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Noise Feasibility Study
Proposed Commercial/Residential Development
Highway 400 & Harvie Road
Barrie, Ontario

Prepared for:

Barrie-Bryne Developments Limited c/o SmartCentres REIT
3200 Highway 7
Vaughan, Ontario
L4K 5Z5

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1 Introduction and Summary

HGC Engineering was retained by Barrie-Bryne Developments Limited c/o SmartCentres REIT to conduct a noise feasibility study for a proposed residential development to be located on the west side of Highway 400, south of Harvie Road, in the City of Barrie, Ontario. The proposed development consists of blocks of semi-detached and townhouses units, mid-rise residential buildings and employment/light industrial uses. The study is required by the municipality as part of their planning and approvals process.

Road traffic for Highway 400 and Harvie Road were obtained from the Ministry of Transportation and City of Barrie personnel, respectively. Road traffic for the future Bryne Drive extension running north-south through the site was obtained from Tatham Engineering Ltd., the transportation consultant for the proposed development. This data was used to predict future traffic sound levels at the proposed residential buildings and in the rear yards. The predicted sound levels were evaluated in accordance with the Ministry of the Environment, Conservation and Parks' (MECP) noise guidelines.

Predicted sound levels exceed MECP guideline limits at the dwelling units closest to Highway 400. Central air conditioning and upgraded glazing constructions will be required for the proposed mid-rise residential buildings. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant will be required for the proposed dwelling units further from Highway 400. The MECP guidelines require that warning clauses be used to inform future residents of the traffic noise impacts, proximity to existing and proposed commercial uses, and to address sound level excesses.

An analysis was also conducted to determine the potential impact of noise from stationary noise sources such as trucking activities and rooftop units on the proposed industrial/commercial buildings at the east side of Bryne Drive extension and their impact on the proposed residential buildings. Reasonable estimates of the size and tonnage have been used based on experience with similar projects. Manufacturer's sound power data was used in the analysis to estimate sound levels associated with the proposed industrial/commercial buildings on the proposed residential buildings.

The results indicate that the sound emissions from the proposed industrial/commercial buildings in the employment blocks on the proposed residential receptors are expected to be below MECP limits. Further, physical mitigation measures are not required for the stationary noise sources associated with the proposed industrial/commercial buildings. When the siting information and uses of the industrial/commercial buildings are known, the noise analysis should be revised and refined.

2 Site Description and Noise Sources

Figure 1 is a key plan showing the location of the proposed development. The site is located on the west side of Highway 400, south of Harvie Road and on either side of the Future Right of Way (Bryne Drive), in the City of Barrie, Ontario. Figure 2 shows the proposed site plan prepared by Weston Consulting dated March 2, 2022. The proposed development will consist of back-to-back and street townhouses, semi-detached units, mid-rise residential units, and employment blocks.

The primary sources of sound are vehicular traffic on Highway 400 and Bryne Drive with secondary contributions from Harvie Road. The site is currently vacant. There are existing residences to the west. There is a Fedex building to the east of Highway 400. There are commercial buildings including a Princess Auto, Home Depot, and Staples to the south of the subject site. Noise from these facilities were not heard at the time of the site visit, nonetheless, a warning clause is recommended to inform future occupants of the development of the proximity to existing commercial uses and that sounds may be audible, as included in Section 3.5. There are no other significant sources of stationary noise within 500 m of the subject site.

3 Traffic Noise Assessment

3.1 Sound Level Criteria

Guidelines for acceptable levels of road traffic noise impacting residential developments are outlined in the MECP publication NPC-300 “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, Part C release date October 21, 2013 and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA].

Table 1: Road Traffic Sound Level Criteria

Area	Daytime L_{EQ} (16 hour) Road	Night-time L_{EQ} (8 hour) Road
Outdoor Living Area	55 dBA	--
Inside Living/Dining Rooms	45 dBA	45 dBA
Inside Bedrooms	45 dBA	40 dBA

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time period between 23:00 and 07:00. The term Outdoor Living Area (OLA) is used in reference to an outdoor patio, backyard, terrace, or other area where passive recreation is expected to occur.

The MECP guidelines allow the sound levels in an OLA be exceeded by up to 5 dBA (i.e. up to 60 dBA), without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows are greater than 60 dBA and where daytime sound levels outside bedroom or living/dining room windows are 65 dBA or greater. Forced-air ventilation with ducts sized to accommodate the future installation of central air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA. The use of warning clauses to notify future residents of possible excesses is also required.

3.2 Road Traffic Data

Road traffic data for Highway 400 was obtained from Ministry of Transportation personnel. Data was provided in the form of current Annual Average Daily Traffic (AADT) volumes, and is provided in Appendix A. A commercial vehicle percentage of 7.4% was obtained and split into 2.8% medium trucks and 4.6% heavy trucks was applied for Highway 400. A day/night split of 66%/34% and a speed limit of 100 km/h was used in the analysis.

Road traffic data for Bryne Drive was obtained from Tatham Engineering Ltd. personnel, the transportation consultant for the subject site. Data was provided in the form of a forecasted AADT, and is provided in Appendix A. A commercial vehicle percentage of 3.0% was obtained and split into 1.2% medium trucks and 1.8% heavy trucks was applied. A day/night split of 90%/10% and a speed limit of 50 km/h was used in the analysis.

Road traffic data for Harvie Road was obtained from City of Barrie personnel. Data was provided in the form of peak hourly volumes, and are provided in Appendix A. A commercial vehicle percentage of 1.4% was obtained and split into 0.5% medium trucks and 0.9% heavy trucks. A day/night split of 90%/10% and a speed limit of 50 km/h was used in the analysis.

The traffic volumes were grown to the year 2032 using a growth rate of 2.5% per year. Table 2 summarizes the road traffic data used in the analysis.

Table 2: Projected Road Traffic Data to 2032

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Highway 400	**Daytime**	133 165	4 027	6 615	143 806
	Nighttime	66 572	2 013	3 307	71 892
	Total	**199 737**	**6 040**	**9 922**	**215 699**
Bryne Drive	**Daytime**	18 333	227	340	18 900
	Nighttime	2 037	25	38	2 100
	Total	**20 370**	**252**	**378**	**21 000**
Harvie Road	**Daytime**	2 815	14	26	2 855
	Nighttime	313	2	3	317
	Total	**3 127**	**16**	**29**	**3 172**

3.3 Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the site in the future, predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix B.

Predictions of the traffic sound levels were made at various locations around the proposed development. The results of these predictions are summarized in Table 3. The acoustic requirements may be subject to modifications if the site plan is changed significantly.

Sound levels were predicted at the plane of the windows of the proposed dwelling units during the daytime and nighttime to investigate ventilation and building façade construction requirements. Daytime sound levels were also predicted in the rear yards to investigate the need for acoustic barriers.

Table 3: Future Road Traffic Sound Levels, [dBA], Without Mitigation

Prediction Location	Block No.	Description	Daytime in OLA $L_{EQ-16\ hr}$	Daytime at Façade $L_{EQ-16\ hr}$	Nighttime at Façade $L_{EQ-8\ hr}$
[A]	58, 59	Mid-Rise residential buildings adjacent to Bryne Drive	--	69	69
[B]	54	Townhouse unit with exposure to Bryne Drive and Highway 400	<55	54	53
[C]	16	Semi-detached unit with exposure to Bryne Drive and Highway 400	<55	53	53
[D]	27	Semi-detached unit with exposure to Bryne Drive and Highway 400	56	59	59
[E]	15	Semi-detached unit with exposure to Bryne Drive and Highway 400	<55	<55	<50
[F]	55 – 57	Townhouse unit with exposure to Bryne Drive and Highway 400	<55	57	57
[G]	25	Semi-detached unit with exposure to Bryne Drive and Highway 400	<55	50	50

3.4 Discussion and Recommendations

The predictions indicate that the future traffic sound levels during the daytime and nighttime at the proposed dwellings closest to Bryne Drive and Highway 400 will exceed MECP guidelines. The

following discussion outlines recommendations for barriers, ventilation requirements, building façade constructions, and warning clauses to achieve the noise criteria stated in Table 1.

3.4.1 Outdoor Living Areas

The predicted sound level in the rear yards of the semi-detached units with the greatest exposure to Highway 400 (Prediction Location [D]) will be up to 56 dBA, 1 dBA in excess of the MECP's limit of 55 dBA. The 1 dBA sound level excess is within the discretionary range acceptable to the MECP with the use of a noise warning clause. Physical mitigation in the form of an acoustic barrier will not be required.

The predicted sound levels in the rear yards of the remaining dwelling units will be less than 55 dBA. Physical mitigation measures in the form of an acoustic barrier will not be required.

a) Mid-Rise Residential Buildings (Blocks 58 & 59)

These blocks are proposed to include mid-rise residential buildings that range from 4 to 6 storeys in height. Any outdoor amenity areas for these buildings should be placed on the shielded side of the buildings to reduce the need for high noise barriers. When siting, lotting and grading information is available, detailed noise studies should be conducted for individual apartment blocks with exposure to the roadways to determine the specific barrier requirements, heights and extents, requirements for ventilation and building envelope construction.

