HGC ENGINEERING

Howe Gastmeier Chapnik Limited
2000 Argentia Road, Plaza One, Suite 203
Mississauga, Ontario, Canada L5N 1P7
t: 905.826.4044

Noise Feasibility Study
Proposed Mixed-Use Development
171 King Street East, Thornbury, Ontario

Prepared for:

The Corporation of the Town of Blue Mountains
32 Mill Street, 2nd Floor
Thornbury, ON
N0H 2P0

Prepared by:

Sheeba Paul, MEng

April 6, 2020

HGC Project No.01900874

Table of Contents

1 Introduction and Summary

Howe Gastmeier Chapnik Limited (HGC Engineering) was retained by the Blue Mountain Attainable Housing Corporation (BMAHC) to conduct a noise feasibility study for a proposed mixed-use development as part of the approvals process. A separate Land Use Compatibility and D-2 Assessment has been completed by Ortech to assess odour and other potential contaminants. The site is located at 171 King Street East in Thornbury, Town of Blue Mountains, Ontario. The study follows Ministry of the Environment, Conservation and Parks (MECP) guidelines with regards to the impact of noise.

Due to the site's proximity to the Thornbury Wastewater Treatment Plant, Town Official Plan Section C11 states the following:

Land uses and development which may be sensitive to the effects of odour, noise, and other contaminants including residences, day care centres, or commercial, industrial and health facilities shall generally not be permitted within 100 metres of a municipal sewage treatment plant property line. This buffer area for the Thornbury and Craigleith sewage treatment plant is shown on the Constraint Mapping. All land uses and development within the buffer setback shall be subject to a relevant study submitted for review by the County of Grey and Town of The Blue Mountains to address the current and future impacts, and to assess appropriate design, buffering and separation distances in conformity with Ministry of Environment and Climate Change guidelines and information requirements. Implementation of the study's recommendations may be required under an agreement between the proponent and the municipality.

Furthermore, a portion of the lands as depicted in Attachment 1 are subject to Holding Zone Category 5. Specifically, the terms of lifting this holding zone to facilitate redevelopment on the subject lands are the following as outlined in Section 10.2.5 of the Town of The Blue Mountains Comprehensive Zoning Bylaw 2018-65:

The Holding (h5) provision applies to land uses and development which may be sensitive to the odours, noise and other contaminants within 100 metres of a municipal wastewater facility (sewage treatment plant). The Holding Provision (h5) may be lifted once it is determined through relevant

study to address the current and future impacts and to assess appropriate design, buffering and separation distances in conformity with the Ministry of Environment and Climate Change guidelines to the satisfaction of the County of Grey and Town of The Blue Mountains.

Road traffic data for King Street/Highway 26 was obtained from the Ontario Ministry of Transportation, Highway 26 Transportation Study, Georgian Triangle Area – Traffic Report prepared by AECOM. The traffic sound level predictions indicate that noise control measures should be incorporated into the building design such that sound levels can comply with the MECP noise criteria. The recommended noise control measures, including some design guidelines, noise warning clauses and suitable ventilation systems for the proposed development are provided. Providing that the proposed building is sufficiently setback (20 m or more) from the centerline of King Street/Highway 26, glazing and wall constructions meeting the requirements of the Ontario Building Code will provide adequate sound insulation.

There are existing residential uses, commercial uses, a Water Reservoir and the Thornbury Sewage Treatment Plant (WWTP) near the subject site. Information regarding the sewage treatment plant was obtained from Town personnel, site observations and sound level measurements taken during the site visit. The results of the assessment indicate that the noise emissions from the nearby sewage treatment facility and equipment associated with the water reservoir including a generator can be within the applicable noise guideline limits of the MECP at the proposed mixed-use development, respecting a 20 m distance setback from the southern property line. A noise warning clause is also recommended to inform future residents of the presence of these facilities.

2 Site Description and Noise Sources

Figure 1 is a key plan of the site and indicates a north arrow. The site is to be located on the south side of Highway 26 (King Street East) and north of Grey Street, specifically at 171 King Street East in Thornbury, Town of Blue Mountains, Ontario. A specific site plan has not been developed, but the property boundary is provided in Figure 1. The site may include a 3, 4 or 5-storey mixed-use building. In this assessment, a 5-storey mixed-use building was assumed in the analysis. An assumed building envelope is provided in Figure 3 along with sound level prediction locations for traffic noise.

An aerial photo showing the site and surrounding land uses is provided as Figure 2. HGC Engineering personnel visited the site in February 2020 in order to investigate the acoustic and topographic environment of the site and to have a tour of the sewage treatment facility and conduct sound level measurements at the sewage treatment facility and the adjacent water reservoir facility. Both facilities have restricted (gated) access. The acoustical environment surrounding the site is urban in nature (Class 1 Area). There are existing residential uses to the north of the site and further east close to the lake, exiting commercial uses on the east side of King Street East including a storage facility (SOS) and a Home Hardware to the further southeast with outdoor storage. Road traffic was the dominant source of sound at the subject site. The Thornbury Wastewater Treatment Plant (WWTP) and the Town's Water Reservoir (WS) are located nearby to the subject site. An investigation of the potential noise impact from WWTP and WS is provided in Section 5.2.

