



REPORT
PROJECT: 131947-6.04.01

NOISE CONTROL FEASIBILITY STUDY
232 DONALD B. MUNRO DRIVE
VILLAGE OF CARP
CITY OF OTTAWA



Prepared for Tartan Homes
by IBI GROUP

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1 INTRODUCTION

IBI was retained by Tartan Homes to prepare a Noise Control Feasibility Study in support of a Zoning By-law Amendment (ZBLA) for a proposed residential subdivision to be located at 232 Donald B. Munro Drive in the Village of Carp, Ottawa. This report has been prepared to determine the impact of transportation-related noise on the residential lands of the proposed development through the use of noise contour lines for both the indoor and outdoor sound level criteria thresholds.

The subject site covers approximately 8.0 hectares, as shown in **Figure 1** below, and is bound by Donald B. Munro Drive to the south, an existing low-rise neighbourhood to the west, a single-family home to the east and undeveloped greenfield land to the north. The proposed development consists of low-rise residential uses including single-family lots, as well as semi-detached and street townhome units.

Figure 1 – Site Location



2 BACKGROUND

2.1 Noise Sources

Road Noise

The subject property is primarily exposed to roadway noise from Donald B. Munro Drive to the south.

Robertlee Drive, located to the west, is screened by existing single-family dwellings and functions as a minor collector road with a curvilinear alignment which will naturally calm traffic and mitigate the potential noise impacts to the subject property. As such, no further consideration of roadway noise from Robertlee Drive is considered in this study.

Aircraft Noise

The subject site is not located within the Airport Vicinity Development Zone (AVDZ), as shown on Annex 10 and Schedule K of the 2013 Official Plan. Aircraft noise from the Ottawa International Airport is, therefore, not included in the analysis for this study. The Carp Airport, however, is located approximately 2.1km to the south and therefore is considered as a potential noise source due to its relative proximity to the site.

Railway Noise

A desktop review of the surrounding area identified a single-track rail-line approximately 220 metres south of the subject property. As this rail-line is within 250 metres of the site, further consideration has been given to its noise impacts in accordance with the City of *Ottawa Environmental Noise Control Guidelines (January 2016)*, hereafter referred to as the ENC Guidelines.

2.2 Sound Level Limits for Road Traffic

Sound level criteria for road traffic is taken from the *City of Ottawa Environmental Noise Control Guidelines* and the *Ministry of Environment Publication NPC-300 (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 fluctuation sound.

2.2.1 Indoor sound level criterion – ventilation and warning clause requirements

Similar to outdoor noise levels, the recommended indoor sound, the sound level criteria from Table 2.2b of the ENC Guidelines are as follows:

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

The sound levels 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 room window at 1.5 metres above the ground for daytime noise and at the plane of the bedroom window 4.5 metres above the ground for nighttime noise.

As per NPC-300 C7.1.2.1 and C7.1.2.2, when the outdoor noise levels at the living room are greater than 55 dBA and less than or equal to 65 dBA and/or greater than 50 dBA and less than or equal to 60 dBA at the bedroom window then a warning clause is required and forced air heating with provision for central air conditioning is required.

Should the outdoor noise levels exceed 65 dBA at the living room and/or exceed 60 dBA at the bedroom 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 NPC-300, the sound level criteria for the outdoor living area (OLA) for the daytime period between 07:00 and 23:00 hours is 55 dBA Leq (16). Sound levels for the OLA are calculated 3 metres from the building face at the centre of the unit or within the centre of the OLA at a height of 1.5 metres above the ground.

If the Leq sound level is less than or equal to the above criteria then no further action is required by the developer. If the sound level exceeds the criteria by less than 5 dBA then the developer may, with City approval, either provide a warning clause to prospective purchasers 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 required.

2.2.3 Indoor Sound Level Criterion – Building Components

As per NPC-300 C7.1.3, when the outdoor sound levels are less than or equal to 65 dBA at the living room window and/or less than or equal to 60 dBA at the bedroom level then the building must be compliant with the Ontario Building Code. Should the outdoor sound levels exceed this criteria then the building component (walls, windows etc.) must be designed to achieve indoor sound level criteria.