As a general note, barriers may be avoided by having houses/buildings sufficiently set back from the road, or by using the house/building to shield the outdoor living areas, as is the case with the fronting dwellings. Single loaded roads with buildings facing the external road not only provide a distance setback, but the row of houses screens the outdoor living areas, and reduces or eliminates the need for sound barriers. Grading of the site 1 to 2 m above the roadway can also help to reduce sound levels and the required barrier heights, but grading the lots below the road will tend to increase them. Common OLA's in the medium density blocks may be located in shielded courtyard areas.

3.4.2 Indoor Living Areas and Ventilation Requirements

Central Air Conditioning

The predicted sound levels at the façades of the proposed mid-rise residential buildings adjacent to the Bryne Drive (Prediction Location [A]) will be greater 60 dBA during the nighttime or 65 dBA during the daytime. Central air conditioning systems are required so that windows may remain closed. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

Provision for the Future Installation of Air Conditioning

The predicted sound levels at the façades of the proposed dwelling units with exposure to Highway 400 (Prediction Locations [B], [C], [D] and [F]) will be between 51 and 60 dBA during the nighttime hours. These dwelling units require the provision for the future installation of central air conditioning systems. This requirement is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant.

Figure 3 shows the ventilation requirements for the development. Window or through-the-wall air conditioning units are not recommended for any residential unit because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. For the mid-rise buildings, a suitable option may include units housed in their own closet with an access door for maintenance. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

3.4.3 Building Façade Constructions

Future road traffic sound levels outside the façades of the proposed mid-rise residential buildings (prediction location [A]) will exceed 65 dBA or 60 dBA during the daytime and nighttime, respectively. MECP guidelines recommend that the windows, walls and doors be designed so that the indoor sound levels comply with the noise criteria.

Since the detailed floor plans and building elevations were not available at the time of this report, the required building components are selected based on the AIF value for road traffic. To do so,

calculations were performed to determine the acoustical insulation factors to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the anticipated area ratios of the facade components (walls, windows and doors) and the floor area of the adjacent room.

The minimum necessary specification for prediction location [A] is Acoustical Insulation Factor, AIF-29 for living/dining rooms and AIF-34 for bedrooms, based on the possibility of sound entering the dwelling through the windows only if the exterior wall is brick or an acoustical equivalent. As a general guideline, a glazing construction with two panes of 3 mm glass and a 13 mm airspace will be sufficient as long as the window to floor area ratio does not exceed 32% for living/dining rooms and 10% for bedrooms.

Further Analysis

Acoustical requirements for the building envelope of the proposed mid-rise buildings should be confirmed once detailed floor plans and elevations are available, as different window-to-floor area ratios may result in different STC rating requirements.

3.5 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements for all units/lots with anticipated traffic sound level excesses. Examples are provided below.

Suggested wording for future dwellings with sound level excesses is given below:

Type A:

> Purchasers and tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of the Environment, Conservation and Parks' noise criteria.

Suggested wording for future dwellings for which physical mitigation has been provided is given 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 may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment, Conservation and Parks' noise criteria.

Suitable wording for future dwellings requiring central air conditioning systems is given below.

Type C:

> This dwelling units 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 Municipality's and the Ministry of the Environment, Conservation and Parks' noise criteria.

A suggested wording for future dwellings requiring forced air ventilation systems is given below.

Type D:

> This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments 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, Conservation and Parks.

Suitable wording for dwellings near existing and proposed commercial facilities.

Type E:

> Purchasers/tenants are advised that due to the proximity of existing institutional and commercial uses, sound levels from these facilities may at times be audible.

These sample clauses are provided by the MECP as examples and can be modified by the Municipality as required.

4 Stationary Noise Assessment

4.1 Criteria for Noise from Industrial Facilities

MECP Guideline NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning" is the MECP guideline for use in investigating Land Use Compatibility issues with regard to noise. An industrial or commercial facility is classified in MECP guidelines as a stationary source of sound (as compared to sources such as traffic or construction, for example) in assessing the potential of noise from such a facility to impact neighbouring noise sensitive land uses.

NPC-300 is intended for use in the planning of both residential and commercial/industrial land uses and provides the acceptability limits for sound due to industrial operations in that regard. The facade of a residence (i.e., in the plane of a window), or any associated usable outdoor area is considered a sensitive point of reception. The exclusionary sound level limit for a stationary noise source in an urban Class 1 area as stipulated by NPC-300 is shown in the table below.

Table 4 – NPC-300 Stationary Noise Exclusionary Limits for Class 1 Areas

Receiver	Daytime 07:00 – 19:00	Evening 19:00 – 23:00	Nighttime 23:00 – 07:00
Outdoor Points of Reception	50 dBA	50 dBA	--
Plane of Window	50 dBA	50 dBA	45 dBA

If the background sound levels due to road traffic exceed the exclusionary limits, then the background sound level becomes the criterion. The background sound level is defined as the sound level that occurs when the sources under consideration are not operating, and may include traffic noise and natural sounds. To ensure a conservative analysis, the exclusionary minimum criteria will be adopted at all receptors.

Commercial activities such as the occasional movement of customer vehicles, occasional deliveries via courier, and garbage collection are not of themselves considered to be significant noise sources in the MECP guidelines. Noise from safety equipment (e.g. back-up beepers) is also exempt from consideration and may be audible on occasion. The decision to include the sound from trucks in an

assessment under MECP noise guidelines depends of the volume of trucking, and the nature of the facility. Occasional deliveries to retail stores and convenience stores are exempt, for example, but heavy trucking at a warehouse or busy shipping/receiving docks at an industry would be assessed.

The likely activities at the proposed commercial/industrial blocks may include the occasional movement of customer vehicles on the property and garbage collection, which as indicated above are not of themselves considered to be significant noise sources in the MECP guidelines. However, tractor trailers may frequent the loading areas of the potential facilities and have been included in the assessment to represent a reasonable worst case scenario.

The MECP guidelines stipulate that the sound level impact during a "predicable worst-case hour" be considered. This is defined to be an hour when a typically busy "planned and predictable mode of operation" occurs at the subject facility, coincident with a period of minimal background sound. Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors although there may still be residual audibility during periods of low background sound.

4.2 Noise Assessment

There are proposed commercial and industrial facilities at the east side of the subject site (labelled employment use on Figure 2) and were identified as having the potential to impact the proposed residential buildings. These include noise sources such as rooftop mechanical units, truck movements, and trucks idling at the loading areas.

Source sound levels for typical rooftop equipment and trucking activities, and assumed operational information (outlined below) were used as input to a predictive computer model (*Cadna/A version 2021 (32 bit) build: 187.5163*), in order to estimate the sound levels from the existing commercial buildings at the future residences. Cadna/A is a computer implementation of ISO Standard 9613-2, "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation", which takes into account attenuation due to distance (geometrical spreading), shielding by intervening structures, air attenuation and ground absorption.

The proposed residential dwelling units and the associated rear yards will be potentially impacted by the proposed industrial/commercial uses. Receptor heights were taken at the top-storey façades for

the proposed residential buildings and 1.5 m above grade in the outdoor amenity area.

The assumed sound power levels used in the analysis are listed in Table 5 below.

Table 5 - Sound Power Level Specifications for Equipment [dB re 10-12 W]

Item	Octave Band Centre Frequency [Hz]							
	63	125	250	500	1k	2k	4k	8K
5 Ton HVAC unit	84	82	76	75	73	69	66	62
10 Ton HVAC unit	87	85	82	80	77	74	71	66
Tractor Trailer Engine Idle	96	91	88	88	91	90	81	70
Tractor Trailer Acceleration	101	100	94	96	97	95	91	86

- Equipment associated with the proposed industrial and commercial uses are shown as green crosses, and truck routes are identified as green lines in Figure 4. A preliminary conceptual plan for the employment uses was used in the analysis. The layout may change as the development progresses.
- The proposed single-storey commercial buildings were assumed to be 4 m in height.
- There are HVAC units associated with the proposed industrial/commercial uses. The HVAC units were assumed to be 1.5 m in height. Exhaust fans were assumed to be 0.6 m in height above the roof.
- Noise data for the equipment was obtained from HGC Engineering files for similar past projects.
- Some of the proposed commercial buildings are assumed to be regularly serviced by delivery trucks that will have access to the loading areas. Each truck accessing a loading bay is assumed to travel at a speed of 10 km/h and maneuver to the loading area.

4.3 Assumed Worst-Case Operating Scenarios

In this impact assessment, we have considered typical worst-case (busiest hour) scenarios for each time period to be as follows:

Assumed daytime/evening worst-case scenario:

- All A/C equipment operating continuously at full capacity;
- One tractor trailer truck per hour accessing each of the assumed loading areas;
- Trucks are assumed to idle engines for 5 minutes in an hour at the loading areas.

Assumed night-time worst-case scenario:

- All A/C equipment operating on a 50% duty cycle, or 30 minutes in an hour;
- No trucking activities.

4.4 Results and Recommendations

The calculations consider the acoustical effects of distance and shielding by the buildings. The unmitigated sound levels due to noise sources associated with the existing and assumed industrial buildings at the façades of the dwelling units within the proposed development are presented graphically in Figures 5 and 6. The maximum predicted sound levels at the top storey plane of windows and outdoor points of reception of proposed dwelling units are provided in the table below.

