This document entitled Road Traffic – Noise Impact Assessment for Salem Secondary Plan Area was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of the City of Barrie (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by  
Kana Ganesh Ph.D., P.Eng.
Sr. Acoustics, Noise, and Vibration Engineer  
Kana.Ganesh@Stantec.com  
Tel: (905) 415-6332

Reviewed by  
John I. Walker, Ph.D.
Senior Atmospheric Scientist  
John.Walker@stantec.com
Table of Contents

EXECUTIVE SUMMARY ............................................................................................................... I

ABBREVIATIONS ........................................................................................................................ II

GLOSSARY ..................................................................................................................................... III

1.0 INTRODUCTION .................................................................................................................. 1.1
1.1 SITE DESCRIPTION ................................................................................................................ 1.1
1.2 PROJECT OVERVIEW ........................................................................................................... 1.2

2.0 ENVIRONMENTAL NOISE GUIDELINES ........................................................................... 2.1
2.1 ONTARIO MINISTRY OF TRANSPORTATION (MTO) .......................................................... 2.1

3.0 ENVIRONMENTAL NOISE ASSESSMENT ....................................................................... 3.1
3.1 ROAD TRAFFIC DATA .......................................................................................................... 3.1
3.2 NOISE PREDICTION METHODOLOGY ............................................................................... 3.1
3.3 LOCATIONS OF NOISE SENSITIVE AREAS ....................................................................... 3.2

4.0 MODELLING RESULTS ..................................................................................................... 4.1

5.0 CONCLUSION AND CLOSURE ......................................................................................... 5.1

6.0 REFERENCES ..................................................................................................................... 6.1

LIST OF TABLES

Table 2-1 Mitigation Effort Required for the Projected Noise Level ........................................ 2.2
Table 3-1 Future Road Traffic Data1 ......................................................................................... 3.1
Table 3-2 Receptor Locations .................................................................................................. 3.3
Table 4-1 Sound Level Predictions .......................................................................................... 4.1

LIST OF FIGURES

Figure 1-1 Area Map Showing the Study Areas ...................................................................... 1.3
Figure 3-1 Receptor Locations .................................................................................................. 3.5

LIST OF APPENDICES

APPENDIX A RECEPTORS

APPENDIX B SAMPLE CALCULATIONS
Executive Summary

Stantec Consulting Ltd. (Stantec) has completed an acoustical assessment for Salem Secondary Plan Area. The analysis focuses on the road traffic noise impact on existing residential dwellings along Salem Road, Essa Road, McKay Road, Veterans Drive, Lockhart Road and Huronia Road in the City of Barrie (the City) due to the proposed road improvements.

This report summarizes the potential noise impacts at representative noise sensitive receptors. The Ministry of Transportation (MTO) document “Environmental Guideline for Noise”, dated October 2006 and updated July 2008, was adopted to assess the noise impact and determine if noise mitigation is warranted.

The assessment indicated that there is no change in the sound levels above the future ambient sound level due to the proposed road improvements. In addition, the projected sound levels (with road improvements) at the rear yards of the existing residential dwellings are predicted to be below 60 dBA.

