ENVIRONMENTAL NOISE FEASIBILITY STUDY

603-643, 645 & 699 Kingston Road

Proposed Mixed-use Development

City of Pickering

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EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) was retained to prepare an Environmental Noise Feasibility Study in support of the proposed mixed-use development.

The current development concept, as represented in the conceptual site plan drawings and development statistics prepared by Graziani + Corazza Architects, dated April 6, 2020, enclosed with this submission, is preliminary in nature and is subject to change.

The current development concept, which represents a high-level master plan for a new mixed-use community, is primarily intended to form the basis of the proposed Draft Official Plan Amendment, which is required to facilitate the proposed density and Floor Space Index on the subject lands, as well as the proposed Draft Zoning By-law Amendment which is required to establish a new site-specific zoning framework that will implement the City's current land use vision for the subject lands.

This proposed official plan and zoning by-law amendment framework is intended to provide flexibility in order to ensure that the development of the lands responds to market conditions and can result in implementation of plans and alternative plans to achieve principles of intensification based on good planning and urban design principles.

As such, the development concept as presented should be considered conceptual and will be revised, as necessary, to account for new and/or evolving considerations related to the master-planned community.

The proposed development will consist of six high-rise towers, ranging in height from 29 to 42 storeys, two 18-storey mid-rise buildings and four 4-storey townhouse blocks. Grade-level parks will be located at the south side of the site, as well as the northeast and northwest corners of the site. The development concept includes two levels of underground parking with the exception of Podium 1, which will have one level of underground parking. Parking will also be provided in Podiums 1 and 4.

The significant noise source in the vicinity is road traffic on Highway 401, Whites Road and Kingston Road, as well as rail traffic on the Canadian National Railway (CN) Kingston Subdivision and the GO Lakeshore East line. There are no stationary noise sources in the vicinity that are expected to have a significant impact at the subject site.

The sound levels on site have been determined and compared with the applicable Ministry of the Environment, Conservation and Parks (MECP) noise guideline limits to determine the need for noise mitigation.

To meet the applicable transportation noise source guideline limits:

- All residential suites in the development require mandatory air conditioning for noise control purposes.
- Upgraded exterior walls and windows with the following Sound Transmission Class (STC) rating could be required. Note that the requirements are based on assumed wall and window areas relative to the associated floor area. Methods to reduce the window STC requirements are discussed in Section 5.1.1.2.1.
  - Towers 1 to 3 and 6 to 8:
    - Exterior walls with ratings up to STC 60; and
    - Exterior windows with ratings up to STC 44.
  - Towers 4 and 5:
    - Exterior walls meeting STC 54; and
    - Exterior windows with ratings up to STC 38.
  - Blocks 1 to 4:
    - Exterior walls meeting STC 54; and
    - Exterior windows with ratings up to STC 33.

Final requirements should be checked when detailed building plans are available.

1.0 INTRODUCTION

1.1 SCOPE

VCL was retained to prepare an Environmental Noise Feasibility Study for the proposed development in support of the Official Plan Amendment (OPA) and Zoning Bylaw Amendment (ZBA) application to the City of Pickering. The potential sound levels and noise mitigation measures needed for the proposed development to comply with the MECP noise guideline requirements are outlined herein.

1.2 THE SITE AND SUROUNDING AREA

The site is located at 603-643, 645 and 699 Kingston Road in the City of Pickering. The site is bounded by:

- Kingston Road, with existing residential and commercial development beyond, to the north;
- Whites Road North, with existing commercial development beyond, to the east;
- Highway 401, with existing commercial/industrial uses beyond, to the south; and
- An existing car dealership to the west.

There are existing commercial buildings on the site that will be demolished as part of the development.

A Key Plan is included as Figure 1. The study is based on the Conceptual Site Plan prepared by Graziani + Corazza Architects, dated April 6, 2020. The Conceptual Site Plan is shown as Figure 2.

1.3 THE PROPOSED DEVELOPMENT

The proposed development will consist of six high-rise towers, two mid-rise towers and four townhouse blocks:

- Towers 1, 2 and 3 are located along the south property line, at the west side for the site. The towers range in height from 29 to 42 storeys and are connected by a 4-storey podium (Podium 1).
- Towers 4 and 5 are each “U”-shaped buildings and are located along the north property line, at the centre of the site. Both mid-towers are 18 storeys.
- Towers 6 and 7 are located along the south property line, near the centre of the site. Towers 6 and 7 are 29 and 42 storeys, respectively. The towers are connected by a 4-storey podium (Podium 4).
- Tower 8 is located at the northeast corner of the site. The tower is 24 storeys, with a 4-storey commercial area located within a 4-storey podium (Podium 5).
- Blocks 1 to 4 are 4-storey townhouse blocks with stacked back-to-back units. Blocks 1 and 2 are located toward the northwest corner of the site. Blocks 3 and 4 are located toward the northeast corner of the site.

Grade-level parks will be provided at the south side of the site (between Towers 3 and 6) as well as the northeast and northwest corners of the site.

The development concept includes two levels of underground parking with the exception of Podium 1, which will have one level of underground parking. Parking will also be provided in Podiums 1 and 4.

2.0 NOISE SOURCES

2.1 TRANSPORTATION SOURCES

The noise sources with potential to impact the proposed development are road traffic on Highway 401, Whites Road and Kingston Road, as well as rail traffic on the CN Kingston Subdivision and the GO Lakeshore East line.

2.1.1 Road Traffic

2.1.1.1 Highway 401

Ultimate road traffic data and overall truck percentages for Highway 401 were obtained from the Ministry of Transportation (MTO).

Highway 401 periodically experiences traffic congestion that results in lower traffic speeds. Calculated sound levels based on vehicles travelling at the posted speed limit are expected to be higher than the sound levels that are actually emitted from vehicles on the roadway, which travel at slower speeds. Further, the ultimate traffic volumes provided by the MTO are significantly higher than the current volumes. With the increased traffic volumes indicated for the ultimate condition, it is expected that even greater congestion and slower travel speeds would result. Thus, calculations using the ultimate traffic volume and the posted speed are expected to overpredict the sound levels at the subject site.

To account for the difference between predictions and actual conditions, sound measurements of road traffic noise from Highway 401 were done on the subject site between January 25, 2020 and February 1, 2020, at a location corresponding to the south facade of Tower 2. Traffic counts (hourly volumes and traffic compositions) on Highway 401 were also done during the same period to account for the difference in current and future volumes. An adjustment was determined based on the difference in sound levels (measured vs. predicted) and was accounted for in the analysis.

2.1.1.2 Whites Road and Kingston Road

Ultimate road traffic data for Whites Road and Kingston Road was provided by Durham Region. The day/night split was assumed to be 90%/10%, as is typical for such roadways.

The road traffic data is summarized in Table 1A. Correspondence related to the road traffic data is shown in Appendix A.

2.1.2 Rail Traffic

The rail line to the south of the site is the CN Kingston Subdivision. The rail line is also used is used by Metrolinx for the GO Transit Lakeshore East line.

2.1.2.1 GO Lakeshore East

Future (10-year horizon) rail traffic on the GO Lakeshore East line was provided by Metrolinx in 2019. The GO rail traffic data was escalated to the year 2030 design condition (1-year projection from forecasts) using a growth rate of 2.5%, compounded annually.

Note that Metrolinx has recently made significant revisions to its forecasts. The most significant changes from the noise perspective are that service is being intensified along all Metrolinx corridors as part of its Regional Express Rail service and GO services will be partially electrified.

As recommended by Metrolinx, all future train traffic was modelled using the reference data for diesel trains.

2.1.2.2 CN Kingston Subdivision

Rail traffic on the Kingston Subdivision consists of freight, way freight and passenger (VIA) trains.

Rail data applicable to the year 2019 for the Kingston Subdivision was obtained directly from CN. The CN rail traffic data was escalated to the year 2030 design condition using a growth rate of 2.5%, compounded annually.

The rail traffic data is summarized in Table 1B. Correspondence related to the rail traffic data is shown in Appendix A.

2.2 STATIONARY SOURCES

An existing car dealership is located to the west of the subject site. The main noise sources associated with the dealership are anticipated to be the rooftop HVAC units and tool operations inside the service centre. The service centre has entrance and exit doors facing north and south, toward Kingston Road and Highway 401, respectively. There are also several overhead doors along the east facade of the building. These overhead doors are in the direction of the parking area in Podium 1. It is noted that the building appears to be air conditioned and the service doors may not be opened for ventilation purposes. Due to the distance separation, the orientation of the overdoors relative to the subject site and the high ambient sound level due to road traffic on Highway 401, noise from the car dealership is not expected to have a significant impact at the subject site. Thus, the dealership has not been considered further in this assessment.

There are existing commercial uses to the north of the subject site, on the north side of Kingston Road. The commercial uses include small retail and office uses, restaurants, a Shoppers Drug Mart and a grocery store. The Shoppers Drug Mart and the grocery store are located at the north side of the plaza, with loading docks at the north sides of the buildings. The main noise sources associated with these uses are anticipated to be the rooftop mechanical units and vehicle movements on site. Due to the distance separation and the ambient road traffic noise form the intervening roadway (Kingston Road), noise from these commercial uses are not expected to have a significant impact at the subject site. Thus, the commercial uses have not been considered further in this assessment.

There is also an existing commercial plaza to the east, on the east side of Whites Road North. The commercial plaza consists of a strip mall building with small retail store, restaurants and offices, as well as a separate restaurant building. The main noise sources associated with these commercial uses are anticipated to be the rooftop mechanical units and vehicle movements on site. Due to the distance separation and the high ambient road traffic noise from the intervening roadway (Whites Road) and Highway 401, noise from this plaza is not expected to have a significant impact at the subject site. Thus, the commercial plaza has not been considered further in this assessment.

