# NOISE IMPACT STUDY

Proposed Residential Subdivision

## *"108, 116, 122 Harvie Road"*

City of Barrie

**Prepared for:**

**ASA Developments Inc.**


**Prepared by:**

**Ralph Bouwmeester, P. Eng.**

**September 24, 2021**

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RBA File: A21007

# EXECUTIVE SUMMARY

R. BOUWMEESTER & ASSOCIATES has been retained to assess potential noise impacts on residential uses within a proposed residential subdivision at the northwest corner of Harvie Road and the future Beacon Road extension in south Barrie.

The goals and objectives of this study are four-fold, namely:

1. To identify noise sources and noise-sensitive land uses.
2. To recommend mitigation measures, if and where required.
3. To identify those areas, if any, requiring more detailed studies.
4. To satisfy the development approval requirements of the City of Barrie.

The noise sources potentially impacting this project are future traffic on Harvie Road, Beacon Road and Highway 400.

Traffic data for Harvie Road and Beacon Road were provided by the City; Highway 400 data were obtained from MTO. Roadway noise from cars and medium and heavy trucks has been accounted for in this analysis. The traffic volumes apply to Year 2031 thereby providing the 10-year minimum projection window required by the MECP.

The predicted equivalent outdoor sound levels at the subject site resulting from road traffic exceed the limits established by the MECP in certain areas. Mitigation measures are required in order to bring day and night-time sound levels down to acceptable levels.

The recommended noise control requirements are summarized as follows:

1. All units require warning clauses registered on title and included in all Development Agreements and Agreements of Purchase and Sale or Lease.
2. The apartment building fronting Harvie Road must be equipped with central air conditioning and the building components (exterior windows, walls and doors) must be reviewed by an acoustic engineer prior to building permit issuance.
3. All remaining dwellings require forced air heating systems sized for the future installation of central air conditioning at the dwelling owners' option and expense.

In summary, the subject development as proposed can be developed in a manner that satisfies the requirements of MECP noise guideline NPC-300.

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## 1. INTRODUCTION

R. BOUWMEESTER & ASSOCIATES has been retained to assess potential noise impacts on residential uses within a proposed residential subdivision at the northwest corner of Harvie Road and the future Beacon Road extension in south Barrie. See Figure 1.

Our analysis is based on the configuration of the development as shown on Concept Plan 19 by Jones Consulting dated August 31, 2021. See Appendix 'D'.

## 2. GOALS AND OBJECTIVES

The goals and objectives of this study are four-fold, namely:

1. To identify noise sources and noise-sensitive land uses.
2. To recommend mitigation measures, if and where required.
3. To identify those areas, if any, requiring more detailed studies.
4. To satisfy the development approval requirements of the City of Barrie.

## 3. NOISE SOURCES

The noise sources potentially impacting this project are future traffic on Harvie Road, Beacon Road and Highway 400. Traffic data for Harvie Road and Beacon Road were provided by the City; Highway 400 data were obtained from MTO. See Appendix 'A'.

## 4. GUIDELINES AND CRITERIA

Reference is made to Ministry of the Environment, Conservation and Parks (MECP) publication, Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (Publication NPC-300, Aug 2013 ver. #22) which recommends the following sound level limits for indoor and outdoor settings.

### 4.1 Sound Level Limits

The following NPC-300 sound level limits apply to road traffic:

**TABLE 1 - Sound Level Limits (Leq)**

| Location | Time Period | | Limit (dBA) |
|---|---|---|---|
| Outdoor | | | |
| Outdoor Living Area | Day | 0700-2300 hrs | 55 |
| Indoor | | | |
| Living/Dining Room | All | 0700-0700 hrs | 45 |
| Bedroom (day) | Day | 0700-2300 hrs | 45 |
| Bedroom (night) | Night | 2300-0700 hrs | 40 |

As compared to earlier MECP noise guidelines, NPC-300 has set indoor sound level limits in bedrooms for the day-time period in addition to night-time.

## 4.2 Noise Control Measures

NPC-300 states that *"Noise control measures are not required if the sound level estimated in the OLA is 55 dBA or less during the daytime and 50 dBA or less in the plane of bedroom windows during either daytime or nighttime"*.

### 4.2.1 Outdoor Living Areas

The above-noted outdoor limit of 55 dBA applies to a protected Outdoor Living Area (OLA) of at least 56 $m^2$ (600 sq. ft.) in the case of single family detached homes, 46 $m^2$ (500 sq. ft.) in the case of semi-detached units, and 37 $m^2$ (400 sq. ft.) in the case of row or townhouse units.

The MECP guidelines indicate that *"Noise control measures are not required if the sound level estimated in the OLA is 55 dBA or less during the daytime"*.

The guidelines state that if the sound level is greater than 55 dBA and less than or equal to 60 dBA, *"noise control measures may be applied to reduce the sound level to 55 dBA. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A"*.

The guidelines further state that if the sound level in the Outdoor Living Area is greater than 60 dBA, *"noise control measures should be implemented to reduce the level to 55 dBA. Only in cases where the required noise control measures are not feasible for technical, economic or administrative reasons would an excess above the limit (55 dBA) be acceptable with a warning clause Type B. In the above situations, any excess above the limit will not be acceptable if it exceeds 5 dBA."* Acoustic barriers typically provide the mitigation needed, and warning clauses are required to be registered on title against the affected units.

### 4.2.2 Plane of Window - Ventilation Requirements

Ventilation requirements to reduce indoor sound levels, by allowing windows to remain closed if so desired by the occupants, include the following:

- For outdoor day-time sound levels in the plane of living/dining/bedroom windows greater than 55 dBA and less than or equal to 65 dBA, dwelling units must be equipped with forced air heating systems with ducting sized for the future installation of central air conditioning. Window, wall, and door components meeting normal Ontario Building Code requirements are typically adequate under these conditions, although warning clauses (Types B and C) must be registered on title against the affected lots.

- For outdoor day-time sound levels in the plane of living/dining/bedroom windows greater than 65 dBA, dwelling units must be equipped with central air conditioning. Warning clauses (Types B and D) must be registered on title against the affected lots.

Ventilation requirements under night-time conditions are similar to the above except that

50 and 60 dBA are used in place of 55 dBA and 65 dBA, respectively.

The location and installation of outdoor air conditioning devices must comply with the sound level limits of Publication NPC-216 and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices or such other criteria as specified by the municipality.

### 4.2.3 Indoor Living Areas - Building Component Requirements

If day-time sound levels outside living/dining/bedroom windows exceed 65 dBA (or night-time levels exceed 60 dBA) building components including windows, walls and doors must be designed so that the indoor sound levels meet the sound level limits quoted in Table 1.

The above sound level limits and mitigation requirements can be summarized as follows:

**TABLE 2 - Sound Level Limits and Standard Mitigation Requirements**

| | Outdoor Sound Level Limits (dBA) | | |
|---|---|---|---|
| | Plane of Window | | |
| | Day | Night | OLA |
| Do nothing | ≤55 | ≤50 | ≤55 |
| Noise barrier or Warning Clause A | | | 56 - 60 |
| Mandatory noise barrier * | | | >60 |
| Provision for future A/C ** | 56 - 65 | 51 - 60 | |
| Mandatory A/C ** | >65 | >60 | |
| Special building component design | >65 | >60 | |

Notes:
* Warning Clause B is required if the net resultant sound level is 56-60 dBA (to the max. allowable 60 dBA).
** Warning clauses required (A, B and C for future central air; A, B and D for mandatory central air).

## 5. ANALYSIS PROCEDURES

### 5.1 Surroundings and Site Characteristics

The subject site is located at the northwest corner of Harvie Road and the future Beacon Road extension in south Barrie. See Figure 1. Existing residential subdivisions lie to the north and south; older-style large residential lots lie to the west.

Generally vacant industrial lands lie to the east across Beacon Road although the Harvie Road at-grade water reservoir and booster pump station are located on the north side of Harvie Road just over 100 m east of the subject site.

Highway 400 lies about 860 m to the east.

A daycare facility (Discovery Child Care) is located at the southeast corner of Harvie Road and Thrushwood Drive. (Beacon becomes Thrushwood Drive south of Harvie.)

The proposed development calls for 127 residential units consisting of a mix of singles (12), townhomes (64) and a 4-storey apartment building (51). The site is 2.48 ha in size.

Private outdoor living space is proposed in the rear yards of the singles and towns. There are also two common outdoor amenity areas, one in the south half of the site (Block A) and one in the north (Block B).

A proposed local east-west street separates Blocks A and B and is intended to connect Kemp Street to Beacon Road. See the Concept Plan in Appendix 'D'.

## 5.2 Noise Sources

The noise sources of concern are future traffic on Harvie Road, Beacon Road and Highway 400. The proposed internal streets are assumed acoustically insignificant.

Roadway noise from cars and medium and heavy trucks has been accounted for in this analysis. The noise source heights used are in accordance with MECP criteria.

This analysis assumes that the roads are of infinite length except for Highway 400 which has a limited exposure angle from the subject site.

Harvie Road adjacent to the subject site was recently reconstructed with four through-lanes plus a centre left-turn lane all within a 34 m right-of-way. See the Concept Plan in Appendix 'D' for lane details. The reconstruction was associated with the Highway 400 overpass project and connects Harvie Road to Big Bay Point Road east of the highway

Beacon Road currently ends just north of the subject site; it will be extended along the site and connect to Harvie Road as this development proceeds. It will be a two-lane road.

For roads with up to four lanes of through traffic, the MECP allows an even directional split in traffic with noise levels assumed to originate from centreline. For more than four through lanes, separate analyses must be carried out for each direction of travel (in sets of up to four lanes each). Notwithstanding the above, given the separation distance to Highway 400 (i.e. 860 m) we have modelled the highway as a single segment including all lanes since the acoustic difference is insignificant at this distance.

It is also worth noting that the distance to the highway exceeds the 500 m limit of the MECP transportation noise model Stamson. We have manually estimated the sound level contribution from the highway for separation distances greater than 500 m and added that to the Stamson results for the Harvie Road and Beacon Road traffic sound levels.

The MECP requires increased truck noise on uphill grades to be accounted for when the grade is at least 2% and where the climb exceeds 6 m. This does not apply in this case as the subject roads are all relatively flat (<2%).

We have also identified the Harvie Road at-grade water reservoir and booster pump station as potential noise sources. During recent site visits, normal operations at the facility were inaudible; however, the pump station is equipped with a diesel generator for

emergency backup power. While the MECP has no sound level limits for emergency equipment operating under emergency conditions, they do stipulate limits for non-emergency scenarios such as maintenance and testing. For example, under non-emergency conditions, the sound level limits are 5 dBA greater than those otherwise applicable to stationary sources. For a Class 1 Area such as this, the resultant day/night limits are 55 and 50 dBA, respectively.

Given the existing residential uses on the subject site and the proximity of the daycare centre, we assume that noise emissions from the booster pump station comply within the MECP limits for stationary noise. As a result, this noise source is not discussed further.

## 5.3 Traffic Data

The City of Barrie provided Year 2031 traffic projections, truck percentages, and speed limits for Harvie Road and Beacon Road. This provides the 10-year minimum projection window required by the MECP. We have assumed that the truck traffic is split 50/50 between medium and heavy trucks.

Highway 400 traffic data was obtained from MTO publication, "Provincial Highways Traffic Volumes 1988-2016". Since the MECP requires the higher of AADT and SADT to be used, our analysis is based on SADT values. The future Year 2031 traffic volume was estimated by projecting the Year 2016 SADT figure using the annual growth rate for the previous 10-year period between 2006 and 2016.

Truck percentages for the highway were obtained from a noise study carried out in 2017 by Novus Environmental as part of the Bryne Drive, Harvie Road and Essa Road Class Environmental Assessment. See Appendix 'A'.

The MECP-recommended percentage splits for day and night time traffic volumes were used in this study (i.e. 67/33 for freeways, 90/10 for arterial roads).

The posted speed limit on the adjacent roads is 50 kph; the highway limit is 100 kph.

See Appendix 'A' for further road traffic details.

## 5.4 Study Periods

The study periods, as per MECP guidelines, are the 16-hour day-time period between 7:00 AM and 11:00 PM, and the 8-hour night-time period from 11:00 PM and 7:00 AM.

## 5.5 Sound Level Prediction Model

Noise level calculations were carried out in accordance with MECP guidelines (Environmental Noise Assessment in Land Use Planning, Training Manual, Ontario Ministry of the Environment, 1987) and through the use of their road noise model ORNAMENT. See References.

### 5.6 Correction Factors

The corrections required by the MECP to be applied to the noise levels have been taken into account where applicable. These include corrections such as:

a) Road segment lengths
b) Ground surface type
c) Source - receiver distance
d) Height of elevated source/receiver, and
e) Day/night split in traffic volumes.

## 6. CALCULATED EQUIVALENT SOUND LEVELS

Indoor sound levels are typically estimated by calculating outdoor levels along the face of a wall exposed to the noise source (i.e. in the plane of windows). Under NPC-300, day and night-time receiver heights are set at bedroom windows which are typically 4.5 m above grade in a typical single or semi-detached house or townhouse.

We note that, since sound levels increase with building height (due to a reduction in the effect of ground attenuation), worst-case receptors are typically located at the uppermost floor in multi-storey building scenarios. Based on the 4-storey height proposed for the apartment building, we have used a receptor height of 11.9 m for 4$^{th}$-floor windows as derived from the architectural elevations (see Appendix 'D'). The townhomes are 3 storeys in height; the receptor height recommended by the MECP in this case is 7.5 m.

