APPENDIX H

Environmental Noise Assessment

Environmental Noise Assessment

Guelph Line (Regional Road 1) Improvements

Derry Road to Conservation Road
Region of Halton

October 20, 2010
Project: 109-187

Prepared for

R and R Associates Inc.

Prepared by

John Emeljanow, B.Eng., P.Eng.

VALCOUSTICS
Canada Ltd.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Environmental Noise Assessment

Guelph Line (Regional Road 1) Improvements

Derry Road to Conservation Road
Region of Halton

1.0 INTRODUCTION

There is a proposal to improve Guelph Line, between one kilometre north of Derry Road and Conservation Road. See Figure 1.

This report summarizes the expected noise impact from the proposed improvements, including the potential impact of construction noise. In addition, the need for noise mitigation based on the requirements of the Ministry of Transportation (MTO)/Ministry of the Environment (MOE) protocol is evaluated.

2.0 ENVIRONMENTAL NOISE GUIDELINES

2.1 MOE

The MOE does not have noise guidelines specifically relating to the construction or widening of roadways. However, the MOE does have a protocol with the MTO relating to Provincial Highway Expansions. The protocol states that the primary objective is to achieve sound exposures not exceeding 55 dBA or the preconstruction ambient sound exposure, whichever is higher, at outdoor receptor locations.

In addition to the absolute sound exposure, changes are also considered. Changes of 0 to 3 dBA are considered insignificant; 4 to 5 dBA are just noticeable and considered minor; 10 dBA and above are considered significant (perceived to be about twice as loud). The MTO/MOE protocol indicates that no mitigation is required for sound exposure increases of 0 to 5 dBA. Increases of greater than 5 dBA require investigation into the administrative, economic, and technical feasibility of effective noise mitigation. To be implemented, a sound barrier must be shown to provide at least 5 dBA of attenuation.

2.2 REGION OF HALTON

The Region of Halton *Noise Abatement Policy for Regional Roads* indicates that for local improvement or retrofit noise walls, a daytime sound exposure of 60 dBA is the objective for outdoor amenity areas. As per the MOE/MTO protocol, any sound barriers must be shown to provide at least 5 dBA of attenuation.

3.0 NOISE SENSITIVE AREAS

Land uses designated as noise sensitive by the MOE/MTO consist of residential developments, hospitals, nursing/retirement homes, etc.

Figure 2 identifies receptor locations which were analysed in detail. These residential dwellings are representative of the noise sensitive areas within the study area, in accordance with Section 9.3.2.1.3-2) of the MTO *Environmental Office Manual*. Other dwellings with similar setback and orientation to the noise source will receive similar sound exposures and noise impacts. Dwellings further removed from the roadway will receive lower sound exposures due to increased distance attenuation.

Receptor locations were identified on drawings provided by R and R Associates Inc. The receptor locations were confirmed during a site visit to the study area.

4.0 NOISE IMPACT ASSESSMENT

4.1 TRAFFIC DATA

Existing (year 2008) and future (year 2031) traffic information for Guelph Line was provided by R and R Associates Inc.

The percentages of heavy and medium trucks were determined from the information provided by R and R Associates Inc. The road traffic data is summarized in Table 1 and in Appendix A.

4.2 PROCEDURE

Sound exposures were calculated using STAMSON V5.04-ORNAMENT, the computerized road traffic noise prediction model of the MOE. This is an accepted approach by the MTO, as outlined in their *Environmental Office Manual Technical Areas – Noise*.

Using the road traffic data, the daytime ($L_{eq\ Day}$) sound exposure in the rear yard amenity area was calculated at each receptor location. To assess the noise impact, the predicted future "do nothing" sound exposures (year 2031) were compared to those with the proposed road improvements.

Since the ambient sound environment in the vicinity of the noise sensitive areas is dominated by Guelph Line road traffic, noise sources other than Guelph Line were ignored. This is a conservative approach since, in the noise impact assessment, these secondary noise sources would tend to reduce the significance of sound exposure changes (i.e. impact) due to the improvement of Guelph Line.

4.3 RESULTS

Table 2 shows, for each receptor, the existing sound exposures, the future sound exposures without the proposed improvements, the future sound exposures for each improvement alternative and the resulting noise impact (i.e. change between the future without improvements and future with improvements scenarios) for each improvement alternative.

