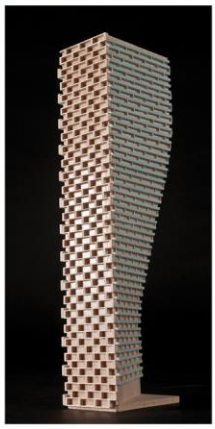
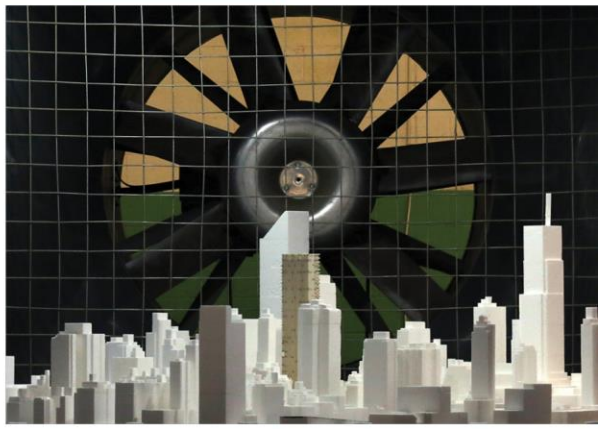
GRADIENTWIND
ENGINEERS & SCIENTISTS

TRANSPORTATION NOISE & VIBRATION FEASIBILITY ASSESSMENT

70 Park Street East
Mississauga, Ontario

REPORT: 22-347 – Transportation Noise & Vibration Feasibility





January 17, 2023

PREPARED FOR

MPCT DIF 70 Park Street East LP
30 Adelaide St. E., Ste 301
Toronto, ON M5C 3H1

PREPARED BY

Essraa Alqassab, BASc, Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This document describes a transportation noise and vibration feasibility assessment performed in support of a Zoning By-law Amendment application for a proposed mixed-use development located at 23, 25, 27, 29, and 31 Helene Street North, 53 Queen Street East, and 70 Park Street East in Mississauga, Ontario. The assessment analyzes transportation noise impacts on the development to ensure that future occupants are afforded comfortable use of the outdoor and indoor living spaces, as directed by the Ministry of the Environment Conservation and Parks (MECP) NPC-300 guidelines.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP); (ii) noise level criteria as specified by the NPC-300; (iii) future vehicular traffic volumes based on the City of Mississauga's Official Plan (OP) roadway classifications; and (iv) architectural drawings provided by the client in January 2023.

The results of the current analysis indicate that POW noise levels will range between 61 and 76 dBA during the daytime period (07:00-23:00) and between 56 and 73 dBA during the nighttime period (23:00-07:00). The highest noise levels will occur at the north façade of the development, which is most exposed to the rail corridor. Upgraded building components with higher Sound Transmission Class (STC) rating will be required where noise levels exceed 60 dBA due to the railway source and 65 dBA due to the roadway source. The highest expected window STC values is expected to be STC 38, which can be achieved with laminated double pane windows.

Results also indicate that the development will require air conditioning, or a similar mechanical system, to ensure the comfort of occupants. A Type D Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Noise levels exceed allowable limits for the Level 9 outdoor amenity area; as such, acoustic mitigation will be required. Results indicate that a barrier of height 1.1 m is able to reduce noise levels to 60 dBA in that area. A Type B Warning Clause will be required, as noise levels are above 55 dBA with mitigation, as summarized in Section 6.

Estimated vibration levels at the foundation nearest to the railway corridor are expected to be 0.067 mm/s RMS (68 dBV), based on the FTA protocol and an offset distance of 43 m to the nearest track centerline. Details of the calculation are provided in Appendix B. Since predicted vibration levels do not exceed the criterion of 0.14 mm/s RMS at the foundation, no vibration mitigation is required. As vibration levels are acceptable, correspondingly, regenerated noise levels are also expected to be acceptable.

A detailed transportation noise study will be required at the time of the site plan control application to determine specific noise control measures for the development.

With regards to stationary noise impacts, Gradient Wind conducted a survey of the study site, using the satellite view of the area. The surroundings consist mainly of midrise and highrise residential buildings to the south and east. To the north is mainly low rise residential. The survey of the satellite imagery indicates there are no significant existing sources of stationary noise surrounding the near field of the development site except the mechanical equipment on the rooftop of the 66 High Street East Building. Our calculations showed that the noise levels generated from the equipment will be below the NPC-300 criterion at the façade of our study building, therefore, considered insignificant.

With regards to stationary noise impacts of the proposed building, it is recommended a stationary noise study be conducted once mechanical plans for the proposed building become available. This study would assess stationary noise impacts from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. Noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary noise screens and silencers can be placed into the design.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by MPCT DIF 70 Park Street East LP ("the Client") to undertake a transportation noise and vibration feasibility assessment for a proposed mixed-use development located at 70 Park Street in Port Credit, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation sources.

The report also addresses any potential noise impact mitigation measures. The assessment was performed on the basis of theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks[1] (MECP) guidelines. Noise calculations were based on architectural drawings provided by the Client in January 2023, with future traffic volumes corresponding to the City of Mississauga's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this transportation noise and vibration study is the proposed mixed-use development located at 70 Park Street East in Port Credit, Ontario. The study site is situated at the west corner of a parcel of land bounded by Queen Street East to the northwest, Helene Street North to the southwest, Park Street East to the southeast and Ann Street to the northeast.

The study building comprises a 38-storey building with an eight-storey podium. Seven levels of below-grade parking, as well as a loading zone, are accessible via a laneway to the southeast of the site connecting to Park Street East. Two retail areas are accessible via entrances along the west façade and at the northwest corner of the building. Residential lobbies are located at the southwest corner and the southeast corner of the podium, with the daycare entrance adjacent to the lobby at the southeast corner. Additional outdoor daycare space is provided to the southwest of the building. Levels 2 through 8 of the podium are reserved exclusively for residential occupancy, with the floorplate over the daycare stepping back from the south at Level 2. At Level 9, the building steps back from the east and north elevations to form the typical tower floorplate, accommodating an outdoor amenity terrace on the podium rooftop.

[1] Ontario Ministry of the Environment and Climate Change – Publication NPC-300

Above Level 9, the building rises uniformly to Level 38 where a mechanical penthouse completes the development.

At the time of the Site Plan Application (SPA), an updated detailed transportation noise and vibration assessment would be conducted. Based on noise levels at the building façades, the update will include an evaluation of indoor noise levels for comparison against indoor noise criteria. This would be performed for a typical unit, assuming building wall details satisfy the minimum Ontario Building Code (OBC) requirements. For areas where the indoor noise criteria are not met, construction details such as the required sound transmission class (STC) rating for windows would be specified to ensure comfort in indoor living areas. Furthermore, ventilation requirements and warning clauses will be provided.

In addition, the stationary noise impacts of the building(s) on the surroundings would be considered at the time of the SPA. Stationary noise sources associated with the development could include rooftop air handling units, cooling towers or dry coolers, and emergency generators. Noise from these sources however can be controlled to acceptable limits established by MECP by judicious selection of the equipment, locating the equipment on a high roof away from nearby residential receptors, and where necessary, installing silencers or noise screens.

3. OBJECTIVES

The principal objective of this work is to calculate the future noise levels on the study site produced by local roadway traffic and explore the potential for noise mitigation where required. Noise calculations were based on a draft plan of subdivision drawing provided by Sorbara Group of Companies, with future traffic volumes corresponding to the City of Mississauga's OP roadway classifications.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to

reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Transportation Noise

4.2.1 Criteria for Transportation Noise

For vehicle traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00)/8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential dwellings. As the dominant source of noise for this development is the rail line, the NPC-300 guidelines specify that the recommended indoor noise limit range is 45, 40 and 35 dBA for retail, living rooms, and sleeping quarters, respectively, as listed in Table 1. However, to account for deficiencies in building construction and to control peak noise, these levels should be targeted toward 42, 37 and 32 dBA.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD/RAIL)

Type of Space	Time Period	Road Leq (dBA)	Rail Leq (dBA)
General offices, reception areas, retail stores, etc.	07:00 – 23:00	50	45
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	23:00 – 07:00	45	40
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40	35

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[2]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[3]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning. Where noise levels exceed 60 dBA daytime and 55 dBA nighttime, building components will require higher levels of sound attenuation[4].

Noise barriers are recommended where noise levels at the Outdoor Living Areas (OLA) exceed 55 dBA, which applies during the daytime period only (07:00 to 23:00). In all cases, noise levels shall not exceed 60 dBA, where technically and administratively feasible.

4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data. Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks.
- The day/night split for all streets was taken to be 90%/10%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- For select sources where appropriate, receptors considered the proposed and/or existing buildings as a barrier partially or fully obstructing exposure to the source.
- Noise receptors were strategically placed at 10 locations around the study area (see Figure 2).

[2] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[3] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[4] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.3 Theoretical Railway Traffic Noise Predictions

When an area is influenced by road and rail traffic, the criteria requires the outdoor noise impact from each source to be examined for comparison to the respective criterion. Calculations were performed for receptors in close proximity to the railway with the assistance of the MECP computerized noise assessment program, STAMSON 5.04. The impact from railway noise is then combined with roadway predictions using a logarithmic addition at each point of reception and compared to the relevant criteria.

Similar to the roadway traffic noise calculations, the railway line was treated as a single line source of noise. Theoretical noise predictions were based on the following parameters:

- Via trains comprise 2 locomotives and 10 cars per train, with a maximum speed of 150 km/h.
- CN Freight trains comprise 4 locomotives and 140 cars per train, with a maximum speed of 96 km/h.
- CN Way Freight trains comprise 2 locomotives and 25 cars per train, with a maximum speed of 96 km/h.
- Go Transit trains comprise 1 locomotive and 12 cars per train, with a maximum speed of 137 km/h.