Shielding by the proposed apartment building was accounted for in the determination of sound levels along the building faces. Parking lots were modelled as reflective surfaces.

OLA sound levels are typically calculated for receivers 3.0 m from the mid-point of the rear wall of a dwelling at a height of 1.5 m above finished grade. They take into account shielding by both the apartment and dwellings. Vegetation shielding was not considered.

Decks and balconies are exempt from the MECP outdoor noise limits unless they are the only outdoor living area available, and they are at least 4.0 m deep, outside the building façade, and unenclosed.

Our analysis includes a sampling of noise levels that can be expected in OLAs and along the building faces based on the lotting configuration shown on the Concept Plan. These noise level predictions were used to flag those areas requiring a more detailed analysis.

Building envelopes for the singles and towns were assumed based on the setbacks provided on the Concept Plan.

An overall summary of the predicted outdoor day-time and night-time sound levels for each of the receptor locations is presented in Table 3. See Figure 2 for receptor locations and source-receiver distances. Sample calculations are provided in Appendix 'B'.

**TABLE 3 - Predicted Outdoor Sound Levels (dBA)**

| Receptor Location | Source | Outdoor Equivalent Sound Levels Due to Road Traffic (dBA) | | |
|---|---|---|---|---|
| | | Day | Night | OLA |
| Blk A Apt SE Corner 4th flr | Harvie/Beacon/400 | 66 | 61 | - |
| Blk A Apt SW Corner 4th flr | Harvie/Beacon/400 | 65 | 60 | - |
| Block A-2 3rd floor | Harvie/400 | 61 | 57 | 58 |
| Lot 1 2nd floor | Harvie/Beacon/400 | 60 | 57 | 52 |
| South Amenity Area | Harvie/Beacon/400 | - | - | 57 |

The Table 3 results confirm that mitigation measures are required in order to ensure that the predicted sound levels meet the MECP criteria. The figures include an estimate of the Highway 400 sound level since it cannot be modelled directly as indicated in Section 5.2. See Appendix 'B' for a breakdown of the noise contributions from each road.

The sound levels throughout the site resulting from Harvie Road and Beacon Road traffic do not warrant central air conditioning or special building components; however, the addition of the ambient noise from the distant highway pushes the noise level over that threshold at the apartment building, particularly at night.

The following summarizes typical acoustic requirements and describes how they apply to this proposed development. See Section 7 and Figure 3 for detailed requirements.

**Warning clauses** must be registered on title and included in Agreements of Purchase and Sale or Lease where sound level limits are exceeded. Based on the predicted noise levels at the building faces, warning clauses are recommended for all dwelling units (see Table 4 and Figure 3) - suggested wording is given in the Notes to Table 4.

**Central air conditioning** is required where the sound level due to road traffic in the plane of a living/dining/bedroom window exceeds 65 dBA day-time or 60 dBA night-time. Air-cooled condenser units should be located in a noise insensitive location. Central air conditioning is not meant to be a sound mitigating measure, although it does provide the dwelling occupants the option of closing windows if so desired. This requirement applies to the apartment building fronting Harvie Road.

**Special building component design**, to ensure that indoor sound levels due to road traffic meet the limits specified in Section 4, is required for residential dwelling units where the sound level in the plane of a living/dining/bedroom window exceeds 65 dBA day-time or 60 dBA night-time. This requirement applies to the apartment building fronting Harvie Road.

To provide preliminary guidance in the selection of building components, we have estimated the window and wall requirements for the worst-case location, namely along the facades of the proposed 4-storey apartment building fronting Harvie Road. See the following and Appendix 'C' for details.

For example, the facade facing Harvie Road requires an acoustic insulation factor (AIF) of 33. Assuming window areas that are 25% of the floor area and walls areas that are 80% of the floor area, this can be achieved with double-glazed windows with a 3(25)3 structure (i.e. two 3 mm panes separated by a 25 mm airspace) and EW2 walls. The equivalent STC ratings are 33 for the windows and 39 for the walls.

A summary of the requirements for the four facades is as follows:

| | | | | STC Equivalent | |
|---|---|---|---|---|---|
| | AIF | Windows | Walls | Windows | Walls |
| South | 33 | 3(25)3 | EW2 | 33 | 39 |
| East | 32 | 3(20)3 | EW1 | 32 | 38 |
| North | 26 | 3(6)3 | EW1 | 26 | 32 |
| West | 29 | 3(6)3 | EW1 | 29 | 35 |

For reference EW1 walls are composed of 12.7 mm gypsum board, vapour barrier and 38 mm x 89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities. EW2 includes the above plus rigid insulation (25-30mm), and wood siding or metal siding and fibre backer board.

The specific window and wall components must be reviewed and confirmed by an acoustic consultant before building permit issuance.

**Forced air heating systems**, with duct work sized to accommodate the future installation of central air conditioning, are required where the sound level due to road traffic in the plane of a living/dining/bedroom window exceeds 55 dBA day-time or 50 dBA night-time. Future air-cooled condenser units should be located in a noise-insensitive location. Construction meeting the minimum non-acoustical requirements of the Ontario Building Code will provide adequate sound insulation. We recommend that this be applied to all dwellings (except the apartment building – see above) particularly due to the highway traffic sound levels at night. See Section 7, Table 4 and Figure 3 for details.

**Acoustic barriers**, to protect outdoor living areas, are required where the day-time outdoor sound level in the OLA exceeds 60 dBA. The MECP's sound level objective for outdoor living areas is 55 dBA; however, sound level excesses of up to 5 dBA are permitted with an appropriate warning clause. Residual noise levels (in excess of 55 dBA) resulting from reduced fence heights must be covered through the use of an appropriately worded warning clause to be included in the Site Plan Agreement and in all Offers of Purchase and Sale or Lease for the affected units, and the clause is to be registered on title against those units.

Based on the proposed Concept Plan, acoustic barriers are not required.

## 7. RECOMMENDATIONS

1. All dwellings require warning clauses registered on title and included in all Development Agreements and Agreements of Purchase and Sale or Lease. See

Figure 3 and Table 4 for the specific lots, and see Notes to Table 4 for wording.

2. The apartment building fronting Harvie Road must be equipped with central air conditioning and the building components (exterior windows, walls and doors) must be reviewed by an acoustic engineer prior to building permit issuance.

   Detailed data for the HVAC equipment should also be reviewed before building permit issuance to ensure that outdoor noise from the equipment does not adversely impact the residential properties nearby or the planes of windows of neighbouring units within the development.

   According to NPC-300, *"Ventilation methods other than central air conditioning are acceptable for high and medium density residential developments, subject to the following conditions:*

   *a) the noise produced by the proposed ventilation system in the space served does not exceed 40 dBA. In practice, this condition usually implies that window air conditioning units are not acceptable;*

   *b) the ventilation system complies with all national, provincial and municipal standards and codes;*

   *c) the ventilation system is designed by a heating and ventilation professional; and*

   *d) the ventilation system enables the windows and exterior doors to remain closed."*

3. All dwellings (except the apartment building – see Recommendation 2 above) require forced air heating systems sized for the future installation of central air conditioning at the dwelling owners' option and expense. See Figure 3 and Table 4 for details.

## 8. CONCLUSIONS

With the incorporation of the recommended noise controls summarized in Section 7 and as contained in Table 4 and shown on Figure 3, the MECP noise guidelines can be met in all dwelling units and outdoor living areas.

In summary, the subject development as proposed can be developed in a manner that satisfies the requirements of MECP noise guideline NPC-300.

Respectfully submitted,

**R. BOUWMEESTER & ASSOCIATES**

Ralph Bouwmeester, P. Eng.
Principal

## TABLE 4 - Summary of Noise Controls

| Lot / Block | Central Air Conditioning | Exterior Windows, Walls and Doors | Acoustic Barrier | Warning Clauses [1.] |
|---|---|---|---|---|
| Block A 4-storey apt | Yes | Special | No | A + B +D + E |
| Lots 1 - 12<br>Blocks A-1 to A-5<br>Blocks B-1 to B-6 | Provision for Adding | OBC | No | A + B + C + E |

Notes:

1. See Notes to Table 4 on following page for wording.
2. Warning Clause 'E' is recommended due to the proximity of the Harvie Road water reservoir and booster pump station.

## NOTES TO TABLE 4

1. Air cooled condenser units should be located in a noise insensitive location. In addition, the location and installation of outdoor air conditioning devices must comply with the sound level limits of Publication NPC-216 and guidelines contained in Environmental Noise Guidelines for Installation of Residential Air Conditioning Devices or such other criteria as specified by the municipality.

2. 'OBC' indicates that construction meeting the minimum non-acoustical requirements of the Ontario Building Code will provide adequate sound insulation. 'Special' indicates that exterior building components such as windows, walls and doors have to be determined by an acoustic consultant when house plans are available and prior to building permit issuance.

3. Acoustic barriers shall be of solid construction with no cracks, holes or gaps, and having a surface density of no less than 20 kg/sm. Any gaps under the noise barrier that are necessary for drainage purposes must be minimized and localized, and must not deteriorate the acoustical performance. A barrier may consist of a berm, a fence, or both.

4. The following warning clauses must be registered on title and included in the Subdivision Agreement and in all Agreements of Purchase and Sale or Lease for those lots and blocks as specified in Table 4:

   TYPE A: *"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

   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 road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

   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."*

   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 sound level limits of the Municipality and the Ministry of the Environment."*

   TYPE E: *"Purchasers/tenants are advised that due to the proximity of the nearby municipal water reservoir and booster pump station, noise from the facility may at times be audible."*

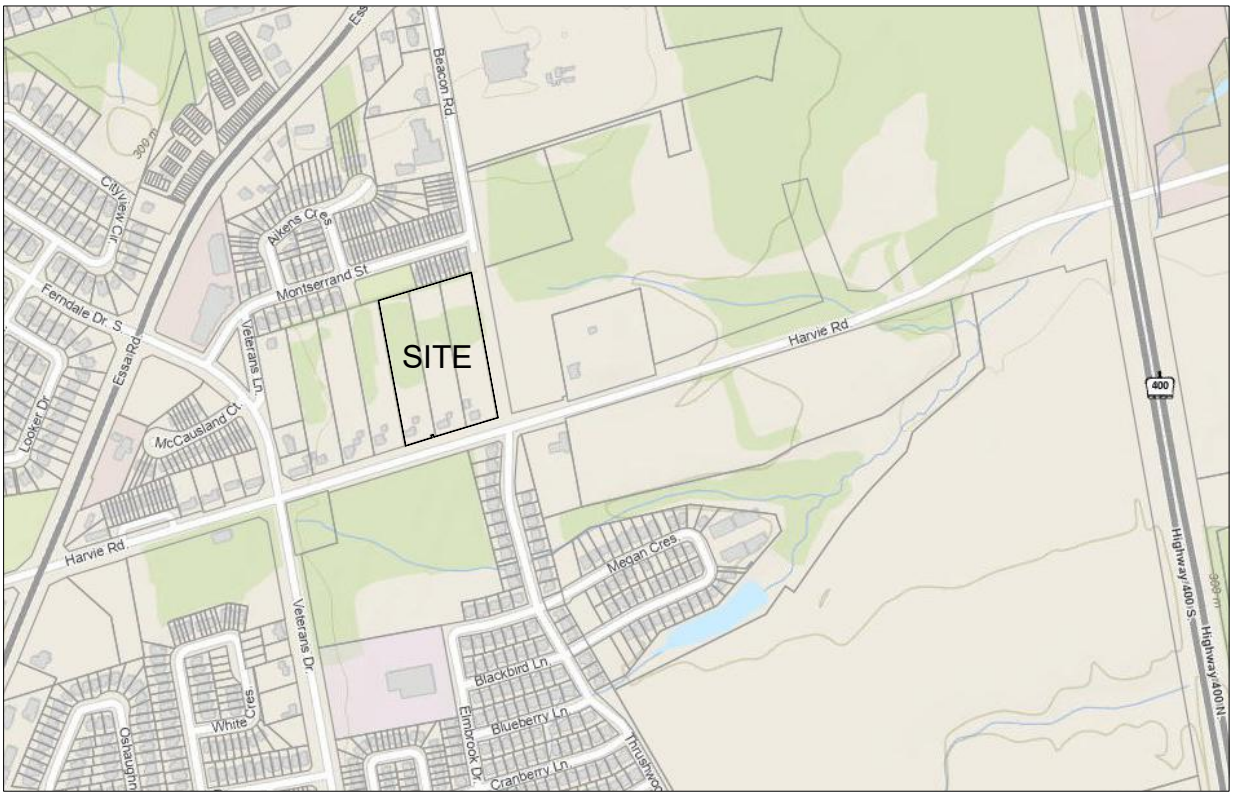
5. Conventional ventilated attic roof construction meeting OBC requirements is satisfactory.