The results shown in Table 2 indicate that the future (year 2031) sound exposure without the proposed improvements are predicted to be essentially the same as the existing (year 2008) sound exposures. Even though the total traffic volume increases by about 50% between 2008 and 2031, the noise generation of the traffic on Guelph Line is offset by the significant reduction in heavy truck traffic from 3% in 2008 to 1% in 2031.

The predicted noise impact for each improvement alternative is less than 2 dBA. This is considered insignificant. Thus, from an acoustical perspective, all three improvement alternatives are considered equal. Table 3 shows the significance of the increased sound exposures.

Since the noise impact for each improvement alternative is 5 dBA or less and the resultant daytime sound exposure in the rear yard amenity area at all receptors is less than 60 dBA, noise mitigation is not required in accordance with the MOE/MTO Protocol and the Region of Halton's Noise Abatement Policy.

5.0 CONSTRUCTION NOISE

Construction noise is temporary noise and depends on the type of work required. The impact of construction noise depends on the type of equipment used, number of pieces of equipment, time and duration of operation and the proximity to noise sensitive receivers in question.

5.1 APPLICABLE MUNICIPAL NOISE CONTROL BY-LAWS

Guelph Line, along the extent of the project, is located in the Town of Milton. Therefore, the noise control by-law for the Town of Milton (By-law No. 16-84) applies.

5.1.1 Town of Milton Noise By-law

The following summarizes the applicable sections of the Town of Milton Noise Control By-law (No. 16-84) concerning construction noise:

> 3 q) *"Any noise that disturbs or is likely to disturb persons in any office, hospital or in any dwelling, hotel or other type of residence, or of any persons in the vicinity arising between the hours of 2100 hours of one day and 0700 hours of the next following day from an excavation, quarry or construction work whatsoever, including the erection, demolition, alteration or repair of any building."*

5.2 RECOMMENDATIONS

- The noise control by-law for the Town of Milton (By-law No. 16-84) will be obeyed. Exemptions, where required, will be applied for through the municipality and should be included in the construction contract documents.

- General noise control measures will be referred to, or placed into construction contract documents. The following constraints addressing construction equipment operation and maintenance should be included in the construction contract documents:

  Equipment Maintenance: Equipment shall be maintained in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffling systems, properly secured components and the lubrication of moving parts.

  Equipment Operation: Idling of equipment shall be restricted to the minimum necessary to perform the specified work.

  Additional noise constraints may be included at the discretion of the Environmental Planner. They could include, for example, the siting of the contractor's yard.

- Any initial complaint from the public will require verification that the general noise control measures agreed to are in effect, any noise concerns will be investigated, and the contractor warned of any problems.

- Notwithstanding compliance with the "general noise control measures", a persistent complaint will require a contractor to comply with the MOE sound level criteria for construction equipment contained

in the MOE Model Municipal Noise Control By-law. Subject to the results of field investigation, alternative noise control measures will be required, where these are reasonably available.

6.0 CONCLUSION

The improvement of Guelph Line between Derry Road and Conservation Road will produce insignificant noise impacts at all receptors for the three improvement alternatives. Acoustically, the three improvement alternatives are considered equal. Since the resultant daytime sound exposures in the rear yard amenity areas will be below 60 dBA, noise mitigation is not required.

7.0 REFERENCES

1. "MTO/MOE Protocol Dealing in Noise Concerns of New Highway Projects", Ontario Ministry of Transportation/Ontario Ministry of the Environment, 1986.

2. "Directive QST A-1 (Noise Policy and Acoustic Standards for Provincial Highways)", Ontario Ministry of Transportation, 1992.

3. PC STAMSON 5.04, "Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment.

4. "Environmental Office Manual – Technical Areas – Noise", Ontario Ministry of Transportation, 1992.

JE\hd
J:\2009\109187\000\Reports\Guelph Line Improvements-Noise Fnl.wpd

TABLE 1

EXISTING AND FUTURE TRAFFIC VOLUME DATA

Roadway	Existing AADT(1)	2031 AADT	Posted Speed Limit (kph)
Guelph Line	6 400	9 875	60

Note:

(1) AADT – Annual Average Daily Traffic as derived from information provided by R and R Associates Inc.