Table 6 – Maximum Predicted Steady Source Sound Levels at the Proposed Façades and Outdoor Points of Reception during a Typical Operation Scenario hour [dBA]

	Description	Façade			OLA	
		Daytime/ Evening (07:00 – 23:00)	Nighttime (23:00 – 07:00)	Criteria (Day/Night)	Daytime/ Evening (07:00 – 23:00)	Criteria (Day)
R1	Proposed 4-6 - storey residential building	48	44	50 / 45	--	50
R2	Proposed 4-6 - storey residential building	48	44	50 / 45	--	50
R3	Proposed 4-6 - storey residential building	47	42	50 / 45	--	50
R4	Proposed 4-6 - storey residential building	45	41	50 / 45	--	50
R5	Proposed 4-6 - storey residential building	37	33	50 / 45	--	50
R6	Proposed 3-storey stacked townhouse unit	35	32	50 / 45	--	50
R7	Proposed 3-storey townhouse unit	36	33	50 / 45	33	50
R8	Proposed 3-storey semi-detached dwelling unit	37	34	50 / 45	35	50

These predicted sound levels are less than the MECP minimum exclusionary limits, based on a typical worst-case operating scenario and a conceptual plan. It is concluded that sounds from the proposed commercial/industrial uses are anticipated to comply with the MECP guidelines at the proposed dwelling units and physical mitigation is not required.

An additional warning clause included in Section 3.5 should be included in the offers of purchase and sale and tenancy agreements to inform the future residents of the proposed dwelling units of the presence of the nearby commercial/industrial uses.

Further Work

When the siting information and uses of the industrial/commercial buildings are known, the noise analysis should be revised and refined. Larger rooftop equipment and greater number of loading bays may result in the need for acoustic screens and/or noise barriers.

5 Summary of Recommendations

In summary, HGC Engineering has reviewed the site plan and performed calculations to determine the potential road traffic and stationary noise impact on the residential properties with respect to MECP guidelines. The following are the recommendations:

For traffic noise sources:

1. Central air conditioning will be required for the proposed mid-rise residential buildings. Forced air ventilation systems with ductwork sized for the future installation of central air conditioning will be required for the proposed dwelling units further from Highway 400. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300, as applicable.

2. Certain minimum building and glazing constructions will be required for the proposed mid-rise residential buildings, as outlined in Section 3.4.4. When detailed floor plans and building elevations are available for the mid-rise buildings, a review should be conducted to verify acoustical requirements for glazing and building façade constructions based on actual window-to-floor area ratios.

3. Warning clauses should be used to inform future residents of the traffic noise excesses and the proximity to nearby commercial uses.

For stationary noise sources:

4. There are no specific mitigation measures required for the proposed industry/commercial stationary noise sources at the east side of the subject site.

5. Warning clauses should be included in the property and tenancy agreements and offers of purchase and sale to inform the future owners/residents of the presence of the nearby industry/commercial operations.

6. When the siting information and uses of the industrial/commercial buildings are known, the noise analysis should be revised and refined. Larger rooftop equipment and greater number of loading bays may result in the need for acoustic screens and/or noise barriers.

Table 7: Summary of Noise Control Requirements and Noise Warning Clauses

Prediction Location	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Required AIF
[A]	--	Central A/C	B, C, E	LRDR – AIF-29 BR – AIF-34
[B]	--	Forced Air	A, D, E	OBC
[C]	--	Forced Air	A, D, E	OBC
[D]	--	Forced Air	A, D, E	OBC
[E]	--	--	E	OBC
[F]	--	Forced Air	A, D, E	OBC
[G]	--	--	E	OBC

Notes:
-- no specific requirement
OBC – meeting the minimum requirements of the Ontario Building Code
*The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.
LRDR – Living/Dining Room
BR – Bedroom

5.1 Implementation

To ensure that the noise recommendations outlined above are fully implemented, it is recommended that:

1. Prior to the issuance of building permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated.

2. Prior to assumption, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly installed and constructed.

3. At the building permit stage, the municipal building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the roof plans and selected rooftop units for compliance with the assumptions of the noise study and ensure compliance at residential receptors. Use of larger or louder equipment may result in the need for acoustic barriers/screens.

Figure 1: Key Plan

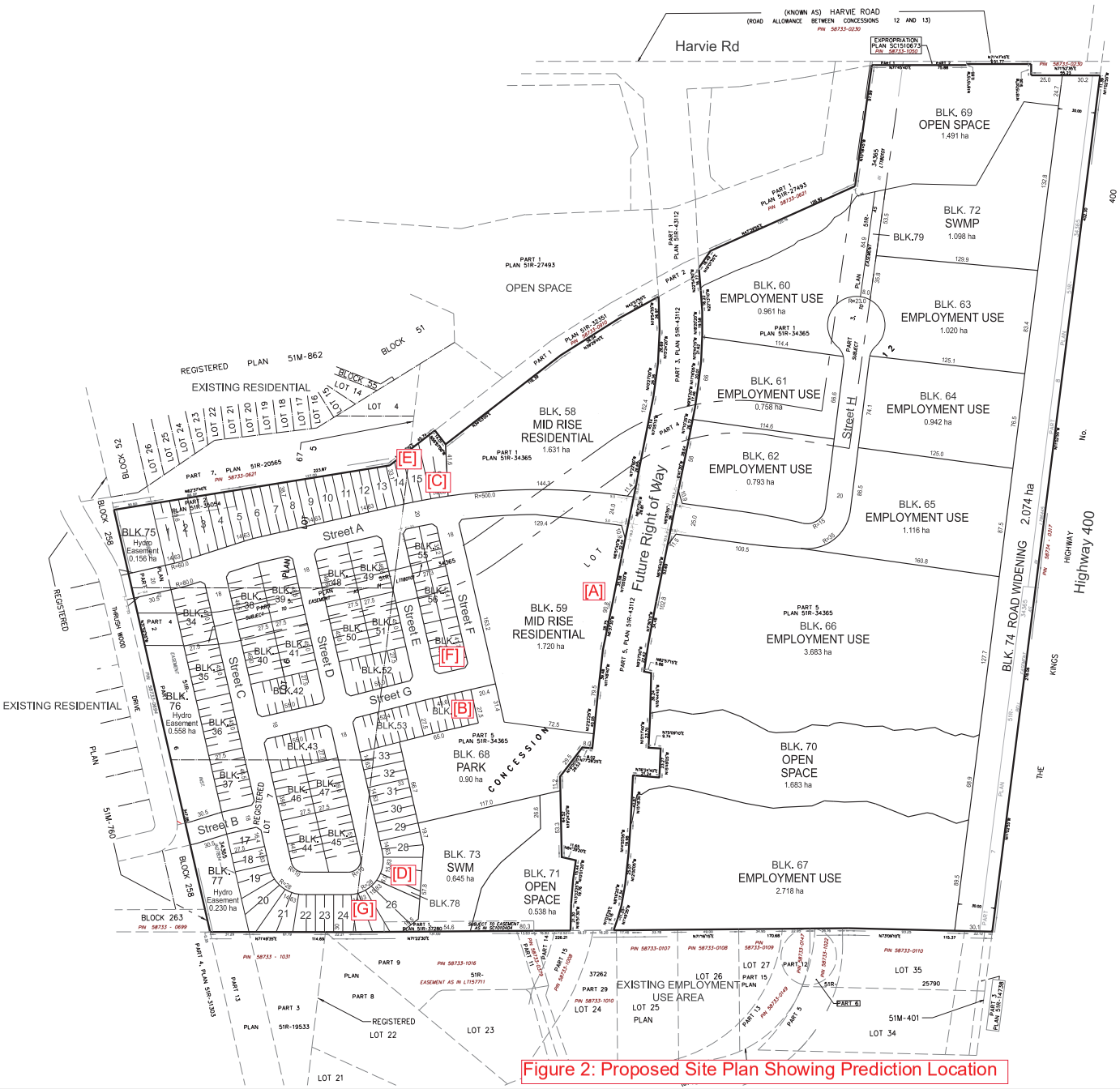
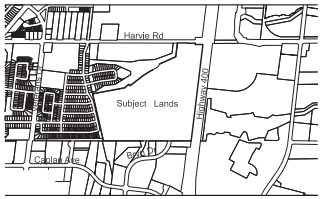


Figure 2: Proposed Site Plan Showing Prediction Location

DRAFT PLAN OF SUBDIVISION

PART OF LOTS 5, 6 AND 7
REGISTERED PLAN 67
AND
PART OF LOT 7
CONCESSION 12
NOW IN THE GEOGRAPHIC TOWNSHIP OF INNISFIL
CITY OF BARRIE
COUNTY OF SIMCOE



OWNER'S CERTIFICATE:

I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Date:

BARRIE-BRYNE DEVELOPMENTS
3200 HIGHWAY 7
VAUGHAN, ON L4K 5Z6
647-362-3212

SURVEYOR'S CERTIFICATE:

I hereby certify that the boundaries of the lands being subdivided and their correct relationship to the adjacent lands are accurately and correctly shown on this plan.

