60dBA

To help address the need for sound attenuation this development has been designed so as to provide an indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- multi-pane glass;
- exterior wall insulation;
- a forced central air conditioning system.

To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features.

This dwelling unit has been supplied with a forced central air conditioning system and other measures which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City of Ottawa and the Ministry of the Environment and Climate Change.

Extensive Mitigation of Outdoor Amenity Area (MO):

Outdoor amenity areas- $L_{eq}(16)$ in the OLA greater than 55 dBA and less than or equal to 60 dBA.

To help address the need for outdoor sound attenuation this development also includes:

- an acoustic barrier.

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City of Ottawa and the Ministry of the Environment and Climate Change.

**NOISE ASSESSMENT REPORT -
2887 RIVERSIDE DRIVE PHASE I**

Appendix C NOISE WARNING CLAUSE
September 18, 2017

Aircraft Noise:

Owners/occupants are forewarned that this site is located in a noise sensitive area due to its proximity to Ottawa Macdonald-Cartier International Airport.

Noise due to aircraft operations interfere year-round with some indoor activities and with outdoor activities, particularly during the summer months. The purchase/building occupants are further advised that the Airport is open and operates 24 hours a day.

The Ottawa Macdonald-Cartier International Airport Authority and the Municipality are not responsible if the occupant/tenant of this development finds that the noise levels due to aircraft operations continue to be a concern or are offensive.

Source: City of Ottawa - Environmental Noise Control Guidelines, January 2016 and Ontario Ministry of the Environment, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning Publication NPC-300, Queen's Printer for Ontario, 2013.

International Airport Authority Ottawa, Delroy Brown