TRAFFIC NOISE IMPACT STUDY
Proposed Road Widening
Municipal Class Environmental Assessment

"Huronia Road"
From Yonge Street to Lockhart Road
City of Barrie

Prepared for:
The Corporation of the City of Barrie

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EXECUTIVE SUMMARY

R. BOUWMEESTER & ASSOCIATES has been retained by the City of Barrie to assess the impact of future traffic noise on existing properties resulting from the proposed widening of Huronia Road between Yonge Street and Lockhart Road (the south city limits). The project is subject to a Municipal Class Environmental Assessment.

The goals and objectives of this study are five-fold, namely:
1. Establish noise criteria.
2. Identify noise sources and existing noise-sensitive receptors.
3. Estimate the increase in traffic noise levels at existing noise-sensitive receptors due to the proposed road improvements.
4. Determine the need for mitigation to protect existing noise-sensitive receptors.
5. Recommend mitigation measures if, and where, required.

The noise source of concern for this project is road noise resulting from increased future traffic on Huronia Road.

Roadway noise from both cars and trucks (medium and heavy) has been accounted for in this analysis. Our analysis is based on traffic volumes projected to Year 2017 providing the 10-year window as required by the MOE.

Although noise levels along Huronia Road between Yonge Street and Lockhart Road are expected to increase as a result of the proposed road widening, the predicted noise levels and noise level increases are not sufficient to warrant noise mitigation under the noise policies and protocol established by the MOE/MTO for provincial highway and freeway (re-) construction projects. There are predicted slight noise level excesses in a few locations, however, they are not sufficient to warrant noise mitigation measures.

In summary, the predicted traffic noise levels and noise level increases within the Study Area due to the proposed road improvements are not sufficient to warrant noise mitigation measures.
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1. **INTRODUCTION**

R. BOUWMEESTER & ASSOCIATES has been retained by the City of Barrie to assess the impact of future traffic noise on existing properties resulting from the proposed widening of Huronia Road between Yonge Street and Lockhart Road (the south city limits). The project is subject to a Municipal Class Environmental Assessment (EA). See Figure 1 for site location and Study Area.

The Study Area (see Location Plan, Figure 1) generally consists of a 300 m wide strip of land centred on Huronia Road running south from Yonge Street to the City’s south limit at Lockhart Road. Nearly one-half of the Study Area frontage is zoned Industrial; about one-quarter is zoned Residential. The balance is zoned Agricultural, Commercial, Open Space, and Environmental Protection. See Zoning Map, Figure 2.

Properties zoned Residential and used as principal residences are the focus of this noise assessment. This ensures that mitigation efforts and funds are directed to areas of greatest need (i.e. principal residences). Notwithstanding the above, existing residential uses in areas designated and zoned for other purposes (e.g. Industrial) are also considered in this assessment. Accordingly, the highest priority is given to properties zoned Residential, followed by those in other zones that are used for residential purposes. The noise impact on non-residential land uses is not addressed in this analysis.

It is noted that there are no provincial noise criteria that apply to the (re-)construction of municipal roads. This is unlike the (re-)construction of provincial highways and freeways, and it is unlike new residential development along existing or planned future roads. As a result, this study draws from provincial noise guidelines and criteria related to highway projects and new residential development projects.

2. **GOALS AND OBJECTIVES**

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

1. Establish noise criteria.
2. Identify noise sources and existing noise-sensitive receptors.
3. Estimate the increase in traffic noise levels at existing noise-sensitive receptors due to the proposed road improvements.
4. Determine the need for mitigation to protect existing noise-sensitive receptors.
5. Recommend mitigation measures if, and where, required.

3. **NOISE SOURCES**

The noise source of concern for this project is road noise resulting from increased future vehicular traffic on Huronia Road within the Study Area resulting from the proposed road improvements. Noise sources include both car and truck (medium and heavy) traffic.

No change is proposed in the location of the centreline of the road, therefore, sound levels will not be influenced by reduced separation distances. (It is noted that separation distance is defined as the distance between centreline and receptor. Higher noise levels
from traffic on the near side of centreline are generally offset by lower levels from that on
the far side. Assuming an even directional split in daily traffic, average noise levels are
assumed to originate from traffic along centreline.) However, future traffic noise levels
will be influenced by changes in traffic volumes.

The traffic data used in this analysis were derived from a report entitled Huronia Road
Traffic Study by Read, Voorhees & Associates Limited (RVA) dated June 2006. This
study provided current traffic data (based on counts in 2003 and 2004) together with Year
2021 projections under both existing (i.e. “do nothing”) and proposed conditions.

Traffic speeds are based on the speed limits provided by RVA in the report noted above. 
(In some cases they differ from those contained in City By-Law 2002-191 and from those
posted; in addition, we note that some of those posted currently differ from the by-law.)

4. GUIDELINES AND CRITERIA

As noted above, there are no specific noise criteria that apply in the case of a municipal
road (re-)construction project adjacent to existing noise-sensitive land uses. The MOE’s
Noise Assessment Criteria in Land Use Planning (Publication LU-131, dated October
1997) relates to the assessment of traffic noise in new developments, and the MOE’s
Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban) (Publication
NPC-205, October 1995) governs the assessment of new sources of stationary noise (e.g.
commercial and industrial operations) that may impact existing (or zoned) noise-sensitive
land uses. Neither applies in this case.

The MOE and the Ontario Ministry of Transportation (MTO) have developed a protocol
(A Protocol for Dealing With Noise Concerns During the Preparation, Review and
Evaluation of Provincial Highways Environmental Assessments, February 1986) for
assessing and dealing with the impact of noise from new or improved provincial
highways and freeways on existing noise-sensitive land uses. This protocol does not
apply in this case since it does not apply to municipal road projects. It is noted that the
protocol requires noise controls only if the predicted noise level, due to the proposed road
improvements and based on ten-year traffic projections, increases by more than 5 dBA.

The MTO issued Ministry Directive A-1 (Noise Policy and Acoustic Standards for
Provincial Highways, July 1978) which was revised in August 1987 to reflect the
requirements of the 1986 MOE/MTO protocol. This directive documents the MTO’s
policy for investigating and controlling provincial highway noise and its effect on
adjacent residential areas. It also establishes warrants for noise control measures.

Although our assessment takes into account the above principles (the Protocol and the
Noise Policy) adopted by the Province for provincial road construction projects through
existing noise-sensitive areas, we will also take into account reasonable noise levels that
can be expected, and which are normally accepted, in a developing urban environment
based on the criteria in LU-131. Although none of these strictly apply in this case, the
results will be readily comparable to generally accepted standards and they will allow us
to assess the potential impacts and to make reasonable recommendations for mitigation.
4.1 MOE Publication LU-131

In the case of new residential development, the LU-131 noise limits are:

- **Indoor Sound Level Limits**  
  Equivalent Sound Level \( L_{eq} \)
  - Bedrooms (2300 to 0700 hours)  40 dBA
  - Living Rooms (0700 to 2300 hours)  45 dBA

Indoor levels are derived from the outdoor levels less 10 dB.

- **Day-time Outdoor Sound Level Limits**
  - 0700 to 2300 hours  55 dBA

The above-noted sound level limits are explained in further detail as follows:

4.1.1 Indoor Sound Levels

The MOE guidelines indicate that "control measures are not required if the \( L_{eq} \) (8 hour) night-time sound level in the plane of a bedroom window is less than or equal to 50 dBA", and "control measures are not required if the \( L_{eq} \) (16 hour) day-time sound level in the plane of a living/dining room window is less than or equal to 55 dBA".

