

Noise Feasibility Study
Proposed Residential Development
6719 Glen Erin Drive
City of Mississauga, Ontario

Prepared for:


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September 23, 2021

HGC Project Number: 02000303

VERSION CONTROL

Noise Feasibility Study,
6719 Glen Erin Drive,
Mississauga, Ontario.

Ver.	Date	Version Description / Changelog	Prepared By
0	June 17, 2021	Noise Feasibility Study in support of a site plan application.	Y.Lo
1	Sept 23, 2021	Noise Feasibility Study updated as per the latest site plan dated September 9, 2021.	Y.Lo

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1 Introduction & Summary

HGC Engineering was retained by Starwood Group Inc. to conduct a noise feasibility study for a proposed residential development located at 6719 Glen Erin Drive, in Mississauga, Ontario. The proposed development will consist of a 12-storey residential building, five townhouse blocks, and one level of underground parking. The study is required by the City of Mississauga as part of the planning and approvals process.

This study is being updated to reflect the latest site plan prepared by IBI Group Architects (Canada) Inc. dated September 9, 2021.

The primary sources of noise impacting the site were determined to be road traffic on Aquitaine Avenue and Glen Erin Drive. Ultimate average annual daily traffic (AADT) was obtained from the City of Mississauga. Relevant traffic data was used to predict future traffic sound levels at the proposed buildings. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and the Municipality to develop noise control recommendations.

The sound level predictions indicate that the future road traffic sound levels will exceed MECP guidelines at the proposed buildings closest to the road traffic noise sources. Central air conditioning and upgraded building construction is required for the proposed 12-storey building. Forced-air ventilation systems with ducts sized to accommodate the future installation for central air conditioning by the occupant are required for the proposed townhouse units with flanking exposure to Glen Erin Drive. Warning clauses are recommended to inform future residents of the traffic noise impacts and to address sound level excesses.

An analysis was also conducted to determine the potential impact of noise from rooftop units on the adjacent residential building to the south on the proposed residential buildings in addition to the potential impact of mechanical equipment on the roof of the proposed 12-storey building on existing and proposed residences. Detailed information regarding the type or model of the proposed and existing rooftop mechanical units were not known at the time of the study, but reasonable estimates of the size and tonnage have been used based on experience with similar projects to determine the sound levels associated with the proposed and existing buildings.



A 3D computer model of the area was created, using acoustic modelling software, in order to predict the sound levels at the locations of the proposed and existing dwelling units. The results indicate that the sound emissions from the rooftop equipment associated with the existing residential building on the proposed buildings, as well as the sound emissions from the proposed building on existing and proposed residential receptors in the area will be below the MECP minimum exclusionary sound level limits. Physical mitigation measures are not required for the rooftop equipment associated with the existing and proposed buildings.

2 Site Description & Noise Sources

The proposed development is located at the northeast corner of Aquitaine Avenue and Glen Erin Drive, specifically at 6719 Glen Erin Drive in the City of Mississauga, Ontario. Figure 1 shows a key plan of the subject site. A site plan prepared by IBI Group Architects (Canada) Inc. dated September 9, 2021 is shown in Figure 2. The proposed development will include blocks of townhouses, a 12-storey residential building and one level of underground parking.

A site visit was made by HGC Engineering personnel in June 2020 to make observations of the acoustic environment, and to identify the significant noise sources in the vicinity. The acoustical environment surrounding the site is urban in nature. Road traffic on Glen Erin Drive and Aquitaine Avenue are the primary sources of sound impacting the proposed development. Ground-borne vibration measurements are not required for the subject site since the proposed building is located more than 75 metres from a railway line. Lands surrounding the subject site include existing residential uses. There is a rooftop mechanical unit on the existing residential building to the south of the subject site and this has been included in the noise assessment.

3 Noise Level 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 below.

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	Nighttime 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 nighttime 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 area 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 nighttime sound levels outside bedroom/living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom/living/dining room windows exceed 65 dBA.

Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom/living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom/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 the window nighttime sound level exceeds 60 dBA or the daytime sound level exceeds 65 dBA due to road traffic noise.

Warning clauses are required to notify future residents of possible excesses when nighttime sound

The distance setbacks of the buildings indicated on the site plan were used in the analysis, along with an aerial photo to determine the distance of the proposed buildings to the roadways. The acoustic recommendations may be subject to modifications if the site plan is changed significantly.

