



REPORT
Project: 138780-6.04-01

ENVIRONMENTAL NOISE IMPACT ASSESSMENT 1050 TAWADINA ROAD WATERIDGE VILLAGE

Table of Contents

1	Introduction	1
2	Background	1
2.1	Noise Sources	1
2.2	Sound Level Limits for Road Traffic	1
2.2.1	Indoor Sound Level Criterion	1
2.2.2	Outdoor Sound Level Criterion	2
3	Roadway Noise	2
3.1	Traffic Volume Data	2
3.2	Calculation Methods	3
4	Aircraft Noise	4
5	Abatement Measures	4
5.1	Indoor Sound Levels	4
5.2	Outdoor Living Areas (OLAs)	4
6	Summary of Attenuation Measures	5
6.1	Warning Clauses	5
6.2	Ventilation Requirements and Building Components	5
7	Conclusion	6
8	Professional Authorization	6

Table of Contents (continued)

List of Tables and Drawings

Table 3.1	Traffic and Road Data Summary
Table 3.2	Unattenuated Noise Level at Building Face
Table 3.3	Unattenuated Noise Levels at OLA
Table 4.1	Attenuated Noise Levels at OLA
Table 5.1	Warning Clause Summary
Noise Plan	Drawing No. 138780-N1

List of Appendices

Appendix A	– Rockcliffe CDP Excerpts
Appendix B	– STAMSON Noise Calculations
	○ Indoor (at Building Face)
	○ Outdoor Living Area (OLA)

1 Introduction

Arcadis IBI Group was retained by WestUrban Developments Ltd. to conduct an Environmental Noise Impact Assessment in support of a Site Plan Control application for the proposed mid-rise residential development at 1050 Tawadina Road in the community of Wateridge Village, Ottawa. The objective of this study is to evaluate the impacts of transportation-related noise on residential uses proposed within the subject lands and provide recommendations for appropriate noise control measures or warning clauses for these sensitive uses, as required.

The proposed development will consist of approximately 200 dwelling units divided amongst two, 9-storey residential buildings with 3-storey podiums located on an approximate 0.7-hectare parcel of land. The subject site occupies the northern portion of 1050 Tawadina Road and is bound by Michael Stoqua Street to the east, Tawadina Road to the north and Bareille-Snow Street to the west. Hemlock Road is located approximately 55 metres to the south and therefore does not serve as a direct boundary street to the subject site.

The subject property and its surrounding context are illustrated in **Appendix A**.

2 Background

2.1 Noise Sources

The proposed development is primarily subjected to roadway noise from Hemlock Road. All other roads within the vicinity of the proposed development are classified as local roads and therefore are not considered to be a significant noise source, in accordance with the *City of Ottawa Environmental Noise Control (ENC) Guidelines* dated January 2016.

The site is located outside of the Airport Vicinity Development Zone (AVDZ), as shown on Annex 10 and Schedule C-14 of the 2021 Draft Official Plan, therefore aircraft noise from the Ottawa International Airport was not accounted for in this study. The Rockcliffe Airport, however, is situated approximately 900 metres northwest of the site and is considered as a potential noise source due to its relative proximity to the site.

There are no rail lines within 500 metres of the site. As such, no consideration has been given to noise impacts from rail traffic in accordance with the ENC Guidelines.

2.2 Sound Level Limits for Road Traffic

Sound level criteria for road traffic is referenced from the ENC Guidelines and from the Ministry of the Environment (MOE) Environmental Noise Guideline Publication NPC-300 dated August 2013. Noise levels are expressed in the form Leq (T), which refers to a weighted level of a steady sound carrying the same total energy in the time period T (in hours) as the observed sounds fluctuates.

2.2.1 Indoor Sound Level Criterion

The recommended indoor sound level criteria from Table 2.2b of the ENC Guidelines are:

- Bedrooms – 23:00 to 07:00 – 40 dBA Leq (8)
- Other areas – 07:00 to 23:00 – 45 dBA Leq (16)

The sound levels noted above are based on the windows and doors to an indoor space being closed.

For the purpose of assessing indoor sound levels, the outdoor sound levels are observed at the plane of the living and bedroom room windows at 7.5 metres (3-storey podium) and 25.5 metres (9-storeys) above the ground for daytime/nighttime to reflect the highest noise exposure for Buildings 'A' and 'B', respectively.