Date:

PIER DE ROSA, OLS, CLP
J.D BARNES LTD
142 COMMERCE PARK DRIVE, UNIT V
BARRIE, ONTARIO L4N 8W8
PHONE:

ADDITIONAL INFORMATION:

[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13], as amended to December 12, 2021.
a), b), e), f), g), j) & l) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - sandy silt to sand
k) - all services to be made available by developer

DEVELOPMENT STATISTICS:

BLOCKS	AREA(HA)
Semi-Detached (7.315 m) [Lots 1-33]:	1.914 ha
Street Townhouses (6.0 m) [Blk 34-54]:	2.721 ha
Back to Back Townhouses (6.4 m) [Blk 55-57]:	0.322 ha
Mid Rise Residential [Blk 58-59]:	3.351 ha
Employment Uses [Blks 60-67]:	11.992 ha
Park [Block 68]:	0.900 ha
Open Space [Blk 69-71]:	3.712 ha
SWMP [Blk 72,73]:	1.743 ha
Road Widening [Blk 74]:	2.074 ha
Hydro Easement [Blk 75-77]:	0.944 ha
Access Easement [Blk 78,79]:	0.092 ha
Roads:	3.496 ha
Total:	33.261 ha

SCALE 1:1500

0 75m

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REVISIONS LIST

02 MAR 2021	Revise Park & SWM & Open Space limits per Constraints Plan & dimensions/stats.
27 JAN 2021	Insert new survey. Update blocks, dimensions & stats.
10 JAN 2021	Revise S.W.M.P. Blk 72. Add block dimensioning & update stats.
23 DEC 2021	Revise Semi-detached frontages to 7.315 m wide
21 DEC 2021	First draft

Drawing Number: D3

File Number:	9683
Drawn By:	SM
Planner:	RG
Scale:	1:1500
CAD:	9683/D3 Draft Plan_2022_03_02.dgn

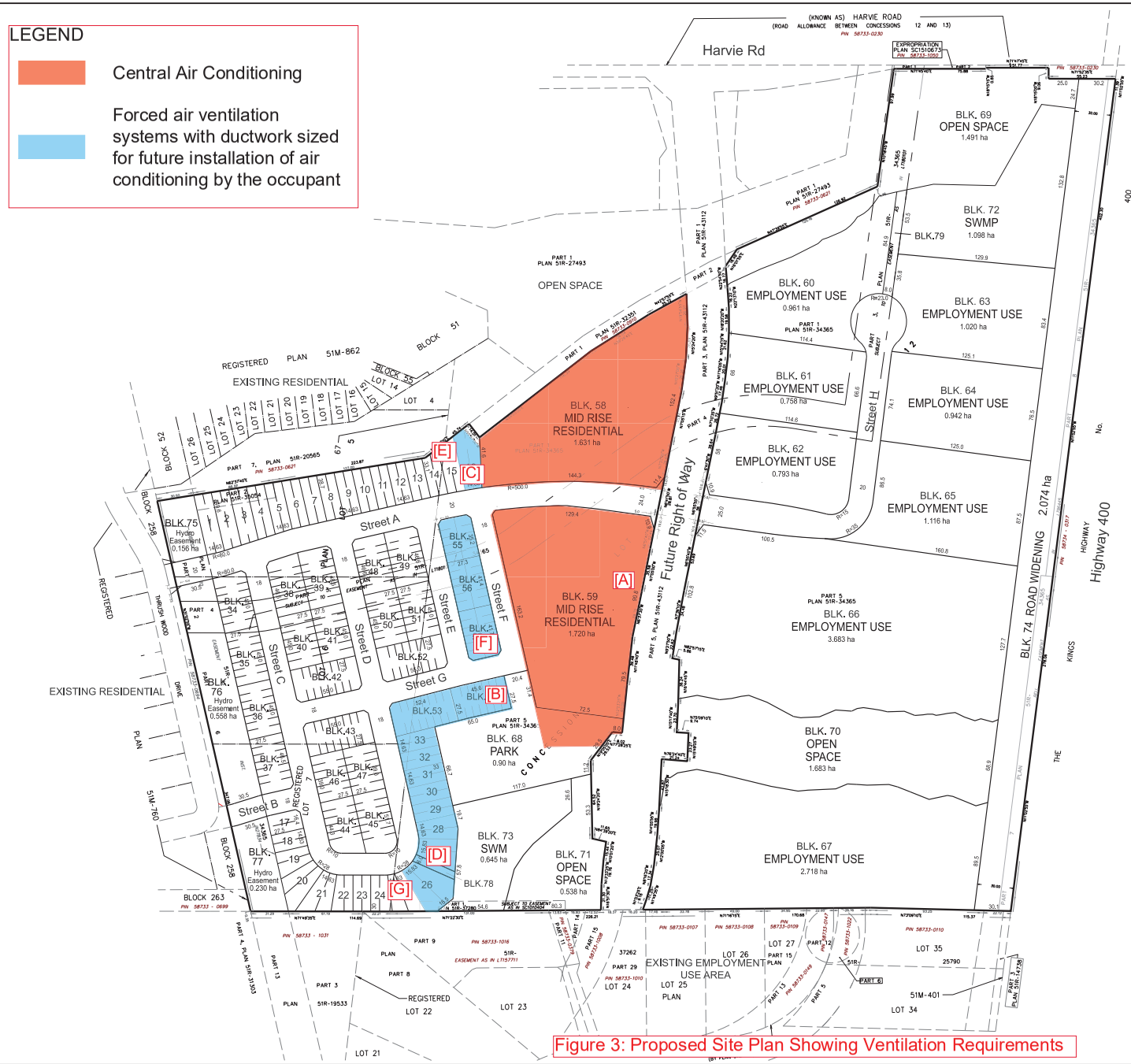
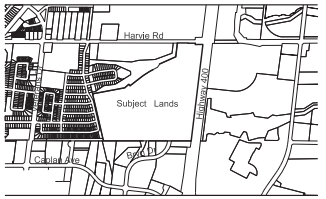


Figure 3: Proposed Site Plan Showing Ventilation Requirements

DRAFT PLAN OF SUBDIVISION

PART OF LOTS 5, 6 AND 7
REGISTERED PLAN 67
AND
PART OF LOT 7
CONCESSION 12
NOW IN THE GEOGRAPHIC TOWNSHIP OF INNISFIL
CITY OF BARRIE
COUNTY OF SIMCOE



OWNER'S CERTIFICATE:

I authorize Weston Consulting Group Inc. to prepare and submit this plan for draft approval.

Date:

BARRIE-BRYNE DEVELOPMENTS
3200 HIGHWAY 7
VAUGHAN, ON L4K 5Z6
647-362-3212

SURVEYOR'S CERTIFICATE:

I hereby certify that the boundaries of the lands being subdivided and their correct relationship to the adjacent lands are accurately and correctly shown on this plan.

Date:

PIER DE ROSA, OLS, CLP
J.D BARNES LTD
142 COMMERCE PARK DRIVE, UNIT V
BARRIE, ONTARIO L4N 8W8
PHONE:

ADDITIONAL INFORMATION:

[Section 51(17) of the Planning Act, R.S.O. 1990, c. P.13], as amended to December 12, 2021.
a), b), e), f), g), j) & l) - on plan.
c) - on key plan
d) - see statistics
h) - piped water to be installed by developer
i) - sandy silt to sand
k) - all services to be made available by developer

DEVELOPMENT STATISTICS:

BLOCKS	AREA(HA)
Semi-Detached (7.315 m) [Lots 1-33]:	1.914 ha
Street Townhouses (6.0 m) [Blk 34-54]:	2.721 ha
Back to Back Townhouses (6.4 m) [Blk 55-57]:	0.322 ha
Mid Rise Residential [Blk 58-59]:	3.351 ha
Employment Uses [Blks 60-67]:	11.992 ha
Park [Block 68]:	0.900 ha
Open Space [Blk 69-71]:	3.712 ha
SWMP [Blk 72,73]:	1.743 ha
Road Widening [Blk 74]:	2.074 ha
Hydro Easement [Blk 75-77]:	0.944 ha
Access Easement [Blk 78,79]:	0.092 ha
Roads:	3.496 ha
Total:	33.261 ha

SCALE 1:1500

0 75m

WESTON CONSULTING
1-800-363-3558 westonconsulting.com
Vaughan: 201 Millway Ave, Suite 19 Vaughan, Ontario L4K 5K8 T. 905.738.8080 F. 905.738.6637
Toronto: 268 Berkeley St. Toronto, Ontario M5A 2X1 T. 416.640.9917 F. 905.738.6637

REVISIONS LIST

02 MAR 2021	Revise Park & SWM & Open Space limits per Constraints Plan & dimensions/stats.
27 JAN 2021	Insert new survey. Update blocks, dimensions & stats.
10 JAN 2021	Revise S.W.M.P. Blk 72. Add block dimensioning & update stats.
23 DEC 2021	Revise Semi-detached frontages to 7.315 m wide
21 DEC 2021	First draft

Drawing Number: D3

File Number:	9683
Drawn By:	SM
Planner:	RG
Scale:	1:1500
CAD:	9683/D3 Draft Plan_2022_03_02.dgn