4.1.1.1 Ventilation Requirements

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

- For outdoor night-time sound levels in the plane of a bedroom window greater than 50 dBA and less than or equal to 60 dBA, dwelling units should be equipped with forced air heating systems with ducting sized for the future installation of central air conditioning. Wall and window components meeting normal Ontario Building Code requirements are typically adequate under these conditions, although a warning clause must be registered on title against the affected lots.

- For outdoor night-time sound levels in the plane of a bedroom window greater than 60 dBA, dwelling units must be equipped with central air conditioning. A warning clause must be registered on title against the affected lots.

Ventilation requirements under day-time conditions are applied to the plane of a living/dining room window and are similar to the above except that 55 dBA and 65 dBA are used in place of 50 dBA and 60 dBA, respectively.

4.1.1.2 Building Component Requirements

In the case of noise from road traffic, special building component design is required when the night-time sound level outside bedroom windows exceeds 60
dBA, or if the day-time sound level outside living/dining room windows exceeds 65 dBA. Building components including windows, walls and doors must then be designed so that the indoor sound levels meet the sound level limits given above.

4.1.2 Outdoor Sound Levels

The above-noted outdoor limit of 55 dBA applies to a protected Outdoor Living Area (OLA) of at least 56m² (600 sq. ft.) in the case of single family detached homes, 47m² (500 sq. ft.) in the case of semi-detached units, and 37m² (400 sq. ft.) in the case of row or townhouse units.

The MOE guidelines indicate that "if the sound level, Leq, in the Outdoor Living Area is less than or equal to 55 dBA, no control measures are required".

The MOE recommends that if the sound level is greater than 55 dBA and less than or equal to 60 dBA, "physical control measures may be applied to reduce the sound level to 55 dBA. If no physical measures are provided, prospective purchasers or tenants shall be made aware of potential noise problems by a suitable warning clause".

The guidelines further state that, "If the sound level in the Outdoor Living Area is greater than 60 dBA, control measures are required to reduce the level to 55 dBA." Acoustic barriers typically provide the mitigation needed, and warning clauses are required to be registered on title against the affected lots.

The above sound level limits and mitigation requirements are summarized below:

**TABLE 1 – LU-131 Sound Level Limits & Mitigation Requirements**

<table>
<thead>
<tr>
<th>Outdoor Sound Level Limits (dBA)</th>
<th>Indoor (day)</th>
<th>Indoor (night)</th>
<th>OLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do nothing</td>
<td>&lt;=55</td>
<td>&lt;=50</td>
<td>&lt;=55</td>
</tr>
<tr>
<td>Fence* or warning clause</td>
<td>56 - 65</td>
<td>51 - 60</td>
<td>56 - 60</td>
</tr>
<tr>
<td>Mandatory fence *</td>
<td>&gt;65</td>
<td>&gt;60</td>
<td>&gt;60</td>
</tr>
</tbody>
</table>

* Note: Warning clauses are required in these cases.

While the future development of existing vacant lands (and the re-development of non-vacant lands) will have to comply with the LU-131 requirements described above, we note that the subject assessment applies only to existing noise-sensitive land uses. As indicated earlier, this study is intended to determine the increase in traffic noise levels at existing noise-sensitive receptors as a direct result of the subject road improvements.

In the case of existing dwellings, there is no opportunity to require central air
conditioning (A/C), special building component design, or warning clauses on
title. Where warranted, however, outdoor living areas (OLA) can be protected by
installing acoustic barriers.

Refer to Noise Level Plan, Figure 4, for a graphical representation of the lands
affected by the above sound level limits during the day-time period.

4.2 MOE/MTO Protocol

The MOE/MTO Protocol includes general provisions, and provisions related to
construction noise as summarized below. These relate to provincial highway
projects and do not apply in the case of municipal road projects. They are,
however, included for reference purposes and are used as a guide in assessing
potential impacts.

4.2.1 General Provisions

Several key components of the protocol include the following:

a) Noise-sensitive areas are defined as being residential areas or quiet areas
as defined in the local municipal noise control by-law. (City of Barrie By-
Law 2006-140 defines “Residential Area” as any area where residential
use is permitted under the City’s Zoning By-Law. It does not identify any
“Quiet Zone” in the vicinity of the Study Area.)
b) Noise impacts are to be predicted for outdoor spaces.
c) The sound level objective is 55 dBA or the ambient, whichever is higher.
The significance of the impact is quantified also by the change in sound
level.
d) If the change in sound level is 5 dBA or less, then no mitigation is
required. If the change is greater than 5 dBA, then alternative noise
control measures within the right-of-way should be investigated.

4.2.2 Construction Noise

The protocol makes the following comments with respect to construction noise:

a) Identify noise-sensitive areas.
b) Identify and obey municipal noise control by-law. If the by-law causes
hardship or timing issues for the contractor, then the contractor may apply
directly to the municipality for an exemption to the by-law.
c) Include general noise control measures (not sound level criteria) in the
construction contract. In response to noise complaints from the public,
check for compliance with the noise control measures stipulated in the
contract. If public complaints continue even if the required noise control
measures are in effect, then enforce the sound level limits specified in the
MOE’s construction noise guideline NPC-115.
4.3 MTO Noise Policy

The MTO Noise Policy provides additional details regarding the assessment of noise and warrants for mitigation. Although not applicable to municipal road projects, it is our opinion that the policy is helpful in assessing potential noise impacts in cases like this.

In addition to the provisions of the MOE/MTO Protocol listed above, key components of the MTO Noise Policy include the following, with commentary added where needed:

a) Noise levels are to be calculated based on daily traffic volumes averaged over a 24-hour period. (We have given more weight to the day-time period (7:00 am to 11:00 pm) since local arterial roads generally carry 90% of the daily traffic volume during that time period. This is consistent with MOE noise criteria for new housing.)

b) The policy suggests that heavy trucks account for 6% of the total traffic on highways; medium trucks account for 4%. We have based our analysis on 3% each for medium and heavy trucks under existing conditions, and 5% each for future conditions, both as per the RVA traffic study.

c) Receiver heights are set at 1.2 m above grade 3 m from the house. (We used a height of 1.5 m as per the MOE guidelines related to new housing.)

d) Noise sensitive areas are defined to include “residential areas” and “quiet areas” as defined in Section 4.2.1.a) above, plus:
   - institutional lands
   - residential lands adjacent to an existing freeway (roadway in our case)
     if the lands were approved for residential use prior to February 8, 1977
   - residential lands adjacent to a new freeway (roadway) if the lands were approved for residential use before the route was designated
   - residential lands adjacent to an expanding freeway (roadway) if the lands were approved for residential use before the expansion.

e) The majority of residences in the area must be zoned Residential and taxed as principal residences. This ensures funds are directed to areas of greatest need.

f) Noise-sensitive areas must have outdoor recreational areas associated with the residential unit. Outdoor living areas are interpreted as being at ground level adjacent to a residential unit.

g) The following qualify as noise-sensitive areas:
   - Single-family dwellings
   - Townhouses
   - Multiples (with OLA’s for use by all occupants)
   - Ground floor units with unshielded balconies or walk-out patios
   - Hospitals
   - Nursing homes/homes for the aged (if there are OLA’s for residents).

h) The following do not necessarily qualify as noise-sensitive areas:
   - Apartment balconies above ground floor
- Educational facilities (except dorms with OLA’s)
- Churches
- Cemeteries
- Parks and picnic areas
- Day care centres
- All commercial
- All industrial.

i) Where existing roads affect the ambient sound level, future sound levels of the completed project are compared with the existing ambient level also projected to the same future date (e.g. in this case to Year 2021).

4.4 **Project Noise Criteria**

The noise criteria developed for this project are derived from the MOE and MTO policies described above. In summary, this assessment focuses on the following:

- Noise-sensitive areas including:
  - 1\textsuperscript{st} priority - lands zoned Residential
  - 2\textsuperscript{nd} priority - existing residential uses of lands zoned for other purposes
- Residential areas where noise levels are expected to increase by more than 5 dBA as a result of the proposed road improvements
- Residential areas where future sound levels in OLA’s are predicted to increase to over 60 dBA as a result of the proposed road improvements.

