Appendix K ROAD TRAFFIC NOISE IMPACT ASSESSMENT

Road Traffic Noise Impact Assessment for Living Arts Drive Extension

FINAL
Proposed Extension of Living Arts Drive, Rathburn Road to Centre View Drive

Prepared for:
The City of Mississauga
300 City Centre Drive
Mississauga, Ontario L5B 3C1

Prepared by:
Stantec Consulting Ltd.
300W – 675 Cochrane Drive
Markham, Ontario L3R 0B8

File 165011016

November 20, 2017

Sign-off Sheet

This document entitled Road Traffic Noise Impact Assessment for Living Arts Drive Extension was prepared by Stantec Consulting Ltd. ("Stantec") for the account of the City of Mississauga (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 
(signature)

George Papadakos, B.A.Sc.
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Executive Summary

On behalf of the City of Mississauga (the City), Stantec Consulting Ltd. (Stantec) completed a road traffic noise impact assessment of the preliminary design drawings completed as part of Municipal Class Environmental (EA) process for Living Arts Drive from Rathburn Road West to Centre View Drive. The analysis focused on the noise impact on nearby residential dwellings due to changes resulting from the proposed extension of Living Arts Drive between Rathburn Road West and Centre View Drive in the City.

This report summarizes the potential noise impacts due to the proposed road extension at the representative noise sensitive receptors (i.e., residential dwellings). The need for noise mitigation was assessed based on the requirements of the City and Ontario Ministry of Transportation (MTO)guidelines.

The projected sound levels at the outdoor living areas (OLA) did not exceed the 60 dBA (Decibel, A-weighted) objected level at any of the identified receptors. The projected sound levels increased by 1 dB with the extension when compared to the future sound level without the expansion. Therefore, no barriers were recommended within this report. The report concludes that the City's and MTO's noise objectives are met without the need for a barrier.

Abbreviations

dB	Decibel
dBA	Decibel, A-weighted
L_{eq}	Energy Equivalent Sound Level
m	metre
MES	most exposed side
MTO	Ministry of Transportation Ontario
NIA	Noise Impact Assessment
NSA	noise sensitive area
OLA	Outdoor Living Area
POR	point(s) of reception
SPL	Sound Pressure Level
ZOI	zone of influence

Glossary

Acoustic Fence	A wall or a similar structure used as a noise control measure.
Administrative Feasibility of Noise Mitigation Measures	The ability to locate and maintain the noise mitigation on lands within public ownership (i.e., provincial, or municipal right-of-way).
Airborne Sound	Sound that reaches the point of interest by propagation through air.
Attenuation	The reduction of sound pressure achieved by various means (e.g., barrier, intermediate ground surface, intervening houses and/or trees).
A-Weighting	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.
Barrier	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.
Capital Road Projects	Road construction projects on regional roads (e.g. road expansion or improvement).
Daytime	Defined as the hours from 07:00h to 23:00h.
Decibel	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.
Decibel, A-weighted	A-weighted decibels (dBA). Most common units for expressing sound levels since they approximate the response of the human ear.
Energy Equivalent Sound Level (Leq)	An energy-equivalent sound level (Leq) 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 a period. The period is often added as a suffix to the label (i.e., Leq(16) for the 16-hour equivalent sound level). An Leq value expressed in dBA is a good, single-value descriptor to use as a measure of road traffic impact.
Mitigation	Measures taken to reduce, eliminate, or control impacts on the environment.
Night-time	Defined as the hours from 23:00h to 07:00h in Ontario
Noise	Any unwanted sound. "Noise" and "sound" are used interchangeably in this document.
Noise Barrier	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.
Noise level	Same as sound level.
Sound	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).
Sound Level	Generally, sound level refers to the weighted sound pressure level obtained by frequency weighting, usually A- weighted, and expressed in decibels
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, topography, achieve a 6 dB reduction, ability to provide a continuous barrier, etc.).

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by the City of Mississauga (the City) to conduct a Noise Impact Assessment (NIA) for the extension of Living Arts Drive Extension, herein referred to as "the Project", located in Mississauga, Ontario. The study is based on the preliminary design drawings completed to date for the proposed extension of Living Arts Drive, from Rathburn Road West to Centre View Drive. A copy of the preliminary design drawings is provided in Appendix A of this report. The analysis focused on the noise impact on the noise sensitive areas (NSAs) along the Project, as well as the associated intersections and approaches.

The Project is being carried out in accordance with the Municipal Engineers Association's Municipal Class Environmental Assessment document (October 2000, as amended in 2015) for a Schedule B undertaking. The purpose of this NIA is to assess the potential acoustical effects of the Project at nearby identified NSAs. This assessment compares future sound level effect of the Project with and without proposed extension to determine the incremental change in acoustical environment.

This study assesses the potential acoustical effects at the representative points of reception (POR) in accordance with the City of Mississauga Policy No 09-03-03 dated April 13, 2011.

1.1 STUDY AREA

Living Arts Drive is a minor collector road under the jurisdiction of the City. The Study Area extends approximately 200 metres (m) from Rathburn Road West to Centre View Drive. New intersections are proposed at Rathburn Road West and Centre View Drive.

The Study Area is predominantly mixed land uses with existing residential dwellings to the south and west (a Zoning Map is included in Appendix B). The Study Area is shown in Figure 1.

1.2 PROJECT OVERVIEW

The existing portion of Living Arts Drive to the south of Rathburn Road West has two travelled lanes (one in each direction). The proposed extension from Rathburn Road West to Centre View Drive is also planned to have two travel lanes with a turn lane at applicable intersections. A new mid-block intersection is proposed as part of the Living Arts Drive extension, as well as a signal-controlled intersection with Centre View Drive. This report focuses on the noise impact on nearby receptors from the future road traffic on travel lanes of the Project.

Legend

Study Area

0 100 200 metres

1:7,500 (at original document size of 8.5x11)

Stantec

Project Location
City Of Mississauga

165011016 REVA
Prepared by SPE on 2017-10-27
Technical Review by BCC on 2017-10-27

Client/Project
CITY OF MISSISSAUGA
CLASS EA STUDY-LIVING ARTS DRIVE
ROAD TRAFFIC NOISE IMPACT ASSESSMENT

Figure No.
1

Title
Study Area

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2016.

2.0 GUIDELINES

2.1 ENVIRONMENTAL NOISE – ROAD OPERATION

Noise is recognized as a contaminant in the *Environmental Protection Act*, as unmitigated noise can have effects on human activities. Environmental noise assessment for road extension projects is typically assessed based on 16-hour daytime equivalent sound levels. The term "sound level" refers to the equivalent continuous sound pressure level (L_{eq}) expressed in A-weighted decibels (dBA) having the same total sound energy as a time-varying sound pressure level over a specified time period (e.g., 16 hours). It is also worth noting that, although environmental noise is reported in dBA, the difference between two A-weighted values is reported in decibels (dB).

Elimination or control of the course of noise is usually a primary objective, however, there are general limits as to what is practically and technically feasible. Since the main practical noise mitigation measure under a road extension project is the use of noise barriers (as alterations to existing residential building envelopes is not considered practically feasible), the road traffic NIA is limited to assessing sound levels of at-grade outdoor living areas (OLAs) during the daytime period only (07:00 h to 23:00 h).

The following sections describe the applicable noise guidelines and criteria used in the road traffic assessment.

2.1.1 Ministry of Transportation Ontario (MTO)

The MTO document "Environmental Guide for Noise", (October 2006, updated July 2008), is used to assess the potential noise impact due to freeway improvement projects. This document requires noise assessment be conducted at a POR of the NSA at the most exposed side (POR, most exposed side). If the change in sound level due to the proposed improvement above the future ambient sound level is 5 dB or less, and the projected sound level with the proposed roadway improvements is less than 65 dBA, then no mitigation effort is required.

If the change in the future sound level at the POR with improvement (i.e., future Project sound level) and without improvement (i.e. future ambient) is greater than or equal to 5 dB, or the projected overall sound levels with the proposed improvements is greater than or equal to 65 dBA, feasibility of noise control measures within the road right-of-way should be investigated to meet the sound level requirements at the OLAs. The investigation shall consider its technical, economical and administrative feasibility (refer to glossary for definitions) of reducing sound level at the OLA of the receptor.

2.1.2 City of Mississauga Noise Attenuation Barriers on Major Roadways Policy

The City document 09-03-03, "Noise Attenuation Barriers on Major Roadways" (April 2011) identifies responsibilities for construction and maintenance of noise attenuation barriers.