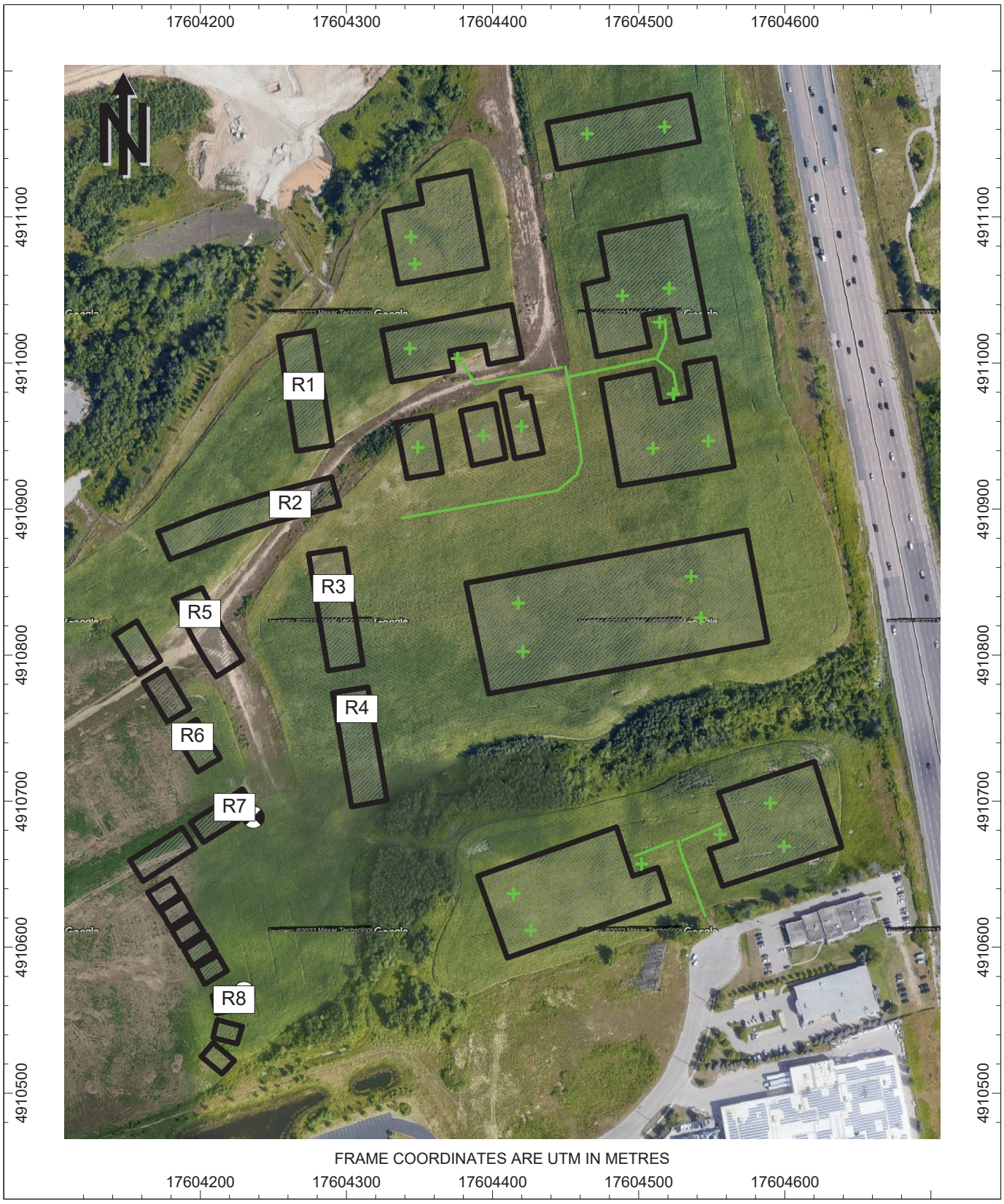


Figure 4 – Aerial Image Showing Noise Source Locations and Nearby Noise Sensitive Receptors

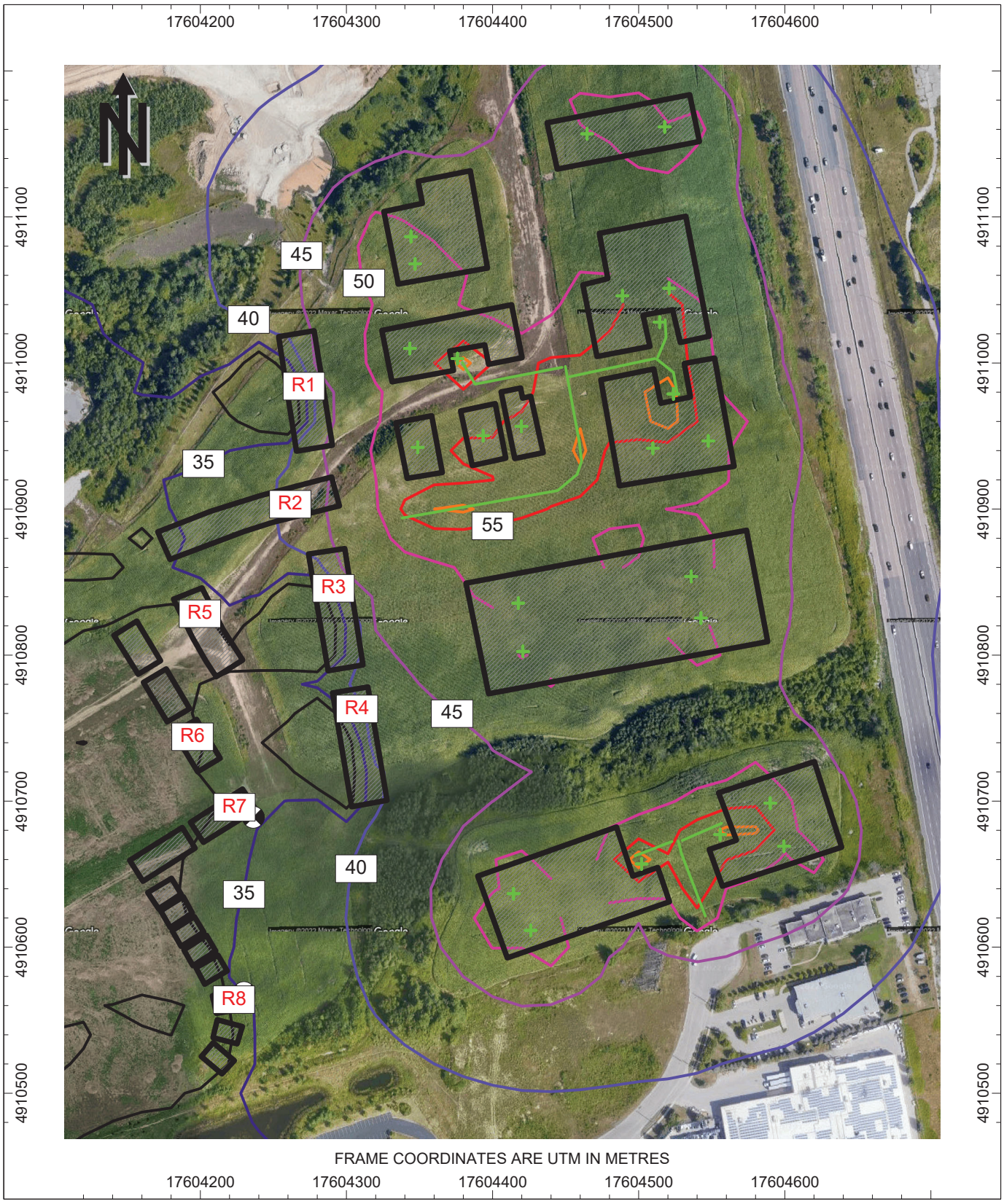


Figure 5 – Sound Level Contours at Nearby Receptors, Daytime/Evening, Unmitigated, dBA