Therefore, it is concluded that the MTO’s and the City’s noise objectives are met without the use of noise mitigation.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>dB</td>
<td>decibel</td>
</tr>
<tr>
<td>dBA</td>
<td>decibel, A-weighted</td>
</tr>
<tr>
<td>$L_{eq}$</td>
<td>Energy Equivalent Sound Level</td>
</tr>
<tr>
<td>MOECC</td>
<td>Ontario Ministry of Environment and Climate Change</td>
</tr>
<tr>
<td>MTO</td>
<td>Ontario Ministry of Transportation</td>
</tr>
<tr>
<td>OLA</td>
<td>outdoor living area</td>
</tr>
<tr>
<td>SPL</td>
<td>sound pressure level</td>
</tr>
</tbody>
</table>
# Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic Fence</td>
<td>A wall or a similar structure used as a noise control measure.</td>
</tr>
<tr>
<td>Administrative Feasibility of Noise Mitigation Measures</td>
<td>The ability to locate and maintain the noise mitigation on lands within public ownership (i.e., provincial or municipal right-of-way).</td>
</tr>
<tr>
<td>Airborne Sound</td>
<td>Sound that reaches the point of interest by propagation through air.</td>
</tr>
<tr>
<td>Attenuation</td>
<td>The reduction of sound intensity achieved by various means (e.g., barrier, air, humidity and porous materials).</td>
</tr>
<tr>
<td>A-Weighing</td>
<td>The weighting network used to account for changes in level sensitivity as a function of frequency. The A-weighting network de-emphasizes the low (i.e., below 1 kHz) frequencies, and emphasizes the frequencies between 1 kHz and 6.3 kHz, in an effort to simulate the relative response of the human ear. See also frequency weighting.</td>
</tr>
<tr>
<td>Barrier</td>
<td>An obstacle on the propagation path of sound (between a source and a receiver composed of a berm, wall or fence (or combination of those) that is free of gaps within or below of its extent and of sufficient mass to prevent significant transmission of sound through it.</td>
</tr>
<tr>
<td>Daytime</td>
<td>Defined as the hours from 07:00h to 23:00h.</td>
</tr>
<tr>
<td>Decibel</td>
<td>A logarithmic measure of any measured physical quantity and commonly used in the measurement of sound. The decibel (dB) provides the possibility of representing a large span of signal levels in a simple manner. The difference between the sound pressure for silenced versus a loud sound is a factor of 1:1,000,000 or more and the same in Decibel is 0-130 dB, therefore it is less cumbersome to use a small range of equivalent values. A tenfold increase in sound power is equal to +10 dB; a tenfold increase in sound amplitude is equal to +20 dB.</td>
</tr>
<tr>
<td>Decibel, A-weighted</td>
<td>A-weighted decibels (dBA). Most common units for expressing sound levels since they approximate the response of the human ear.</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Economic Feasibility of Noise Mitigation Measures</td>
<td>A cost/benefit assessment of the noise mitigation (i.e. determine the cost per benefited receiver).</td>
</tr>
<tr>
<td>Energy Equivalent Sound Level ($L_{eq}$)</td>
<td>An energy-equivalent sound level ($L_{eq}$) over a specified period of time that would have the same sound energy as the actual (i.e., unsteady) time varying sound over the same period of time. It represents the average sound pressure encountered for the period. The period is often added as a suffix to the label (i.e., $L_{eq}(24)$ for the 24-hour equivalent sound level). An $L_{eq}$ value expressed in dBA is a good, single-value descriptor to use as a measure of annoyance due to noise.</td>
</tr>
<tr>
<td>Mitigation</td>
<td>Measures taken to reduce, eliminate, or control impacts on the environment.</td>
</tr>
<tr>
<td>Night-time</td>
<td>Defined as the hours from 23:00h to 07:00h in Ontario.</td>
</tr>
<tr>
<td>Noise</td>
<td>Any unwanted sound. “Noise” and “sound” are used interchangeably in this document.</td>
</tr>
<tr>
<td>Noise Barrier</td>
<td>Same as barrier or sound barrier. A wall, berm, a combination of a wall and a berm or a similar structure used as a noise control measure.</td>
</tr>
<tr>
<td>Noise Sensitive Areas</td>
<td>Noise sensitive land uses, such as private homes, townhouses, multiple unit buildings, hospitals, etc., with an associated outdoor living area.</td>
</tr>
<tr>
<td>Noise level</td>
<td>Same as sound level.</td>
</tr>
<tr>
<td>Sound</td>
<td>A wave motion in air, water, or other media. It is the rapid oscillatory compression changes in a medium that propagate to distant points. It is characterized by changes in density, pressure, motion, and temperature as well as other physical properties. Not all rapid changes in the medium are due to sound (e.g., wind distortion on a microphone diaphragm).</td>
</tr>
<tr>
<td>Sound Level</td>
<td>Generally, sound level refers to the weighted sound pressure level obtained by frequency weighting, usually A- or C-weighted, and expressed in decibels.</td>
</tr>
</tbody>
</table>
### Sound Pressure
The root-mean-square of the instantaneous sound pressures during a specified time interval in a stated frequency band.

### Sound Pressure Level
Logarithmic ratio of the root mean square sound pressure to the sound pressure at the threshold of human hearing (i.e., 20 micropascals).

### Technical Feasibility of Noise Mitigation Measures
A review of the constructability of the noise mitigation (i.e., design of wall, roadside safety, shadow effect, topography, achieve a 5 dB reduction, ability to provide a continuous barrier, etc.).
1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) has completed an acoustical assessment for the Salem Secondary Plan Area on behalf of the City of Barrie. The plan includes improvements of:

a. Salem Road
b. Essa Road
c. McKay Road
d. Veterans Drive
e. Lockhart Road
f. Huronia Road

The objective of this study is to assess the noise impact due to the proposed road improvements and to determine if noise mitigation is warranted.

1.1 SITE DESCRIPTION

The existing land uses within the Salem Secondary Plan Area (SSPA) are primarily agricultural with some areas of industrial and residential land uses. Within the SSPA, roads identified for improvement are located to the east and west of Highway 400 identified as East and West Sites.

