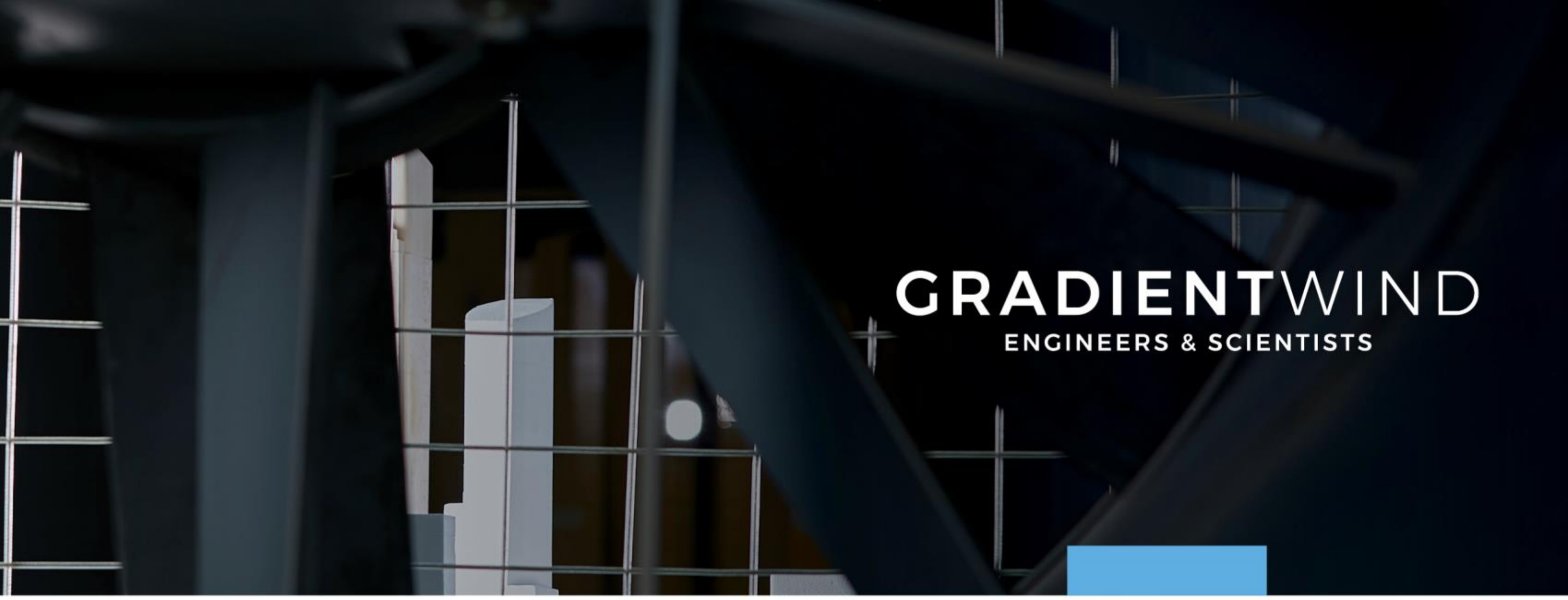
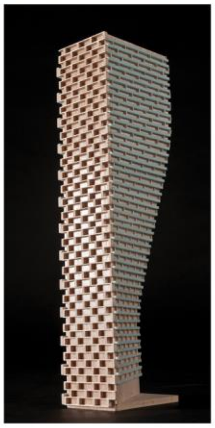


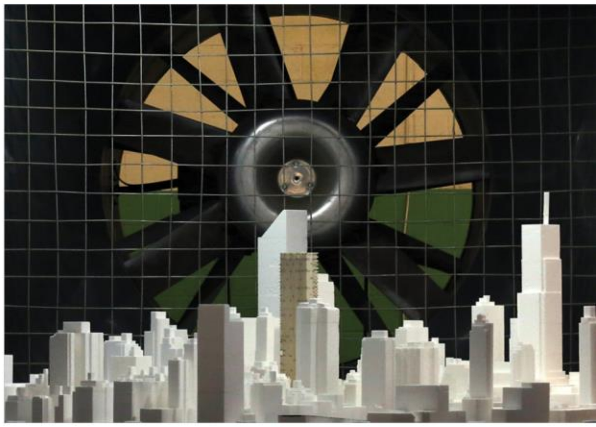
GRADIENTWIND
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE ASSESSMENT