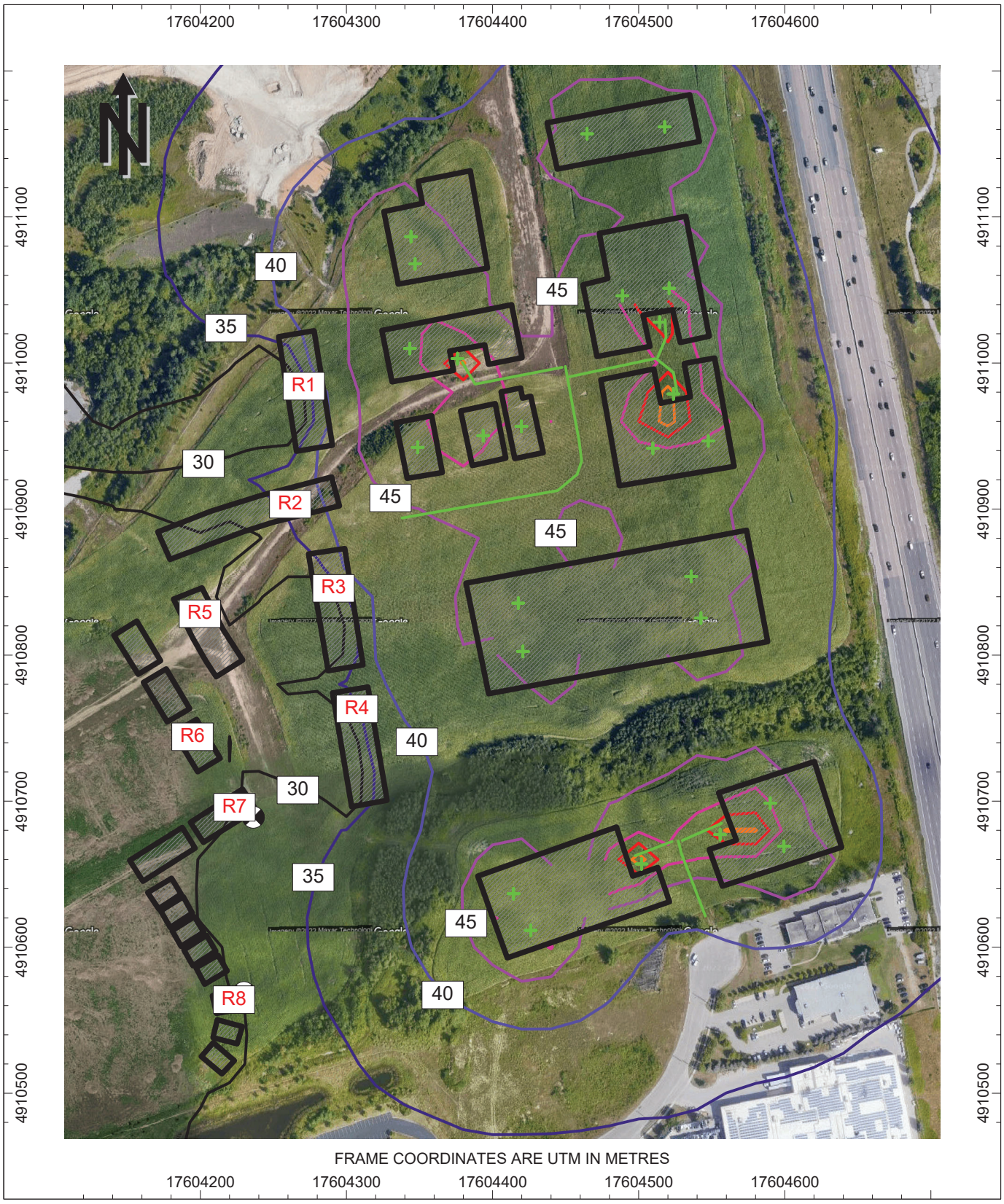


Figure 6 – Sound Level Contours at Nearby Receptors, Nighttime, Unmitigated, dBA

APPENDIX A

Road Traffic Data

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
400	MOLSON PARK DR-MAPLEVIEW DR IC 90	3.8	1988	IC	39,200	50,900	43,100	31,300	0.8
			1989	IC	42,400	54,600	47,000	34,700	0.9
			1990	IC	45,600	57,800	50,500	37,300	0.9
			1991	IC	47,200	59,400	52,300	39,100	0.4
			1992	IC	48,800	60,000	53,600	41,400	0.8
			1993	IC	50,500	63,600	56,000	40,900	0.5
			1994	IC	51,800	64,800	57,000	41,900	0.8
			1995	IC	53,100	66,900	59,500	42,900	0.6
			1996	IC	54,400	70,700	62,000	44,000	0.6
			1997	IC	59,300	77,100	67,600	47,900	0.6
			1998	IC	64,400	83,100	73,400	52,100	0.5
			1999	IC	69,500	89,700	78,900	56,200	0.9
			2000	IC	74,000	90,800	86,800	62,700	0.4
			2001	IC	76,100	93,600	89,000	76,100	0.4
			2002	IC	79,900	98,300	93,700	67,700	0.7
			2003	IC	88,400	108,700	103,400	75,100	0.6
			2004	IC	87,600	97,600	98,600	77,600	0.5
			2005	IC	86,400	96,100	97,000	76,200	0.4
			2006	IC	89,500	99,400	100,400	79,300	0.4
			2007	IC	92,500	102,800	105,900	81,800	0.5
			2008	IC	88,000	97,500	94,300	77,600	0.3
			2009	IC	95,300	105,600	106,600	84,500	0.3
			2010	IC	97,000	112,600	113,500	90,200	0.4
			2011	IC	98,000	107,800	111,700	88,200	N/A
			2012	IC	98,700	109,600	105,600	87,800	N/A
			2013	IC	90,000	99,900	99,000	80,100	N/A
			2014	IC	93,100	103,300	102,400	82,900	N/A
			2015	IC	106,300	118,000	116,900	94,600	N/A
			2016	IC	108,700	120,600	119,500	96,700	N/A
400	SIMCOE RD 27 IC-94-ESSA RD-BARRIE	2.4	1988	CTR	46,000	59,700	50,600	36,800	1.4
			1989	CTR	50,000	64,400	55,500	40,900	1.1
			1990	CTR	54,000	68,500	59,900	44,200	0.5
			1991	CTR	55,800	70,300	61,900	46,300	1.0

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
			1992	CTR	57,900	71,100	63,600	49,100	0.7
			1993	CTR	59,900	75,400	66,400	48,500	0.8
			1994	CTR	60,700	75,900	66,800	49,100	0.8
			1995	CTR	61,500	77,500	68,900	49,700	0.7
			1996	CTR	62,300	81,000	71,000	50,400	0.6
			1997	CTR	70,100	91,100	79,900	56,700	0.6
			1998	CTR	77,400	99,800	88,200	62,600	0.4
			1999	CTR	84,000	108,400	95,300	67,900	0.6
			2000	CTR	88,200	112,900	100,100	71,300	0.7
			2001	CTR	89,100	114,900	100,700	72,200	0.6
			2002	CTR	93,500	120,100	106,100	75,800	0.8
			2003	CTR	97,900	126,300	111,600	79,300	0.8
			2004	CTR	105,600	132,400	118,000	85,400	0.7
			2005	CTR	105,500	131,400	117,400	85,400	0.8
			2006	CTR	103,300	124,600	112,900	87,700	0.5
			2007	CTR	101,000	122,400	122,000	85,600	0.6
			2008	CTR	98,800	119,700	117,400	84,400	0.6
			2009	CTR	96,500	119,400	106,600	77,800	0.7
			2010	CTR	94,300	114,800	110,300	80,100	0.8
			2011	CTR	98,500	120,200	115,200	83,700	N/A
			2012	CTR	99,100	119,900	118,900	84,200	N/A
			2013	CTR	100,000	119,000	128,000	85,000	N/A
			2014	CTR	111,400	111,400	106,900	105,800	N/A
			2015	CTR	111,100	111,100	106,700	105,500	N/A
			2016	CTR	119,100	145,300	146,500	101,300	N/A
400	SIMCOE RD 90-DUNLOP ST IC-96-BARRIE	2.4	1988	CTR	48,400	62,900	53,200	38,700	0.9
			1989	CTR	52,000	67,000	57,700	42,600	1.4
			1990	CTR	55,600	70,600	61,700	45,500	0.7
			1991	CTR	56,000	70,500	62,100	46,400	0.8
			1992	CTR	58,000	71,200	63,700	49,200	0.7
			1993	CTR	60,100	75,700	66,700	48,600	0.7
			1994	CTR	64,900	81,100	71,400	52,500	0.7
			1995	CTR	65,400	82,400	73,200	52,900	1.1

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
			1996	CTR	66,400	86,300	75,700	53,700	0.9
			1997	CTR	74,100	96,300	84,500	59,900	0.4
			1998	CTR	78,600	101,400	89,600	63,500	0.4
			1999	CTR	84,700	109,300	97,200	67,800	0.5
			2000	CTR	88,900	113,800	100,900	71,900	0.7
			2001	CTR	90,300	116,500	102,000	73,100	0.5
			2002	CTR	94,200	121,000	106,800	76,400	0.7
			2003	CTR	98,200	126,700	111,900	79,500	0.6
			2004	CTR	101,300	127,000	113,200	81,900	0.7
			2005	CTR	98,300	122,400	109,400	79,600	0.7
			2006	CTR	108,600	131,000	118,700	92,200	0.6
			2007	CTR	103,900	125,900	125,500	88,000	0.5
			2008	CTR	106,700	129,200	126,800	91,200	0.5
			2009	CTR	91,100	101,000	101,900	80,800	0.5
			2010	CTR	112,300	124,300	125,300	99,600	0.4
			2011	CTR	105,000	115,500	119,700	94,500	N/A
			2012	CTR	110,200	122,300	117,900	98,100	N/A
			2013	CTR	112,300	124,700	123,500	99,900	N/A
			2014	CTR	105,600	117,200	116,200	94,000	N/A
			2015	CTR	106,700	118,400	117,400	95,000	N/A
			2016	CTR	109,400	133,400	134,500	93,000	N/A
400	HWY 26 IC-98-BAYFIELD ST-BARRIE	2.7	1988	CTR	35,300	45,800	38,800	28,200	0.7
			1989	CTR	39,000	50,300	43,200	31,900	0.5
			1990	CTR	42,500	53,900	47,100	34,800	0.5
			1991	CTR	44,200	55,600	49,000	36,600	0.5
			1992	CTR	45,900	56,400	50,400	39,000	0.4
			1993	CTR	47,700	60,100	52,900	38,600	0.4
			1994	CTR	51,400	64,300	56,500	41,600	0.3
			1995	CTR	54,000	68,000	60,500	43,700	0.3
			1996	CTR	56,700	73,700	64,600	45,800	0.4
			1997	CTR	59,300	77,100	67,600	47,900	0.4
			1998	CTR	61,900	79,900	70,600	50,000	0.4
			1999	CTR	64,600	83,300	73,300	52,200	0.3

Yvonne Lo

From: Bee, Christopher (MTO) <Christopher.Bee@ontario.ca>
Sent: January 6, 2022 2:59 PM
To: Yvonne Lo
Cc: Bee, Christopher (MTO)
Subject: RE: Commercial Vehicle Percentage % - Highway 400/Essa Road

To Yvonne Lo, HGC Engineering:

Happy and better New Year to you too!