3 Criteria

3.1 Road Traffic Noise

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

Table 1: MECP Road Traffic Noise Criteria [dBA]

Space	Daytime L_{EQ} (16 hour) Road	Night-time L_{EQ} (8 hour) Road
Outdoor Living Areas	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, while night-time refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace or other areas where passive recreation is expected to occur. Balconies that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines.

The guidelines in the MECP publication allow the sound level in an OLA to be exceeded by up to 5 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 all dwellings where night-time sound levels at the façade exceed 60 dBA and/or daytime sound levels at the façade exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when night-time sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA and/or when daytime sound levels at living/dining room or bedroom 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 façade sound level is greater than 60 dBA during the night-time hours and/or greater than 65 dBA during the daytime hours.

Warning clauses are required to notify future residents of possible excesses when night-time sound levels exceed 50 dBA at the plane of the windows and/or when daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the windows.

3.2 Criteria for Stationary (Industrial) Sources of Sound

MECP Guideline NPC-300 is the applicable guideline for use in investigating Land Use Compatibility issues with regards to noise. An industrial or commercial facility is classified in the MECP Guideline NPC-300 as a stationary source of sound (as compared to sources such as traffic or construction, for example) for noise assessment purposes. A stationary noise source encompasses the noise from all the activities and equipment within the property boundary of a facility including regular on-site truck traffic, material handling and mechanical equipment. In terms of background sound, the development is located in an urban acoustical environment which is characterized by an acoustical environment dominated by road traffic and human activity.

Stationary Source (Steady Sound)

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 commercial/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 (within 30 m of a dwelling façade). NPC-300 stipulates that the exclusionary sound level limit for a stationary noise source in an urban Class 1 area are taken to be 50 dBA during daytime and evening hours (07:00 to 19:00 and 19:00 to 23:00), and 45 dBA during night-time hours (23:00 to 07:00) at the plane of the windows of noise sensitive spaces. If the background sound levels due to road traffic exceed the exclusionary limits, then that background sound level becomes the criterion. The background sound level is defined as the sound level that occurs when the source under consideration is not operating, and may include traffic noise and natural sounds.

Generators

The sound level limits for noise produced by emergency equipment operating in non-emergency situations, such as testing or maintenance of such equipment, are 5 dB greater than the sound level limits otherwise applicable to stationary sources (or 55 dBA). The noise produced by emergency equipment operating in non-emergency situations should be assessed independently of all other stationary sources of noise. Specifically, the emissions are not required to be included with the overall noise assessment of a stationary source facility.

In addition, sound level limits do not apply to emergency equipment operating in emergency situations.

Other Activities

Commercial activities such as the occasional movement of customer/employee vehicles, and garbage collection are not of themselves considered to be significant noise sources in the MECP guidelines.

Compliance with MECP criteria generally results in acceptable levels of sound at residential receptors although there may be residual audibility during periods of low background sound.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Road traffic information was obtained from a report entitled, "Highway 26 Transportation Study, Georgian Triangle Area – Traffic Report" prepared by AECOM dated October 2014. Relevant pages are included in Appendix A. The traffic data was further projected to the year 2030 using a 2.5% growth rate. A commercial vehicle percentage of 6% was used in the analysis and was further split into 3.7% and 2.3% for medium and heavy trucks, respectively, using the Ministry of Transportation (MTO) split. A day/night split of 90%/10% along with a design speed limit of 50 km/hr was also used in the analysis. Table 2 summarizes the traffic volume data used in this study.

Table 2: Projected Road Traffic Data to Year 2030

Road Name	Time Period	Cars	Medium Trucks	Heavy Trucks	Total
Highway 26/King Street East	Daytime	15 001	367	590	15 959
	Night-time	1 667	41	66	1 773
	Total	**16 668**	**408**	**656**	**17 732**

4.2 Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04. Sample STAMSON outputs are included in Appendix B.

Sound levels were predicted at the plane of the top storey (5th storey) bedroom and/or living/dining room windows during daytime and night-time hours to investigate ventilation requirements. Since a site plan was not yet available, minimum distance setbacks of a future building were estimated. The approximate location of the proposed building is shown in Figure 3. Prediction locations were chosen around the site to obtain a representation of the future sound levels at various future facades and potential outdoor living areas. The results of these predictions are summarized in Table 3. The acoustic recommendations may be subject to modifications when the site plan is available and actual building setbacks are available.

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

Prediction Location	Description	Daytime - in OLA Total $L_{EQ(16)}$	Daytime - at Façade Total $L_{EQ(16)}$	Night-time - at Façade Total $L_{EQ(8)}$
[A]	Façade of Building Setback 15 m from the centerline of Highway 26	NA	67	61
[B]	Façade of Building Setback 20 m from the centerline of Highway 26	NA	65	59
[C]	Potential outdoor amenity area (70 m or more from centerline of Highway 26)	55	NA	NA

4.3 Traffic Noise Recommendations

The predictions indicate that the future traffic sound levels from Highway 26/King Street will exceed MECP guidelines at the future building facades with exposure to the roadway. The following discussion outlines recommendations for ventilation requirements, upgraded building façade constructions and warning clauses to achieve the noise criteria stated in Table 1.