The project limits are as follows:

- West of Highway 400 (West Sites)
  - Essa Road, between County Road 27 and Mapleview Drive West
  - Salem Road, between County Road 27 and Veterans Drive
  - McKay Road, between Country Road 27 and approximately 275 m east of Veterans Drive
  - Veterans Drive, between Salem Road and approximately 660 m south of McKay Road
- East of Highway 400 (East Sites)
  - Lockhart Road, between approximately 230 m east of Highway 400 and 10 Sideroad
  - McKay Road, between approximately 330 m east of Highway 400 and 10 Sideroad
  - 10 Sideroad, between Lockhart Road and approximately 650 m south of McKay Road.

Figure 1-1 shows the Study Areas.
1.2 PROJECT OVERVIEW

On January 1, 2010, 2,350 hectares of land, “Annexed Lands”, were transferred from the Town of Innisfil to the City of Barrie pursuant to the Barrie-Innisfil Boundary Adjustment Act, 2009. The Salem Secondary Plan Area is the westerly part and Hewitt’s Secondary Plan Area is the easterly part of the Annexed Lands. The Annexed Lands have been the subject of a comprehensive master planning exercise.

The City of Barrie has completed Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) for the Salem and Hewitt’s Secondary Planning Areas as part of the Multi-Modal Active Transportation Master Plan (MMATMP). The City has initiated transportation improvements assessments based on Phase 3 and 4 of the Municipal Class EA process.

This report assesses the noise effect of the proposed improvements on Salem Road, Essa Road, McKay Road, Veterans Drive, Lockhart Road, and Huronia Road located within the SSPA.

Improvements on these roadways include road widening to accommodate future traffic growth and provide a continuous two-way left-turn lane in the middle. These improvements aim to reduce delays, improve traffic safety and reduce traffic collisions. It is understood that no immediate changes in traffic volume or speed are expected due to these improvements.
Area Map Showing the Study Areas
2.0 ENVIRONMENTAL NOISE GUIDELINES

Noise is recognized as a pollutant in the Environmental Protection Act, as uncontrolled noise can affect human activities. Environmental noise due to transportation sources is typically assessed based on 16-hour daytime or 8-hour nighttime equivalent sound levels. The term “sound level” refers to the equivalent continuous sound pressure level (Leq) expressed in A-weighted decibels (dBA) referenced to 20μPa, having the same total sound energy as a time-varying sound pressure level over a specified time period. It is also worth noting that, although environmental noise is reported in A-weighted decibels (dBA), the difference between two A-weighted values is reported in decibels (dB).

Although elimination or control of the source of pollution is usually a primary objective, there are general limits as to what is practical and technically possible. Since the most commonly implemented noise mitigation measure for road improvement projects is the use of noise barriers (as alterations to existing residential building envelopes is not considered practically feasible), this road traffic noise assessment is limited to assessing the sound level in outdoor living areas (OLA) of identified receptors.

The following section describes the applicable noise guidelines and criteria used in this road traffic noise assessment.

2.1 ONTARIO MINISTRY OF TRANSPORTATION (MTO)

The City of Barrie does not have specific noise guidelines for road construction projects adjacent to noise sensitive land uses. However, the MTO document “Environmental Guide for Noise”, dated October 2006 (updated July 2008) (MTO guideline), does provide guidelines which relate to road traffic noise assessments for road improvement projects [Reference 1] and is typically adopted by Cities, Municipalities and Regions within Ontario to assess the regional and municipal road improvement projects.

The MTO guideline supersedes the Ministry of Environment and Climate Change (MOECC)/MTO Noise Protocol and the MTO Quality and Standards Directive A-1.

The MTO guideline states that if the change in the sound level above the future ambient sound level (without road improvements) is 5 dB or less and the projected overall sound level with the proposed road improvements is less than 65 dBA, then no mitigation effort is required for the road improvement project.

If the change in the future sound level with and without improvement is greater than or equal to 5 dB, or if the projected overall sound level with the proposed improvements is greater than or equal to 65 dBA, noise control measures on the road right-of-way should be investigated for technical, economical and administrative feasibility. The noise control measures must be
located within the right-of-way and the mitigation should achieve a minimum of 5 dB attenuation over the first row of receivers.

Noise mitigation measures may include acoustical barriers, berms, vertical and horizontal alignments and noise reducing surface pavements.