Existing commercial/industrial uses are located to the south of the subject site, on the south side of Highway 401. The main noise sources associated with these uses are anticipated to be the rooftop mechanical units and truck activities at the loading docks. Due to the distance separation and the high ambient sound level from the intervening Highway 401, noise impact from these commercial/industrial uses at the subject site is expected to be insignificant. Thus, these commercial/industrial uses have not been considered further in this assessment.

3.0 ENVIRONMENTAL NOISE GUIDELINES

3.1 MECP PUBLICATION NPC-300

The applicable noise guidelines for new residential development are those in MECP Publication NPC-300, "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning". These are discussed briefly below and summarized in Appendix B.

3.1.1 Architectural Elements

In the daytime (0700 to 2300), the indoor criterion for road noise is $L_{eq\ Day}$(1) of 45 dBA for sensitive spaces such as living/dining rooms, dens and bedrooms. At night, the indoor criterion for road noise is $L_{eq\ Night}$(2) of 45 dBA for sensitive spaces such as living/dining rooms and dens and 40 dBA for bedrooms. The indoor criteria for rail noise are 5 dBA more stringent than those for road noise; that is 40 dBA for living/dining rooms, dens and bedrooms during the daytime and nighttime periods except for bedrooms where the nighttime indoor criterion is 35 dBA. The architectural design of the building envelope (walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound level limits.

3.1.2 Ventilation

In accordance with the MECP noise guideline for transportation noise sources, if the daytime sound level, $L_{eq\ Day}$, at the exterior face of a noise sensitive window is greater than 65 dBA, means must be provided so that windows can be kept closed for noise control purposes and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA inclusive, there need only be the provision for adding air conditioning at a later date. A warning clause advising the occupant of the potential interference with some activities is also required. At nighttime, air conditioning would be required when the sound level exceeds 60 dBA ($L_{eq\ Night}$) at a noise sensitive window (provision for adding air conditioning is required when greater than 50 dBA).

3.1.3 Outdoors

For outdoor amenity areas ("Outdoor Living Areas" - OLA's), the guideline is $L_{eq\ Day}$ of 55 dBA, with an excess not exceeding 5 dBA considered acceptable if it is technically not practicable to achieve the 55 dBA objective, providing warning clauses are registered on title. Note that for transportation noise sources, a balcony is not considered an OLA, unless it is:

(1) 16-hour energy equivalent sound level (0700-2300 hours).
(2) 8-hour energy equivalent sound level (2300-0700 hours).

- the only OLA for the occupant;
- at least 4 m in depth; and
- unenclosed.

Note that NPC-300 defines OLA's as areas that are "intended and designed for the quiet enjoyment of the outdoor environment" and that are "readily accessible from the building". The parks at the south, northwest and northeast sides of the development do not strictly meet this definition, as they are intended for active use and not intended for the quiet enjoyment of the outdoors.

3.2 FEDERATION OF CANADIAN MUNICIPALITY AND RAILWAY ASSOCIATION OF CANADA

CN and Metrolinx have adopted the noise guidelines indicated by the Federation of Canadian Municipalities and the Railway Association of Canada (FCM/RAC).

The standard mitigation requirements of the FCM/RAC suggest a dwelling setback of 30 m for a residential development adjacent to a principal main line, if in combination with a safety berm at least 2.5 m above the property line grade. A 5.5 m high sound barrier is also suggested (e.g., 3.0 m high acoustic fence atop a 2.5 m high safety berm). With the significant setback distance and since there is the highway and existing development located between the subject site and the rail line, this requirement is not expected to apply.

Warning clauses specific to the railway for all dwellings within 300 m of the right-of-way are recommended.

Aside from "standard" requirements regarding the setback of dwellings and safety berm/sound barrier configuration, the sound level design objectives of FCM/RAC are similar to those of the MECP.

4.0 NOISE IMPACT ASSESSMENT

4.1 METHOD

Using the road traffic data in Table 1, the sound levels, in terms of $L_{eq\ Day}$ and $L_{eq\ Night}$, were determined using STAMSON V5.04 – ORNAMENT and STEAM, the computerized road and rail traffic noise prediction models of the MECP.

As discussed in Section 2.1.1.1 above, sound measurements of road traffic noise from Highway 401 were done to account for the difference in sound level between the prediction method and the actual noise emissions from the roadway, the main difference being the travel speed of vehicles. The measured sound levels were then used to adjust the predicted sound levels from Highway 401. The method used is discussed further in Appendix C. The predicted sound levels from Whites Road, Kingston Road and the rail line were not adjusted.

The daytime and nighttime sound levels at all building facades were calculated at the top floor windows of the towers and the townhouse units.

All balconies and terraces in the development are anticipated to be less than 4 m in depth and therefore do not qualify as OLA's.

Inherent screening of each building face due to its orientation to the noise source, as well as screening provided by the proposed development on itself, was taken into account.

Table 2 summarizes the predicted sound levels outdoors at specific locations.

A sample sound level calculation is included in Appendix D.

4.2 RESULTS

At the towers, the highest daytime/nighttime sound levels of 80 dBA/76 dBA are predicted to occur at the south facade of Towers 1, 2, 3 and 6 (the towers closest to Highway 401).

At the townhouses, the highest daytime/nighttime sound levels of 73 dBA/68 dBA are predicted to occur at the south facade of Block 4, the block with greatest exposure to Highway 401.

5.0 NOISE ABATEMENT REQUIREMENTS

The noise control measures can generally be classified into two categories which are interrelated, but which can be treated separately for the most part:

a) Architectural elements to achieve acceptable indoor noise guidelines for transportation sources; and

b) Design features to protect the OLA's.

Noise abatement requirements are summarized in Table 3 and the notes to Table 3.

5.1 INDOORS

5.1.1 Architectural Requirements

The indoor sound level guidelines for the transportation sources can be achieved by using appropriate construction for exterior walls, windows and doors.

5.1.1.1 Townhouse Blocks

At the townhouse units, in determining the worst-case architectural requirements, the wall and window areas were assumed to be 80% and 30%, respectively of the associated floor area of a corner room with both facades exposed to the noise sources.

To meet the indoor noise criteria:

- exterior wall construction should be designed to meet a rating of STC 54 (e.g. brick veneer); and
- exterior windows should be designed to meet a rating of up to STC 33.

5.1.1.2 High-Rise Towers

At the high-rise towers, wall and window areas were each assumed to be 50% of the associated floor area, on each facade of a room exposed to the noise sources.

Based on the predicted sound levels, upgraded exterior wall and window construction with the following STC ratings would be required:

- Towers 1 to 3 and 6 to 8
  - Exterior walls meeting STC 60;
  - Exterior windows with the following ratings:
    - Living rooms:
      - Up to STC 42 at corner rooms with windows on both facades;
      - Up to STC 40 at rooms with windows on a single facade.
    - Bedrooms:
      - Up to STC 44 at corner rooms with windows on both facades;
      - Up to STC 42 at rooms with windows on a single facade.

- Towers 4 and 5:
  - Exterior walls meeting STC 54;
  - Exterior windows with the following ratings:
    - Living rooms:
      - Up to STC 37 at corner rooms with windows on both facades;
      - Up to STC 34 at rooms with windows on a single facade.
    - Bedrooms:
      - Up to STC 38 at corner rooms with windows on both facades;
      - Up to STC 35 at rooms with windows on a single facade.

5.1.1.2.1 *Methods to Reduce Window STC Requirements*

The window STC requirements above are high. Design measures can be used to reduce the STC requirements and should be considered early in the design. These measures include:

- Designing the spaces such that there are no bedrooms at the corners of the buildings (with two facades exposed to the noise sources). If this can be done, the highest window requirement would be STC 42 (for corner living rooms).
- Reducing the size of the windows or ensuring that the exterior window area is small relative to floor area of the associated space. That is, do not use floor to floor window or curtain wall.
- Designing the spaces such that the rooms at the corners of the buildings have windows on only one facade.

- Having non-noise sensitive space, such as walk in closets or washrooms at the corners of the building.

The window frames themselves must be designed to ensure that the overall sound isolation performance for the entire window unit meets the sound isolation requirement. This will need to be confirmed by the window manufacturer through the submission of acoustical test data.

The final sound isolation requirements should be reviewed when architectural plans are finalized. Wall and window constructions should also be reviewed at this point to ensure that the required sound isolation performance is met.

5.1.2 Ventilation Requirements

Based on the predicted daytime and nighttime sound levels, all dwelling units in the development (towers as well as townhouse blocks) require mandatory air conditioning to allow windows to remain closed for noise control purposes.

5.2 OUTDOORS

As previously discussed, the parks are not considered OLA's under NPC-300, as they are not intended for the quiet enjoyment of the outdoors. In addition, all balconies and terraces in the development are less than 4 m in depth and therefore do not qualify as OLA's. Thus, sound barriers are not required at these locations for noise control purposes.

5.3 WARNING CLAUSES

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing noise sources. Where the guideline sound level limits are exceeded, appropriate warning clauses should be registered on title or included in the development agreement that is registered on title. The warning clauses should also be included in agreements of Offers of Purchase and Sale and lease/rental agreements to make future occupants aware of the potential noise situation.

Table 3 and the notes to Table 3 summarize the warning clauses for the site.

6.0 THE EFFECT OF THE PROJECT ON THE NEIGHBOURHOOD

The main source of noise associated with this development, with the potential to impact surrounding buildings, is the mechanical equipment. Mechanical plans and unit selections are not yet available.