4.3.1 Outdoor Living Areas

A potential outdoor amenity area located 70 m or more from the centerline of Highway 26 will have sound levels meeting 55 dBA. Physical mitigation in the form of acoustic barrier will not be required.

Balconies or terraces less than 4 m in depth may be included for the mixed-use building. These areas are not considered to be outdoor living areas and a noise assessment is not required.

4.3.2 Indoor Living Areas & Ventilation Requirements

Central Air Conditioning

If the building façade is located 15 m to 19 m from the centerline of Highway 26, the predicted sound levels will be greater than 65 dBA during the daytime hours and greater than 60 dBA during the night-time hours. To address these excesses, the MECP guidelines require that the building include central air conditioning.

Forced Air Ventilation Systems

If the building façade is located 20 m or more from the centerline of Highway 26, the predicted sound levels will be between 56 and 65 dBA during the daytime hours and/or between 51 dBA and 60 dBA during the night-time hours. To address these excesses, the MECP guidelines recommend that the units be equipped with forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant. The guidelines also recommend warning clauses for these dwelling units.

Window or through-the-wall air conditioning units are not recommended for any residential units 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. Acceptable units are those 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 as applicable.

4.3.3 Building Façade Constructions

If the building façade is located 15 m to 19 m from the centerline of Highway 26, building façade constructions are required to be selected based on the predicted sound levels. Detailed floor plans and building elevations will be required to complete this selection.

If the building façade is located 20 m or more from the centerline of Highway 26, any exterior wall and double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for these dwellings.

4.3.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale or rental agreements with anticipated traffic sound level excesses.

Suggested wording for future dwellings which have sound levels in excess of MECP criteria but do not require mitigation measures is given below.

Type A:

> Purchasers/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 sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

OR

Suggested wording for future dwellings with daytime OLA sound levels exceeding the MECP criteria for which physical mitigation has been provided to meet the applicable limit 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 Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria.

Suggested wording for future dwellings which have provisions for central air conditioning to be installed is given below.

Type C:

> 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.

OR

Suggested wording for future dwellings which include central air conditionings is given below.

Type C:

> This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Ministry of the Environment, Conservation and Parks' noise criteria.

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

5 Stationary (Industrial/Commercial) Noise Assessment

5.1 Discussion of Nearby Industrial and Commercial Facilities

Under MECP guidelines D-2 "Compatibility between Sewage Treatment and Sensitive Land Use", a separation distance of less than 100 metres may be permitted, however a qualified professional must produce a study showing the feasibility of the distance based on:

- the application of noise reduction equipment to any potential noise source(s),
- the degree and type of odour mitigation applied to the facility, and
- other contaminants of concern (i.e. aerosols) which may need to be addressed.

HGC Engineering personnel observed the operations of the neighbouring commercial and industrial facilities and conducted sound level measurements in February 2020. The wastewater treatment plant and the water reservoir facility located to the south and southeast of the site was found to have the potential to impact the proposed mixed-use/residential development and additional discussion is provided below with regards to the wastewater treatment plant and water reservoir facility.

Wastewater Treatment Plant (WWTP)

The WWTP operates 24 hours per day. The southeast corner boundary of the proposed mixed-use/residential development is within the 100 m setback distance from the WWTP as indicated in Figure 4. An approximately 3 m high berm is located along the northern boundary of the WWTP. Based on information provided by the Town to Blue Mountain personnel, it is understood that while the WWTP is a 24 hours per day facility, sludge material haulage during the night-time hours is not expected. A tanker truck delivery of alum could potentially occur once every 3 to 4 weeks. Although, this is not frequent, it has been included in the analysis.

The WWTP is proposed to undergo upgrades and modifications as part of a future expansion within the next 5 years. This will include additional aeration basins, clarifier, sand filtration and a backup generator. Any noise sources such as mechanical rooftop units, generator and trucking activities and deliveries should be considered in the updated Environmental Compliance Approval (ECA) for the WWTP at that time.

Short term L_{EQ} sound level measurements were conducted at one location while the generator was

tested, located inside of the building at the water reservoir facility. The measurements are summarized below. Measurement locations are shown on Figure 4. The generator is tested once month during the mid-morning hours.

Table 4 – Attended Sound Level Measurements

Measurement Location	Date	Time	$L_{EQ20min}$ [dBA]	$L_{9020min}$ [dBA]	Comments
M1	Feb 24, 2020	14:22	52	52	Traffic audible, generator steady and dominant

5.2 Noise Assessment

Steady Sources

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 2020 MR1 (32 bit) build: 177.5010), in order to estimate the sound levels from the existing industrial 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 sound power levels measured and obtained from similar facilities examined under other studies by HGC Engineering were used in the analysis and are summarized in Table 5.

Table 5: Source Sound Power Levels [dB re 10-12 W]

Source	Octave Band Centre Frequency [Hz]								
	63	125	250	500	1k	2k	4k	8k	A
Truck Passby	101	100	94	96	97	95	91	86	101
Blower Truck	104	106	105	104	101	103	95	86	107
Exhaust fan	78	85	79	69	64	63	58	54	75

The above outlined sound levels and various features of the site were used as input to a predictive computer model. A blower truck is shown as a green cross and a truck route is identified as a green line.

