July 2016

NOISE IMPACT STUDY

Class Environmental Assessment for Portage Parkway Vaughan, Ontario

Submitted to:
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REPORT

Report **Number:** 1522372 (9000)
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Golder Associates

Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The City of Vaughan (City) retained CIMA Canada Inc. as the Project Manager Consultant to complete the Municipal Class Environmental Assessment (EA) for the widening and extension of Portage Parkway in the City (the Project). CIMA retained Golder Associates Ltd. (Golder) to assess the potential noise impact of the Project and prepare this Noise Impact Study (NIS).

The proposed Project is located within the Vaughan Metropolitan Centre (VMC) and involves the widening of Portage Parkway from two to four lanes from Applewood Crescent to Jane Street, and the extension of Portage Parkway from Jane Street to Creditstone Road, also crossing the Black Creek channel (Project Site). The Project Site limits are shown on the Site Location, Figure 1.

The NIS provides a summary of the noise impact assessment for the Project on the identified neighbouring sensitive receptors. The NIS also identifies the applicable municipal noise by-law, describes a noise complaint process for construction activities, and provides a general discussion regarding noise arising from construction activities.

The Ontario Ministry of Transportation (MTO) Noise Protocols described in the MTO's *Environmental Guide for Noise*, October 2006, (MTO Noise Guide), the York Region *Traffic Noise Mitigation Policy for Regional Roads* – March 2006 (York Region Traffic Noise Mitigation Policy), the York Region *Transportation Services, Capital Delivery – Roads Standard Operating Procedures for Traffic Noise Mitigation on Regional Roads* – July 2010 (York Region Noise Mitigation SOP), the City of Vaughan *Noise By-Law* and the Ontario Ministry of Environment and Climate Change (MOECC) *Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning – Publication NPC-300* (NPC-300) generally formed the basis of the assessment criteria and methodology for the NIS.

2.0 PROJECT DESCRIPTION

According to the City, the VMC is the City's new downtown with the vision of multi-use office towers, residences, open green space and urban squares, pedestrian shopping areas and restaurants, walking and cycling paths, all coexisting by the year 2031. It will include a regional transportation hub allowing connections to the Greater Toronto Area (GTA).

As part of the vision for the VMC, the City adopted the Official Plan (2010) and associated Transportation Master Plan (TMP) *A New Path* (2013). The TMP identified the widening of Portage Parkway and its extension to Creditstone Road by crossing the Black Creek Channel as priority projects.

The Project involves the widening of Portage Parkway from two to four lanes from Applewood Crescent to Jane Street, and the extension of Portage Parkway from Jane Street to Creditstone Road which will cross over the Black Creek channel (Project Site). Figure 1 illustrates the Project Site.

2.1 Existing Conditions

Currently, Portage Parkway is an east-west local road located in the City. It extends from Chrislea Road at its west end (West of HWY 400), to Jane Street at its east end. The existing surrounding land uses are primarily employment, commercial and agricultural uses. Figure 2 provides the zoning information around the Project Site. The posted speed limit is 50 km/hr and the Annual Average Daily Traffic (AADT) count for Portage Parkway ranges from 5,024 to 8,064 within the Project Site.

2.2 Proposed Future Conditions

For the purposes of the NIS, it is understood the future proposed condition is for the year 2031 and includes the widening of Portage Parkway from two to four lanes from Applewood Crescent to Jane Street, and the extension of Portage Parkway from Jane Street to Creditstone Road, including crossing the Black Creek channel. The posted speed limit will remain at 50 km/hr and the AADT for Portage Parkway will range from 7,831 to 22,196 within the Project Site.

According to the vision for the VMC, the new downtown will eventually consist of sensitive land uses. Based on a cursory review, the proposed land uses within the VMC are presented in the *Vaughan Metropolitan Secondary Plan* (Secondary Plan) which was partially approved by the Ontario Municipal Board on November 18, 2015. The Secondary Plan presents the potential for sensitive land uses to exist in the vicinity of the Project Site. For the purposes of the NIS, only existing sensitive land uses in the vicinity of the Project Site were evaluated. It is expected all future applications to the City for future development projects for sensitive land uses will be supported with appropriate noise assessments, which would consider the future design of Portage Parkway.

3.0 DESCRIPTION OF TECHNICAL TERMS

To help understand the analysis and recommendations made in this report, the following is a brief discussion of technical noise terms.

Sound pressure level is expressed on a logarithmic scale in units of decibels (dB). Since the scale is logarithmic, a sound that is twice the sound pressure level as another will be three decibels (3 dB) higher.

The noise data and analysis in this report have been given in terms of frequency distribution. The levels are grouped into octave bands. Typically, the centre frequencies for each octave band are 31.5, 63, 125, 250, 500, 1000, 2000, 4000 and 8000 Hertz (Hz). The human ear responds to the pressure variations in the atmosphere that reach the ear drum. These pressure variations are composed of different frequencies that give each sound we hear its unique character.

It is common practice to sum sound levels over the entire audible spectrum (i.e., 20 Hz to 20 kHz) to give an overall sound level. However, to approximate the hearing response of humans, each octave band measured has a weighting applied to it. The resulting “A-weighted” sound level is often used as a criterion to indicate a maximum allowable sound level. In general, low frequencies are weighted higher, as human hearing is less sensitive to low frequency sound.

Environmental noise levels vary over time, and are described using an overall sound level as the L_{eq}, or energy averaged sound level. The L_{eq} is the equivalent continuous sound level, which in a stated time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure L_{eq} sound levels in order to obtain a representative average sound level.

4.0 RELEVANT GUIDELINES AND POLICIES

The following guidance documents and policies can be applicable for providing criteria for the assessment of noise from road traffic for this Project. These documents and their relevance to the NIS are summarized in Table 1 below, followed by a cursory review of each one.

Table 1: Applicable Noise Criteria

Governing Body	Guidance Document	Intended Use	Location of Assessment	Criterion to consider mitigation[1]
Ontario Ministry of Transportation (MTO)	Environmental Guide for Noise (October 2006)	Roadways	Outdoor Living Area (OLA)	≥65 dBA, or ≥5 dB increase with the Project; 55 dBA target where feasible (16 or 24 hour average)[2]
Ontario Ministry of Environment and Climate Change (MOECC)	NPC-300 – Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning Publication (August 2013)	Permitting of stationary sources (i.e., industry) or land use planning (i.e., residential development)	Outdoor Living Area (OLA) for land use planning	>55 dBA Daytime traffic only (i.e., 7:00 to 23:00, 16 hrs)[2]
York Region	York Region Traffic Noise Mitigation Policy for Regional Roads (March 2006)	Regional Roads	*For Capital Projects and Retrofit [3]:* Outdoor Living Area (OLA)	Daytime traffic only (i.e., 7:00 to 23:00, 16 hrs)[2] *Capital Road Projects* No mitigation when Project increases noise from 0 - 5 dB and <60 dBA; Mitigation required when Project ≥55 dBA and increases noise ≥5 dB. A minimum attenuation of 6 dB must be achieved. Mitigation may be deferred until noise levels exceed 60 dBA; *Retrofit* Eligibility exists when existing noise levels are greater than 60 dBA and other conditions are satisfied.
York Region	Transportation Services, Capital Delivery – Roads Standard Operating Procedures for Traffic Noise Mitigation on Regional Roads (July 2010)	Regional Roads	*For Capital Projects and Retrofit [3]:* Outdoor Living Area (OLA)	Applies the criterion defined in the *York Region Traffic Noise Mitigation Policy for Regional Roads (March 2006)*

Governing Body	Guidance Document	Intended Use	Location of Assessment	Criterion to consider mitigation[1]
City of Vaughan	City of Vaughan By-Law #96-2006 (Noise By-Law)	Guidance and specific procedures associated with stationary sources, various noise and construction noise	Point of Reception	Time and day restrictions on construction activities

Notes:
[1]: Calculated noise levels based on projected future traffic counts (i.e., 10 years into the future, or ultimate traffic count where appropriate).
[2]: Values represent average levels established over the given period.
[3]: Capital Projects and Retrofit scenarios are considered to be the most applicable to the Project from the four scenarios presented in the York Region Traffic Noise Mitigation Policy.

4.1 York Region's Traffic Noise Mitigation Policy for Regional Roads and Transportation Services, Capital Delivery – Roads Standard Operating Procedures (SOP) for Traffic Noise Mitigation on Regional Roads

York Region's Traffic Noise Mitigation Policy and Noise Mitigation SOP provides requirements for noise assessments and mitigation relating to the construction of new or the expansion of existing Regional Roads. This policy and SOP identifies the requirements regarding noise control measures for the following scenarios:

a) Capital Program Projects – Mitigation is required when future noise levels (i.e. Mature State of Development) at the OLA are expected to increase by ≥5 dB and levels are expected to exceed 55 dBA (Leq 16 hrs – 07:00 to 23:00) or the established ambient noise level at the start of construction. If a noise barrier is deemed necessary it must provide a minimum sound insertion loss of 6 dB. Noise mitigation may be deferred until noise levels exceed 60 dBA.

b) Retrofit Applications – Are requested by residents and noise mitigation is investigated at the OLA only when the following exists: 1) Existing noise levels are greater than 60 dBA (Leq 16 hrs – 07:00 to 23:00) 2) At least 5 continuous dwellings are affected 3) The proposed improvement must achieve at least a 6 dB improvement 4) At least 2/3 of affected residents support the application including 50% of cost.

c) Development Planning – Applies to the planning of new noise sensitive land uses adjacent to regional roads and bus transit corridors. Alternate methods of reducing noise impacts shall be considered prior to considering noise attenuation barriers. The objective sound level at the OLA is 55 dBA (Leq 16 – 07:00 to 23:00) or the established ambient noise level after attenuation. If a noise barrier is deemed necessary it must provide a minimum sound insertion loss of 6 dB. In addition to the OLA, the bedroom plane of window (POW) ultimate predicted sound level must be less than 50 dBA (Leq 8 hrs – 23:00 to 07:00).

d) Replacement Applications – Provides guidance regarding the rules and responsibilities associated with potential hazards for existing noise barriers.

4.2 MTO's Environmental Guide for Noise, October 2006, (MTO Noise Guideline)

The MTO Noise Guide provides requirements for noise assessments and mitigation relating to the construction of new or the expansion of existing Provincial Highways. These requirements have been summarized into the following two Environmental Protection Requirement(s) (EPR(s)) for noise according to the *MTO Environmental Protection Requirements Section 6*:

NOISE-1 *During design of a new or modified highway, a noise assessment by a qualified acoustical specialist is required for the Most Exposed Side and the OLAs of Noise Sensitive Areas. As an initial screening, future sound levels shall be assessed with and without the proposed improvements for the Most Exposed Side. The objective for outdoor sound levels is to achieve the future predicted ambient that would occur without the proposed highway. The significance of a noise impact will be quantified by using this objective in addition to the change in sound level above the ambient (i.e., the future sound level without the proposed improvements is compared to the future sound level with the proposed improvement).*

The determination of the provision of mitigation is based on the analysis of the predicted noise level at the OLAs.

Table 2 below, which is a copy of Table 2.1 of the MTO Noise Guide, summarizes the criteria for the requirement of noise mitigation efforts:

Table 2: MTO Noise Guide - Mitigation Effort Required for the Projected Noise Level with the Proposed Improvements above the Ambient

Change in Noise Level Above Ambient / Projected Noise Levels with Proposed Improvements	Mitigation Effort Required
■ <5 dBA change & <65 dBA	■ None
■ ≥ 5 dBA change OR ■ ≥ 65 dBA	■ Investigate noise control measures on right-of-way. ■ Introduce noise control measures within right-of-way and mitigate to ambient if technically, economically and administratively feasible. ■ Noise control measures, where introduced, should achieve a minimum of 5 dBA attenuation, over first row receivers.

NOISE-2 *Highway construction shall be undertaken in a manner to minimize noise levels and identify a process for dealing with public complaints during construction. Pile driving and blasting operations shall be in accordance with Ontario Provincial Standard Specifications (OPSS 120) and Ministry of the Environment Publication NPC-119.*

As described in the MTO Noise Guide, a noise analysis is carried out as follows during the Transportation Planning stage to meet EPR Noise-1:

- identification of the area of investigation;
- identification of noise sensitive areas;
- determination of future ambient noise levels (i.e., without the Project);
- determination of future noise levels with the undertaking (i.e., with the Project);
- determination of potential impact;
- determination of significance;
- assessment of mitigation; and
- summarize the noise analysis in a noise report.