60 Balliol Street
Toronto, Ontario

Report: 22-107 – Traffic Noise





May 18, 2022

PREPARED FOR
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EXECUTIVE SUMMARY

This roadway traffic noise assessment has been prepared in support of an Official Plan Amendment (OPA), Zoning By-law Amendment (ZBA) and a Site Plan Approval (SPA) applications submitted by Osmington Gerofsky Development Corporation (OGDC), the applicant, for the site municipally known as 33 Davisville Avenue and 60 Balliol Street (the “Subject Lands”). The Subject Lands are located between Davisville Avenue and Balliol Street, approximately 85 metres east of Yonge Street, and represent a total area of 5,638 square metres (0.56 hectares). The property is managed by Real Property Management Services (“RPMS”).

The Subject Lands consists of a 21-storey, 266-unit rental apartment building located on the northern portion of the site fronting Davisville Avenue (33 Davisville Avenue). The southern portion of the site is currently used as a privately-owned open space (60 Balliol Street). The requested OPA, ZBA and SPA applications would permit infill intensification on the lands known as 60 Balliol Street (the “Development Site”) with a 39-storey residential building comprised of a 6-storey base building and 33 storey tower element on a developable site area of 2,879 square metres (0.28 ha). The existing 21-storey building currently on site at 33 Davisville Avenue will be retained.

The focus of this study is the residential building located at 60 Balliol Street. Hereinafter referred to as the “study building”. The study building comprises a 39-storey residential tower rising on a 6-storey podium. The development is topped with a mechanical penthouse and includes three levels of underground parking. The site is surrounded by a mix of low- and medium-rise buildings in all directions, with high-rise buildings to the northeast, south, and northwest and is bordered by Davisville Avenue to the north. The Line 1 Yonge-University subway line is located approximately 170 metres to the west of the study site. As the subway line is beyond 75 metres, it is not a concern for ground vibrations and noise. The primary sources of roadway traffic noise are Davisville Avenue to the north, Merton Street to the South, and Yonge Street to the west. This assessment is based on architectural drawings, prepared by Wallman Architects, dated April 2022. Figure 1 illustrates the site location with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) requirements; (ii) future vehicular traffic volumes corresponding to roadway classification and theoretical capacities; and (iii) architectural drawings provided by Wallman Architects.

The results of the current analysis indicate that roadway noise levels will range between 42 and 52 dBA during the daytime period (07:00-23:00) and between 34 and 46 dBA during the nighttime period (23:00-07:00) at POW receptors. The highest noise level (52 dBA) occurs at the north façade of the building which is nearest and most exposed to Davisville Avenue. As roadway noise levels are below NPC-300 criteria, of 55 dBA, no mitigation is required for this development.

The noise levels at outdoor living areas are below the NPC-300 criterion, therefore, no mitigation measures are required for outdoor living areas as well.

Gradient Wind conducted a survey of the study site, using the satellite view of the area, the only source identified in the area was the TTC Davisville Rail yard. There is a natural buffer of existing and proposed buildings intervening between the subject property and the rail yard. The introduction of the new noise-sensitive development will not introduce any further constraints on the rail yard operations, as there are existing apartment buildings in closer proximity to the rail yard.