In accordance with NPC-300 C7.1.3, if the outdoor sound levels exceed 65 dBA (daytime) at the living room window or exceed 60 dBA (nighttime) at the bedroom window, then the building must be compliant with the Ontario Building Code. Should the sound levels at the building face exceed either of these thresholds, then the building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria with the windows and doors closed.

As per NPC-300 C7.1.2.1 and C7.1.2.2, when the daytime noise levels at the building face are greater than 55 dBA and less than or equal to 65 dBA at the living room window, or if the nighttime noise levels are greater than 50 dBA but less than or equal to 60 dBA at the bedroom window, then a warning clause is compulsory. This warning clause specifies that forced air heating with a provision for central air conditioning is required. Should the sound levels at the building face exceed these criteria, then central air conditioning is mandatory and a warning clause is required.

2.2.2 Outdoor Sound Level Criterion

As per Table 2.2a of the ENC Guidelines, the sound level criterion for the outdoor living area (OLA) is 55 dBA Leq (16) during the daytime. Sound levels for the OLA are generally calculated 3 metres from the building face at the centre of the façade and a height of 1.5 metres above the ground.

If the Leq sound level is less than or equal to the above criteria, no further action is required by the proponent. If the sound level exceeds the criteria by less than 5 dBA then the proponent may either provide a warning clause to prospective tenants or install physical attenuation. For sound levels greater than 5 dBA above the criteria, control measures are required to reduce the noise levels as close to 55 dBA as technically, economically and administratively possible. Should the sound levels with the barrier in place exceed 55 dBA, a warning clause is also mandatory.

3 Roadway Noise

3.1 Traffic Volume Data

The major sources of road noise impacting the site are expected to originate from vehicular traffic on Hemlock Road, as indicated in the *Former CFB Rockcliffe Community Design Plan (August 2015)* and presented in Figure 5.2 (see **Appendix A**).

Hemlock Road is classified as a two-lane, urban major collector road (2-UMCU) within the vicinity of the subject site. The Rockcliffe CDP further identifies the segment of Hemlock Road within closest proximity to the site as a 'Core Street' to complement its location within the 'Core' neighbourhood in Wateridge Village, as identified in the CDP. Traffic calming measures are also planned on Hemlock in order to meet the City's 30km/h design objectives. For the purposes of this study, the posted speed limit of Hemlock Road was assumed to be 40km/h in order to provide a more conservative analysis.

Table 3.1 below summarizes the traffic and road parameters used to assess the traffic volume parameters, as extracted from Appendix B of the ENC Guidelines.

TABLE 3.1: TRAFFIC AND ROAD DATA SUMMARY

	HEMLOCK ROAD (2-UMCU)
Annual Average Daily Traffic (AADT)	12,000
Posted Speed Limit (km/h)	40
% Medium Trucks	7%
% Heavy Trucks	5%
% Daytime Traffic	92%

3.2 Calculation Methods

The roadway noise analysis for this study was conducted using STAMSON v5.04, an industry-standard software program developed by the Ontario Ministry of the Environment (MOE). Detailed results of this analysis are provided in **Appendix B**.

As indicated on **Noise Plan Drawing No. 138780-N1**, receptor locations were selected to identify the limits of the noise criteria at the building face (see **Table 3.2**), as well as within the outdoor living areas (see **Table 3.3**).

The limit of the noise at the building face was determined by calculating the building façade which falls below the 55 dBA (daytime) and 50 dBA (nighttime) thresholds, while the outdoor living area (OLA) only required analysis for the shared outdoor amenity area in the centre of the site. It should also be noted that the balconies and ground-floor patios associated with each unit have depths of less than 4 metres and are therefore not defined as ‘outdoor living areas’ in the ENC Guidelines.

TABLE 3.2: UNATTENUATED NOISE LEVELS AT BUILDING FACE (INDOOR)

LOCATION		ROADWAY	SOURCE - RECEIVER DISTANC (m)	SEGMENT ANGLES		INDOOR NOISE LEVELS (dBA)	
BUILDING	FAÇADE/ CORNER			LEFT	RIGHT	DAYTIME	NIGHTTIME
Building 'A'	South Façade	Hemlock Road	89.5	-65	90	52.73	45.13
Building 'B'	South Façade	Hemlock Road	74.0	-90	90	58.79	51.19
Building 'B'	East Façade	Hemlock Road	75.0	-90	0	55.72	48.12
Building 'B'	West Façade	Hemlock Road	76.5	0	90	55.63	48.03

As indicated in **Table 3.2** above, noise levels exceed the 55 dBA (daytime) or 50 dBA (nighttime) thresholds at the east-, south- and west-facing facades of Building 'B', therefore abatement measures will be reviewed for these dwelling units.