2.3 Sound Level Limits for Aircraft Noise

Aircraft noise impact assessment is based on the Noise Exposure Forecast (NEF) and Noise Exposure Projection (NEP) methods approved by Transport Canada. The noise contours were used to define the Airport Operating Influence Zone (AOIZ) and Airport Vicinity Development Zone (AVDZ) which is shown on Schedule K of the Official Plan.

No new noise sensitive developments are permitted within the AOIZ. Noise sensitive development is permitted within the AVDZ and outside of the AOIZ subject to a noise study or under the Prescribed Measures for Aircraft Noise in Part 6 of the ENC Guidelines. Indoor and outdoor sound level limits for aircraft noise is included in Table 4.2a of the ENC Guidelines.

3 ROADWAY NOISE

3.1 Road Traffic Data

As discussed previously, the major sources of road noise impacting the site are expected to originate from the traffic flows on Donald B. Munro Drive.

Donald B. Munro Drive

Adjacent to the subject property, Donald B. Munro Drive is a two-lane, undivided urban collector (2-UCU) roadway which is located in a speed transition zone from 60km/h to 40km/h, approaching the Village of Carp. For the purposes of this study, the posted speed limit will be assumed as 60km/h to provide a more conservative and realistic analysis.

Table 3.1 below summarizes the traffic and road parameters are used to assess the noise levels.

TABLE 3.1: TRAFFIC AND ROAD DATA SUMMARY

	DONALD B. MUNRO DRIVE
Annual Average Daily Traffic (AADT)	8,000
Posted Speed Limit (km/h)	60
% Medium Trucks	7%
% Heavy Trucks	5%
% Daytime Traffic	92%

3.2 Calculation Methods

Roadway noise is calculated using the STAMSON 5.04 computer program from the Ontario Ministry of the Environment.

This study will identify the noise contours generated by the traffic for various scenarios. To determine the indoor noise level requirements for ventilation and noise clauses, the contours for the 55 dBA daytime and 50 dBA nighttime levels are used. For the indoor noise level requirement to evaluate building components, mandatory air conditioning and warning clauses, the 65 dBA daytime and 60 dBA night time contours are used. To determine the requirements for outdoor noise levels on the outdoor living area, the 55 dBA and 60 dBA daytime noise contours are used. **Table 3.2** below provides the offset from centreline of the roadway to the noise contours. The distances are measured from the centreline of the right-of-way for Donald B. Munro Drive.

TABLE 3.2: NOISE CONTOUR OFFSETS

NOISE CRITERIA	DISTANCE FROM CENTRELINE (M) DONALD B. MUNRO DRIVE (2-UCU)
Indoor Daytime 65 dBA	16.8
55 dBA	67.2
Indoor Nighttime 60 dBA	<15
50 dBA	51.2
Outdoor Living Area 60 dBA (Daytime Only)	33.6
55 dBA	67.2

Based on **Table 3.2** above for the indoor noise evaluation, the daytime contours are further from centreline than the nighttime levels for each criterion, therefore only the daytime levels will be used in the evaluation. Noise contours for both indoor (daytime only) and outdoor noise evaluation are shown in **Figure 2**. The noise contours have not been adjusted to reflect screening from proposed buildings.

STAMSON Noise Calculations are provided in **Appendix A**.

4 AIRCRAFT NOISE

The Carp Airport is located approximately 2.1 kilometres south of the proposed development and is currently operated by West Capital Developments. This airport caters primarily to local aviation pilots flying private planes.

There are no NEF/NEP noise contours available for this airport in the Official Plan and based on the size and nature of the airport which differs significantly from the Ottawa International Airport, it is reasonable to assume that the subject site is well outside of the NEF 25 contour line. As such, no analysis is deemed necessary. It is important to note as well that the orientation of the principal runway is east-west, which suggests that flight paths would be less likely to cross over the subject site. Regardless, Transport Canada recommends that a warning clause be provided to advise occupants of the proximity of the airport to the proposed development.