4.3 MOECC Environmental Noise Guideline – Stationary and Transportation Sources – Approval and Planning – Publication NPC-300

This guideline focuses on the control of noise source emissions into the environment and serves the following four (4) purposes:

- provides sound level limits that are applied by the MOECC to Stationary Sources which can include industrial, commercial, or auxiliary transportation facilities;
- provides advice, sound level criteria and guidance to land use planning approval authorities (municipalities, planning boards and other ministries, developers and consultants) for planning decisions made under the Planning Act concerning noise sensitive land uses in support of the Provincial Policy Statement;
- provides sound level limits that may be included in noise control by-laws which may be developed by municipalities in accordance with the Municipality Act and/or other enabling legislation; and
- provides sound level limits that may be applied for licensing activities of aggregate resource extraction activities applied under the provisions of the Aggregate Resources Act.

This guideline provides guidance for land use planning purposes as it relates to transportation and stationary sources of noise (Part C). As stated in NPC-300, the MOECC has no authority under the Planning Act regarding the land use planning approval process. NPC-300 provides guidance for land use planning authorities that exercise decision-making authority under the Planning Act, developers and consultants to address environmental noise in the land use planning process. It is the MOECC's opinion the proponent/developer of the new noise sensitive land use is responsible for ensuring the sound level criteria are met including: the feasibility of the project, outdoor and indoor acoustical environments, ensuring any required noise control measures are included in the development and describing the technical details and clarifying the responsibility for the implementation and maintenance of the required noise controls. The noise impact assessment of transportation sources considers road, rail and aircraft. Future noise level predictions due to road and rail are based on a minimum 10 year traffic forecast. The sound level limits due to road traffic noise sources are: 45 dBA for the indoor living area during the daytime, 40 dBA for the indoor bedroom area during the nighttime and 55 dBA for the outdoor living area during the daytime.

It is also recommended that feasibility and/or detailed noise impact studies be required by the land use planning authority in the early stages of the land use planning stages to support the development for a noise sensitive land use proposal. NPC-300 highlights the requirements of these studies.

5.0 METHODOLOGY

The following methodology was carried out to assess the potential noise impacts due to the Project;

- identification of the Area of Investigation;
- identification of Noise Sensitive Areas (NSAs);
- determination of existing ambient noise levels without the Project;
- determination of future noise levels with the Project;
- determination of potential impact;
- determination of significance; and
- assessment of mitigation.

5.1 Area of Investigation

The Area of Investigation defines an area surrounding the Project where potential noise effects are assessed at sensitive receptor locations. For the NIS, sensitive receptors up to 500 m from the edge of the Project Site were identified. Figure 1 illustrates the Area of Investigation.

5.2 Noise Sensitive Areas

The MTO Noise Guide has been primarily applied in this assessment to identify Noise Sensitive Areas (NSAs) OLA(s). The NSA OLA's were evaluated as per the MTO Noise Guide, but assessed at a height of 1.5 m as per the MOECC NPC-300 (i.e., the MTO's 1.2 m height was not applied).

The MTO Noise Guide defines NSA(s) as one of the following land uses, with an OLA associated with them:

- private homes such as single family residences (owned or rental);
- townhouses (owned or rental);
- multiple unit buildings, such as apartments with OLAs for use by all occupants; and
- hospitals, nursing homes for the aged, where there are OLAs for the patients.

Where a new freeway/highway corridor or route is planned, the following land uses would quality as NSAs, provided they have OLAs, in addition to the land uses noted above;

- education facilities and day care centres
- campgrounds that provide overnight accommodation
- Hotels/motels with OLAs (i.e. swimming pool area, etc.) for visitors

Land uses by themselves that do not qualify as NSAs include the following:

- apartment balconies above ground floor;
- churches;
- cemeteries;
- parks and picnic areas which are not inherently part of a NSA;
- all commercial; and
- all industrial.

5.2.1 Noise Sensitive Areas Identification

NSAs were selected that were representative of the acoustic environment within the Area of Investigation and the potential impact due to the Project.

First, as discussed in Section 2.2, for the purposes of the NIS, only existing sensitive land uses were evaluated with the understanding that project specific noise studies would be prepared in support of all future developments, and they will include the potential noise impacts due to Portage Parkway.

A single NSA was identified within the Area of Investigation, as shown in Figure 3. Table 3 provides a description of the NSA, approximate distance from NSA to the Portage Parkway centreline and approximate UTM coordinates.

Table 3: Description of NSAs around the Project

Noise Sensitive Area (NSA) ID	Description	Approximate Distance to Centreline of Portage Parkway	Approximate UTM coordinates (Zone 17)	
			Easting	Northing
		(m)	(m)	(m)
R1	EXPO Condominiums – High Density Residences	360	618945	4850247

Using publically available imagery, the location of R1 OLA was estimated near the northwest corner of the most western building footprint. The location and heights of localized shielding was assumed.

During the process of identifying NSAs within the Area of Investigation, the Monte Carlo Inn (Hotel) was initially identified as a potential NSA. With the use of publically available imagery, an OLA was identified along the Hotel's western façade. The Project is both an expansion and extension (i.e. new corridor), with the Hotel OLA only exposed to the expansion. Therefore, the Hotel was not further assessed as an NSA in the NIS.

5.3 Traffic Volumes

The existing and future noise levels were predicted at the selected NSA OLA. Due to the proximity to other major roads with relatively higher AADT volumes (i.e., Highway 400 and Highway 7) than those roadways within the Project Site, the NIS included theses additional roadways. It is expected these other major roadways contribute the most to the overall noise levels in the vicinity of the Project Site. Table 4 and Table 5 below provides the summary of traffic volumes for the roadways considered.

Total traffic volumes along Portage Parkway and of the intersecting roadways within the Project Site were provided by CIMA as Annual Average Daily Traffic (AADT) values for both 2016 and 2031. The traffic volumes for the other roadways were obtained from other sources and adjusted to both 2016 and 2031 using a 2% Annual Growth Rate. The percentage breakdown of heavy and medium trucks was estimated using the *Adaptation and Verification of Pavement Design Guide for Ontario Conditions* (March 2008). The daytime and nighttime period percentage were assumed based on similar projects. Traffic data provided is summarized in Appendix A.

Table 4: 2016 Traffic Summary

Roadway	AADT	% Commercial	Truck % (Medium/Heavy)	Time of Day % (Daytime/Nighttime)[1]	Speed Limit (km/h)
Highway 400	163,519	12	5 / 7	90 / 10	100
Edgeley BLVD	7,867	6	5 / 1	90 / 10	50
Jane Street	18,478	10	7 / 3	90 / 10	60
Creditstone	9,087	10	7 / 3	90 / 10	60
Highway 407	110,000	12	5 / 7	90 / 10	100
Highway 7	52,282	12	5 / 7	90 / 10	70
Portage PKWY	7,323	10	7 / 3	90 / 10	50

Note:
[1]: Daytime (16 Hours) – 07:00 to 23:00. Nighttime (8 Hours) – 23:00 to 07:00.

Table 5: 2031 Traffic Summary

Roadway	AADT	%Commercial	Truck % (Medium/Heavy)	Time of Day % (Daytime/Nighttime)[1]	Speed Limit (km/h)
Highway 400	220,075	12	5 / 7	90 / 10	100
Edgeley BLVD	13,038	6	5 / 1	90 / 10	50
Jane Street	23,297	10	7 / 3	90 / 10	60
Creditstone	17,511	10	7 / 3	90 / 10	60
Highway 407	110,000	12	5 / 7	90 / 10	100
Highway 7	70,365	12	5 / 7	90 / 10	70
Portage PKWY	21,730	10	7 / 3	90 / 10	50

Note:
[1]: Daytime (16 Hours) – 07:00 to 23:00. Nighttime (8 Hours) – 23:00 to 07:00.

5.4 Noise Prediction Modelling

As presented in the York Region, MTO, and MOECC guides, Golder used the approved Ontario Road Noise Analysis Method (ORNAMENT) prediction methodology, utilized in the STAMSON v 5 noise modelling computer program, to predict for the proposed future conditions as well as with the existing conditions at the selected NSA OLA.

All predictions were carried out for the daytime, which represents a 16 hour equivalent sound level and is consistent with the York Region Traffic Noise Mitigation Policy. If levels greater than 60 dBA or an increase in noise levels greater than 5 dB were predicted at the OLA, investigation of mitigation was carried out with STAMSON modelling.

In addition to including traffic volumes and respective traffic breakdowns for the relevant roadways, the following additional inputs were considered for modelling in Stamson:

- perpendicular distance between the roadway and the OLA;
- based on an analysis of available terrain contours, generally flat land between road and receptor;
- pavement type of “average” acoustic absorption for the roadway;
- acoustically hard surface between roadway and the receptor (i.e., hard versus soft ground);
- generally flat road grades;
- current and future posted speed limits; and
- current and proposed widths of the roadway.

Following a conservative approach, the prediction modelling did not consider potential attenuation due to the presence of any woodlots or existing privacy fencing between the roadway and OLA.

Furthermore, the NIS considers traffic to be predominantly free-flowing along Portage Parkway and does not include specific inputs for vehicles accelerating or decelerating. A more comprehensive assessment approach can be used at the detailed design stage, which can include certain acoustic effects of traffic flow controls.

6.0 RESULTS

6.1 Determination of Potential Noise Impacts

Table 6 presents the summary of the potential noise impact results at the identified NSA OLA. The results presented are based on the analysis carried out using the Stamson prediction model, for which input data has been summarized in Appendix B.

Table 6: Summary of Predicted Noise Levels ($L_{eq\ 16\ hours}$) at OLAs

OLA ID	Approximate Distance to Centreline of Roadway (m)	Predicted 2016 Noise Level (dBA)	Expected Change in Noise Level between 2016 and 2031 (dB)	Predicted 2031 Noise Level (dBA)
R01	360	70	+1	71

The York Region's noise level limit criterion of 55 dBA has been exceeded. However, the Project is expected to result in an increase of less than 5 dB at the identified NSA (i.e., R1). As discussed in Section 5.2, the location of R1 OLA was estimated near the northwest corner of the most western building footprint with the location and heights of localized shielding assumed. As the dominate roadways are existing, Golder expects noise impacts on the development were evaluated appropriately as part of the planning and development process for R1 (i.e, NPC 300 and York Region's Traffic Noise Mitigation Policy) and any required noise mitigation was identified. Accordingly, noise mitigation from existing roadways were not further investigated as part of this NIS.

7.0 ENVIRONMENTAL PROTECTION REQUIREMENT NOISE (EPR)-2

The construction phase of any project is typically considered temporary or short term relative to the entire life cycle of a project. The following is a summary of the items to be considered relating to construction noise according to applicable noise guidelines.

7.1 Construction Equipment and Activities

As construction noise could impact receptors in the vicinity of the Project, some general recommendations to assist in minimizing noise impacts due to the Project's construction equipment and activities are provided below:

- All construction equipment should be properly maintained according to manufacturer's recommendations and be in accordance MOECC Model Municipal Noise Control by-law (i.e., NPC-115), where appropriate.
- If any of the construction activities involve Piling or Blasting, they should to be carried out in accordance with OPSS 120 and MOECC NPC-119.
- Construction equipment and/or activities typically known to be of annoyance (e.g., piling) should consider one of the following:
  - limit operating time within the daytime period when ambient noise levels are expected to be higher;
  - maintain an acceptable setback distance from the identified nearby NSAs, where practical;
  - carry out additional noise studies or monitoring program to verify and document noise levels;
  - implement temporary noise barriers or other localized noise mitigation measures (where practical); and
  - investigate other alternative construction equipment or processes to complete the task.

7.2 Noise Complaints Process

A process for dealing with noise complaints during the construction phase should be considered. Noise complaints are usually received directly from the complainant or a municipal by-law officer. Note that compliance with noise guidelines or regulations does not ensure noise complaints will not occur. The following is a general recommended process for dealing with noise complaints based on Golder's past project experiences:

- Identify an individual or group on the Project (Site Supervisor, Health and Safety representative, etc.) to handle the noise complaints and someone that can be easily contacted.
- Document the noise complaint. Include the date, time and the individual's contact information from whom the noise complaint was received. Specific information such as the location, duration, time and type of sound heard (steady, impulsive, etc.) should be included as it will assist in the investigation process. Be aware of any time constraints put in place by the municipality for the noise complaint to be addressed.
- Investigate the noise complaint and identify the source of the noise complaint. Document the investigation.
- If the noise complaint is justified, in that excessive noise levels were generated, minimize or eliminate the source of the noise complaint. Document the action taken.
- Follow up with the complainant and provide the results of the noise complaint investigation.

7.3 Applicable By-Laws

Golder reviewed applicable by-laws to identify applicable requirements. Generally, each regulating jurisdiction has a by-law dealing with noise, with often slightly differing by-law requirements. The jurisdiction with by-law authority in the vicinity of the Project is the City of Vaughan.