This is official data from MTO at H400 and Essa

Year	% trucks
2012	12.0
2013	12.0
2014	12.0
2015	9.2
2016	7.4

HT-7.4*8/13=4.6%
MT-7.4*5/13=2.8%

"% trucks" include long trucks, short trucks, vans, cars with trailer, buses, and specials, but not regular cars.

You can plot the above data on a graph over time, and draw the best straight lien through the data points, and extend the straight line to 2019 to estimate recent data.
2020-2021 data cannot be trended because of COVID.

Regards

Christopher Bee
MTO CR
STIRCS, TIMD

From: Yvonne Lo <ylo@hgcengineering.com>
Sent: January 4, 2022 1:11 PM
To: Bee, Christopher (MTO) <Christopher.Bee@ontario.ca>
Subject: Commercial Vehicle Percentage % - Highway 400/Essa Road

Hi Christopher,

Hope you had a wonderful holiday. We are currently conducting a noise study for a proposed development located near Highway 400 and Essa Road.

Can you please provide the commercial vehicle percentages for the Highway 400 at Essa Road?

Thank you!

Yvonne Lo

From: David Perks <dperks@tathameng.com>
Sent: January 25, 2022 2:40 PM
To: Yvonne Lo
Subject: RE: Request For Proposal (Noise) - Barrie S2

Hi Yvonne,

The volumes for Bryne Drive (Caplan to Harvie):

Horizon Year: 2043
Peak Hour: 4200 vehicles (NB + SB)
Daily Volume: 21,000
Truck %: 3%

Let me know if you need anything else.

Regards,

David Perks, M.Sc.
Transportation Planner, Project Manager

Tatham Engineering Limited
41 King Street, Unit 4 | Barrie | Ontario | L4N 6B5
T 705-733-9037 x2066 | dperks@tathameng.com | tathameng.com

Enhancing our communities

From: Yvonne Lo <ylo@hgcengineering.com>
Sent: Tuesday, January 25, 2022 9:09 AM
To: David Perks <dperks@tathameng.com>
Subject: RE: Request For Proposal (Noise) - Barrie S2

Hi David,

We need ultimate horizon volumes. We want to use future traffic data to predict noise levels at the proposed buildings.

Trans-Plan Transportation Inc.

Site ID Code:
Intersection Location: Veterans Drive and Harvie Road
Municipality: Barrie, Ontario
Count Date: Thursday, February 9, 2017
Weather and Temperature: Clear, -10C Degrees
Surveyor: TP

AM	NORTH APPROACH											EAST APPROACH											SOUTH APPROACH											WEST APPROACH										
	CAR			TRUCKS			CYCLISTS			Peds	Total	CAR			TRUCKS			CYCLISTS			Peds	Total	CAR			TRUCKS			CYCLISTS			Peds	Total	CAR			TRUCKS			CYCLISTS			Peds	Total
	L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R		
7:15	7	72	0	0	2	0	0	0	0	0	81	1	1	11	0	0	0	0	0	0	0	13	2	33	0	0	3	0	0	0	0	0	38	0	0	3	0	0	0	0	0	0	0	3
7:30	7	87	0	2	1	0	0	0	0	2	97	1	1	8	0	0	1	0	0	0	1	11	0	43	1	0	3	0	0	0	0	1	47	1	2	3	0	0	0	0	0	0	1	6
7:45	11	98	0	0	1	0	0	0	0	1	110	0	0	16	0	1	0	0	0	0	0	17	2	64	2	0	3	0	0	0	0	0	71	0	0	6	0	0	1	0	0	0	0	7
8:00	14	154	0	0	4	0	0	0	0	0	172	1	1	18	0	0	0	0	0	0	0	20	0	41	1	0	3	0	0	0	0	0	45	0	1	11	0	0	0	0	0	0	0	12
8:15	5	125	0	0	1	0	0	0	0	0	131	3	0	13	0	0	0	0	0	0	0	16	2	68	3	0	5	0	0	0	0	0	78	0	0	6	0	0	0	0	0	0	0	6
8:30	15	133	0	0	2	0	0	0	0	1	150	5	0	12	1	1	0	0	0	0	3	19	2	64	4	0	2	0	0	0	0	1	72	1	1	13	0	0	0	0	0	0	0	15
8:45	34	128	0	2	2	0	0	0	0	2	166	4	0	24	0	0	1	0	0	0	7	29	1	72	8	1	3	0	0	0	0	0	85	1	2	9	0	0	1	0	0	0	0	13
9:00	33	165	0	0	2	0	0	0	0	0	200	3	0	39	0	0	0	0	0	0	5	42	2	72	5	0	2	0	0	0	0	1	81	1	1	4	0	0	0	0	0	0	1	6
MD	.																																											
11:15	5	105	0	0	2	0	0	0	0	0	112	0	1	5	0	0	0	0	0	0	0	6	3	100	0	0	3	0	0	0	0	0	106	0	1	6	0	0	0	0	0	0	0	7
11:30	10	108	0	0	4	0	0	0	0	0	122	0	2	5	0	0	0	0	0	0	0	7	5	100	3	0	1	0	0	0	0	0	109	1	1	4	0	0	0	0	0	0	0	6
11:45	10	122	0	0	3	0	0	0	0	0	135	3	1	11	0	0	2	0	0	0	1	17	2	96	1	0	4	0	0	0	0	1	103	1	0	3	0	0	0	0	0	0	2	4
12:00	3	125	0	0	2	0	0	0	0	0	130	0	0	8	0	0	1	0	0	0	0	9	0	114	0	0	2	0	0	0	0	0	116	1	0	3	0	0	0	0	0	0	0	4
12:15	5	118	0	1	4	0	0	0	0	1	128	2	0	5	0	0	0	0	0	0	1	7	6	135	0	0	3	0	0	0	0	0	144	0	0	4	0	0	0	0	0	0	0	4
12:30	6	132	0	0	1	1	0	0	0	0	140	0	0	5	0	0	0	0	0	0	0	5	4	125	2	0	5	0	0	0	0	0	136	0	0	8	0	0	1	0	0	0	1	9
12:45	10	121	0	0	2	0	0	0	0	1	133	0	1	7	0	0	0	0	0	0	0	8	4	117	0	0	4	0	0	0	0	0	125	0	0	2	0	0	1	0	0	0	0	3
13:00	6	114	0	0	3	0	0	0	0	0	123	0	0	1	0	0	0	0	0	0	0	1	5	129	1	0	3	0	0	0	0	0	138	0	0	0	0	0	0	0	0	0	1	0
13:15	9	122	0	0	1	0	0	0	0	0	132	2	0	5	0	0	0	0	0	0	0	7	2	123	1	0	2	0	0	0	0	0	128	0	0	2	0	0	0	0	0	0	0	2
13:30	5	109	0	0	3	0	0	0	0	1	117	2	0	3	0	0	0	0	0	0	0	5	4	117	1	0	1	0	0	0	0	0	123	0	1	7	0	0	0	0	0	0	1	9
13:45	2	143	0	0	1	0	0	0	0	0	146	0	1	6	0	0	0	0	0	0	0	7	8	119	0	0	7	0	0	0	0	0	134	0	0	2	0	0	0	0	0	0	0	2
14:00	12	126	0	0	3	0	0	0	0	0	141	0	0	4	0	0	0	0	0	0	1	4	5	129	0	0	2	0	0	0	0	0	136	2	0	8	0	0	1	0	0	0	0	11
PM																																												
15:15	21	104	0	0	3	0	0	0	0	0	128	1	0	6	0	0	0	0	0	0	3	7	3	152	2	0	4	0	0	0	0	0	161	1	1	3	0	0	0	0	0	0	2	5
15:30	15	124	0	0	5	0	0	0	0	0	144	0	1	14	0	0	0	0	0	0	8	15	3	153	1	0	1	0	0	0	0	0	158	0	1	3	0	0	0	0	0	0	5	4
15:45	11	138	0	0	3	0	0	0	0	0	152	1	0	15	0	0	1	0	0	0	9	17	3	146	3	0	5	0	0	0	0	1	157	1	0	4	0	0	0	0	0	0	0	5
16:00	14	125	0	1	4	0	0	0	0	1	144	0	0	13	0	0	0	0	0	0	0	13	6	169	3	0	4	0	0	0	0	0	182	2	1	7	0	0	0	0	0	0	2	10
16:15	20	136	0	0	3	0	0	0	0	0	159	1	1	17	0	0	0	0	0	0	0	19	5	211	3	1	1	0	0	0	0	0	221	1	1	5	0	1	1	0	0	0	0	9
16:30	16	130	0	0	3	0	0	0	0	0	149	2	1	15	0	0	0	0	0	0	2	18	9	203	4	0	3	0	0	0	0	0	219	0	1	7	0	0	0	0	0	0	1	8
16:45	9	145	0	0	3	0	0	0	0	0	157	2	4	21	0	0	0	0	0	0	0	27	7	215	5	0	2	0	0	0	0	0	229	3	0	9	0	0	0	0	0	0	1	12
17:00	21	159	0	0	6	0	0	0	0	0	186	2	1	12	0	0	0	0	0	0	1	15	9	181	1	0	0	0	0	0	0	0	191	1	0	9	0	0	0	0	0	0	0	10
17:15	15	140	0	0	2	0	0	0	0	0	157	1	0	14	0	0	0	0	0	0	3	15	8	228	2	0	1	0	0	0	0	0	239	0	0	8	0	0	0	0	0	0	0	8
17:30	13	124	0	0	3	0	0	0	0	0	140	1	1	10	0	0	0	0	0	0	0	12	9	202	0	0	1	0	0	0	0	0	212	0	0	3	0	0	0	0	0	0	0	3
17:45	14	125	0	0	1	0	0	0	0	0	140	2	0	8	0	0	0	0	0	0	0	10	6	198	2	0	2	0	0	0	0	0	208	2	0	5	0	0	0	0	0	0	0	7
18:00	11	137	0	0	1	0	0	0	0	0	149	1	2	9	0	0	0	0	0	0	4	12	12	173	2	0	1	0	0	0	0	0	188	0	0	5	0	0	0	0	0	0	0	5