**Table 2-1** below summarizes the criteria for determination of mitigation effort as recommended by the MTO guideline.

**Table 2-1 Mitigation Effort Required for the Projected Noise Level**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mitigation Effort Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Noise Level Above Ambient &lt; 5 dB change AND Project Noise Levels with Proposed Improvement &lt; 65 dBA</td>
<td>• No mitigation effort is required for the project</td>
</tr>
</tbody>
</table>
| Change in Noise Level Above Ambient ≥ 5 dB change OR Project Noise Levels with Proposed Improvement ≥ 65 dBA | • Investigate feasibility of noise control measures within right-of-way  
  • If noise control is technically, economically and administratively feasible, introduce it within the road right-of-way to mitigate to ambient level  
  • If noise control measures are to be considered effective, they should achieve a minimum of 5 dBA attenuation over first row of receivers. If not, mitigation is considered “not technically feasible”. |

3.0 ENVIRONMENTAL NOISE ASSESSMENT

3.1 ROAD TRAFFIC DATA

Traffic data were provided by the design team and are summarized in Table 3-1 below. It is understood that the road improvements are proposed to accommodate a continuous two-way left-turn lane in the middle. These improvements aim to reduce delays, improve traffic safety and reduce traffic collisions. It is understood that no immediate change in traffic volume or speed is expected due to these improvements.

Table 3-1 Future Road Traffic Data

<table>
<thead>
<tr>
<th>Road Section</th>
<th>Annual Average Daily Traffic (AADT) Year 2031</th>
<th>Posted Speed Limit (km/h)</th>
<th>% Truck</th>
<th>Day/Night Split (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salem Road (between County Road 27 and Essa Road)</td>
<td>1,020</td>
<td>80</td>
<td>12</td>
<td>92/8</td>
</tr>
<tr>
<td>Essa Road (between Salem Road and County Road 27)</td>
<td>7,820</td>
<td>80</td>
<td>3</td>
<td>87/13</td>
</tr>
<tr>
<td>Essa Road (between Mapleview Drive West and Salem Road)</td>
<td>7,400</td>
<td>60</td>
<td>8</td>
<td>87/13</td>
</tr>
<tr>
<td>Huronia Road (between Lockhart Road and McKay Road)</td>
<td>17,530</td>
<td>80</td>
<td>12</td>
<td>91/9(^3)</td>
</tr>
<tr>
<td>McKay Road (between Essa Road and Veterans Drive)</td>
<td>9,290</td>
<td>80</td>
<td>7</td>
<td>91/9</td>
</tr>
<tr>
<td>McKay Road (between Hwy 400 and Huronia Road)</td>
<td>21,620</td>
<td>80</td>
<td>7</td>
<td>91/9</td>
</tr>
</tbody>
</table>

1. Provided by the design team
2. Among the total truck volume, a 60% was considered medium truck and the remaining 40% was considered heavy truck
3. Assumed to be the same as McKay Road

3.2 NOISE PREDICTION METHODOLOGY

Road traffic sound levels were estimated using STAMSON V5.04. STAMSON is a computerized implementation of the road and rail traffic noise prediction methods described in ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM (Sound from Trains Environmental Analysis Method). ORNAMENT is an approved noise prediction methodology of the MTO.
Based on the traffic data provided, daytime sound levels were calculated in the identified OLAs. The OLAs were selected considering reverse-frontage and side-frontage with exposures to the roadways. The source-receiver distances were obtained from the design drawings and scaled aerial imagery.

3.3 LOCATIONS OF NOISE SENSITIVE AREAS

Noise sensitive areas are noise sensitive land uses such as detached homes, townhouses, multiple unit residential buildings, hotels, and hospitals, with an associated OLA. Commercial plazas, industrial and agricultural uses are not considered noise sensitive.

A review of aerial imagery and available drawings indicated that existing noise sensitive receptors are located within the West and East Sites, as described below.

West Sites - Four (4) receptor locations representing the existing residential dwellings were selected as the West Sites for assessment. The assessment points representing OLAs of the dwellings were selected based upon their orientation with respect to roadways (i.e. backing or siding onto the roadways).

East Sites - there are no OLAs located adjacent to the roads on the East Sites. The OLAs on the East Sites are along McKay Road and Huronia Road/Sideroad 10, but are fully screened by the buildings themselves. However, for completeness, four (4) receptors were included in this assessment.

The future sound levels with and without the proposed project improvement were predicted at these representative receptor locations. The predictions without improvements represent the future ambient sound levels, while the predictions with the improvements represent future as built sound levels.

As required by the guidelines, the OLA locations were modelled as 1.5 m above grade, 3 m from the building façade and aligned with the midpoint of the applicable façade.

Other residences with similar setback and orientation to the noise source will receive similar exposure and noise impacts. Therefore, the selected locations were considered representative of all receptors within the Study Areas.