The noise generated from both on-road and railway traffic were combined for the 10 receptor locations identified in Figure 2.

4.2.4 Roadway and Railway Traffic Volumes

NPC-300 dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Mississauga's Transportation Master Plan (TMP), which provides additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on theoretical capacities for each roadway classification. Table 2 (below) summarizes the AADT values used for the roadway included in this assessment. Railway traffic volumes are based on the best available information adopted from *Noise and Vibration Feasibility Study, 30 Queen Street,* by J.E. Coulter Associates Limited, dated February 4, 2022.

TABLE 1: TRANSPORTATION TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Queen Street	2-Lane Collector	50	**8,000**
Ann Street	2-Lane Collector	50	**8,000**
Hurontario Street	4-Lane Arterial	50	**30,000**
Railway	Via	150	**12/0***
	CN Freight	96	**1/0***
	CN Way Freight	96	**1/4***
	Go Transit	137	**192/46***

*Daytime/Nighttime volumes

4.3 Ground Vibration Criteria

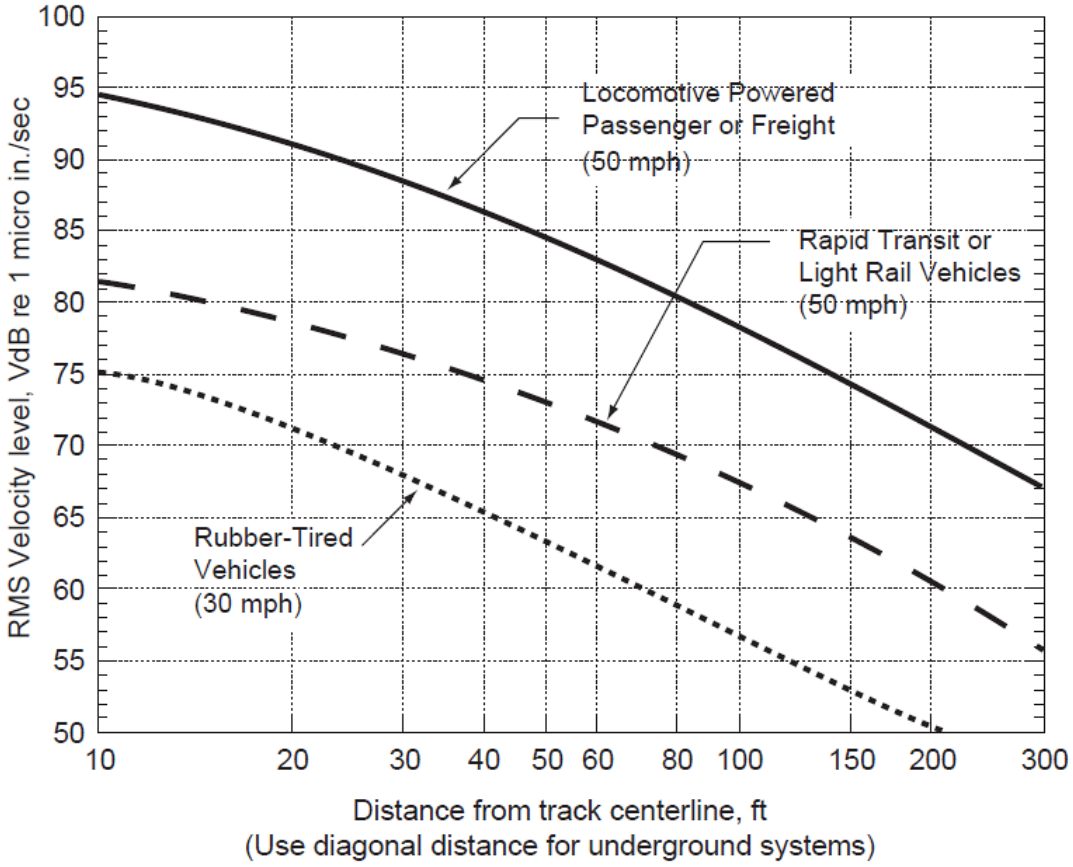
In the United States, the Federal Transportation Authority (FTA) has set vibration criteria for sensitive land uses next to transit corridors. Similar standards have been developed by the MECP. For main line railways, a document titled *Guidelines for New Development in Proximity to Railway Operations*[5], indicates that vibration conditions should not exceed 0.14 mm/s RMS averaged over a one second time-period at the first floor and above of the proposed dwelling. The Federal Transportation Authority (FTA) criterion was adopted as the appropriate standard for this study.

4.4 Theoretical Ground Vibration Prediction Procedure

Potential vibration impacts of the trains were predicted using the Federal Transit Authority's (FTA) *Transit Noise and Vibration Impact Assessment*[6] protocol. The FTA general vibration assessment is based on an upper bound generic set of curves that show vibration level attenuation with distance. These curves, illustrated in the figure on the following page, are based on ground vibration measurements at various transit systems throughout North America. Vibration levels at points of reception are adjusted by various factors to incorporate known characteristics of the system being analyzed, such as operating speed of

vehicle, conditions of the track, construction of the track and geology, as well as the structural type of the impacted building structures. The vibration impact on the building was determined using a set of curves for Locomotive Powered Passenger/Freight at a speed of 50 mph. Adjustment factors were considered based on the following information:

- The maximum operating speed of the rail line is 150 km/h (93 mph).
- The conservative offset distance between the development and the closest track is 43 m.
- The vehicles are assumed to have soft primary suspensions.
- Tracks are welded and in good condition.
- Soil conditions do not efficiently propagate vibrations.
- Type of transit structure is Open Cut.
- The building's foundation coupling is masonry on piles.



FTA GENERALIZED CURVES OF VIBRATION LEVELS VERSUS DISTANCE (ADOPTED FROM FIGURE 10-1, FTA TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT)

5. RESULTS AND DISCUSSION

5.1 Transportation Noise Levels

The results of the current analysis indicate that POW noise levels will range between 61 and 76 dBA during the daytime period (07:00-23:00) and between 56 and 73 dBA during the nighttime period (23:00-07:00). The highest noise level (76 dBA) occurs at the north façade, which is most exposed to the rail corridor. As noise levels exceed the 60 dBA noise criterion due to railway noise, upgraded building components with higher Sound Transmission Class (STC) ratings will be required at the north, east, and west facades. Furthermore, as noise levels exceed the 55 dBA criterion for the Level 9 outdoor amenity, noise mitigation in the form of noise barriers may be required. A detailed transportation noise study will be required at the time of the site plan control application to determine specific noise control measures for the development.

TABLE 2: EXTERIOR NOISE LEVELS

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Roadway Noise Level (dBA)		Railway Noise Level (dBA)		Total Noise Level (dBA)	
			Day	Night	Day	Night	Day	Night
1	27.7	POW – Level 8 North Façade	66	61	76	72	**76**	**73**
2	27.7	POW – Level 8 East Façade	64	61	72	68	**72**	**69**
3	27.7	POW – Level 8 South Façade	59	53	56	52	**61**	**56**
4	27.7	POW – Level 8 West Façade	60	54	71	68	**72**	**68**
5	125	POW – Level 38 North Façade	66	59	75	72	**76**	**72**
6	125	POW – Level 38 East Façade	65	58	72	69	**73**	**69**
7	125	POW – Level 38 South Façade	61	54	54	51	**62**	**56**
8	125	POW – Level 38 West Façade	61	54	72	68	**72**	**69**
9	30.8	OLA – Level 9 outdoor amenity	55	N/A	60	N/A	**61**	**N/A**
10	1.5	OLA – Daycare outdoor space	33	N/A	-	-	**33**	**N/A**

5.2 Ground Vibrations and Ground-Borne Noise Levels

Estimated vibration levels at the foundation nearest to the rail corridor are expected to be 0.067 mm/s RMS (68 dBV), based on the FTA protocol and an offset distance of 43 m to the nearest track centerline. Details of the calculation are provided in Appendix B. Since predicted vibration levels do not exceed the criterion of 0.14 mm/s RMS at the foundation, concerns due to vibration impacts on the site are not expected. As vibration levels are acceptable, correspondingly, regenerated noise levels are also expected to be acceptable.

5.3 Noise Barrier Investigation

Noise level at the Level 9 outdoor amenity area is expected to exceed the 55 dBA OLA noise criterion during the daytime period. If this area is to be used as an outdoor living area, noise control measures are required to reduce noise levels to not exceed 60 dBA, and as close as possible to 55 dBA. Further analysis investigated the noise mitigating impact of a 1.1 m high noise barrier. Table 3 (below) summarizes the results of the barrier investigation. Results of the investigation proved that noise levels can be reduced to 60 dBA with this mitigation measure. Reducing noise levels to 55 dBA in this area would require excessive barrier heights that would not be administratively and financially feasible. Location of the noise barrier can be seen in Figure 3.

TABLE 3: RESULTS OF NOISE BARRIER INVESTIGATION

Receptor Number	Receptor Height Above Roof (m)	Receptor Location	Daytime L_{eq} Noise Levels (dBA)			
			No Barrier	With 1.1m Barrier	With 1.5m Barrier	With 2m Barrier
9	1.5	Level 9 outdoor amenity	61	**60**	60	59

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that POW noise levels will range between 61 and 76 dBA during the daytime period (07:00-23:00) and between 56 and 73 dBA during the nighttime period (23:00-07:00). The highest noise level (76 dBA) occurs at the north façade, which is most exposed to the rail corridor. As noise levels exceed the 60 dBA noise criterion due to railway noise, upgraded building components with higher Sound Transmission Class (STC) ratings will be required at the north, east, and west facades. The development will also require air conditioning, or a similar mechanical system, to ensure the comfort of occupants. A Type D Warning Clause will be required to be placed on Lease, Purchase, and Sale Agreements.