With regards to the impacts of the proposed building on the surroundings and itself, by careful placing and judicious selection of noise-generating equipment like cooling towers, chillers, and generators, stationary noise impact from the proposed building can comply with the sound level limits defined in NPC-300. Where necessary, noise screens, silencers, and other noise control measures can be added. It is recommended that an acoustic consultant review the proposed HVAC design once it is ready.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Osmington Gerofsky Development Corporation to undertake a roadway traffic noise assessment in support of Zoning By-law Amendment (ZBA) and Site Plan Control (SPA) applications for the proposed development located at 60 Balliol Street in Toronto, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation sources.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP)[1] guidelines. Noise calculations were based on architectural drawings provided by Wallman Architects, with future traffic volumes corresponding to roadway classifications of the City of Toronto and theoretical roadway capacities.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise study is the proposed residential high-rise development located at 60 Balliol Street in Toronto, Ontario. The study site is situated on the south side of a parcel of land bounded by Davisville Avenue to the north, Pailton Crescent to the east, Balliol Street to the south, and Yonge Street to the west.

The study building comprises a 39-storey residential tower rising on a 6-storey podium. Three levels of underground parking are connected to the below-grade levels of the existing 33 Davisville Avenue building to the north and are accessed from Davisville Avenue. The ground floor consists of a lobby and residential units along the south elevation fronting Balliol Street, a loading area in the northwest corner accessed from a laneway along the west elevation, a rear lobby located centrally on the north side, and an indoor amenity area in the northeast corner with an adjacent outdoor amenity area along the north elevation. Levels 2-6 are exclusively residential. At Level 7, the east and west elevations set back featuring outdoor amenity terraces, and the east elevation sets back at Level 8 to accommodate a private terrace. Above Level 8, the tower rises uniformly with a rectangular planform to full height. Above Level 39, the tower

[1] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013

sets back from all elevations to a mechanical penthouse and rooftop outdoor amenity on the south side, completing the development.

Level 7 outdoor amenity areas located on the east and west sides of the building, Level 8 outdoor amenity (located to the west), and rooftop outdoor amenity (located to the south) were assessed as Outdoor Living Areas (OLA) in the study.

The site is surrounded by a mix of low- and medium-rise buildings in all directions, with high-rise buildings to the northeast, south, and northwest and is bordered by Davisville Avenue to the north. The Line 1 Yonge-University subway line is located approximately 170 metres to the west of the study site. The impact limit is 75 metres for ground vibrations[2]. As the subway line is beyond the vibration and noise impact limits, it is not a concern for ground vibration and noise impacts on the study building. The primary sources of roadway traffic noise are Davisville Avenue to the north, Merton Street to the South, and Yonge Street to the west. This assessment is based on architectural drawings, prepared by Wallman Architects, dated April 2022. Figure 1 illustrates the site location with the surrounding context.

3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the study buildings produced by local transportation sources, and (ii) determine whether exterior noise levels exceed the allowable limits specified by the MECP Noise Control Guidelines – NPC-300 as outlined in Section 4 of this report.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better

[2] Dialog and J.E. Coulter Associates Limited, prepared for The Federation of Canadian Municipalities and The Railway Associated of Canada, May 2013.

represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For vehicle traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00)/8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The NPC-300 guidelines specify that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for general offices/retail stores, residence living rooms, and sleeping quarters respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [3]

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise while a standard closed window is capable of providing a minimum 20 dBA noise reduction[4]. Therefore, where

[3] Adapted from Table C-2, Part C, Section 3.2.3 of NPC-300
[4] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125

noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning (or similar systems). Where noise levels exceed 65 dBA daytime and 60 dBA nighttime building components will require higher levels of sound attenuation[5].

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime period (07:00 to 23:00). When noise levels exceed 55 dBA and are less than or equal to 60 dBA, mitigation should be considered to reduce noise levels to as close to 55 dBA if technically, economically, and administratively feasible. If noise levels exceed 60 dBA, mitigation must be provided to reduce noise levels below 60 dBA.