Table 3-2 summarizes representative receptors considered in the assessment and Figure 3-1 shows the locations of the receptors. Details of the representative receptors are included in Appendix A.
## Table 3-2 Receptor Locations

<table>
<thead>
<tr>
<th>Receptor ID*</th>
<th>Municipal Address</th>
<th>UTM Coordinates (17T)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Easting (m)</td>
</tr>
<tr>
<td><strong>West Sites</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R01</td>
<td>508 Salem Road</td>
<td>601109</td>
</tr>
<tr>
<td>R02</td>
<td>901 Essa Road</td>
<td>601771</td>
</tr>
<tr>
<td>R03</td>
<td>143 Athabaska Road</td>
<td>602120</td>
</tr>
<tr>
<td>R04</td>
<td>922 Veterans Drive</td>
<td>604217</td>
</tr>
<tr>
<td><strong>East Sites</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R05</td>
<td>110 McKay Road</td>
<td>605800</td>
</tr>
<tr>
<td>R06</td>
<td>149 McKay Road</td>
<td>606076</td>
</tr>
<tr>
<td>R07</td>
<td>180 McKay Road</td>
<td>606269</td>
</tr>
<tr>
<td>R08</td>
<td>1020 Huronia Road</td>
<td>607168</td>
</tr>
</tbody>
</table>

* Refer to Figure 3-1 for locations and to Appendix A for details.
Modelling Results
May 23, 2017

4.0 MODELLING RESULTS

Table 4-1 summarizes the projected sound levels (with and without improvements) at the representative receptors.

The highest projected sound level with the road improvement is 57 dBA and is predicted to occur at receptor R03. In addition, the assessment indicated that there is no sound level increase at any of the selected receptor locations.

Thus, as per the MTO noise guideline, noise mitigation is not required.

Table 4-1 Sound Level Predictions

<table>
<thead>
<tr>
<th>Receptors (OLAs)</th>
<th>Municipal Address</th>
<th>Sound Level Leq 16-Hr (dBA)</th>
<th>Change in Sound Levels (dB) (B-A)</th>
<th>Projected Sound Level exceeds 65 dBA? (Yes or No)</th>
<th>Change in Sound Level is 5 dB or Greater? (Yes or No)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Projected, with No Improvement (Future Ambient) (Column A)</td>
<td>Projected, with Improvements (Column B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R01</td>
<td>508 Salem Road</td>
<td>53</td>
<td>53</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R02</td>
<td>901 Essa Road</td>
<td>51</td>
<td>51</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R03</td>
<td>143 Athabaska Road</td>
<td>57</td>
<td>57</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R04</td>
<td>922 Veterans Drive</td>
<td>55</td>
<td>55</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R05</td>
<td>110 McKay Road</td>
<td>55</td>
<td>55</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R06</td>
<td>149 McKay Road</td>
<td>53</td>
<td>53</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R07</td>
<td>180 McKay Road</td>
<td>51</td>
<td>51</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>R08</td>
<td>1020 Huronia Road</td>
<td>49</td>
<td>49</td>
<td>0</td>
<td>No</td>
</tr>
</tbody>
</table>
5.0 CONCLUSION AND CLOSURE

Stantec was retained by the City of Barrie to prepare a Road Traffic Noise Impact Assessment for the Salem Secondary Plan Area in the City of Barrie. Stantec’s assessment, based on the information available at the time of this report, predicted that the projected future sound levels at all identified receptors due to the proposed road improvements did not exceed the 65 dBA limit. There was also no change in sound levels above the future ambient (i.e. without road improvements). Therefore, it is concluded that noise objectives are met without the use of noise mitigation.
ROAD TRAFFIC – NOISE IMPACT ASSESSMENT FOR SALEM SECONDARY PLAN AREA

References
May 23, 2017

6.0 REFERENCES


Appendix B  SAMPLE CALCULATIONS
Road data, segment # 1: Salem Road (day/night)
----------------------------------------------
Car traffic volume : 8258/718 veh/TimePeriod *
Medium truck volume : 676/59 veh/TimePeriod *
Heavy truck volume : 450/39 veh/TimePeriod *
Posted speed limit : 80 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): 10200
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.20
Heavy Truck % of Total Volume : 4.80
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Salem Road (day/night)
--------------------------------------------
Angle1 Angle2 : -90.00 deg  20.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Salem Road (day)
-------------------------------------
Source height = 1.48 m
ROAD (0.00 + 62.70 + 0.00) = 62.70 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>-90</td>
<td>20</td>
<td>0.66</td>
<td>70.76</td>
<td>0.00</td>
<td>-4.75</td>
<td>-3.31</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>62.70</td>
</tr>
</tbody>
</table>

Segment Leq : 62.70 dBA
Total Leq All Segments: 62.70 dBA

Results segment # 1: Salem Road (night)
Appendix B  Sample Calculations
May 23, 2017

---------------------------------------
Source height = 1.48 m

ROAD (0.00 + 55.47 + 0.00) = 55.47 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>-90</td>
<td>20</td>
<td>0.57</td>
<td>63.16</td>
<td>0.00</td>
<td>-4.50</td>
<td>-3.19</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>55.47</td>
</tr>
</tbody>
</table>