Type D:

> *"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

As noise levels exceed criteria at the Level 9 outdoor amenity area, acoustic mitigation in the form of noise barriers will be required. According to the results, a 1.1m high noise barrier will reduce noise levels at the Level 9 outdoor amenity area to 60 dBA. Reducing noise levels to 55 dBA in this area would require excessive barrier heights that would not be administratively and financially feasible. As noise levels exceed 55 dBA with noise control measures in place, a Type B Warning Clause will be required, as seen below:

Type B:

> *"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic and rail traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

Furthermore, due to the site's proximity to the rail corridor, the following Warning Clauses will be required to be placed on Lease, Purchase, and Sale Agreements:

CN:

> *"Warning: Canadian National Railway Company or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject thereof. There may be alterations to*

or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."

Metrolinx:

"Metrolinx, carrying on business as GO Transit, and its assigns and successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that GO Transit or any railway entering into an agreement with GO Transit to use the right-of-way or their assigns or successors as aforesaid may expand their operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."

Estimated vibration levels at the foundation nearest to the rail corridor are expected to be 0.067 mm/s RMS (68 dBV), based on the FTA protocol and an offset distance of 43 m to the nearest track centerline. Details of the calculation are provided in Appendix B. Since predicted vibration levels do not exceed the criterion of 0.14 mm/s RMS at the foundation, concerns due to vibration impacts on the site are not expected. As vibration levels are acceptable, correspondingly, regenerated noise levels are also expected to be acceptable.

A detailed transportation noise study will be required at the time of the site plan control application to determine specific noise control measures for the development.

With regards to stationary noise impacts, Gradient Wind conducted a survey of the study site, using the satellite view of the area. The surroundings consist mainly of midrise residential buildings to the south and east. To the north is mainly low rise residential. The survey of the satellite imagery indicates there are no significant existing sources of stationary noise surrounding the near field of the development site

except the mechanical equipment on the rooftop of the 66 High Street East Building. Our calculations showed that the noise levels generated from the equipment will be below the NPC-300 criterion at the façade of our study building, therefore, considered insignificant.

With regards to stationary noise impacts of the proposed building, it is recommended a stationary noise study be conducted once mechanical plans for the proposed building become available. This study would assess stationary noise impacts from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. Noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary noise screens and silencers can be placed into the design.

This concludes our transportation noise feasibility assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

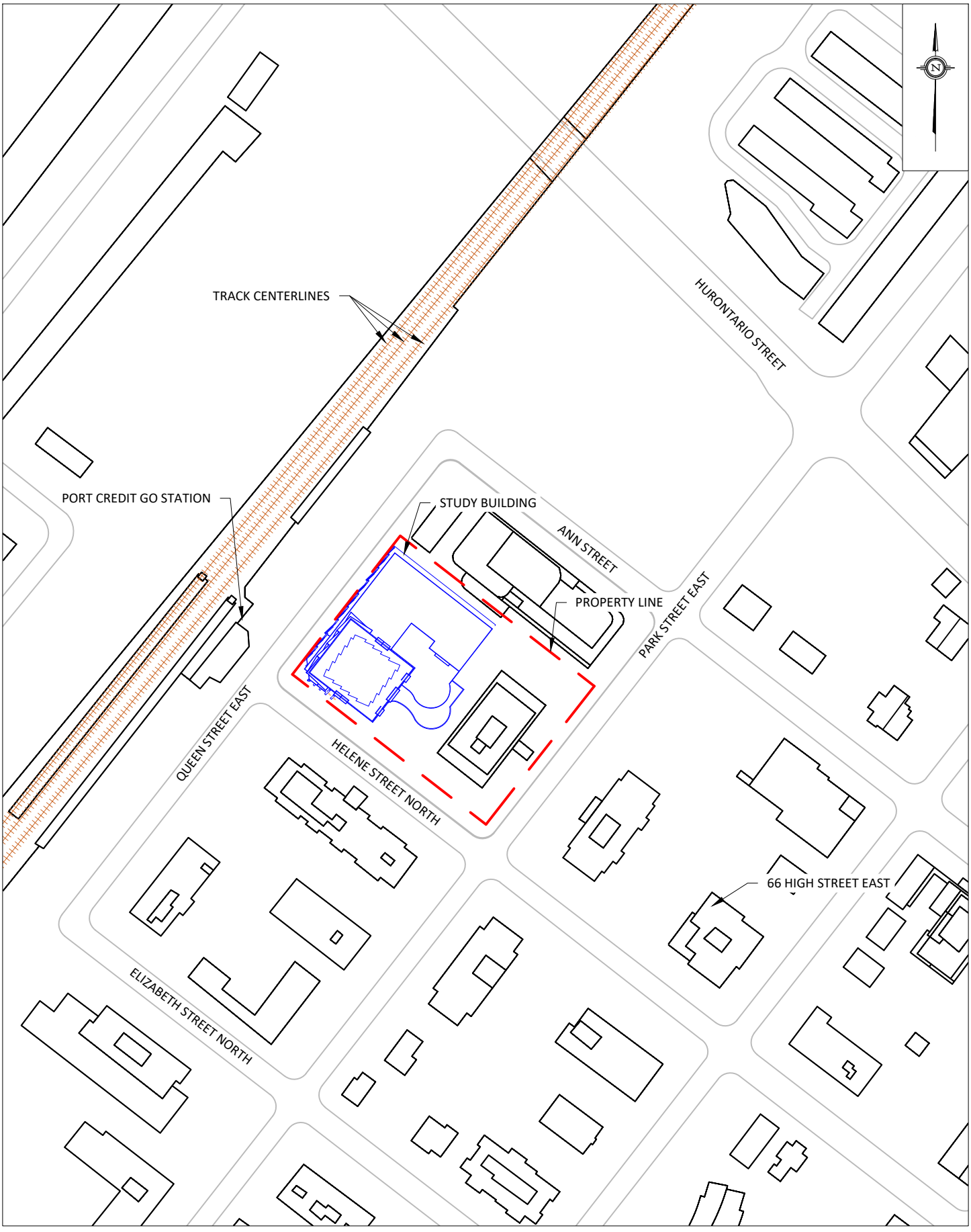
Sincerely,

Gradient Wind Engineering Inc.

Essraa Alqassab, BASc
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #22-304 – Transportation Noise & Vibration Feasibility



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PROJECT	70 PARK STREET EAST, PORT CREDIT ROADWAY TRAFFIC FEASBILITY NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW22-347-1
DATE	DECEMBER 22, 2022
DRAWN BY	E.A.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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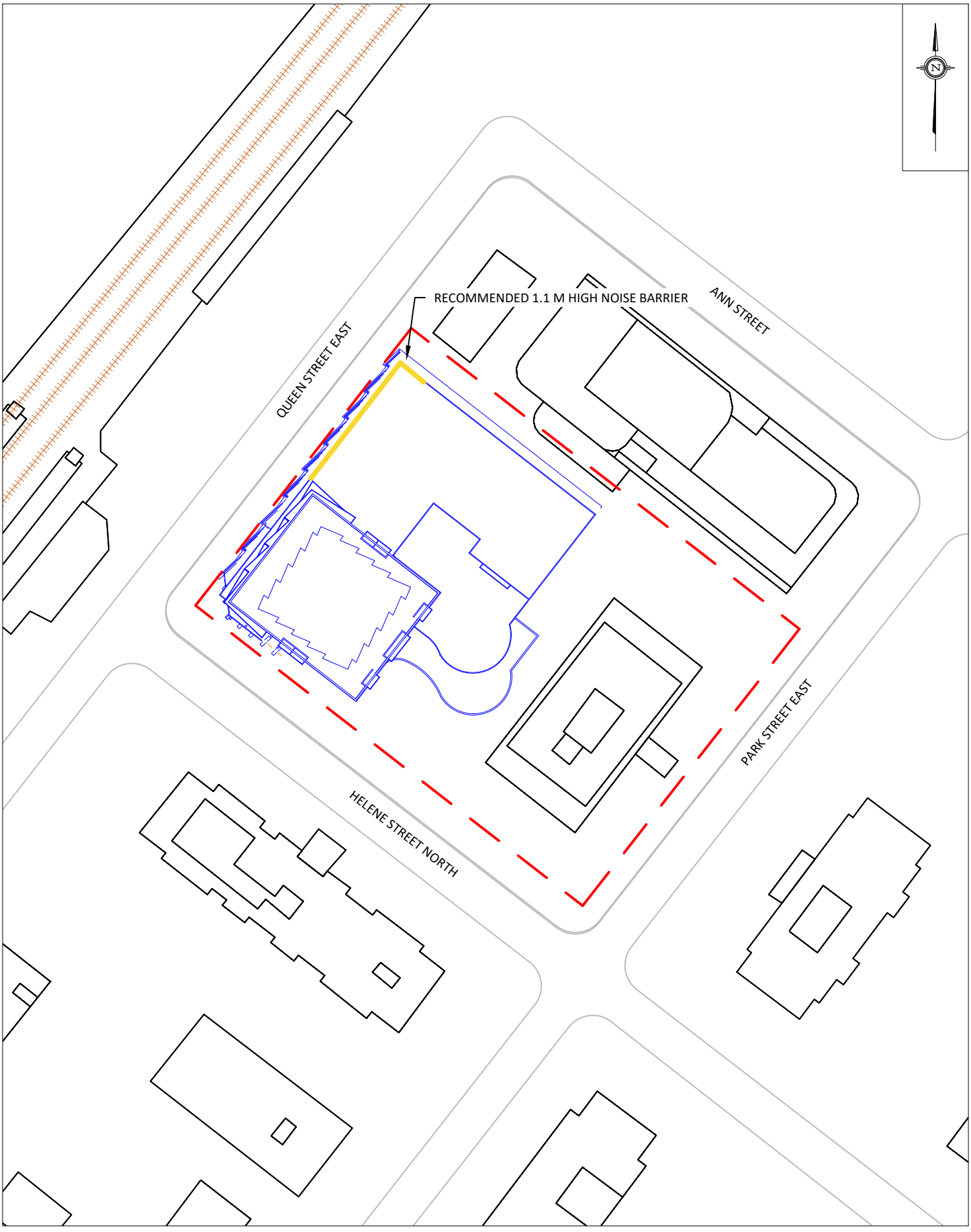
PROJECT	70 PARK STREET EAST, PORT CREDIT ROADWAY TRAFFIC FEASBILITY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-347-2
DATE	DECEMBER 22, 2022	DRAWN BY	E.A.