4.2.2 Roadway Traffic Volumes

NPC-300 dictates that noise calculations should consider future sound levels based on a roadway's mature state of development. As a conservative approach, traffic volumes have been considered for the mature state of development based on roadway classifications obtained from the City of Toronto Transportation Master Plan and theoretical maximum capacities for each roadway type. Table 2 (below) summarizes the AADT values used for roadways included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Class	Speed Limit (km/h)	Traffic Volumes
Davisville Avenue	Minor Arterial	40	**15,000**
Yonge Street	Major Arterial	50	**30,000**
Merton Street	Collector	40	**8,000**

[5] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.3 Theoretical Roadway Noise Predictions

Transportation noise source modelling is based on the software program *Predictor-Lima* which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. This computer program can represent three-dimensional surfaces and the first reflection of sound waves over a suitable spectrum for human hearing.

Roadway noise calculations were performed by treating each road segment as separate line sources of noise, and by using existing and proposed building locations as noise barriers. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks.
- The day/night split for all roads was taken to be 90% / 10%, respectively.
- The ground surface was modelled as reflective due to the presence of pavement and concrete at the proximity of the study site.
- Topography was assumed to be a flat/gentle slope surrounding the study site.
- Noise receptors were strategically placed at seven (7) locations on the façades as Plane of Window (POW) receptors.
- Four (4) receptor locations were chosen as OLA receptors located at outdoor amenity areas; one on Level 7 outdoor amenity area located to the east, one to the west, one on Level 8 outdoor amenity located to the west, and one on the rooftop outdoor amenity; at 1.5 metres above the walking surface.
- The locations of the receptors are illustrated in Figure 2.

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Type / Location	Roadway Noise Level (dBA)	
			Day	Night
1	121.5	POW / Level 39 North Façade	52	45
2	121.5	POW / Level 39 East Façade	40	34
3	121.5	POW / Level 39 South Façade	44	38
4	121.5	POW / Level 39 West Façade	51	45
5	20.5	POW / Level 6 North Façade	52	46
6	20.5	POW / Level 6 East Façade	49	42
7	20.5	POW / Level 6 South Façade	42	35
8	23.5	OLA / Level 7 East Terrace	42	N/A*
9	28.5	OLA / Level 8 East Terrace	45	N/A*
10	128	OLA / Rooftop Terrace	35	N/A*
11	23.5	OLA / Level 7 West Terrace	49	N/A*

* OLA noise levels during the nighttime are not considered, as per NPC-300.

The results of the current analysis indicate that roadway noise levels will range between 42 and 52 dBA during the daytime period (07:00-23:00) and between 34 and 46 dBA during the nighttime period (23:00-07:00) at POW receptors. The highest noise level (52 dBA) occurs at the north façade of the building which is nearest and most exposed to Davisville Avenue.

Correlation calculations between Predictor-Lima and STAMSON showed a good correlation with Predictor-Lima and variability between the two programs was within an acceptable level of ±0-3 dBA.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that roadway noise levels will range between 42 and 52 dBA during the daytime period (07:00-23:00) and between 34 and 46 dBA during the nighttime period (23:00-07:00) at POW receptors. The highest noise level (52 dBA) occurs at the north façade of the building which is nearest and most exposed to Davisville Avenue. As roadway noise levels are below NPC-300 criteria, of 55 dBA, no mitigation is required for this development.