5. **ANALYSIS PROCEDURES**

5.1 **Surroundings and Site Characteristics**

Nearly one-half of the frontage of Huronia Road within the Study Area (see Location Plan, Figure 1) is zoned Industrial; about one-quarter is zoned Residential. The balance is zoned Agricultural, Commercial, Open Space, and Environmental Protection. See Zoning Map, Figure 2. Land use details can be found on Figures 4A to 4J, Noise Level Plan.

The Residential zoned properties support a mix of housing types including 1950’s style bungalows on relatively large lots fronting Huronia Road, 1990’s and 2000’s style single-detached homes fronting Huronia Road (some under construction), and a 1990’s style subdivision with townhouse blocks (complete with acoustic barriers) backing onto Huronia Road. The Residential area is generally limited to both sides of Huronia Road from Yonge Street to Herrell Avenue, and along the east side in the vicinity of Loon Avenue. Several residential dwellings can also be found within the Industrial and Agricultural zoned lands. Existing commercial properties are located near the Yonge Street and Mapleview Drive intersections where uses including a food store, an auto dealership and retail plazas can be found. Industrial uses are by far the dominant land use within the Study Area. There are many large industrial buildings along Huronia Road as well as vacant industrial lands, some of which are currently being built upon. Huronia Road is
also bordered by park uses, a driving range, a Par 3 golf course, and a synagogue.

The configuration of the subject properties, the presence of existing homes, and the topography of the Study Area were derived from zoning mapping, topographic surveys and air photos provided by the City of Barrie supplemented by site visits.

Our noise assessment is based on the proposed five-lane configuration described in the June 2006 Huronia Road Traffic Study.

Huronia Road is a north-south arterial serving the Planning Areas of Allandale Heights, Painswick North, and 400 East. It is generally a two-lane paved road with localized widening to accommodate turning lanes at Big Bay Point Road and at Mapleview Drive East. Huronia Road continues as a two-lane road south of the city limits as County Road 54. The City of Barrie’s 1999 Transportation Study by RVA recommends reconstructing Huronia Road to a two-lane urban cross-section with 11m of pavement from Yonge Street south to Lockhart Road. Huronia Road is generally flat (<2%) although we have identified two areas where the grade is about 2 to 3% with a climb height that will cause truck noise to increase in the uphill direction (Little Avenue to Webb Street, and near Loon Avenue).

See Section 5.4 for a summary of the speed limits used in this study within the Study Area. It is currently posted as 80 kph to the south.

5.2 Noise Sources

The primary noise source of concern for this project is future traffic noise from increasing traffic volumes on the proposed widened Huronia Road.

Roadway noise from both cars and trucks (medium and heavy) have been accounted for in this analysis, and the noise source heights have been established in accordance with MOE criteria.

We note that traffic noise levels are influenced by a number of factors including the amount of traffic, traffic speed, percent trucks, source-receiver heights above grade, source-receiver separation distance, changes in terrain type (e.g. asphalt vs. vegetation), and the removal/addition of intervening structures. In this analysis the only factor expected to change as the result of the proposed works is the traffic volume.

The terrain between the road and noise-sensitive receptors is non-reflective for the purpose of this analysis. Shielding by intervening woods and buildings has not been accounted for unless noted otherwise. (Noise levels along the rear wall of a building are typically about 15 dBA less than those not shielded by the building, and noise levels along the side wall of a building, that is, in locations exposed to only one-half of the road length, are typically about 3 dBA less.)
Noise calculations in this study are based on an infinite road length. In addition, since noise levels increase where road grades exceed 2% and the height of climb exceeds 6 m, adjustments have been applied in the areas noted earlier.

The MOE traffic noise model is based on vehicles equipped with mufflers in good working condition. It does not account for car stereos, squealing tires, honking horns, etc. The model assumes a steady flow of traffic at the speed limit, and vehicles equally spaced throughout the study period.

It is noted that there are other noise sources in the area (e.g. traffic on other streets, and commercial and industrial operations) which contribute to the existing ambient noise levels. These are not accounted for in this study since the focus of this environmental assessment is the potential increase in traffic noise resulting from the proposed road improvements on Huronia Road.

5.3 Noise-Sensitive Areas

Potential noise-sensitive areas were identified from the Zoning Map, Figure 2, and from observed land uses based on site visits (see Figure 4, Noise Level Plan).

Within non-residential zones it can be difficult to visually determine from the street whether a property is being used for residential purposes. This is especially true in older areas where some houses have been (partially) converted to commercial use. In order to confirm the use of properties within non-residential zones, we relied on visual assessments to identify those which should be deemed to be noise-sensitive for the purpose of this study.

Based on the above, and the noise criteria summarized in Section 4.4, the following qualify as noise-sensitive areas that warrant further investigation:

a) Residential-zoned lands
   i. Homes on residential-zoned lands within the Study Area
b) Residential uses on lands zoned other than Residential
   i. Home at 364 Huronia Road (zoned Industrial)
   ii. Homes between Loon Avenue and Mapleview Drive (zoned Agricultural).

5.4 Traffic Data

Traffic data (existing and future) were derived from the Huronia Road Traffic Study referred to earlier. See Appendix ‘A’ for a summary of the traffic volumes that apply in this study. Figure 3, Traffic Data Plan, shows the road sections to which the various Year 2017 speed limits and traffic volumes apply.

Based on traffic counts by the City of Barrie, the current (2003/2004) traffic volume on Huronia Road from Yonge Street to Little Avenue is 7,000 vehicles per day, from Little Avenue to Big Bay Point Road it is 8,000, from Big Bay Point Road to Loon Avenue it is 9,000, from Loon Avenue to Mapleview Drive
East it is 11,000, and from Maplevue Drive East to Lockhart Road (the south city limits) it is 8,000 vehicles per day. The City is predicted to be built out to its limits in about 10 years with a population of about 175,000. At that time the traffic volume on Huronia Road will be about 18,000 vehicles per day from Yonge Street to Big Bay Point Road, 20,000 from Big Bay Point Road to Maplevue Drive East, 18,000 from Maplevue Drive East to Saunders Road, and 16,000 from Saunders Road to Lockhart Road (the south city limits). Truck traffic is assumed by RVA to increase from the current 3% each for medium and heavy trucks, to about 5% each in 10 years time. We note that these predicted traffic volumes satisfy the MOE's requirement for a 10-year projection window.

The Huronia Road Traffic Study indicates that the carrying capacity of the subject section of Huronia Road, with its current two-lane configuration, is about 12,000 vehicles per day. If no improvements are made, the traffic volume will be limited to about 12,000 vehicles per day in ten years. Accordingly, the traffic increase due to the proposed road widening ranges from about 4,000 to 8,000 vehicles per day.

The MOE-recommended split for day and night-time traffic volumes on arterial roads (90/10) was used in this study. The speed limits used for the “do nothing” and “proposed” scenarios are as follows: 50 kph from Yonge Street to Loon Avenue, 60 kph from Loon Avenue to Saunders Road, and 80 kph from Saunders Road to Lockhart Road (the south city limits).

5.5 Study Periods

The key study periods, as per the LU-131 guidelines, are the 16-hour day-time period between 7:00 am and 11:00 pm, and the 8-hour night-time period between 11:00 pm and 7:00 am. This study focuses on the day-time period because it represents the worst-case scenario.