The City requires that a noise assessment be conducted at the OLA if the residential area is adjacent to municipal highways, arterial and major collector roads. It provides the following criteria for installation of noise barriers:

- The noise level must be greater than 60 dBA (L_{eq} daytime). (L_{eq} means "equivalent sound level" and daytime means 7:00 a.m. to 11:00 p.m. L_{eq} daytime means daytime average.)
- The residential area must be adjacent to arterial and major collector roads, as designated in the Official Plan. Retrofit or replacements will not be considered adjacent to freeways or railway tracks, as they are not under the jurisdiction of the City.
- Barriers must be installed on a complete block to ensure their effectiveness.

2.1.3 Region of Peel Noise Guideline and City of Mississauga Noise By-Law

The Region of Peel noise guideline "General Guidelines for the Preparation of Acoustical Reports in the Region of Peel" is meant for land use planning where noise sensitive developments are planned near roadways.

The City by-law 360-79 and its amendments prohibit construction in quiet zone without the use of an effective exhaust or intake muffling device in good working order and in constant operation.

2.1.4 Summary

Based on the above discussion, the City's policy 09-03-03 was applied as Living Arts Drive is under the jurisdiction of the City, and given that the City's criteria are more stringent than the MTO's 65 dBA objective limit.

2.2 ENIRONMENTAL NOISE – ROAD CONSTRUCTION

The MTO or Ministry of Environment and Climate Change (MOECC) does not stipulate overall sound level limits for construction activities in the same way that limits are stipulated for noise sources during facility operation. Instead, the MOECC publication "Construction Equipment, Model Municipal Control By-Law (NPC-115)" (MOE 1978a) sets sound emission standards for various types of construction equipment according to their power rating and date of manufacture. This publication does not set receptor-based sound level limits, due to the temporary nature of construction activities, but rather sets limits for noise generated by each individual piece of equipment.

Table 1 illustrates maximum noise emission levels which should be adhered to for typical construction equipment per NPC-115.

Table 1: NPC-115 Noise Emission Limits for Construction Equipment

Type of Equipment	Maximum Sound Level (dBA)
Excavation equipment, bulldozers, loaders, backhoes, or other equipment[1]	83 (for Power Rating less than 75 kW)
	85 (for Power Rating 75 kW and greater)
Pneumatic Pavement Breakers[2]	85
Portable Air Compressors[2]	70

[1] Maximum Sound Level (dBA), as determined using Publication NPC-103 – Procedures, Section 6.
[2] Maximum Sound Level (dBA), as measured using Publication NPC-103 – Procedures, Section 7.

In addition, NPC-115 emphasizes the importance of: good maintenance of construction equipment; considerate use of construction equipment over the nighttime periods, holidays, and weekends; and, emphasizes the use of administrative controls. This is also consistent with City requirements. The City by-law 360-79 and its amendments prohibits construction in areas within the City where quiet is of importance without the use of an effective exhaust or intake muffling device in good working order and in constant operation.

In summary, both MOECC's NPC-115 and City of Mississauga's by-law were applied.

3.0 NOISE ASSESSMENT METHODOLOGY

3.1 ROAD TRAFFIC DATA

Road traffic data for Living Arts Drive, Centre View Drive, Confederation Parkway, and Rathburn Road West were obtained from design team (included in Appendix C). The traffic data is summarized below in Table 2.

Table 2: Road Traffic Data

Road	Annual Average Daily Traffic (AADT)		Posted Speed Limit (km/h)[1]	% Truck[2]	Day/Night Split
	Existing (Before Construction) 2017	Mature State of Development 2031			
Living Arts Drive	1,500	10,500	50	6	90/10
Centre View Drive	24,000	32,000	70	5	90/10
Confederation Parkway	27,000	40,500	50	2	90/10
Rathburn Road	21,000	28,000	50	3	90/10

[1] For Living Arts Drive extension, a speed limit of 50 km/h was assumed, which is consistent with similar roads in the area.
[2] Medium / Heavy truck split of 55/45 was used in the assessment.

3.2 NOISE PREDICTION AND ASSESSMENT METHODS

Road traffic sound levels were assessed 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 of Environment and Transportation) and STEM (Sound from Trains and Environmental Analysis Method). STAMSON is an approved noise prediction methodology of the MOECC.

Based on the traffic data provided, daytime sound levels were calculated at the OLAs near the Project. Sample calculations are provided in Appendix D. OLAs were selected for nearby residential dwellings to the west of Living Arts Drive based on their proximity and exposure. The OLA locations were selected in the rear yard in accordance with the guideline requirements. No at-grade OLAs were located for the nearby apartment complexes to the south and west of the Project.

If the calculated daytime level at the OLAs are above the guideline requirement of 60 dBA, the use of noise attenuation barriers need to be explored. It should be noted that there is an existing concrete acoustical fence along the north side of Rathburn Road which extends around the OLAs in the area.

Using the traffic data provided in Table 2, energy equivalent sound levels over a 16-hour period, L_{eq} (16), were calculated at OLAs within the Study Area. The source-receiver distances were obtained from design drawings and aerial imagery. Design drawings are included in Appendix A.

3.3 LOCATIONS OF OUTDOOR LIVING AREAS

Two (2) receptor locations representing the OLAs were selected from the existing residential dwellings near the Project. The OLA locations were modeled as 1.5 m above grade, 3 m from the building façade and aligned with the midpoint of the applicable façade.

Table 3 summarizes the municipal addresses of the receptors considered in the assessment and Figure 2 shows the locations of the receptors.

Table 3: Receptor Locations

Receptor ID[1]	Municipal Address	UTM Coordinates (17T, NAD83)	
		Easting (m)	Northing (m)
R01	439 Greenpark Crescent	608630	4827134
R02	4354 Elora Drive	608753	4827073

[1] Refer to Figure 1 for receptor locations.

Other residences with similar setback and orientation to the noise source are expected to receive similar sound exposure and noise impacts. Therefore, the selected locations were considered representative of several dwellings with similar setbacks.

3.4 CONSTRUCTION NOISE

The construction noise would be considered qualitatively in conjunction with MOECC's publication NPC-115 and the City by-law 360-79.

It is expected that construction phase will occur over several months. Construction equipment will include sources such as bulldozers, excavators, large and medium sized trucks, and hydraulic shovels. A complete list of expected construction equipment (stationary and mobile) considered for this project is not available, however, it is anticipated above noted typical equipment units will be used.

Legend

- Study Area
- Receptor Location

0 100 200 metres

1:7,500 (at original document size of 8.5x11)

Stantec

Project Location
City Of Mississauga

165011016 REVA
Prepared by SPE on 2017-10-27
Technical Review by BCC on 2017-10-27

Client/Project
CITY OF MISSISSAUGA
CLASS EA STUDY-LIVING ARTS DRIVE
ROAD TRAFFIC NOISE IMPACT ASSESSMENT

Figure No.
2

Title
Receptor Locations

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2017. Imagery Date, 2016.

4.0 RESULTS AND DISCUSSION

4.1 NOISE DUE TO ROAD OPERATION

Table 4 summarizes the predicted sound levels at the mature state of development (2031), with and without the extension, at the representative receptor locations.

Table 4: Sound Level Results

Receptor ID	Projected Sound Level Leq 16-hr (dBA)		Change in Projected Sound Levels (dB)[1]	With extension exceeds 60 dBA? (Yes or No)	Change in Projected Sound Levels Exceeds 5 dB? (Yes or No)
	With Extension 2031	Without Extension 2031			
R01	55	54	1	No	No
R02	52	52	0	No	No

[1] As described in Section 2.1, the difference between two A-weighted values is reported in decibels (dB).

The projected sound levels at the mature state of development do not exceed the 60 dBA objective level at any of the receptor locations. Also, the change in projected sound levels did not exceed 1 dB.

4.2 NOISE DUE TO ROAD CONSTRUCTION

Standard measures for mitigation noise emissions shall be implemented for construction. These measures will include, but will not be limited to:

- Standard noise mitigation measures (e.g. muffler systems).
- Construction equipment to be turned off when not in use (i.e. a no idling policy).
- In addition, if construction is planned during evening, weekends, and statutory holidays, a by-law exemption shall be considered during detailed engineering stage.