Through an initial review of the City of Vaughan By-Law #96-2006 (Noise By-Law), construction projects operating construction equipment are subject to a noise curfew between the hours of 19:00 to 07:00 on Monday through Saturday in residential areas with no operation of construction equipment on Sundays or Statutory Holidays. Noise from construction equipment are subject to a curfew from 17:00 to 07:00 on Monday through Saturday in quiet zones with no operation of construction equipment on Sundays or Statutory Holidays. One may apply and seek approval for a noise by-law exemption for construction equipment provided they satisfy the requirements of the By-Law. Further discussion between the City and relevant parties regarding noise by-law exemptions may be required.

8.0 CONCLUSIONS

This NIS provides a summary of the noise impact assessment for the Project on the neighbouring sensitive receptors and identifies: the applicable municipal noise by-law, describes a noise complaint process for construction activities, and provides a general discussion regarding noise arising from construction activities.

The following are the conclusions from the assessment of the Project:

- The York Region's noise level limit criterion of 55 dBA has been exceeded. However, the expected increase in levels associated with this project are expected to be less than 5 dB at the identified NSA OLA (i.e., R01). As the elevated noise levels were associated with existing roadways, Golder expects noise levels were evaluated as part of the planning and development process for R1 (i.e, NPC 300 and York Regions Traffic Noise Mitigation Policy). It is further expected the development-specific noise studies would have identified noise mitigation requirements.
- An outline regarding construction noise, a noise complaint process and the applicable noise by-law during the construction phase of the Project has been provided. Based on a review of available information, an exemption from the applicable by-law may be required.

9.0 REFERENCES

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Report Signature Page

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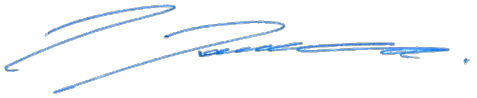

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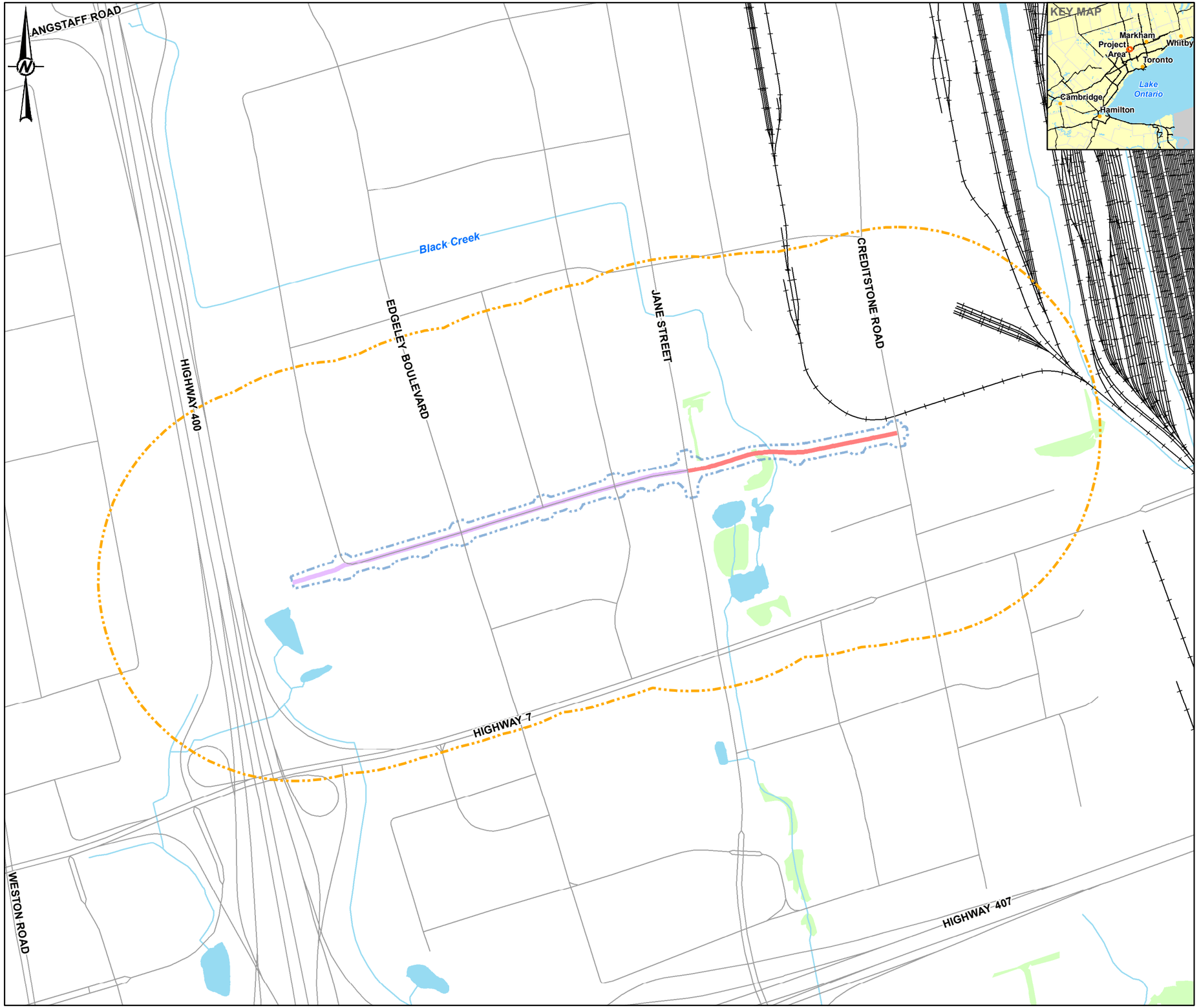
FIGURES



LEGEND

- ROAD
- RAILWAY
- WATERCOURSE
- WATERBODY
- WETLAND
- WOODED AREA

PROJECT COMPONENTS

- PROPOSED PORTAGE PARKWAY EXTENSION
- PROPOSED PORTAGE PARKWAY WIDENING
- PROJECT SITE
- AREA OF INVESTIGATION

0 400 800

1:10,000 METRES

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2015
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM
ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2015
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17

CLIENT
CITY OF VAUGHAN

PROJECT
MUNICIPAL CLASS EA PORTAGE PARKWAY NOISE IMPACT STUDY

TITLE
SITE LOCATION

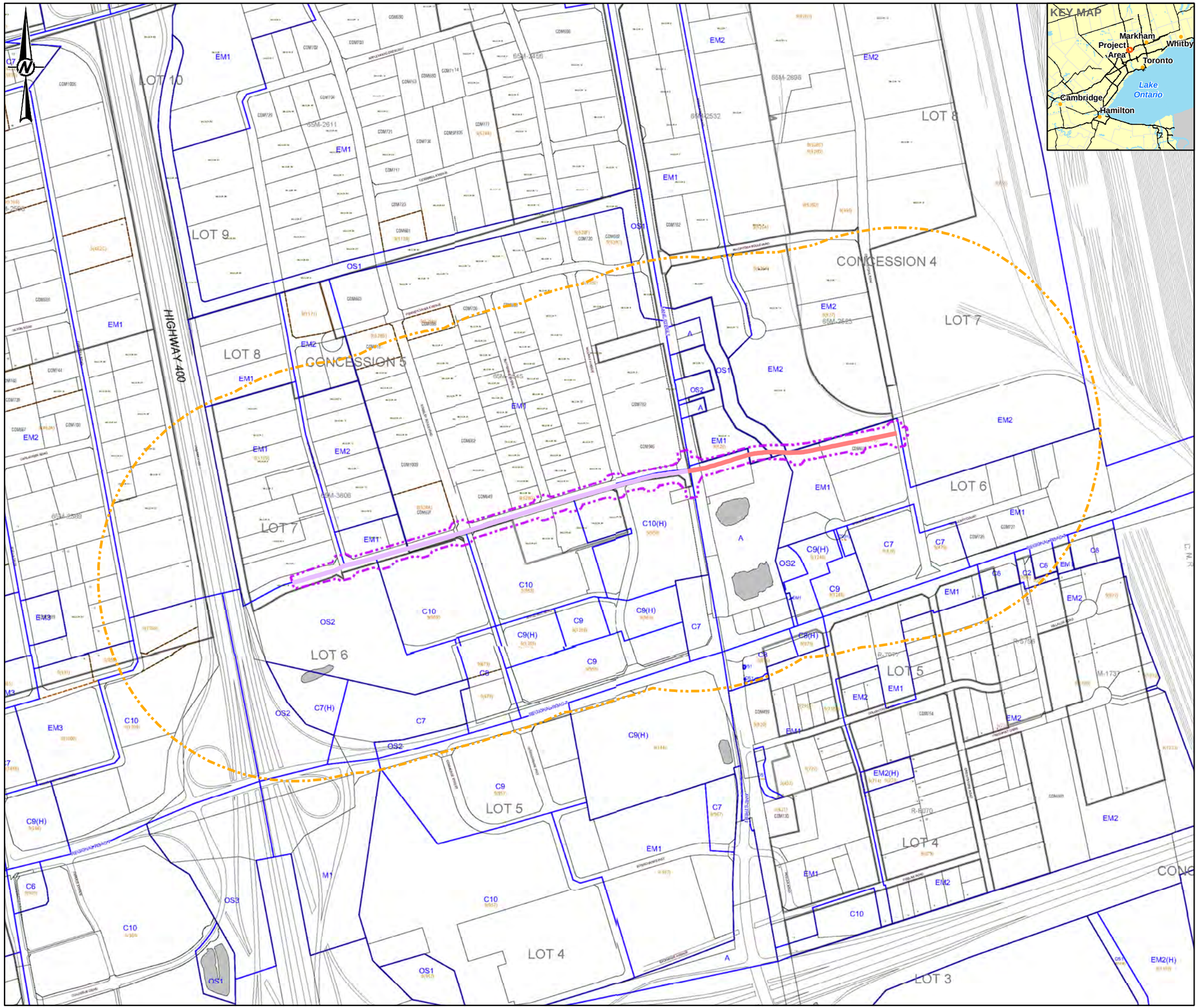
CONSULTANT
Golder Associates

YYYY-MM-DD	2016-05-18
DESIGNED	ME
PREPARED	JR
REVIEWED	SC
APPROVED	SC

PROJECT NO.	CONTROL	REV.	MAP
1522372	-	-	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

S:\Clients\City_of_Vaughan\CIMA_Portage_Parkway\99_PRO\1522372_PortageParkway\40_PROD\0006_Noise_Assessment\1522372-0006-RN-0001.mxd



LEGEND

PROJECT COMPONENTS

- PROPOSED PORTAGE PARKWAY EXTENSION
- PROPOSED PORTAGE PARKWAY WIDENING
- PROJECT SITE
- AREA OF INVESTIGATION

Zone	Description
A	Agricultural
C6	Highway Commercial
C7	Service Commercial
C9	Corporate Centre Zone
C10	Corporate District Zone
EM1	Prestige Employment Area
EM2	General Employment Area
EM3	Retail Warehouse Employment Area
OS1	Open Space Conservation
OS2	Open Space Park
OS3	Open Space Commercial

0 400 800

1:10,000 METRES

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2015
ZONING DATA - CITY OF VAUGHAN, OBTAINED 2016
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM
ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2015
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17