5.6 Sound Level Prediction Model

Noise level calculations were carried out in accordance with MOE guidelines (Environmental Noise Assessment in Land Use Planning, Training Manual, Ontario Ministry of the Environment, 1987) and through the use of the Ministry's roadway noise model ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) as contained in the Ministry's roadway noise computer program Stamson 5.0.

Noise level calculations are computed by Stamson software, which implements the ORNAMENT roadway noise model. Sample noise level calculations from Stamson are provided in Appendix ‘B’.

5.7 Correction Factors

Typical corrections required by the MOE to be applied to the noise levels have been taken into account where applicable. These include corrections for:
6. **CALCULATED EQUIVALENT SOUND LEVELS**

Outdoor living area sound levels are typically calculated for receivers located 3.0 m from the rear wall of a house, with a receiver height of 1.5 m above finished grade. It is noted that noise barriers may not protect against noise levels where decks, balconies, or rooftop terraces are provided. Resultant noise levels in these locations may, therefore, be higher than the allowable limit. (We note that decks and balconies are exempt from the LU-131 outdoor noise limits unless they are the only outdoor living area available to the resident, and they are at least 4.0 m deep, outside the building façade, and unenclosed.)

6.1 **Noise Contours**

In order to put the traffic noise levels into perspective, we have developed sound level contours. The following table sets out day-time outdoor sound levels at various distances from centreline. These values do not account for shielding by buildings, etc., therefore, actual noise levels in shielded areas will be less in both the current and future scenarios.

The data for Year 2017 are graphically shown on Figure 4, Noise Level Plan.

See Table 2, Sound Level Contours, below.

**TABLE 2 – Sound Level Contours (dBA)**

<table>
<thead>
<tr>
<th>Huronia Road Section</th>
<th>Required Distance from Centreline of Road (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td></td>
<td>Year 2004</td>
</tr>
<tr>
<td>Sound Level (dBA)</td>
<td>55  60  65</td>
</tr>
<tr>
<td>Yonge to Little</td>
<td>38 19 &lt;15</td>
</tr>
<tr>
<td>Little to Big Bay Point</td>
<td>41 21 &lt;15</td>
</tr>
<tr>
<td>section @ 2% road grade</td>
<td>45 22 &lt;15</td>
</tr>
<tr>
<td>Big Bay Point to Loon</td>
<td>44 22 &lt;15</td>
</tr>
<tr>
<td>section @ 3% road grade</td>
<td>48 24 &lt;15</td>
</tr>
<tr>
<td>Loon to Mapleview</td>
<td>62 31 16</td>
</tr>
<tr>
<td>section @ 3% road grade</td>
<td>67 34 17</td>
</tr>
<tr>
<td>Mapleview to Saunders</td>
<td>52 26 &lt;15</td>
</tr>
<tr>
<td>Saunders to Lockhart</td>
<td>74 37 19</td>
</tr>
</tbody>
</table>
The "Existing", "Do Nothing" and "Proposed" distances are based on the speed limits provided in the RVA Traffic Study. See Appendix ‘A’.

The sound levels given in the column headings of the table above (i.e. 55, 60 and 65 dBA) are thresholds at which noise controls are required for new residential development (as per LU-131 – see Table 1). They are as follows:

- Forced air heat (for future central air conditioning) required if >55 dBA
- Central air conditioning required if > 65 dBA
- Building component design required if >65 dBA
- Acoustic fence or warning clause required if noise level in OLA >55 dBA
- Acoustic fence mandatory if noise level in OLA day >60 dBA.

From Table 2 (and Figure 4, Noise Level Plan) it is evident that key sound levels from future traffic will reach further into the adjacent lands. For example, under LU-131 forced air heating is currently mandatory for new dwellings less than 38 m from the centreline of Huronia Road between Yonge Street and Little Avenue. By Year 2017, without the proposed road improvements, new dwellings within 66 m will require forced air heating. With increased traffic due to the proposed widening, this will increase to 85 m by Year 2017.

6.2 Sound Level Increases

In order to quantify the true noise impact of the proposed road improvements, the table below compares the proposed Year 2017 sound levels (i.e. with the proposed improvements in place) to those assuming the status quo, that is, assuming no road improvements (i.e. "do nothing") and allowing for normal growth limited by the physical road capacity. This approach compares future proposed noise levels to future ambient noise levels as permitted by the MTO Noise Policy (see Section 4.3). The net result is shown in the last column.

**TABLE 3 – Predicted Sound Level Increases (dBA)**

<table>
<thead>
<tr>
<th>Huronia Road Section</th>
<th>Traffic Volume (AADT)</th>
<th>Year 2004 Existing</th>
<th>&quot;Do Nothing&quot;</th>
<th>&quot;Proposed&quot;</th>
<th>Sound Level Increase (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yonge to Little</td>
<td>7,000</td>
<td>12,000</td>
<td>18,000</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Little to Big Bay Point</td>
<td>8,000</td>
<td>12,000</td>
<td>18,000</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Big Bay Point to Loon</td>
<td>9,000</td>
<td>12,000</td>
<td>20,000</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Loon to Mapleview</td>
<td>11,000</td>
<td>12,000</td>
<td>20,000</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Mapleview to Saunders</td>
<td>8,000</td>
<td>12,000</td>
<td>18,000</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Saunders to Lockhart</td>
<td>8,000</td>
<td>12,000</td>
<td>16,000</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Notes to Table 3:
The “Do Nothing” traffic volume of 12,000 represents the physical capacity of the road.

From the previous table it is evident that sound levels are expected to increase a maximum of about 2.2 dBA due to the proposed works. (Even when compared to Year 2004 conditions, the overall maximum increase will be only about 4.1 dBA.)

Increases of less than 5 dBA do not warrant noise mitigation according to the MOE/MTO protocol, and even if they exceed 5 dBA, mitigation options are typically investigated only within the right-of-way. Noise control measures for highway improvement projects typically relate to noise levels only in outdoor living areas (at ground level) of residential properties, not at the building face. Using the MOE and MTO criteria as a guide, it is our opinion that only those areas where unshielded day-time outdoor sound levels are expected to exceed 60 dBA need to be examined in further detail.

OLA sound levels (see spot sound levels on Figure 4, Noise Level Plan) were predicted accounting for shielding by buildings and existing noise fences. (This is explained below.) Figure 4, Noise Level Plan, reveals those locations where OLA’s are exposed to Huronia Road and where sound levels may exceed 60 dBA.

6.3 Predicted Year 2017 Sound Levels

In order to compare the future sound levels to those that would warrant noise fences in a “new development” scenario (as per LU-131), we have estimated future (Year 2017) sound levels in OLA’s of existing dwellings along Huronia Road. Our predictions were carried out for properties that are used for residential purposes whether they are zoned Residential or otherwise. The results are shown on Figures 4A to 4J.

These predicted sound levels account for shielding by the houses. For example, along the rear wall of houses, the resultant sound levels are typically about 15 dBA less than the noise contour value. Along the side wall of houses, where the wall is exposed to only one-half of the roadway length, the reduction is about 3 dBA. A contour value of 60 dBA along the rear wall of a house implies an actual noise level of about 45 dBA; along the side wall it would be about 57 dBA.

Actual sound levels in OLA’s were predicted using the Stamson program.

Building and outdoor amenity area locations were derived from the air photos, mapping and plans referred to earlier, and confirmed through site visits.

Our analysis takes into account existing noise barriers (acoustic fences or berms). For example, on the east side of Huronia Road just north of Loon Avenue there is an acoustic fence that was installed in the late 1990’s as part of the Lover’s Creek Estates Subdivision. We have estimated that the sound levels in the backyards of
these homes would be up to about 65 dBA in Year 2017 without the barrier; the barrier reduces the sound levels to less than 60 dBA which is acceptable.

Existing noise barrier locations and heights were field measured. Base elevations were derived from grading plans and building permit plot plans for the Lover’s Creek Estates Subdivision as provided by the City.