The shared outdoor amenity area located in the centre of Buildings 'A' and 'B' meets the requirements outlined in the ENC Guidelines for an outdoor living area (OLA), however it is almost entirely enclosed by the two buildings proposed within this development. Regardless, the results of the noise analysis for this shared outdoor amenity area are provided in **Table 3.3** below. The receptor location (P1) was conservatively assumed at the southern edge of the interlock area containing benches, in order to evaluate the portion of the OLA with the highest exposure to noise.

TABLE 3.3: UNATTENUATED NOISE LEVELS AT OUTDOOR LIVING AREA (OLA)

LOCATION	ROADWAY	SOURCE - RECEIVER DISTANCE (m)	SEGMENT ANGLES		INDOOR NOISE LEVELS (dBA)
			LEFT	RIGHT	DAYTIME
Shared Outdoor Amenity Area – P1	Hemlock Road	85.5	-60	90	51.30

As presented in **Table 3.3** above, the daytime noise levels are not expected to exceed the 55 dBA threshold and therefore no abatement measures are required with respect to outdoor living areas (OLAs) for this study.

4 Aircraft Noise

The Rockcliffe Airport is located approximately 900 metres northwest of the proposed development and is currently operated by the Rockcliffe Flying Club which provides flying lessons using two and four-seat Cessna planes. There are no Noise Exposure Factor (NEF) or Noise Exposure Projection (NEP) noise contours available for this airport in the Official Plan, therefore no noise analysis can be conducted. Based on the type of aircraft flown at this airport, it is reasonable to suggest that the proposed development is well outside of the NEF 25 contour line and therefore no action is required. Regardless, Transport Canada recommends that a warning clause be provided to advise residents within the proposed development of the proximity to the Rockcliffe Airport.

5 Abatement Measures

5.1 Indoor Sound Levels

Based on the results of the indoor noise analysis presented previously in **Table 3.2**, east, south- and west-facing dwelling units in Building 'B' will have noise levels at the building face greater than 55 dBA but less than 65 dBA and therefore these units will require a Type 'C' warning clause. An alternative means of ventilation is also required in the Tenancy Agreement of each unit, which usually consists of a forced air heating system with ducts sized for future installation of central air conditioning.

As indicated through the analysis conducted for this study, there are no dwelling units within the subject development which exceed the 65 dBA (daytime) or 60 dBA (nighttime) thresholds and therefore the use of a Type 'D' warning clause is not required.

5.2 Outdoor Living Areas (OLAs)

Not Applicable: As defined in the ENC Guidelines, there are no OLAs which exceed the 55 dBA (daytime threshold).

It is expected that as the property parcel located between Hemlock Road and the subject site is developed, that this will provide additional noise screening for both the shared outdoor amenity area and south-facing dwelling units identified on the **Noise Plan - Drawing No. 138780-N1**.

6 Summary of Attenuation Measures

6.1 Warning Clauses

A noise warning clause must appear on the Tenancy Agreement for each dwelling unit identified on the **Noise Plan Drawing No. 138780-N1** and listed in **Table 5.1** below.

TABLE 5.1: WARNING CLAUSE SUMMARY

WARNING CLAUSE	APPLICABLE DWELLING UNITS
Type 'C'	Building 'B' – East, South & West-Facing Dwelling Units
Aircraft	All Dwelling Units within the Proposed Development

The following warning clauses are taken from Section C8.1 of NPC-300 Guidelines:

Type 'C'	“This dwelling unit has been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.”
----------	--

The warning clause for aircraft noise is as follows:

“Purchasers/tenants are advised that due to the proximity of this development to the nearby Rockcliffe Airport, sound levels from the facility may at times be audible.”

6.2 Ventilation Requirements and Building Components

All dwelling units requiring a Type 'C' warning clause listed in Section 5.1 should be fitted with a forced air heating system, sized to accommodate a central air conditioning system.

A review of building components is not required for the subject property, as no dwelling units meet or exceed the thresholds for a Type 'D' warning clause.