CLIENT
CITY OF VAUGHAN

PROJECT
MUNICIPAL CLASS EA PORTAGE PARKWAY NOISE IMPACT STUDY

TITLE
CITY OF VAUGHAN ZONING BY-LAW NUMBER 1-88

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-05-18
DESIGNED	ME
PREPARED	JR
REVIEWED	SC
APPROVED	SC

PROJECT NO.	CONTROL	REV.	MAP
1522372	-	-	2

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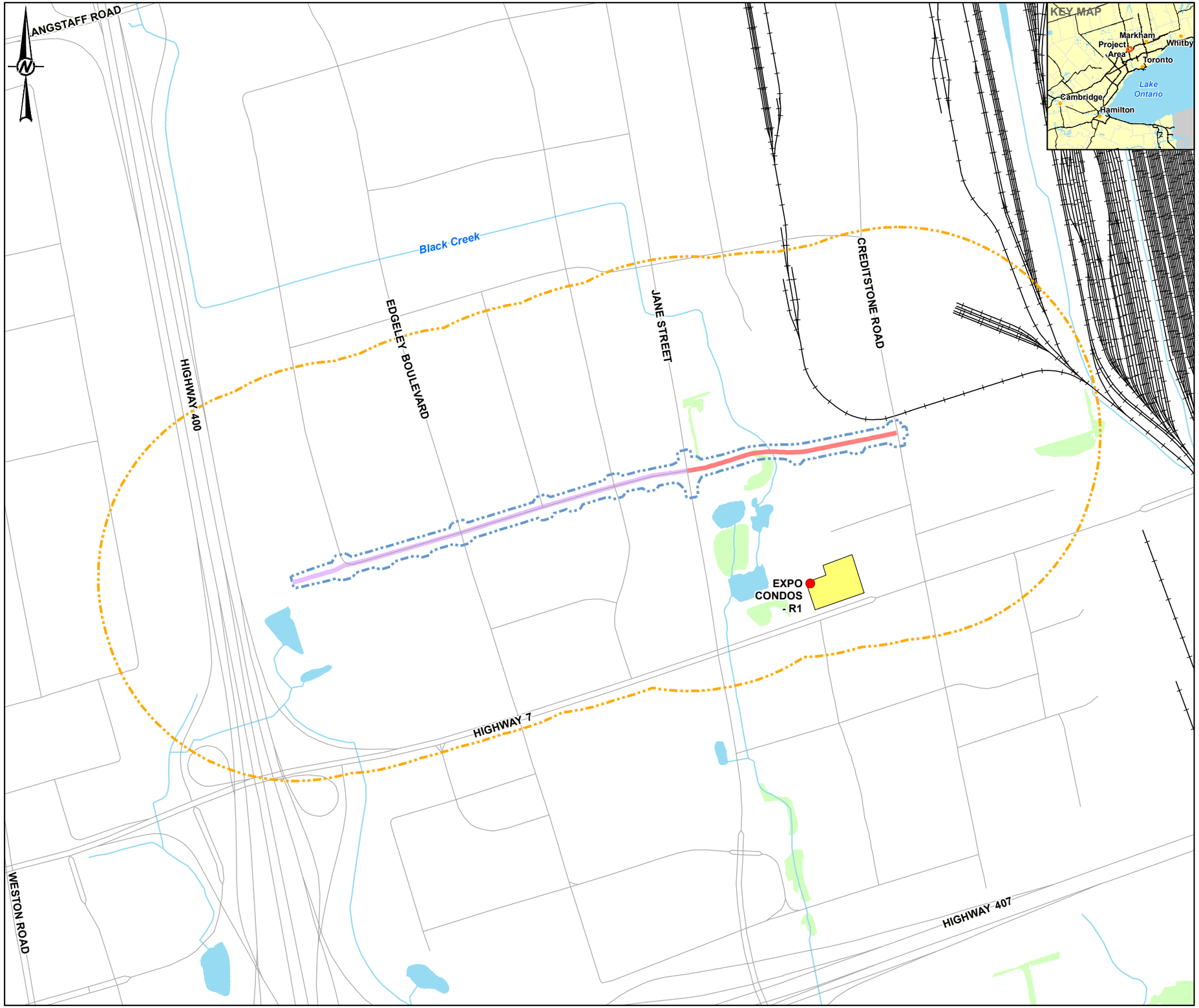

LEGEND

- ROAD
- RAILWAY
- WATERCOURSE
- WATERBODY
- WETLAND
- WOODED AREA

PROJECT COMPONENTS

- PROPOSED PORTAGE PARKWAY EXTENSION
- PROPOSED PORTAGE PARKWAY WIDENING
- NOISE SENSITIVE AREA
- OUTDOOR LIVING AREA (OLA)
- PROJECT SITE
- AREA OF INVESTIGATION

0 400 800

1:10,000 METRES

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2015
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM
ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2015
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17

CLIENT
CITY OF VAUGHAN

PROJECT
MUNICIPAL CLASS EA PORTAGE PARKWAY NOISE IMPACT STUDY

TITLE
NOISE SENSITIVE AREAS AND OUTDOOR LIVING AREAS ASSESSED

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-05-18
DESIGNED	ME
PREPARED	JR
REVIEWED	SC
APPROVED	SC

PROJECT NO.	CONTROL	REV.	MAP
1522372	-	-	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0

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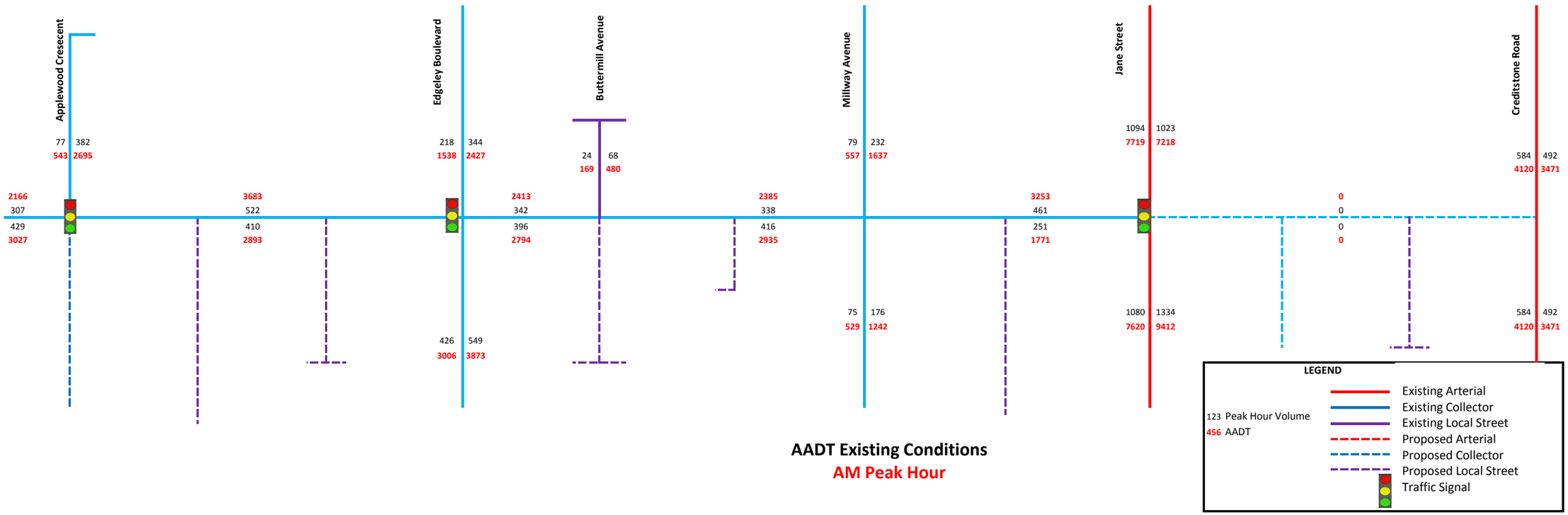
APPENDIX A