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

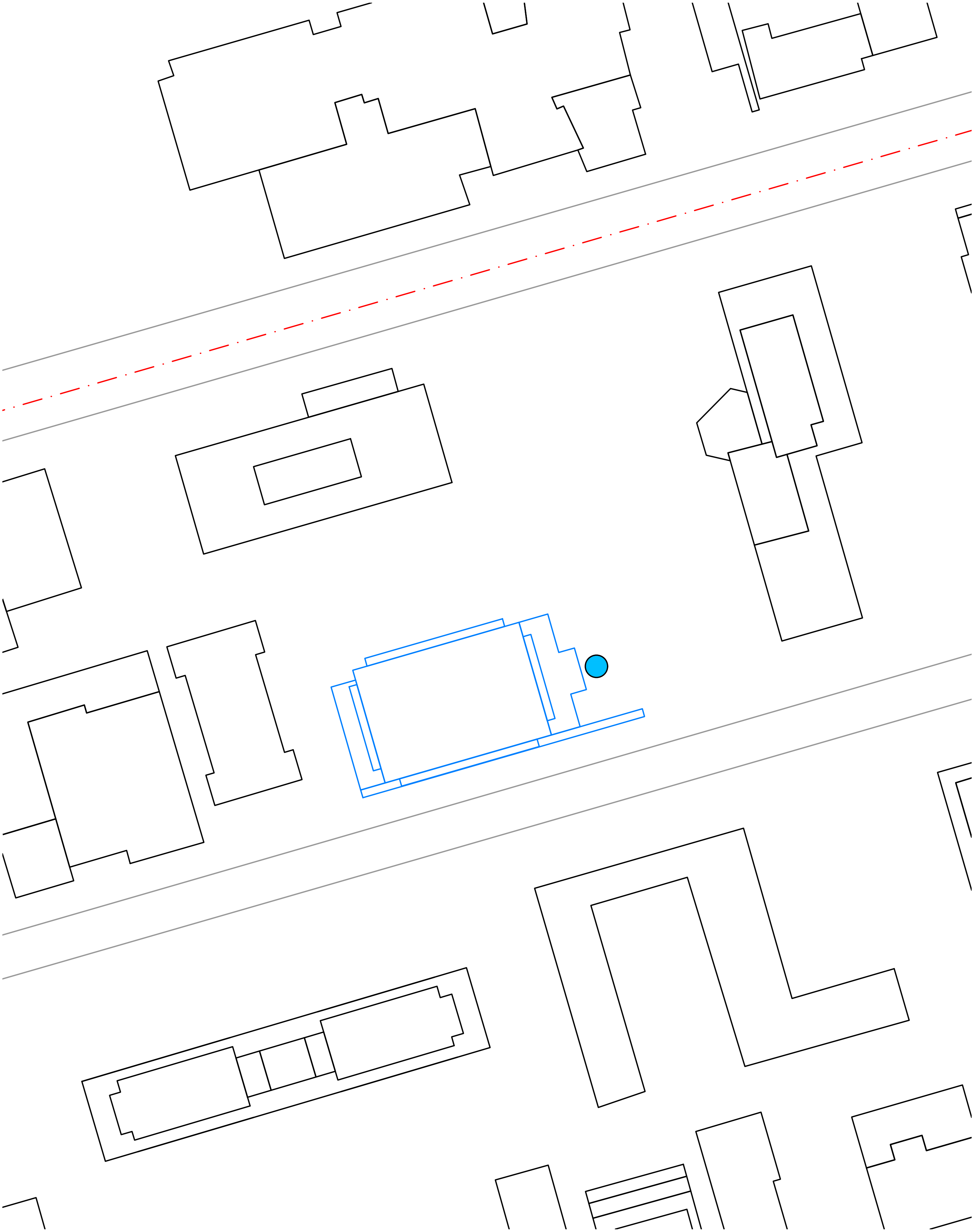
Sincerely,

Gradient Wind Engineering Inc.

Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #22-107-Traffic Noise



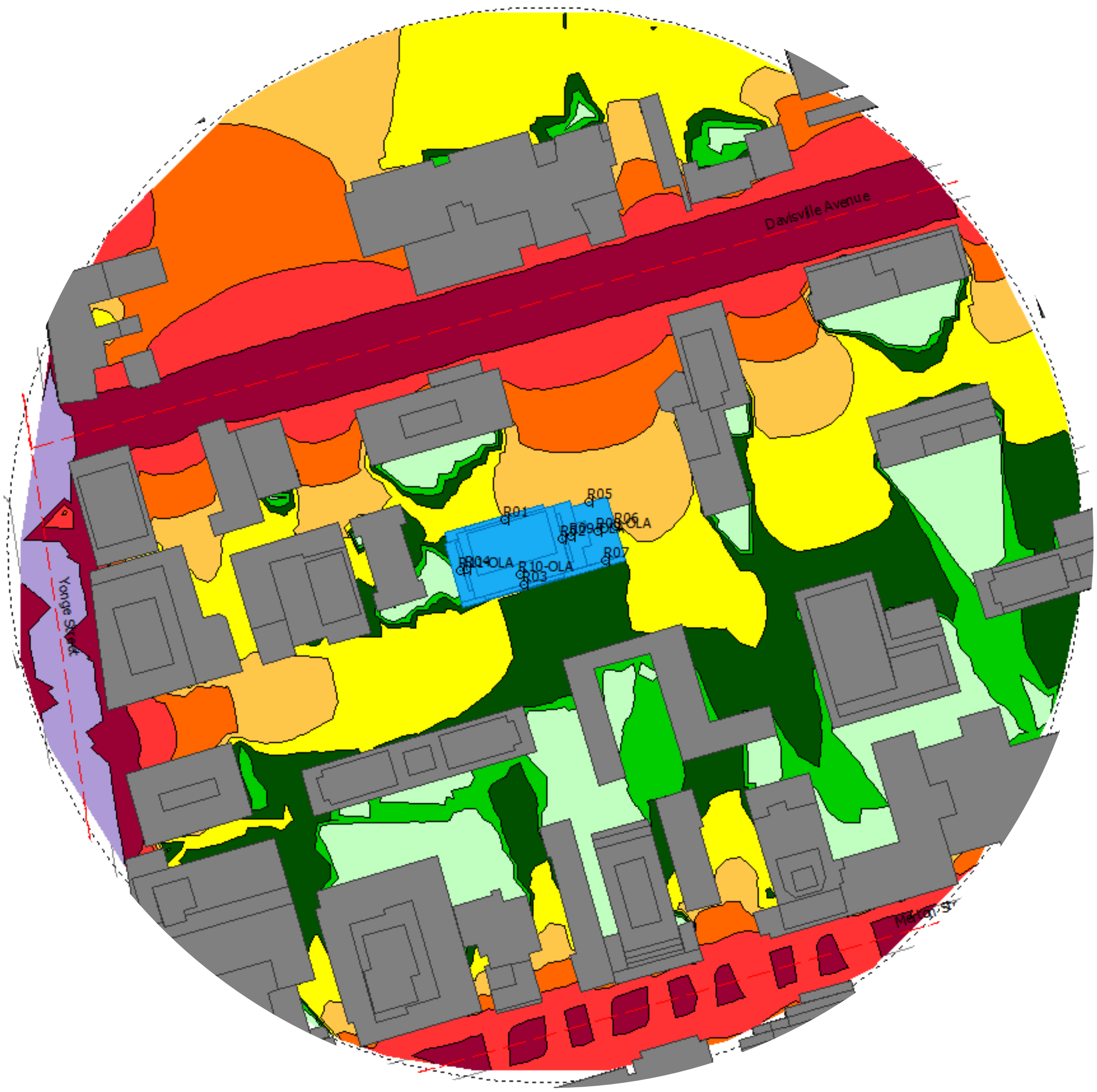
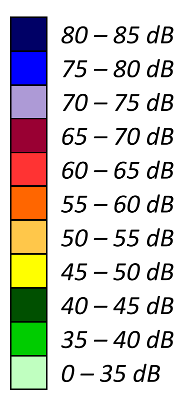


FIGURE 3: DAYTIME NOISE CONTOURS (4.5 M ABOVE GRADE)