The following information and assumptions were used in the analysis:

- The height of the buildings at the WWTP and water reservoir were assumed to be 3 - 4 m in height.

Assumed daytime/evening worst-case busiest hour scenario (steady sources):

WWTP

- One tanker truck is assumed to enter and depart the facility at the east side of the facility for a full hour.
- Exhaust fans are located on the roofs of the buildings.

Water Reservoir Buildings

- Exhaust fans are located on the roofs of the buildings, and are assumed to operate for a full hour.

Assumed night-time worst-case busiest hour scenario (steady sources):

WWTP

- No night-time truck deliveries.
- Exhaust fans are assumed to operate for a full hour.

5.3 Results

As previously noted, a site plan has not yet been developed for the site. In the absence of a site plan, a building location has been assumed for modeling purposes to determine the impact of a future building near the WWTP.

Steady Source Noise

The calculations consider the acoustical effects of distance and shielding by the buildings. The predicted sound levels due to the trucking activities at the closest façade of the proposed mixed-use building during an assumed worst-case busiest hour operating scenario, are summarized in Table 6 and on Figures 5 and 6.

Table 6: Predicted Steady Sources Sound Levels at Subject Site during a Worst-case Operating Scenario Hour [dBA]

Receptor Location	Criteria Day/Night (dBA)	Daytime (07:00-23:00)	Night-time (23:00-07:00)
R1	50 / 45	49	<30
R2	50 / 45	50	30

Note: Receptor height is 15 m above ground

The results of this analysis indicate that the predicted stationary sources of sound will meet the applicable sound level limits at the proposed mixed-use/residential development under an assumed worst-case operating scenario with the setback of the façade of the building at 20 m from the south property boundary. Further setbacks are also feasible.

The presence of the nearby industrial facilities should be addressed through the implementation of a noise warning clause in the offers of purchase and sale and tenancy agreements for the residential units in the development. An example of the required noise warning clause is provided below.

Type D:

> Purchasers/tenants are advised that due to the proximity of the adjacent industrial facilities, noise levels from the industrial facilities may be at times be audible.

The sample clause is provided as an example only and can be modified by the Municipality as

required.

6 Summary of Recommendations

The results of the study indicate that the proposed mixed-use/residential development is feasible. Sound levels due to road traffic will exceed MECP guidelines at the facades of the building closest to Highway 26, but feasible means of mitigation exist to address the excesses. We have the following recommendations:

Transportation Noise

1. A potential outdoor amenity area located 70 m or more from the centerline of Highway 26 will have sound levels meeting 55 dBA. Physical mitigation in the form of acoustic barrier will not be required.

2. If the building façade is located 15 m to 19 m from the centerline of Highway 26, the building should include central air conditioning. If the building façade is located 20 m or more from the centerline of Highway 26, the building should include forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant.

3. Warning clauses should be used to inform future residents of the road traffic noise.

4. When a site plan is developed, the acoustic recommendations should be refined.

Stationary Noise

5. The minimum distance setback of 20 m from the southern boundary line should be adhered to.

6. Warning clauses should be used to inform future residents of the presence of nearby institutional, industrial and commercial facilities.

Refer to previous sections in the report where these recommendations are discussed in more detail.

7 Implementation

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

1) Before the issuance of building permits for the mixed-use building, the acoustic requirements should be refined as the site plan is development. Once the building plans are available, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review to confirm that the required noise control measures, as approved, have been included in their entirety.