6. All exterior doors must be fully weather-stripped.

# REFERENCES


1. Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning (MECP Publication NPC-300, Aug 2013 ver. #22)
2. Environmental Noise Assessment in Land Use Planning (MOE Training Manual, 1987)
3. Road and Rail Noise: Effects on Housing (CMHC, Rev. 1981)
4. ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) (MECP, October 1989)
5. Traffic data (City of Barrie, MTO)
6. Provincial Highways Traffic Volumes 1988-2016 (MTO)
7. Environmental Noise Assessment, Bryne Drive, Harvie Road and Essa Road Class Environmental Assessment, City of Barrie (Novus Environmental, September 27, 2017)
8. Zoning By-law 2009-141 (see Appendix 'E')

# FIGURES




# Location Plan

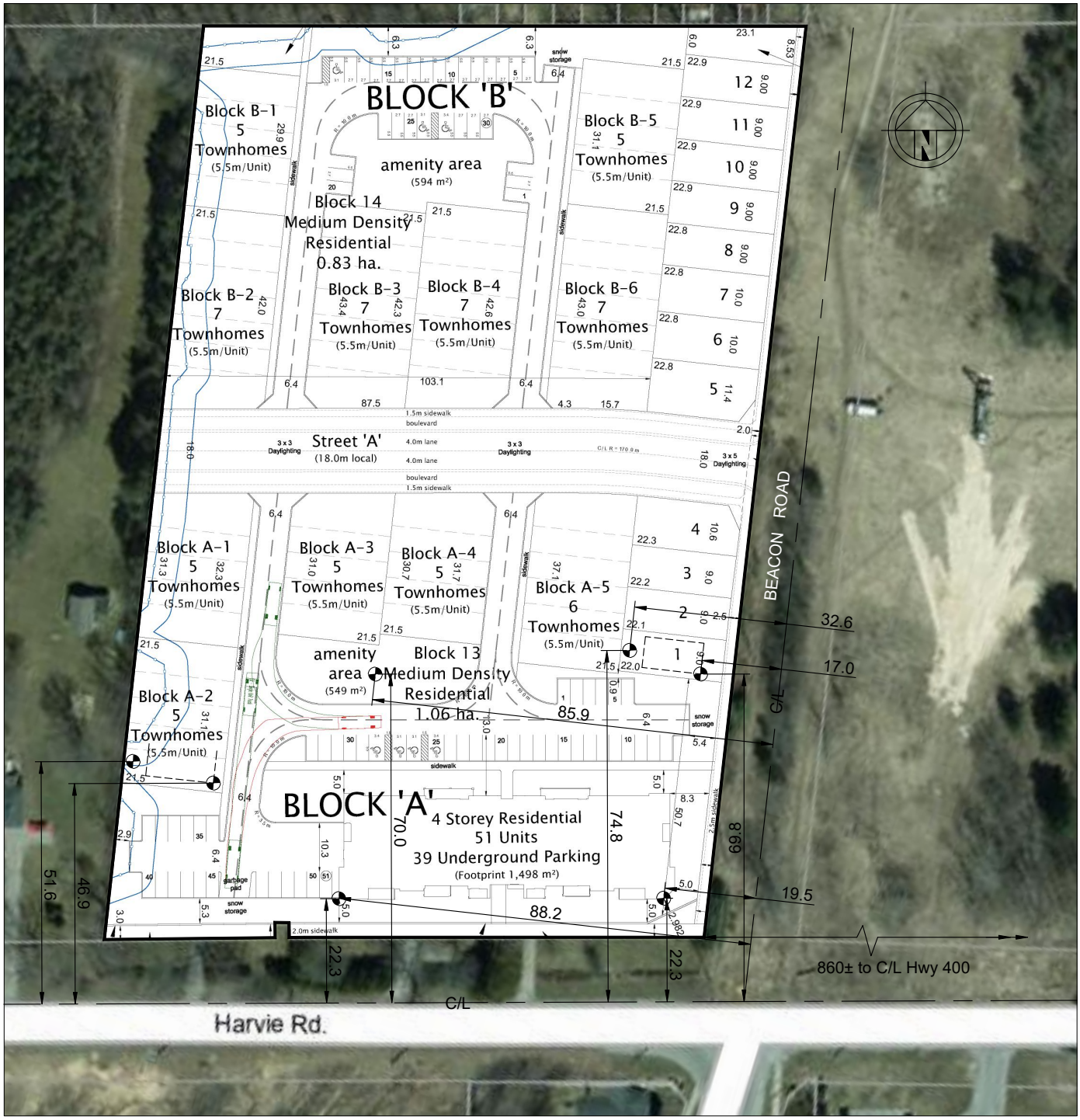
Scale: 1:10,000

# FIG. 1

September 2021

R. Bouwmeester & Associates

Base map source: Simcoe County




LEGEND

Building envelope and Receptor Location

# Receptor Plan

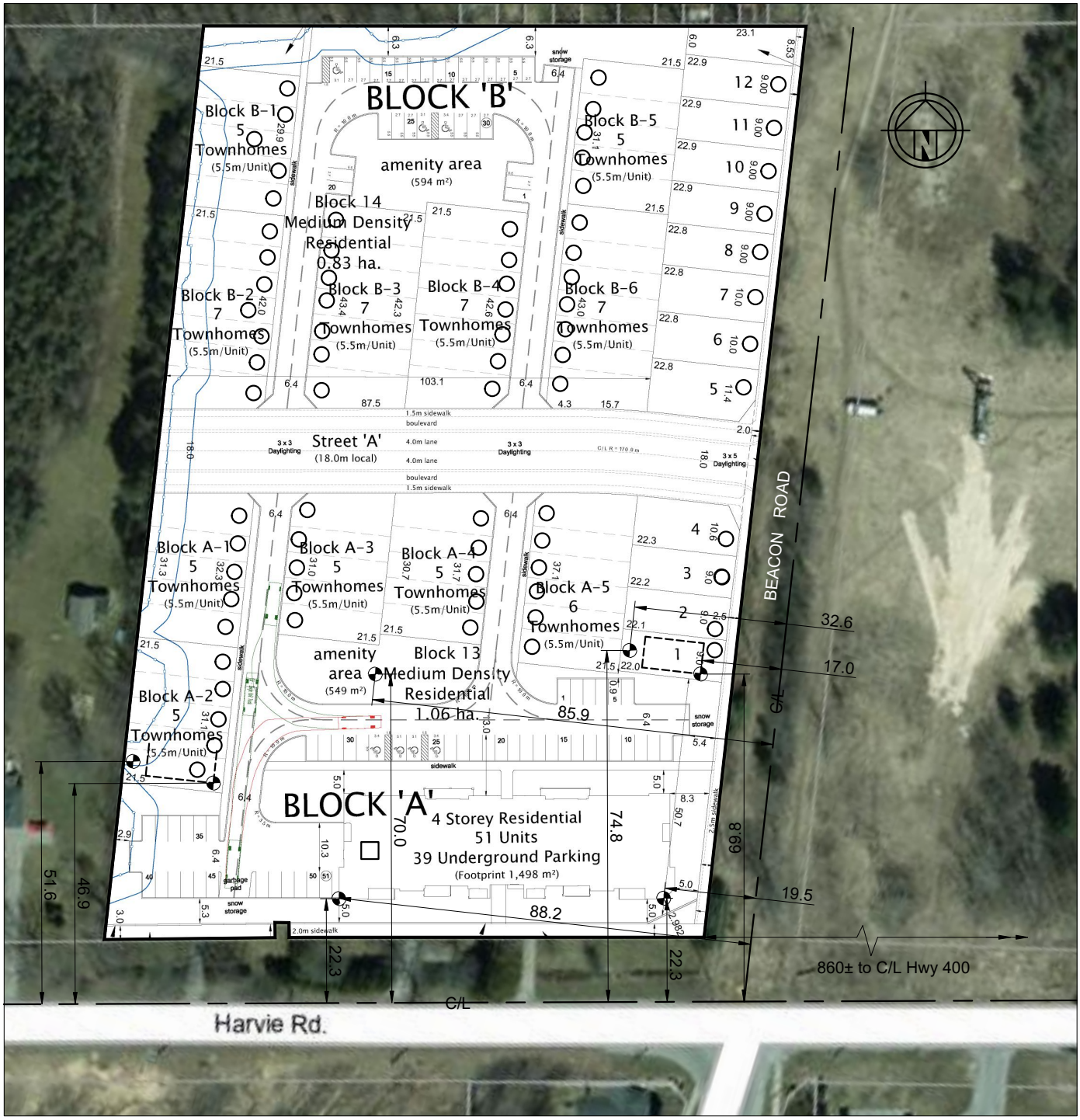
Scale: 1 : 1250

# FIG. 2

September 2021

R. Bouwmeester & Associates

Draft Plan source: Jones Consulting




LEGEND

- ☐ Dwellings requiring central air, building component design + Warning Clauses (See Recommendation 2.)
- ○ Dwellings requiring forced air heating + Warning Clauses (See Recommendation 3.)

# Noise Control Plan

Scale: 1 : 1250

# FIG. 3

September 2021

R. Bouwmeester & Associates

Draft Plan source: Jones Consulting

# APPENDICES

A. Road Traffic Data
B. Sample Sound Level Calculations
C. Sample Acoustic Insulation Factor Calculations
D. Background Plans (Concept Plan, Floor Plans and Elevations)
E. Zoning Info (source: Zoning By-Law 2009-141)

# APPENDIX 'A'

## ROAD TRAFFIC DATA

**City of Barrie**

- Harvie Road:
  - AADT Year 2031 = 20,000 with 5% commercial and heavy vehicles
  - 50 kph
- Beacon Road:
  - AADT Year 2031 = 5,000 with 3% commercial and heavy vehicles
  - 50 kph
- Highway 400 (from Novus report – see Reference 7):
  - 12% commercial and heavy vehicles (2.2% medium. 9.8% heavy)

**Ministry of Transportation**

- Highway 400:
  - AADT Year 2006 = 89,500; AADT Year 2016 = 108,700
  - SADT Year 2006 = 99,400; SADT Year 2016 = 120,600
  - SADT growth rate 2006 to 2016 = 1.95% compounded annually

**Ministry of the Environment, Conservation and Parks**

The MECP recommended splits for day/night traffic are:

- Freeways – 67/33
- Arterial roads – 90/10

**SUMMARY OF DATA USED IN THIS STUDY**

For the purpose of this noise assessment, the following Year 2031 data apply:

| | **Harvie** | **Beacon** | **Hwy 400** |
|---|---|---|---|
| Traffic volume (AADT) | 20,000 | 5,000 | 161,122 * |
| Day/night split (%) | 90 / 10 | 90 / 10 | 67/33 |
| Percent trucks M / H | 2.5 / 2.5 ** | 1.5 / 1.5 ** | 2.2 / 9.8 |
| Posted Speed (kph) | 50 | 50 | 100 |
| Number of through lanes | 4 | 2 | 6 |
| ROW width (m) | 34 | 24 | ±66 to ±110 |
| Road Grade (%) | <2 | <2 | <2 |
| Pavement Type | normal asphalt | normal asphalt | normal asphalt |

* Note: Hwy 400 traffic based on SADT
Year 2031 AADT derived as follows:
120600 x (1.0195^15) = 161,122

**Note: assumed split 50/50

**Subject:** RE: Traffic Data Request - Harvie/Beacon
**From:** Justin MacDonald <Justin.MacDonald@barrie.ca>
**Date:** 06/25/2021, 1:27 PM
**To:** Ralph Bouwmeester <rbouwmeester@rogers.com>

Good afternoon Ralph,

As per your request:

Harvie Road – I do not have counts for this area as previously it was a dead end I have no counts. All information provided is based on the City's 2019 TMP EMME plots.
AAADT - Projected volume of 20,000 vehicles per day in 2031,
Commercial and Heavy Vehicle Percentage - 5%
Speed Limit – 50km/h
ROW – 34m
Cross Section 5 lanes with Active Transportation.

Beacon Road -
AADT – 1,300 vehicles per day (2019)
Growth Rate – No growth rate is available as it was included as part of the 2019 TMP; Given limited information I have deferred to the Transportation Design Manual which states collector roads have a typical volume of 5,000 to 9,900 vehicles per day. I would assume a volume closer to 5,000 vehicles per day.
Commercial and Heavy Vehicle Percentage - 3%
Speed Limit – 50km/h
ROW – 24m
Cross Section – 1 lane per direction

Thrushwood –
AADT – 1,500 vehicles per day (2016)
Growth Rate – 1% per year to a horizon year of 2031
Commercial and Heavy Vehicle Percentage - 1%
Speed Limit – 50km/h
ROW – 20m
Cross Section – 1 lane per direction

Please let me know if you have any questions.

Thanks.

Justin MacDonald

---

**From:** Ralph Bouwmeester <rbouwmeester@rogers.com>
**Sent:** Wednesday, June 23, 2021 4:01 PM
**To:** Justin MacDonald <Justin.MacDonald@barrie.ca>
**Subject:** Traffic Data Request - Harvie/Beacon

Hi Justin -

Hope you're keeping well.

Could you please provide future traffic data for the 4 legs of the Harvie Road and Beacon/Thrushwood intersection. Please include future (to at least Year 2031) AADTs, medium and heavy truck percentages, speed limits, number of lanes and ROW widths.

Thank you kindly.