Segment Leq : 55.47 dBA

Total Leq All Segments: 55.47 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.70

AADT Adjustment for Salem Road: 10 dB

TOTAL Leq FROM ALL SOURCES AFTER ADJUSTMENT (DAY): 52.70
Appendix B  Sample Calculations
May 23, 2017

STAMSON 5.0        NORMAL REPORT        Date: 09-09-2016 13:27:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r02_nb.te            Time Period: Day/Night 16/8 hours
Description: Receptor R02 with Road Improvements

Road data, segment # 1: Salem Road (day/night)
----------------------------------------------
Car traffic volume :  8258/718  veh/TimePeriod  *
Medium truck volume :   676/59    veh/TimePeriod  *
Heavy truck volume  :   450/39    veh/TimePeriod  *
Posted speed limit  :    80 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):  10200
  Percentage of Annual Growth        :   0.00
  Number of Years of Growth          :   0.00
  Medium Truck % of Total Volume     :   7.20
  Heavy Truck % of Total Volume     :   4.80
  Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Salem Road (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  42.00 / 42.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Essa Road (day/night)
---------------------------------------------
Car traffic volume :  6599/986  veh/TimePeriod  *
Medium truck volume :   122/18    veh/TimePeriod  *
Heavy truck volume  :    82/12    veh/TimePeriod  *
Posted speed limit  :    80 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):   7820
  Percentage of Annual Growth        :   0.00
  Number of Years of Growth          :   0.00
  Medium Truck % of Total Volume     :   1.80
  Heavy Truck % of Total Volume     :   1.20
  Day (16 hrs) % of Total Volume     :  87.00
Data for Segment # 2: Essa Road (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 : 67.00 / 67.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1  (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Salem Road (day)

Source height = 1.48 m
ROAD (0.00 + 58.87 + 0.00) = 58.87 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>0</td>
<td>90</td>
<td>0.66</td>
<td>70.76</td>
<td>0.00</td>
<td>-7.42</td>
<td>-4.47</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>58.87</td>
</tr>
</tbody>
</table>

Segment Leq : 58.87 dBA

Results segment # 2: Essa Road (day)

Source height = 1.05 m
ROAD (0.00 + 46.29 + 0.00) = 46.29 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>45</td>
<td>90</td>
<td>0.66</td>
<td>66.13</td>
<td>0.00</td>
<td>-10.79</td>
<td>-9.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>46.29</td>
</tr>
</tbody>
</table>

Segment Leq : 46.29 dBA

Total Leq All Segments: 59.10 dBA

Results segment # 1: Salem Road (night)

Source height = 1.48 m
ROAD (0.00 + 51.27 + 0.00) = 51.27 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>0</td>
<td>90</td>
<td>0.66</td>
<td>63.16</td>
<td>0.00</td>
<td>-7.42</td>
<td>-4.47</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>51.27</td>
</tr>
</tbody>
</table>
Appendix B  Sample Calculations
May 23, 2017

Segment Leq : 51.27 dBA

Results segment # 2: Essa Road (night)
--------------------------------------
Source height = 1.04 m
ROAD (0.00 + 41.01 + 0.00) = 41.01 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>45</td>
<td>90</td>
<td>0.66</td>
<td>60.85</td>
<td>0.00</td>
<td>-10.79</td>
<td>-9.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>41.01</td>
</tr>
</tbody>
</table>

Segment Leq : 41.01 dBA

Total Leq All Segments: 51.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.10

AADT Adjustment for Salem Road: 10 dB

TOTAL Leq FROM ALL SOURCES AFTER ADJUSTMENT (DAY): 50.78
STAMSON 5.0 NORMAL REPORT Date: 09-09-2016 13:28:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: r03_wb.te Time Period: Day/Night 16/8 hours
Description: Receptor R03 with Road Improvements

Road data, segment # 1: Essa Road (day/night)
-------------------------------------------------------------
Car traffic volume : 5923/885 veh/TimePeriod *
Medium truck volume : 309/46 veh/TimePeriod *
Heavy truck volume : 206/31 veh/TimePeriod *
Posted speed limit : 60 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): 7400
  Percentage of Annual Growth : 0.00
  Number of Years of Growth : 0.00
  Medium Truck % of Total Volume : 4.80
  Heavy Truck % of Total Volume : 3.20
  Day (16 hrs) % of Total Volume : 87.00

Data for Segment # 1: Essa Road (day/night)
---------------------------------------------
Angle1 Angle2 : -30.00 deg  90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 32.00 / 32.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Essa Road (day)
------------------------------------
Source height = 1.34 m
ROAD (0.00 + 57.03 + 0.00) = 57.03 dBA