5 RAIL NOISE

Further research of the rail-line located approximately 220 metres south of the subject property indicates that it is commonly referred to as the Renfrew Subdivision and is an active, single-track rail corridor owned the City of Ottawa. Based on a review of the recently-conducted Noise Control Feasibility Study for 147 Langstaff Drive (Paterson Group Inc., 2019), it is understood that Nylene Canada Inc. is the sole user of this line, operating just 2 trains per week within the corridor.

A Secondary Main Railway Line in the ENC Guidelines is defined as a train line with volumes generally exceeding 5 trains per day. As the Renfrew Subdivisions falls well below this volume threshold, the train tracks are separated from the subject property by a significant distance of at least 220 metres and each train consists of just 7 cars including one locomotive engine, it is assumed that no further consideration of rail traffic will be required as part of this development application.

6 RESULTS

6.1 Indoor Sound Levels

The daytime indoor 55 dBA contour shown on **Figure 2** represents the limit in which a Type 'C' warning clause and forced air heating with provision for central air conditioning are required for the residential units. Dwelling units located between 16.8 metres and 67.2 metres from the centreline of Donald B. Munro Drive may experience noise levels above 55 dBA but below 65 dBA and require alternative means of ventilation, as well as a Type 'C' warning clause. The exact number of units that exceed 55 dBA will be determined during detailed design stage. As noted in Section 3.2, the noise contours have not been adjusted to account for screening by the proposed buildings.

The daytime indoor 65 dBA contour is the limit in which a Type 'D' warning clause, central air conditioning and an acoustical review/design of the building components are required. The limit of the 65 dBA contour line is approximately 16.8 metres from the centreline of Donald B. Munro Drive and therefore these measures will only need to be considered for units directly backing onto or flanking Donald B. Munro Drive.

Warning clauses for indoor noise are as follows:

Type 'C'

"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."

Type 'D'

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria."

6.2 Outdoor Sound Levels

The outdoor 60 dBA contour on **Figure 2** represents the limit in which physical attenuation is required in the outdoor living areas of residential units. For units between the 60 dBA and 55 dBA contours, physical attenuation may not be required but should be considered as stated in Part 4, Section 3.4 of the ENC Guidelines.

The 60 dBA contour limit was determined to be an approximate 33.6 metres from the centreline of Donald B. Munro Drive. It is expected that single-family lots or blocks backing onto or flanking this collector road with outdoor living areas within the contours will require physical attenuation in the form of a noise barrier.

There are a number of locations where the noise levels are expected to be below 60 dBA but above 55 dBA, which are located between 33.6 metres and 67.2 metres from the centreline of Donald B. Munro Drive. At these locations, warning clause Type 'A' could be considered in lieu of a noise barrier.

In the event that noise levels are reduced to below 60 dBA but remain above 55 dBA with attenuation, a warning clause Type 'B' would be required.

Warning clauses for outdoor noise are as follows:

Type 'A'

"Purchasers/tenants are advised that sound levels due to increasing Donald B. Munro Drive traffic volumes may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."

Type 'B'

"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 Donald B. Munro Drive traffic volumes may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."

6.3 Aircraft Sound Levels

The warning clause for aircraft noise is as follows:

"Purchasers/tenants are advised that due to the proximity of the airport, noise from the airport and individual aircraft may at times interfere with outdoor or indoor activities"

7 CONCLUSION

This report outlines the impact of transportation-related noise on the residential development located at 232 Donald B. Munro Drive in the Village of Carp, Ottawa. The exact location of residential units requiring noise warning clauses, ventilation, air conditioning requirements, acoustical review/design of building components, and the location and size of noise barriers will be determined during the detailed design phase when the Draft Plan and grading plan are finalized.