5.0 CONCLUSIONS AND CLOSURE

Stantec was retained by the City of Mississauga to prepare a Road Traffic Noise Impact Assessment for the Living Arts Drive Extension Municipal Class EA in the City of Mississauga. Based on information available at the time of this report, Stantec's assessment predicted that the proposed improvements will result in a change in future sound levels of 1 dB or less at each identified receptor. No future sound levels were predicted to exceed the objective level of 60 dBA. Thus, the feasibility of noise mitigation measures was not investigated.

6.0 REFERENCES

City of Mississauga. 1980. Noise Control By-Law No.360-79. Available at http://www.mississauga.ca/file/COM/noiseupdate.pdf. Accessed September 2017.

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International Organization for Standardization (ISO). 1996b. ISO 9613-2, Attenuation of sound during propagation outdoors – Part 2: General method of calculation. Geneva, Switzerland.

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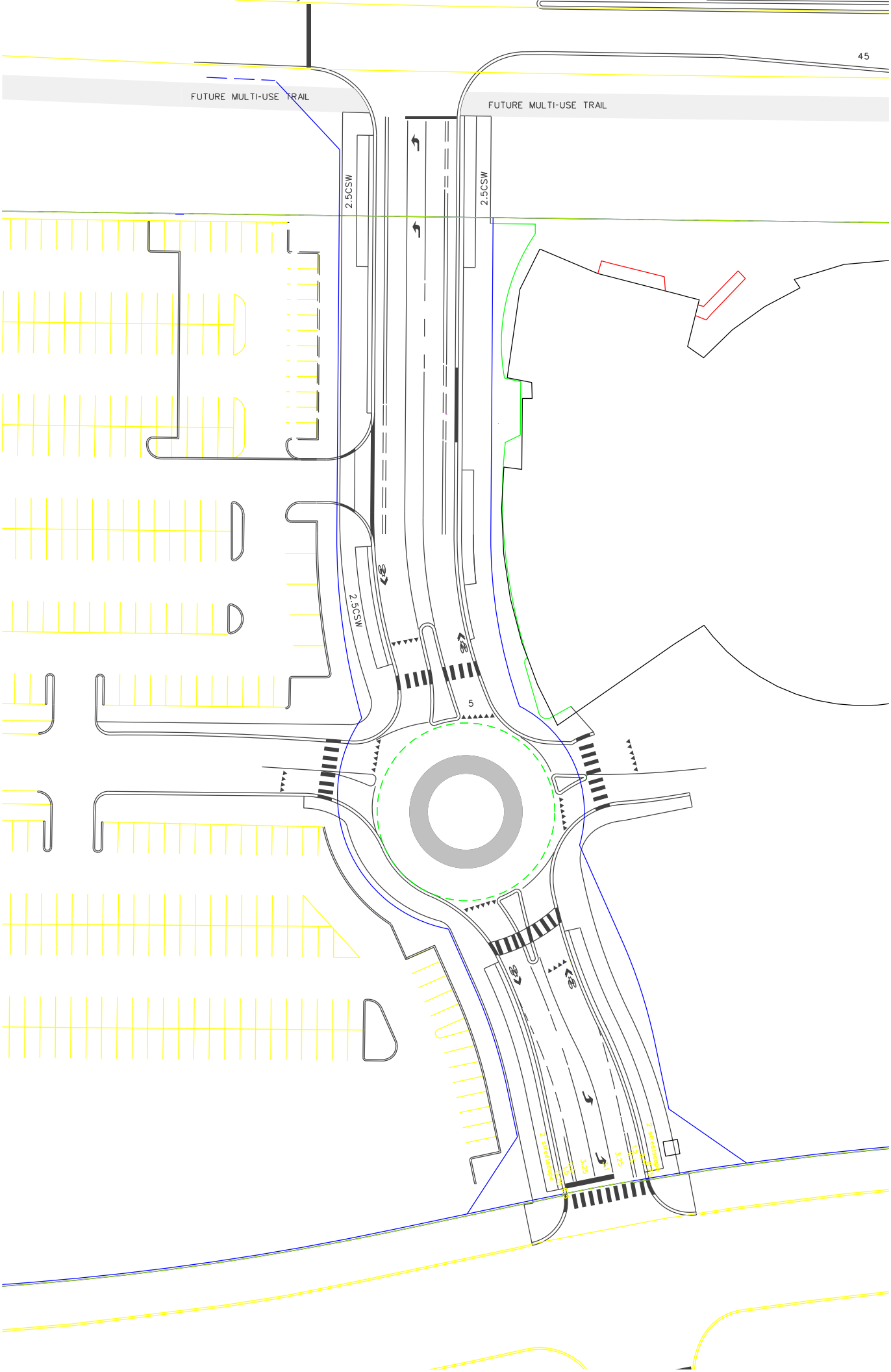
Municipal Engineers Association (MEA). 2000. Municipal Class Environmental Assessment. October 2000, as amended in 2007 and 2011.

Ministry of Transportation Ontario (MTO). 2006. Environmental Guide for Noise. St. Catharines, Ontario.

Ontario Ministry of the Environment. 1989. Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT).

United States Federal Transit Administration (FTA). 2006. FTA Transit Noise and Vibration Impact Assessment. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed September 2017.

Appendix A PRELIMINARY DESIGN DRAWING


45
FUTURE MULTI-USE TRAIL
FUTURE MULTI-USE TRAIL
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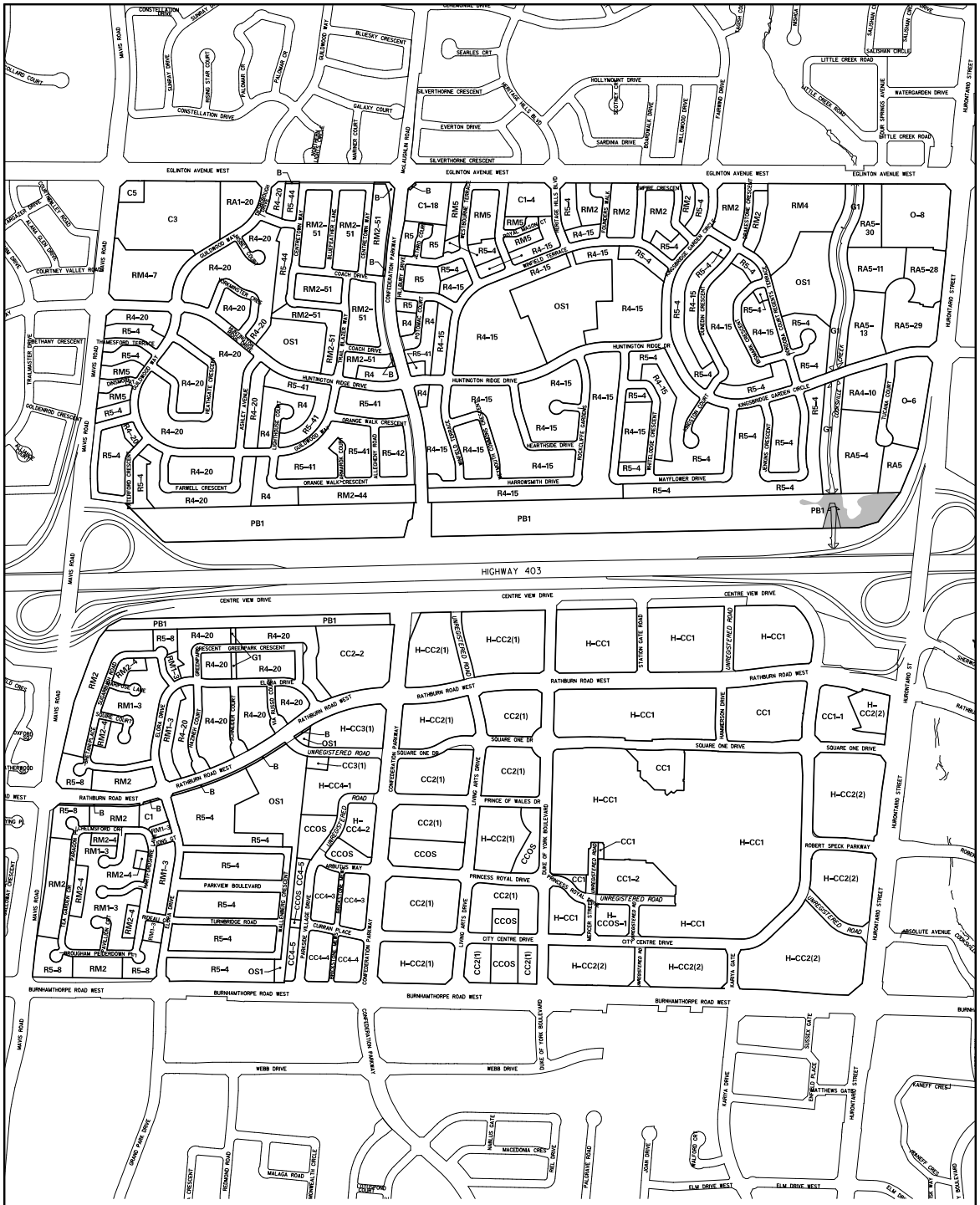
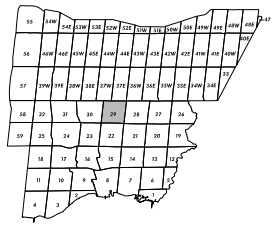
2.5CSW
2.5CSW
5
3.25
3.25