--

Regards -
Ralph

Ralph Bouwmeester, P. Eng.
rbouwmeester@rogers.com

**R. BOUWMEESTER & ASSOCIATES**
**Land Development Engineering**
Barrie, ON Canada
tel/fax 705-726-3392
---

| Highway | Location Description | Dist. (KM) | Year | Pattern Type | AADT | SADT | SAWDT | WADT | AR |
|---|---|---|---|---|---|---|---|---|---|
| 400 | MOLSON PARK DR-MAPLEVIEW DR IC 90 | 3.8 | 1988 | IC | 39,200 | 50,900 | 43,100 | 31,300 | 0.8 |
| | | | 1989 | IC | 42,400 | 54,600 | 47,000 | 34,700 | 0.9 |
| | | | 1990 | IC | 45,600 | 57,800 | 50,500 | 37,300 | 0.9 |
| | | | 1991 | IC | 47,200 | 59,400 | 52,300 | 39,100 | 0.4 |
| | | | 1992 | IC | 48,800 | 60,000 | 53,600 | 41,400 | 0.8 |
| | | | 1993 | IC | 50,500 | 63,600 | 56,000 | 40,900 | 0.5 |
| | | | 1994 | IC | 51,800 | 64,800 | 57,000 | 41,900 | 0.8 |
| | | | 1995 | IC | 53,100 | 66,900 | 59,500 | 42,900 | 0.6 |
| | | | 1996 | IC | 54,400 | 70,700 | 62,000 | 44,000 | 0.6 |
| | | | 1997 | IC | 59,300 | 77,100 | 67,600 | 47,900 | 0.6 |
| | | | 1998 | IC | 64,400 | 83,100 | 73,400 | 52,100 | 0.5 |
| | | | 1999 | IC | 69,500 | 89,700 | 78,900 | 56,200 | 0.9 |
| | | | 2000 | IC | 74,000 | 90,800 | 86,800 | 62,700 | 0.4 |
| | | | 2001 | IC | 76,100 | 93,600 | 89,000 | 76,100 | 0.4 |
| | | | 2002 | IC | 79,900 | 98,300 | 93,700 | 67,700 | 0.7 |
| | | | 2003 | IC | 88,400 | 108,700 | 103,400 | 75,100 | 0.6 |
| | | | 2004 | IC | 87,600 | 97,600 | 98,600 | 77,600 | 0.5 |
| | | | 2005 | IC | 86,400 | 96,100 | 97,000 | 76,200 | 0.4 |
| | | | 2006 | IC | 89,500 | 99,400 | 100,400 | 79,300 | 0.4 |
| | | | 2007 | IC | 92,500 | 102,800 | 105,900 | 81,800 | 0.5 |
| | | | 2008 | IC | 88,000 | 97,500 | 94,300 | 77,600 | 0.3 |
| | | | 2009 | IC | 95,300 | 105,600 | 106,600 | 84,500 | 0.3 |
| | | | 2010 | IC | 97,000 | 112,600 | 113,500 | 90,200 | 0.4 |
| | | | 2011 | IC | 98,000 | 107,800 | 111,700 | 88,200 | N/A |
| | | | 2012 | IC | 98,700 | 109,600 | 105,600 | 87,800 | N/A |
| | | | 2013 | IC | 90,000 | 99,900 | 99,000 | 80,100 | N/A |
| | | | 2014 | IC | 93,100 | 103,300 | 102,400 | 82,900 | N/A |
| | | | 2015 | IC | 106,300 | 118,000 | 116,900 | 94,600 | N/A |
| | | | 2016 | IC | 108,700 | 120,600 | 119,500 | 96,700 | N/A |
| 400 | SIMCOE RD 27 IC-94-ESSA RD-BARRIE | 2.4 | 1988 | CTR | 46,000 | 59,700 | 50,600 | 36,800 | 1.4 |
| | | | 1989 | CTR | 50,000 | 64,400 | 55,500 | 40,900 | 1.1 |
| | | | 1990 | CTR | 54,000 | 68,500 | 59,900 | 44,200 | 0.5 |
| | | | 1991 | CTR | 55,800 | 70,300 | 61,900 | 46,300 | 1.0 |

| Road and Section | AADT | Day / Night Split [1] | Overall % Commercial Vehicles | Medium / Heavy Truck Split [2], [3] | Posted Speed Limit (km/h) |
|---|---|---|---|---|---|
| Coughlin Rd. to Veterans Dr. | 17,345 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Veterans Dr. to Ardagh Rd. | 29,555 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Ardagh Rd. to Highway 400 SB Off Ramp | 40,890 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Harvie Road | | | | | |
| Essa Rd. to Veterans Dr. | 1,250 | 90/10 | 2.0 | 1.0/1.0 | 50 |
| Veterans Dr. to Thrushwood Dr. | 1,963 | 90/10 | 2.0 | 1.0/1.0 | 50 |
| Thrushwood Dr. to Dead End | 863 | 90/10 | 2.0 | 1.0/1.0 | 50 |
| Bryne Drive | | | | | |
| Dead End to Essa Rd. | 7,290 | 90/10 | 4.0 | 2.0/2.0 | 50 |
| Veterans Drive | | | | | |
| Essa Rd. to Harvie Rd. | 19,275 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Harvie Rd. to Touchette Dr. | 18,938 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Mapleview Drive | | | | | |
| Veterans Rd. to Essa Rd. | 22,175 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Highway 400 | | | | | |
| Essa Rd. to Mapleview Dr. | 151,700 | 67/33 | 12.0 | 2.2/9.8 | 100 |
| Thrushwood Drive | | | | | |
| South of Harvie Rd. | 1,400 | 90/10 | 2.0 | 1.0/1.0 | 50 |

Notes: [1] XX / YY is the percentage of vehicle traffic in the 16 hour daytime and 8 hour night-time respectively.
[2] MM / HH is the percentage of medium trucks and heavy trucks used in the analysis, respectively.
[3] Medium / Heavy Truck Split of 50/50 based on historical information for this class of roadway except for Highway 400.

Table 4: Road Traffic **Data for 2031 Future "Build"** Scenario

| Road and Section | AADT | Day / Night Split [1] | Overall % Commercial Vehicles | Medium / Heavy Truck Split [2], [3] | Posted Speed Limit (km/h) |
|---|---|---|---|---|---|
| Essa Road | | | | | |
| Mapleview Dr. West to Coughlin Rd. | 20,075 | 90/10 | 2.0 | 1.0/1.0 | 70 |
| Coughlin Rd. to Veterans Dr. | 17,345 | 90/10 | 2.0 | 1.0/1.0 | 70 |
| Veterans Dr. to Ardagh Rd. | 39,390 | 90/10 | 2.0 | 1.0/1.0 | 70 |
| Ardagh Rd. to Highway 400 SB Off Ramp | 53,445 | 90/10 | 2.0 | 1.0/1.0 | 70 |
| Harvie Road | | | | | |
| Essa Rd. to Veterans Dr. | 14,488 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Veterans Dr. to Thrushwood Dr. | 30,963 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Thrushwood Dr. to 200 m E. of Thrushwood Dr. | 29,800 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| 200 m E. of Thrushwood Dr. to Bryne Dr. | 29,800 | 90/10 | 2.0 | 1.0/1.0 | 70 |
| Bryne Drive | | | | | |
| Essa Rd. to Harvie Rd. | 14,745 | 90/10 | 2.0 | 1.0/1.0 | 50 |
| Harvie Rd. to Caplan Ave. | 14,190 | 90/10 | 2.0 | 1.0/1.0 | 50 |

| Road and Section | AADT | Day / Night Split [1] | Overall % Commercial Vehicles | Medium / Heavy Truck Split [2], [3] | Posted Speed Limit (km/h) |
|---|---|---|---|---|---|
| Veterans Drive | | | | | |
| Essa Rd. to Harvie Rd. | 15,750 | 90/10 | 4.0 | 2.0/2.0 | 60 |
| Harvie Rd. to Touchette Dr. | 24,638 | 90/10 | 4.0 | 2.0/2.0 | 60 |
| Mapleview Drive | | | | | |
| Veterans Dr. to Essa Rd. | 32,340 | 90/10 | 2.0 | 1.0/1.0 | 60 |
| Highway 400 | | | | | |
| Essa Rd. to Mapleview Dr. | 151,700 | 67/33 | 12.0 | 2.2/9.8 | 100 |
| Thrushwood Drive | | | | | |
| South of Harvie Rd. | 1,400 | 90/10 | 2.0 | 1.0/1.0 | 50 |

Notes: [1] XX / YY is the percentage of vehicle traffic in the 16 hour daytime and 8 hour night-time respectively.
[2] MM / HH is the percentage of medium trucks and heavy trucks used in the analysis, respectively.
[3] Medium / Heavy Truck Split of 50/50 based on historical information for this class of roadway except for Highway 400.

## 2.6 Noise Model Used

The highway noise prediction model used is the United States Federal Highway Administration Method. The STAMINA 2.0 highway noise prediction model is a computerized version of this method. This model is jointly approved by the MTO and the MOECC.

The noise prediction model relies on the use of vehicle noise emission levels to generate a noise source that can then be assessed at the noise receptors based on the following factors:

- posted speeds for the roadways in the area used in the noise analysis. (In the case of roadways with a posted speed of less than 50 km/h a more conservative speed of 50 km/h is used as the approved models will not predict sound levels below that speed);
- pavement surface used for construction of the roadway (i.e. hot mix asphaltic pavement);
- elevations, contours and locations of all of the NSA's near the right-of-way;
- roadway grades;
- intervening rows of homes and barriers;
- type of ground cover, soft or hard ground;
- percentage of commercial traffic; and
- distance from the roadway.

The model uses the following vehicle classifications:

Automobiles - Two axles and four wheels designed primarily for the transportation of nine or fewer passengers, or transportation of cargo (light trucks). This classification includes motorcycles. Generally, the gross vehicle weight is less than 4,500 kilograms.

# APPENDIX 'B'

## SAMPLE SOUND LEVEL CALCULATIONS

```
STAMSON 5.0        NORMAL REPORT        Date: 10-09-2021 15:04:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 107aptdn.te          Time Period: Day/Night 16/8 hours
Description: Blk A Apt SE cor 4th floor


Road data, segment # 1: Harvie (day/night)
-----------------------------------------
Car traffic volume  : 17100/1900  veh/TimePeriod  *
Medium truck volume :   450/50    veh/TimePeriod  *
Heavy truck volume  :   450/50    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  20000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Harvie (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  :  22.30 / 22.30  m
Receiver height           :  11.90 / 11.90  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Beacon (day/night)
-----------------------------------------
Car traffic volume  :  4365/485   veh/TimePeriod  *
Medium truck volume :    68/8     veh/TimePeriod  *
Heavy truck volume  :    68/8     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   5000
    Percentage of Annual Growth        :   0.00
```

```
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.50
    Heavy Truck  % of Total Volume     :   1.50
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Beacon (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  :  19.50 / 19.50  m
Receiver height           :  11.90 / 11.90  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Harvie (day)
---------------------------------

Source height = 1.26 m

ROAD (0.00 + 63.99 + 0.00) = 63.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.36  67.21   0.00  -2.33  -0.89   0.00   0.00   0.00  63.99
-------------------------------------------------------------------------------

Segment Leq : 63.99 dBA

Results segment # 2: Beacon (day)
---------------------------------

Source height = 1.11 m

ROAD (0.00 + 57.44 + 0.00) = 57.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.36  59.89   0.00  -1.55  -0.90   0.00   0.00   0.00  57.44
-------------------------------------------------------------------------------

Segment Leq : 57.44 dBA

Total Leq All Segments: 64.86 dBA

Results segment # 1: Harvie (night)
-----------------------------------

Source height = 1.26 m

ROAD (0.00 + 57.46 + 0.00) = 57.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.36  60.68   0.00  -2.33  -0.89   0.00   0.00   0.00  57.46
-------------------------------------------------------------------------------
```

Segment Leq : 57.46 dBA

Results segment # 2: Beacon (night)
---

Source height = 1.12 m

ROAD (0.00 + 51.05 + 0.00) = 51.05 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.36 | 53.50 | 0.00 | -1.55 | -0.90 | 0.00 | 0.00 | 0.00 | 51.05 |

Segment Leq : 51.05 dBA

Total Leq All Segments: 58.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.86
(NIGHT): 58.35

Filename: 107aptsw.te Time Period: Day/Night 16/8 hours
Description: Blk A Apt SW corner 4th floor

Road data, segment # 1: Harvie (day/night)
---
Car traffic volume : 17100/1900 veh/TimePeriod *
Medium truck volume : 450/50 veh/TimePeriod *
Heavy truck volume : 450/50 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 2.50
Heavy Truck % of Total Volume : 2.50
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Harvie (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 : 22.30 / 22.30 m
Receiver height : 11.90 / 11.90 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Beacon (day/night)
---
Car traffic volume : 4365/485 veh/TimePeriod *
Medium truck volume : 68/8 veh/TimePeriod *
Heavy truck volume : 68/8 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 5000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00

```
Data for Segment # 2: Beacon (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   -6.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     95 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  88.20 / 88.20  m
Receiver height           :  11.90 / 11.90  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Beacon (day/night)
------------------------------------------
Car traffic volume  :  4365/485   veh/TimePeriod  *
Medium truck volume :    68/8     veh/TimePeriod  *
Heavy truck volume  :    68/8     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   5000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.50
    Heavy Truck  % of Total Volume     :   1.50
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Beacon (day/night)
----------------------------------------
Angle1   Angle2           :  -6.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  88.20 / 88.20  m
Receiver height           :  11.90 / 11.90  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Harvie (day)
---------------------------------

Source height = 1.26 m

ROAD (0.00 + 63.99 + 0.00) = 63.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.36  67.21   0.00  -2.33  -0.89   0.00   0.00   0.00  63.99
-------------------------------------------------------------------------------

Segment Leq : 63.99 dBA
```

Results segment # 2: Beacon (day)
---

Source height = 1.11 m

ROAD (0.00 + 36.13 + 0.00) = 36.13 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | -6 | 0.36 | 59.89 | 0.00 | -10.46 | -4.28 | 0.00 | -9.02 | 0.00 | 36.13 |

Segment Leq : 36.13 dBA

Results segment # 3: Beacon (day)
---

Source height = 1.11 m

ROAD (0.00 + 45.86 + 0.00) = 45.86 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -6 | 90 | 0.36 | 59.89 | 0.00 | -10.46 | -3.57 | 0.00 | 0.00 | 0.00 | 45.86 |

Segment Leq : 45.86 dBA

Total Leq All Segments: 64.06 dBA

Results segment # 1: Harvie (night)
---

Source height = 1.26 m

ROAD (0.00 + 57.46 + 0.00) = 57.46 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 90 | 0.36 | 60.68 | 0.00 | -2.33 | -0.89 | 0.00 | 0.00 | 0.00 | 57.46 |