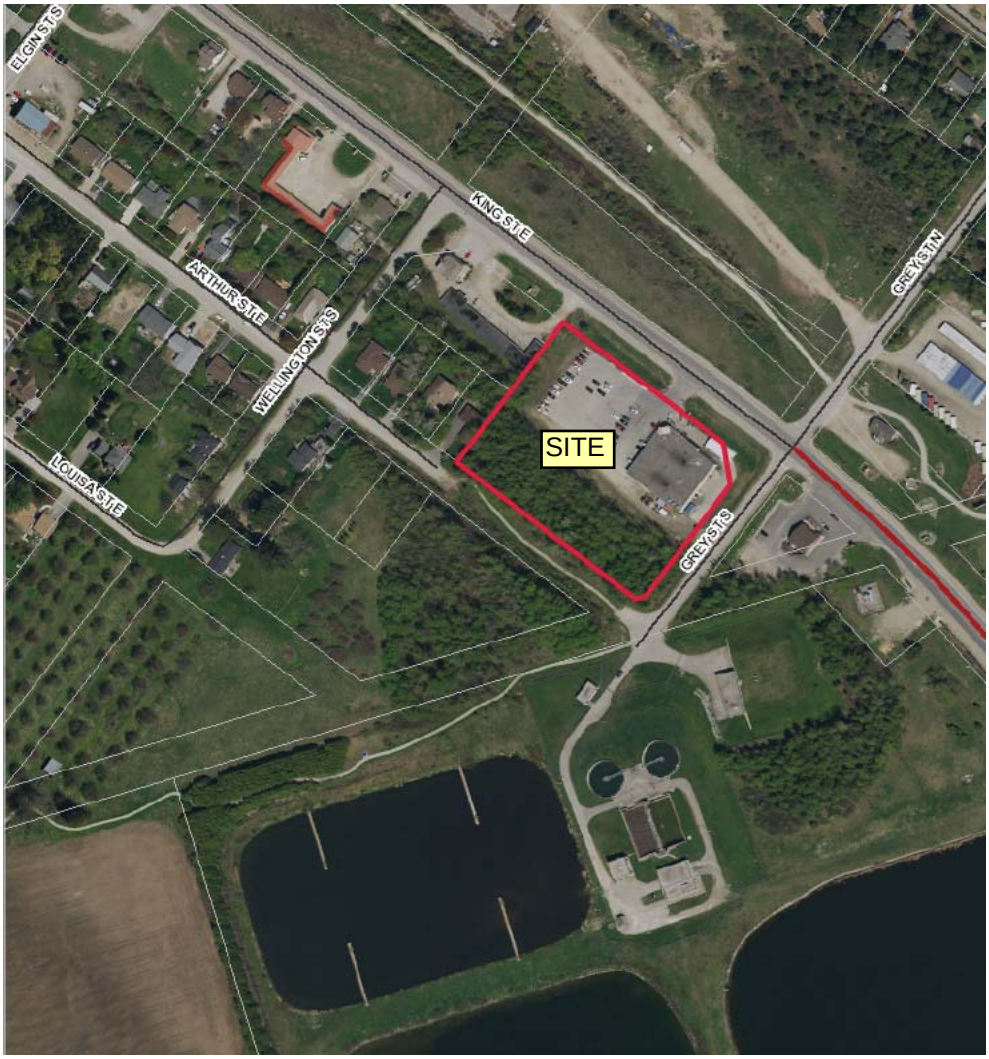


Figure 1 – Key Plan

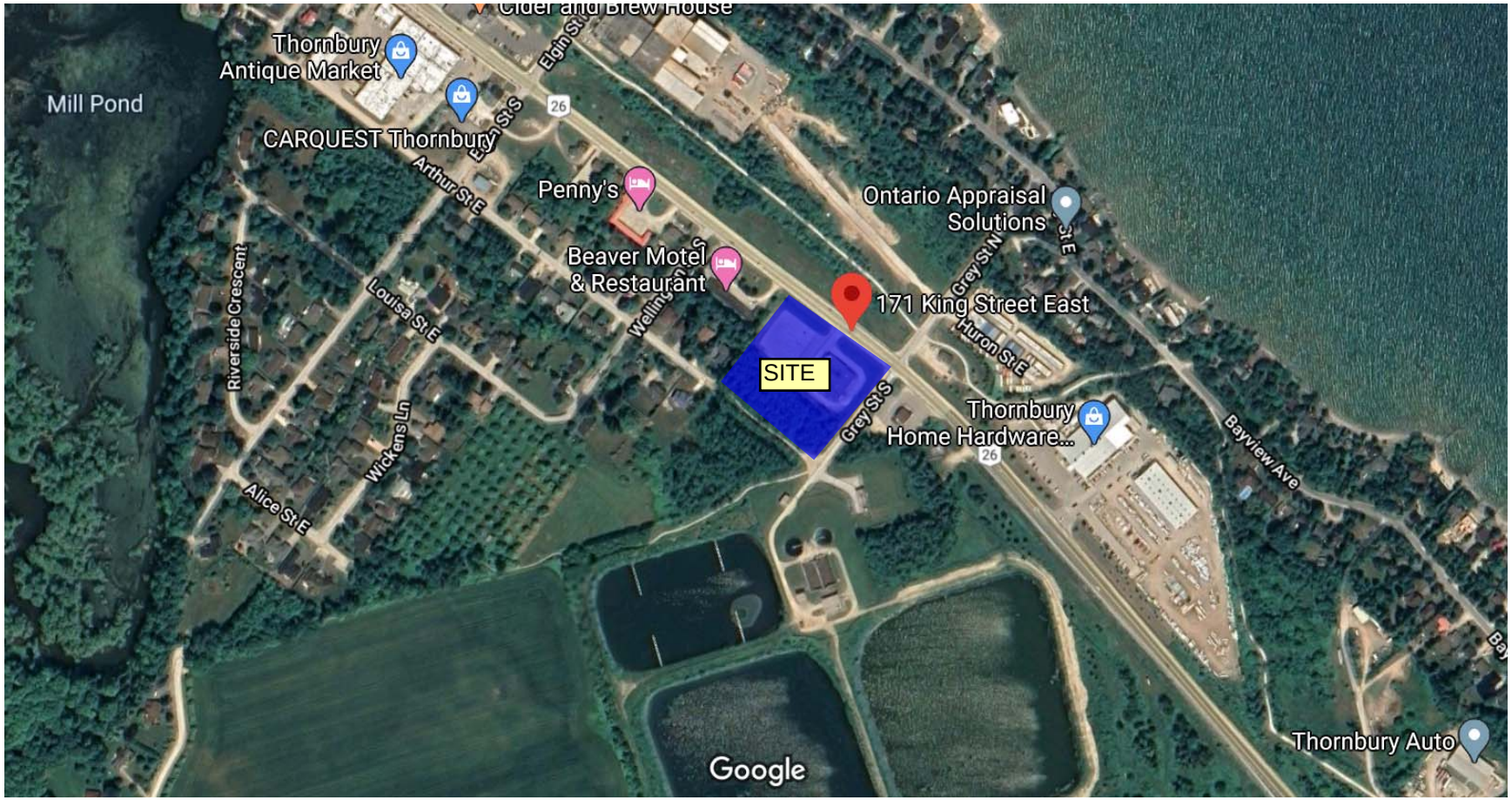


Figure 2: Aerial Photo Showing Site and Surrounding Land Uses

Figure 3: Prediction Locations for Traffic Noise and Assumed Building Envelope

Figure 4 - Measurement Locations

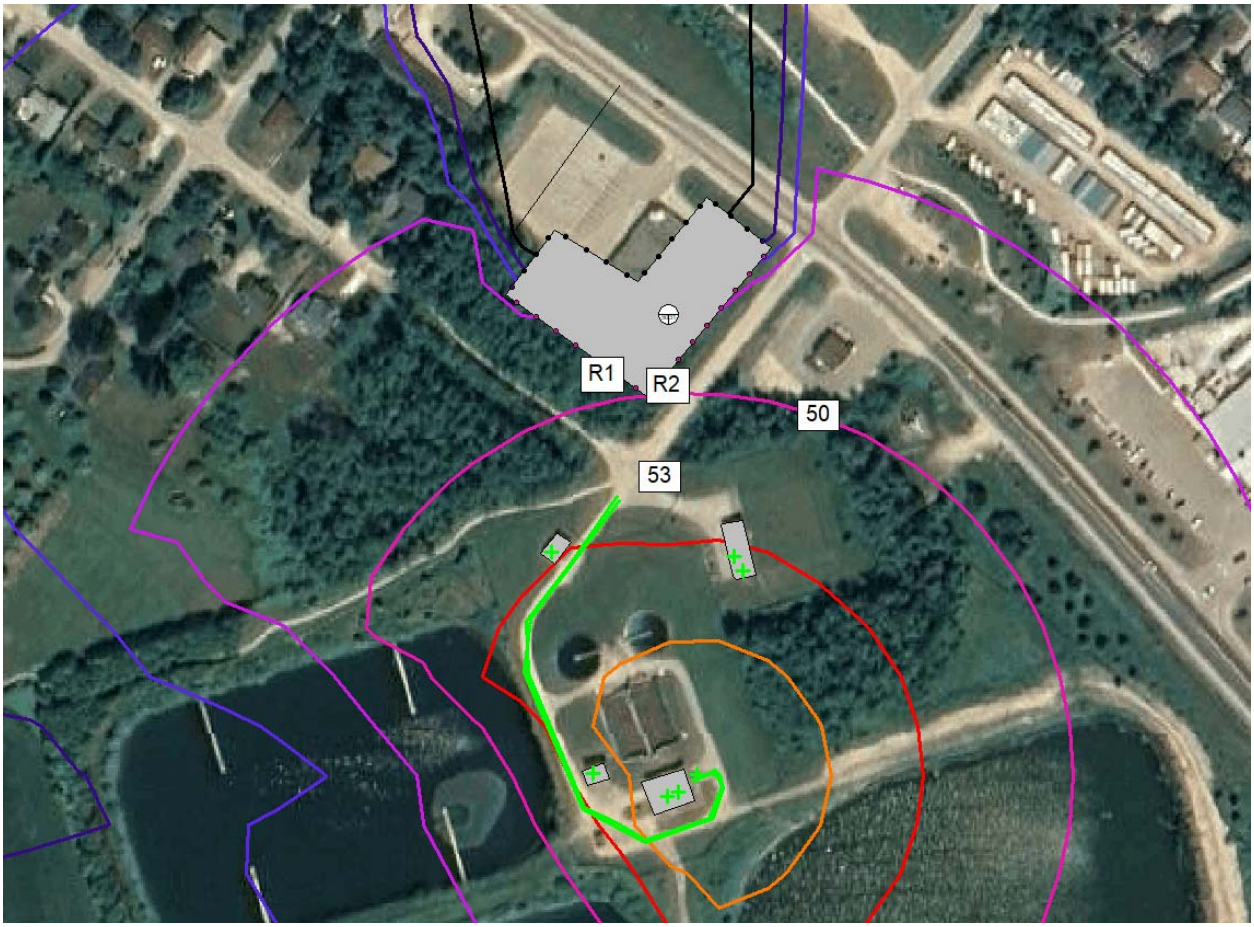


Figure 5: Predicted Daytime Sound Level Contours at 15 m in height

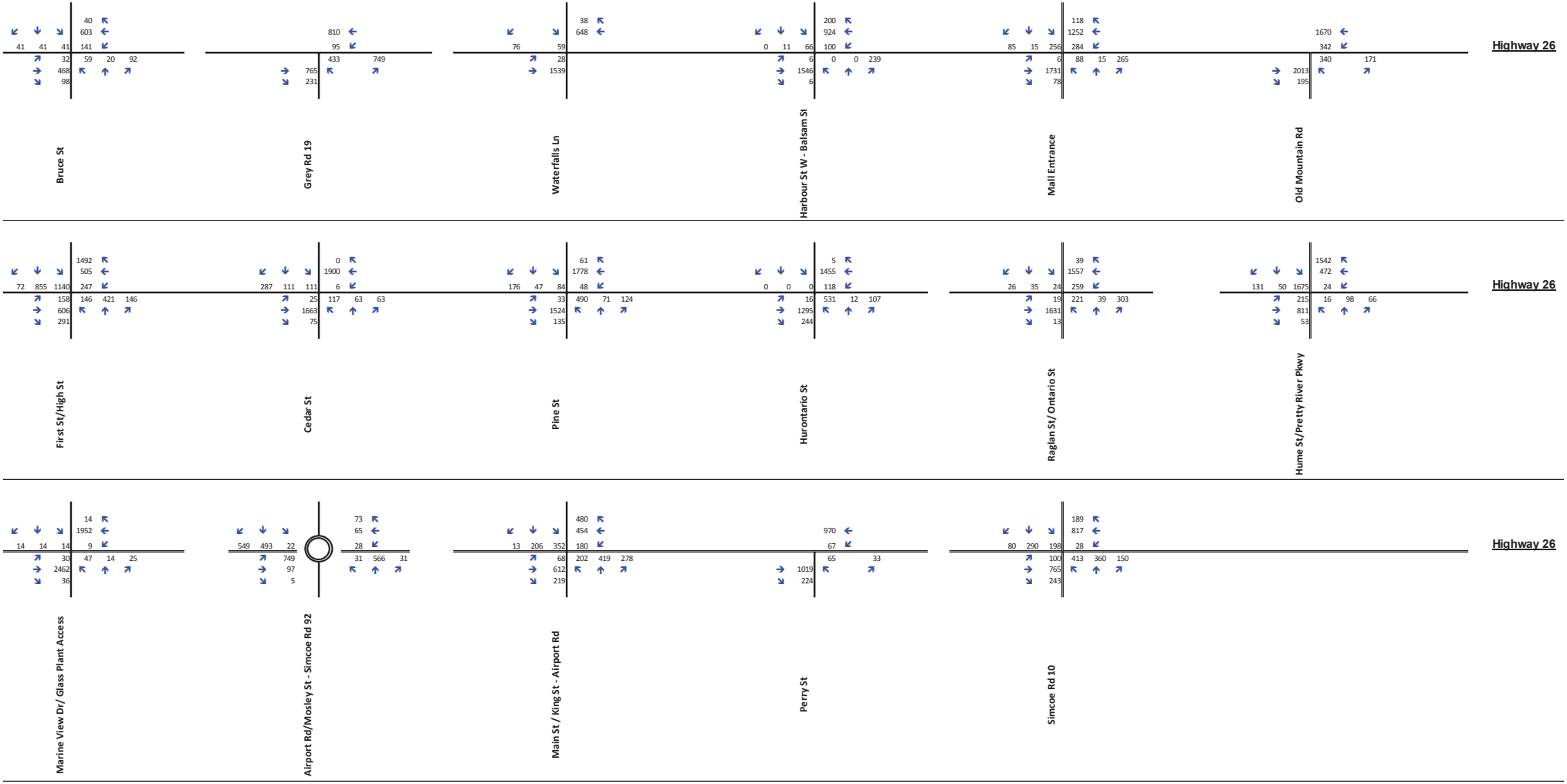
Figure 6: Predicted Night-time Sound Level Contours at 15 m in height

APPENDIX A

Road Traffic Data

Figure 29: Future 2031 Study Area Traffic Volumes on Highway 26 (PM Peak Hour)

HIGHWAY 26 TRANSPORTATION STUDY
VISSIM Microsimulation Model
Input Volumes at Signalized Intersections
2031 PM Peak



5. Existing Traffic Operations

Section 5 examines the existing traffic operations and safety performance of Highway 26. Existing travel volumes are studied, the operational performance of study area intersections are analyzed, the safety performance of existing road segments and intersections are evaluated, and signal warrant analyses are conducted.

5.1 Existing Traffic Volumes

Table 5-1, below, presents AADT values along Highway 26 through the study area from 1990 to 2008 and 2008 SADT, SAWDT, and accident rates obtained from the 2008 Ontario Ministry of Transportation (MTO) Provincial Highways Traffic Volumes publication. Definitions for each of these measures are presented in the bulleted list below.