Appendix B ZONING MAPS

37W 37E

30 28





MISSISSAUGA

0 100 200
METRES

Greenlands Overlay

Zoning Notation Example:
R4–12 = R4–Exception 12

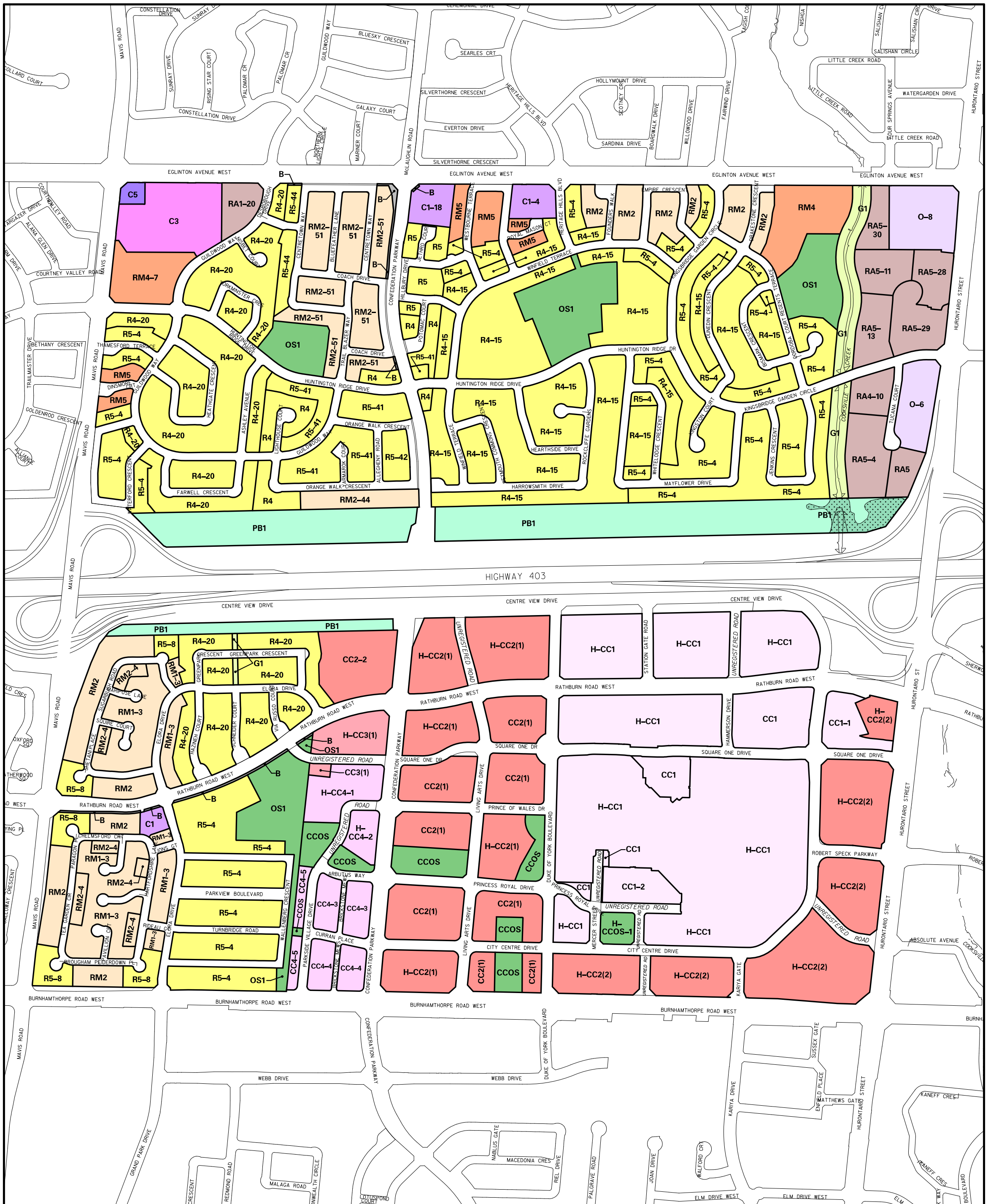
Zoning
Map 29

Schedule "B" To
By–law No. 0225–2007

Revised: 2016 December 31

37W

37E



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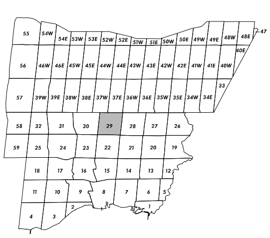

Greenlands Overlay

Zoning Notation Example:
R4-12 = R4-Exception 12

0 100 200
METRES

MISSISSAUGA

Zoning Map 29

Schedule "B" To
By-law No. 0225-2007

Revised: 2016 December 31

Appendix C ROAD TRAFFIC DATA

From: Kaczmarek, Martin
To: Bradley, Michael
Cc: Tomeo, Francois; Addley, Diana
Subject: RE: Living Arts Drive Extension Class EA - AADT data
Date: Monday, September 25, 2017 5:21:02 PM

Hi Mike,

Please see below for the AADT and HV% estimates for the existing and horizon year scenarios. Since the trip characteristics are expected to change with the extension of Living Arts Drive, it was assumed that Living Arts Drive would experience the same HV% as Duke of York Boulevard in the horizon year scenarios. Let me know if you have any questions or comments.

Table 1 - Existing AADT and HV%

Segment		Year 2017	
		AADT	HV%
Centre View Drive:	W of Duke of York Boulevard	24000	5%
Confederation Parkway:	N of Rathburn Road	27000	2%
Rathburn Road:	W of Duke of York Boulevard	22500	4%
Rathburn Road:	W of Living Arts Drive	21000	3%
Living Arts Drive:	N of Rathburn Road	1500	1%
Living Arts Drive:	S of Rathburn Road	3500	5%

Table 2 - Forecast AADT and HV%

Segment		Year					
		2021		2031		2041	
		AADT	HV%	AADT	HV%	AADT	HV%
Centre View Drive:	W of Duke of York Boulevard	24500	5%	28500	5%	28000	5%
Centre View Drive:	W of Living Arts Drive	27500	5%	32000	5%	36500	5%
Confederation Parkway:	N of Rathburn Road	37000	2%	40500	2%	39000	2%
Rathburn Road:	W of Duke of York Boulevard	23000	4%	25500	4%	38500	4%
Rathburn Road:	W of Living Arts Drive	25500	3%	28000	3%	30500	3%
Living Arts Drive:	S of Centre View Drive	7000	6%	10000	6%	23500	6%
Living Arts Drive:	N of Rathburn Road	8000	6%	10500	6%	24000	6%
Living Arts Drive:	S of Rathburn Road	10000	4%	12000	4%	17500	4%
Cineplex Access:	W of Duke of York Boulevard	1000	1%	1000	1%	1000	1%
Cineplex Access:	W of Living Arts Drive	1000	1%	1000	1%	1000	1%

Thanks,

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Phone: (416) 507-3443
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From: Bradley, Michael
Sent: Thursday, September 21, 2017 3:34 PM
To: Kaczmarek, Martin <Martin.Kaczmarek@stantec.com>
Cc: Tomeo, Francois <Francois.Tomeo@stantec.com>; Addley, Diana <Diana.Addley@stantec.com>
Subject: Living Arts Drive Extension Class EA - AADT data

Hi Martin,

Similar to the information you prepared for the Square One Drive Extension Class EA, would you be able to compile the **AADTs** and **heavy vehicle percentages** for the following scenarios/locations to support the air quality and noise assessments?