7 Conclusion

This Environmental Noise Impact Assessment was conducted in support of a Site Plan Control application for a proposed residential development at 1050 Tawadina Road, within the Wateridge Village of Ottawa. The impacts of transportation-related noise within the proposed development were evaluated and, based on the analysis conducted for this study, it is expected that noise levels will remain within the standards established by the City of Ottawa and Ministry of the Environment (MOE) with the exception of select units/facades identified on **Noise Plan Drawing No. 138780-N1**. For these dwelling units, appropriate warning clauses and associated noise abatement measures must be provided on the Tenancy Agreement. Given the site's proximity to the Rockcliffe Airport, an aircraft warning clause is required for all dwelling units as well.

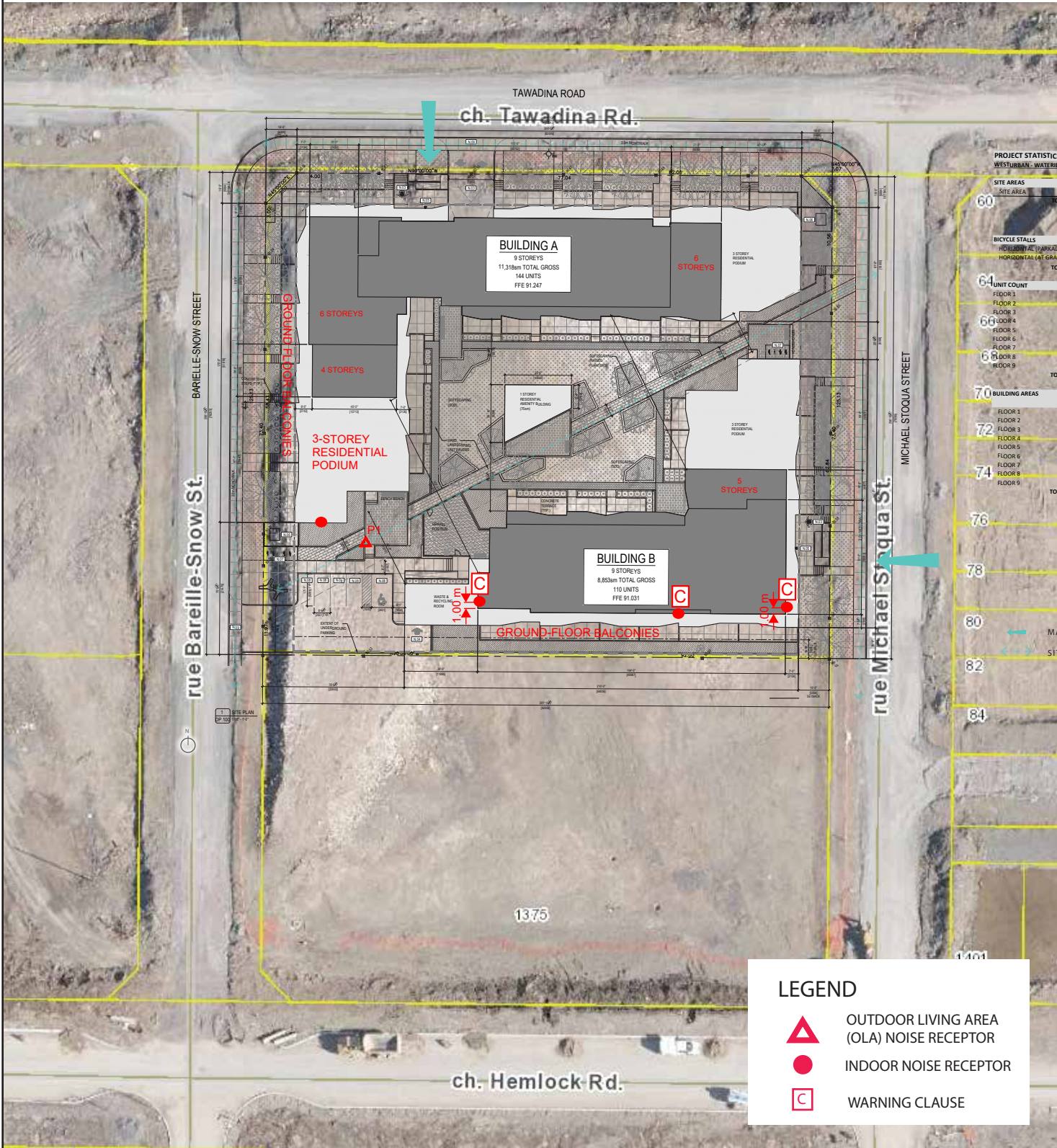
Once the southern portion of 1050 Tawadina Road is developed, it is expected that the indoor and outdoor noise receptor locations evaluated in this study will all experience a significant reduction in traffic noise from Hemlock Road and will no longer require Type 'C' warning clauses in the Tenancy Agreement.