Mechanical equipment interfacing to the outdoors must comply with the MECP noise guideline limits in NPC-300. By proper engineering design, all requirements can be met and significant noise impact would not be created for surrounding uses. Appropriate choice of location, equipment type, and noise control features should be considered during detailed design for such items as rooftop equipment and air intakes and exhausts, including underground parking garage ventilation systems. Any parking garage air shafts located immediately adjacent to residential uses, in addition to appropriate choice of fan type, may need special noise control treatment such as acoustically lining of the shaft or providing silencers.

For any emergency generators, appropriate steps should be taken to ensure that the equipment placement, treatment, and the routine testing schedule will not create significant noise impact on neighbouring properties.

7.0 CONCLUSIONS

With the incorporation of the recommended noise mitigation measures, the applicable MECP noise guidelines can be met and a suitable acoustical environment provided for the occupants.

The approvals and administrative procedures are available to ensure that the noise requirements are implemented.

8.0 REFERENCES

1. PC STAMSON 5.04, “Computer Program for Road Traffic Noise Assessment”, Ontario Ministry of the Environment.

2. Building Practice Note No. 56: "Controlling Sound Transmission into Buildings", by J. D. Quirt, Division of Building Research, National Council of Canada, September 1985.

3. “Stationary and Transportation Sources – Approval and Planning”, Ontario Ministry of the Environment, Publication NPC-300, August 2013.

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TABLE 1A: ROAD TRAFFIC DATA

Roadway	Ultimate Volume	% Trucks		Day/Night (%)	Speed Limit (kph)
		Medium	Heavy		
Highway 401[1] [2]	381 000	2.25	6.75	67/33	100
Whites Road[3]	35 000	3	7	90/10	60
Kingston Road[3]	40 000	6	4	90/10	60

Notes:

1) Ultimate AADT obtained from the MTO. The truck percentage was assumed to split 75%/25% heavy/medium, as recommended by the MTO for freeways.
2) Hourly traffic count data were also obtained and used in the assessment. These are shown in Appendix C.
3) Ultimate traffic data obtained from the Region of Durham. The day/night split was assumed.

TABLE 1B: RAIL TRAFFIC DATA

Source of Rail Traffic	Period	Train Type	# of Trains[3]	Max # of Cars/Train	Max # of Locos/Train	Max Speed (kph)
CN Kingston Subdivision	Daytime (0700 to 2300)	Freight[1]	12 (15.7)	140	4	105
		Way Freight[1]	0 (0)	25	4	105
		Passenger[1]	34 (44.5)	10	2	153
		GO Commuter[2]	180 (184.5)	12	1	137
	Nighttime (2300 to 0700)	Freight[1]	4 (5.2)	140	4	105
		Way Freight[1]	4 (5.2)	25	4	105
		Passenger[1]	1 (1.3)	10	2	153
		GO Commuter[2]	28 (28.7)	12	1	137

Notes:

1) Obtained directly from CN for the year 2019.
2) 10-year forecast obtained directly from Metrolinx in the year 2019. Both electric and diesel trains have been modelled as diesel trains.
3) The data shown in brackets is projected to the year 2030 with a 2.5% growth rate, compounded annually.

TABLE 2: PREDICTED UNMITIGATED SOUND LEVELS OUTDOORS

Location[1]	Source	Distance (m)[2]	Leq Day (dBA)[3]	Leq Night (dBA)[3]
Tower 1 (South Facade)	Highway 401 Westbound Collector	54	75	71
	Highway 401 Westbound Express	75	73	70
	Highway 401 Eastbound Express	95	72	69
	Highway 401 Eastbound Collector	116	72	68
	CN Kingston/GO Lakeshore East	434	68	65
	TOTAL	**-**	**80**	**76**
Tower 4 (South Facade)	Highway 401 Westbound Collector	120	66	62
	Highway 401 Westbound Express	140	65	62
	Highway 401 Eastbound Express	160	65	61
	Highway 401 Eastbound Collector	181	64	61
	CN Kingston/GO Lakeshore East	418	63	59
	TOTAL	**-**	**72**	**68**
Tower 5 (East Facade)	Highway 401 Westbound Collector	125	66	63
	Highway 401 Westbound Express	145	66	62
	Highway 401 Eastbound Express	165	65	62
	Highway 401 Eastbound Collector	186	65	61
	Kingston Road (Westbound)	82	59	52
	Kingston Road (Eastbound)	67	60	53
	CN Kingston/GO Lakeshore East	375	65	62
	TOTAL	**-**	**73**	**69**
Tower 5 (North Facade)	Whites Road (Northbound)	189	55	49
	Whites Road (Southbound)	177	56	49
	Kingston Road (Westbound)	38	66	60
	Kingston Road (Eastbound)	23	69	62
	TOTAL	**-**	**71**	**64**
Tower 7 (South Facade)	Highway 401 Westbound Collector	79	73	70
	Highway 401 Westbound Express	99	72	69
	Highway 401 Eastbound Express	119	71	68
	Highway 401 Eastbound Collector	140	71	67
	Whites Road (Northbound)	133	60	53
	Whites Road (Southbound)	120	60	54
	CN Kingston/GO Lakeshore East	327	70	66
	TOTAL	**-**	**79**	**75**
Tower 7 (East Facade)	Highway 401 Westbound Collector	79	70	67
	Highway 401 Westbound Express	99	69	66
	Highway 401 Eastbound Express	119	68	65
	Highway 401 Eastbound Collector	140	68	64
	Whites Road (Northbound)	133	61	54
	Whites Road (Southbound)	120	61	55
	CN Kingston/GO Lakeshore East	327	68	63
	TOTAL	**-**	**77**	**72**

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TABLE 2: PREDICTED UNMITIGATED SOUND LEVELS OUTDOORS (continued)

Location[1]	Source	Distance (m)[2]	Leq Day (dBA)[3]	Leq Night (dBA)[3]
Tower 8 (North Facade)	Whites Road (Northbound)	79	59	53
	Whites Road (Southbound)	66	60	53
	Kingston Road (Westbound)	38	66	60
	Kingston Road (Eastbound)	23	69	62
	TOTAL	**-**	**71**	**65**
Tower 8 (South Facade)	Highway 401 Westbound Collector	138	70	67
	Highway 401 Westbound Express	158	70	66
	Highway 401 Eastbound Express	178	69	66
	Highway 401 Eastbound Collector	199	69	65
	Whites Road (Northbound)	59	63	57
	Whites Road (Southbound)	46	64	58
	CN Kingston/GO Lakeshore East	342	69	66
	TOTAL	**-**	**77**	**73**
Tower 8 (East Facade)	Highway 401 Westbound Collector	138	68	64
	Highway 401 Westbound Express	158	67	64
	Highway 401 Eastbound Express	178	67	63
	Highway 401 Eastbound Collector	199	66	63
	Whites Road (Northbound)	59	64	58
	Whites Road (Southbound)	46	65	59
	Kingston Road (Westbound)	76	60	54
	Kingston Road (Eastbound)	61	61	55
	CN Kingston/GO Lakeshore East	342	67	63
	TOTAL	**-**	**75**	**71**
Block 1 (West Facade)	Highway 401 Westbound Collector	157	60	56
	Highway 401 Westbound Express	177	59	55
	Highway 401 Eastbound Express	198	58	55
	Highway 401 Eastbound Collector	218	58	54
	Kingston Road (Westbound)	36	61	55
	Kingston Road (Eastbound)	21	64	58
	TOTAL	**-**	**68**	**63**
Block 1 (North Facade)	Kingston Road (Westbound)	36	64	58
	Kingston Road (Eastbound)	21	67	61
	TOTAL	**-**	**69**	**63**
Block 4 (South Facade)	Highway 401 Westbound Collector	120	66	63
	Highway 401 Westbound Express	141	65	62
	Highway 401 Eastbound Express	161	64	61
	Highway 401 Eastbound Collector	182	64	60
	Whites Road (Northbound)	110	57	50
	Whites Road (Southbound)	97	57	51
	CN Kingston/GO Lakeshore East	349	64	60
	TOTAL	**-**	**72**	**68**

Notes:

(1) See Figure 2.

(2) Distance indicated is taken from the centreline of the noise source to the point of reception

(3) Predicted sound levels due to road traffic on Highway 401 include -0.6 dB and -4.1 dB corrections during the daytime and nighttime, respectively, as determined based on sound monitoring on site. See Appendix C.

TABLE 3: NOISE ABATEMENT MEASURES

Location	Air Conditioning(1)	Exterior Wall(2)	Exterior Window(3)	Sound Barrier(4)	Warning Clauses(5)
Towers 1 to 3 and 6 to 8	Mandatory	Up to STC 60	Up to STC 44 at bedrooms Up to STC 42 at living rooms (See Section 5.1.1.2)	None	A + B + C
Towers 4 and 5	Mandatory	STC 54	Up to STC 38 at bedrooms Up to STC 37 at living rooms (See Section 5.1.1.2)	None	A + B + C
Townhouse Blocks 1 to 4	Mandatory	STC 54	Up to STC 33	None	A + B + C

Notes:

(1) Where methods must be provided to allow windows to remain closed for noise control purposes, a commonly used technique is that of air conditioning. Air conditioning equipment must comply with the MECP guidelines.

(2) STC - Sound Transmission Class Rating (Reference ASTM-E413). Analyses were based upon the assumption that all wall and window areas are as indicated in Section 5.1.1 of text. Requirements should be checked once floor plans have been finalized and exterior wall construction details are defined.