- existing conditions
  - Centre View Drive, west of Duke of York Boulevard
  - Rathburn Road West, between Confederation Parkway and Duke of York Boulevard
  - Living Arts Drive, north of Rathburn Road West
  - Living Arts Drive, between Rathburn Road West and Square One Drive
  - Confederation Parkway, north of Rathburn Road West

- for each future horizon year (i.e. 2021, 2031, and 2041):
  - Centre View Drive, west of Living Arts Drive
  - Centre View Drive, between Living Arts Drive and Duke of York
  - Rathburn Road West, between Living Arts Drive and Confederation Parkway
  - Rathburn Road West, between Living Arts Drive and Duke of York Boulevard
  - Cineplex driveway, west of Living Arts Drive
  - Cineplex driveway, east of Living Arts Drive
  - Living Arts Drive, between Rathburn Road West and Centre View Drive
  - Living Arts Drive, between Rathburn Road West and Square One Drive
  - Confederation Parkway, north of Rathburn Road West

Let me know if you have any questions.

Thanks,
- Mike

Mike Bradley, P.Eng.
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Phone: (905) 944-7763
Cell: (289) 552-2266
mike.bradley@stantec.com

Appendix D SAMPLE STAMSON CALCULATIONS

STAMSON 5.0 NORMAL REPORT Date: 16-10-2017 11:45:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r01wext.te Time Period: Day/Night 16/8 hours
Description: R01 with extension

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

Car traffic volume : 8883/987 veh/TimePeriod *
Medium truck volume : 312/35 veh/TimePeriod *
Heavy truck volume : 255/28 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 10500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.30
Heavy Truck % of Total Volume : 2.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Living Arts (day/night)

Angle1 Angle2 : -45.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 350.00 / 350.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -45.00 deg Angle2 : 0.00 deg
Barrier height : 2.20 m
Barrier receiver distance : 7.00 / 7.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Road data, segment # 2: Confed Pkwy (day/night)

Car traffic volume : 35721/3969 veh/TimePeriod *
Medium truck volume : 401/45 veh/TimePeriod *
Heavy truck volume : 328/36 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 40500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.10
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Confed Pkwy (day/night)

```
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 210.00 / 210.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :   7.00 / 7.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Road data, segment # 3: Centre View (day/night)
-----------------------------------------------
Car traffic volume  : 27360/3040  veh/TimePeriod  *
Medium truck volume :   792/88    veh/TimePeriod  *
Heavy truck volume  :   648/72    veh/TimePeriod  *
Posted speed limit  :    70 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  32000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.75
    Heavy Truck  % of Total Volume     :   2.25
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Centre View (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  :  95.00 / 15.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  29.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Road data, segment # 4: Rathburn (day/night)
--------------------------------------------
Car traffic volume  : 24444/2716  veh/TimePeriod  *
Medium truck volume :   416/46    veh/TimePeriod  *
Heavy truck volume  :   340/38    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

```
    24 hr Traffic Volume (AADT or SADT):  28000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.65
    Heavy Truck  % of Total Volume     :   1.35
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: Rathburn (day/night)
------------------------------------------
Angle1   Angle2           :  65.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 170.00 / 170.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  65.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Results segment # 1: Living Arts (day)
--------------------------------------

Source height = 1.28 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.28 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 38.53 + 0.00) = 38.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45      0   0.00  64.75   0.00 -13.68  -6.02   0.00   0.00  -6.51  38.53
-------------------------------------------------------------------------------

Segment Leq : 38.53 dBA

♀
Results segment # 2: Confed Pkwy (day)
--------------------------------------

Source height = 0.97 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.97 !        1.50 !        1.48 !         1.48

ROAD (0.00 + 47.41 + 0.00) = 47.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  67.99   0.00 -11.46  -3.01   0.00   0.00  -6.11  47.41
-------------------------------------------------------------------------------
```

Segment Leq : 47.41 dBA

♀
Results segment # 3: Centre View (day)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	1.50	1.42	1.42

ROAD (0.00 + 53.13 + 0.00) = 53.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.54	72.17	0.00	-12.32	-1.24	0.00	0.00	-5.48	53.13

Segment Leq : 53.13 dBA

♀
Results segment # 4: Rathburn (day)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	1.50	1.47	1.47

ROAD (0.00 + 42.81 + 0.00) = 42.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
65	90	0.00	67.21	0.00	-10.54	-8.57	0.00	0.00	-5.28	42.81

Segment Leq : 42.81 dBA

Total Leq All Segments: 54.58 dBA

♀
Barrier table for segment # 1: Living Arts (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	32.37	32.37
4.20	4.20	30.74	30.74
4.70	4.70	29.36	29.36
5.20	5.20	28.18	28.18
5.70	5.70	27.15	27.15
6.20	6.20	26.25	26.25
6.70	6.70	25.47	25.47
7.20	7.20	25.13	25.13
7.70	7.70	25.05	25.05

8.20	8.20	25.05	25.05

Barrier table for segment # 2: Confed Pkwy (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	43.13	43.13
4.20	4.20	41.98	41.98
4.70	4.70	40.98	40.98
5.20	5.20	40.10	40.10
5.70	5.70	39.32	39.32
6.20	6.20	38.62	38.62
6.70	6.70	38.01	38.01
7.20	7.20	37.53	37.53
7.70	7.70	37.14	37.14
8.20	8.20	36.81	36.81

Barrier table for segment # 3: Centre View (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	51.59	51.59
4.20	4.20	51.02	51.02
4.70	4.70	50.50	50.50
5.20	5.20	50.03	50.03
5.70	5.70	49.62	49.62
6.20	6.20	49.26	49.26
6.70	6.70	48.96	48.96
7.20	7.20	48.69	48.69
7.70	7.70	48.46	48.46
8.20	8.20	48.26	48.26

Barrier table for segment # 4: Rathburn (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	41.08	41.08
4.20	4.20	40.41	40.41
4.70	4.70	39.74	39.74
5.20	5.20	39.11	39.11
5.70	5.70	38.51	38.51
6.20	6.20	37.95	37.95
6.70	6.70	37.43	37.43
7.20	7.20	36.94	36.94
7.70	7.70	36.48	36.48
8.20	8.20	36.05	36.05

♀
Results segment # 1: Living Arts (night)

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	4.50	4.44	4.44

ROAD (0.00 + 38.49 + 0.00) = 38.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	0	0.00	58.19	0.00	-13.68	-6.02	0.00	0.00	0.00	38.49*
-45	0	0.00	58.19	0.00	-13.68	-6.02	0.00	0.00	0.00	38.49

* Bright Zone !

Segment Leq : 38.49 dBA

♀

Results segment # 2: Confed Pkwy (night)

Source height = 0.97 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.97	4.50	4.38	4.38

ROAD (0.00 + 46.98 + 0.00) = 46.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	61.45	0.00	-11.46	-3.01	0.00	0.00	-0.25	46.73*
-90	0	0.00	61.45	0.00	-11.46	-3.01	0.00	0.00	0.00	46.98

* Bright Zone !

Segment Leq : 46.98 dBA

♀

Results segment # 3: Centre View (night)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	4.50	2.32	2.32

ROAD (0.00 + 64.32 + 0.00) = 64.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.45	65.64	0.00	0.00	-1.07	0.00	0.00	-4.94	59.63*
-90	90	0.58	65.64	0.00	0.00	-1.32	0.00	0.00	0.00	64.32

* Bright Zone !

Segment Leq : 64.32 dBA

♀

Results segment # 4: Rathburn (night)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	4.50	4.28	4.28

ROAD (0.00 + 41.56 + 0.00) = 41.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
65	90	0.00	60.68	0.00	-10.54	-8.57	0.00	0.00	-1.73	39.84*
65	90	0.00	60.68	0.00	-10.54	-8.57	0.00	0.00	0.00	41.56

 * Bright Zone !

Segment Leq : 41.56 dBA

Total Leq All Segments: 64.43 dBA

♀

Barrier table for segment # 1: Living Arts (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	38.49	38.49
4.20	4.20	38.49	38.49
4.70	4.70	33.25	33.25
5.20	5.20	31.75	31.75
5.70	5.70	29.60	29.60
6.20	6.20	27.48	27.48
6.70	6.70	25.60	25.60
7.20	7.20	24.00	24.00
7.70	7.70	22.64	22.64
8.20	8.20	21.48	21.48

Barrier table for segment # 2: Confed Pkwy (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	46.98	46.98
4.20	4.20	46.98	46.98
4.70	4.70	41.73	41.73
5.20	5.20	40.59	40.59
5.70	5.70	39.09	39.09
6.20	6.20	37.63	37.63
6.70	6.70	36.33	36.33
7.20	7.20	35.21	35.21
7.70	7.70	34.23	34.23
8.20	8.20	33.37	33.37

Barrier table for segment # 3: Centre View (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	55.23	55.23
4.20	4.20	53.62	53.62
4.70	4.70	52.29	52.29
5.20	5.20	51.17	51.17
5.70	5.70	50.20	50.20
6.20	6.20	49.50	49.50
6.70	6.70	48.96	48.96
7.20	7.20	48.54	48.54
7.70	7.70	48.23	48.23
8.20	8.20	47.99	47.99

Barrier table for segment # 4: Rathburn (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	41.56	41.56
4.20	4.20	41.56	41.56
4.70	4.70	36.47	36.47
5.20	5.20	36.12	36.12
5.70	5.70	35.60	35.60
6.20	6.20	34.97	34.97
6.70	6.70	34.29	34.29
7.20	7.20	33.62	33.62
7.70	7.70	32.96	32.96
8.20	8.20	32.34	32.34

TOTAL Leq FROM ALL SOURCES (DAY): 54.58
(NIGHT): 64.43

STAMSON 5.0 NORMAL REPORT Date: 16-10-2017 11:46:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r01wo.te Time Period: Day/Night 16/8 hours
Description: R01 without extension

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

Car traffic volume : 35721/3969 veh/TimePeriod *
Medium truck volume : 401/45 veh/TimePeriod *
Heavy truck volume : 328/36 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 40500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.10
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Confed Pkwy (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 210.00 / 210.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
Barrier height : 2.20 m
Barrier receiver distance : 7.00 / 7.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Road data, segment # 2: Centre View (day/night)

Car traffic volume : 27360/3040 veh/TimePeriod *
Medium truck volume : 792/88 veh/TimePeriod *
Heavy truck volume : 648/72 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 32000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.75
Heavy Truck % of Total Volume : 2.25
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Centre View (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  :  95.00 / 210.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  29.00 / 144.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Road data, segment # 3: Rathburn Rd (day/night)
-----------------------------------------------
Car traffic volume  : 24444/2716  veh/TimePeriod  *
Medium truck volume :   416/46    veh/TimePeriod  *
Heavy truck volume  :   340/38    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  28000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.65
    Heavy Truck  % of Total Volume     :   1.35
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Rathburn Rd (day/night)
---------------------------------------------
Angle1   Angle2           :  65.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 170.00 / 170.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  65.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.20 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

♀