8 Professional Authorization

Prepared By:



Ben Pascolo-Neveu, P.Eng.



PROJECT STATISTICS
WESTURBAN - WATERBURY




SITE AREAS
SITE AREA

BICYCLE STALLS
HORIZONTAL (PARKAD)
HORIZONTAL (AT GRADE)

UNIT COUNT
FLOOR 1
FLOOR 2
FLOOR 3
FLOOR 4
FLOOR 5
FLOOR 6
FLOOR 7
FLOOR 8
FLOOR 9

BUILDING AREAS
FLOOR 1
FLOOR 2
FLOOR 3
FLOOR 4
FLOOR 5
FLOOR 6
FLOOR 7
FLOOR 8
FLOOR 9

LEGEND

-  OUTDOOR LIVING AREA (OLA) NOISE RECEPTOR
-  INDOOR NOISE RECEPTOR
-  WARNING CLAUSE

Appendix A
Rockcliffe CDP - Road Network Classifications

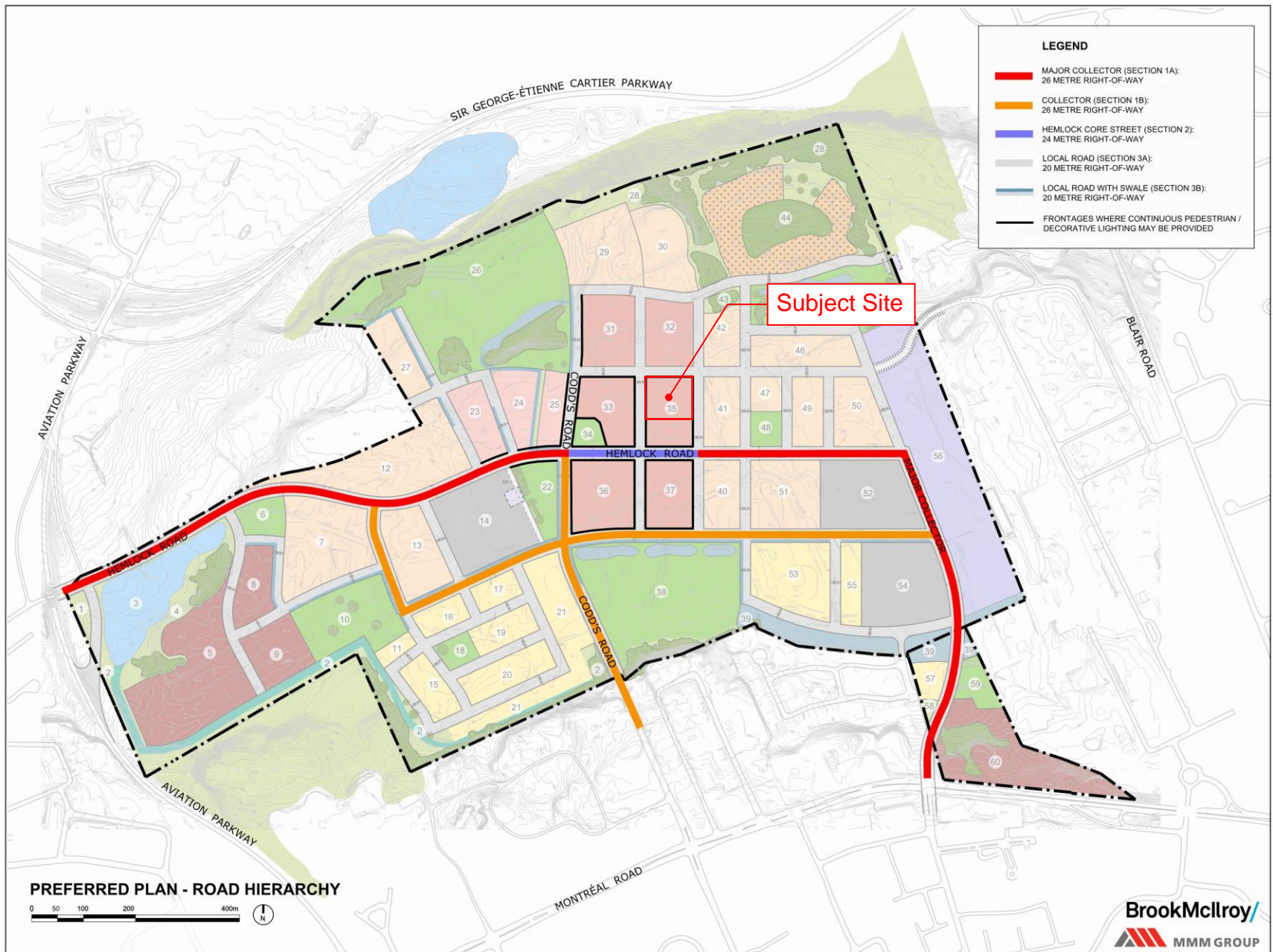


Figure 5.8: Road Sections by Type

Appendix B
STAMSON Noise Calculations

Indoor Noise at Building Face

3
4 Filename: basf.te Time Period: Day/Night 16/8 hours
5 Description: building a south facade indoor

6
7
8 Road data, segment # 1: Hemlock Road (day/night)


9 -----
10 Car traffic volume : 9715/845 veh/TimePeriod *
11 Medium truck volume : 773/67 veh/TimePeriod *
12 Heavy truck volume : 552/48 veh/TimePeriod *
13 Posted speed limit : 40 km/h
14 Road gradient : 1 %
15 Road pavement : 1 (Typical asphalt or concrete)

16
17 * Refers to calculated road volumes based on the following input:

18
19 24 hr Traffic Volume (AADT or SADT): 12000
20 Percentage of Annual Growth : 0.00
21 Number of Years of Growth : 0.00
22 Medium Truck % of Total Volume : 7.00
23 Heavy Truck % of Total Volume : 5.00
24 Day (16 hrs) % of Total Volume : 92.00

25
26 Data for Segment # 1: Hemlock Road (day/night)

27 -----
28 Angle1 Angle2 : -65.00 deg 90.00 deg
29 Wood depth : 0 (No woods.)
30 No of house rows : 0 / 0
31 Surface : 1 (Absorptive ground surface)
32 Receiver source distance : 89.50 / 89.50 m