We have identified two locations where the predicted Year 2017 sound levels may exceed 60 dBA. These are lots on the east side of Huronia Road at the Herrell Avenue intersection (see Figure 5, Noise Barrier Options). We have estimated a noise level of 65 dBA in the backyards of two lots at the north-east and south-east corners (Nos. 133 and 134 Herrell Avenue, respectively). Although these sound levels are high enough to warrant noise fences under “new development” conditions, we note that they represent an increase of only about 2 dBA as compared to the “do nothing” scenario. Based on MTO’s policy requiring a 5 dBA increase before mitigation is even considered, it is our opinion that noise fences are not warranted. Should the City of Barrie, however, wish to provide noise fences in these locations, we would recommend a 2.15 m high noise fence as per City Standard BSD-19A. In both cases this would provide a sound reduction of about 6 dBA bringing the resultant sound level to below 60 dBA.

If the City decides to provide noise fences for 133 and 134 Herrell Avenue, the 2.15m high fence needs simply to be installed along the west and rear property lines together with a return to the wall of the house, all as shown on Figure 5, Noise Barrier Options. Before undertaking such work, we recommend that the height and extent of the noise fences be confirmed by an acoustic consultant based on detailed topographic surveys of the affected lots.

7. **NOISE IMPACT SUMMARY**

The noise impacts at the locations identified in Section 5.3 are summarized below.

7.1 **Residential-Zoned Lands**

The noise impact on properties between Yonge Street and Herrell Avenue is not significant (< 5 dBA increase). Actual noise levels in back yards will generally remain well below the 60 dBA threshold at which noise barriers are required in new residential developments. Two flankage lots at Herrell Avenue are expected to experience sound levels in excess of 60 dBA although the increases are less than 5 dBA. Noise fence options are provided in the event the City of Barrie wishes to provide mitigation for these two lots. (See Figure 5, Noise Barrier Options.)

The noise impact on the Lover’s Creek Estates Subdivision near Loon Avenue is not significant (< 5 dBA increase). The existing noise fence provides the level of mitigation intended (i.e. to below 60 dBA) even though traffic volumes are expected to increase more than anticipated when this fence was designed (20,000
7.2 Residential Uses on Lands Zoned Other than Residential

The noise impact on the home at 364 Huronia Road is not significant (< 5 dBA increase). Actual noise levels in the back yard will remain below 60 dBA.

The noise impact on the homes between Loon Avenue and Mapleview Drive is not significant (< 5 dBA increase). Actual noise levels in the back yards will remain below 60 dBA.

8. RECOMMENDATIONS & CONCLUSIONS

Although traffic noise levels along Huronia Road between Yonge Street and Lockhart Road (the south city limits) are expected to increase as a result of the proposed road widening, the predicted noise level increases are not sufficient to warrant noise mitigation under the noise policies and protocol established by the MOE and MTO for provincial highway and freeway (re-) construction projects. There are predicted noise level excesses in 2 locations; however, they are not sufficient to warrant mitigation measures.

If the City of Barrie, however, chooses to consider the noise impact on lands adjacent to Huronia Road under the MOE noise guidelines for new residential development, then noise mitigation can be provided in two locations where the resultant sound exposure from road traffic in qualified existing outdoor amenity areas within the Study Area is predicted to exceed the day-time limits permitted by the MOE for new residential development. Mitigation options and recommendations are discussed in Section 6.3.

In summary, the predicted increases in traffic noise within the Study Area due to the proposed road improvements are not sufficient to warrant noise mitigation measures; however, mitigation options that can serve to reduce the noise impact of the proposed works are provided in Section 6.3.

Respectfully submitted,

R. BOUWMEESTER & ASSOCIATES

Ralph Bouwmeester, P. Eng.
Principal
REFERENCES

1. Noise Assessment Criteria in Land Use Planning - Requirements, Procedures and Implementation (MOE, October 1997)
2. Noise Assessment Criteria in Land Use Planning (MOE, Publication LU-131, October 1997)
3. Annex to Publication LU-131 (MOE, October 1997)
4. Sound Levels due to Road Traffic (MOE, Publication NPC-206, October 1995)
9. City of Barrie Noise Control By-Law No. 2006-140 (June 12, 2006)
10. City of Barrie Speed By-Law No. 2002-191 (June 12, 2002)
FIGURES

Figure 1  - Location Plan
Figure 2  - Zoning Map
Figure 3  - Traffic Data Plan
Figure 4A to 4J  - Noise Level Plan
Figure 5  - Noise Barrier Options
LEGEND
18,000 - DENOTES YEAR 2017 AADT WITH ROAD IMPROVEMENTS
2% - DENOTES ROAD GRADE
50 KPH - DENOTES SPEED LIMIT AS PER RVA JUNE 2006 TRAFFIC STUDY

NOTES
1. YEAR 2017 AADT WITHOUT ROAD IMPROVEMENTS IS 12,000 THROUGHOUT STUDY AREA.
2. SOUND LEVEL CORRECTIONS APPLY WHERE ROAD GRADE IS 2% OR GREATER AND WHERE CLIMB IS AT LEAST 6m.
3. RVA SPEED LIMITS DIFFER FROM CITY BY-LAW 2002-191 (HERRELL TO LOON) AND FROM POSTED LIMITS (BIG BAY TO LOON, SAUNDERS TO LOCKHART).

TRAFFIC DATA PLAN
FIG. 3
SCALE: 1:25,000
R. BOUWMEESTER & ASSOCIATES
MAR 2007
LEGEND

DWELLING TYPES:
1S = DENOTES ONE-STOREY
2S = DENOTES TWO-STOREY
B = DENOTES BRICK
F = DENOTES FRAME
SC = DENOTES STUCCO
SN = DENOTES STONE
V = DENOTES VINYL

SOUND LEVEL CONTOURS:

--- WITHOUT ROAD IMPROVEMENTS

--- WITH ROAD IMPROVEMENTS

55 dBA
60 dBA
65 dBA

SPOT SOUND LEVELS:

DENOTES OUTDOOR RECEPTOR LOCATION AND YR 2017 SOUND LEVEL (dBA) WITH ROAD IMPROVEMENTS.

NOTES

1. CONTOURS DENOTE UNSHIELDED YR 2017 DAY-TIME OUTDOOR SOUND LEVELS.
2. SPOT SOUND LEVELS ACCOUNT FOR SHIELING BY BUILDINGS.

NOISE LEVEL PLAN

FIG. 4A

SCALE: 1:2000

R. BOUVMEESTER & ASSOCIATES

FEB 2007
NOTE: SOUND LEVELS MARKED * INCLUDE REDUCTIONS FOR EXISTING ACOUSTIC BARRIER.
NOTE: SOUND LEVELS MARKED * INCLUDE REDUCTIONS FOR EXISTING ACOUSTIC BARRIER.

EX. ACOUSTIC BARRIER
1m ACOUSTIC FENCE ON 2m BERM

EX. ACOUSTIC BARRIER
2.5m HIGH ACOUSTIC FENCE
NOTE: FENCE HEIGHTS AND EXTENTS TO BE CONFIRMED BY ACOUSTIC CONSULTANT PENDING TOPO SURVEY AND PRIOR TO CONSTRUCTION.

2.15m HIGH ACOUSTIC FENCE AS PER BARRIE STD BSD-19A TO ACHIEVE SOUND LEVEL <60dBA
APPENDICES

A. Road Traffic Data
B. Sample Noise Level Calculations (Stamson Computer Printouts)
APPENDIX “A”

ROAD TRAFFIC DATA

The traffic data used in this analysis were derived from a report entitled *Huronia Road Traffic Study* by Read, Voorhees & Associates Limited (RVA) dated June 2006. That report provides current traffic data (based on counts in 2003 and 2004) together with Year 2021 projections under both existing (i.e. “do nothing”) and proposed conditions. It also provides speed limits.