Segment Leq : 57.46 dBA

Results segment # 2: Beacon (night)
---

Source height = 1.12 m

ROAD (0.00 + 29.74 + 0.00) = 29.74 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | -6 | 0.36 | 53.50 | 0.00 | -10.46 | -4.28 | 0.00 | -9.02 | 0.00 | 29.74 |

Segment Leq : 29.74 dBA

Results segment # 3: Beacon (night)
---

Source height = 1.12 m

ROAD (0.00 + 39.47 + 0.00) = 39.47 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -6 | 90 | 0.36 | 53.50 | 0.00 | -10.46 | -3.57 | 0.00 | 0.00 | 0.00 | 39.47 |

Segment Leq : 39.47 dBA

Total Leq All Segments: 57.54 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.06
(NIGHT): 57.54

Filename: 107a2dn.te Time Period: Day/Night 16/8 hours
Description: Blk A2 day/night at 3rd floor

Road data, segment # 1: Harvie (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | : 17100/1900 | veh/TimePeriod * |
| Medium truck volume | : 450/50 | veh/TimePeriod * |
| Heavy truck volume | : 450/50 | veh/TimePeriod * |
| Posted speed limit | : 50 | km/h |
| Road gradient | : 0 | % |
| Road pavement | : 1 | (Typical asphalt or concrete) |

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

| | |
|---|---|
| 24 hr Traffic Volume (AADT or SADT) | 20000 |
| Percentage of Annual Growth | 0.00 |
| Number of Years of Growth | 10.00 |
| Medium Truck % of Total Volume | 2.50 |
| Heavy Truck % of Total Volume | 2.50 |
| Day (16 hrs) % of Total Volume | 90.00 |

Data for Segment # 1: Harvie (day/night)
---

| | | |
|---|---|---|
| Angle1 Angle2 | : -90.00 deg | -47.00 deg |
| Wood depth | : 0 | (No woods.) |
| No of house rows | : 1 / 1 | |
| House density | : 95 % | |
| Surface | : 2 | (Reflective ground surface) |
| Receiver source distance | : 46.90 / 46.90 | m |
| Receiver height | : 7.50 / 7.50 | m |
| Topography | : 1 | (Flat/gentle slope; no barrier) |
| Reference angle | : 0.00 | |

Road data, segment # 2: Harvie (day/night)
---

| | | |
|---|---|---|
| Car traffic volume | : 17100/1900 | veh/TimePeriod * |
| Medium truck volume | : 450/50 | veh/TimePeriod * |
| Heavy truck volume | : 450/50 | veh/TimePeriod * |
| Posted speed limit | : 50 | km/h |
| Road gradient | : 0 | % |
| Road pavement | : 1 | (Typical asphalt or concrete) |

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

| | |
|---|---|
| 24 hr Traffic Volume (AADT or SADT) | 20000 |
| Percentage of Annual Growth | 0.00 |
| Number of Years of Growth | 10.00 |
| Medium Truck % of Total Volume | 2.50 |
| Heavy Truck % of Total Volume | 2.50 |
| Day (16 hrs) % of Total Volume | 90.00 |

```
Data for Segment # 2: Harvie (day/night)
----------------------------------------
Angle1   Angle2           : -47.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  46.90 / 46.90  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Harvie (day/night)
------------------------------------------
Car traffic volume  : 17100/1900  veh/TimePeriod  *
Medium truck volume :   450/50    veh/TimePeriod  *
Heavy truck volume  :   450/50    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  20000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   2.50
    Heavy Truck  % of Total Volume     :   2.50
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Harvie (day/night)
----------------------------------------
Angle1   Angle2           :  45.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  46.90 / 46.90  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Harvie (day)
---------------------------------

Source height = 1.26 m

ROAD (0.00 + 46.33 + 0.00) = 46.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -47   0.00  67.21   0.00  -4.95  -6.22   0.00  -9.71   0.00  46.33
-------------------------------------------------------------------------------

Segment Leq : 46.33 dBA
```

Results segment # 2: Harvie (day)
---

Source height = 1.26 m

ROAD (0.00 + 59.34 + 0.00) = 59.34 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -47 | 45 | 0.00 | 67.21 | 0.00 | -4.95 | -2.91 | 0.00 | 0.00 | 0.00 | 59.34 |

Segment Leq : 59.34 dBA

Results segment # 3: Harvie (day)
---

Source height = 1.26 m

ROAD (0.00 + 51.50 + 0.00) = 51.50 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 90 | 0.49 | 67.21 | 0.00 | -7.36 | -8.35 | 0.00 | 0.00 | 0.00 | 51.50 |

Segment Leq : 51.50 dBA

Total Leq All Segments: 60.18 dBA

Results segment # 1: Harvie (night)
---

Source height = 1.26 m

ROAD (0.00 + 39.80 + 0.00) = 39.80 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | -47 | 0.00 | 60.68 | 0.00 | -4.95 | -6.22 | 0.00 | -9.71 | 0.00 | 39.80 |

Segment Leq : 39.80 dBA

Results segment # 2: Harvie (night)
---

Source height = 1.26 m

ROAD (0.00 + 52.81 + 0.00) = 52.81 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -47 | 45 | 0.00 | 60.68 | 0.00 | -4.95 | -2.91 | 0.00 | 0.00 | 0.00 | 52.81 |

Segment Leq : 52.81 dBA

Results segment # 3: Harvie (night)
---

Source height = 1.26 m

ROAD (0.00 + 44.96 + 0.00) = 44.96 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 90 | 0.49 | 60.68 | 0.00 | -7.36 | -8.35 | 0.00 | 0.00 | 0.00 | 44.96 |

Segment Leq : 44.96 dBA

Total Leq All Segments: 53.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.18
(NIGHT): 53.65

STAMSON 5.0 NORMAL REPORT Date: 10-09-2021 15:06:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 107a2o.te Time Period: 16 hours
Description: Blk A2 OLA

Road data, segment # 1: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Harvie
---
Angle1 Angle2 : -90.00 deg -41.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1
House density : 95 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 51.60 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Harvie
---
Angle1 Angle2 : -41.00 deg -9.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 51.60 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %

Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 3: Harvie
---
Angle1 Angle2 : -9.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 51.60 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Harvie
---
Source height = 1.26 m

ROAD (0.00 + 46.60 + 0.00) = 46.60 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | -41 | 0.00 | 67.21 | 0.00 | -5.37 | -5.65 | 0.00 | -9.60 | 0.00 | 46.60 |

Segment Leq : 46.60 dBA

Results segment # 2: Harvie
---
Source height = 1.26 m

ROAD (0.00 + 54.34 + 0.00) = 54.34 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -41 | -9 | 0.00 | 67.21 | 0.00 | -5.37 | -7.50 | 0.00 | 0.00 | 0.00 | 54.34 |

Segment Leq : 54.34 dBA

Results segment # 3: Harvie
---
Source height = 1.26 m

ROAD (0.00 + 54.40 + 0.00) = 54.40 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -9 | 90 | 0.66 | 67.21 | 0.00 | -8.91 | -3.90 | 0.00 | 0.00 | 0.00 | 54.40 |

Segment Leq : 54.40 dBA

Total Leq All Segments: 57.73 dBA

TOTAL Leq FROM ALL SOURCES: 57.73

STAMSON 5.0 NORMAL REPORT Date: 10-09-2021 15:07:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 107l1dn.te Time Period: Day/Night 16/8 hours
Description: Lot 1 day/night at 2nd floor

Road data, segment # 1: Harvie (day/night)
---
Car traffic volume : 17100/1900 veh/TimePeriod *
Medium truck volume : 450/50 veh/TimePeriod *
Heavy truck volume : 450/50 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 2.50
Heavy Truck % of Total Volume : 2.50
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Harvie (day/night)
---
Angle1 Angle2 : -90.00 deg 7.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 69.80 / 69.80 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Harvie (day/night)
---
Car traffic volume : 17100/1900 veh/TimePeriod *
Medium truck volume : 450/50 veh/TimePeriod *
Heavy truck volume : 450/50 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 20000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 2.50
Heavy Truck % of Total Volume : 2.50
Day (16 hrs) % of Total Volume : 90.00

```
Data for Segment # 2: Harvie (day/night)
----------------------------------------
Angle1   Angle2           :   7.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  69.80 / 69.80  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Beacon (day/night)
------------------------------------------
Car traffic volume  :  4365/485   veh/TimePeriod  *
Medium truck volume :    68/8     veh/TimePeriod  *
Heavy truck volume  :    68/8     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   5000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.50
    Heavy Truck  % of Total Volume     :   1.50
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Beacon (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  :  17.00 / 17.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Harvie (day)
---------------------------------

Source height = 1.26 m

ROAD (0.00 + 52.78 + 0.00) = 52.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      7   0.58  67.21   0.00 -10.53  -3.89   0.00   0.00   0.00  52.78
-------------------------------------------------------------------------------

Segment Leq : 52.78 dBA

Results segment # 2: Harvie (day)
```

```
---------------------------------

Source height = 1.26 m

ROAD (0.00 + 47.90 + 0.00) = 47.90 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     7     90   0.00  67.21   0.00  -6.68  -3.36   0.00  -9.27   0.00  47.90
-------------------------------------------------------------------------------

Segment Leq : 47.90 dBA

Results segment # 3: Beacon (day)
---------------------------------

Source height = 1.11 m

ROAD (0.00 + 57.71 + 0.00) = 57.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.58  59.89   0.00  -0.86  -1.32   0.00   0.00   0.00  57.71
-------------------------------------------------------------------------------

Segment Leq : 57.71 dBA

Total Leq All Segments: 59.25 dBA

Results segment # 1: Harvie (night)
-----------------------------------

Source height = 1.26 m

ROAD (0.00 + 46.25 + 0.00) = 46.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      7   0.58  60.68   0.00 -10.53  -3.89   0.00   0.00   0.00  46.25
-------------------------------------------------------------------------------

Segment Leq : 46.25 dBA

Results segment # 2: Harvie (night)
-----------------------------------

Source height = 1.26 m

ROAD (0.00 + 50.64 + 0.00) = 50.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     7     90   0.00  60.68   0.00  -6.68  -3.36   0.00   0.00   0.00  50.64
-------------------------------------------------------------------------------

Segment Leq : 50.64 dBA

Results segment # 3: Beacon (night)
```

```
-----------------------------------

Source height = 1.12 m

ROAD (0.00 + 51.31 + 0.00) = 51.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.58  53.50   0.00  -0.86  -1.32   0.00   0.00   0.00  51.31
-------------------------------------------------------------------------------

Segment Leq : 51.31 dBA

Total Leq All Segments: 54.67 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 59.25
                           (NIGHT): 54.67
```

Filename: 107l1o.te Time Period: 16 hours
Description: Lot 1 OLA

Road data, segment # 1: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Harvie
---
Angle1 Angle2 : -90.00 deg -36.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1
House density : 95 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 74.80 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Harvie
---
Angle1 Angle2 : -36.00 deg -15.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 74.80 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h

```
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Harvie
----------------------------
Angle1   Angle2           : -15.00 deg   64.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  74.80 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Harvie
------------------------------
Car traffic volume  : 17100 veh/TimePeriod  *
Medium truck volume :   450 veh/TimePeriod  *
Heavy truck volume  :   450 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: Harvie
----------------------------
Angle1   Angle2           :  64.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  74.80 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 5: Beacon
------------------------------
Car traffic volume  :  4365 veh/TimePeriod  *
Medium truck volume :    68 veh/TimePeriod  *
Heavy truck volume  :    68 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: Beacon
----------------------------
Angle1   Angle2           : -90.00 deg   48.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.60 m
Receiver height           :   1.50 m
```

```
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 6: Beacon
------------------------------
Car traffic volume  :  4365 veh/TimePeriod  *
Medium truck volume :    68 veh/TimePeriod  *
Heavy truck volume  :    68 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 6: Beacon
----------------------------
Angle1   Angle2           :  48.00 deg   68.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  32.60 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 7: Beacon
------------------------------
Car traffic volume  :  4365 veh/TimePeriod  *
Medium truck volume :    68 veh/TimePeriod  *
Heavy truck volume  :    68 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 7: Beacon
----------------------------
Angle1   Angle2           :  68.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.60 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Harvie
---------------------------

Source height = 1.26 m

ROAD (0.00 + 38.63 + 0.00) = 38.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -36   0.66  67.21   0.00 -11.58  -7.79   0.00  -9.20   0.00  38.63
-------------------------------------------------------------------------------
```

Segment Leq : 38.63 dBA

Results segment # 2: Harvie
---

Source height = 1.26 m

ROAD (0.00 + 45.98 + 0.00) = 45.98 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -36 | -15 | 0.66 | 67.21 | 0.00 | -11.58 | -9.64 | 0.00 | 0.00 | 0.00 | 45.98 |

Segment Leq : 45.98 dBA

Results segment # 3: Harvie
---

Source height = 1.26 m

ROAD (0.00 + 47.45 + 0.00) = 47.45 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -15 | 64 | 0.00 | 67.21 | 0.00 | -6.98 | -3.58 | 0.00 | -9.20 | 0.00 | 47.45 |

Segment Leq : 47.45 dBA

Results segment # 4: Harvie
---

Source height = 1.26 m

ROAD (0.00 + 42.63 + 0.00) = 42.63 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 90 | 0.00 | 67.21 | 0.00 | -6.98 | -8.40 | 0.00 | -9.20 | 0.00 | 42.63 |