<table>
<thead>
<tr>
<th>Angle1 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>-30 90</td>
<td>0.66</td>
<td>65.34</td>
<td>0.00</td>
<td>-5.46</td>
<td>-2.85</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>57.03</td>
</tr>
</tbody>
</table>

Segment Leq : 57.03 dBA
Total Leq All Segments: 57.03 dBA
Appendix B  Sample Calculations
May 23, 2017

Results segment # 1: Essa Road (night)
---------------------------------------------------------------

Source height = 1.34 m

ROAD (0.00 + 51.80 + 0.00) = 51.80 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>-30</td>
<td>90</td>
<td>0.66</td>
<td>60.11</td>
<td>0.00</td>
<td>-5.46</td>
<td>-2.85</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>51.80</td>
</tr>
</tbody>
</table>

Segment Leq : 51.80 dBA

Total Leq All Segments: 51.80 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.03
ROAD TRAFFIC – NOISE IMPACT ASSESSMENT FOR SALEM SECONDARY PLAN AREA

Appendix B Sample Calculations
May 23, 2017

STAMSON 5.0        NORMAL REPORT        Date: 09-09-2016 13:28:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r04_wb.te            Time Period: Day/Night 16/8 hours
Description: Receptor R04 with Road Improvements

Road data, segment # 1: McKay Road (day/night)
----------------------------------------------
Car traffic volume  :  7862/778  veh/TimePeriod  *
Medium truck volume :   355/35    veh/TimePeriod  *
Heavy truck volume  :   237/23    veh/TimePeriod  *
Posted speed limit  :    80 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):   9290
  Percentage of Annual Growth        :   0.00
  Number of Years of Growth          :   0.00
  Medium Truck % of Total Volume     :   4.20
  Heavy Truck  % of Total Volume     :   2.80
  Day (16 hrs) % of Total Volume     :  91.00

Data for Segment # 1: McKay Road (day/night)
--------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  63.00 / 63.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: McKay Road (day)
-------------------------------------
Source height = 1.29 m

ROAD (0.00 + 54.62 + 0.00) = 54.62 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>-10</td>
<td>90</td>
<td>0.66</td>
<td>68.81</td>
<td>0.00</td>
<td>-10.35</td>
<td>-3.84</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>54.62</td>
</tr>
</tbody>
</table>

Segment Leq : 54.62 dBA
Total Leq All Segments: 54.62 dBA

Results segment # 1: McKay Road (night)
Source height = 1.29 m

ROAD (0.00 + 47.55 + 0.00) = 47.55 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>-10</td>
<td>90</td>
<td>0.66</td>
<td>61.74</td>
<td>0.00</td>
<td>-10.35</td>
<td>-3.84</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>47.55</td>
</tr>
</tbody>
</table>

Segment Leq : 47.55 dBA

Total Leq All Segments: 47.55 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.62
Appendix B  Sample Calculations
May 23, 2017

STAMSON 5.0        NORMAL REPORT        Date: 17-02-2017 12:34:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r06.te            Time Period: Day/Night 16/8 hours
Description: Receptor R06 with Road Improvements

Road data, segment # 1: McKay Road (day/night)
----------------------------------------------
Car traffic volume : 14836/1467 veh/TimePeriod *
Medium truck volume :   670/66    veh/TimePeriod *
Heavy truck volume  :   447/44    veh/TimePeriod *
Posted speed limit  :    80 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):  17530
Percentage of Annual Growth        : 0.00
Number of Years of Growth          : 0.00
Medium Truck % of Total Volume     : 4.20
Heavy Truck  % of Total Volume     : 2.80
Day (16 hrs) % of Total Volume     : 91.00

Data for Segment # 1: McKay Road (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  :  41.00 / 41.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -70.00 deg   Angle2 : 70.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           : 0.00

Results segment # 1: McKay Road (day)
-------------------------------------
Source height = 1.29 m

Barrier height for grazing incidence
-------------------------------------
Source ! Receiver ! Barrier ! Elevation of Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-------------------------------------+-------------------------------------
1.29 !     1.50 !       1.48 !       1.48
### Appendix B  Sample Calculations

May 23, 2017

**ROAD TRAFFIC – NOISE IMPACT ASSESSMENT FOR SALEM SECONDARY PLAN AREA**

#### Segment 1: McKay Road (night)

**Source height = 1.29 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>1.29</td>
<td>1.50</td>
<td>1.48</td>
<td>1.48</td>
</tr>
</tbody>
</table>