```
Results segment # 1: Confed Pkwy (day)
--------------------------------------

Source height = 0.97 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.97 !        1.50 !        1.48 !         1.48
```

ROAD (0.00 + 47.41 + 0.00) = 47.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	67.99	0.00	-11.46	-3.01	0.00	0.00	-6.11	47.41

Segment Leq : 47.41 dBA

♀
Results segment # 2: Centre View (day)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	1.50	1.42	1.42

ROAD (0.00 + 53.13 + 0.00) = 53.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.54	72.17	0.00	-12.32	-1.24	0.00	0.00	-5.48	53.13

Segment Leq : 53.13 dBA

♀
Results segment # 3: Rathburn Rd (day)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	1.50	1.47	1.47

ROAD (0.00 + 42.81 + 0.00) = 42.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
65	90	0.00	67.21	0.00	-10.54	-8.57	0.00	0.00	-5.28	42.81

Segment Leq : 42.81 dBA

Total Leq All Segments: 54.47 dBA

♀
Barrier table for segment # 1: Confed Pkwy (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	43.13	43.13
4.20	4.20	41.98	41.98
4.70	4.70	40.98	40.98

5.20	5.20	40.10	40.10
5.70	5.70	39.32	39.32
6.20	6.20	38.62	38.62
6.70	6.70	38.01	38.01
7.20	7.20	37.53	37.53
7.70	7.70	37.14	37.14
8.20	8.20	36.81	36.81

Barrier table for segment # 2: Centre View (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	51.59	51.59
4.20	4.20	51.02	51.02
4.70	4.70	50.50	50.50
5.20	5.20	50.03	50.03
5.70	5.70	49.62	49.62
6.20	6.20	49.26	49.26
6.70	6.70	48.96	48.96
7.20	7.20	48.69	48.69
7.70	7.70	48.46	48.46
8.20	8.20	48.26	48.26

Barrier table for segment # 3: Rathburn Rd (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	41.08	41.08
4.20	4.20	40.41	40.41
4.70	4.70	39.74	39.74
5.20	5.20	39.11	39.11
5.70	5.70	38.51	38.51
6.20	6.20	37.95	37.95
6.70	6.70	37.43	37.43
7.20	7.20	36.94	36.94
7.70	7.70	36.48	36.48
8.20	8.20	36.05	36.05

♀

Results segment # 1: Confed Pkwy (night)

Source height = 0.97 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.97	4.50	4.38	4.38

ROAD (0.00 + 46.98 + 0.00) = 46.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	61.45	0.00	-11.46	-3.01	0.00	0.00	-0.25	46.73*
-90	0	0.00	61.45	0.00	-11.46	-3.01	0.00	0.00	0.00	46.98

* Bright Zone !

Segment Leq : 46.98 dBA

♀
Results segment # 2: Centre View (night)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	4.50	2.25	2.25

ROAD (0.00 + 46.24 + 0.00) = 46.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.45	65.64	0.00	-16.58	-1.07	0.00	0.00	-5.00	42.99*
-90	90	0.58	65.64	0.00	-18.09	-1.32	0.00	0.00	0.00	46.24

* Bright Zone !

Segment Leq : 46.24 dBA

♀
Results segment # 3: Rathburn Rd (night)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	4.50	4.28	4.28

ROAD (0.00 + 41.56 + 0.00) = 41.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
65	90	0.00	60.68	0.00	-10.54	-8.57	0.00	0.00	-1.73	39.84*
65	90	0.00	60.68	0.00	-10.54	-8.57	0.00	0.00	0.00	41.56

* Bright Zone !

Segment Leq : 41.56 dBA

Total Leq All Segments: 50.26 dBA

♀
Barrier table for segment # 1: Confed Pkwy (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	46.98	46.98
4.20	4.20	46.98	46.98
4.70	4.70	41.73	41.73

5.20	5.20	40.59	40.59
5.70	5.70	39.09	39.09
6.20	6.20	37.63	37.63
6.70	6.70	36.33	36.33
7.20	7.20	35.21	35.21
7.70	7.70	34.23	34.23
8.20	8.20	33.37	33.37

Barrier table for segment # 2: Centre View (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	43.50	43.50
4.20	4.20	43.41	43.41
4.70	4.70	43.26	43.26
5.20	5.20	43.09	43.09
5.70	5.70	42.91	42.91
6.20	6.20	42.74	42.74
6.70	6.70	42.59	42.59
7.20	7.20	42.46	42.46
7.70	7.70	42.36	42.36
8.20	8.20	42.30	42.30

Barrier table for segment # 3: Rathburn Rd (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.70	3.70	41.56	41.56
4.20	4.20	41.56	41.56
4.70	4.70	36.47	36.47
5.20	5.20	36.12	36.12
5.70	5.70	35.60	35.60
6.20	6.20	34.97	34.97
6.70	6.70	34.29	34.29
7.20	7.20	33.62	33.62
7.70	7.70	32.96	32.96
8.20	8.20	32.34	32.34

♀

TOTAL Leq FROM ALL SOURCES (DAY): 54.47
(NIGHT): 50.26

♀
♀

STAMSON 5.0 NORMAL REPORT Date: 16-10-2017 11:46:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r02wext.te Time Period: Day/Night 16/8 hours
Description: R02 with extension

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

Car traffic volume : 8883/987 veh/TimePeriod *
Medium truck volume : 312/35 veh/TimePeriod *
Heavy truck volume : 255/28 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 10500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.30
Heavy Truck % of Total Volume : 2.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Living Arts (day/night)

Angle1 Angle2 : 5.00 deg 25.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 349.00 / 349.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 5.00 deg Angle2 : 25.00 deg
Barrier height : 2.40 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Road data, segment # 2: Confed Pkwy (day/night)

Car traffic volume : 35721/3969 veh/TimePeriod *
Medium truck volume : 401/45 veh/TimePeriod *
Heavy truck volume : 328/36 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): 40500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.10
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Confed Pkwy (day/night)