(3) STC values are based upon the assumption that all wall and window areas are as indicated in Section 5.1.1 of text. The requirements at the towers can be reduced though design measures. Methods to reduce the requirements are discussed in Section 5.1.1.2.1. Requirements should be checked once floor plans have been finalized and exterior wall construction details are defined.

(4) Sound barriers must be of solid construction with no gaps cracks or holes and must meet a minimum surface density of 20 kg/m². Suitable material can include wood, concrete metal sandwich panel, glazing or a combination of these.

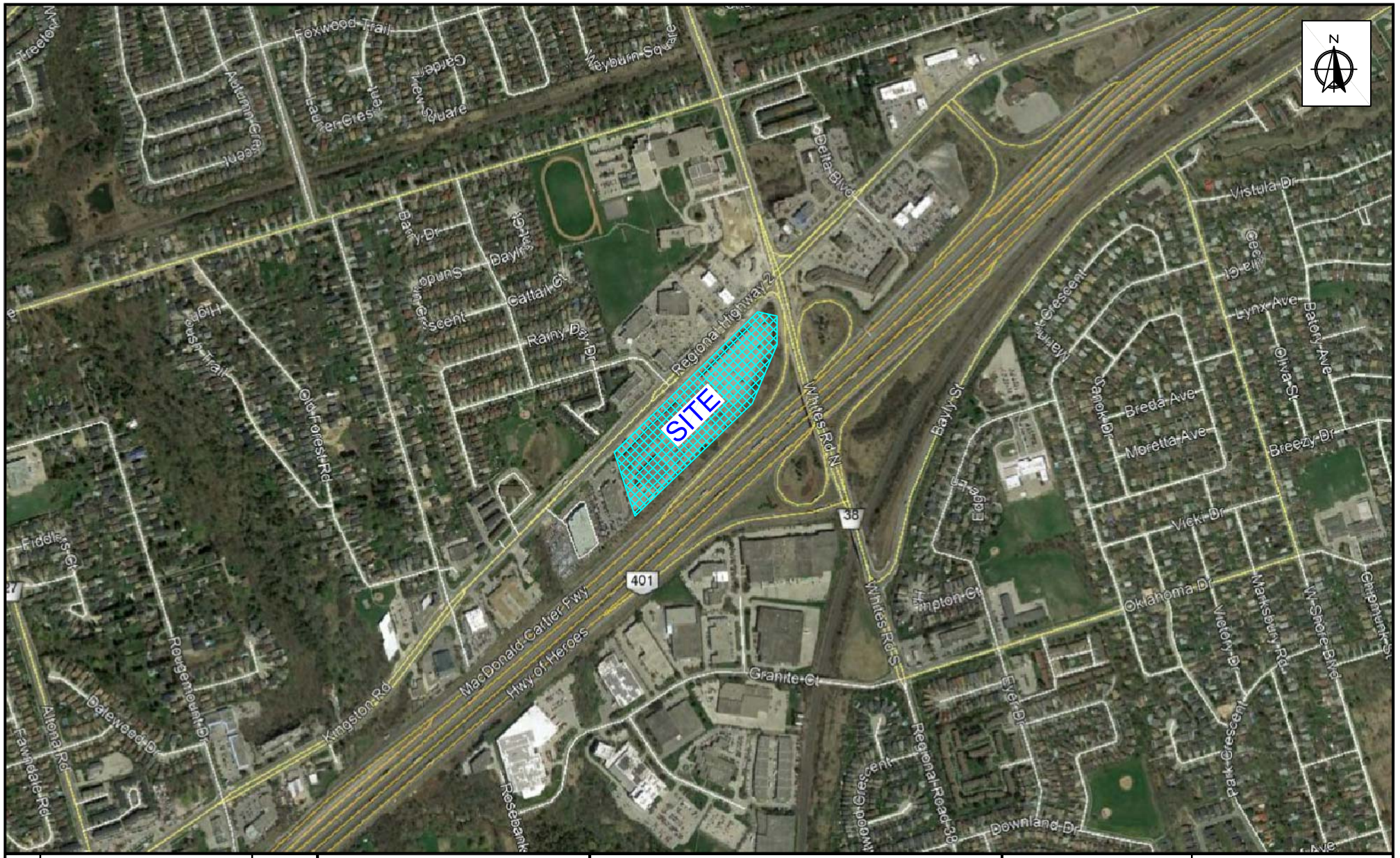
(5) The warning clauses to be registered on title and be included in Offers of Purchase and Sale for designated lots:

A. "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 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."

B. "This dwelling unit has been supplied with an 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."

C. "Purchasers/occupants are advised that due to the proximity of the existing car dealership and commercial developments, sound from these facilities may, at times, be audible."

(6) All exterior doors shall be fully weatherstripped

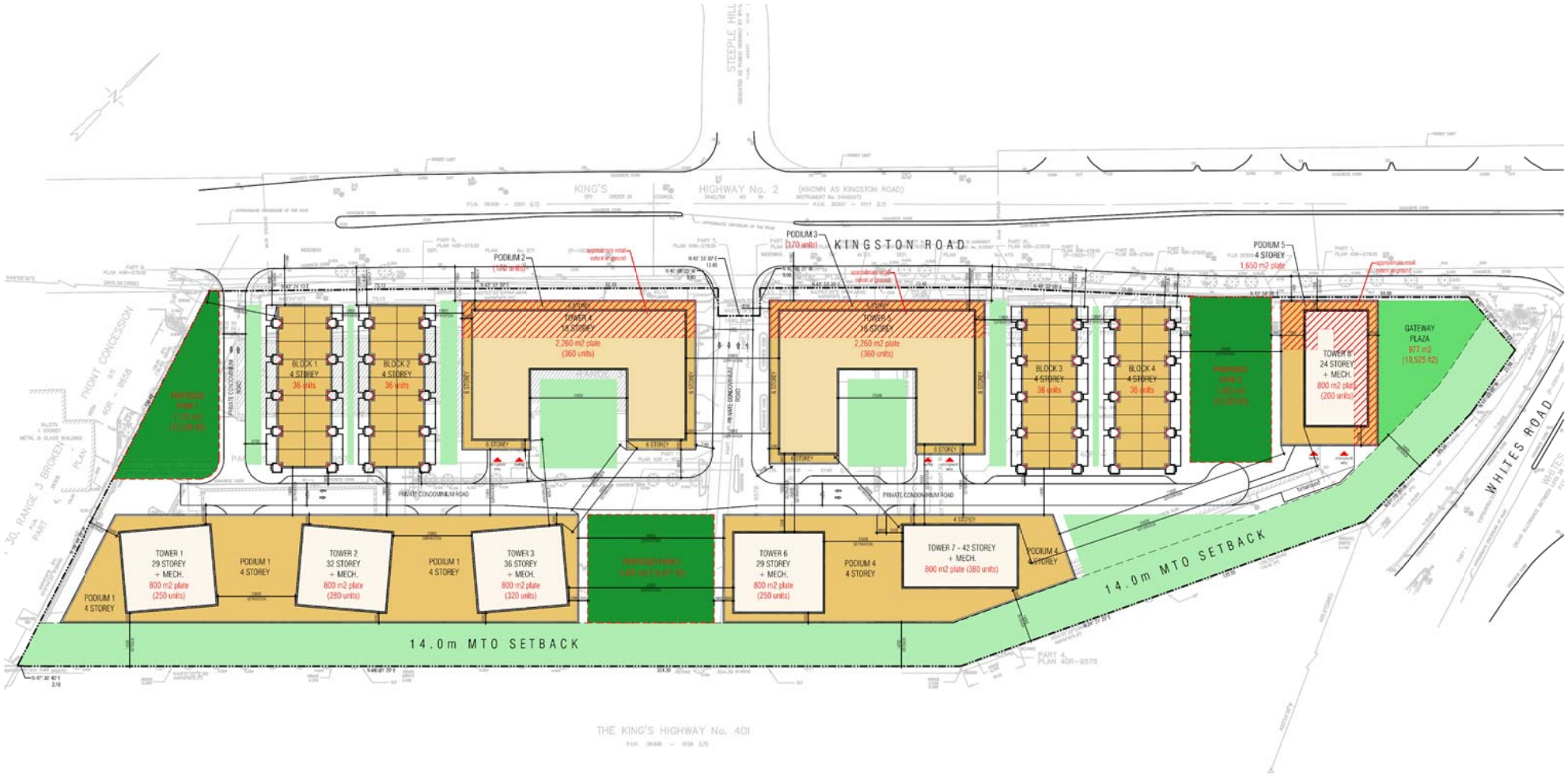


No.	Revision/Issue	Date

VALCOUSTICS
Canada Ltd.
30 Wertheim Court, Unit 25
Richmond Hill, Ontario
Canada L4B 1B9
solutions@valcoustics.com
Phone: (905) 764-5223
Fax: (905) 764-6813

Title: Key Plan	Project No.: 119-0215	Date: Apr. 16, 2020
Project Name: 603-643, 645 & 699 Kingston Road, Pickering	Scale: N.T.S.	Figure: 1

All dwelling units require mandatory air conditioning for noise control puposes



BASE DRAWING BY GRAZIANI + CORAZZA ARCHITECTS

No.	Revision/Issue	Date

VALCOUSTICS Canada Ltd.