**ROAD** (49.53 + 45.43 + 49.53) = 53.31 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>-90</td>
<td>-70</td>
<td>0.66</td>
<td>71.56</td>
<td>0.00</td>
<td>-7.25</td>
<td>-14.79</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>49.53</td>
</tr>
<tr>
<td>-70</td>
<td>70</td>
<td>0.37</td>
<td>71.56</td>
<td>0.00</td>
<td>-5.97</td>
<td>-1.55</td>
<td>0.00</td>
<td>0.00</td>
<td>-18.62</td>
<td>45.43</td>
</tr>
<tr>
<td>70</td>
<td>90</td>
<td>0.66</td>
<td>71.56</td>
<td>0.00</td>
<td>-7.25</td>
<td>-14.79</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>49.53</td>
</tr>
</tbody>
</table>

Segment Leq : 53.31 dBA

Total Leq All Segments: 53.31 dBA

**Results segment # 1: McKay Road (night)**

---

**Source height = 1.29 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>1.29</td>
<td>1.50</td>
<td>1.48</td>
<td>1.48</td>
</tr>
</tbody>
</table>

**ROAD** (42.48 + 38.38 + 42.48) = 46.26 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>-90</td>
<td>-70</td>
<td>0.66</td>
<td>64.51</td>
<td>0.00</td>
<td>-7.25</td>
<td>-14.79</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>42.48</td>
</tr>
<tr>
<td>-70</td>
<td>70</td>
<td>0.37</td>
<td>64.51</td>
<td>0.00</td>
<td>-5.97</td>
<td>-1.55</td>
<td>0.00</td>
<td>0.00</td>
<td>-18.62</td>
<td>38.38</td>
</tr>
<tr>
<td>70</td>
<td>90</td>
<td>0.66</td>
<td>64.51</td>
<td>0.00</td>
<td>-7.25</td>
<td>-14.79</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>42.48</td>
</tr>
</tbody>
</table>

Segment Leq : 46.26 dBA

Total Leq All Segments: 46.26 dBA

**TOTAL Leq FROM ALL SOURCES (DAY): 53.31**
Appendix B Sample Calculations
May 23, 2017

STAMSON 5.0 NORMAL REPORT Date: 17-02-2017 12:34:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r08_wb.te Time Period: Day/Night 16/8 hours
Description: Receptor R08 with Road Improvements

Road data, segment # 1: Huronia Rd (day/night)
----------------------------------------------
Car traffic volume : 17313/1712 veh/TimePeriod *
Medium truck volume : 1417/140 veh/TimePeriod *
Heavy truck volume : 944/93 veh/TimePeriod *
Posted speed limit : 80 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): 21620
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.20
Heavy Truck % of Total Volume : 4.80
Day (16 hrs) % of Total Volume : 91.00

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 : 68.00 / 68.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -80.00 deg Angle2 : 80.00 deg
Barrier height : 5.00 m
Barrier receiver distance : 3.00 / 3.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Huronia Rd (day)
-------------------------------------
Source height = 1.48 m

Barrier height for grazing incidence
-------------------------------------
Source ! Receiver ! Barrier ! Elevation of Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-------------------------------------
1.48 ! 1.50 ! 1.50 ! 1.50

Stantec
Appendix B  Sample Calculations
May 23, 2017

ROAD (43.31 + 46.35 + 43.31) = 49.34 dBA

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</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>-90</td>
<td>-80</td>
<td>0.66</td>
<td>73.97</td>
<td>0.00</td>
<td>-10.90</td>
<td>-19.76</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>-80</td>
<td>80</td>
<td>0.36</td>
<td>73.97</td>
<td>0.00</td>
<td>-8.93</td>
<td>-1.14</td>
<td>0.00</td>
<td>0.00</td>
<td>-17.55</td>
</tr>
<tr>
<td>80</td>
<td>90</td>
<td>0.66</td>
<td>73.97</td>
<td>0.00</td>
<td>-10.90</td>
<td>-19.76</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment Leq : 49.34 dBA

Total Leq All Segments: 49.34 dBA

Results segment # 1: Huronia Rd (night)

Source height = 1.48 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>1.48</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
</tr>
</tbody>
</table>

ROAD (36.26 + 39.30 + 36.26) = 42.30 dBA

<table>
<thead>
<tr>
<th>Angle1</th>
<th>Angle2</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>-90</td>
<td>-80</td>
<td>0.66</td>
<td>66.92</td>
<td>0.00</td>
<td>-10.90</td>
<td>-19.76</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>-80</td>
<td>80</td>
<td>0.36</td>
<td>66.92</td>
<td>0.00</td>
<td>-8.93</td>
<td>-1.14</td>
<td>0.00</td>
<td>0.00</td>
<td>-17.55</td>
</tr>
<tr>
<td>80</td>
<td>90</td>
<td>0.66</td>
<td>66.92</td>
<td>0.00</td>
<td>-10.90</td>
<td>-19.76</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment Leq : 42.30 dBA

Total Leq All Segments: 42.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.34