TABLE 2

NOISE ASSESSMENT RESULTS

Receptor	Existing $L_{eq\ Day}$ (dBA)	Future (2031) $L_{eq\ Day}$ (dBA)				Noise Impact[(1)] (dBA)		
		No Improvement	Alternatives			Alternatives		
			1	2	3	1	2	3
R1	48	49	49	49	49	–	–	–
R2	46	46	46	46	46	–	–	–
R3	49	50	50	50	50	–	0.2	0.6
R4	51	52	52	51	51	–	-0.3	-0.7
R5	56	56	55	55	55	-1.2	-1.2	-1.2
R6	52	52	52	52	50	–	–	-1.9
R7	43	43	43	43	44	–	–	0.7
R8	45	45	45	45	45	–	–	–
R9	54	54	54	54	54	–	–	–
R10	56	56	56	56	56	–	–	–
R11	53	53	53	53	53	–	0.6	0.6
R12	54	54	54	55	55	–	0.7	0.7

Note:

(1) The predicted noise impact for each improvement alternatives is the difference between the future with improvements and the future no improvement scenarios.

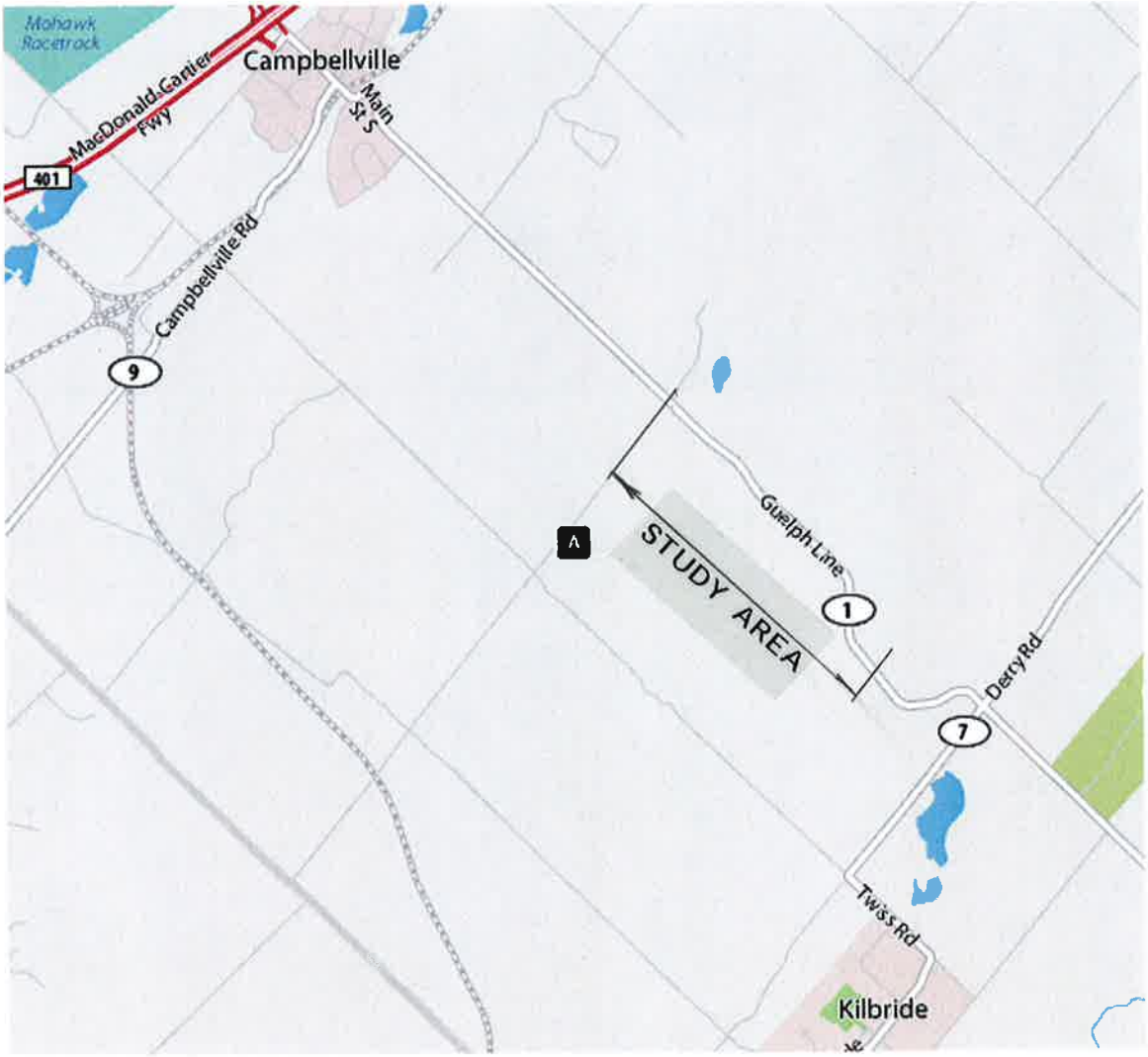
TABLE 3

TYPICAL IMPACT OF INCREASED SOUND EXPOSURES(1)

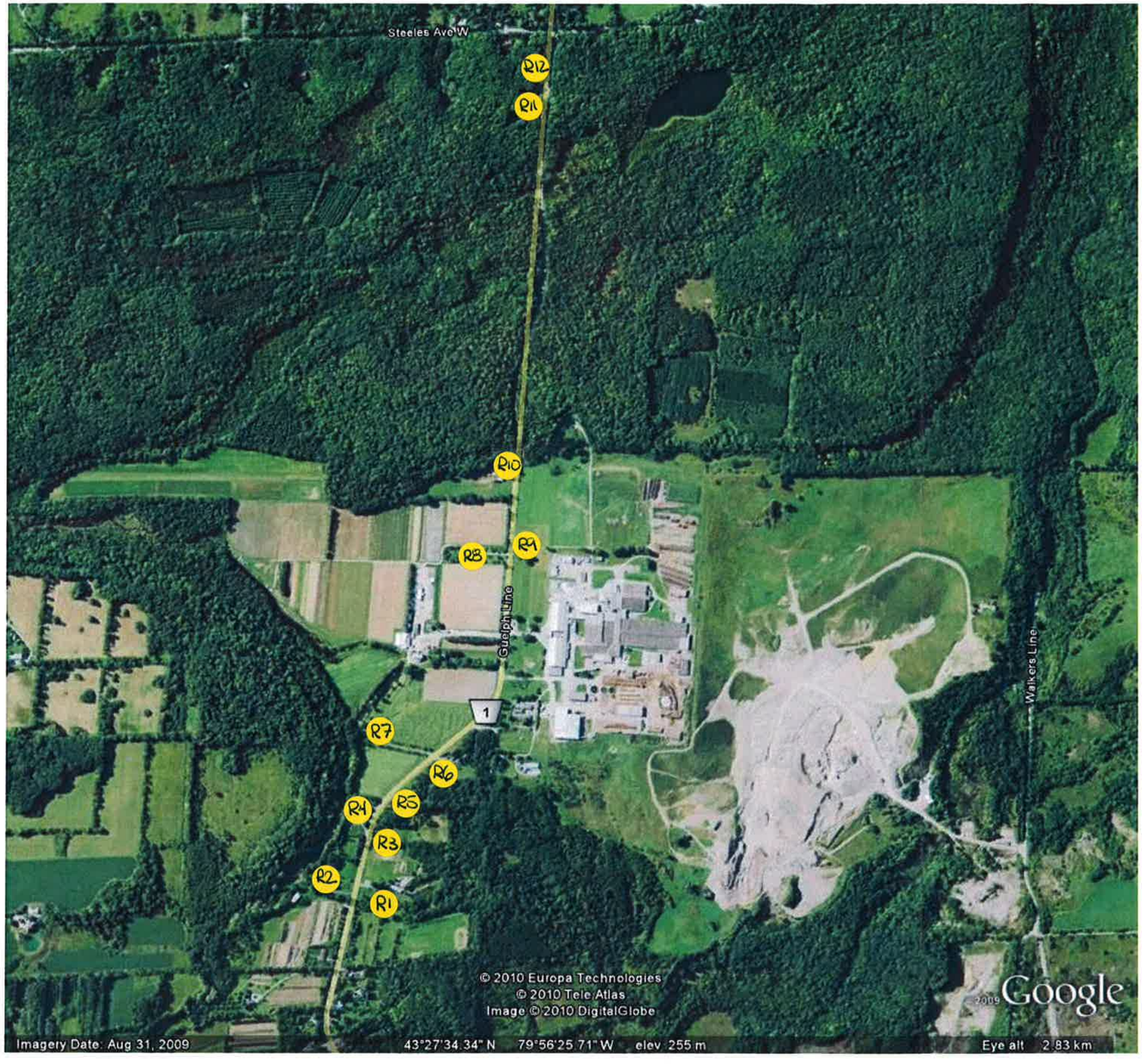
Incremental Increase Over Background Noise (dBA)	General Perception	Impact
0-3	No Change	Nil
4-5	Perceptible Change	Low
6-9	Almost twice as loud	Medium
10 and above	Doubling of loudness or greater	High