33 Receiver height : 7.50 / 7.50 m
34 Topography : 1 (Flat/gentle slope; no barrier)
35 Reference angle : 0.00


36
37  Results segment # 1: Hemlock Road (day)

38 -----
39
40 Source height = 1.50 m

41
42 ROAD (0.00 + 52.73 + 0.00) = 52.73 dBA
43 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
44 -----
45 -65 90 0.48 65.72 0.00 -11.48 -1.51 0.00 0.00 0.00 52.73
46 -----

47
48
49 Segment Leq : 52.73 dBA




50
51 Total Leq All Segments: 52.73 dBA

52
53  Results segment # 1: Hemlock Road (night)

54 -----
55
56 Source height = 1.50 m

57
58 ROAD (0.00 + 45.13 + 0.00) = 45.13 dBA
59 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
60 -----
61 -65 90 0.48 58.12 0.00 -11.48 -1.51 0.00 0.00 0.00 45.13
62 -----

63
64
65 Segment Leq : 45.13 dBA

67 Total Leq All Segments: 45.13 dBA
68
69 
70
71
72
73 TOTAL Leq FROM ALL SOURCES (DAY): 52.73
74 (NIGHT): 45.13
75 
76 
77

3
4 Filename: bbsf.te Time Period: Day/Night 16/8 hours
5 Description: building b south facade indoor
6
7

8 Road data, segment # 1: Hemlock Road (day/night)
9 -----

10 Car traffic volume : 9715/845 veh/TimePeriod *
11 Medium truck volume : 773/67 veh/TimePeriod *
12 Heavy truck volume : 552/48 veh/TimePeriod *
13 Posted speed limit : 40 km/h
14 Road gradient : 1 %
15 Road pavement : 1 (Typical asphalt or concrete)

16
17 * Refers to calculated road volumes based on the following input:

18
19 24 hr Traffic Volume (AADT or SADT): 12000
20 Percentage of Annual Growth : 0.00
21 Number of Years of Growth : 0.00
22 Medium Truck % of Total Volume : 7.00
23 Heavy Truck % of Total Volume : 5.00
24 Day (16 hrs) % of Total Volume : 92.00
25