30 Wertheim Court, Unit 25
Richmond Hill, Ontario
Canada L4B 1B9
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Phone: (905) 764-5223
Fax: (905) 764-6813

Title	Project No.	Date
Conceptual Site Plan	119-0215	Apr. 16, 2020
Project Name	**Scale**	**Figure**
603-643, 645 & 699 Kingston Road, Pickering	N.T.S.	2

APPENDIX A

ROAD AND RAIL TRAFFIC DATA

From: Rail Data Requests
To: Seema Nagaraj
Subject: RE: Rail traffic data request (VCL File: 115-0487)
Date: March-12-19 9:08:01 AM
Attachments: image002.png

Good Morning Seema,

Further to your request dated February 26, 2019, the subject site is located east of Pickering GO Station and within 300 metres of Lakeshore East rail corridor. We note we do not maintain information pertaining to the idling activities at stations – that would be up to the consultant to collect that information for a typical weekday period.

It's anticipated that GO service on this corridor will be comprised of a mix of both diesel and electric trains within (at least) a 10-year time horizon. The combined preliminary midterm weekday train volume forecast at this location, including both revenue and equipment trips is in the order of 208 trains – (8 diesel: 8 day, 0 night; 200 electric: 172 day, 28 night). Trains will be comprised of a single locomotive and up to 12 passenger cars.

The maximum design speed on this corridor is 85 mph (137 km/h).

With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO and UP Express rail network and we are currently working towards the next phase. Metrolinx has not made a final decision regarding the electric train technology or technologies to be deployed. We can, however, provide the following interim information which may be helpful;

1. At lower speeds, train noise is dominated by the powertrain. At higher speeds, train noise is dominated by the wheel- track interaction. Hence, at higher speeds, the noise level and spectrum of electric trains is expected to be very similar, if not identical, to those of equivalent diesel trains.

2. Along with electrification, Metrolinx will intensify service levels along all of its corridors to deliver the promised GO Expansion service. Everything else being equal, this will likely result in an overall increase in train noise emissions.

Given the above considerations, it would be prudent, for the purposes of acoustical analyses, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability, and passenger demand.

It should be noted that CNR and VIA operate trains in this area and it would be prudent to contact them directly for rail traffic information.

I trust this information is useful. Should you have any questions, please feel free to contact me.

Best Regards,

IVAN CHEUNG, M.Sc, B.URPl
Intern | Third Party Projects Review
Pre-Construction Services | Capital Projects Group
Metrolinx
20 Bay Street, Suite 600 | Toronto | Ontario | M5J 2W3
T: 416-202-5920

Planning and Economic
Development Department

Planning Division

605 ROSSLAND RD. E.
4TH FLOOR
P.O. BOX 623
WHITBY, ON L1N 6A3
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905-668-7711
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Fax: 905-666-6208
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www.durham.ca

Brian Bridgeman, MCIP, RPP
Commissioner of Planning and
Economic Development

The Regional Municipality of Durham

ROAD SEGMENT TRAFFIC FORECASTS FOR NOISE ANALYSES

This information is to be used as the basis for assessing the potential impacts of noise, generated by traffic on Provincial Highways and arterial roads, on proposed land uses that are sensitive (e.g., residential subdivisions). Arterial roads include existing and future Type A, B and C, as designated in the Durham Regional Official Plan.

Noise assessment reports recommend specific measures to be integrated into the design of sensitive developments to reduce road noise impacts to acceptable levels.

Provided For:

Name / Name of Firm: Seema Nagaraj

Address: Valcoustics Ltd

Telephone: (905) 764-5223 Fax:

Location of Proposal:

Kingston Road and Whites Road, Pickering

Municipality: Pickering Lot(s): Concession:

Durham Region File No. (if available):

Name of Property Owner (if available):

Date Request Received: Tuesday, June 25, 2019 Received By: Brad Holmes

Date Forecast Sent: Thursday, June 27, 2019

Name of Road Segment	Forecasted AADT*	No. of Lanes	% of Trucks	Heavy : Medium Truck Ratio		Speed (km/h)
Whites Road	35,000	6	10	70	30	60
Kingston Road	40,000	6	10	40	60	60
	0	0	0	0	0	0
	0	0	0	0	0	0

* Average Annual Daily Traffic. Forecast based on ultimate development according to the Durham Regional Official Plan.

Date: 2019/03/18 Project Number: KNG - 312.65 – Pickering Town City Center

Dear Seema:

Re: Train Traffic Data – CN Kingston Subdivision near Pickering Town City Center in Pickering, ON

The following is provided in response to Seema's 2019/03/18 request for information regarding rail traffic in the vicinity of Pickering Town City Center in Pickering at approximately Mile 312.65 on CN's Kingston Subdivision.

Typical daily traffic volumes are recorded below. However, traffic volumes may fluctuate due to overall economic conditions, varying traffic demands, weather conditions, track maintenance programs, statutory holidays and traffic detours that when required may be heavy although temporary. For the purpose of noise and vibration reports, train volumes must be escalated by 2.5% per annum for a 10-year period.

Typical daily traffic volumes at this site location are as follows:

***Maximum train speed is given in Miles per Hour**

	0700-2300			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	12	140	65	4
Way Freight	0	25	65	4
Passenger	34	10	95	2

	2300-0700			
Type of Train	Volumes	Max.Consist	Max. Speed	Max. Power
Freight	4	140	65	4
Way Freight	4	25	65	4
Passenger	1	10	95	2

The volumes recorded reflect westbound and eastbound freight and passenger operations on CN's Kingston Subdivision.

Except where anti-whistling bylaws are in effect, engine-warning whistles and bells are normally sounded at all at-grade crossings. There is no at-grade crossing in the immediate vicinity of the study area. Please note that engine warning whistles may be sounded in cases of emergency, as a safety and or warning precaution at station locations and pedestrian crossings and occasionally for operating requirements.

With respect to equipment restrictions, the gross weight of the heaviest permissible car is 286,000 lbs.

The double mainline track is considered to be continuously welded rail throughout the study area. The presence of 4 switches located at Mile 313.02, 313.04, 313.12, and 313.13 may exacerbate the noise and vibration caused by train movements.

The Canadian National Railway continues to be strongly opposed to locating developments near railway facilities and rights-of-way due to potential safety and environmental conflicts. Development adjacent to the Railway Right-of-Way is not appropriate without sound impact mitigation measures to reduce the incompatibility. For confirmation of the applicable rail noise, vibration and safety standards, Adjacent Development, Canadian National Railway Properties at Proximity@cn.ca should be contacted directly.

I trust the above information will satisfy your current request.

Sincerely,

Michael Vallins P.Eng
Manager of Public Works
public_works_gld@cn.ca

From: Alam, Ahsan (MTO)
To: Seema Nagaraj
Cc: Tai, Arthur (MTO)
Subject: RE: Traffic data request (VCL File: 119-0215)
Date: July-10-19 4:29:28 PM
Attachments: image002.png
image004.jpg
image005.jpg
image001.png

Good Afternoon Seema,

In response to your request please find below the information available from this office for Highway 401 (West of Whites Road) In Pickering:

2016 AADT = 226,000
2016 SADT = 248,600
Ultimate AADT (estimated)= 381,000
Number of Through Lanes =14
Posted Speed = 100 km/hr
% Trucks (2016) = 9%

Please note that the above information is estimated based upon our current knowledge of the area, which may be subject to change in the future. Other information related to ROW, gradient, day/night split and heavy/medium truck split will be available from Central Region Traffic Office.

If you require further information, please don't hesitate to contact me.

Thanks,
Ahsan

Ahsan Alam, PhD, Planner
Systems Analysis and Forecasting Office
Transportation Planning Branch, MTO
Suite 700, 7th Floor, 777 Bay Street
Toronto, ON M7A 2J8, Tel: 416-585-7357
A Strong
Transportation Future
Together

From: Seema Nagaraj <seema@valcoustics.com>
Sent: June 25, 2019 9:14 AM
To: Alam, Ahsan (MTO) <Ahsan.Alam@ontario.ca>
Subject: Traffic data request (VCL File: 119-0215)

Hi Ahsan,

We are currently preparing an environmental noise study for a proposed development near Highway 401, west of Whites Road, in Pickering (see attached image for specific location). Can you please provide the ultimate traffic data for this segment of Highway 401?

Thank you,

Seema Nagaraj, Ph.D., P.Eng.
Acoustical Engineer

30 Wertheim Court, Unit 25
Richmond Hill, Ontario
Canada L4B 1B9
Tel: 905-764-5223 ext. 243
Fax: 905-764-6813

APPENDIX B

ENVIRONMENTAL NOISE GUIDELINES

APPENDIX B

ENVIRONMENTAL NOISE GUIDELINES

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP)

Reference: MECP Publication NPC-300, October 2013: *"Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning"*.