This analysis is based on the RVA traffic projections and speed limits.

We note that in some cases the RVA speed limits differ from those contained in City By-Law 2002-191 and from those posted; in addition, we note that some of those posted currently differ from the by-law.

The following traffic volumes (AADT) and speed limits apply to this noise assessment:

<table>
<thead>
<tr>
<th>Huronia Road</th>
<th>Speed Limit (kph)</th>
<th>Year 2004 Existing</th>
<th>Year 2017 “Do Nothing”</th>
<th>Year 2017 “Proposed”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yonge to Little</td>
<td>50</td>
<td>7,000</td>
<td>12,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Little to Big Bay Point</td>
<td>50</td>
<td>8,000</td>
<td>12,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Big Bay Point to Loon</td>
<td>50</td>
<td>9,000</td>
<td>12,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Loon to Mapleview</td>
<td>60</td>
<td>11,000</td>
<td>12,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Mapleview to Saunders</td>
<td>60</td>
<td>8,000</td>
<td>12,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Saunders to Lockhart</td>
<td>80</td>
<td>8,000</td>
<td>12,000</td>
<td>16,000</td>
</tr>
</tbody>
</table>

Notes:
1. Based on RVA June 2006 traffic study.
2. Existing road configuration and existing traffic volume.
3. Existing road configuration and future traffic volume (based on carrying capacity).
4. Proposed widening and proposed traffic volume.
EXISTING DAILY TRAFFIC
HURONIA ROAD TRAFFIC STUDY

FIG. 3
APPENDIX 'B'

STAMSON PRINTOUTS

STAMSON 5.0 NORMAL REPORT Date: 08-03-2007 09:54:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hur50cap.te Time Period: Day/Night 16/8 hours
Description: Yonge-Little - Yr 2017 55 dBA "Do Nothing"

Road data, segment # 1: Huronia Rd (day/night)

<table>
<thead>
<tr>
<th>Car traffic volume</th>
<th>9720/1080 veh/TimePeriod *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium truck volume</td>
<td>540/60 veh/TimePeriod *</td>
</tr>
<tr>
<td>Heavy truck volume</td>
<td>540/60 veh/TimePeriod *</td>
</tr>
<tr>
<td>Posted speed limit</td>
<td>50 km/h</td>
</tr>
<tr>
<td>Road gradient</td>
<td>0 %</td>
</tr>
<tr>
<td>Road pavement</td>
<td>1 (Typical asphalt or concrete)</td>
</tr>
</tbody>
</table>

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

24 hr Traffic Volume (AADT or SADT): 12000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Huronia Rd (day/night)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>: -90.00 deg 90.00 deg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood depth</td>
<td>: 0 (No woods.)</td>
<td></td>
</tr>
<tr>
<td>No of house rows</td>
<td>: 0 / 0</td>
<td></td>
</tr>
<tr>
<td>Surface</td>
<td>: 1 (Absorptive ground surface)</td>
<td></td>
</tr>
<tr>
<td>Receiver source distance</td>
<td>: 66.33 / 66.33 m</td>
<td></td>
</tr>
<tr>
<td>Receiver height</td>
<td>: 1.50 / 4.50 m</td>
<td></td>
</tr>
<tr>
<td>Topography</td>
<td>: 1 (Flat/gentle slope; no barrier)</td>
<td></td>
</tr>
<tr>
<td>Reference angle</td>
<td>: 0.00</td>
<td></td>
</tr>
</tbody>
</table>

Results segment # 1: Huronia Rd (day)

Source height = 1.50 m
ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

| Angle1 Angle2 Alpha RefLeq F.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq |
|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| -90 | 90 | 0.66 | 67.17 | 0.00 | -10.72 | -1.46 | 0.00 | 0.00 | 0.00 | 55.00 |

Segment Leq : 55.00 dBA
Total Leq All Segments: 55.00 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.50 m
ROAD (0.00 + 49.20 + 0.00) = 49.20 dBA

| Angle1 Angle2 Alpha RefLeq F.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq |
|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| -90 | 90 | 0.57 | 60.64 | 0.00 | -10.14 | -1.30 | 0.00 | 0.00 | 0.00 | 49.20 |

Segment Leq : 49.20 dBA
Total Leq All Segments: 49.20 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 49.20
STAMSON 5.0 NORMAL REPORT Date: 08-03-2007 09:55:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hur50cap.te Time Period: Day/Night 16/8 hours
Description: Yonge-Little - Yr 2017 60 dBA "Do Nothing"

Road data, segment # 1: Huronia Rd (day/night)

Car traffic volume : 9720/1080 veh/TimePeriod *
Medium truck volume : 540/60 veh/TimePeriod *
Heavy truck volume : 540/60 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 3ADT): 12000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Huronia Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 33.15 / 33.15 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Huronia Rd (day)

Source height = 1.50 m
ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

<table>
<thead>
<tr>
<th>Angle1 Angle2</th>
<th>Alpha Ref Leq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj Sub Leq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90 90</td>
<td>0.66 67.17 0.00 -5.72 -1.46 0.00 0.00 0.00 60.00</td>
</tr>
</tbody>
</table>

Segment Leq : 60.00 dBA
Total Leq All Segments: 60.00 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.50 m
ROAD (0.00 + 53.93 + 0.00) = 53.93 dBA

<table>
<thead>
<tr>
<th>Angle1 Angle2</th>
<th>Alpha Ref Leq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj Sub Leq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90 90</td>
<td>0.57 60.64 0.00 -5.41 -1.30 0.00 0.00 0.00 53.93</td>
</tr>
</tbody>
</table>

Segment Leq : 53.93 dBA
Total Leq All Segments: 53.93 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 53.93
STAMSON 5.0 NORMAL REPORT Date: 08-03-2007 09:56:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hur50cap.te Time Period: Day/Night 16/8 hours
Description: Yonge-Little - Yr 2017 65 dBA "Do Nothing"

Road data, segment # 1: Huronia Rd (day/night)

<table>
<thead>
<tr>
<th>Traffic characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car traffic volume</td>
<td>9720/1080 veh/TimePeriod</td>
</tr>
<tr>
<td>Medium truck volume</td>
<td>540/60 veh/TimePeriod</td>
</tr>
<tr>
<td>Heavy truck volume</td>
<td>540/60 veh/TimePeriod</td>
</tr>
<tr>
<td>Posted speed limit</td>
<td>50 km/h</td>
</tr>
<tr>
<td>Road gradient</td>
<td>0 %</td>
</tr>
<tr>
<td>Road pavement</td>
<td>1 (Typical asphalt or concrete)</td>
</tr>
</tbody>
</table>

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

24 hr Traffic Volume (AADT or SADT): 12000
Percentage of Annual Growth: 0.00
Number of Years of Growth: 10.00
Medium Truck % of Total Volume: 5.00
Heavy Truck % of Total Volume: 5.00
Day (16 hrs) % of Total Volume: 90.00

Data for Segment # 1: Huronia Rd (day/night)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90.00</td>
<td>90.00</td>
<td>deg</td>
</tr>
</tbody>
</table>

Wood depth: 0 (No woods.)
No of house rows: 0 / 0
Surface: 1 (Absorptive ground surface)
Receiver source distance: 16.57 / 16.57 m
Receiver height: 1.50 / 4.50 m
Topography: 1 (Flat/gentle slope; no barrier)
Reference angle: 0.00

Results segment # 1: Huronia Rd (day)