FIGURE 2:
RECEPTOR LOCATIONS



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PROJECT	70 PARK STREET EAST, PORT CREDIT ROADWAY TRAFFIC FEASBILITY NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-347-3
DATE	JANUARY 17, 2022	DRAWN BY	E.A.

FIGURE 3:
POTENTIAL NOISE BARRIER LOCATION

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

```
STAMSON 5.0        NORMAL REPORT        Date: 21-12-2022 13:56:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CN Freight  !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. Go          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (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  :  49.00 / 49.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00


Results segment # 1: Rail (day)
-------------------------------

LOCOMOTIVE (0.00 + 74.89 + 0.00) = 74.89 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.00  80.03  -5.14   0.00   0.00   0.00   0.00  74.89
-------------------------------------------------------------------

WHEEL (0.00 + 67.68 + 0.00) = 67.68 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.00  72.82  -5.14   0.00   0.00   0.00   0.00  67.68
-------------------------------------------------------------------

Segment Leq : 75.65 dBA

Total Leq All Segments: 75.65 dBA


Results segment # 1: Rail (night)
```

```
---------------------------------

LOCOMOTIVE (0.00 + 71.55 + 0.00) = 71.55 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  76.70  -5.14   0.00   0.00   0.00   0.00  71.55
-------------------------------------------------------------------------

WHEEL (0.00 + 64.47 + 0.00) = 64.47 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  69.61  -5.14   0.00   0.00   0.00   0.00  64.47
-------------------------------------------------------------------------

Segment Leq : 72.33 dBA

Total Leq All Segments: 72.33 dBA


Road data, segment # 1: Hurontario (day/night)
------------------------------------------
Car traffic volume  : 17600/8800  veh/TimePeriod
Medium truck volume :  1400/700   veh/TimePeriod
Heavy truck volume  :  1000/500   veh/TimePeriod
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Hurontario (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 171.00 / 171.00 m
Receiver height           :  27.70 / 27.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Queen (day/night)
-----------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Queen (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  :  15.00 / 15.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Hurontario (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.51 + 0.00) = 56.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  70.09   0.00 -10.57  -3.01   0.00   0.00   0.00
56.51
-------------------------------------------------------------------------------
--

Segment Leq : 56.51 dBA


Results segment # 2: Queen (day)
--------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.65 + 0.00) = 65.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  65.65   0.00   0.00   0.00   0.00   0.00   0.00
65.65
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 65.65 dBA

Total Leq All Segments: 66.15 dBA


Results segment # 1: Hurontario (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.51 + 0.00) = 56.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  70.09   0.00 -10.57  -3.01   0.00   0.00   0.00
56.51
-------------------------------------------------------------------------
--

Segment Leq : 56.51 dBA


Results segment # 2: Queen (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.12 + 0.00) = 59.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  59.12   0.00   0.00   0.00   0.00   0.00   0.00
59.12
-------------------------------------------------------------------------
--

Segment Leq : 59.12 dBA

Total Leq All Segments: 61.02 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 76.11
                           (NIGHT): 72.64
```

```
STAMSON 5.0         NORMAL REPORT         Date: 21-12-2022 13:39:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                 Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
-----------------------------------------
Train             ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type              !             !(km/h) !/Train!/Train! type !weld
------------------+-------------+-------+------+------+------+----
  1. Via          !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CN Freight   !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0    !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. Go           ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (day/night)
---------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  61.00 / 61.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :  37.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Rail (day)
--------------------------------

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       27.70 !       23.81 !        23.81
       0.50 !       27.70 !       23.24 !        23.24

LOCOMOTIVE (67.07 + 68.63 + 0.00) = 70.93 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     37   0.00  80.03  -6.09  -6.87   0.00   0.00   0.00  67.07
```

```
-------------------------------------------------------------------------------
    37      90    0.00   80.03  -6.09  -5.31   0.00   0.00  -0.01  68.61*
    37      90    0.00   80.03  -6.09  -5.31   0.00   0.00   0.00  68.63
-------------------------------------------------------------------------------

 * Bright Zone !

WHEEL (59.85 + 61.41 + 0.00) = 63.71 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     37   0.00  72.82  -6.09  -6.87   0.00   0.00   0.00  59.85
-------------------------------------------------------------------------------
    37      90    0.00   72.82  -6.09  -5.31   0.00   0.00  -0.02  61.40*
    37      90    0.00   72.82  -6.09  -5.31   0.00   0.00   0.00  61.41
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 71.68 dBA

Total Leq All Segments: 71.68 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       27.70 !       23.81 !        23.81
       0.50 !       27.70 !       23.24 !        23.24

LOCOMOTIVE (63.73 + 65.29 + 0.00) = 67.59 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     37   0.00  76.70  -6.09  -6.87   0.00   0.00   0.00  63.73
-------------------------------------------------------------------------------
    37      90    0.00   76.70  -6.09  -5.31   0.00   0.00  -0.01  65.28*
    37      90    0.00   76.70  -6.09  -5.31   0.00   0.00   0.00  65.29
-------------------------------------------------------------------------------

 * Bright Zone !

WHEEL (56.65 + 58.21 + 0.00) = 60.51 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     37   0.00  69.61  -6.09  -6.87   0.00   0.00   0.00  56.65
-------------------------------------------------------------------------------
    37      90    0.00   69.61  -6.09  -5.31   0.00   0.00  -0.02  58.19*
```

```
    37     90   0.00  69.61  -6.09  -5.31   0.00   0.00   0.00  58.21
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 68.37 dBA

Total Leq All Segments: 68.37 dBA


Road data, segment # 1: Hurontario (day/night)
------------------------------------------------
Car traffic volume  : 17600/8800  veh/TimePeriod
Medium truck volume :  1400/700   veh/TimePeriod
Heavy truck volume  :  1000/500   veh/TimePeriod
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Hurontario (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  : 157.00 / 157.00 m
Receiver height           :  27.70 / 27.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Ann (day/night)
---------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Ann (day/night)
-------------------------------------
```

```
Angle1   Angle2           : -24.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :  27.20 / 27.70  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -24.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  28.00 / 28.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: Queen (day/night)
------------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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      :   5.00
    Day (16 hrs) % of Total Volume      :  90.00

Data for Segment # 3: Queen (day/night)
---------------------------------------
Angle1   Angle2           :   0.00 deg   64.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  37.00 deg   Angle2 : 64.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Hurontario (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.89 + 0.00) = 59.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  70.09   0.00 -10.20   0.00   0.00   0.00   0.00
59.89
-------------------------------------------------------------------------
--

Segment Leq : 59.89 dBA


Results segment # 2: Ann (day)
------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.20 !       12.21 !        12.21

ROAD (0.00 + 58.62 + 0.00) = 58.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -24     90   0.00  65.65   0.00  -5.05  -1.98   0.00   0.00  -0.06
58.56*
   -24     90   0.00  65.65   0.00  -5.05  -1.98   0.00   0.00   0.00
58.62
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 58.62 dBA
```

```
Results segment # 3: Queen (day)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !       16.31 !        16.31

ROAD (56.93 + 55.56 + 0.00) = 59.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     37   0.00  65.65   0.00  -1.86  -6.87   0.00   0.00   0.00
56.93
-------------------------------------------------------------------------------
--
    37     64   0.00  65.65   0.00  -1.86  -8.24   0.00   0.00   0.00
55.56*
    37     64   0.00  65.65   0.00  -1.86  -8.24   0.00   0.00   0.00
55.56
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 59.31 dBA

Total Leq All Segments: 64.08 dBA

Results segment # 1: Hurontario (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.89 + 0.00) = 59.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  70.09   0.00 -10.20   0.00   0.00   0.00   0.00
59.89
-------------------------------------------------------------------------------
--

Segment Leq : 59.89 dBA
```

```
Results segment # 2: Ann (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !       12.41 !        12.41

ROAD (0.00 + 52.09 + 0.00) = 52.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -24     90   0.00  59.12   0.00  -5.05  -1.98   0.00   0.00  -0.05
52.04*
   -24     90   0.00  59.12   0.00  -5.05  -1.98   0.00   0.00   0.00
52.09
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 52.09 dBA


Results segment # 3: Queen (night)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !       16.31 !        16.31

ROAD (50.40 + 49.03 + 0.00) = 52.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     37   0.00  59.12   0.00  -1.86  -6.87   0.00   0.00   0.00
50.40
-------------------------------------------------------------------------------
--
```

```
    37      64    0.00   59.12    0.00   -1.86   -8.24    0.00    0.00    0.00
49.03*
    37      64    0.00   59.12    0.00   -1.86   -8.24    0.00    0.00    0.00
49.03
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 52.78 dBA

Total Leq All Segments: 61.23 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 72.38
                           (NIGHT): 69.14
```

```
STAMSON 5.0         NORMAL REPORT         Date: 22-12-2022 10:38:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te                 Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CNFreight   !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  4.0 ! 25.0 !Diesel! Yes
  4. Go          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (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  :  98.00 / 98.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  48.00 / 48.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Rail (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       27.70 !       16.09 !        16.09
       0.50 !       27.70 !       14.38 !        14.38

LOCOMOTIVE (0.00 + 54.87 + 0.00) = 54.87 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  80.05  -8.15   0.00   0.00   0.00 -17.03  54.87
```

```
-------------------------------------------------------------------------

WHEEL (0.00 + 47.19 + 0.00) = 47.19 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  72.82  -8.15   0.00   0.00   0.00 -17.48  47.19
-------------------------------------------------------------------------

Segment Leq : 55.55 dBA

Total Leq All Segments: 55.55 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       27.70 !       16.09 !        16.09
       0.50 !       27.70 !       14.38 !        14.38

LOCOMOTIVE (0.00 + 51.77 + 0.00) = 51.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  76.95  -8.15   0.00   0.00   0.00 -17.03  51.77
-------------------------------------------------------------------------

WHEEL (0.00 + 44.01 + 0.00) = 44.01 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  69.64  -8.15   0.00   0.00   0.00 -17.48  44.01
-------------------------------------------------------------------------

Segment Leq : 52.44 dBA

Total Leq All Segments: 52.44 dBA


Road data, segment # 1: Ann (day/night)
---------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Ann (day/night)
-------------------------------------