SPACE	SOURCE	TIME PERIOD	CRITERION
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	Road	23:00 to 07:00	45 dBA
	Rail	23:00 to 07:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Sleeping quarters	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 0
Sleeping quarters	Road	23:00 to 07:00	40 dBA
	Rail	23:00 to 07:00	35 dBA
	Aircraft	24-hour period	NEF/NEP 0
Outdoor Living Areas	Road and Rail	07:00 to 23:00	55 dBA
Outdoor Point of Reception	Aircraft	24-hour period	NEF/NEP 30#
	Stationary Source		
	Class 1 Area	07:00 to 19:00(1)	50* dBA
		19:00 to 23:00(1)	50* dBA
	Class 2 Area	07:00 to 19:00(2)	50* dBA
		19:00 to 23:00(2)	45* dBA
	Class 3 Area	07:00 to 19:00(3)	45* dBA
		19:00 to 23:00(3)	40* dBA
	Class 4 Area	07:00 to 19:00(4)	55* dBA
		19:00 to 23:00(4)	55* dBA

…./cont'd

SPACE	SOURCE	TIME PERIOD	CRITERION
Plane of a Window of Noise Sensitive Spaces	Stationary Source		
	Class 1 Area	07:00 to 19:00(1)	50* dBA
		19:00 to 23:00(1)	50* dBA
		23:00 to 07:00(1)	45* dBA
	Class 2 Area	07:00 to 19:00(2)	50* dBA
		19:00 to 23:00(2)	50* dBA
		23:00 to 07:00(2)	45* dBA
	Class 3 Area	07:00 to 19:00(3)	45* dBA
		19:00 to 23:00(3)	45* dBA
		23:00 to 07:00(3)	40* dBA
	Class 4 Area	07:00 to 19:00(4)	60* dBA
		19:00 to 23:00(4)	60* dBA
		23:00 to 07:00(4)	55* dBA

\# may not apply to in-fill or re-development.
* or the minimum hourly background sound exposure $L_{eq(1)}$, due to road traffic, if higher.
(1) Class 1 Area: Urban.
(2) Class 2 Area: Urban during day; rural-like evening and night.
(3) Class 3 Area: Rural.
(4) Class 4 Area: Subject to land use planning authority's approval.

Reference: MECP Publication ISBN 0-7729-2804-5, 1987: *"Environmental Noise Assessment in Land-Use Planning"*.

EXCESS ABOVE RECOMMENDED SOUND LEVEL LIMITS (dBA)	CHANGE IN SUBJECTIVE LOUDNESS ABOVE	MAGNITUDE OF THE NOISE PROBLEM	NOISE CONTROL MEASURES (OR ACTION TO BE TAKEN)
No excess (<55 dBA)	—	No expected noise problem	None
1 to 5 inclusive (56 to 60 dBA)	Noticeably louder	Slight noise impact	If no physical measures are taken, then prospective purchasers or tenants should be made aware by suitable warning clauses.
6 to 10 inclusive (61 - 65 dBA)	Almost twice as loud	Definite noise impact	Recommended.
11 to 15 inclusive (66 - 70 dBA)	Almost three times as loud	Serious noise impact	Strongly Recommended.
16 and over (>70 dBA)	Almost four times as loud	Very serious noise impact	Strongly Recommended (may be mandatory).

APPENDIX C

SOUND MEASUREMENT DETAILS

Appendix C – Sound Measurement Analysis Details

Background sound level monitoring was done at the subject site between January 25, 2020 and February 1, 2020, at a location corresponding to the south facade of Tower 2. The measurement location is shown on Figure C1.

FIGURE C1: MEASUREMENT LOCATION

The sound level measurements were done using a Type 1 Norsonic Nor140 sound level meter. The measurement microphone was set at a height of approximately 4.2 m above the roof of the existing Value Village roof (total height of 13 m above grade). The sound level meter was calibrated prior to and after the measurement campaign. The microphone of the sound level meter was equipped with a windscreen.

Figure C2 shows a photo of the measurement setup.

FIGURE C2: MEASUREMENT SETUP

Traffic counts on Highway 401 in the vicinity of the site were done for the duration of the sound measurements and provided for use in the analysis. The existing traffic counts were used to scale the measured sound levels up to the future condition. [It is recognized that this is conservative, as increasing the traffic volume would likely not increase the sound levels to the same degree as the predictions indicate. This is because with more vehicles, traffic congestion would likely increase, travel speeds would decrease, and the actual noise emissions would not increase in the manner dictated by the prediction method].

The assessment procedure was:

1. Sound level predictions were made at the development site using ORNAMENT/STAMSON and the ultimate data provided by the MTO for Highway 401;

2. Sound level measurements were done on site at a reference location, see Figure C1 above. The measurement data was scaled up to a future condition using the following procedure.

    a. Day and night sound levels (in terms of $L_{eq\ 16}$ and $L_{eq\ 8}$) were determined from the measurement data for each 24-hour period.

b. Current 24 hour traffic volumes and day/night splits were determined from the traffic counts. The day/night splits were applied to the ultimate volume, i.e. ultimate day/night volumes were calculated for each 24 hour period.

c. The measured $L_{eq\ 16}$ and $L_{eq\ 8}$ sound levels were then scaled up to a future condition accounting for the increase in day/night volumes between the current and ultimate conditions.

d. The highest future $L_{eq\ 16}$ and $L_{eq\ 8}$ sound levels were then selected. Note that these did not occur on the same day.

3. The sound levels from ORNAMENT/STAMSON were then adjusted using the measurement data.

a. A sound level prediction using ORNAMENT/STAMSON and the ultimate road data for Highway 401 was done at the reference location (shown on Figure C1) and compared to the scaled-up measured value at this same location. The scaled up measured values were 0.6 dBA lower in the daytime and 4.1 dBA lower in the nighttime.

b. The predicted sound levels determined in Step 1 were then adjusted using these factors. These adjusted sound levels are those reported in Table 2.

The traffic volumes, sound levels, adjustments, and adjusted sound levels are shown in Table C1.

TABLE C1: MEASUREMENT DATA AND CALCULATIONS

Date	Time Period	Counted Total Traffic Volume	Counted %Trucks	Counted Day/Night Split	Ultimate Volume Scaled By Counted Day/Night Split	Sound Level Adjustment Based on Volume Increase (dB)	Measured LAeq	Measured LAeq with Volume Adjustment
1/25/2020	Nighttime	25949	3%	13%	47781.75	2.65	72.70	75.35
1/25/2020	Daytime	180962	2%	87%	333218.25	2.65	76.60	79.25
1/28/2020	Nighttime	36449	8%	16%	61666.86	2.28	73.54	75.82
1/28/2020	Daytime	188746	6%	84%	319333.14	2.28	75.90	78.19

Note:
Table C1 shows a subset of the measurement data. The values in the highlighted rows are the highest adjusted day/night sound levels from the measurement period, as indicated in Step 2.d above.

	Friday		Saturday		Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	
Start Time	2020-01-24		2020-01-25		2020-01-26		2020-01-27		2020-01-28		2020-01-29		2020-01-30		2020-01-31		2020-02-01	
	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume	Measured LAeq	Traffic Volume
00:00	0	2445	73.4	3829	72.2	4055	71.4	2341	70.9	2160	71	2611	0	2824	71.3	2785	72.9	3886
01:00	0	1600	72	2990	70.9	2739	69.8	1466	70.1	1568	69.8	1620	0	1699	70.2	1879	71.9	2766
02:00	0	1373	71	2324	70	2037	69.2	1216	69.9	1401	69.9	1392	0	1464	70.4	1618	71.3	2222
03:00	0	1552	70.6	1823	69.5	1569	70.4	1394	70.5	1534	70.6	1553	0	1655	71	1722	70.8	1811
04:00	0	3120	70.8	1898	68.8	1439	73.5	3076	73.4	3067	73.4	3241	0	3064	73	2964	71.1	1749
05:00	0	9887	72.9	3009	70.4	1802	77.3	9749	76.8	9802	76.8	9864	0	9945	76.6	9202	73.4	3119
06:00	0	13226	74.3	4379	72.1	2874	77.6	12999	77.1	12978	76.9	13145	0	13112	77.1	12436	74.2	4386
07:00	0	15120	75	6380	72.2	3905	77.3	15327	76.2	15290	76.8	15340	76.9	15360	77.1	15291	75.3	6394
08:00	0	14251	76.5	9016	73.5	5368	77.4	14748	77.2	14694	77	14949	77.1	15065	77.3	15242	76.3	9169
09:00	0	12078	76.9	11131	74.9	7697	77.1	12006	77	11562	76.5	11812	77.1	12106	77.1	12396	76.8	11247
10:00	0	11453	77.2	12185	75.8	10039	77	10670	76.5	10398	76.1	10868	77.2	11309	77.3	11670	76.9	12024
11:00	0	12246	77.4	13469	75.9	11182	76.7	10719	76.4	10449	76	10744	77.2	11444	77	12249	76.9	13529
12:00	0	12933	77.6	14176	75.9	11897	76.5	10996	76.3	10892	75.8	11299	77	11481	76.9	12679	76.8	14014
13:00	0	13295	77.5	14084	76.1	12873	76.4	11480	76	11464	75.7	11709	77.2	11892	77	13363	76.6	14313
14:00	77.1	14547	77.5	14383	76	13226	76.3	13045	76	13543	75.6	13531	77.2	13769	77.1	14715	76.3	14446
15:00	76.9	15955	77.2	14713	76.1	13293	76.3	14906	76	15638	75.5	14890	77.2	15377	76.7	15970	76.4	14364
16:00	76.2	15348	77	14269	76.5	13064	76	15587	75.8	15447	75.1	14737	76.8	15526	75.3	15488	76.8	14570
17:00	75.9	14527	76.9	13368	76.4	12585	76	15143	75.9	14985	75.2	14477	76.5	14871	74.7	14464	76.5	13213
18:00	75.6	13683	76.7	11975	76.3	10821	75.5	12669	75.8	12996	75.3	13141	76.5	13062	65.6	13551	76.4	12375
19:00	75.8	12067	76.1	9971	76.1	8388	75.4	10432	75.2	10558	75.1	11189	75.9	11019	55.1	11900	75.4	9643
20:00	75.2	10386	75.1	7945	75.7	7096	74.8	8301	75	9003	0	9156	75.4	8829	73.2	9966	74.8	7899
21:00	74.7	7929	74.7	7300	75.3	5907	74.5	6891	74.2	6579	0	7761	74.7	7462	71.2	8256	74.8	7039
22:00	75.7	7042	74.5	6597	74.7	5874	73.3	5635	73.5	5248	0	5943	73.9	5866	75.2	7267	74.5	6592
23:00	74.6	5697	73.6	5808	72.6	4913	72.1	3939	72.5	4046	0	4083	72.6	4682	74.3	5767	74.1	5691
LeqDay			76.6	180962	75.6	153215	76.2	188555	75.9	188746					75.7	204467	76.2	180831
LeqNight			72.7	25949	71.2	22323	73.9	37154	73.5	36449					73.6	37288	72.7	25706
			2020-01-25		2020-01-26		2020-01-27		2020-01-28						2020-01-31		2020-02-01	