Segment Leq : 42.63 dBA

Results segment # 5: Beacon
---

Source height = 1.11 m

ROAD (0.00 + 42.06 + 0.00) = 42.06 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | 48 | 0.66 | 59.89 | 0.00 | -5.60 | -2.19 | 0.00 | -10.04 | 0.00 | 42.06 |

Segment Leq : 42.06 dBA

Results segment # 6: Beacon
---

Source height = 1.11 m

ROAD (0.00 + 42.90 + 0.00) = 42.90 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 48 | 68 | 0.66 | 59.89 | 0.00 | -5.60 | -11.39 | 0.00 | 0.00 | 0.00 | 42.90 |

Segment Leq : 42.90 dBA

Results segment # 7: Beacon
---

Source height = 1.11 m

ROAD (0.00 + 37.35 + 0.00) = 37.35 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 68 | 90 | 0.00 | 59.89 | 0.00 | -3.37 | -9.13 | 0.00 | -10.04 | 0.00 | 37.35 |

Segment Leq : 37.35 dBA

Total Leq All Segments: 52.09 dBA

TOTAL Leq FROM ALL SOURCES: 52.09

Filename: 107amen.te Time Period: 16 hours
Description: South Amenity Area

Road data, segment # 1: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Harvie
---
Angle1 Angle2 : -90.00 deg -68.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 70.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Harvie
---
Angle1 Angle2 : -68.00 deg 16.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1
House density : 95 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 70.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Harvie
---
Car traffic volume : 17100 veh/TimePeriod *
Medium truck volume : 450 veh/TimePeriod *
Heavy truck volume : 450 veh/TimePeriod *
Posted speed limit : 50 km/h

```
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Harvie
----------------------------
Angle1   Angle2           :  16.00 deg   56.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  70.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Harvie
------------------------------
Car traffic volume  : 17100 veh/TimePeriod  *
Medium truck volume :   450 veh/TimePeriod  *
Heavy truck volume  :   450 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: Harvie
----------------------------
Angle1   Angle2           :  56.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 5: Beacon
------------------------------
Car traffic volume  :  4365 veh/TimePeriod  *
Medium truck volume :    68 veh/TimePeriod  *
Heavy truck volume  :    68 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 5: Beacon
----------------------------
Angle1   Angle2           : -90.00 deg   -6.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.80 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
```

```
Reference angle           :   0.00

Road data, segment # 6: Beacon
------------------------------
Car traffic volume  :  4365 veh/TimePeriod  *
Medium truck volume :    68 veh/TimePeriod  *
Heavy truck volume  :    68 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 6: Beacon
----------------------------
Angle1   Angle2           :  -6.00 deg   16.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  85.80 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 7: Beacon
------------------------------
Car traffic volume  :  4365 veh/TimePeriod  *
Medium truck volume :    68 veh/TimePeriod  *
Heavy truck volume  :    68 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 7: Beacon
----------------------------
Angle1   Angle2           :  16.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1
House density             :     95 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.80 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Harvie
---------------------------

Source height = 1.26 m

ROAD (0.00 + 51.39 + 0.00) = 51.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -68   0.00  67.21   0.00  -6.69  -9.13   0.00   0.00   0.00  51.39
-------------------------------------------------------------------------------
```

Segment Leq : 51.39 dBA

Results segment # 2: Harvie
---

Source height = 1.26 m

ROAD (0.00 + 47.94 + 0.00) = 47.94 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -68 | 16 | 0.00 | 67.21 | 0.00 | -6.69 | -3.31 | 0.00 | -9.27 | 0.00 | 47.94 |

Segment Leq : 47.94 dBA

Results segment # 3: Harvie
---

Source height = 1.26 m

ROAD (0.00 + 53.99 + 0.00) = 53.99 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 56 | 0.00 | 67.21 | 0.00 | -6.69 | -6.53 | 0.00 | 0.00 | 0.00 | 53.99 |

Segment Leq : 53.99 dBA

Results segment # 4: Harvie
---

Source height = 1.26 m

ROAD (0.00 + 35.83 + 0.00) = 35.83 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 56 | 90 | 0.66 | 67.21 | 0.00 | -11.11 | -11.01 | 0.00 | -9.27 | 0.00 | 35.83 |

Segment Leq : 35.83 dBA

Results segment # 5: Beacon
---

Source height = 1.11 m

ROAD (0.00 + 33.37 + 0.00) = 33.37 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -90 | -6 | 0.66 | 59.89 | 0.00 | -12.57 | -4.89 | 0.00 | -9.06 | 0.00 | 33.37 |

Segment Leq : 33.37 dBA

Results segment # 6: Beacon
---

Source height = 1.11 m

ROAD (0.00 + 43.19 + 0.00) = 43.19 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -6 | 16 | 0.00 | 59.89 | 0.00 | -7.57 | -9.13 | 0.00 | 0.00 | 0.00 | 43.19 |

Segment Leq : 43.19 dBA

Results segment # 7: Beacon
---

Source height = 1.11 m

ROAD (0.00 + 32.57 + 0.00) = 32.57 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 90 | 0.66 | 59.89 | 0.00 | -12.57 | -5.70 | 0.00 | -9.06 | 0.00 | 32.57 |

Segment Leq : 32.57 dBA

Total Leq All Segments: 56.81 dBA

TOTAL Leq FROM ALL SOURCES: 56.81

```
STAMSON 5.0        NORMAL REPORT        Date: 10-09-2021 20:10:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 107h400.te           Time Period: Day/Night 16/8 hours
Description: Highway 400 at 4th floor of Apt


Road data, segment # 1: Hwy 400 (day/night)
-------------------------------------------
Car traffic volume  : 94530/47258 veh/TimePeriod  *
Medium truck volume :  2363/1181  veh/TimePeriod  *
Heavy truck volume  : 10527/5263  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT): 120600
    Percentage of Annual Growth        :   1.95
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.20
    Heavy Truck  % of Total Volume     :   9.80
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 1: Hwy 400 (day/night)
-----------------------------------------
Angle1   Angle2           : -45.00 deg   40.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :  11.90 / 11.90  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy 400 (day)
----------------------------------

Source height = 1.77 m

ROAD (0.00 + 60.50 + 0.00) = 60.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45     40   0.34  84.30   0.00 -20.41  -3.40   0.00   0.00   0.00  60.50
-------------------------------------------------------------------------------

Segment Leq : 60.50 dBA

Total Leq All Segments: 60.50 dBA

Results segment # 1: Hwy 400 (night)
------------------------------------
```

Source height = 1.77 m

ROAD (0.00 + 60.50 + 0.00) = 60.50 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 40 | 0.34 | 84.30 | 0.00 | -20.41 | -3.40 | 0.00 | 0.00 | 0.00 | 60.50 |

Segment Leq : 60.50 dBA

Total Leq All Segments: 60.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.50
(NIGHT): 60.50

**ESTIMATED ADJUSTMENT FOR SOURCE-RECEIVER DISTANCE = 860 m**

**The separation distance to Highway 400 exceeds the 500 m limit in Stamson. The above sound level predictions were carried out at the 500 m limit and manually reduced as follows:**

**delta dBA=10*(1+alpha)*log (500/D).**

**for D=860 and alpha=0.34, delta dBA=-3.16**

**Therefore, the estimated sound level contribution from the highway is 57.34 dBA day and night at the 4$^{th}$ floor receptor at the SE corner of the Apartment on Block A.**

```
STAMSON 5.0        NORMAL REPORT        Date: 10-09-2021 21:03:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 107h4003.te          Time Period: Day/Night 16/8 hours
Description: Highway 400 at 3rd floor – Block A-2


Road data, segment # 1: Hwy 400 (day/night)
-------------------------------------------
Car traffic volume  : 94530/47258 veh/TimePeriod  *
Medium truck volume :  2363/1181  veh/TimePeriod  *
Heavy truck volume  : 10527/5263  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT): 120600
    Percentage of Annual Growth        :   1.95
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.20
    Heavy Truck  % of Total Volume     :   9.80
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 1: Hwy 400 (day/night)
-----------------------------------------
Angle1   Angle2           : -45.00 deg   40.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy 400 (day)
----------------------------------

Source height = 1.77 m

ROAD (0.00 + 58.43 + 0.00) = 58.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45     40   0.47  84.30   0.00 -22.42  -3.46   0.00   0.00   0.00  58.43
-------------------------------------------------------------------------------

Segment Leq : 58.43 dBA

Total Leq All Segments: 58.43 dBA
```

Results segment # 1: Hwy 400 (night)
---

Source height = 1.77 m

ROAD (0.00 + 58.43 + 0.00) = 58.43 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 40 | 0.47 | 84.30 | 0.00 | -22.42 | -3.46 | 0.00 | 0.00 | 0.00 | 58.43 |

Segment Leq : 58.43 dBA

Total Leq All Segments: 58.43 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.43
(NIGHT): 58.43

**ESTIMATED ADJUSTMENT FOR SOURCE-RECEIVER DISTANCE = 970 m**

**The separation distance to Highway 400 exceeds the 500 m limit in Stamson. The above sound level predictions were carried out at the 500 m limit and manually reduced as follows:**

**delta dBA=10*(1+alpha)*log (500/D).**

**for D=970 and alpha=0.47, delta dBA=-4.23**

**Therefore, the estimated sound level contribution from the highway is 54.20 dBA day and night at the second floor receptor on Lot 1.**

```
STAMSON 5.0        NORMAL REPORT        Date: 10-09-2021 20:45:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 107h4002.te          Time Period: Day/Night 16/8 hours
Description: Highway 400 at 2nd floor – Lot 1


Road data, segment # 1: Hwy 400 (day/night)
-------------------------------------------
Car traffic volume  : 94530/47258 veh/TimePeriod  *
Medium truck volume :  2363/1181  veh/TimePeriod  *
Heavy truck volume  : 10527/5263  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT): 120600
    Percentage of Annual Growth        :   1.95
    Number of Years of Growth          :  15.00
    Medium Truck % of Total Volume     :   2.20
    Heavy Truck  % of Total Volume     :   9.80
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 1: Hwy 400 (day/night)
-----------------------------------------
Angle1   Angle2           : -45.00 deg   40.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy 400 (day)
----------------------------------

Source height = 1.77 m

ROAD (0.00 + 57.02 + 0.00) = 57.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45     40   0.56  84.30   0.00 -23.79  -3.49   0.00   0.00   0.00  57.02
-------------------------------------------------------------------------------

Segment Leq : 57.02 dBA

Total Leq All Segments: 57.02 dBA

Results segment # 1: Hwy 400 (night)
------------------------------------
```

Source height = 1.77 m

ROAD (0.00 + 57.02 + 0.00) = 57.02 dBA

| Angle1 | Angle2 | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj | B.Adj | SubLeq |
|---|---|---|---|---|---|---|---|---|---|---|
| -45 | 40 | 0.56 | 84.30 | 0.00 | -23.79 | -3.49 | 0.00 | 0.00 | 0.00 | 57.02 |

Segment Leq : 57.02 dBA

Total Leq All Segments: 57.02 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.02
(NIGHT): 57.02

**ESTIMATED ADJUSTMENT FOR SOURCE-RECEIVER DISTANCE = 860 m**

**The separation distance to Highway 400 exceeds the 500 m limit in Stamson. The above sound level predictions were carried out at the 500 m limit and manually reduced as follows:**

**delta dBA=10*(1+alpha)*log (500/D).**

**for D=860 and alpha=0.56, delta dBA=-3.67**

**Therefore, the estimated sound level contribution from the highway is 53.35 dBA day and night at the second floor receptor on Lot 1.**

ASA Development
Harvie & Beacon
Predicted Sound Levels including Estimated Hwy 400 Traffic Noise

| Receptor Location | Harvie | | Beacon | | Total Harvie + Beacon | | Highway 400 | | Overall Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | D | N | D | N | D | N | D* | N* | D | N |
| Blk A Apt SE Corner 4th flr | 63.99 | 57.46 | 57.44 | 51.05 | 64.86 | 58.35 | 57.34 | 57.34 | 65.57 | 60.89 |
| Blk A Apt SW Corner 4th flr | 63.99 | 57.46 | 46.30 | 39.91 | 64.06 | 57.54 | 57.34 | 57.34 | 64.90 | 60.45 |
| Block A-2 3rd floor | 60.18 | 53.65 | | | 60.18 | 53.65 | 54.20 | 54.20 | 61.16 | 56.94 |
| Lot 1 2nd floor | 54.00 | 51.99 | 57.71 | 51.31 | 59.25 | 54.67 | 53.35 | 53.35 | 60.24 | 57.07 |

* without shielding

# APPENDIX ‘C’

## SAMPLE ACOUSTIC INSULATION FACTOR CALCULATIONS

**Building Component Design - R. Bouwmeester & Associates**

Project: Harvie & Beacon
Location: Apartment Building - SE Apt
RBA File: A21007
Date: September 2021

**STEP 1** **Day-time Noise Level at 4th Floor Window (dBA)**

| Source | North Wall 1 | South Wall 2 | East Wall 3 | West Wall 4 |
|---|---|---|---|---|
| Harvie | | 63.99 | 60.99 | |
| Beacon | | 54.44 | 57.44 | |
| Hwy 400 | | 54.34 | 57.34 | |
| Combined | | 65 | 64 | |
| Shielding | | (incl. in the above) | | |
| Resultant | | 65 | 64 | |

**STEP 2** Number of wall components *

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Total No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Comp. |
| BR | | | | 1 | 1 | | 1 | 1 | | | | | 4 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

*Walls not incl when actual AIF more than 10 greater than required, or when dBA < 55.