Source height = 1.50 m
ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha</th>
<th>RefLq</th>
<th>P.Adj</th>
<th>D.Adj</th>
<th>F.Adj</th>
<th>W.Adj</th>
<th>H.Adj</th>
<th>B.Adj</th>
<th>SubLq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90</td>
<td>90</td>
<td>0.66</td>
<td>67.17</td>
<td>0.00</td>
<td>-0.72</td>
<td>-1.46</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>65.00</td>
</tr>
</tbody>
</table>

Segment Leq: 65.00 dBA
Total Leq All Segments: 65.00 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.50 m
ROAD (0.00 + 58.66 + 0.00) = 58.66 dBA

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha</th>
<th>RefLq</th>
<th>P.Adj</th>
<th>D.Adj</th>
<th>F.Adj</th>
<th>W.Adj</th>
<th>H.Adj</th>
<th>B.Adj</th>
<th>SubLq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90</td>
<td>90</td>
<td>0.57</td>
<td>60.64</td>
<td>0.00</td>
<td>-0.68</td>
<td>-1.30</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>58.66</td>
</tr>
</tbody>
</table>

Segment Leq: 58.66 dBA
Total Leq All Segments: 58.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 58.66
STAMSON 5.0  NORMAL REPORT  Date: 08-03-2007 09:58:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hurlpro.te  Time Period: Day/Night 16/8 hours
Description: Yonge-Little - Yr 2017 55 dBA "Proposed"

Road data, segment # 1: Huronia Rd (day/night)

Car traffic volume : 14580/1620 veh/TimePeriod *
Medium truck volume : 810/90 veh/TimePeriod *
Heavy truck volume : 810/90 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): 18000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Huronia Rd (day/night)

Angke1  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 : 84.62 / 84.62 m
Receiver height : 1.50 / 4.50 m
Topography : 1  (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Huronia Rd (day)

Source height = 1.50 m
ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA
Angke1 Angle2 Alpha Reflexq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-90  90  0.66  68.93  0.00 -12.47 -1.46  0.00  0.00  0.00 55.00

Segment Leq : 55.00 dBA
Total Leq All Segments: 55.00 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.50 m
ROAD (0.00 + 49.30 + 0.00) = 49.30 dBA
Angke1 Angle2 Alpha Reflexq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-90  90  0.57  62.40  0.00 -11.80 -1.30  0.00  0.00  0.00 49.30

Segment Leq : 49.30 dBA
Total Leq All Segments: 49.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 49.30
STAMSON 5.0 NORMAL REPORT Date: 08-03-2007 09:59:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hurlpro.te Time Period: Day/Night 16/8 hours
Description: Yonge-Little - Yr 2017 60 dBA "Proposed"

Road data, segment # 1: Huronia Rd (day/night)

Car traffic volume : 14580/1620 veh/TimePeriod *
Medium truck volume : 810/90 veh/TimePeriod *
Heavy truck volume : 810/90 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): 18000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Huronia Rd (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 : 42.30 / 42.30 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Huronia Rd (day)

Source height = 1.50 m
ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

<table>
<thead>
<tr>
<th>Angle1 Angle2</th>
<th>Alpha</th>
<th>Ref</th>
<th>Leq</th>
<th>P.A</th>
<th>d Adj</th>
<th>D. Adj</th>
<th>F. Adj</th>
<th>W. Adj</th>
<th>H. Adj</th>
<th>B. Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90</td>
<td>90</td>
<td>0.66</td>
<td>68.93</td>
<td>0.00</td>
<td>-7.47</td>
<td>-1.46</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Segment Leq : 60.00 dBA
Total Leq All Segments: 60.00 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.50 m
ROAD (0.00 + 54.03 + 0.00) = 54.03 dBA

<table>
<thead>
<tr>
<th>Angle1 Angle2</th>
<th>Alpha</th>
<th>Ref</th>
<th>Leq</th>
<th>P.A</th>
<th>d Adj</th>
<th>D. Adj</th>
<th>F. Adj</th>
<th>W. Adj</th>
<th>H. Adj</th>
<th>B. Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90</td>
<td>90</td>
<td>0.57</td>
<td>62.40</td>
<td>0.00</td>
<td>-7.07</td>
<td>-1.30</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>54.03</td>
</tr>
</tbody>
</table>

Segment Leq : 54.03 dBA
Total Leq All Segments: 54.03 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.00 (NIGHT): 54.03
STAMSON 5.0 NORMAL REPORT Date: 08-03-2007 10:00:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hurlpro.te Time Period: Day/Night 16/8 hours
Description: Yonge-Little - Yr 2017 65 dBA "Proposed"

Road data, segment # 1: Huronia Rd (day/night)

Car traffic volume : 14580/1620 veh/TimePeriod *
Medium truck volume : 810/90 veh/TimePeriod *
Heavy truck volume : 810/90 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): 16000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Huronia Rd (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 : 21.16 / 21.16 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Huronia Rd (day)

Source height = 1.50 m
ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

<table>
<thead>
<tr>
<th>Angle1 Angle2</th>
<th>Alpha RefLeq</th>
<th>F.Adj</th>
<th>D.Adj</th>
<th>F.Adj</th>
<th>W.Adj</th>
<th>H.Adj</th>
<th>B.Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90 90</td>
<td>0.66</td>
<td>68.93</td>
<td>0.00</td>
<td>-2.48</td>
<td>-1.46</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 65.00</td>
</tr>
</tbody>
</table>

Segment Leq : 65.00 dBA
Total Leq All Segments: 65.00 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.50 m
ROAD (0.00 + 58.75 + 0.00) = 58.75 dBA

<table>
<thead>
<tr>
<th>Angle1 Angle2</th>
<th>Alpha RefLeq</th>
<th>F.Adj</th>
<th>D.Adj</th>
<th>F.Adj</th>
<th>W.Adj</th>
<th>H.Adj</th>
<th>B.Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90 90</td>
<td>0.57</td>
<td>62.40</td>
<td>0.00</td>
<td>-2.35</td>
<td>-1.30</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00 58.75</td>
</tr>
</tbody>
</table>

Segment Leq : 58.75 dBA
Total Leq All Segments: 58.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 58.75
**STAMSON 5.0NORMAL REPORT**  
Date: 08-03-2007 10:03:31  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hurl134.te  
Time Period: Day/Night 16/8 hours  
Description: **134 Herrell OLA w/o barrier**

**Road data, segment # 1: Huronia (day/night)**

<table>
<thead>
<tr>
<th>Car traffic volume</th>
<th>Medium truck volume</th>
<th>Heavy truck volume</th>
<th>Posted speed limit</th>
<th>Road gradient</th>
<th>Road pavement</th>
</tr>
</thead>
<tbody>
<tr>
<td>14580/1620 veh/TimePeriod</td>
<td>810/90 veh/TimePeriod</td>
<td>810/90 veh/TimePeriod</td>
<td>50 km/h</td>
<td>0 %</td>
<td>1 (Typical asphalt or concrete)</td>
</tr>
</tbody>
</table>

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

24 hr Traffic Volume (AADT or SADT): 18000  
Percentage of Annual Growth: 0.00  
Number of Years of Growth: 10.00  
Medium Truck % of Total Volume: 5.00  
Heavy Truck % of Total Volume: 5.00  
Day (16 hrs) % of Total Volume: 90.00

**Data for Segment # 1: Huronia (day/night)**

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Wood depth</th>
<th>No of house rows</th>
<th>Surface</th>
<th>Receiver source distance</th>
<th>Receiver height</th>
<th>Topography</th>
<th>Reference angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90.00 deg</td>
<td>37.00 deg</td>
<td>0</td>
<td>0 / 0</td>
<td>(Absorptive ground surface)</td>
<td>19.40 / 19.40 m</td>
<td>1.50 / 4.50 m</td>
<td>(Flat/gentle slope; no barrier)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Road data, segment # 2: Huronia (day/night)**