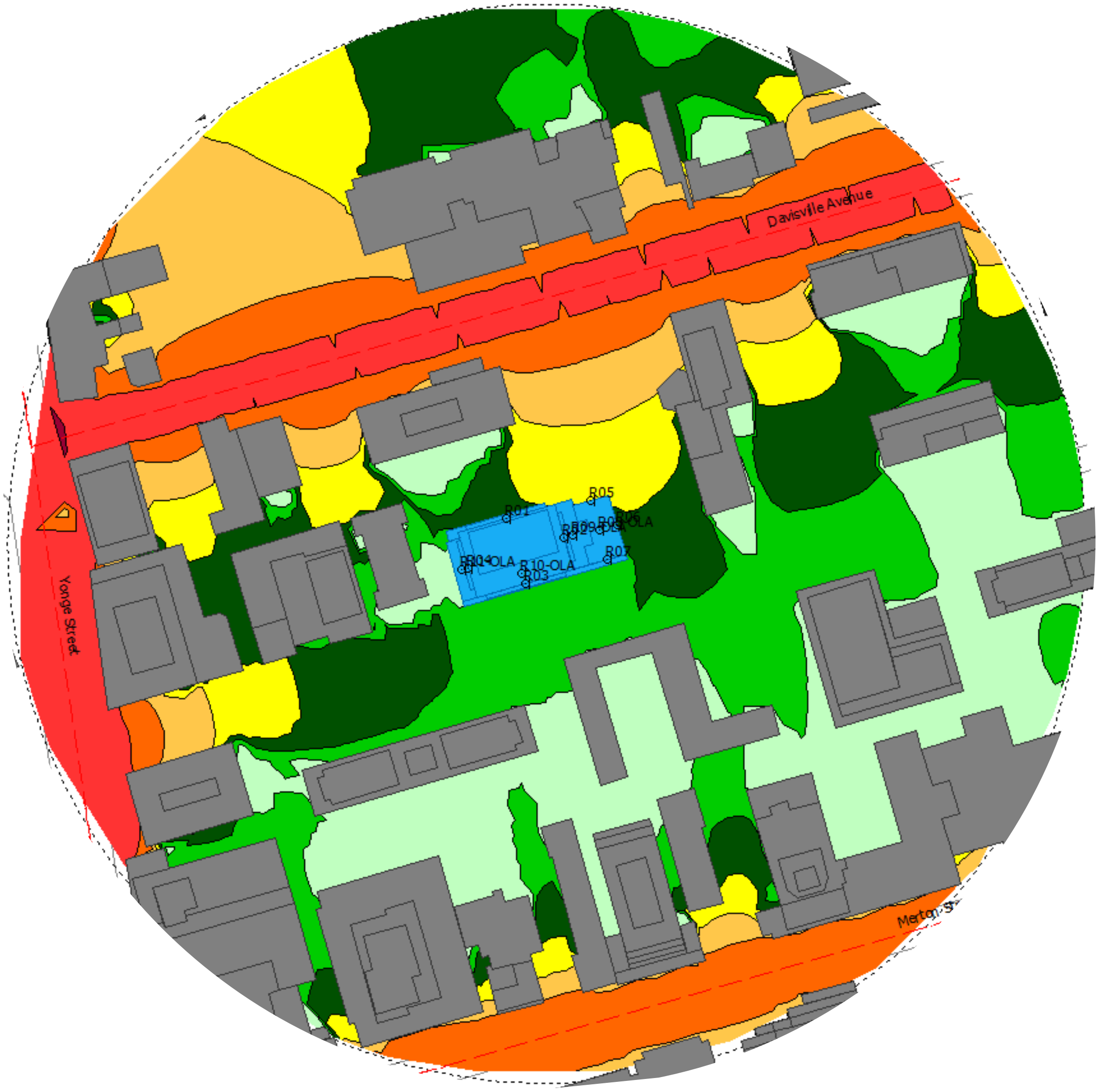


FIGURE 4: NIGHTTIME NOISE CONTOURS (4.5 M ABOVE GRADE)

- *80 – 85 dB*
- *75 – 80 dB*
- *70 – 75 dB*
- *65 – 70 dB*
- *60 – 65 dB*
- *55 – 60 dB*
- *50 – 55 dB*
- *45 – 50 dB*
- *40 – 45 dB*
- *35 – 40 dB*
- *0 – 35 dB*