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

Prediction Location	Description	Daytime - at Façade Total LEQ(16)	Daytime - at Façade Total LEQ(16)	Nighttime - at Façade Total LEQ(8)
A	12-storey Residential Building – South Façade	--	69	63
B	12-storey Residential Building – East Façade	--	66	59
C	12-storey Residential Building – North Façade	--	57	50
D	12-storey Residential Building – West Façade	--	67	60
E	Townhouse block with some exposure to Aquitaine Avenue	--	55	<50
F	Townhouse block with flanking exposure to Glen Erin Drive	--	61	54
G	Interior Playground	<55	--	--
H	Interior Amenity Area	<55	--	--

5 Traffic Noise Recommendations

The predictions indicate that the future traffic sound levels from Aquitaine Avenue and Glen Erin Drive will exceed MECP guidelines at the closest proposed buildings. The following discussion outlines recommendations for ventilation requirements, upgraded building façade constructions and warning clauses to achieve the noise criteria stated in Table 1.

5.1 Outdoor Living Areas

The proposed 12-storey residential building may have balconies that are less than 4 m in depth. These areas are not considered to be outdoor amenity areas under MECP guidelines, and therefore are exempt from traffic noise assessment.

The proposed townhouse units have rooftop terraces and rear yard patios that are less than 4 m in depth. These areas are not considered to be outdoor amenity areas under MECP guidelines, and therefore are exempt from traffic noise assessment. Green roofs are not considered to be OLA's as

they are not intended or designed for the quiet enjoyment of the outdoor environment, as mentioned in NPC-300.

The predicted daytime sound level in the interior playground area is less than 55 dBA. Physical mitigation in the form of an acoustic barrier is not required.

5.2 Indoor Living Areas & Ventilation Requirements

Air Conditioning

The predicted daytime sound levels at some of the façades of the proposed 12-storey residential building will be greater than 65 dBA during the daytime and 60 dBA during the nighttime. To address these excesses, the MECP guidelines recommend that the proposed building be equipped with central air conditioning systems, so that the windows can be closed. In general, window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. 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. Acceptable units are those that are housed in their own closet with an access door for maintenance. The guidelines also recommend noise warning clauses for the building.

Provision for the future installation of Air Conditioning

The predicted future sound level at the proposed dwelling units with flanking exposure to Glen Erin Drive (Prediction Location [F]) will be between 56 and 65 dBA during the daytime. These dwellings should 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 noise warning clauses for the dwelling units. These units are indicated in Figure 3.

In general, window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. 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.

For the proposed townhouse units further into the interior of the subdivision, there are no specific ventilation requirements.

5.3 Building Façade Constructions

Future sound levels at some of the façades of the proposed 12-storey residential building will exceed 65 dBA during the daytime hours and 60 dBA during the nighttime hours. MECP guidelines recommend that the windows, walls, and doors be designed so that the indoor sound levels comply with MECP noise criteria.

Calculations have been performed to determine the building envelope constructions likely to be required 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 of the facade components (walls, windows and doors) relative to the floor area of the adjacent room.

5.3.1 Acoustical Requirements for Glazing

The minimum necessary specification for the building envelope is Acoustical Insulation Factor, AIF-29 for living/dining rooms and AIF-28 for bedrooms at the south façade of the proposed residential building (prediction location [A]), based on the possibility of sound entering the dwellings through the walls and windows. Any well sealed thermopane unit have a Sound Transmission Class (STC) rating of 30, that is two 3 mm panes and a 13 mm inter-pane gap will provide sufficient noise insulation as long as the window to flow area ratio is less than 40% for bedrooms and less than 32% for living/dining rooms.

The minimum necessary specification for the building envelope is Acoustical Insulation Factor, AIF-27 for living/dining rooms at the east and west façades of the proposed residential building (prediction locations [B] and [D]), based on the possibility of sound entering the dwellings through the walls and windows. Any well sealed thermopane unit have a Sound Transmission Class (STC) rating of 30, that is two 3 mm panes and a 13 mm inter-pane gap will provide sufficient noise insulation as long as the window to flow area ratio is less than 50% for living/dining rooms.



5.4 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for the proposed buildings as there are anticipated traffic sound level excesses. The following noise warning clauses are required for specific units.

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

Type A:

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the noise criteria of the Municipality and the Ministry of the Environment, Conservation and Parks.

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

Type B:

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.

A suggested wording for future dwellings requiring central air conditioning systems 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 sound level limits of the Municipality and the Ministry of Environment, Conservation and Parks.