Traffic Data and References

AADT (Hwy 400)	107072
Peak Hour (Hwy 400)	15176
AADT Factor	0.14

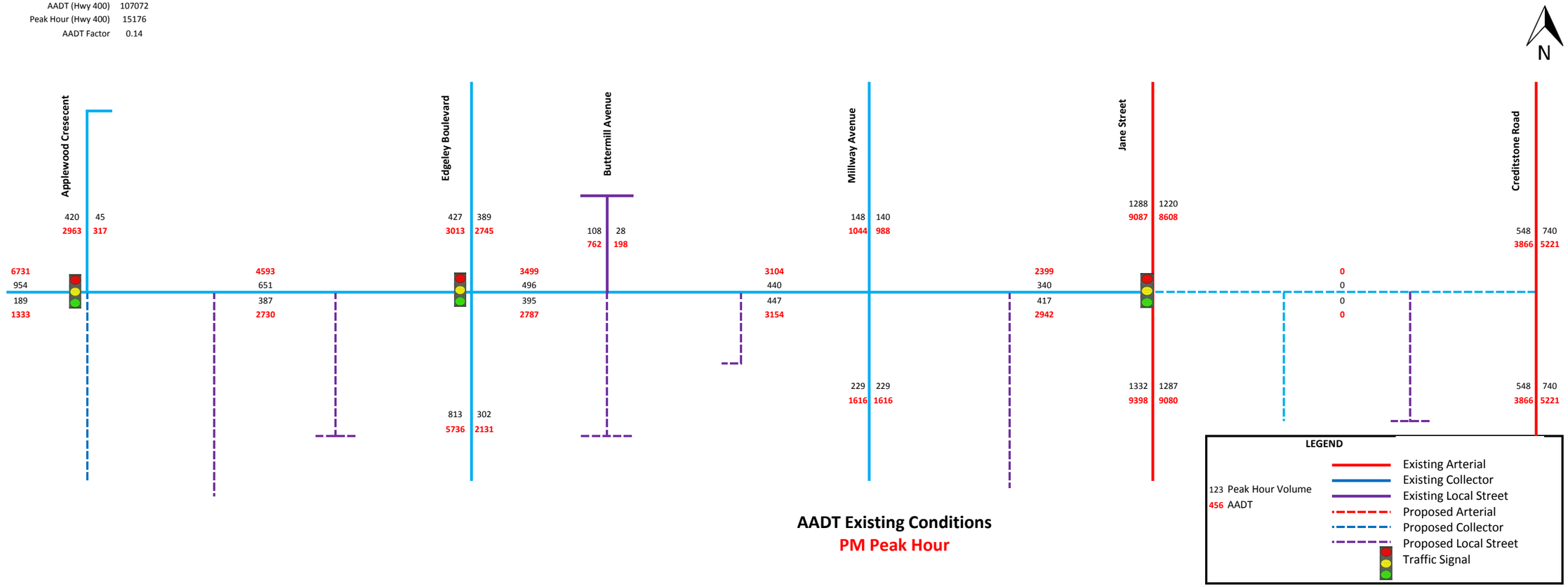
123 Peak Hour Volume
456 AADT

N



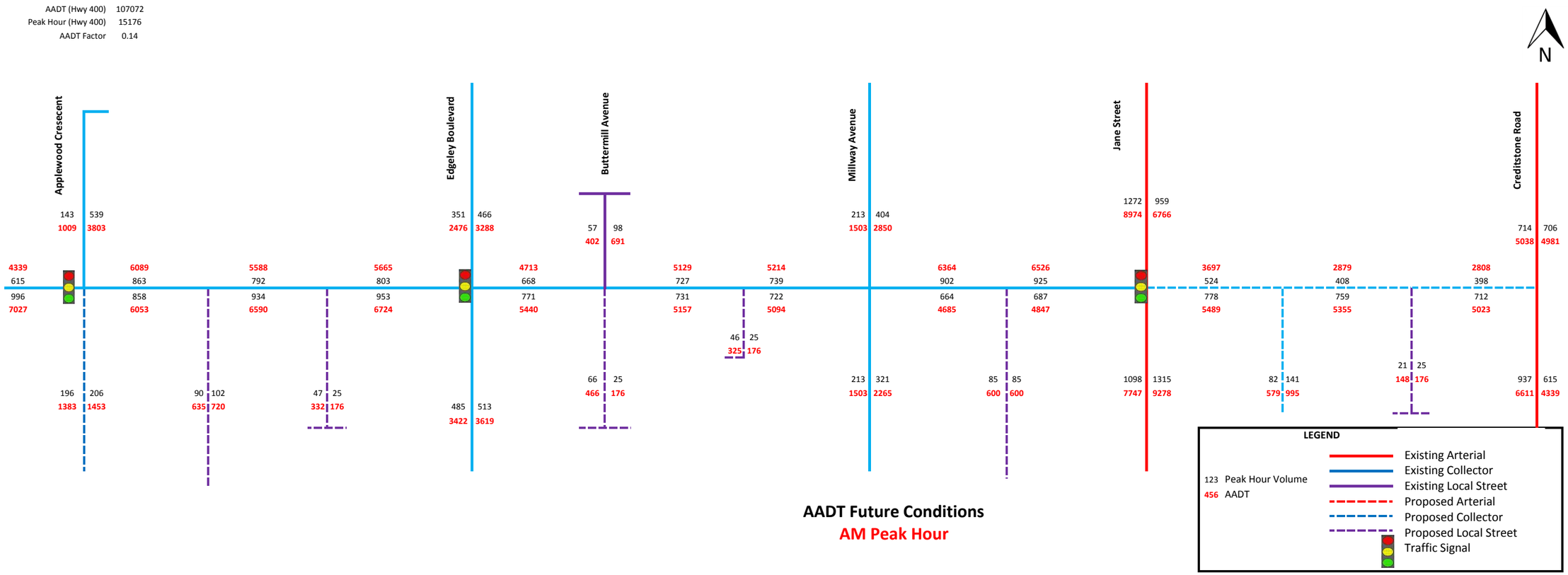
AADT Existing Conditions
AM Peak Hour

AADT (Hwy 400) 107072
Peak Hour (Hwy 400) 15176
AADT Factor 0.14

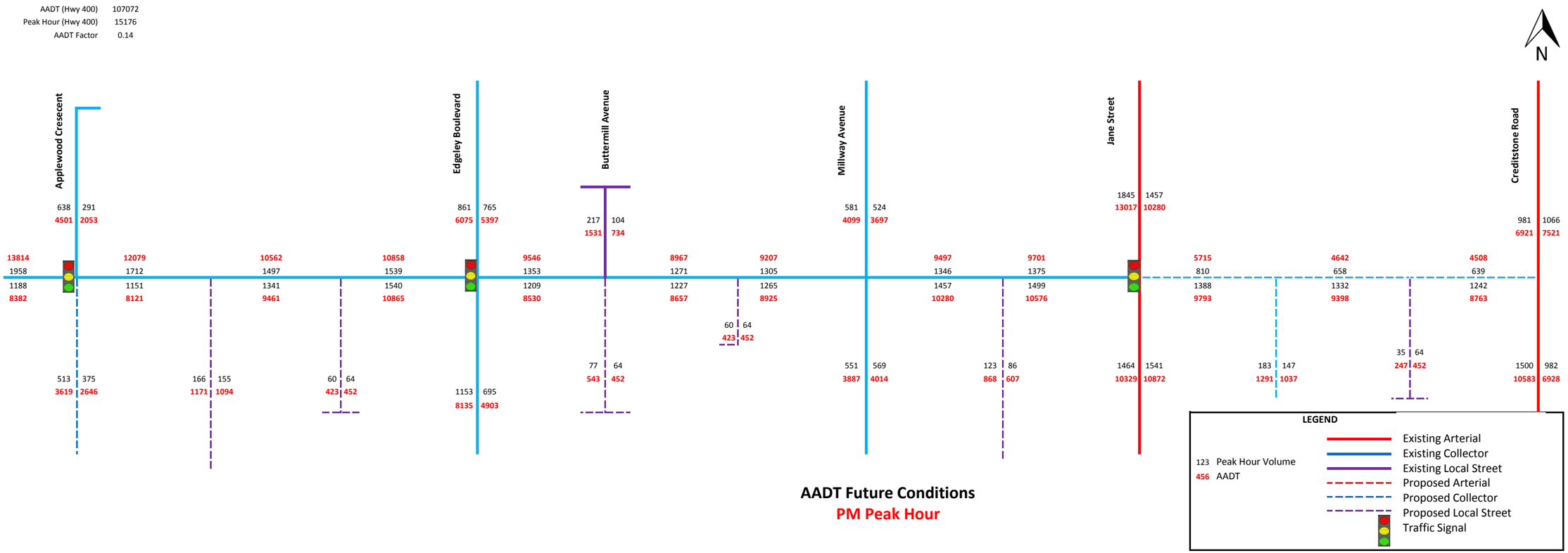


AADT Existing Conditions
PM Peak Hour

AADT (Hwy 400) 107072
Peak Hour (Hwy 400) 15176
AADT Factor 0.14



AADT (Hwy 400) 107072
Peak Hour (Hwy 400) 15176
AADT Factor 0.14



AADT Future Conditions
PM Peak Hour

Attachment 1

The Regional Municipality of York

2015 Transportation Fact Book

York Region

Top 10 Highest Traffic Volume Locations

Highway 7 is York Region's most travelled roadway providing a link between Peel Region and Durham Region. Highway 7 is also a major connecting road to Highway 427, Highway 400 and Highway 404.

The volumes presented in **Table 3** are derived from an eight-hour turning movement count for all approaches and represents traffic during a typical weekday. **Figure 11** illustrates the top 10 highest traffic volume locations in York Region between 2010 and 2015.

Table 3 – Top 10 Highest Traffic Volume Locations in York Region

Rank	Description	Year Counted	Total Vehicles	Total Pedestrians	Total Bikes	Total Trucks	% Trucks
1	Highway 7 (between Weston Road and Hwy 400)	2010	56,005	1,001	58	3,647	7%
2	Highway 7 at Keele Street	2015	54,986	296	8	6,752	12%
3	Highway 7 (east of Hwy 400 to Creditstone Road)	2015	51,257	444	3	6,069	12%
4	Highway 7 between Hwy 404 and Woodbine Avenue	2011	44,308	196	0	1,766	4%
5	Highway 7 between Leslie Street and Hwy 404	2014	42,054	1,131	48	1,826	4%
6	Major Mackenzie Drive at Jane Street	2011	38,089	213	29	1,148	4%
7	Centre Street at Dufferin Street	2012	37,694	515	19	1,367	4%
8	Highway 7 at Warden Avenue	2011	37,695	336	3	981	3%
9	Rutherford Road/Carville Road at Bathurst Street	2011	37,397	712	55	1,326	4%
10	Highway 7 at Islington Avenue	2010	36,895	447	6	2,372	6%

Ontario

Ministry of Transportation | Highway Standards Branch | Traffic Office

Provincial Highways Traffic Volumes 2010

King's Highways / Secondary Highways / Tertiary Roads

Ministry Contact:
Traffic Office (905)-704-2960

Abstract:
This annual publication contains averaged traffic volume information for each of the sections of highway under MTO jurisdiction for the year 2010 only.

Key Words:
Annual Average Daily Traffic volume (AADT

Highway	Location Description - From	Location Description - To	Dist. (km)	2010 AADT
141	MUSKOKA RD 35-HUNTSVILLE W LTS	MUSKOKA RD 24-DEE BANK RD-ULLSWATER	10.1	2,150
141	MUSKOKA RD 24-DEE BANK RD-ULLSWATER	MUSKOKA/PARRY SOUND BDY	13.4	1,550
141	MUSKOKA/PARRY SOUND BDY	SEC HWY 632-PINE ST-ROSSEAU	1.4	1,550
141	SEC HWY 632-PINE ST-ROSSEAU	HWY 69/141 N JCT OVERLAPS HWY 69	17.3	1,850
141	HWY 69/141 N JCT OVERLAPS HWY 69	HWY 69/141 S JCT	3.5	
141	HWY 69/141 S JCT	HWY 400/141 IC -HWY END END OF HWY 141	0.9	N/A
144	HWY 17 OP IC	SUDBURY REG RD 24(E)	4.0	2,450
144	SUDBURY REG RD 24(E)	REG RD 15(N)REG RD 35(E)	13.6	3,750
144	REG RD 15(N)REG RD 35(E)	ST ALBERT ST(W)CHARETTE ST (E)	1.1	22,000
144	ST ALBERT ST(W)CHARETTE ST (E)	REG RD 13-VERMILION LK RD (W)	5.4	11,600
144	REG RD 13-VERMILION LK RD (W)	LARCHWOOD AV -ONAPING FALLS	4.1	8,400
144	LARCHWOOD AV -ONAPING FALLS	SUDBURY RD 8	12.7	6,800
144	SUDBURY RD 8	ONAPING FALLS W LTS	3.0	2,350
144	ONAPING FALLS W LTS	CARTIER EAST ENTRANCE	13.1	2,350
144	CARTIER EAST ENTRANCE	ONAPING LK RD(E)ULSTER TWP	16.9	1,700
144	ONAPING LK RD(E)ULSTER TWP	SUDBURY-NEW LISK DIST BDY	45.2	1,100
144	SUDBURY-NEW LISK DIST BDY	SEC HWY 560	34.9	1,100
144	SEC HWY 560	SEC HWY 661 -GOGAMA RD	32.0	1,100
144	SEC HWY 661 -GOGAMA RD	HASSARD/DOYLE TWP BDY	53.3	1,100
144	HASSARD/DOYLE TWP BDY	TIMMINS S LTS -COCHRANE DIST BDY	20.6	1,400
144	TIMMINS S LTS -COCHRANE DIST BDY	HWY 101 -TIMMINS -HWY END END OF HWY 144	11.8	1,400
148	ONTARIO-QUEBEC PROV BDY	RENFREW RD 40 (S)	1.8	5,500
148	RENFREW RD 40 (S)	CEDAR LANE L24-25 -START OF NA PEMBROKE-HWY TRANSFER	3.2	11,800
148	CEDAR LANE L24-25 -START OF NA PEMBROKE-HWY TRANSFER	HWY 17 &62 -END OF NA-HWY END END OF HWY 148	9.4	
400	MAPLE LEAF DR UP-NORTH YORK	JANE ST IC OP	0.4	66,100
400	JANE ST IC OP	HWY 401 IC	1.2	73,000
400	HWY 401 IC	FINCH AVE IC	4.4	212,100
400	FINCH AVE IC	STEELES AVE IC-NORTH YORK	2.1	213,500
400	STEELES AVE IC-NORTH YORK	HWY 407 IC	1.2	150,100
400	HWY 407 IC	HWY 7 IC-VAUGHAN	0.9	146,800
400	HWY 7 IC-VAUGHAN	LANGSTAFF RD IC	2.0	145,200
400	LANGSTAFF RD IC	RUTHERFORD RD IC	2.1	158,900
400	RUTHERFORD RD IC	400-MAJOR MACKENZIE DR IC	2.1	141,100
400	400-MAJOR MACKENZIE DR IC	YORK RD 11 IC (TO KING CITY)	8.4	106,600
400	YORK RD 11 IC (TO KING CITY)	AURORA RD/LOYDTOWN RD IC	9.2	94,500
400	AURORA RD/LOYDTOWN RD IC	HWY 9 IC	3.2	101,000
400	HWY 9 IC	CANAL RD IC	2.9	92,700
400	CANAL RD IC	SIMCOE ROAD 88 IC UP	5.6	91,400
400	SIMCOE ROAD 88 IC UP	HWY 89 IC UP	11.4	83,800
400	HWY 89 IC UP	INNISFIL BEACH RD IC	9.7	94,500
400	INNISFIL BEACH RD IC	MOLSON PARK DR -MAPLEVIEW DR IC	5.0	84,300
400	MOLSON PARK DR -MAPLEVIEW DR IC	SIMCOE ROAD 27 IC -ESSA RD-BARRIE	3.8	101,700

CONCRETE HIGHWAYS

CASE STUDY OF THE PORTLAND CEMENT CONCRETE PAVEMENT SECTION OF HIGHWAY 407 OPEN ACCESS TOLL HIGHWAY

Yasser Hassan
Associate Professor
Carleton University
Ottawa, Canada

April 2005

CONCRETETHINKING
in transportation **solutions**

Traffic Conditions

Available data from the Ministry of Transportation of Ontario indicate a design average annual daily traffic (AADT) of 110,000 vehicles/day with a 10% truck proportion (or 11,000 trucks/day), adding up to a total design ESAL of 100 Million. It should be noted, however, that the 110,000 vehicles/day represent the design daily volume on a section, while the 407 ETR as a route serves considerably more traffic as reflected in the figures of actual daily trips shown in Table 1.

Table 1. Average Daily Trips on 407 ETR.

	2000	2001	2002	2003†	2004‡
Jan	184,363	202,466	225,911	233,311	234,486
Feb	201,834	208,638	236,272	239,249	245,711
Mar	207,481	209,858	225,666	232,309	
Apr	201,315	212,881	251,707	241,109	
May	220,748	233,367	261,741	257,486	
Jun	237,791	244,354	269,137	272,245	
Jul	218,537	237,837	271,792	275,753	
Aug	237,814	259,691	266,588	264,265	
Sep	234,951	254,638	270,495	285,633	
Oct	232,718	267,983	279,455	291,073	
Nov	233,275	273,101	269,254	271,935	
Dec	194,149	224,269	234,432	248,691	
Avg.	**217,058**	**235,865**	**255,251**	**259,496**	**243,978‡**

† Trips occurred on August 14, 15 and 16 during the North American power failure were not captured.
‡ Average daily trips based on January and February data only.

Fig. 4. Construction of 407 ETR.

York Region

STATUS
Council Approved Y N
CAO Approved: Y N

TITLE: York Region Traffic Noise Mitigation Policy for Regional Roads	NO.: Approval Date: March 23, 2006 Last Updated:

POLICY STATEMENT:

This policy provides a process for the effective mitigation of traffic noise on Regional Roads.

APPLICATION:

This policy shall be used for noise assessment and mitigation during implementation of Capital Roads Projects, Review and Approval of New Development Applications, Consideration of Retrofit Noise Mitigation and to address potentially unsafe situations of privately owned noise barriers adjacent of public areas on Regional Roads.

PURPOSE:

This policy identifies York Region's requirements for conducting noise assessments, including when and under what conditions mitigation is to be implemented.

DEFINITIONS:

"Ambient or Background" sound level - is the all-encompassing noise associated with a given environment and comprises a composite of sounds from many sources, other than the source of interest, near and far . In the context of this document, the ambient or existing noise level is the noise level which exists at a receptor as a result of existing traffic conditions without the addition of noise generated by the proposed undertaking or the new source of noise.