<table>
<thead>
<tr>
<th>Car traffic volume</th>
<th>Medium truck volume</th>
<th>Heavy truck volume</th>
<th>Posted speed limit</th>
<th>Road gradient</th>
<th>Road pavement</th>
</tr>
</thead>
<tbody>
<tr>
<td>14580/1620 veh/TimePeriod</td>
<td>810/90 veh/TimePeriod</td>
<td>810/90 veh/TimePeriod</td>
<td>50 km/h</td>
<td>0 %</td>
<td>1 (Typical asphalt or concrete)</td>
</tr>
</tbody>
</table>

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

24 hr Traffic Volume (AADT or SADT): 18000  
Percentage of Annual Growth: 0.00  
Number of Years of Growth: 10.00  
Medium Truck % of Total Volume: 5.00  
Heavy Truck % of Total Volume: 5.00  
Day (16 hrs) % of Total Volume: 90.00

**Data for Segment # 2: Huronia (day/night)**

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Wood depth</th>
<th>No of house rows</th>
<th>Surface</th>
<th>Receiver source distance</th>
<th>Receiver height</th>
</tr>
</thead>
<tbody>
<tr>
<td>37.00 deg</td>
<td>90.00 deg</td>
<td>0</td>
<td>1 / 0</td>
<td>(Absorptive ground surface)</td>
<td>19.40 / 19.40 m</td>
<td>1.50 / 4.50 m</td>
</tr>
</tbody>
</table>
Topography : 1  (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Huronia (day)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha RefLeq</th>
<th>P. Adj</th>
<th>D. Adj</th>
<th>F. Adj</th>
<th>W. Adj</th>
<th>H. Adj</th>
<th>B. Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90</td>
<td>37</td>
<td>0.66</td>
<td>68.93</td>
<td>0.00</td>
<td>-1.85</td>
<td>-2.57</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment Leq : 64.51 dBA

Results segment # 2: Huronia (day)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha RefLeq</th>
<th>P. Adj</th>
<th>D. Adj</th>
<th>F. Adj</th>
<th>W. Adj</th>
<th>H. Adj</th>
<th>B. Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>90</td>
<td>0.66</td>
<td>68.93</td>
<td>0.00</td>
<td>-1.85</td>
<td>-7.92</td>
<td>0.00</td>
<td>-10.10</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment Leq : 49.06 dBA
Total Leq All Segments: 64.63 dBA

Results segment # 1: Huronia (night)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha RefLeq</th>
<th>P. Adj</th>
<th>D. Adj</th>
<th>F. Adj</th>
<th>W. Adj</th>
<th>H. Adj</th>
<th>B. Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90</td>
<td>37</td>
<td>0.57</td>
<td>62.40</td>
<td>0.00</td>
<td>-1.75</td>
<td>-2.46</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment Leq : 58.19 dBA

Results segment # 2: Huronia (night)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha RefLeq</th>
<th>P. Adj</th>
<th>D. Adj</th>
<th>F. Adj</th>
<th>W. Adj</th>
<th>H. Adj</th>
<th>B. Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>90</td>
<td>0.57</td>
<td>62.40</td>
<td>0.00</td>
<td>-1.75</td>
<td>-7.62</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment Leq : 53.03 dBA
Total Leq All Segments: 59.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.63
(NIGHT): 59.35
STAMSON 5.0          NORMAL REPORT          Date: 08-03-2007 10:04:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: hur134.te          Time Period: Day/Night 16/8 hours
Description: 134 Herrell OLA w/barrier

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

<table>
<thead>
<tr>
<th>Traffic Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car traffic volume</td>
<td>14580/1620 veh/TimePeriod *</td>
</tr>
<tr>
<td>Medium truck volume</td>
<td>810/90     veh/TimePeriod *</td>
</tr>
<tr>
<td>Heavy truck volume</td>
<td>810/90     veh/TimePeriod *</td>
</tr>
<tr>
<td>Posted speed limit</td>
<td>50 km/h</td>
</tr>
<tr>
<td>Road gradient</td>
<td>0 %</td>
</tr>
<tr>
<td>Road pavement</td>
<td>1 (Typical asphalt or concrete)</td>
</tr>
</tbody>
</table>

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

24 hr Traffic Volume (AADT or SADT): 18000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Huronia (day/night)

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-90.00 deg</td>
<td>37.00 deg</td>
</tr>
</tbody>
</table>

Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 19.40 / 19.40 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg
Barrier angle2 : 37.00 deg
Barrier height : 2.15 m
Barrier receiver distance : 5.80 / 5.80 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

<table>
<thead>
<tr>
<th>Traffic Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car traffic volume</td>
<td>14580/1620 veh/TimePeriod *</td>
</tr>
<tr>
<td>Medium truck volume</td>
<td>810/90     veh/TimePeriod *</td>
</tr>
<tr>
<td>Heavy truck volume</td>
<td>810/90     veh/TimePeriod *</td>
</tr>
<tr>
<td>Posted speed limit</td>
<td>50 km/h</td>
</tr>
<tr>
<td>Road gradient</td>
<td>0 %</td>
</tr>
<tr>
<td>Road pavement</td>
<td>1 (Typical asphalt or concrete)</td>
</tr>
</tbody>
</table>

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

24 hr Traffic Volume (AADT or SADT): 18000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 2: Huronia (day/night)

Angle1 Angle2 : 37.00 deg  90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 19.40 / 19.40 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Huronia (day)

Source height = 1.50 m
Barrier height for grazing incidence

<table>
<thead>
<tr>
<th>Source Height (m)</th>
<th>Receiver Height (m)</th>
<th>Barrier Height (m)</th>
<th>Elevation of Barrier Top (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
</tr>
</tbody>
</table>

ROAD (0.00 + 58.17 + 0.00) = 58.17 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-90 37 0.53 68.93 0.00 -1.71 -2.41 0.00 0.00 -6.64 58.17

Segment Leq : 58.17 dBA

Results segment # 2: Huronia (day)

Source height = 1.50 m
ROAD (0.00 + 49.06 + 0.00) = 49.06 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
37 90 0.66 68.93 0.00 -1.85 -7.92 0.00 -10.10 0.00 49.06

Segment Leq : 49.06 dBA
Total Leq All Segments: 58.67 dBA

Results segment # 1: Huronia (night)

Source height = 1.50 m
Barrier height for grazing incidence

<table>
<thead>
<tr>
<th>Source Height (m)</th>
<th>Receiver Height (m)</th>
<th>Barrier Height (m)</th>
<th>Elevation of Barrier Top (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50</td>
<td>4.50</td>
<td>3.60</td>
<td>3.60</td>
</tr>
</tbody>
</table>

ROAD (0.00 + 58.19 + 0.00) = 58.19 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-90 37 0.44 62.40 0.00 -1.61 -2.29 0.00 0.00 -0.25 58.26*
-90 37 0.57 62.40 0.00 -1.75 -2.46 0.00 0.00 0.00 58.19

* Bright Zone!
Segment Leq : 58.19 dBA

Results segment # 2: Huronia (night)

Source height = 1.50 m
ROAD (0.00 + 53.03 + 0.00) = 53.03 dBA

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</th>
<th>Alpha</th>
<th>RefLeq</th>
<th>P.Adj</th>
<th>D.Adj</th>
<th>F.Adj</th>
<th>W.Adj</th>
<th>H.Adj</th>
<th>B.Adj</th>
<th>SubLeq</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>90</td>
<td>0.57</td>
<td>62.40</td>
<td>0.00</td>
<td>-1.75</td>
<td>-7.62</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>53.03</td>
</tr>
</tbody>
</table>

Segment Leq : 53.03 dBA
Total Leq All Segments: 59.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.67
(NIGHT): 59.35