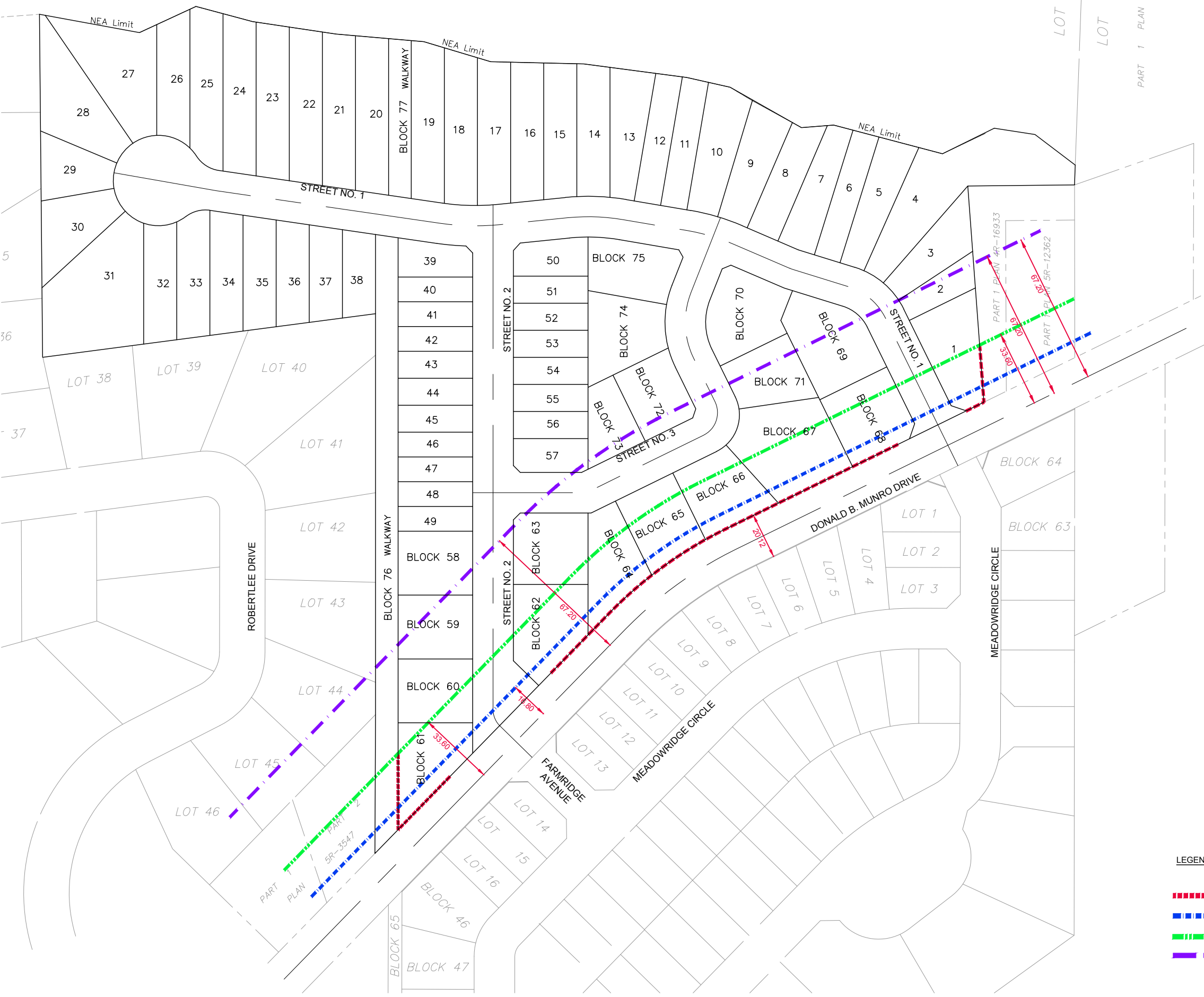
8 PROFESSIONAL AUTHORIZATION

Prepared by:



Ben Pascolo-Neveu, P. Eng.

j:\131947_Corp\7.0_Production\7.03_Design\04_Civil_Land\Noise Report\131947-Noise-figure.dwg Layout Name: FIGURE 2 Plot Scale: 1:5.13 Plotted At: 10/12/2021 Last Saved By: DSurna Last Saved At:

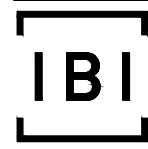


LEGEND:

- - - - - POTENTIAL NOISE BARRIER LOCATION
- - - - - 65 dBA INDOOR NOISE CONTOUR
- - - - - 60 dBA OUTDOOR NOISE CONTOUR
- - - - - 55 dBA INDOOR AND OUTDOOR NOISE CONTOUR

CENTERLINE OFFSETS:
DONALD B MUNRO DRIVE
2-UCU

55 dBA OUTDOOR	67.2
60 dBA OUTDOOR	33.6
55 dBA INDOOR	67.2
65 dBA INDOOR	16.8



Scale
N.T.S.

Project Title
**NOISE CONTROL FEASIBILITY STUDY
323 DONALD B. MUNRO DRIVE
VILLAGE OF CARP**

Drawing Title
NOISE STUDY

Sheet No.
FIGURE 2

APPENDIX A
STAMSON CALCULATIONS

Filename: dbm6550.te Time Period: Day/Night 16/8 hours
 Description: Donald B Munro - 65 dBA Day, 50 dBA night

Road data, segment # 1: D B Munro (day/night)

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod *
Medium truck volume  : 515/45    veh/TimePeriod *
Heavy truck volume   : 368/32    veh/TimePeriod *
Posted speed limit   : 60 km/h
Road gradient        : 1 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
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: D B Munro (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0          (No woods.)
No of house rows   : 0 / 0
Surface            : 1          (Absorptive ground surface)
Receiver source distance : 16.78 / 51.17 m
Receiver height    : 1.50 / 4.50 m
Topography         : 1          (Flat/gentle slope; no barrier)
Reference angle    : 0.00
```



Results segment # 1: D B Munro (day)

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.27	0.00	-0.81	-1.46	0.00	0.00	0.00	65.00

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA



Results segment # 1: D B Munro (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	59.67	0.00	-8.37	-1.30	0.00	0.00	0.00	50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 50.00



Filename: dbm6050.te Time Period: Day/Night 16/8 hours
 Description: Donald B Munro - 60 dBA Day, 50 dBA night

Road data, segment # 1: D B Munro (day/night)

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod *
Medium truck volume  : 515/45    veh/TimePeriod *
Heavy truck volume   : 368/32    veh/TimePeriod *
Posted speed limit   : 60 km/h
Road gradient        : 1 %
Road pavement        : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
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: D B Munro (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 1          (Absorptive ground surface)
Receiver source distance : 33.59 / 51.17 m
Receiver height     : 1.50 / 4.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```



Results segment # 1: D B Munro (day)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.27	0.00	-5.81	-1.46	0.00	0.00	0.00	60.00

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA



Results segment # 1: D B Munro (night)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	59.67	0.00	-8.37	-1.30	0.00	0.00	0.00	50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00



Filename: dbm5560.te Time Period: Day/Night 16/8 hours
 Description: Donald B Munro - 55 dBA Day, 60 dBA night

Road data, segment # 1: D B Munro (day/night)

```
-----
Car traffic volume   : 6477/563   veh/TimePeriod  *
Medium truck volume : 515/45    veh/TimePeriod  *
Heavy truck volume  : 368/32    veh/TimePeriod  *
Posted speed limit  : 60 km/h
Road gradient       : 1 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8000
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: D B Munro (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 1 (Absorptive ground surface)
Receiver source distance : 67.22 / 15.00 m
Receiver height : 1.50 / 4.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```



Results segment # 1: D B Munro (day)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.27	0.00	-10.81	-1.46	0.00	0.00	0.00	55.00

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA



Results segment # 1: D B Munro (night)

Source height = 1.50 m

ROAD (0.00 + 58.37 + 0.00) = 58.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	59.67	0.00	0.00	-1.30	0.00	0.00	0.00	58.37

Segment Leq : 58.37 dBA

Total Leq All Segments: 58.37 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 58.37