"Capital Projects" - where capital road construction projects are being undertaken on Regional Roads.

"Development" - development or redevelopment adjacent to Regional Roads.

"dBA" - a unit of measure to quantify noise levels.

Leg – The Energy Equivalent Continuous Sound Level - is the constant sound level over the time period in question, that results in the same total sound energy as the actually varying sound. It must be associated with a time period. Leq is a measure of total sound energy dose over a specified time period.

Leq (T): Leq (16 hours), Leq (8 hours), Leq (1 hours) means the A-weighted level of a steady sound carrying the same total energy in the time period T as the observed fluctuating sound. The time period T is given in brackets.

"Mature State of Development" – the future build-out of development that fronts or backs onto the Region's right-of –way, based on the ultimate population and traffic capacity forecasts as defined in York Region's Official Plan.

"Noise" - unwanted traffic sound.

"Outdoor Living Area" - means the part of an outdoor area designated or commonly used for private, exclusive and common use that is easily accessible from the building and designed for the quiet enjoyment of the outdoor environment. For the purposes of this policy Outdoor Living Areas (OLA's) include, but are not limited to, the following:

- Backyards - the area at grade directly behind the dwelling, measured up to 3 m from the back of the dwelling;
- Outdoor Living Areas combined with front yards for innovative or special house designs, if approved by the Local Municipality for location, size, fencing, etc…
- Balconies, provided they are the only OLA for the occupant and meet the following conditions:
  (a) minimum depth of 3 m (or as set by the local municipality);
  (b) outside the exterior building facade;
  (c) unenclosed;
- Common OLA's associated with multi-storey apartment buildings or condominiums;
- Passive recreational areas such as parks if identified by York Region or the local municipality.
- Other noise sensitive applications such as residential developments, seasonal residential developments, hospitals, nursing/retirement homes, schools, day care centers or other non-residential land uses containing noise sensitive areas and spaces as approved by York Region.

"Retrofit" - where no Capital Road Projects are being undertaken adjacent to existing residential areas that may warrant noise mitigation.

"Standard Operating Procedures (SOP's)" – York Region's technical guidelines for the assessment and mitigation of noise on Regional Roads.

DESCRIPTION:

TECHNICAL AND DESIGN CRITERIA

1. The following technical and design criteria shall be used in determining noise level predictions and modeling:

a) Future noise levels shall be based on the "Mature State of Development";
b) The significant noise impact or change in noise levels attributable to implementation of a road project shall be calculated as the difference in projected noise levels at the start of construction and the projected noise levels at the "Mature State of Development";

c) The significant noise impact or change in noise levels for a new development shall be calculated based on the difference between existing noise levels and projected noise levels at the "Mature – State of Development.
d) Alternative noise mitigation measures shall be considered prior to making the decision to use noise barriers, i.e. pavement types, alternate alignments, landscaped berms, service road concepts, etc. Noise barriers shall only be used as a last resort, where all other mitigation measures are not feasible. Where noise barriers are required, landscaping is also required. Additionally, policies pertaining to community planning and transit objectives must be fully considered during the evaluation of potential noise mitigation solutions;
e) For Capital Road projects, any mitigation deemed necessary shall achieve a minimum reduction of 6 dBA against the greater of either the objective level Leq 16 hours (55 dBA) or the established ambient noise level at the start of construction.
f) Any mitigation deemed necessary shall attempt to achieve a minimum reduction of 6 dBA against the objective level (55 dBA), Leq 16 (7:00 – 23:00) and the greater of either the objective level or the established ambient noise level in all cases;
g) The noise impacts from capital road projects and in retrofit areas, shall only consider the OLA;
h) Where noise barriers are deemed appropriate they must be continuous across the adjacent residential properties without breaks or discontinuities and with returns along side lot lines where required to ensure effective noise attenuation; and
i) Noise mitigation must be constructed in accordance with York Region Standards and SOP's.

CAPITAL ROAD PROJECTS

2. In connection with the implementation of capital road projects, the following shall be used as a guideline in considering mitigation of noise impacts:

a) For projected noise level increases from 0 - 5 dBA on adjacent residential properties, no mitigation be considered unless projected noise levels are greater than 60 dBA (Either at the start of construction or at the mature state of development);
b) For projected sound levels at the start of construction greater than 55 dBA, and projected future noise level increases greater than 5 dBA, the feasibility of noise reduction measures shall be investigated where a minimum attenuation of 6 dBA can be achieved;
c) If it is deemed that noise mitigation is to be implemented, York Region shall assume the full cost of implementing the noise control measures;
d) York Region shall assume the ownership and maintenance of any noise control measures when constructed under the Capital Program;
e) Noise mitigation implemented as part of capital road projects will only be permitted along the property line at the extreme outer edge of York Region's ultimate right-of-way or along the flanking ends of the subdivision where required; and
f) When noise mitigation is not warranted on the basis of projected noise levels not exceeding 60 dBA, the mitigation may be deferred until noise levels exceed 60 dBA.

DEVELOPMENT

3. In connection with the approval of development applications adjacent to Regional Roads:

a) Noise attenuation reports in accordance with the York Region Noise Policy and SOP's, approved and recommended by the local municipalities must be provided to York Region during the submission of draft plan of subdivision or prior to Site Plan Approval, in order that noise attenuation measures can be evaluated during review of the draft/site plan;
b) Alternate methods of reducing the noise impact shall be considered prior to considering noise barriers;
c) Noise attenuation barriers shall be constructed along the extreme outer edge of the landowners/homeowners property line provided it is a minimum of 2.2 meters in height. However, the Commissioner of Transportation and Works can approve noise attenuation barriers up to a maximum height of up to 3.0 meters in situations where deemed appropriate and where recommended by the local municipality; and
d) Noise barriers are only to be used as a last resort where no other options are feasible. In these situations enhanced warning clauses shall be provided to warn purchasers including specific maintenance obligations and the municipalities' recourse to take corrective actions, should the owner fail to maintain the noise barriers in a state of good repair.

RETROFIT

4. In connection with the retrofit of existing developed areas adjacent to Regional Roads where no capital road projects are planned and no noise attenuation measures exist, but are requested by residents, the following shall be used as a guideline in considering mitigation of noise impacts.

To be eligible for retrofit the requirements of the Municipal Act must be satisfied as per the following conditions:

1. Existing noise levels are greater than 60 dBA.
2. At least 5 continuous dwellings are affected.
3. The proposed improvement must achieve at least 6 dBA improvement.
4. At least 2/3 of affected residents support application (including the 50% of cost).

In cases where existing noise walls are ineffective due to design deficiencies, they can become candidates for the Retrofit Program if the new mitigation can achieve a recommended benefit of 6 dBA over and above the existing noise barrier and all other existing retrofit conditions are satisfied.

Applications that satisfy retrofit criteria will be ranked, priced and submitted to Council for funding approval as part of the yearly capital budget cycle. Based on approved funding, improvements will be made based on highest ranking. If approved funding is limited, qualified applications not implemented shall be re-budgeted in the next year's budget cycle and implemented based on new rank and approved funding.

EXISTING PRIVATELY OWNED NOISE BARRIERS

5. In connection with severely deteriorated privately owned noise barriers that are located adjacent to the Regional Roads, the following process shall be used in addressing potentially unsafe situations adjacent to public areas:

a) Potential hazards shall have owners directed by the local municipality as soon as the hazard has been identified by Regional forces to correct the problem within a fixed time period.

b) Failure to comply shall result in Regional staff working with Local Municipal staff to have unsafe sections dismantled and have removed materials either disposed of or stockpiled on or adjacent to the owner's property. All costs incurred will be back charged to the homeowner with the assistance of the governing local municipality via the Property Standards Act.

RESPONSIBILITIES:

All administrative and financial procedures shall conform to the Regulations under the Municipal Act and the provisions of this policy.

REFERENCE:

Draft Approval (Transportation and Works Committee Report XX, Clause XX, May XX, 2005)

CONTACT:

General Manager, Roads – Transportation and Works Department

APPROVAL INFORMATION

CAO Approval Date: TBD

Committee: Transportation and Works	**Clause**: TBD		**Report No**: TBD
Council Approval: TBD	**Minute No.** TBD	**Page:** TBD	**Date: TBD**

APPENDIX B

STAMSON Inputs Summary and Results

ROAD	HIGHWAY 400	APPLEWOOD CRESCENT	EDGELEY BOULEVARD	MILLWAY AVENUE	JANE STREET	CREDITSTONE	HIGHWAY 407	HIGHWAY 7	PORTAGE PARKWAY
AADT	145200	3280	7867	3232	18478	9087	110000	51257	7323
AADT YEAR	2010	2016	2016	2016	2016	2016	2016	2015	2016
AADT SOURCE DATA	MTO. Provincial Highways Traffic Volumes 2010 AADT Only.pdf. HWY 7 to Langstaff	Client Existing PM Period. B000541_Existing AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Existing AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Existing AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Existing AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Existing AADT PM_Marked Up SC.pdf	Cement Association. Ultimate Design Traffic	Vaughan, Highest Volume Intersection CityofVaughan AADT Review.pdf Highway 7 @ Jane Street	Client Existing PM Period. B000541_Existing AADT PM_Marked Up SC.pdf
AADT ANNUAL GROWTH FACTOR	2.0%	0%	0%	0%	0%	0%	0%	2%	0%
ADJUSTED AADT YEAR	2016	2016	2016	2016	2016	2016	2016	2016	2016
ADJUSTED AADT	163519	3280	7867	3232	18478	9087	110000	52282	7323
# OF YEARS OF GROWTH	0	0	0	0	0	0	0	0	0
MEDIUM TRUCKS %	5.0%	5.0%	5.0%	5.0%	7.0%	7.0%	5.0%	5.0%	7.0%
HEAVY TRUCKS %	7.0%	1.0%	1.0%	1.0%	3.0%	3.0%	7.0%	7.0%	3.0%
A/MT/HT % SOURCE	AASHTO Guide - 2008 - Urban/Principal Arterial or Freeway Med (2-4 Axle)- 12% * (30 +10)% Heavy - 12% - Med	AASHTO Guide - 2008 - Local Med (2-4 Axle)- 6% * (90+2)% Heavy - 6% - Med	AASHTO Guide - 2008 - Local Med (2-4 Axle)- 6% * (90+2)% Heavy - 6% - Med	AASHTO Guide - 2008 - Local Med (2-4 Axle)- 6% * (90+2)% Heavy - 6% - Med	AASHTO Guide - 2008 - Urban/Minor Arterial Med (2-4 Axle) - 10% * (65+5)% Heavy - 10% - Med	AASHTO Guide - 2008 - Urban/Minor Arterial Med (2-4 Axle) - 10% * (65+5)% Heavy - 10% - Med	AASHTO Guide - 2008 - Urban/Principal Arterial or Freeway Med (2-4 Axle)- 12% * (30 +10)% Heavy - 12% - Med	AASHTO Guide - 2008 - Urban/Principal Arterial or Freeway Med (2-4 Axle)- 12% * (30 +10)% Heavy - 12% - Med	AASHTO Guide - 2008 - Urban/Minor Arterial Med (2-4 Axle) - 10% * (65+5)% Heavy - 10% - Med
AUTOMOBILE %	88%	94%	94%	94%	90%	90%	88%	88%	90%
% COMMERCIAL	12%	6%	6%	6%	10%	10%	12%	12%	10%
TIME PERIOD	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT
DAYTIME %	90%	90%	90%	90%	90%	90%	90%	90%	90%
NIGHTTIME %	10%	10%	10%	10%	10%	10%	10%	10%	10%
DT/NT % SOURCE	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2
AUTOMOBILES - DT	129507.0	2775.0	6655.0	2734.0	14967.0	7360.0	87120.0	41407.0	5932.0
MEDIUM TRUCKS - DT	7358.0	148.0	354.0	145.0	1164.0	572.0	4950.0	2353.0	461.0
HEAVY TRUCKS - DT	10302.0	30.0	71.0	29.0	499.0	245.0	6930.0	3294.0	198.0
AUTOMOBILES - NT	14390.0	308.0	739.0	304.0	1663.0	818.0	9680.0	4601.0	659.0
MEDIUM TRUCKS - NT	818.0	16.0	39.0	16.0	129.0	64.0	550.0	261.0	51.0
HEAVY TRUCKS - NT	1145.0	3.0	8.0	3.0	55.0	27.0	770.0	366.0	22.0
QAQC	163520.0	3280.0	7866.0	3231.0	18477.0	9086.0	110000.0	52282.0	7323.0
	1.2	0.0	-1.0	-1.0	-1.0	-1.0	0.0	-0.1	0.0
ROAD EXPOSURE - ANGLE 1	-45	30	0	45	-60	-90	-90	-90	-60
ROAD EXPOSURE - ANGLE 2	90	45	45	75	90	90	90	90	45
SPEED LIMIT	100	50	50	50	60	60	100	70	50
ROAD GRADIENT	0	0	0	0	0	0	0	0	0
ROAD PAVEMENT	1	1	1	1	1	1	1	1	1
TOPOGRAPHY	1	1	1	1	1	1	1	1	1
WOOD DEPTH	0	0	0	0	0	0	0	0	0
NO OF ROWS OF HOUSES	0	0	0	0	0	0	0	0	0
DENSITY OF THE 1ST ROW	20	20	20	20	20	20	20	20	20
INTERMEDIATE SURFACE	1	1	1	1	1	1	1	1	1
RECEIVER HEIGHT (m)	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
SOURCE RECIVER DISTANCE (m)	**1507**	**1242**	**827**	**650**	**272**	**296**	**959**	**90**	**355**
BARRIER (YES/NO)	NO	NO	NO	NO	NO	YES	Yes	Yes	NO
BARRIER ANGLE 1	-	-	-	-	-	0	-90	-90	-
BARRIER ANGLE 2	-	-	-	-	-	90	0	0	-
BARRIER HEIGHT (m)	-	-	-	-	-	6	6	6	-
BARRIER RECEIVER DISTANCE (m)	-	-	-	-	-	50	5	5	-
TOTAL LEQ (dBA)									