Angle1   Angle2           :   0.00 deg   44.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  56.00 / 56.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 44.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  43.00 / 43.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Hurontario (day/night)
----------------------------------------------
Car traffic volume  : 23760/2640  veh/TimePeriod  *
Medium truck volume :  1890/210   veh/TimePeriod  *
Heavy truck volume  :  1350/150   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):  30000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Hurontario (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 160.00 / 160.00 m
```

```
Receiver height           :  27.70 / 27.70  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 :  43.00 / 43.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Ann (day)
------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !        7.58 !         7.58

ROAD (0.00 + 53.82 + 0.00) = 53.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     44   0.00  65.65   0.00  -5.72  -6.12   0.00   0.00   0.00
53.82*
     0     44   0.00  65.65   0.00  -5.72  -6.12   0.00   0.00   0.00
53.82
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 53.82 dBA

Results segment # 2: Hurontario (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !       20.66 !        20.66
```

```
ROAD (0.00 + 58.10 + 0.00) = 58.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  71.39   0.00 -10.28  -3.01   0.00   0.00  -0.03
58.08*
     0     90   0.00  71.39   0.00 -10.28  -3.01   0.00   0.00   0.00
58.10
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 58.10 dBA

Total Leq All Segments: 59.48 dBA


Results segment # 1: Ann (night)
--------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !        7.58 !         7.58

ROAD (0.00 + 47.28 + 0.00) = 47.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     44   0.00  59.12   0.00  -5.72  -6.12   0.00   0.00   0.00
47.28*
     0     44   0.00  59.12   0.00  -5.72  -6.12   0.00   0.00   0.00
47.28
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 47.28 dBA


Results segment # 2: Hurontario (night)
---------------------------------------
```

```
Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       27.70 !       20.66 !        20.66

ROAD (0.00 + 51.57 + 0.00) = 51.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  64.86   0.00 -10.28  -3.01   0.00   0.00  -0.03
51.55*
     0     90   0.00  64.86   0.00 -10.28  -3.01   0.00   0.00   0.00
51.57
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 51.57 dBA

Total Leq All Segments: 52.94 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 60.95
                           (NIGHT): 55.71
```

```
STAMSON 5.0        NORMAL REPORT        Date: 21-12-2022 13:24:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CNFreight   !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWay       !   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. GO          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (day/night)
--------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00


Results segment # 1: Rail (day)
-------------------------------

LOCOMOTIVE (0.00 + 70.65 + 0.00) = 70.65 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90      0   0.00  80.03  -6.37  -3.01   0.00   0.00   0.00  70.65
-------------------------------------------------------------------------

WHEEL (0.00 + 63.44 + 0.00) = 63.44 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90      0   0.00  72.82  -6.37  -3.01   0.00   0.00   0.00  63.44
-------------------------------------------------------------------------

Segment Leq : 71.41 dBA

Total Leq All Segments: 71.41 dBA
```

```
Results segment # 1: Rail (night)
---------------------------------

LOCOMOTIVE (0.00 + 67.32 + 0.00) = 67.32 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90      0   0.00  76.70  -6.37  -3.01   0.00   0.00   0.00  67.32
-------------------------------------------------------------------------

WHEEL (0.00 + 60.23 + 0.00) = 60.23 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90      0   0.00  69.61  -6.37  -3.01   0.00   0.00   0.00  60.23
-------------------------------------------------------------------------

Segment Leq : 68.10 dBA

Total Leq All Segments: 68.10 dBA


Road data, segment # 1: Queen (day/night)
-----------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Queen (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  27.00 / 27.00  m
Receiver height           :  27.70 / 27.70  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Queen (day)
```

```
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.09 + 0.00) = 60.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  65.65   0.00  -2.55  -3.01   0.00   0.00   0.00
60.09
-------------------------------------------------------------------------------
--

Segment Leq : 60.09 dBA

Total Leq All Segments: 60.09 dBA


Results segment # 1: Queen (night)
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.56 + 0.00) = 53.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.00  59.12   0.00  -2.55  -3.01   0.00   0.00   0.00
53.56
-------------------------------------------------------------------------------
--

Segment Leq : 53.56 dBA

Total Leq All Segments: 53.56 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 71.72
                           (NIGHT): 68.25
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-01-2023 09:39:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CN Freight  !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. Go          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (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  :  53.00 / 53.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.00 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


Results segment # 1: Rail (day)
--------------------------------

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !      125.00 !      113.58 !       113.58
       0.50 !      125.00 !      113.25 !       113.25

LOCOMOTIVE (0.00 + 74.55 + 0.00) = 74.55 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  80.03  -5.48   0.00   0.00   0.00  -0.00  74.55*
```

```
   -90     90    0.00  80.03  -5.48    0.00    0.00    0.00    0.00  74.55
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 67.33 + 0.00) = 67.33 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90    0.00  72.82  -5.48    0.00    0.00    0.00  -0.00  67.33*
   -90     90    0.00  72.82  -5.48    0.00    0.00    0.00   0.00  67.33
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 75.30 dBA

Total Leq All Segments: 75.30 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !      125.00 !      113.58 !       113.58
       0.50 !      125.00 !      113.25 !       113.25

LOCOMOTIVE (0.00 + 71.21 + 0.00) = 71.21 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90    0.00  76.70  -5.48    0.00    0.00    0.00  -0.00  71.21*
   -90     90    0.00  76.70  -5.48    0.00    0.00    0.00   0.00  71.21
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 64.13 + 0.00) = 64.13 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90    0.00  69.61  -5.48    0.00    0.00    0.00  -0.00  64.13*
   -90     90    0.00  69.61  -5.48    0.00    0.00    0.00   0.00  64.13
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 71.99 dBA

Total Leq All Segments: 71.99 dBA
```

```
Road data, segment # 1: Hurontario (day/night)
----------------------------------------------
Car traffic volume  : 23760/2640  veh/TimePeriod  *
Medium truck volume :  1890/210   veh/TimePeriod  *
Heavy truck volume  :  1350/150   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):  30000
    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      :   5.00
    Day (16 hrs) % of Total Volume      :  90.00

Data for Segment # 1: Hurontario (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -7.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 198.00 / 198.00 m
Receiver height           : 125.00 / 125.00 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Queen (day/night)
-----------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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      :   5.00
    Day (16 hrs) % of Total Volume      :  90.00

Data for Segment # 2: Queen (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  :  15.00 / 15.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Hurontario (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.83 + 0.00) = 56.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     -7   0.00  71.39   0.00 -11.21  -3.36   0.00   0.00   0.00
56.83
-------------------------------------------------------------------------------
--

Segment Leq : 56.83 dBA


Results segment # 2: Queen (day)
---------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.65 + 0.00) = 65.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  65.65   0.00   0.00   0.00   0.00   0.00   0.00
65.65
-------------------------------------------------------------------------------
--

Segment Leq : 65.65 dBA

Total Leq All Segments: 66.19 dBA


Results segment # 1: Hurontario (night)
---------------------------------------
```

```
Source height = 1.50 m

ROAD (0.00 + 50.30 + 0.00) = 50.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     -7   0.00  64.86   0.00 -11.21  -3.36   0.00   0.00   0.00
50.30
-------------------------------------------------------------------------
--

Segment Leq : 50.30 dBA


Results segment # 2: Queen (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.12 + 0.00) = 59.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  59.12   0.00   0.00   0.00   0.00   0.00   0.00
59.12
-------------------------------------------------------------------------
--

Segment Leq : 59.12 dBA

Total Leq All Segments: 59.66 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 75.80
                           (NIGHT): 72.24
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-01-2023 09:42:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CN Freight  !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. Go          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (day/night)
---------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  55.00 / 55.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :   0.00 deg   Angle2 : 78.00 deg
Barrier height            :  29.00 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


Results segment # 1: Rail (day)
--------------------------------

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !      125.00 !      114.00 !       114.00
       0.50 !      125.00 !      113.68 !       113.68

LOCOMOTIVE (0.00 + 70.76 + 62.63) = 71.38 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     78   0.00  80.03  -5.64  -3.63   0.00   0.00   0.00  70.76*
```

```
     0     78    0.00  80.03  -5.64  -3.63   0.00   0.00   0.00  70.76
-------------------------------------------------------------------------
    78     90    0.00  80.03  -5.64 -11.76   0.00   0.00   0.00  62.63
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 63.54 + 55.41) = 64.16 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     78    0.00  72.82  -5.64  -3.63   0.00   0.00   0.00  63.54*
     0     78    0.00  72.82  -5.64  -3.63   0.00   0.00   0.00  63.54
-------------------------------------------------------------------------
    78     90    0.00  72.82  -5.64 -11.76   0.00   0.00   0.00  55.41
-------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 72.13 dBA

Total Leq All Segments: 72.13 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !      125.00 !      114.00 !       114.00
       0.50 !      125.00 !      113.68 !       113.68

LOCOMOTIVE (0.00 + 67.42 + 59.29) = 68.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     78    0.00  76.70  -5.64  -3.63   0.00   0.00   0.00  67.42*
     0     78    0.00  76.70  -5.64  -3.63   0.00   0.00   0.00  67.42
-------------------------------------------------------------------------
    78     90    0.00  76.70  -5.64 -11.76   0.00   0.00   0.00  59.29
-------------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 60.34 + 52.21) = 60.96 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     78    0.00  69.61  -5.64  -3.63   0.00   0.00   0.00  60.34*
     0     78    0.00  69.61  -5.64  -3.63   0.00   0.00   0.00  60.34
-------------------------------------------------------------------------
```

```
    78      90    0.00   69.61   -5.64 -11.76    0.00    0.00    0.00   52.21
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 68.82 dBA

Total Leq All Segments: 68.82 dBA


Road data, segment # 1: Hurontario (day/night)
-----------------------------------------------
Car traffic volume  : 23760/2640  veh/TimePeriod  *
Medium truck volume :  1890/210   veh/TimePeriod  *
Heavy truck volume  :  1350/150   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):  30000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Hurontario (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  : 188.00 / 188.00 m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 17.00 deg
Barrier height            :  29.00 m
Barrier receiver distance :  31.00 / 31.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Ann (day/night)