Note:

(1) Note that community sound level assessments are done using an A-weighted logarithmic or decibel (dBA) scale and not a linear scale since humans do not respond linearly to sound. In other words, two cars (or a doubling of background traffic) do not sound twice as loud as one car. Two cars produce a sound level that is 3 dBA higher than a single car, which is the limit of perceptible change to the average person. In fact, it takes a tenfold increase in traffic (a 10 dBA increase) to be perceived as a doubling of loudness.



STUDY AREA	FIGURE 1



VALCOUSTICS
Canada Ltd.

FIGURE 2 RECEPTOR LOCATIONS

APPENDIX A

ROAD TRAFFIC INFORMATION

Date:	November 20, 2009
To:	**Mr. John Emeljanow – Valcoustics Canada Ltd.**
From:	Rick Hein, P.Eng., PTOE, AVS
Re:	**Derry Road and Guelph Line Transportation Corridor Improvements Class Environmental Assessments Traffic Data**
Our Ref:	RR-09-019 and RR-09-024
cc:	N/A

The following traffic data summary and tables outlines the existing and projected future average daily traffic volumes for the following road corridors:

- Derry Road (Regional Road 7) corridor between Milburough Line and McNiven Road; and
- Guelph Line (Regional Road 1) corridor from Conservation Road (formerly Steeles Avenue) to 1 km north of Derry Road.

R and R Associates is currently reviewing both existing and future traffic conditions to the 2021 and 2031 horizon years.

Derry Road Corridor (Milburough Line to McNiven Road)

Existing 2008 Traffic Volumes

- Derry Road carries approximately 3,250 vehicles on a daily basis (Average Daily Traffic - ADT).
- Two-way vehicle volumes range from 300 to 380 vehicles per hour during the weekday AM and PM peak periods, respectively.
- Commercial and heavy vehicles represent approximately 3.0 percent of the total traffic on Derry Road during a typical weekday and 1.0 to 2.0 percent of the total traffic during the weekday AM and PM peak periods, respectively.

The following table summarizes the data derived from Halton Region Automatic Traffic Recorder (ATR) Station #100715 located within the study area limits between Milburough Line and McNiven Road. The ATR count provides a 24-hour summary of traffic speed, volume, and vehicle classifications at this location for a typical weekday.

Future 2021 and 2031 Traffic Volumes

Future traffic volumes within the Derry Road corridor are anticipated to grow by approximately three percent per annum to the 2021 and 2031 horizon years based on a review of historical growth trends and an analysis of the Region's transportation forecast model.

600 Ontario Street, PO Box 28058, St. Catharines, Ontario L2N 7P8 | Phone: 905-937-1708 | Fax: 905-937-4384 | E-mail: info@RandR-Associates.com

- Derry Road will carry approximately 4,630 and 6,220 vehicles on a daily basis by the 2021 and 2031 horizon years, respectively.
- Two-way vehicle volumes will range from 430 to 540 and 580 to 725 vehicles per hour during the weekday 2021 and 2031 AM and PM peak periods, respectively.
- Commercial and heavy vehicles are anticipated to remain fairly stable based on existing percentages and will represent approximately four percent of the total traffic on Derry Road during the weekday 2021 and 2031AM and PM peak periods, respectively.