In response to your request please find below the information available from this office for Highway 401 (West of Whites Road) In Pickering:

2016 AADT = 226,000
2016 SADT = 248,600
Ultimate AADT (estimated)= 381,000
Number of Through Lanes =14
Posted Speed = 100 km/hr
% Trucks (2016) = 9%

Ultimate 381000

Date	Time Period	Traffic Volume	Day/Night Split	Ultimate Volume	Volume Adj	Measured LAeq	Measured LAeq with Volume Adjustment Only
1/24/2020	Daytime	**202860**					
1/25/2020	Nighttime	**25949**	12.5%	47782	**2.7**	72.7	**75.4**
1/25/2020	Daytime	**180962**	87.5%	333218	**2.7**	76.6	**79.3**
1/26/2020	Nighttime	**22323**	12.7%	48451	**3.4**	71.2	**74.6**
1/26/2020	Daytime	**153215**	87.3%	332549	**3.4**	75.6	**79.0**
1/27/2020	Nighttime	**37154**	16.5%	62716	**2.3**	73.9	**76.1**
1/27/2020	Daytime	**188555**	83.5%	318284	**2.3**	76.2	**78.4**
1/28/2020	Nighttime	**36449**	16.2%	61667	**2.3**	73.5	**75.8**
1/28/2020	Daytime	**188746**	83.8%	319333	**2.3**	75.9	**78.2**
1/29/2020	Nighttime	**37472**	16.4%	62339	**2.2**	*	
1/29/2020	Daytime	**191546**	83.6%	318661	**2.2**	*	
1/30/2020	Nighttime	**37846**	16.3%	62076	**2.1**	*	
1/30/2020	Daytime	**194438**	83.7%	318924	**2.1**	*	
1/31/2020	Nighttime	**37288**	15.4%	58765	**2.0**	73.6	**75.6**
1/31/2020	Daytime	**204467**	84.6%	322235	**2.0**	75.7	**77.7**
2/1/2020	Nighttime	**25706**	12.4%	47420	**2.7**	72.7	**75.3**
2/1/2020	Daytime	**180831**	87.6%	333580	**2.7**	76.2	**78.8**

*Technical difficult with sound level meter during a portion of Wednesday and Thursday

APPENDIX D

SAMPLE SOUND LEVEL CALCULATION

```
STAMSON 5.04        NORMAL REPORT        Date: 16-04-2020 14:06:50
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS/ NOISE ASSESSMENT

Filename: t1_sw_sf.te          Time Period: Day/Night 16/8 hours
Description: Tower 1 - South Facade


Rail data, segment # 1: CN Kingston (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
* 1. Freight     !  15.7/5.2   ! 105.0 !  4.0 !140.0 !Diesel! Yes
* 2. Way Freight !   0.0/5.2   ! 105.0 !  4.0 ! 25.0 !Diesel! Yes
* 3. Passenger   !  44.6/1.3   ! 153.0 !  2.0 ! 10.0 !Diesel! Yes
* 4. GO Commuter ! 184.5/28.7  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

* The identified number of trains have been adjusted for
  future growth using the following parameters:

Train type:          ! Unadj. ! Annual % ! Years of !
 No  Name            ! Trains ! Increase !  Growth  !
--------------------+--------+----------+----------+
  1. Freight         !  12.0/4.0   !    2.50  !   11.00  !
  2. Way Freight     !   0.0/4.0   !    2.50  !   11.00  !
  3. Passenger       !  34.0/1.0   !    2.50  !   11.00  !
  4. GO Commuter     ! 180.0/28.0  !    2.50  !    1.00  !

Data for Segment # 1: CN Kingston (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 434.00 / 434.00 m
Receiver height           :  85.50 / 85.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

Results segment # 1: CN Kingston (day)
--------------------------------------

LOCOMOTIVE (0.00 + 67.59 + 0.00) = 67.59 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  82.20 -14.61   0.00   0.00   0.00   0.00  67.59
-------------------------------------------------------------------------

WHEEL (0.00 + 60.35 + 0.00) = 60.35 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  74.96 -14.61   0.00   0.00   0.00   0.00  60.35
-------------------------------------------------------------------------

Segment Leq : 68.34 dBA

Total Leq All Segments: 68.34 dBA
```

```
Results segment # 1: CN Kingston (night)
----------------------------------------

LOCOMOTIVE (0.00 + 63.76 + 0.00) = 63.76 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  78.37 -14.61   0.00   0.00   0.00   0.00  63.76
-------------------------------------------------------------------------

WHEEL (0.00 + 56.73 + 0.00) = 56.73 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.00  71.35 -14.61   0.00   0.00   0.00   0.00  56.73
-------------------------------------------------------------------------

Segment Leq : 64.55 dBA

Total Leq All Segments: 64.55 dBA

Road data, segment # 1: Hwy 401 WB C (day/night)
------------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 1: Hwy 401 WB C (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  54.00 / 54.00  m
Receiver height           :  85.50 / 85.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Hwy 401 WB E (day/night)
------------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67
```

```
Data for Segment # 2: Hwy 401 WB E (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  75.00 / 75.00  m
Receiver height           :  85.50 / 85.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Hwy 401 EB E (day/night)
-------------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 3: Hwy 401 EB E (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  95.00 / 95.00  m
Receiver height           :  85.50 / 85.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Hwy 401 EB C (day/night)
-------------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67
```

```
Data for Segment # 4: Hwy 401 EB C (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 116.00 / 116.00 m
Receiver height           :  85.50 / 85.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy 401 WB C (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 75.48 + 0.00) = 75.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -5.56   0.00   0.00   0.00   0.00  75.48
-------------------------------------------------------------------------------

Segment Leq : 75.48 dBA (-0.58 dBA measurement correction = 74.90 dBA)

Results segment # 2: Hwy 401 WB E (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 74.05 + 0.00) = 74.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -6.99   0.00   0.00   0.00   0.00  74.05
-------------------------------------------------------------------------------

Segment Leq : 74.05 dBA (-0.58 dBA measurement correction = 73.47 dBA)

Results segment # 3: Hwy 401 EB E (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 73.02 + 0.00) = 73.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -8.02   0.00   0.00   0.00   0.00  73.02
-------------------------------------------------------------------------------

Segment Leq : 73.02 dBA (-0.58 dBA measurement correction = 72.44 dBA)

Results segment # 4: Hwy 401 EB C (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 72.16 + 0.00) = 72.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -8.88   0.00   0.00   0.00   0.00  72.16
-------------------------------------------------------------------------------

Segment Leq : 72.16 dBA (-0.58 dBA measurement correction = 71.58 dBA)

Total Leq All Segments: 79.88 dBA (79.30 dBA with measurement corrections)
```

```
Results segment # 1: Hwy 401 WB C (night)
-----------------------------------------

Source height = 1.61 m

ROAD (0.00 + 75.48 + 0.00) = 75.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -5.56   0.00   0.00   0.00   0.00  75.48
-------------------------------------------------------------------------------

Segment Leq : 75.48 dBA (-4.08 dBA measurement correction = 71.40 dBA)

Results segment # 2: Hwy 401 WB E (night)
-----------------------------------------

Source height = 1.61 m

ROAD (0.00 + 74.05 + 0.00) = 74.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -6.99   0.00   0.00   0.00   0.00  74.05
-------------------------------------------------------------------------------

Segment Leq : 74.05 dBA (-4.08 dBA measurement correction = 69.97 dBA)

Results segment # 3: Hwy 401 EB E (night)
-----------------------------------------

Source height = 1.61 m

ROAD (0.00 + 73.02 + 0.00) = 73.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -8.02   0.00   0.00   0.00   0.00  73.02
-------------------------------------------------------------------------------

Segment Leq : 73.02 dBA (-4.08 dBA measurement correction = 68.94 dBA)

Results segment # 4: Hwy 401 EB C (night)
-----------------------------------------

Source height = 1.61 m

ROAD (0.00 + 72.16 + 0.00) = 72.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  81.04   0.00  -8.88   0.00   0.00   0.00   0.00  72.16
-------------------------------------------------------------------------------

Segment Leq : 72.16 dBA (-4.08 dBA measurement correction = 68.08 dBA)

Total Leq All Segments: 79.88 dBA (75.80 dBA with measurement correction)

TOTAL Leq FROM ALL SOURCES (DAY): 80.17 (79.63 dBA with measurement correction)
                           (NIGHT): 80.00 (76.11 dBA with measurement correction)
```

```
STAMSON 5.04        NORMAL REPORT        Date: 16-04-2020 14:07:19
MINISTRY OF ENVIRONMENT, CONSERVATON AND PARKS / NOISE ASSESSMENT

Filename: t8_se_ef.te          Time Period: Day/Night 16/8 hours
Description: Tower 8 - East Facade


Rail data, segment # 1: CN Kingston (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
* 1. Freight     !  15.7/5.2   ! 105.0 !  4.0 !140.0 !Diesel! Yes
* 2. Way Freight !   0.0/5.2   ! 105.0 !  4.0 ! 25.0 !Diesel! Yes
* 3. Passenger   !  44.6/1.3   ! 153.0 !  2.0 ! 10.0 !Diesel! Yes
* 4. GO Commuter ! 184.5/28.7  ! 137.0 !  1.0 ! 12.0 !Diesel! Yes

* The identified number of trains have been adjusted for
  future growth using the following parameters:

Train type:         ! Unadj. ! Annual % ! Years of !
 No  Name           ! Trains ! Increase !  Growth  !
--------------------+--------+----------+----------+
  1. Freight        !  12.0/4.0   !    2.50  !   11.00  !
  2. Way Freight    !   0.0/4.0   !    2.50  !   11.00  !
  3. Passenger      !  34.0/1.0   !    2.50  !   11.00  !
  4. GO Commuter    ! 180.0/28.0  !    2.50  !    1.00  !

Data for Segment # 1: CN Kingston (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 342.00 / 342.00 m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

Results segment # 1: CN Kingston (day)
--------------------------------------

LOCOMOTIVE (0.00 + 66.28 + 0.00) = 66.28 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     15   0.00  82.20 -13.58  -2.34   0.00   0.00   0.00  66.28
-------------------------------------------------------------------

WHEEL (0.00 + 59.04 + 0.00) = 59.04 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     15   0.00  74.96 -13.58  -2.34   0.00   0.00   0.00  59.04
-------------------------------------------------------------------

Segment Leq : 67.03 dBA

Total Leq All Segments: 67.03 dBA
```

```
Results segment # 1: CN Kingston (night)
----------------------------------------

LOCOMOTIVE (0.00 + 62.45 + 0.00) = 62.45 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     15   0.00  78.37 -13.58  -2.34   0.00   0.00   0.00  62.45
-------------------------------------------------------------------------

WHEEL (0.00 + 55.43 + 0.00) = 55.43 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     15   0.00  71.35 -13.58  -2.34   0.00   0.00   0.00  55.43
-------------------------------------------------------------------------

Segment Leq : 63.24 dBA

Total Leq All Segments: 63.24 dBA

Road data, segment # 1: Hwy 401 WB C (day/night)
------------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 1: Hwy 401 WB C (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 138.00 / 138.00 m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Hwy 401 WB E (day/night)
------------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67
```

```
Data for Segment # 2: Hwy 401 WB E (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 158.00 / 158.00 m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Hwy 401 EB E (day/night)
-----------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67

Data for Segment # 3: Hwy 401 EB E (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 178.00 / 178.00 m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Hwy 401 EB C (day/night)
-----------------------------------------------
Car traffic volume  : 57788/28890 veh/TimePeriod  *
Medium truck volume :  1429/714   veh/TimePeriod  *
Heavy truck volume  :  4286/2143  veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  95250
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   2.25
    Heavy Truck  % of Total Volume     :   6.75
    Day (16 hrs) % of Total Volume     :  66.67
```

```
Data for Segment # 4: Hwy 401 EB C (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 199.00 / 199.00 m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 5: Whites NB (day/night)
-----------------------------------------------
Car traffic volume  : 14175/1575  veh/TimePeriod  *
Medium truck volume :   473/53    veh/TimePeriod  *
Heavy truck volume  :  1103/123   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.00
    Heavy Truck  % of Total Volume     :   7.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 5: Whites NB (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   60.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  59.00 / 59.00  m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 6: Whites SB (day/night)
-----------------------------------------------
Car traffic volume  : 14175/1575  veh/TimePeriod  *
Medium truck volume :   473/53    veh/TimePeriod  *
Heavy truck volume  :  1103/123   veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  17500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.00
    Heavy Truck  % of Total Volume     :   7.00
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 6: Whites SB (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   60.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  46.00 / 46.00  m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 7: Kingston WB (day/night)
-----------------------------------------------
Car traffic volume  : 16200/1800  veh/TimePeriod  *
Medium truck volume :  1080/120   veh/TimePeriod  *
Heavy truck volume  :   720/80    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  20000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 7: Kingston WB (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  76.00 / 76.00  m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 8: Kingston EB (day/night)
-----------------------------------------------
Car traffic volume  : 16200/1800  veh/TimePeriod  *
Medium truck volume :  1080/120   veh/TimePeriod  *
Heavy truck volume  :   720/80    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  20000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   6.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 8: Kingston EB (day/night)
-------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  61.00 / 61.00  m
Receiver height           :  70.50 / 70.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy 401 WB C (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 68.39 + 0.00) = 68.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  81.04   0.00  -9.64  -3.01   0.00   0.00   0.00  68.39
-------------------------------------------------------------------------------

Segment Leq : 68.39 dBA (-0.58 dBA measurement correction = 67.81 dBA)

Results segment # 2: Hwy 401 WB E (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 67.80 + 0.00) = 67.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  81.04   0.00 -10.23  -3.01   0.00   0.00   0.00  67.80
-------------------------------------------------------------------------------

Segment Leq : 67.80 dBA (-0.58 dBA measurement correction = 67.22 dBA)

Results segment # 3: Hwy 401 EB E (day)
---------------------------------------

Source height = 1.61 m

ROAD (0.00 + 67.29 + 0.00) = 67.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.00  81.04   0.00 -10.74  -3.01   0.00   0.00   0.00  67.29
-------------------------------------------------------------------------------

Segment Leq : 67.29 dBA (-0.58 dBA measurement correction = 66.71 dBA)
```