- **AADT**: Annual Average Daily Traffic (January – December)
- **SADT**: Summer Average Daily Traffic (July – August)
- **SAWDT**: Summer Average Weekday Traffic (July – August)
- **Accident Rate**: Annual accidents per million vehicle kilometres

Table 5-1: Historic Traffic Volumes on Highway 26 (1990-2008)

Location Description (From)	Location Description (To)	Dist. (km)	2008 AADT	2006 AADT	2000 AADT	1990 AADT	2008 SADT	2008 SAWDT	2008 Accident Rate
Horseshoe Valley Road - Stayner									
Simcoe Road 22	Simcoe Road 10 – Sunnidale Corners	13.2	9,700	9,100	7,400	5,300	11,700	11,500	0.7
Simcoe Road 10 – Sunnidale Corners	Centre Line Road	4.1	11,100	10,600	8,900	6,600	13,400	13,300	1.0
Centre Line Road	Mowat St.	1.6	11,700	11,300	10,100	8,400	14,200	13,900	2.0
Stayner – Collingwood									
Stayner N LTS L 25-26 – End of NA	Simcoe Road 92 – Wasaga Beach S LTS	4.1	10,600	10,200	9,000	7,400	12,800	12,700	0.9
Simcoe Road 92 – Wasaga Beach S LTS	Collingwood S LTS – Start of NA Collingwood	6.1	18,300	17,600	15,300	12,600	22,600	22,200	1.9
Collingwood - Thornbury									
Long Point Rd (N) – End of NA	Grey Road 19 (S)	2.8	8,550	8,550	7950	7,350	10,300	10,300	0.8
Grey Road 19 (S)	Thornbury E LTS – Start of NA Thornbury	10.3	8,100	7,950	7,100	6,550	9,800	9,750	0.6
Thornbury - Meaford									
Thornbury W LTS – Peel St. – End of NA	Meaford E LTS – Start of NA Meaford	9.8	6,300	6,300	5,850	4,750	6,650	6,250	1.0

APPENDIX B

Sample STAMSON 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 06-04-2020 36:58:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te Time Period: Day/Night 16/8 hours
Description: ***Daytime and nighttime sound levls at the futrue Façade of Building Setback 15 m from the centerline of Highway 26***

Road data, segment # 1: King/Hwy26 (day/night)

Car traffic volume : 15001/1667 veh/TimePeriod *
Medium truck volume : 367/41 veh/TimePeriod *
Heavy truck volume : 590/66 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): 10300
Percentage of Annual Growth : 2.50
Number of Years of Growth : 22.00
Medium Truck % of Total Volume : 2.30
Heavy Truck % of Total Volume : 3.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: King/Hwy26 (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 : 15.00 / 15.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: King/Hwy26 (day)

Source height = 1.39 m

ROAD (0.00 + 66.19 + 0.00) = 66.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.64	0.00	0.00	-1.46	0.00	0.00	0.00	66.19

Segment Leq : 66.19 dBA

Total Leq All Segments: 66.19 dBA

```
Results segment # 1: King/Hwy26 (night)
----------------------------------------

Source height = 1.39 m

ROAD (0.00 + 59.82 + 0.00) = 59.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.57  61.13   0.00   0.00  -1.31   0.00   0.00   0.00
59.82
-------------------------------------------------------------------------
---

Segment Leq : 59.82 dBA

Total Leq All Segments: 59.82 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 66.19
                           (NIGHT): 59.82
```

```
STAMSON 5.0        NORMAL REPORT        Date: 06-04-2020 36:58:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te                 Time Period: Day/Night 16/8 hours
Description:  Daytime and nighttime Façade of Building Setback 20 m from
the centerline of Highway 26

Road data, segment # 1: King/Hwy26 (day/night)
-----------------------------------------------
Car traffic volume  : 15001/1667  veh/TimePeriod  *
Medium truck volume :   367/41    veh/TimePeriod  *
Heavy truck volume  :   590/66    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):  10300
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  22.00
    Medium Truck % of Total Volume     :   2.30
    Heavy Truck  % of Total Volume     :   3.70
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: King/Hwy26 (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  :  20.00 / 20.00  m
Receiver height           :  15.00 / 15.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: King/Hwy26 (day)
-------------------------------------

Source height = 1.39 m

ROAD (0.00 + 65.40 + 0.00) = 65.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.26  67.64   0.00  -1.57  -0.67   0.00   0.00   0.00
65.40
-------------------------------------------------------------------------
---

Segment Leq : 65.40 dBA

Total Leq All Segments: 65.40 dBA
```

```
Results segment # 1: King/Hwy26 (night)
---------------------------------------

Source height = 1.39 m

ROAD (0.00 + 58.88 + 0.00) = 58.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.26  61.13   0.00  -1.57  -0.67   0.00   0.00   0.00
58.88
-------------------------------------------------------------------------
---

Segment Leq : 58.88 dBA

Total Leq All Segments: 58.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.40
                           (NIGHT): 58.88
```

```
Road data, segment # 1: King/Hwy26
STAMSON 5.0        NORMAL REPORT        Date: 06-04-2020 37:18:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c.te                 Time Period: 16 hours
Description:   Daytime sound level in Potential outdoor amenity area (70
m or more from centerline of Highway 26)

Road data, segment # 1: King/Hwy26
----------------------------------
Car traffic volume  : 15001 veh/TimePeriod  *
Medium truck volume :   367 veh/TimePeriod  *
Heavy truck volume  :   590 veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: King/Hwy26
--------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: King/Hwy26
--------------------------------

Source height = 1.39 m

ROAD (0.00 + 55.08 + 0.00) = 55.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
---
   -90     90   0.66  67.64   0.00 -11.11  -1.46   0.00   0.00   0.00
55.08
-------------------------------------------------------------------------
---

Segment Leq : 55.08 dBA

Total Leq All Segments: 55.08 dBA

TOTAL Leq FROM ALL SOURCES:       55.08
```