The traffic data for the Derry Road corridor is summarized in **Table 1**.

Table 1
Derry Road Corridor (Milburough Line to McNiven Road)

Characteristic	Existing (2008)	Future 2021	Future 2031
Posted Speed Limits			
Existing (km/hr)	60	-	-
Future (km/hr) [1]		60	60
Traffic Data			
ADT (vpd)	3,250	4,630	6,220
AM Peak Hour (vph)	300	430	580
PM Peak Hour (vph)	380	540	725
Vehicle Classification Percentages			
Cars (%)	97.2	96.0	96.0
Small Trucks (%)	1.2	2.0	2.0
Medium Trucks (%)	1.0	1.0	1.0
Heavy Trucks (%)	0.6	1.0	1.0

[1] Assumed future speed limit.

Guelph Line Corridor (Conservation Road to 1 km north of Derry Road)

Existing 2008 Traffic Volumes

- Guelph Line carries approximately 6,400 vehicles on a daily basis (Average Daily Traffic - ADT).
- Two-way vehicle volumes range from 625 to 660 vehicles per hour during the weekday AM and PM peak periods, respectively.
- Commercial and heavy vehicles represent approximately 6.0 percent of the total traffic on Derry Road during a typical weekday and 5.0 to 6.0 percent of the total traffic during the weekday AM and PM peak periods, respectively.

The following table summarizes the data derived from Halton Region Automatic Traffic Recorder (ATR) Station #100112 located within the study area limits between Conservation Road and

Derry Road. The ATR count provides a 24-hour summary of traffic speed, volume, and vehicle classifications at this location for a typical weekday.

Future 2021 and 2031 Traffic Volumes

Future traffic volumes within the Guelph Line corridor are anticipated to grow by approximately two percent per annum to the 2021 and 2031 horizon years based on a review of historical growth trends and an analysis of the Region's transportation forecast model.

- Guelph Line will carry approximately 8,100 and 9,875 vehicles on a daily basis by the 2021 and 2031 horizon years, respectively.
- Two-way vehicle volumes will range from 790 to 835 and 965 to 1,020 vehicles per hour during the weekday 2021 and 2031 AM and PM peak periods, respectively.
- Commercial and heavy vehicles are anticipated to remain fairly stable based on existing percentages and will represent approximately four percent of the total traffic on Guelph Line during the weekday 2021 and 2031AM and PM peak periods, respectively.

The traffic data for the Guelph Line corridor is summarized in **Table 2**.

Table 2
Guelph Line Corridor (Conservation Road to 1 km north of Derry Road)

Characteristic	Existing (2008)	Future 2021	Future 2031
Posted Speed Limits			
Existing (km/hr)	60	-	-
Future (km/hr) [1]		60	60
Traffic Data			
ADT (vpd)	6,400	8,100	9,875
AM Peak Hour (vph)	625	790	965
PM Peak Hour (vph)	660	835	1,020
Vehicle Classification Percentages			
Cars (%)	94.3	96.0	96.0
Small Trucks (%)	0.9	2.0	2.0
Medium Trucks (%)	1.8	1.0	1.0
Heavy Trucks (%)	3.0	1.0	1.0

[1] Assumed future speed limit.

Also, for your information, we have placed a PDF roll plans (shown at the recent Public Information Centres) on our FTP site. The roll plans show existing conditions within the project study limits for Derry Road and Guelph Line.

600 Ontario Street, PO Box 28058, St. Catharines, Ontario L2N 7P8 | Phone: 905-937-1708 | Fax: 905-937-4384 | E-mail: info@RandR-Associates.com

Access to the R and R Associates FTP site is as follows:

FTP Site - R and R Associates' Client

- FTP Address: ftp://RRClient.randr-associates.com@randr-associates.com/
- Name: RRClient.randr-associates.com
- Pass: RR2008ftp

If you have any questions related to the above or require additional information please contact me at your convenience by phone at 289-241-2624 or via e-mail at RHein@RandR-Associates.com.

Best regards,

R and R Associates Inc.

Rick Hein, P.Eng., PTOE, AVS
Principal