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

6.2 Assessment of Noise Emissions from Existing Rooftop Mechanical Equipment at Proposed Sensitive Receptors

Sound power levels for the existing rooftop mechanical equipment at the residential building to the south of the subject site were estimated based on an aerial photo and manufacturer's data for similar mechanical equipment used in similar past projects. A rooftop make-up air unit with a sound power rating of 90 dBA was assumed. The results of this assessment indicate predicted sound levels of 36 dBA during the daytime and 33 dBA during the nighttime at the proposed dwelling units. Daytime and nighttime results are also shown graphically in Figures 5 and 6. These predicted sound levels are less than the MECP minimum exclusionary limit of 50 dBA during the daytime hours and 45 dBA during the nighttime hours, based on a typical worst-case operating scenario.

It is concluded that sounds from the existing rooftop mechanical equipment associated with the adjacent residential building are anticipated to comply with the MECP guidelines at the proposed sensitive receptors and physical mitigation is not required.

6.3 Assessment of Noise Emissions from Proposed Rooftop Mechanical Equipment at Nearby Sensitive Receptors

Sound power levels from the rooftop mechanical equipment at the proposed 12-storey residential building were estimated based on manufacturer's data for similar mechanical equipment used in similar past projects since detailed information is not known at this time. A rooftop make-up air unit with a sound power rating of 90 dBA was assumed in the analysis. The results of this assessment indicate predicted maximum sound levels of 33 dBA during the daytime and 30 dBA during the nighttime at the proposed and existing dwelling units. Daytime and nighttime results are also shown graphically in Figures 7 and 8. These predicted sound levels are less than the MECP minimum exclusionary limit of 50 dBA during the daytime hours and 45 dBA during the nighttime hours, based on a typical worst-case operating scenario.

It is concluded that sounds from the rooftop mechanical equipment associated with the proposed residential building are anticipated to comply with the MECP guidelines at the proposed and existing sensitive receptors and physical mitigation is not required.

6.4 Impact of the Development on Itself

Section 5.9.1 of the Ontario Building Code (OBC) specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls should meet or exceed STC-50. Walls separating a suite from a noisy space such as a refuse chute, or elevator shaft, should meet or exceed STC-55. In addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

7 Summary & Recommendations

The following list and Table 4 summarize the recommendations made in this report. The reader is referred to previous sections of the report where these recommendations are applied and discussed in more detail.

For transportation noise sources

1. Central air conditioning is required for the proposed 12-storey residential building. Forced air ventilation systems with ductwork sized for future installation of central air conditioning by the occupant will be required for the proposed townhouse units with flanking exposure to Glen Erin Drive. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300, as applicable.

2. Noise warning clauses to inform the occupants of the sound level excesses should be placed in the property and tenancy agreements and offers of purchase and sale.
3. Tarion Builder's Bulletin B19R requires that the internal design of condominium projects integrates suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels.

For stationary noise sources

1. A make-up air unit was assumed on the roof of the proposed 12-storey residential building. This rooftop equipment should be selected to have a sound power level rating of 90 dBA or less.
2. If alternate rooftop units are chosen or the location of the mechanical units are modified, an acoustical engineer should verify that with the selected HVAC equipment and locations, acceptable sound levels will result at all offsite residential receptors.



Table 4: Summary of Noise Control Requirements and Noise Warning Clauses

Prediction Location	Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Construction (LRDR/BR)
A	12-storey Residential Building – South Façade	--	Central A/C	A, C	LRDR: AIF – 29 BR: AIF – 28
B	12-storey Residential Building – East Façade	--			LRDR: AIF – 27 BR: OBC
C	12-storey Residential Building – North Façade	--			OBC
D	12-storey Residential Building – West Façade	--			LRDR: AIF – 27 BR: OBC
E	Townhouse block with some exposure to Aquitaine Avenue	--	--	--	OBC
F	Townhouse block with flanking exposure to Glen Erin Drive	--	Forced Air	A, B	OBC
G	Interior Playground	--	--	--	--
H	Interior Amenity Area	--	--	--	--
--	Remaining Units	--	--	--	OBC

Notes:

* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300 as applicable.

-- no specific requirement

OBC – Ontario Building Code

LRDR – Living Room/ Dining Room

BR - Bedroom

7.1 Implementation

To ensure that the noise control 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, installed and constructed.
2. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the mechanical drawings and specifications for the mechanical equipment to certify that the MECP sound levels will be met at all offsite noise sensitive receptors.