ROAD	HIGHWAY 400	APPLEWOOD CRESCENT	EDGELEY BOULEVARD	MILLWAY AVENUE	JANE STREET	CREDITSTONE	HIGHWAY 407	HIGHWAY 7	PORTAGE PARKWAY
AADT	145200	6554	13038	7901	23297	17511	110000	51257	21730
AADT YEAR	2010	2031	2031	2031	2031	2031	2031	2015	2031
AADT SOURCE DATA	MTO. Provincial Highways Traffic Volumes 2010 AADT Only.pdf. HWY 7 to Langstaff	Client Existing PM Period. B000541_Future AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Future AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Future AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Future AADT PM_Marked Up SC.pdf	Client Existing PM Period. B000541_Future AADT PM_Marked Up SC.pdf	Cement Association. Ultimate Design Traffic	Vaughan, Highest Volume Intersection CityofVaughan AADT Review.pdf Highway 7 @ Jane Street	Client Existing PM Period. B000541_Future AADT PM_Marked Up SC.pdf
AADT ANNUAL GROWTH FACTOR	2.0%	0%	0%	0%	0%	0%	0%	2%	0%
ADJUSTED AADT YEAR	2031	2031	2031	2031	2031	2031	2031	2031	2031
ADJUSTED AADT	220075	6554	13038	7901	23297	17511	110000	70365	21730
# OF YEARS OF GROWTH	0	0	0	0	0	0	0	0	0
MEDIUM TRUCKS %	5.0%	5.0%	5.0%	5.0%	7.0%	7.0%	5.0%	5.0%	7.0%
HEAVY TRUCKS %	7.0%	1.0%	1.0%	1.0%	3.0%	3.0%	7.0%	7.0%	3.0%
A/MT/HT % SOURCE	AASHTO Guide - 2008 - Urban/Principal Arterial or Freeway Med (2-4 Axle)- 12% * (30 +10)% Heavy - 12% - Med	AASHTO Guide - 2008 - Local Med (2-4 Axle)- 6% * (90+2)% Heavy - 6% - Med	AASHTO Guide - 2008 - Local Med (2-4 Axle)- 6% * (90+2)% Heavy - 6% - Med	AASHTO Guide - 2008 - Local Med (2-4 Axle)- 6% * (90+2)% Heavy - 6% - Med	AASHTO Guide - 2008 - Urban/Minor Arterial Med (2-4 Axle) - 10% * (65+5)% Heavy - 10% - Med	AASHTO Guide - 2008 - Urban/Minor Arterial Med (2-4 Axle) - 10% * (65+5)% Heavy - 10% - Med	AASHTO Guide - 2008 - Urban/Principal Arterial or Freeway Med (2-4 Axle)- 12% * (30 +10)% Heavy - 12% - Med	AASHTO Guide - 2008 - Urban/Principal Arterial or Freeway Med (2-4 Axle)- 12% * (30 +10)% Heavy - 12% - Med	AASHTO Guide - 2008 - Urban/Minor Arterial Med (2-4 Axle) - 10% * (65+5)% Heavy - 10% - Med
AUTOMOBILE %	88%	94%	94%	94%	90%	90%	88%	88%	90%
% COMMERCIAL	12%	6%	6%	6%	10%	10%	12%	12%	10%
TIME PERIOD	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT	16 DT/8 NT
DAYTIME %	90%	90%	90%	90%	90%	90%	90%	90%	90%
NIGHTTIME %	10%	10%	10%	10%	10%	10%	10%	10%	10%
DT/NT % SOURCE	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2	ASSUMED BASED ON ESTIMATIONS FROM US EPA MOVES 2012/FHWA Traffic Monitoring Guide - Figure 1-2
AUTOMOBILES - DT	174299.0	5545.0	11030.0	6684.0	18871.0	14184.0	87120.0	55729.0	17601.0
MEDIUM TRUCKS - DT	9903.0	295.0	587.0	356.0	1468.0	1103.0	4950.0	3166.0	1369.0
HEAVY TRUCKS - DT	13865.0	59.0	117.0	71.0	629.0	473.0	6930.0	4433.0	587.0
AUTOMOBILES - NT	19367.0	616.0	1226.0	743.0	2097.0	1576.0	9680.0	6192.0	1956.0
MEDIUM TRUCKS - NT	1100.0	33.0	65.0	40.0	163.0	123.0	550.0	352.0	152.0
HEAVY TRUCKS - NT	1541.0	7.0	13.0	8.0	70.0	53.0	770.0	493.0	65.0
QAQC	220075.0	6555.0	13038.0	7902.0	23298.0	17512.0	110000.0	70365.0	21730.0
	0.2	1.0	0.0	1.0	1.0	1.0	0.0	0.1	0.0
ROAD EXPOSURE - ANGLE 1	-45	30	0	45	-60	-90	-90	-90	-60
ROAD EXPOSURE - ANGLE 2	90	45	45	75	90	90	90	90	45
SPEED LIMIT	100	50	50	50	60	60	100	70	50
ROAD GRADIENT	0	0	0	0	0	0	0	0	0
ROAD PAVEMENT	1	1	1	1	1	1	1	1	1
TOPOGRAPHY	1	1	1	1	1	1	1	1	1
WOOD DEPTH	0	0	0	0	0	0	0	0	0
NO OF ROWS OF HOUSES	0	0	0	0	0	0	0	0	0
DENSITY OF THE 1ST ROW	20	20	20	20	20	20	20	20	20
INTERMEDIATE SURFACE	1	1	1	1	1	1	1	1	1
RECEIVER HEIGHT (m)	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
SOURCE RECIVER DISTANCE (m)	**1507**	**1242**	**827**	**650**	**272**	**296**	**959**	**90**	**355**
BARRIER (YES/NO)	NO	NO	NO	NO	NO	YES	Yes	Yes	NO
BARRIER ANGLE 1	-	-	-	-	-	0	-90	-90	-
BARRIER ANGLE 2	-	-	-	-	-	90	0	0	-
BARRIER HEIGHT (m)	-	-	-	-	-	6	6	6	-
BARRIER RECEIVER DISTANCE (m)	-	-	-	-	-	50	5	5	-
TOTAL LEQ (dBA)									

STAMSON 5.0 NORMAL REPORT Date: 16-06-2016 15:12:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pp2016r1.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: HWY400 (day/night)

Car traffic volume : 129507/14390 veh/TimePeriod *
Medium truck volume : 7358/818 veh/TimePeriod *
Heavy truck volume : 10302/1145 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 163519
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 7.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: HWY400 (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 2775/308 veh/TimePeriod *
Medium truck volume : 148/16 veh/TimePeriod *
Heavy truck volume : 30/3 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): 3280
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 1.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: APPLEWOOD (day/night)

Angle1 Angle2 : 30.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

```
Road data, segment # 3: EDGELEY (day/night)
------------------------------------------
Car traffic volume  :  6655/739   veh/TimePeriod  *
Medium truck volume :   354/39    veh/TimePeriod  *
Heavy truck volume  :    71/8     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   7867
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: EDGELEY (day/night)
-----------------------------------------
Angle1   Angle2           :   0.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: MILLWAY (day/night)
-------------------------------------------
Car traffic volume  :  2734/304   veh/TimePeriod  *
Medium truck volume :   145/16    veh/TimePeriod  *
Heavy truck volume  :    29/3     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):   3232
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: MILLWAY (day/night)
-----------------------------------------
Angle1   Angle2           :  45.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 5: JANE (day/night)
----------------------------------------
Car traffic volume  : 14967/1663  veh/TimePeriod  *
Medium truck volume :  1164/129   veh/TimePeriod  *
Heavy truck volume  :   499/55    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):  18478
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   3.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 5: JANE (day/night)
--------------------------------------
Angle1   Angle2           : -60.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 272.00 / 272.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 6: CREDITSTONE (day/night)
-----------------------------------------------
Car traffic volume  :  7360/818   veh/TimePeriod  *
Medium truck volume :   572/64    veh/TimePeriod  *
Heavy truck volume  :   245/27    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):   9087
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   3.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 6: CREDITSTONE (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 296.00 / 296.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  50.00 / 50.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 7: HWY407 (day/night)
------------------------------------------
Car traffic volume  : 87120/9680  veh/TimePeriod  *
Medium truck volume :  4950/550   veh/TimePeriod  *
Heavy truck volume  :  6930/770   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT): 110000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   7.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 7: HWY407 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 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            :   6.00 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 # 8: HWY7 (day/night)
----------------------------------------
Car traffic volume  : 41407/4601  veh/TimePeriod  *
Medium truck volume :  2353/261   veh/TimePeriod  *
Heavy truck volume  :  3294/366   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):  52282
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   7.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 8: HWY7 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  90.00 / 90.00  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            :   6.00 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 # 9: PORTAGE (day/night)

Car traffic volume : 5932/659 veh/TimePeriod *
Medium truck volume : 461/51 veh/TimePeriod *
Heavy truck volume : 198/22 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): 7323
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 9: PORTAGE (day/night)

Angle1 Angle2 : -60.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 355.00 / 355.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: HWY400 (day)

Source height = 1.63 m

ROAD (0.00 + 68.70 + 0.00) = 68.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.00	85.18	0.00	-15.23	-1.25	0.00	0.00	0.00	68.70

Segment Leq : 68.70 dBA

Results segment # 2: APPLEWOOD (day)

Source height = 1.00 m

ROAD (0.00 + 32.38 + 0.00) = 32.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
30	45	0.00	58.40	0.00	-15.23	-10.79	0.00	0.00	0.00	32.38

Segment Leq : 32.38 dBA

Results segment # 3: EDGELEY (day)

Source height = 1.00 m

ROAD (0.00 + 40.93 + 0.00) = 40.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	45	0.00	62.18	0.00	-15.23	-6.02	0.00	0.00	0.00	40.93

Segment Leq : 40.93 dBA

Results segment # 4: MILLWAY (day)

Source height = 1.00 m

ROAD (0.00 + 35.30 + 0.00) = 35.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
45	75	0.00	58.31	0.00	-15.23	-7.78	0.00	0.00	0.00	35.30

Segment Leq : 35.30 dBA

Results segment # 5: JANE (day)

Source height = 1.32 m

ROAD (0.00 + 56.33 + 0.00) = 56.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	90	0.00	69.70	0.00	-12.58	-0.79	0.00	0.00	0.00	56.33

Segment Leq : 56.33 dBA

Results segment # 6: CREDITSTONE (day)

Source height = 1.32 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.32	1.50	1.47	1.47

ROAD (50.66 + 41.25 + 0.00) = 51.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	66.62	0.00	-12.95	-3.01	0.00	0.00	0.00	50.66
0	90	0.00	66.62	0.00	-12.95	-3.01	0.00	0.00	-9.41	41.25

Segment Leq : 51.13 dBA

Results segment # 7: HWY407 (day)

Source height = 1.63 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.63	1.50	1.50	1.50

ROAD (0.00 + 49.80 + 65.22) = 65.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	83.45	0.00	-15.23	-3.01	0.00	0.00	-15.42	49.80
0	90	0.00	83.45	0.00	-15.23	-3.01	0.00	0.00	0.00	65.22

Segment Leq : 65.34 dBA

Results segment # 8: HWY7 (day)

Source height = 1.63 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.63	1.50	1.51	1.51

ROAD (0.00 + 50.86 + 66.43) = 66.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	77.23	0.00	-7.78	-3.01	0.00	0.00	-15.58	50.86
0	90	0.00	77.23	0.00	-7.78	-3.01	0.00	0.00	0.00	66.43

Segment Leq : 66.55 dBA

Results segment # 9: PORTAGE (day)

Source height = 1.32 m

ROAD (0.00 + 47.97 + 0.00) = 47.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	45	0.00	64.05	0.00	-13.74	-2.34	0.00	0.00	0.00	47.97

Segment Leq : 47.97 dBA

Total Leq All Segments: 72.04 dBA

Results segment # 1: HWY400 (night)

Source height = 1.63 m

ROAD (0.00 + 62.17 + 0.00) = 62.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.00	78.65	0.00	-15.23	-1.25	0.00	0.00	0.00	62.17

Segment Leq : 62.17 dBA

Results segment # 2: APPLEWOOD (night)

Source height = 0.98 m

ROAD (0.00 + 25.69 + 0.00) = 25.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
30	45	0.00	51.71	0.00	-15.23	-10.79	0.00	0.00	0.00	25.69

Segment Leq : 25.69 dBA

Results segment # 3: EDGELEY (night)

Source height = 1.00 m

ROAD (0.00 + 34.40 + 0.00) = 34.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	45	0.00	55.65	0.00	-15.23	-6.02	0.00	0.00	0.00	34.40

Segment Leq : 34.40 dBA

Results segment # 4: MILLWAY (night)

Source height = 0.98 m

ROAD (0.00 + 28.67 + 0.00) = 28.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
45	75	0.00	51.68	0.00	-15.23	-7.78	0.00	0.00	0.00	28.67

Segment Leq : 28.67 dBA

Results segment # 5: JANE (night)

Source height = 1.31 m

ROAD (0.00 + 49.78 + 0.00) = 49.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	90	0.00	63.15	0.00	-12.58	-0.79	0.00	0.00	0.00	49.78

Segment Leq : 49.78 dBA

Results segment # 6: CREDITSTONE (night)

Source height = 1.31 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.31	4.50	3.96	3.96

ROAD (44.12 + 37.71 + 0.00) = 45.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	60.08	0.00	-12.95	-3.01	0.00	0.00	0.00	44.12
0	90	0.00	60.08	0.00	-12.95	-3.01	0.00	0.00	-6.40	37.71

Segment Leq : 45.01 dBA

Results segment # 7: HWY407 (night)

Source height = 1.63 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.63	4.50	4.47	4.47

ROAD (0.00 + 49.44 + 58.68) = 59.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	76.92	0.00	-15.23	-3.01	0.00	0.00	-9.24	49.44
0	90	0.00	76.92	0.00	-15.23	-3.01	0.00	0.00	0.00	58.68

Segment Leq : 59.17 dBA

Results segment # 8: HWY7 (night)

Source height = 1.63 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.63	4.50	4.34	4.34

ROAD (0.00 + 50.10 + 59.90) = 60.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	70.69	0.00	-7.78	-3.01	0.00	0.00	-9.80	50.10
0	90	0.00	70.69	0.00	-7.78	-3.01	0.00	0.00	0.00	59.90

Segment Leq : 60.33 dBA

Results segment # 9: PORTAGE (night)

Source height = 1.32 m

ROAD (0.00 + 41.44 + 0.00) = 41.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	45	0.00	57.52	0.00	-13.74	-2.34	0.00	0.00	0.00	41.44

Segment Leq : 41.44 dBA

Total Leq All Segments: 65.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.04
(NIGHT): 65.68

STAMSON 5.0 NORMAL REPORT Date: 16-06-2016 15:15:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pp2031r1.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: HWY400 (day/night)

Car traffic volume : 174299/19367 veh/TimePeriod *
Medium truck volume : 9903/1100 veh/TimePeriod *
Heavy truck volume : 13865/1541 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 220075
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 7.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: HWY400 (day/night)

Angle1 Angle2 : -45.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 5545/616 veh/TimePeriod *
Medium truck volume : 295/33 veh/TimePeriod *
Heavy truck volume : 59/7 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): 6554
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 1.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: APPLEWOOD (day/night)

Angle1 Angle2 : 30.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 500.00 / 500.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