```
Angle1   Angle2           : -15.00 deg   10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 169.00 / 169.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -15.00 deg   Angle2 : 10.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Road data, segment # 3: Centre View (day/night)
-----------------------------------------------
Car traffic volume  : 27360/3040  veh/TimePeriod  *
Medium truck volume :   792/88    veh/TimePeriod  *
Heavy truck volume  :   648/72    veh/TimePeriod  *
Posted speed limit  :    70 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):  32000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.75
    Heavy Truck  % of Total Volume     :   2.25
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Centre View (day/night)
---------------------------------------------
Angle1   Angle2           : -15.00 deg   40.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 230.00 / 230.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -15.00 deg   Angle2 : 40.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   7.00 / 7.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Road data, segment # 4: Rathburn (day/night)
--------------------------------------------
Car traffic volume  : 24444/2716  veh/TimePeriod  *
Medium truck volume :   416/46    veh/TimePeriod  *
Heavy truck volume  :   340/38    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):  28000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.65
    Heavy Truck  % of Total Volume     :   1.35
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: Rathburn (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.00 / 36.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 30.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Results segment # 1: Living Arts (day)
--------------------------------------

Source height = 1.28 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.28 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 33.36 + 0.00) = 33.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     5     25   0.00  64.75   0.00 -13.67  -9.54   0.00   0.00  -8.17  33.36
-------------------------------------------------------------------------------

Segment Leq : 33.36 dBA

♀
Results segment # 2: Confed Pkwy (day)
--------------------------------------

Source height = 0.97 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.97 !        1.50 !        1.48 !         1.48

ROAD (0.00 + 40.55 + 0.00) = 40.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -15     10   0.00  67.99   0.00 -10.52  -8.57   0.00   0.00  -8.36  40.55
-------------------------------------------------------------------------------
```

Segment Leq : 40.55 dBA

♀
Results segment # 3: Centre View (day)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	1.50	1.49	1.49

ROAD (0.00 + 41.37 + 0.00) = 41.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	40	0.52	72.17	0.00	-18.07	-5.29	0.00	0.00	-7.44	41.37

Segment Leq : 41.37 dBA

♀
Results segment # 4: Rathburn (day)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	1.50	1.32	1.32

ROAD (0.00 + 51.74 + 0.00) = 51.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.53	67.21	0.00	-5.81	-2.68	0.00	0.00	-6.97	51.74

Segment Leq : 51.74 dBA

Total Leq All Segments: 52.47 dBA

♀
Barrier table for segment # 1: Living Arts (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	26.60	26.60
4.40	4.40	25.08	25.08
4.90	4.90	23.81	23.81
5.40	5.40	22.73	22.73
5.90	5.90	21.80	21.80
6.40	6.40	21.54	21.54
6.90	6.90	21.54	21.54
7.40	7.40	21.54	21.54
7.90	7.90	21.54	21.54

8.40	8.40	21.54	21.54

Barrier table for segment # 2: Confed Pkwy (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	33.72	33.72
4.40	4.40	32.19	32.19
4.90	4.90	30.93	30.93
5.40	5.40	29.85	29.85
5.90	5.90	28.93	28.93
6.40	6.40	28.90	28.90
6.90	6.90	28.90	28.90
7.40	7.40	28.90	28.90
7.90	7.90	28.90	28.90
8.40	8.40	28.90	28.90

Barrier table for segment # 3: Centre View (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	36.29	36.29
4.40	4.40	35.12	35.12
4.90	4.90	34.19	34.19
5.40	5.40	33.43	33.43
5.90	5.90	32.83	32.83
6.40	6.40	32.33	32.33
6.90	6.90	32.17	32.17
7.40	7.40	32.45	32.45
7.90	7.90	32.81	32.81
8.40	8.40	33.17	33.17

Barrier table for segment # 4: Rathburn (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	48.08	48.08
4.40	4.40	47.14	47.14
4.90	4.90	46.33	46.33
5.40	5.40	45.63	45.63
5.90	5.90	45.01	45.01
6.40	6.40	44.46	44.46
6.90	6.90	44.00	44.00
7.40	7.40	43.70	43.70
7.90	7.90	43.51	43.51
8.40	8.40	43.37	43.37

♀
Results segment # 1: Living Arts (night)

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	4.50	4.45	4.45

ROAD (0.00 + 34.98 + 0.00) = 34.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
5	25	0.00	58.19	0.00	-13.67	-9.54	0.00	0.00	0.00	34.98*
5	25	0.00	58.19	0.00	-13.67	-9.54	0.00	0.00	0.00	34.98

* Bright Zone !

Segment Leq : 34.98 dBA

♀

Results segment # 2: Confed Pkwy (night)

Source height = 0.97 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.97	4.50	4.40	4.40

ROAD (0.00 + 42.36 + 0.00) = 42.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	10	0.00	61.45	0.00	-10.52	-8.57	0.00	0.00	0.00	42.36*
-15	10	0.00	61.45	0.00	-10.52	-8.57	0.00	0.00	0.00	42.36

* Bright Zone !

Segment Leq : 42.36 dBA

♀

Results segment # 3: Centre View (night)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	4.50	4.40	4.40

ROAD (0.00 + 41.62 + 0.00) = 41.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	40	0.43	65.64	0.00	-17.01	-5.27	0.00	0.00	0.00	43.37*
-15	40	0.58	65.64	0.00	-18.71	-5.31	0.00	0.00	0.00	41.62

* Bright Zone !

Segment Leq : 41.62 dBA

♀

Results segment # 4: Rathburn (night)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	4.50	3.07	3.07

ROAD (0.00 + 51.91 + 0.00) = 51.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.44	60.68	0.00	-5.47	-2.56	0.00	0.00	-3.90	48.76*
-90	30	0.58	60.68	0.00	-6.02	-2.75	0.00	0.00	0.00	51.91

 * Bright Zone !

Segment Leq : 51.91 dBA

Total Leq All Segments: 52.79 dBA

♀
Barrier table for segment # 1: Living Arts (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	34.98	34.98
4.40	4.40	34.98	34.98
4.90	4.90	29.03	29.03
5.40	5.40	26.58	26.58
5.90	5.90	23.96	23.96
6.40	6.40	21.72	21.72
6.90	6.90	19.89	19.89
7.40	7.40	18.39	18.39
7.90	7.90	17.13	17.13
8.40	8.40	16.07	16.07

Barrier table for segment # 2: Confed Pkwy (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	42.36	42.36
4.40	4.40	37.36	37.36
4.90	4.90	36.11	36.11
5.40	5.40	33.50	33.50
5.90	5.90	30.87	30.87
6.40	6.40	28.65	28.65
6.90	6.90	26.85	26.85
7.40	7.40	25.37	25.37
7.90	7.90	24.14	24.14
8.40	8.40	23.09	23.09

Barrier table for segment # 3: Centre View (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	41.62	41.62
4.40	4.40	41.62	41.62
4.90	4.90	39.33	39.33
5.40	5.40	37.70	37.70
5.90	5.90	35.81	35.81
6.40	6.40	34.12	34.12
6.90	6.90	32.72	32.72
7.40	7.40	31.59	31.59
7.90	7.90	30.69	30.69
8.40	8.40	29.97	29.97

Barrier table for segment # 4: Rathburn (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	46.88	46.88
4.40	4.40	45.61	45.61
4.90	4.90	44.32	44.32
5.40	5.40	43.16	43.16
5.90	5.90	42.16	42.16
6.40	6.40	41.29	41.29
6.90	6.90	40.54	40.54
7.40	7.40	39.89	39.89
7.90	7.90	39.32	39.32
8.40	8.40	38.81	38.81

TOTAL Leq FROM ALL SOURCES (DAY): 52.47
(NIGHT): 52.79

STAMSON 5.0 NORMAL REPORT Date: 16-10-2017 11:55:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r02wo.te Time Period: Day/Night 16/8 hours
Description: R02 without extension

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

Car traffic volume : 8883/987 veh/TimePeriod *
Medium truck volume : 312/35 veh/TimePeriod *
Heavy truck volume : 255/28 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 10500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.30
Heavy Truck % of Total Volume : 2.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Living Arts (day/night)

Angle1 Angle2 : 10.00 deg 25.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 349.00 / 349.00 m
Receiver height : 1.50 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 10.00 deg Angle2 : 25.00 deg
Barrier height : 2.40 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

♀
Road data, segment # 2: Confed Pkwy (day/night)

Car traffic volume : 35721/3969 veh/TimePeriod *
Medium truck volume : 401/45 veh/TimePeriod *
Heavy truck volume : 328/36 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 40500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.10
Heavy Truck % of Total Volume : 0.90
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Confed Pkwy (day/night)