---------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Ann (day/night)
-------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  78.00 / 78.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -10.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.00 m
Barrier receiver distance :  31.00 / 31.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: Queen (day/night)
-----------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Queen (day/night)
---------------------------------------
```

```
Angle1   Angle2           :   0.00 deg   78.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  17.00 / 17.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 78.00 deg
Barrier height            :  29.00 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


Results segment # 1: Hurontario (day)
-----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !      104.63 !       104.63

ROAD (0.00 + 58.16 + 56.49) = 60.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     17   0.00  71.39   0.00 -10.98  -2.26   0.00   0.00  -0.00
58.15*
   -90     17   0.00  71.39   0.00 -10.98  -2.26   0.00   0.00   0.00
58.16
-------------------------------------------------------------------------------
--
    17     90   0.00  71.39   0.00 -10.98  -3.92   0.00   0.00   0.00
56.49
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 60.41 dBA


Results segment # 2: Ann (day)
------------------------------
```

```
Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !       75.91 !        75.91

ROAD (0.00 + 55.94 + 0.00) = 55.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -10     90   0.00  65.65   0.00  -7.16  -2.55   0.00   0.00  -0.01
55.93*
   -10     90   0.00  65.65   0.00  -7.16  -2.55   0.00   0.00   0.00
55.94
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 55.94 dBA


Results segment # 3: Queen (day)
--------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !       88.68 !        88.68

ROAD (0.00 + 61.48 + 0.00) = 61.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     78   0.00  65.65   0.00  -0.54  -3.63   0.00   0.00   0.00
61.48*
     0     78   0.00  65.65   0.00  -0.54  -3.63   0.00   0.00   0.00
61.48
-------------------------------------------------------------------------
--
```

```
 * Bright Zone !

Segment Leq : 61.48 dBA

Total Leq All Segments: 64.62 dBA


Results segment # 1: Hurontario (night)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !      104.63 !       104.63

ROAD (0.00 + 51.62 + 49.96) = 53.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     17   0.00  64.86   0.00 -10.98  -2.26   0.00   0.00  -0.00
51.62*
   -90     17   0.00  64.86   0.00 -10.98  -2.26   0.00   0.00   0.00
51.62
-------------------------------------------------------------------------------
--
    17     90   0.00  64.86   0.00 -10.98  -3.92   0.00   0.00   0.00
49.96
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 53.88 dBA


Results segment # 2: Ann (night)
--------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !       75.91 !        75.91
```

```
ROAD (0.00 + 49.41 + 0.00) = 49.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -10     90   0.00  59.12   0.00  -7.16  -2.55   0.00   0.00  -0.01
49.40*
   -10     90   0.00  59.12   0.00  -7.16  -2.55   0.00   0.00   0.00
49.41
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 49.41 dBA


Results segment # 3: Queen (night)
----------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !       88.68 !        88.68

ROAD (0.00 + 54.95 + 0.00) = 54.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     78   0.00  59.12   0.00  -0.54  -3.63   0.00   0.00   0.00
54.95*
     0     78   0.00  59.12   0.00  -0.54  -3.63   0.00   0.00   0.00
54.95
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 54.95 dBA

Total Leq All Segments: 58.09 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.84
                           (NIGHT): 69.17
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-01-2023 09:45:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CNFreight   !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. GO          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (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  :  85.00 / 85.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            : 131.60 m
Barrier receiver distance :  35.00 / 35.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Rail (day)
--------------------------------

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !      125.00 !       75.18 !        75.18
       0.50 !      125.00 !       73.74 !        73.74

LOCOMOTIVE (0.00 + 53.02 + 0.00) = 53.02 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  80.03  -7.53   0.00   0.00   0.00 -19.48  53.02
```

```
-------------------------------------------------------------------------

WHEEL (0.00 + 45.80 + 0.00) = 45.80 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  72.82  -7.53   0.00   0.00   0.00 -19.49  45.80
-------------------------------------------------------------------------

Segment Leq : 53.77 dBA

Total Leq All Segments: 53.77 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !      125.00 !       75.18 !        75.18
       0.50 !      125.00 !       73.74 !        73.74

LOCOMOTIVE (0.00 + 49.68 + 0.00) = 49.68 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  76.70  -7.53   0.00   0.00   0.00 -19.48  49.68
-------------------------------------------------------------------------

WHEEL (0.00 + 42.59 + 0.00) = 42.59 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  69.61  -7.53   0.00   0.00   0.00 -19.49  42.59
-------------------------------------------------------------------------

Segment Leq : 50.46 dBA

Total Leq All Segments: 50.46 dBA


Road data, segment # 1: Ann (day/night)
---------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Ann (day/night)
-------------------------------------
Angle1   Angle2           :   0.00 deg   38.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  88.00 / 88.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 38.00 deg
Barrier height            :  29.00 m
Barrier receiver distance :  39.00 / 39.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Hurontario (day/night)
----------------------------------------------
Car traffic volume  : 23760/2640  veh/TimePeriod  *
Medium truck volume :  1890/210   veh/TimePeriod  *
Heavy truck volume  :  1350/150   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):  30000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Hurontario (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  : 194.00 / 194.00 m
```

```
Receiver height           : 125.00 / 125.00 m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.00 m
Barrier receiver distance :  39.00 / 39.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Ann (day)
------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !       70.26 !        70.26

ROAD (0.00 + 51.22 + 0.00) = 51.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     38   0.00  65.65   0.00  -7.68  -6.75   0.00   0.00   0.00
51.22*
     0     38   0.00  65.65   0.00  -7.68  -6.75   0.00   0.00   0.00
51.22
-------------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 51.22 dBA


Results segment # 2: Hurontario (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !      100.17 !       100.17
```

```
ROAD (57.27 + 57.27 + 0.00) = 60.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  71.39   0.00 -11.12  -3.01   0.00   0.00   0.00
57.27
-------------------------------------------------------------------------
--
     0     90   0.00  71.39   0.00 -11.12  -3.01   0.00   0.00  -0.00
57.26*
     0     90   0.00  71.39   0.00 -11.12  -3.01   0.00   0.00   0.00
57.27
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 60.28 dBA

Total Leq All Segments: 60.79 dBA


Results segment # 1: Ann (night)
--------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !       70.26 !        70.26

ROAD (0.00 + 44.68 + 0.00) = 44.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     38   0.00  59.12   0.00  -7.68  -6.75   0.00   0.00   0.00
44.68*
     0     38   0.00  59.12   0.00  -7.68  -6.75   0.00   0.00   0.00
44.68
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 44.68 dBA
```

```
Results segment # 2: Hurontario (night)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !      125.00 !      100.17 !       100.17

ROAD (50.74 + 50.74 + 0.00) = 53.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  64.86   0.00 -11.12  -3.01   0.00   0.00   0.00
50.74
-------------------------------------------------------------------------
--
     0     90   0.00  64.86   0.00 -11.12  -3.01   0.00   0.00  -0.00
50.73*
     0     90   0.00  64.86   0.00 -11.12  -3.01   0.00   0.00   0.00
50.74
-------------------------------------------------------------------------
--

 * Bright Zone !

Segment Leq : 53.75 dBA

Total Leq All Segments: 54.26 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 61.58
                           (NIGHT): 55.77
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-01-2023 09:46:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CN Freight  !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. Go          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00


Results segment # 1: Rail (day)
-------------------------------

LOCOMOTIVE (0.00 + 71.00 + 0.00) = 71.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90      0   0.00  80.03  -6.02  -3.01   0.00   0.00   0.00  71.00
-------------------------------------------------------------------

WHEEL (0.00 + 63.79 + 0.00) = 63.79 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90      0   0.00  72.82  -6.02  -3.01   0.00   0.00   0.00  63.79
-------------------------------------------------------------------

Segment Leq : 71.76 dBA

Total Leq All Segments: 71.76 dBA


Results segment # 1: Rail (night)
```

```
---------------------------------

LOCOMOTIVE (0.00 + 67.66 + 0.00) = 67.66 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90      0   0.00  76.70  -6.02  -3.01   0.00   0.00   0.00  67.66
-------------------------------------------------------------------------

WHEEL (0.00 + 60.58 + 0.00) = 60.58 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90      0   0.00  69.61  -6.02  -3.01   0.00   0.00   0.00  60.58
-------------------------------------------------------------------------

Segment Leq : 68.44 dBA

Total Leq All Segments: 68.44 dBA


Road data, segment # 1: Queen (day/night)
-----------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Queen (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  22.00 / 22.00  m
Receiver height           : 125.00 / 125.00 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Queen (day)
--------------------------------
```

```
Source height = 1.50 m

ROAD (0.00 + 60.98 + 0.00) = 60.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  65.65   0.00  -1.66  -3.01   0.00   0.00   0.00
60.98
-------------------------------------------------------------------------
--

Segment Leq : 60.98 dBA

Total Leq All Segments: 60.98 dBA


Results segment # 1: Queen (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.45 + 0.00) = 54.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.00  59.12   0.00  -1.66  -3.01   0.00   0.00   0.00
54.45
-------------------------------------------------------------------------
--

Segment Leq : 54.45 dBA

Total Leq All Segments: 54.45 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 72.11
                           (NIGHT): 68.61
```

```
STAMSON 5.0        NORMAL REPORT        Date: 18-01-2023 11:32:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. Via         !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CNFreight   !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0   !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. GO          ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (day/night)
--------------------------------------
Angle1   Angle2           : -61.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :  30.80 / 30.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -61.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  13.00 / 13.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Rail (day)
-------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       30.80 !       24.99 !        24.99
       0.50 !       30.80 !       24.23 !        24.23

LOCOMOTIVE (0.00 + 59.70 + 0.00) = 59.70 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------
```

```
   -61     90    0.00  80.03  -6.02  -0.76   0.00   0.00 -13.55  59.70
-------------------------------------------------------------------------

WHEEL (0.00 + 51.51 + 0.00) = 51.51 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -61     90    0.00  72.82  -6.02  -0.76   0.00   0.00 -14.53  51.51
-------------------------------------------------------------------------

Segment Leq : 60.31 dBA

Total Leq All Segments: 60.31 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       30.80 !       24.99 !        24.99
       0.50 !       30.80 !       24.23 !        24.23

LOCOMOTIVE (0.00 + 56.37 + 0.00) = 56.37 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -61     90    0.00  76.70  -6.02  -0.76   0.00   0.00 -13.55  56.37