```
Road data, segment # 3: EDGELEY (day/night)
-------------------------------------------
Car traffic volume  : 11030/1226  veh/TimePeriod  *
Medium truck volume :   587/65    veh/TimePeriod  *
Heavy truck volume  :   117/13    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):  13038
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: EDGELEY (day/night)
-----------------------------------------
Angle1   Angle2           :   0.00 deg   45.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: MILLWAY (day/night)
-------------------------------------------
Car traffic volume  :  6684/743   veh/TimePeriod  *
Medium truck volume :   356/40    veh/TimePeriod  *
Heavy truck volume  :    71/8     veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):   7901
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   1.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 4: MILLWAY (day/night)
-----------------------------------------
Angle1   Angle2           :  45.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 5: JANE (day/night)
------------------------------------------
Car traffic volume  : 18871/2097  veh/TimePeriod  *
Medium truck volume :  1468/163   veh/TimePeriod  *
Heavy truck volume  :   629/70    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):  23297
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   3.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 5: JANE (day/night)
--------------------------------------
Angle1   Angle2           : -60.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 272.00 / 272.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 6: CREDITSTONE (day/night)
-----------------------------------------------
Car traffic volume  : 14184/1576  veh/TimePeriod  *
Medium truck volume :  1103/123   veh/TimePeriod  *
Heavy truck volume  :   473/53    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):  17511
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   3.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 6: CREDITSTONE (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 296.00 / 296.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  50.00 / 50.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 7: HWY407 (day/night)
------------------------------------------
Car traffic volume  : 87120/9680  veh/TimePeriod  *
Medium truck volume :  4950/550   veh/TimePeriod  *
Heavy truck volume  :  6930/770   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT): 110000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   7.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 7: HWY407 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 500.00 / 500.00 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            :   6.00 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 # 8: HWY7 (day/night)
----------------------------------------
Car traffic volume  : 55729/6192  veh/TimePeriod  *
Medium truck volume :  3166/352   veh/TimePeriod  *
Heavy truck volume  :  4433/493   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):  70365
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   5.00
    Heavy Truck  % of Total Volume     :   7.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 8: HWY7 (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  90.00 / 90.00  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            :   6.00 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 # 9: PORTAGE (day/night)

Car traffic volume : 17601/1956 veh/TimePeriod *
Medium truck volume : 1369/152 veh/TimePeriod *
Heavy truck volume : 587/65 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): 21730
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 9: PORTAGE (day/night)

Angle1 Angle2 : -60.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 355.00 / 355.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: HWY400 (day)

Source height = 1.63 m

ROAD (0.00 + 69.99 + 0.00) = 69.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.00	86.47	0.00	-15.23	-1.25	0.00	0.00	0.00	69.99

Segment Leq : 69.99 dBA

Results segment # 2: APPLEWOOD (day)

Source height = 1.00 m

ROAD (0.00 + 35.36 + 0.00) = 35.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
30	45	0.00	61.38	0.00	-15.23	-10.79	0.00	0.00	0.00	35.36

Segment Leq : 35.36 dBA

Results segment # 3: EDGELEY (day)

Source height = 1.00 m

ROAD (0.00 + 43.12 + 0.00) = 43.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	45	0.00	64.37	0.00	-15.23	-6.02	0.00	0.00	0.00	43.12

Segment Leq : 43.12 dBA

Results segment # 4: MILLWAY (day)

Source height = 1.00 m

ROAD (0.00 + 39.19 + 0.00) = 39.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
45	75	0.00	62.20	0.00	-15.23	-7.78	0.00	0.00	0.00	39.19

Segment Leq : 39.19 dBA

Results segment # 5: JANE (day)

Source height = 1.32 m

ROAD (0.00 + 57.33 + 0.00) = 57.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	90	0.00	70.71	0.00	-12.58	-0.79	0.00	0.00	0.00	57.33

Segment Leq : 57.33 dBA

Results segment # 6: CREDITSTONE (day)

Source height = 1.32 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.32	1.50	1.47	1.47

ROAD (53.51 + 44.10 + 0.00) = 53.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	69.47	0.00	-12.95	-3.01	0.00	0.00	0.00	53.51
0	90	0.00	69.47	0.00	-12.95	-3.01	0.00	0.00	-9.41	44.10

Segment Leq : 53.98 dBA

Results segment # 7: HWY407 (day)

Source height = 1.63 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.63	1.50	1.50	1.50

ROAD (0.00 + 49.80 + 65.22) = 65.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	83.45	0.00	-15.23	-3.01	0.00	0.00	-15.42	49.80
0	90	0.00	83.45	0.00	-15.23	-3.01	0.00	0.00	0.00	65.22

Segment Leq : 65.34 dBA

Results segment # 8: HWY7 (day)

Source height = 1.63 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.63	1.50	1.51	1.51

ROAD (0.00 + 52.15 + 67.72) = 67.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	78.52	0.00	-7.78	-3.01	0.00	0.00	-15.58	52.15
0	90	0.00	78.52	0.00	-7.78	-3.01	0.00	0.00	0.00	67.72

Segment Leq : 67.84 dBA

Results segment # 9: PORTAGE (day)

Source height = 1.32 m

ROAD (0.00 + 52.70 + 0.00) = 52.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	45	0.00	68.78	0.00	-13.74	-2.34	0.00	0.00	0.00	52.70

Segment Leq : 52.70 dBA

Total Leq All Segments: 73.11 dBA

Results segment # 1: HWY400 (night)

Source height = 1.63 m

ROAD (0.00 + 63.46 + 0.00) = 63.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.00	79.93	0.00	-15.23	-1.25	0.00	0.00	0.00	63.46

Segment Leq : 63.46 dBA

Results segment # 2: APPLEWOOD (night)

Source height = 1.02 m

ROAD (0.00 + 28.92 + 0.00) = 28.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
30	45	0.00	54.94	0.00	-15.23	-10.79	0.00	0.00	0.00	28.92

Segment Leq : 28.92 dBA

Results segment # 3: EDGELEY (night)

Source height = 1.00 m

ROAD (0.00 + 36.58 + 0.00) = 36.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	45	0.00	57.83	0.00	-15.23	-6.02	0.00	0.00	0.00	36.58

Segment Leq : 36.58 dBA

Results segment # 4: MILLWAY (night)

Source height = 1.00 m

ROAD (0.00 + 32.69 + 0.00) = 32.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
45	75	0.00	55.70	0.00	-15.23	-7.78	0.00	0.00	0.00	32.69

Segment Leq : 32.69 dBA

Results segment # 5: JANE (night)

Source height = 1.32 m

ROAD (0.00 + 50.80 + 0.00) = 50.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-60	90	0.00	64.18	0.00	-12.58	-0.79	0.00	0.00	0.00	50.80

Segment Leq : 50.80 dBA

Results segment # 6: CREDITSTONE (night)

Source height = 1.32 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.32	4.50	3.96	3.96

ROAD (47.00 + 40.60 + 0.00) = 47.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	62.96	0.00	-12.95	-3.01	0.00	0.00	0.00	47.00
0	90	0.00	62.96	0.00	-12.95	-3.01	0.00	0.00	-6.40	40.60

Segment Leq : 47.89 dBA

Results segment # 7: HWY407 (night)

Source height = 1.63 m

Barrier height for grazing incidence

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

```
       1.63 !        4.50 !        4.47 !         4.47

ROAD (0.00 + 49.44 + 58.68) = 59.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  76.92   0.00 -15.23  -3.01   0.00   0.00  -9.24  49.44
-------------------------------------------------------------------------------
     0     90   0.00  76.92   0.00 -15.23  -3.01   0.00   0.00   0.00  58.68
-------------------------------------------------------------------------------

Segment Leq : 59.17 dBA

Results segment # 8: HWY7 (night)
---------------------------------

Source height = 1.63 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.63 !        4.50 !        4.34 !         4.34

ROAD (0.00 + 51.39 + 61.19) = 61.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  71.99   0.00  -7.78  -3.01   0.00   0.00  -9.80  51.39
-------------------------------------------------------------------------------
     0     90   0.00  71.99   0.00  -7.78  -3.01   0.00   0.00   0.00  61.19
-------------------------------------------------------------------------------

Segment Leq : 61.63 dBA

Results segment # 9: PORTAGE (night)
------------------------------------

Source height = 1.32 m

ROAD (0.00 + 46.16 + 0.00) = 46.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -60     45   0.00  62.24   0.00 -13.74  -2.34   0.00   0.00   0.00  46.16
-------------------------------------------------------------------------------

Segment Leq : 46.16 dBA

Total Leq All Segments: 66.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.11
                           (NIGHT): 66.75
```

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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