```
Angle1   Angle2           : -15.00 deg   10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 169.00 / 169.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -15.00 deg   Angle2 : 10.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Road data, segment # 3: Centre View (day/night)
-----------------------------------------------
Car traffic volume  : 27360/3040  veh/TimePeriod  *
Medium truck volume :   792/88    veh/TimePeriod  *
Heavy truck volume  :   648/72    veh/TimePeriod  *
Posted speed limit  :    70 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  32000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.75
    Heavy Truck  % of Total Volume     :   2.25
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Centre View (day/night)
---------------------------------------------
Angle1   Angle2           : -15.00 deg   40.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 230.00 / 230.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -15.00 deg   Angle2 : 40.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   7.00 / 7.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Road data, segment # 4: Rathburn (day/night)
--------------------------------------------
Car traffic volume  : 24444/2716  veh/TimePeriod  *
Medium truck volume :   416/46    veh/TimePeriod  *
Heavy truck volume  :   340/38    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)

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

```
    24 hr Traffic Volume (AADT or SADT):  28000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.65
    Heavy Truck  % of Total Volume     :   1.35
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: Rathburn (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  36.00 / 36.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 30.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

♀
Results segment # 1: Living Arts (day)
--------------------------------------

Source height = 1.28 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.28 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 32.14 + 0.00) = 32.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    10     25   0.00  64.75   0.00 -13.67 -10.79   0.00   0.00  -8.15  32.14
-------------------------------------------------------------------------------

Segment Leq : 32.14 dBA

♀
Results segment # 2: Confed Pkwy (day)
--------------------------------------

Source height = 0.97 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.97 !        1.50 !        1.48 !         1.48

ROAD (0.00 + 40.55 + 0.00) = 40.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -15     10   0.00  67.99   0.00 -10.52  -8.57   0.00   0.00  -8.36  40.55
-------------------------------------------------------------------------------
```

Segment Leq : 40.55 dBA

♀
Results segment # 3: Centre View (day)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	1.50	1.49	1.49

ROAD (0.00 + 41.37 + 0.00) = 41.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	40	0.52	72.17	0.00	-18.07	-5.29	0.00	0.00	-7.44	41.37

Segment Leq : 41.37 dBA

♀
Results segment # 4: Rathburn (day)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	1.50	1.32	1.32

ROAD (0.00 + 51.74 + 0.00) = 51.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.53	67.21	0.00	-5.81	-2.68	0.00	0.00	-6.97	51.74

Segment Leq : 51.74 dBA

Total Leq All Segments: 52.45 dBA

♀
Barrier table for segment # 1: Living Arts (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	25.39	25.39
4.40	4.40	23.87	23.87
4.90	4.90	22.60	22.60
5.40	5.40	21.53	21.53
5.90	5.90	20.60	20.60
6.40	6.40	20.29	20.29
6.90	6.90	20.29	20.29
7.40	7.40	20.29	20.29
7.90	7.90	20.29	20.29

8.40	8.40	20.29	20.29

Barrier table for segment # 2: Confed Pkwy (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	33.72	33.72
4.40	4.40	32.19	32.19
4.90	4.90	30.93	30.93
5.40	5.40	29.85	29.85
5.90	5.90	28.93	28.93
6.40	6.40	28.90	28.90
6.90	6.90	28.90	28.90
7.40	7.40	28.90	28.90
7.90	7.90	28.90	28.90
8.40	8.40	28.90	28.90

Barrier table for segment # 3: Centre View (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	36.29	36.29
4.40	4.40	35.12	35.12
4.90	4.90	34.19	34.19
5.40	5.40	33.43	33.43
5.90	5.90	32.83	32.83
6.40	6.40	32.33	32.33
6.90	6.90	32.17	32.17
7.40	7.40	32.45	32.45
7.90	7.90	32.81	32.81
8.40	8.40	33.17	33.17

Barrier table for segment # 4: Rathburn (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	48.08	48.08
4.40	4.40	47.14	47.14
4.90	4.90	46.33	46.33
5.40	5.40	45.63	45.63
5.90	5.90	45.01	45.01
6.40	6.40	44.46	44.46
6.90	6.90	44.00	44.00
7.40	7.40	43.70	43.70
7.90	7.90	43.51	43.51
8.40	8.40	43.37	43.37

♀
Results segment # 1: Living Arts (night)

Source height = 1.28 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.28	4.50	4.45	4.45

ROAD (0.00 + 33.73 + 0.00) = 33.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
10	25	0.00	58.19	0.00	-13.67	-10.79	0.00	0.00	0.00	33.73*
10	25	0.00	58.19	0.00	-13.67	-10.79	0.00	0.00	0.00	33.73

* Bright Zone !

Segment Leq : 33.73 dBA

♀

Results segment # 2: Confed Pkwy (night)

Source height = 0.97 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.97	4.50	4.40	4.40

ROAD (0.00 + 42.36 + 0.00) = 42.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	10	0.00	61.45	0.00	-10.52	-8.57	0.00	0.00	0.00	42.36*
-15	10	0.00	61.45	0.00	-10.52	-8.57	0.00	0.00	0.00	42.36

* Bright Zone !

Segment Leq : 42.36 dBA

♀

Results segment # 3: Centre View (night)

Source height = 1.22 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.22	4.50	4.40	4.40

ROAD (0.00 + 41.62 + 0.00) = 41.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	40	0.43	65.64	0.00	-17.01	-5.27	0.00	0.00	0.00	43.37*
-15	40	0.58	65.64	0.00	-18.71	-5.31	0.00	0.00	0.00	41.62

* Bright Zone !

Segment Leq : 41.62 dBA

♀

Results segment # 4: Rathburn (night)

Source height = 1.08 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.08	4.50	3.07	3.07

ROAD (0.00 + 51.91 + 0.00) = 51.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	30	0.44	60.68	0.00	-5.47	-2.56	0.00	0.00	-3.90	48.76*
-90	30	0.58	60.68	0.00	-6.02	-2.75	0.00	0.00	0.00	51.91

 * Bright Zone !

Segment Leq : 51.91 dBA

Total Leq All Segments: 52.77 dBA

♀
Barrier table for segment # 1: Living Arts (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	33.73	33.73
4.40	4.40	33.73	33.73
4.90	4.90	27.79	27.79
5.40	5.40	25.35	25.35
5.90	5.90	22.75	22.75
6.40	6.40	20.51	20.51
6.90	6.90	18.68	18.68
7.40	7.40	17.18	17.18
7.90	7.90	15.93	15.93
8.40	8.40	14.86	14.86

Barrier table for segment # 2: Confed Pkwy (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	42.36	42.36
4.40	4.40	37.36	37.36
4.90	4.90	36.11	36.11
5.40	5.40	33.50	33.50
5.90	5.90	30.87	30.87
6.40	6.40	28.65	28.65
6.90	6.90	26.85	26.85
7.40	7.40	25.37	25.37
7.90	7.90	24.14	24.14
8.40	8.40	23.09	23.09

Barrier table for segment # 3: Centre View (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	41.62	41.62
4.40	4.40	41.62	41.62
4.90	4.90	39.33	39.33
5.40	5.40	37.70	37.70
5.90	5.90	35.81	35.81
6.40	6.40	34.12	34.12
6.90	6.90	32.72	32.72
7.40	7.40	31.59	31.59
7.90	7.90	30.69	30.69
8.40	8.40	29.97	29.97

Barrier table for segment # 4: Rathburn (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
3.90	3.90	46.88	46.88
4.40	4.40	45.61	45.61
4.90	4.90	44.32	44.32
5.40	5.40	43.16	43.16
5.90	5.90	42.16	42.16
6.40	6.40	41.29	41.29
6.90	6.90	40.54	40.54
7.40	7.40	39.89	39.89
7.90	7.90	39.32	39.32
8.40	8.40	38.81	38.81

TOTAL Leq FROM ALL SOURCES (DAY): 52.45
(NIGHT): 52.77