26 Data for Segment # 1: Hemlock Road (day/night)
27 -----

28 Angle1 Angle2 : -90.00 deg 90.00 deg
29 Wood depth : 0 (No woods.)
30 No of house rows : 0 / 0
31 Surface : 1 (Absorptive ground surface)
32 Receiver source distance : 74.00 / 74.00 m
33 Receiver height : 25.50 / 25.50 m
34 Topography : 1 (Flat/gentle slope; no barrier)
35 Reference angle : 0.00
36

37 **■ ■**
38 Results segment # 1: Hemlock Road (day)
39 -----

40
41 Source height = 1.50 m
42

43 ROAD (0.00 + 58.79 + 0.00) = 58.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.72	0.00	-6.93	0.00	0.00	0.00	0.00	58.79

47 -----

48
49 Segment Leq : 58.79 dBA
50

51 Total Leq All Segments: 58.79 dBA
52

53 **■ ■**
54 Results segment # 1: Hemlock Road (night)
55 -----

56
57 Source height = 1.50 m
58

59 ROAD (0.00 + 51.19 + 0.00) = 51.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	58.12	0.00	-6.93	0.00	0.00	0.00	0.00	51.19

63 -----

64
65 Segment Leq : 51.19 dBA
66

67 Total Leq All Segments: 51.19 dBA
68
69 **RE**
70
71
72
73 TOTAL Leq FROM ALL SOURCES (DAY): 58.79
74 (NIGHT): 51.19
75 **RE**
76 **RE**
77

3
4 Filename: bbef.te Time Period: Day/Night 16/8 hours
5 Description: building b east facade indoor
6
7

8 Road data, segment # 1: Hemlock Road (day/night)
9 -----

10 Car traffic volume : 9715/845 veh/TimePeriod *
11 Medium truck volume : 773/67 veh/TimePeriod *
12 Heavy truck volume : 552/48 veh/TimePeriod *
13 Posted speed limit : 40 km/h
14 Road gradient : 1 %
15 Road pavement : 1 (Typical asphalt or concrete)

16
17 * Refers to calculated road volumes based on the following input:

18
19 24 hr Traffic Volume (AADT or SADT): 12000
20 Percentage of Annual Growth : 0.00
21 Number of Years of Growth : 0.00
22 Medium Truck % of Total Volume : 7.00
23 Heavy Truck % of Total Volume : 5.00
24 Day (16 hrs) % of Total Volume : 92.00
25

26 Data for Segment # 1: Hemlock Road (day/night)
27 -----

28 Angle1 Angle2 : -90.00 deg 0.00 deg
29 Wood depth : 0 (No woods.)
30 No of house rows : 0 / 0
31 Surface : 1 (Absorptive ground surface)
32 Receiver source distance : 75.00 / 75.00 m
33 Receiver height : 25.50 / 25.50 m
34 Topography : 1 (Flat/gentle slope; no barrier)
35 Reference angle : 0.00
36

37 **■ ■**
38 Results segment # 1: Hemlock Road (day)
39 -----

40
41 Source height = 1.50 m
42

43 ROAD (0.00 + 55.72 + 0.00) = 55.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	65.72	0.00	-6.99	-3.01	0.00	0.00	0.00	55.72

47 -----

48
49 Segment Leq : 55.72 dBA
50

51 Total Leq All Segments: 55.72 dBA
52

53 **■ ■**
54 Results segment # 1: Hemlock Road (night)
55 -----

56
57 Source height = 1.50 m
58

59 ROAD (0.00 + 48.12 + 0.00) = 48.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	58.12	0.00	-6.99	-3.01	0.00	0.00	0.00	48.12

63 -----

64
65 Segment Leq : 48.12 dBA
66

67 Total Leq All Segments: 48.12 dBA
68
69 **RE**
70
71
72
73 TOTAL Leq FROM ALL SOURCES (DAY): 55.72
74 (NIGHT): 48.12
75 **RE**
76 **RE**
77

3
4 Filename: bbwf.te Time Period: Day/Night 16/8 hours
5 Description: building b west facade indoor
6
7

8 Road data, segment # 1: Hemlock Road (day/night)
9 -----


10 Car traffic volume : 9715/845 veh/TimePeriod *
11 Medium truck volume : 773/67 veh/TimePeriod *
12 Heavy truck volume : 552/48 veh/TimePeriod *
13 Posted speed limit : 40 km/h
14 Road gradient : 1 %
15 Road pavement : 1 (Typical asphalt or concrete)