-------------------------------------------------------------------------

WHEEL (0.00 + 48.30 + 0.00) = 48.30 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -61     90    0.00  69.61  -6.02  -0.76   0.00   0.00 -14.53  48.30
-------------------------------------------------------------------------

Segment Leq : 57.00 dBA

Total Leq All Segments: 57.00 dBA


Road data, segment # 1: Queen St (day/night)
--------------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Queen St (day/night)
-----------------------------------------
Angle1   Angle2           : -58.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  22.00 / 22.00  m
Receiver height           :  30.80 / 30.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -58.00 deg   Angle2 : 70.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  13.00 / 13.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Ann (day/night)
---------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Ann (day/night)
-------------------------------------
Angle1   Angle2           : -19.00 deg   52.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
```

```
Receiver source distance  :  66.00 / 66.00  m
Receiver height           :  30.80 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -19.00 deg   Angle2 : 52.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  17.00 / 17.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: Hurontario (day/night)
-----------------------------------------------
Car traffic volume  : 23760/2640  veh/TimePeriod  *
Medium truck volume :  1890/210   veh/TimePeriod  *
Heavy truck volume  :  1350/150   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):  30000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Hurontario (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  : 175.00 / 168.00 m
Receiver height           :  30.80 / 30.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  17.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Queen St (day)
-----------------------------------
```

```
Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       13.48 !        13.48

ROAD (0.00 + 42.51 + 0.00) = 42.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -58     70   0.00  65.65   0.00  -1.66  -1.48   0.00   0.00 -20.00
42.51
-------------------------------------------------------------------------
--

Segment Leq : 42.51 dBA


Results segment # 2: Ann (day)
------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       23.25 !        23.25

ROAD (0.00 + 37.33 + 0.00) = 37.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -19     52   0.00  65.65   0.00  -6.43  -4.04   0.00   0.00 -17.85
37.33
-------------------------------------------------------------------------
--

Segment Leq : 37.33 dBA

Results segment # 3: Hurontario (day)
-------------------------------------

Source height = 1.50 m
```

```
Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       27.95 !        27.95

ROAD (0.00 + 54.16 + 0.00) = 54.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  71.39   0.00 -10.67   0.00   0.00   0.00  -6.57
54.16
-------------------------------------------------------------------------
--

Segment Leq : 54.16 dBA

Total Leq All Segments: 54.53 dBA


Results segment # 1: Queen St (night)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       13.48 !        13.48

ROAD (0.00 + 35.98 + 0.00) = 35.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -58     70   0.00  59.12   0.00  -1.66  -1.48   0.00   0.00 -20.00
35.98
-------------------------------------------------------------------------
--

Segment Leq : 35.98 dBA


Results segment # 2: Ann (night)
--------------------------------

Source height = 1.50 m
```

```
Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        4.50 !        3.73 !         3.73

ROAD (0.00 + 28.65 + 0.00) = 28.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -19     52   0.00  59.12   0.00  -6.43  -4.04   0.00   0.00 -20.00
28.65
-------------------------------------------------------------------------
--

Segment Leq : 28.65 dBA


Results segment # 3: Hurontario (night)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       29.06 !        29.06

ROAD (0.00 + 49.27 + 0.00) = 49.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  64.86   0.00 -10.49   0.00   0.00   0.00  -5.10
49.27
-------------------------------------------------------------------------
--

Segment Leq : 49.27 dBA

Total Leq All Segments: 49.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.33
                           (NIGHT): 57.71
```

```
STAMSON 5.0         NORMAL REPORT         Date: 18-01-2023 11:31:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9b.te                 Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Rail (day/night)
-----------------------------------------
Train             ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type              !             !(km/h) !/Train!/Train! type !weld
------------------+-------------+-------+------+------+------+----
  1. Via          !  12.0/0.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes
  2. CNFreight    !   1.0/0.0   !  96.0 !  4.0 !140.0 !Diesel! Yes
  3. CNWayFreight!   1.0/4.0    !  96.0 !  2.0 ! 25.0 !Diesel! Yes
  4. GO           ! 192.0/46.0  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Rail (day/night)
---------------------------------------
Angle1   Angle2           : -58.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :  30.80 / 30.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -58.00 deg   Angle2 : 90.00 deg
Barrier height            :  30.40 m
Barrier receiver distance :  13.00 / 13.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Rail (day)
--------------------------------

Barrier height for grazing incidence
-------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       30.80 !       24.99 !        24.99
       0.50 !       30.80 !       24.23 !        24.23

LOCOMOTIVE (0.00 + 57.96 + 0.00) = 57.96 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -58     90   0.00  80.03  -6.02  -0.85   0.00   0.00 -15.21  57.96
```

```
-------------------------------------------------------------------------

WHEEL (0.00 + 49.94 + 0.00) = 49.94 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -58     90   0.00  72.82  -6.02  -0.85   0.00   0.00 -16.01  49.94
-------------------------------------------------------------------------

Segment Leq : 58.60 dBA

Total Leq All Segments: 58.60 dBA


Results segment # 1: Rail (night)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       30.80 !       24.99 !        24.99
       0.50 !       30.80 !       24.23 !        24.23

LOCOMOTIVE (0.00 + 54.62 + 0.00) = 54.62 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -58     90   0.00  76.70  -6.02  -0.85   0.00   0.00 -15.21  54.62
-------------------------------------------------------------------------

WHEEL (0.00 + 46.74 + 0.00) = 46.74 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -58     90   0.00  69.61  -6.02  -0.85   0.00   0.00 -16.01  46.74
-------------------------------------------------------------------------

Segment Leq : 55.28 dBA

Total Leq All Segments: 55.28 dBA


Road data, segment # 1: Queen St (day/night)
--------------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Queen St (day/night)
-----------------------------------------
Angle1   Angle2           : -58.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  22.00 / 22.00  m
Receiver height           :  30.80 / 30.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -58.00 deg   Angle2 : 70.00 deg
Barrier height            :  30.40 m
Barrier receiver distance :  13.00 / 13.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Ann (day/night)
---------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Ann (day/night)
-------------------------------------
Angle1   Angle2           : -19.00 deg   52.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  66.00 / 66.00  m
```

```
Receiver height           :  30.80 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -19.00 deg   Angle2 : 52.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  17.00 / 17.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 3: Hurontario (day/night)
-----------------------------------------------
Car traffic volume  : 23760/2640  veh/TimePeriod  *
Medium truck volume :  1890/210   veh/TimePeriod  *
Heavy truck volume  :  1350/150   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):  30000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Hurontario (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  : 175.00 / 168.00 m
Receiver height           :  30.80 / 30.80  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :  29.30 m
Barrier receiver distance :  17.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Queen St (day)
-----------------------------------

Source height = 1.50 m
```

```
Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       13.48 !        13.48

ROAD (0.00 + 42.51 + 0.00) = 42.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -58     70   0.00  65.65   0.00  -1.66  -1.48   0.00   0.00 -20.00
42.51
-------------------------------------------------------------------------
--

Segment Leq : 42.51 dBA


Results segment # 2: Ann (day)
------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       23.25 !        23.25

ROAD (0.00 + 37.33 + 0.00) = 37.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -19     52   0.00  65.65   0.00  -6.43  -4.04   0.00   0.00 -17.85
37.33
-------------------------------------------------------------------------
--

Segment Leq : 37.33 dBA


Results segment # 3: Hurontario (day)
-------------------------------------

Source height = 1.50 m
```

```
Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       27.95 !        27.95

ROAD (0.00 + 54.16 + 0.00) = 54.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  71.39   0.00 -10.67   0.00   0.00   0.00  -6.57
54.16
-------------------------------------------------------------------------
--

Segment Leq : 54.16 dBA

Total Leq All Segments: 54.53 dBA


Results segment # 1: Queen St (night)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       13.48 !        13.48

ROAD (0.00 + 35.98 + 0.00) = 35.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -58     70   0.00  59.12   0.00  -1.66  -1.48   0.00   0.00 -20.00
35.98
-------------------------------------------------------------------------
--

Segment Leq : 35.98 dBA


Results segment # 2: Ann (night)
--------------------------------

Source height = 1.50 m
```

```
Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        4.50 !        3.73 !         3.73

ROAD (0.00 + 28.65 + 0.00) = 28.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -19     52   0.00  59.12   0.00  -6.43  -4.04   0.00   0.00 -20.00
28.65
-------------------------------------------------------------------------
--

Segment Leq : 28.65 dBA


Results segment # 3: Hurontario (night)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       30.80 !       29.06 !        29.06

ROAD (0.00 + 49.27 + 0.00) = 49.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  64.86   0.00 -10.49   0.00   0.00   0.00  -5.10
49.27
-------------------------------------------------------------------------
--

Segment Leq : 49.27 dBA

Total Leq All Segments: 49.50 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 60.04
                           (NIGHT): 56.30
```

```
STAMSON 5.0        NORMAL REPORT        Date: 21-12-2022 13:37:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Ann Street (day/night)
----------------------------------------------
Car traffic volume  :  6336/704   veh/TimePeriod  *
Medium truck volume :   504/56    veh/TimePeriod  *
Heavy truck volume  :   360/40    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):   8000
    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     :   5.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Ann Street (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  91.00 / 91.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 30.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  78.00 / 78.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Ann Street (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
```

```
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !        1.50 !        1.50 !         1.50

ROAD (0.00 + 33.13 + 0.00) = 33.13 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     30   0.00  65.65   0.00  -7.83  -7.78   0.00   0.00 -16.91
33.13
-------------------------------------------------------------------------
--

Segment Leq : 33.13 dBA

Total Leq All Segments: 33.13 dBA


Results segment # 1: Ann Street (night)
---------------------------------------

Source height = 1.50 m

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

ROAD (0.00 + 26.60 + 0.00) = 26.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     30   0.00  59.12   0.00  -7.83  -7.78   0.00   0.00 -16.91
26.60
-------------------------------------------------------------------------
--

Segment Leq : 26.60 dBA

Total Leq All Segments: 26.60 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 33.13
                           (NIGHT): 26.60
```