TRANS-PLAN
transportation engineering

Turning Movement Count Diagram

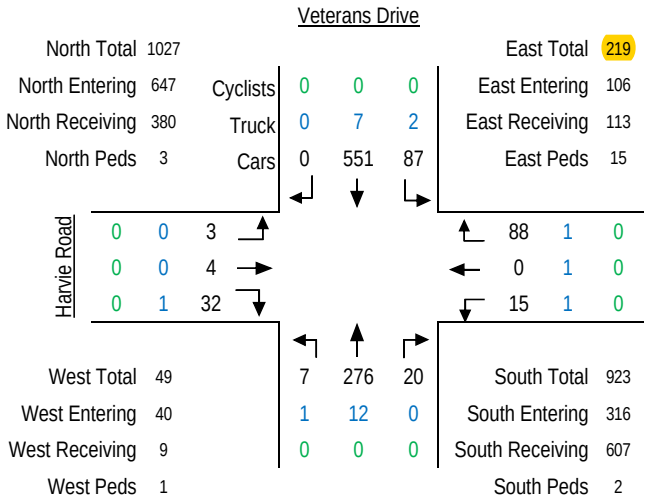
Intersection: Veterans Drive and Harvie Road

Intersection ID:

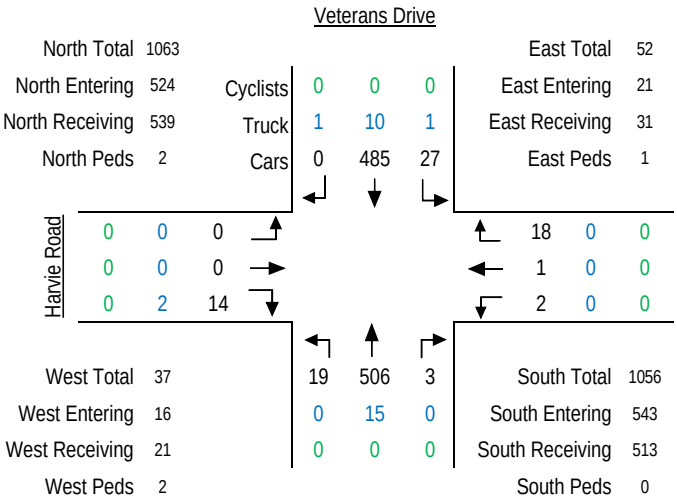
Municipality: Barrie, Ontario

Date: Thursday, February 9, 2017

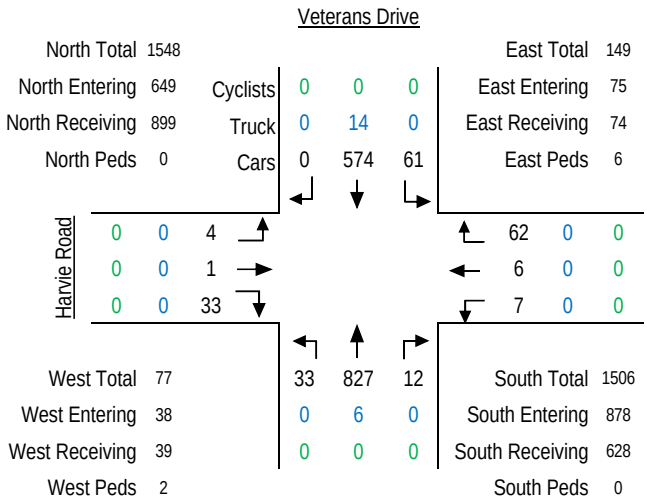
AM Peak Hour: 8:00 to 9:00



MD Peak Hour: 12:00 to 13:00

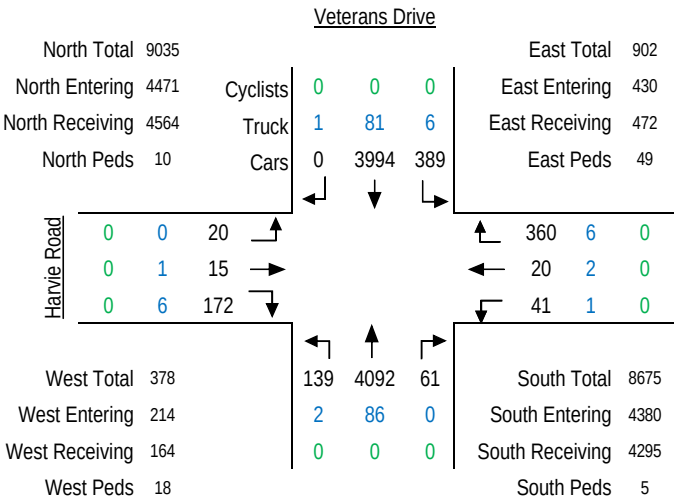


PM Peak Hour: 16:15 to 17:15



(3+2+0+0)/219 = 1.4%
HT-1.4*8/13=0.9%
MT-1.4*5/13=0.5%

Total 8-Hour Count



APPENDIX B

Sample STAMSON 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 16-03-2022 31:11:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te Time Period: Day/Night 16/8 hours
Description: **Predicted daytime and nighttime sound levels at the proposed mid-rise buildings adjacent to Bryne Drive , prediction location [A].**

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

Car traffic volume : 66582/33286 veh/TimePeriod *
Medium truck volume : 2013/1006 veh/TimePeriod *
Heavy truck volume : 3308/1654 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): 72650
Percentage of Annual Growth : 2.50
Number of Years of Growth : 16.00
Medium Truck % of Total Volume : 2.80
Heavy Truck % of Total Volume : 4.60
Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 1: HWY400 (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 : 440.00 / 440.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: HWY400 (day/night)

Car traffic volume : 66582/33286 veh/TimePeriod *
Medium truck volume : 2013/1006 veh/TimePeriod *
Heavy truck volume : 3308/1654 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): 72650
Percentage of Annual Growth : 2.50
Number of Years of Growth : 16.00
Medium Truck % of Total Volume : 2.80
Heavy Truck % of Total Volume : 4.60
Day (16 hrs) % of Total Volume : 66.67

```
Data for Segment # 2: HWY400 (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  : 456.00 / 456.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: Byrne (day/night)
----------------------------------------
Car traffic volume  : 18333/2037  veh/TimePeriod  *
Medium truck volume :   227/25    veh/TimePeriod  *
Heavy truck volume  :   340/38    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

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

    24 hr Traffic Volume (AADT or SADT):  21000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   1.20
    Heavy Truck  % of Total Volume     :   1.80
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Byrne (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  : 115.00 / 115.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
Results segment # 1: HWY400 (day)
---------------------------------

Source height = 1.46 m

ROAD (0.00 + 66.15 + 0.00) = 66.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  80.82   0.00 -14.67   0.00   0.00   0.00   0.00
66.15
-------------------------------------------------------------------------
---
```

```
Segment Leq : 66.15 dBA

Results segment # 2: HWY400 (day)
---------------------------------

Source height = 1.46 m

ROAD (0.00 + 65.99 + 0.00) = 65.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  80.82   0.00 -14.83   0.00   0.00   0.00   0.00
65.99
-------------------------------------------------------------------------
---

Segment Leq : 65.99 dBA

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

Source height = 1.16 m

ROAD (0.00 + 57.54 + 0.00) = 57.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  66.39   0.00  -8.85   0.00   0.00   0.00   0.00
57.54
-------------------------------------------------------------------------
---

Segment Leq : 57.54 dBA

Total Leq All Segments: 69.38 dBA

Results segment # 1: HWY400 (night)
-----------------------------------

Source height = 1.46 m

ROAD (0.00 + 66.15 + 0.00) = 66.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  80.82   0.00 -14.67   0.00   0.00   0.00   0.00
66.15
-------------------------------------------------------------------------
---

Segment Leq : 66.15 dBA
```

```
Results segment # 2: HWY400 (night)
----------------------------------

Source height = 1.46 m

ROAD (0.00 + 65.99 + 0.00) = 65.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  80.82   0.00 -14.83   0.00   0.00   0.00   0.00
65.99
-------------------------------------------------------------------------
---

Segment Leq : 65.99 dBA

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

Source height = 1.16 m

ROAD (0.00 + 51.02 + 0.00) = 51.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.00  59.87   0.00  -8.85   0.00   0.00   0.00   0.00
51.02
-------------------------------------------------------------------------
---

Segment Leq : 51.02 dBA

Total Leq All Segments: 69.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.38
                           (NIGHT): 69.15
```