16
17 * Refers to calculated road volumes based on the following input:

18
19 24 hr Traffic Volume (AADT or SADT): 12000
20 Percentage of Annual Growth : 0.00
21 Number of Years of Growth : 0.00
22 Medium Truck % of Total Volume : 7.00
23 Heavy Truck % of Total Volume : 5.00
24 Day (16 hrs) % of Total Volume : 92.00
25

26 Data for Segment # 1: Hemlock Road (day/night)
27 -----

28 Angle1 Angle2 : 0.00 deg 90.00 deg
29 Wood depth : 0 (No woods.)
30 No of house rows : 0 / 0
31 Surface : 1 (Absorptive ground surface)
32 Receiver source distance : 76.50 / 76.50 m
33 Receiver height : 25.50 / 25.50 m
34 Topography : 1 (Flat/gentle slope; no barrier)
35 Reference angle : 0.00
36

37  Results segment # 1: Hemlock Road (day)
38 -----
39

40
41 Source height = 1.50 m
42


43 ROAD (0.00 + 55.63 + 0.00) = 55.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	65.72	0.00	-7.08	-3.01	0.00	0.00	0.00	55.63

45 -----
46
47 -----

48
49 Segment Leq : 55.63 dBA
50

51 Total Leq All Segments: 55.63 dBA
52

53  Results segment # 1: Hemlock Road (night)
54 -----
55

56
57 Source height = 1.50 m
58

59 ROAD (0.00 + 48.03 + 0.00) = 48.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	58.12	0.00	-7.08	-3.01	0.00	0.00	0.00	48.03

61 -----
62
63 -----

64
65 Segment Leq : 48.03 dBA
66

67 Total Leq All Segments: 48.03 dBA
68
69 **RE**
70
71
72
73 TOTAL Leq FROM ALL SOURCES (DAY): 55.63
74 (NIGHT): 48.03
75 **RE**
76 **RE**
77

Outdoor Living Area (OLA)

4 Filename: plola.te Time Period: Day/Night 16/8 hours
 5 Description: P1 OLA

8 Road data, segment # 1: Hemlock Road (day/night)

10 Car traffic volume : 9715/845 veh/TimePeriod *
 11 Medium truck volume : 773/67 veh/TimePeriod *
 12 Heavy truck volume : 552/48 veh/TimePeriod *
 13 Posted speed limit : 40 km/h
 14 Road gradient : 1 %
 15 Road pavement : 1 (Typical asphalt or concrete)

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

19 24 hr Traffic Volume (AADT or SADT): 12000
 20 Percentage of Annual Growth : 0.00
 21 Number of Years of Growth : 0.00
 22 Medium Truck % of Total Volume : 7.00
 23 Heavy Truck % of Total Volume : 5.00
 24 Day (16 hrs) % of Total Volume : 92.00

26 Data for Segment # 1: Hemlock Road (day/night)

28 Angle1 Angle2 : -60.00 deg 90.00 deg
 29 Wood depth : 0 (No woods.)
 30 No of house rows : 0 / 0
 31 Surface : 1 (Absorptive ground surface)
 32 Receiver source distance : 85.50 / 85.50 m
 33 Receiver height : 1.50 / 25.50 m
 34 Topography : 1 (Flat/gentle slope; no barrier)
 35 Reference angle : 0.00

37 **■ ■**
 38 Results segment # 1: Hemlock Road (day)

41 Source height = 1.50 m
 43 ROAD (0.00 + 51.30 + 0.00) = 51.30 dBA
 44 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 46 -----
 46 -60 90 0.66 65.72 0.00 -12.55 -1.87 0.00 0.00 0.00 51.30
 47 -----

49 Segment Leq : 51.30 dBA
 51 Total Leq All Segments: 51.30 dBA

53 **■ ■**
 54 Results segment # 1: Hemlock Road (night)

57 Source height = 1.50 m
 59 ROAD (0.00 + 49.77 + 0.00) = 49.77 dBA
 60 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
 61 -----
 62 -60 90 0.00 58.12 0.00 -7.56 -0.79 0.00 0.00 0.00 49.77
 63 -----

65 Segment Leq : 49.77 dBA

67 Total Leq All Segments: 49.77 dBA
68
69 **RE**
70
71
72
73 TOTAL Leq FROM ALL SOURCES (DAY): 51.30
74 (NIGHT): 49.77
75 **RE**
76 **RE**
77