**STEP 3** Find AIF from Table 10.5

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | | 33 | 32 | |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 4** AIF adjustment for source geometry

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| Angle Range | | 0-90 | 0-90 | |
| Adjustment | | 0 | 0 | |

**STEP 5** **Required AIF**

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | | 33 | 32 | |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 1** Component areas

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Room Flr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Area |
| BR | | | | 0.25 | 0.8 | | 0.25 | 0.8 | | | | | 1.0 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

**STEP 2** Component percentages

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | | | | 25% | 80% | | 25% | 80% | | | | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 3** Component Selection

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | | | | 3(25)3 | EW2 | | 3(20)3 | EW1 | | | | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 4** **Actual AIF**

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | | | | 33 | 34 | | 32 | 32 | | | | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**Building Component Design - R. Bouwmeester & Associates**

Project: Harvie & Beacon
Location: Apartment Building - NE Apt
RBA File: A21007
Date: September 2021

**STEP 1** **Day-time Noise Level at 4th Floor Window (dBA)**

| Source | North<br>Wall 1 | South<br>Wall 2 | East<br>Wall 3 | West<br>Wall 4 |
|---|---|---|---|---|
| Harvie | 48.99 | | 60.99 | |
| Beacon | 54.44 | | 57.44 | |
| Hwy 400 | 54.34 | | 57.34 | |
| Combined | 58 | | 64 | |
| Shielding | | (incl.in the above) | | |
| Resultant | 58 | | 64 | |

**STEP 2** Number of wall components *

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Total No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Comp. |
| BR | 1 | 1 | | | | | 1 | 1 | | | | | 4 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

*Walls not incl when actual AIF more than 10 greater than required, or when dBA < 55.

**STEP 3** Find AIF from Table 10.5

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | 26 | | 32 | |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 4** AIF adjustment for source geometry

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| Angle Range | 0-90 | | 0-90 | |
| Adjustment | | 0 | 0 | |

**STEP 5** **Required AIF**

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | 26 | | 32 | |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 1** Component areas

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Room Flr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Area |
| BR | 0.25 | 0.8 | | | | | 0.25 | 0.8 | | | | | 1.0 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

**STEP 2** Component percentages

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | 25% | 80% | | | | | 25% | 80% | | | | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 3** Component Selection

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | 3(6)3 | EW1 | | | | | 3(20)3 | EW1 | | | | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 4** **Actual AIF**

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | 29 | 32 | | | | | 32 | 32 | | | | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**Building Component Design - R. Bouwmeester & Associates**

Project: Harvie & Beacon
Location: Apartment Building - SW Apt
RBA File: A21007
Date: September 2021

**STEP 1** **Day-time Noise Level at 4th Floor Window (dBA)**

| Source | North Wall 1 | South Wall 2 | East Wall 3 | West Wall 4 |
|---|---|---|---|---|
| Harvie | | 63.99 | | 60.99 |
| Beacon | | 54.44 | | 42.34 |
| Hwy 400 | | 54.34 | | 42.34 |
| Combined | | 65 | | 61 |
| Shielding | | (incl.in the above) | | |
| Resultant | | 65 | | 61 |

**STEP 2** Number of wall components *

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Total No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Comp. |
| BR | | | | 1 | 1 | | | | | 1 | 1 | | 4 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

*Walls not incl when actual AIF more than 10 greater than required, or when dBA < 55.

**STEP 3** Find AIF from Table 10.5

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | | 33 | | 29 |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 4** AIF adjustment for source geometry

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| Angle Range | | 0-90 | | 0-90 |
| Adjustment | | 0 | | 0 |

**STEP 5** **Required AIF**

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | | 33 | | 29 |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 1** Component areas

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Room Flr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Area |
| BR | | | | 0.25 | 0.8 | | | | | 0.25 | 0.8 | | 1.0 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

**STEP 2** Component percentages

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | | | | 25% | 80% | | | | | 25% | 80% | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 3** Component Selection

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | | | | 3(25)3 | EW2 | | | | | 3(6)3 | EW1 | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 4** **Actual AIF**

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | | | | 33 | 34 | | | | | 29 | 32 | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**Building Component Design - R. Bouwmeester & Associates**

Project: Harvie & Beacon
Location: Apartment Building - NW Apt
RBA File: A21007
Date: September 2021

**STEP 1** **Day-time Noise Level at 4th Floor Window (dBA)**

| Source | North Wall 1 | South Wall 2 | East Wall 3 | West Wall 4 |
|---|---|---|---|---|
| Harvie | 48.99 | | | 60.99 |
| Beacon | 54.44 | | | 42.34 |
| Hwy 400 | 54.34 | | | 42.34 |
| Combined | 58 | | | 61 |
| Shielding | (incl.in the above) | | | |
| Resultant | 58 | | | 61 |

**STEP 2** Number of wall components *

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Total No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Comp. |
| BR | 1 | 1 | | | | | | | | 1 | 1 | | 4 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

*Walls not incl when actual AIF more than 10 greater than required, or when dBA < 55.

**STEP 3** Find AIF from Table 10.5

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | 26 | | | 29 |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 4** AIF adjustment for source geometry

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| Angle Range | 0-90 | | | 0-90 |
| Adjustment | 0 | | | 0 |

**STEP 5** **Required AIF**

| | WALL 1 | WALL 2 | WALL 3 | WALL 4 |
|---|---|---|---|---|
| BR | 26 | | | 29 |
| K | | | | |
| Bath | | | | |
| Lndy | | | | |

**STEP 1** Component areas

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | | Room Flr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Area |
| BR | 0.25 | 0.8 | | | | | | | | 0.25 | 0.8 | | 1.0 |
| K | | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | | |

**STEP 2** Component percentages

| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | 25% | 80% | | | | | | | | 25% | 80% | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 3** Component Selection

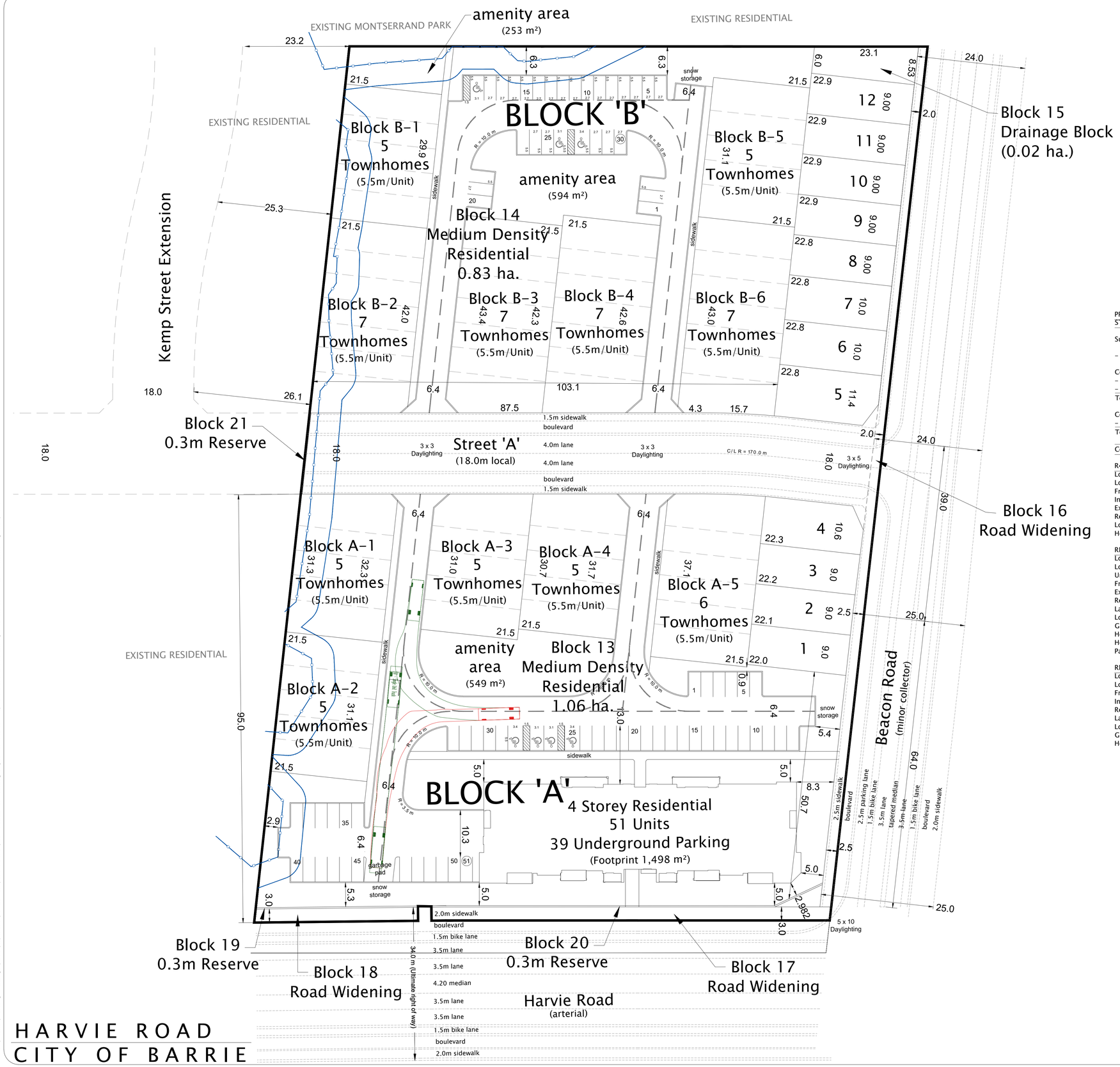
| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | 3(6)3 | EW1 | | | | | | | | 3(6)3 | EW1 | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

**STEP 4** **Actual AIF**

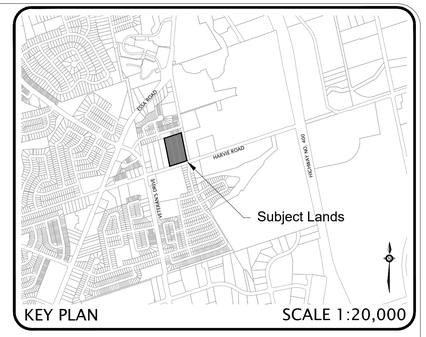
| | WALL 1 | | | WALL 2 | | | WALL 3 | | | WALL 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr | Wi | Wa | Dr |
| BR | 29 | 32 | | | | | | | | 29 | 32 | |
| K | | | | | | | | | | | | |
| Bath | | | | | | | | | | | | |
| Lndy | | | | | | | | | | | | |

# APPENDIX ‘D’

## BACKGROUND PLANS




HARVIE ROAD
CITY OF BARRIE




# Concept Plan

Surveyor's Real Property Report
Part 1 Plan of Survey of Lots 2, 3, 4, 5, 6 and 7
Registered Plan 1200 City of Barrie
(Geographic Township of Innisfil)
County of Simcoe
2021

PRELIMINARY STATISTICS

| | | |
|---|---|---|
| Subject Lands Area | 2.48 ha. | |
| - Freehold Singles (1 - 12) | 12 units | |
| Condominium Block 'A' Area | 1.06 ha. | |
| - 4 Storey Residential | 50 units | |
| - Townhomes (A-1 - A-5) | 27 units | |
| Total Block 'A' | 77 units | |
| Condominium Block 'B' Area | 0.83 ha. | |
| - Townhomes (B-1 - B-6) | 38 units | |
| Total Block 'B' | 38 units | |
| Combined Total Units | 127 units | |

| R4 (Single Lots 1 - 12) | Required | Provided |
|---|---|---|
| Lot Area (min.) | 335 m² | 198 m² * |
| Lot Frontage (min.) | 10.0 m | 9.0 m * |
| Front Yard (min.) | 4.5 m | 5.5 m min. |
| Interior Side Yard | 1.2 m | >0.6 m |
| Exterior Side Yard | 3.0 m | 2.0 m * |
| Rear Yard | 7.0 m | 3.2 m * |
| Lot Coverage (max) | 45 % | <45 m² |
| Height (max.) | 10.0 m | <10.0 m |

| RM2 Block A | Required | Provided |
|---|---|---|
| Lot Area (min.) | 720 m² | 1.06 ha. |
| Lot Frontage (min.) | 21.0 m | 50.7 m |
| Unit Frontage (min.) | 4.5 m | 5.5 m |
| Front Yard (min.) | 7.0 m | 5.0 m * |
| Exterior Side Yard | 3.0 m | 1.8 m * |
| Rear Yard | 7.0 m | 5.0 m * |
| Landscaped Area (min.) | 35 % | >35 m² |
| Lot Coverage (max) | 45 % | <45 m² |
| Gross Floor Area (max.) | 60 % | 60 % |
| Height (max.) - Townhome | 10.0 m | <10 m |
| Height (max.) - Apartment | 10.0 m | <13 m |
| Parking Setback | 3.0 m | 0.9 m * |

| RM2 Block B | Required | Provided |
|---|---|---|
| Lot Area (min.) | 720 m² | 0.83 ha. |
| Lot Frontage (min.) | 21.0 m | 103.1 m |
| Front Yard (min.) | 4.5 m | 2.0 m * |
| Interior Side Yard | 1.8 m | 5.0 m |
| Rear Yard | 7.0 m | 8.6 m |
| Landscaped Area (min.) | 35 % | >35 m² |
| Lot Coverage (max) | 45 % | <45 m² |
| Gross Floor Area (max.) | 60 % | 60 % |
| Height (max.) | 10.0 m | <10 m |

Private Amenity Calculations

| | | |
|---|---|---|
| Block 'A' | | |
| 12 m² / Unit (77 Units) | 924 m² | 1,770 m² |
| Amenity Area | | 549 m² |
| Private Lot Amenity | | 715 m² |
| Private Balcony Amenity | | 506 m² |
| Sub Total | | 1,770 m² |
| Block 'B' | | |
| 12 m² / Unit (38 Units) | 456 m² | 1,892 m² |
| Amenity Area | | 847 m² |
| Private Lot Amenity | | 1,045 m² |
| Sub Total | | 1,892 m² |
| Combined Totals ('A' & 'B') | | |
| 12 m² / Unit (115 Units) | 1,380 m² | 1,770 m² |
| Amenity Area | | 1,396 m² |
| Private Lot Amenity | | 1,760 m² |
| Private Balcony Amenity | | 506 m² |
| Sub Total | | 3,662 m² |

Parking Calculations

Required Parking (1.5/Unit)

| | | |
|---|---|---|
| Freehold Singles | 18 spaces | 24 spaces |
| - 12 Driveway spaces | | |
| - 12 Garage spaces | | |
| 24 Total Freehold spaces | | |
| Block 'A' (77 units) | 116 spaces | 142 spaces |
| - 26 unit spaces | | |
| - 26 unit garage spaces | | |
| - 47 on street spaces | | |
| - 4 on street barrier free spaces | | |
| (2 @ Type A (3.4 m) | | |
| (2 @ Type B (3.1 m) | | |
| - 38 undergound typical spaces | | |
| - 1 underground barrier free space | | |
| 142 Total spaces Block 'A' | | |
| Block 'B' (38 units) | 57 spaces | 106 spaces |
| - 38 unit spaces | | |
| - 38 unit garage spaces | | |
| - 27 on street spaces | | |
| - 3 Barrier Free Spaces | | |
| (1 @ Type A (3.4 m) | | |
| (2 @ Type B (3.1 m) | | |
| 106 Total spaces Block 'B' | | |
| Total Required & Provided | 191 spaces | 272 spaces |

Fire Route — — —

NOTE
* Indicates a zoning by-law amendment is required.