APPENDIX B

FTA VIBRATION CALCULATIONS

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

GWE22-347 22-Dec-22

Possible Vibration Impacts on 70 Park Street East
Perdicted using FTA General Assesment

Train Speed 150 km/h 93 mph

	Distance from C/L	
	(m)	(ft)
Rail	43.0	141.1

	Vibration		
From FTA Manual Fig 10-1			
Vibration Levels at distance from track	74	dBV re 1 micro in/sec	
Adjustment Factors FTA Table 10-1			
Speed reference 50 mph	5	Operating speed 93 mph	
Vehicle Parameters	0	Assume Soft primary suspension, Weels run true	
Track Condition	0	None	
Track Treatments	0	None	
Type of Transit Structure	-5	At station	
Efficient vibration Propagation	0	Propogation through rock	
Vibration Levels at Fdn	74		0.133
Coupling to Building Foundation	-10	large masonry on piles	
Floor to Floor Attenuation	-2.0	Ground Floor occupied	
Amplification of Floor and Walls	6		
Total Vibration Level	68.39026	dBV or	0.067 mm/s
Noise Level in dBA	33.39026	dBA	

Table 10-1. Adjustment Factors for Generalized Predictions of Ground-Borne Vibration and Noise

Factors Affecting Vibration Source

Source Factor	Adjustment to Propagation Curve			Comment
Speed		Reference Speed		Vibration level is approximately proportional to 20*log(speed/speed$_{ref}$). Sometimes the variation with speed has been observed to be as low as 10 to 15 log(speed/speed$_{ref}$).
	Vehicle Speed	50 mph	30 mph	
	60 mph	+1.6 dB	+6.0 dB	
	50 mph	0.0 dB	+4.4 dB	
	40 mph	-1.9 dB	+2.5 dB	
	30 mph	-4.4 dB	0.0 dB	
	20 mph	-8.0 dB	-3.5 dB	
Vehicle Parameters (not additive, apply greatest value only)				
Vehicle with stiff primary suspension	+8 dB			Transit vehicles with stiff primary suspensions have been shown to create high vibration levels. Include this adjustment when the primary suspension has a vertical resonance frequency greater than 15 Hz.
Resilient Wheels	0 dB			Resilient wheels do not generally affect ground-borne vibration except at frequencies greater than about 80 Hz.
Worn Wheels or Wheels with Flats	+10 dB			Wheel flats or wheels that are unevenly worn can cause high vibration levels. This can be prevented with wheel truing and slip-slide detectors to prevent the wheels from sliding on the track.
Track Conditions (not additive, apply greatest value only)				
Worn or Corrugated Track	+10 dB			If both the wheels and the track are worn, only one adjustment should be used. Corrugated track is a common problem. Mill scale on new rail can cause higher vibration levels until the rail has been in use for some time.
Special Trackwork	+10 dB			Wheel impacts at special trackwork will significantly increase vibration levels. The increase will be less at greater distances from the track.
Jointed Track or Uneven Road Surfaces	+5 dB			Jointed track can cause higher vibration levels than welded track. Rough roads or expansion joints are sources of increased vibration for rubber-tire transit.
Track Treatments (not additive, apply greatest value only)				
Floating Slab Trackbed	-15 dB			The reduction achieved with a floating slab trackbed is strongly dependent on the frequency characteristics of the vibration.
Ballast Mats	-10 dB			Actual reduction is strongly dependent on frequency of vibration.
High-Resilience Fasteners	-5 dB			Slab track with track fasteners that are very compliant in the vertical direction can reduce vibration at frequencies greater than 40 Hz.

Table 10-1. Adjustment Factors for Generalized Predictions of Ground-Borne Vibration and Noise (Continued)

Factors Affecting Vibration Path

Path Factor	Adjustment to Propagation Curve	Comment
Resiliently Supported Ties	-10 dB	Resiliently supported tie systems have been found to provide very effective control of low-frequency vibration.
Track Configuration (not additive, apply greatest value only)		
Type of Transit Structure	Relative to at-grade tie & ballast: Elevated structure -10 dB Open cut 0 dB	The general rule is the heavier the structure, the lower the vibration levels. Putting the track in cut may reduce the vibration levels slightly. Rock-based subways generate higher-frequency vibration.
	Relative to bored subway tunnel in soil: Station -5 dB Cut and cover -3 dB Rock-based - 15 dB	
Ground-borne Propagation Effects		
Geologic conditions that promote efficient vibration propagation	Efficient propagation in soil +10 dB	Refer to the text for guidance on identifying areas where efficient propagation is possible.
	Propagation in rock layer: Dist. / Adjust. 50 ft +2 dB 100 ft +4 dB 150 ft +6 dB 200 ft +9 dB	The positive adjustment accounts for the lower attenuation of vibration in rock compared to soil. It is generally more difficult to excite vibrations in rock than in soil at the source.
Coupling to building foundation	Wood Frame Houses -5 dB 1-2 Story Masonry -7 dB 3-4 Story Masonry -10 dB Large Masonry on Piles -10 dB Large Masonry on Spread Footings -13 dB Foundation in Rock 0 dB	The general rule is the heavier the building construction, the greater the coupling loss.

Factors Affecting Vibration Receiver

Receiver Factor	Adjustment to Propagation Curve	Comment
Floor-to-floor attenuation	1 to 5 floors above grade: -2 dB/floor 5 to 10 floors above grade: -1 dB/floor	This factor accounts for dispersion and attenuation of the vibration energy as it propagates through a building.
Amplification due to resonances of floors, walls, and ceilings	+6 dB	The actual amplification will vary greatly depending on the type of construction. The amplification is lower near the wall/floor and wall/ceiling intersections.
Conversion to Ground-borne Noise		
Noise Level in dBA	Peak frequency of ground vibration: Low frequency (<30 Hz): -50 dB Typical (peak 30 to 60 Hz): -35 dB High frequency (>60 Hz): -20 dB	Use these adjustments to estimate the A-weighted sound level given the average vibration velocity level of the room surfaces. See text for guidelines for selecting low, typical or high frequency characteristics. Use the high-frequency adjustment for subway tunnels in rock or if the dominant frequencies of the vibration spectrum are known to be 60 Hz or greater.