Results segment # 4: Hwy 401 EB C (day)

Source height = 1.61 m

ROAD (0.00 + 66.80 + 0.00) = 66.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	81.04	0.00	-11.23	-3.01	0.00	0.00	0.00	66.80

Segment Leq : 66.80 dBA (-0.58 dBA measurement correction = 66.22 dBA)

Results segment # 5: Whites NB (day)

Source height = 1.63 m

ROAD (0.00 + 64.27 + 0.00) = 64.27 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	60	0.00	71.01	0.00	-5.95	-0.79	0.00	0.00	0.00	64.27

Segment Leq : 64.27 dBA

Results segment # 6: Whites SB (day)

Source height = 1.63 m

ROAD (0.00 + 65.35 + 0.00) = 65.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	60	0.00	71.01	0.00	-4.87	-0.79	0.00	0.00	0.00	65.35

Segment Leq : 65.35 dBA

Results segment # 7: Kingston WB (day)

Source height = 1.41 m

ROAD (0.00 + 60.43 + 0.00) = 60.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	70.49	0.00	-7.05	-3.01	0.00	0.00	0.00	60.43

Segment Leq : 60.43 dBA

Results segment # 8: Kingston EB (day)

Source height = 1.41 m

ROAD (0.00 + 61.39 + 0.00) = 61.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	70.49	0.00	-6.09	-3.01	0.00	0.00	0.00	61.39

Segment Leq : 61.39 dBA

Total Leq All Segments: 75.00 dBA (74.59 dBA with measurement correction)

Results segment # 1: Hwy 401 WB C (night)

Source height = 1.61 m

ROAD (0.00 + 68.39 + 0.00) = 68.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	81.04	0.00	-9.64	-3.01	0.00	0.00	0.00	68.39

Segment Leq : 68.39 dBA (-4.08 dBA measurement correction = 64.31 dBA)

Results segment # 2: Hwy 401 WB E (night)

Source height = 1.61 m

ROAD (0.00 + 67.80 + 0.00) = 67.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	81.04	0.00	-10.23	-3.01	0.00	0.00	0.00	67.80

Segment Leq : 67.80 dBA (-4.08 dBA measurement correction = 63.72 dBA)

Results segment # 3: Hwy 401 EB E (night)

Source height = 1.61 m

ROAD (0.00 + 67.29 + 0.00) = 67.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	81.04	0.00	-10.74	-3.01	0.00	0.00	0.00	67.29

Segment Leq : 67.29 dBA (-4.08 dBA measurement correction = 63.21 dBA)

Results segment # 4: Hwy 401 EB C (night)

Source height = 1.61 m

ROAD (0.00 + 66.80 + 0.00) = 66.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	81.04	0.00	-11.23	-3.01	0.00	0.00	0.00	66.80

Segment Leq : 66.80 dBA (-4.08 dBA measurement correction = 62.72 dBA)

Results segment # 5: Whites NB (night)

Source height = 1.63 m

ROAD (0.00 + 57.75 + 0.00) = 57.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	60	0.00	64.49	0.00	-5.95	-0.79	0.00	0.00	0.00	57.75

Segment Leq : 57.75 dBA

Results segment # 6: Whites SB (night)

Source height = 1.63 m

ROAD (0.00 + 58.83 + 0.00) = 58.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	60	0.00	64.49	0.00	-4.87	-0.79	0.00	0.00	0.00	58.83

Segment Leq : 58.83 dBA

Results segment # 7: Kingston WB (night)

Source height = 1.41 m

ROAD (0.00 + 53.90 + 0.00) = 53.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	63.96	0.00	-7.05	-3.01	0.00	0.00	0.00	53.90

Segment Leq : 53.90 dBA

```
Results segment # 8: Kingston EB (night)
----------------------------------------

Source height = 1.41 m

ROAD (0.00 + 54.85 + 0.00) = 54.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  63.96   0.00  -6.09  -3.01   0.00   0.00   0.00  54.85
-------------------------------------------------------------------------------

Segment Leq : 54.85 dBA

Total Leq All Segments: 73.98 dBA (70.36 dBA with measurement correction)

TOTAL Leq FROM ALL SOURCES (DAY): 75.65 (75.29 with measurement correction)
                           (NIGHT): 74.33 (71.15 with measurement correction)
```