Tree Preservation Fence as per JD Bell Landscape Architect.
Tree Preservation Fence 5.0m Buffer Limit.

0 5 10 20 30M
SCALE 1 : 400 (A1)

HARVIE ROAD
CONCEPT PLAN

Raymond J. Duhaime
REGISTERED PROFESSIONAL PLANNER
R.P.P.

| | |
|---|---|
| Date Issued: | AUG. 31, 2021 |
| Checked By: | RD |
| Project No.: | ASA-20533 |
| Drawn By: | m.c.r. |
| Drawing Name: | ASA-20533-CP-19.dwg |

JONES
CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Drive East, Unit 1, Barrie, Ontario, L4N 0W5
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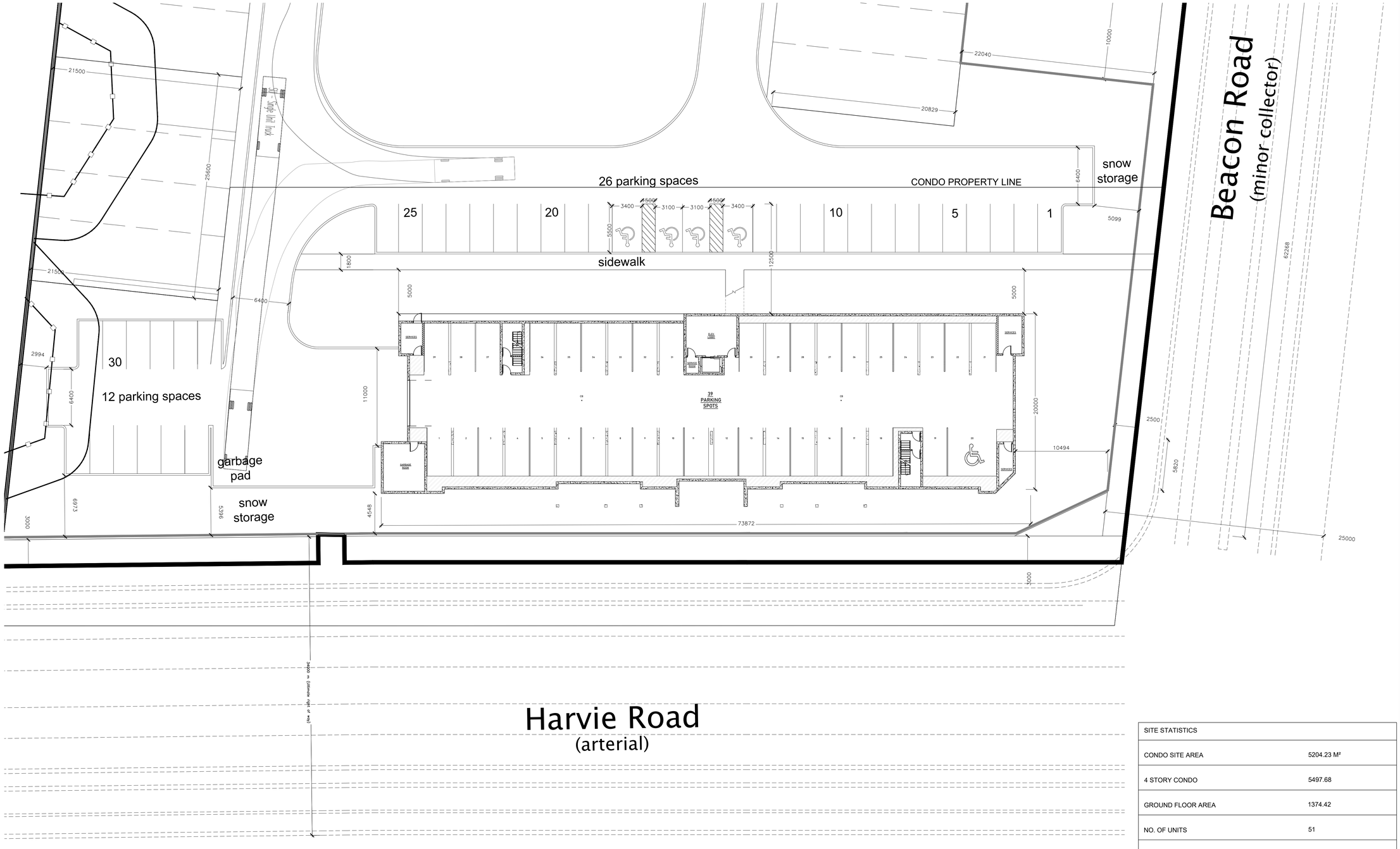


U/G PARKING PLAN 1:200

| SITE STATISTICS | |
|---|---|
| CONDO SITE AREA | 5204.23 M² |
| 4 STORY CONDO | 5497.68 |
| GROUND FLOOR AREA | 1374.42 |
| NO. OF UNITS | 51 |
| PARKING GARAGE | 39 |
| PARKING OUTSIDE | 38 |
| FRONT YARD (BEACON) | 10.494M |
| EXT. SIDE YARD (HARVIE) | 4.548M |


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E: ian@ismarchitects.ca


| No. | ISSUE/ REVISION | DATE |
|---|---|---|
| 1. | SUBMISSION & REZONE | 2021.06.28 |

STAMP
ONTARIO ASSOCIATION OF ARCHITECTS
IAN S. MALCOLM
LICENCE
2853

ORIENTATION
NORTH

CLIENT
ASA DEVELOPMENT INC.
ABDALLAH ASSAF

PROJECT
108 116 122 HARVIE ROAD.
BARRIE

PROJECT INFORMATION

| | |
|---|---|
| PROJECT No.: | 204158 |
| DRAWN BY: | AF |
| CHECKED BY: | ISM |
| DATE: | 28.06.2021 |
| SCALE: | AS NOTED |

DRAWING
U/G PARKING PLAN

DRAWING No.
A100


## SECOND FLOOR PLAN 1:200


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ORIENTATION
HARVIE

CLIENT
ASA DEVELOPMENT INC.
ABDALLAH ASSAF

PROJECT
108 116 122 HARVIE ROAD.
BARRIE

PROJECT INFORMATION

| | |
|---|---|
| PROJECT No.: | 204158 |
| DRAWN BY: | AF |
| CHECKED BY: | ISM |
| DATE: | 28.06.2021 |
| SCALE: | AS NOTED |

DRAWING
SECOND FLOOR PLAN 13 UNITS
THIRD FLOOR PLAN 13 UNITS
FOURTH FLOOR PLAN 13 UNITS

DRAWING No.
A201


SOUTH ELEVATION 1:100 VIEW FROM HARVIE ROAD

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2853

ORIENTATION
NORTH

CLIENT
ASA DEVELOPMENT INC.
ABDALLAH ASSAF

PROJECT
108 116 122 HARVIE ROAD.
BARRIE

PROJECT INFORMATION

| | |
|---|---|
| PROJECT No.: | 204158 |
| DRAWN BY: | AF |
| CHECKED BY: | ISM |
| DATE: | 01.06.2021 |
| SCALE: | AS NOTED |

DRAWING
SOUTH ELEVATION

DRAWING No.
A301


NORTH ELEVATION 1:100

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| 1. | SUBMISSION & REZONE | 2021.06.28 |

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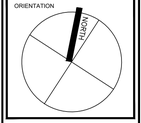
2853

ORIENTATION




CLIENT

ASA DEVELOPMENT INC.
ABDALLAH ASSAF

PROJECT

108 116 122 HARVIE ROAD.
BARRIE

PROJECT INFORMATION

| | |
|---|---|
| PROJECT No.: | 204158 |
| DRAWN BY: | AF |
| CHECKED BY: | ISM |
| DATE: | 01.06.2021 |
| SCALE: | AS NOTED |

DRAWING

NORTH ELEVATION

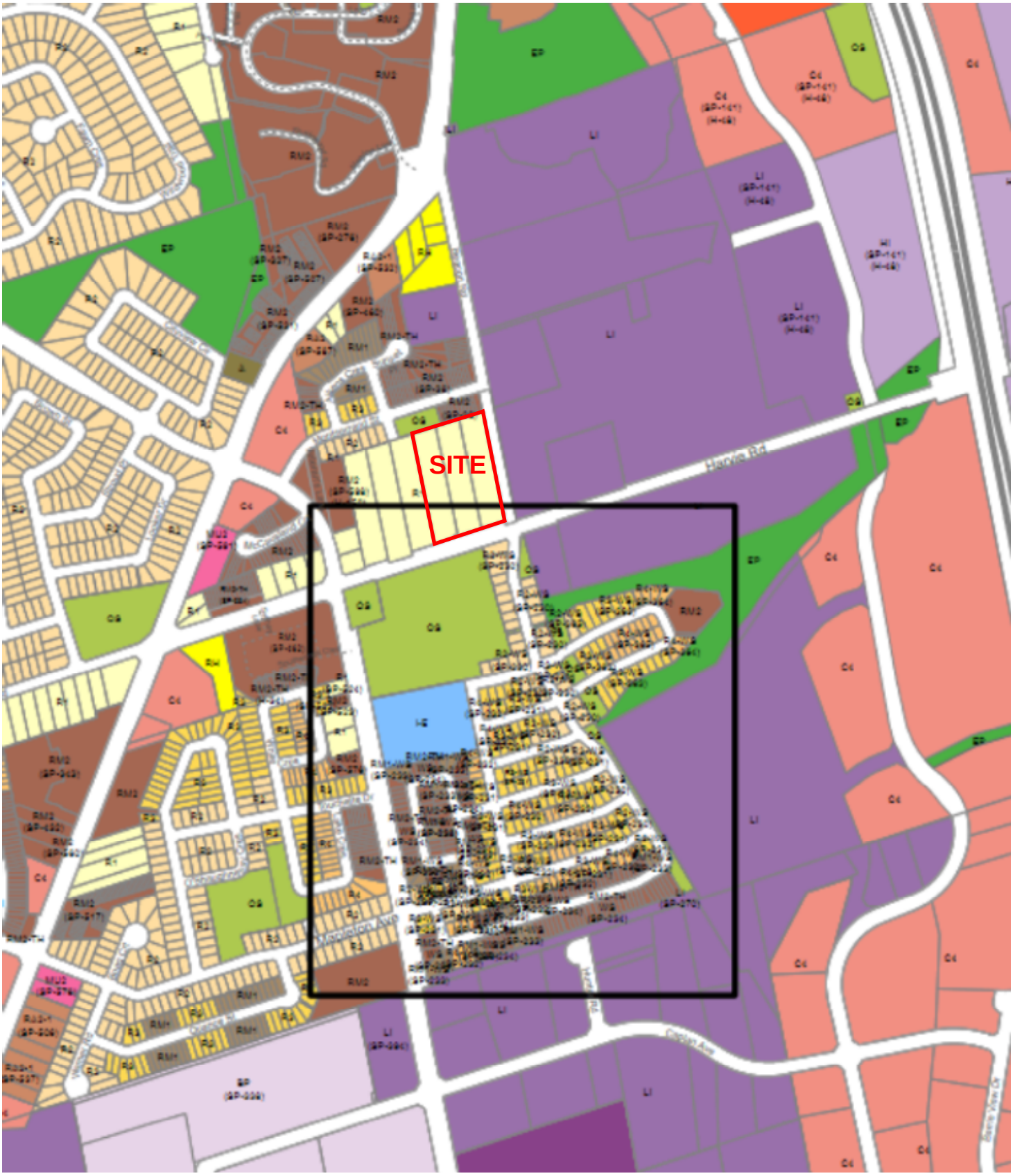
DRAWING No.

A302

# APPENDIX 'E'

## ZONING INFO

(Source: City of Barrie Zoning By-Law 2009-141)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