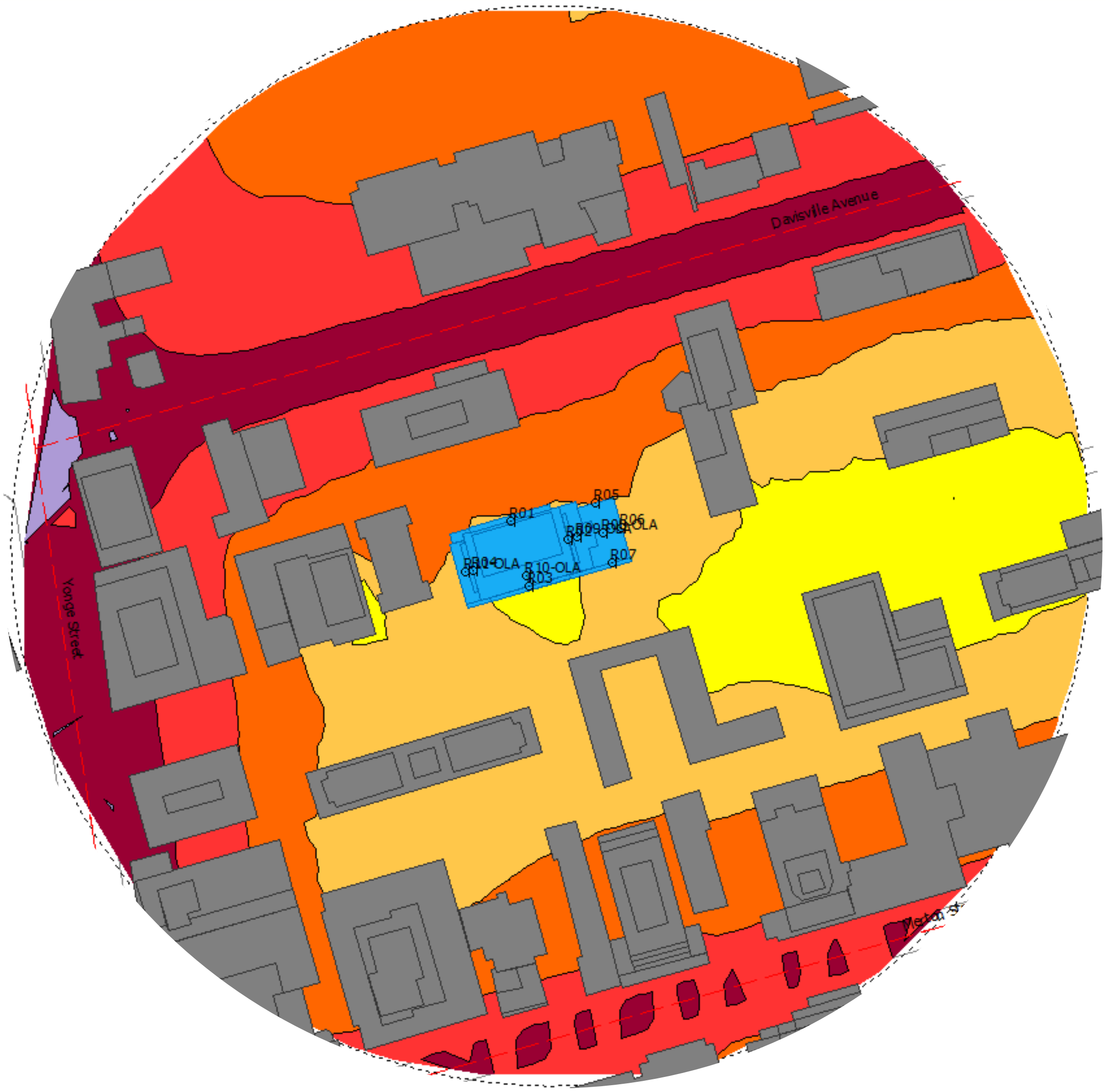


FIGURE 5: DAYTIME NOISE CONTOURS (121.5 M ABOVE GRADE)

80 – 85 dB
75 – 80 dB
70 – 75 dB
65 – 70 dB
60 – 65 dB
55 – 60 dB
50 – 55 dB
45 – 50 dB
40 – 45 dB
35 – 40 dB
0 – 35 dB

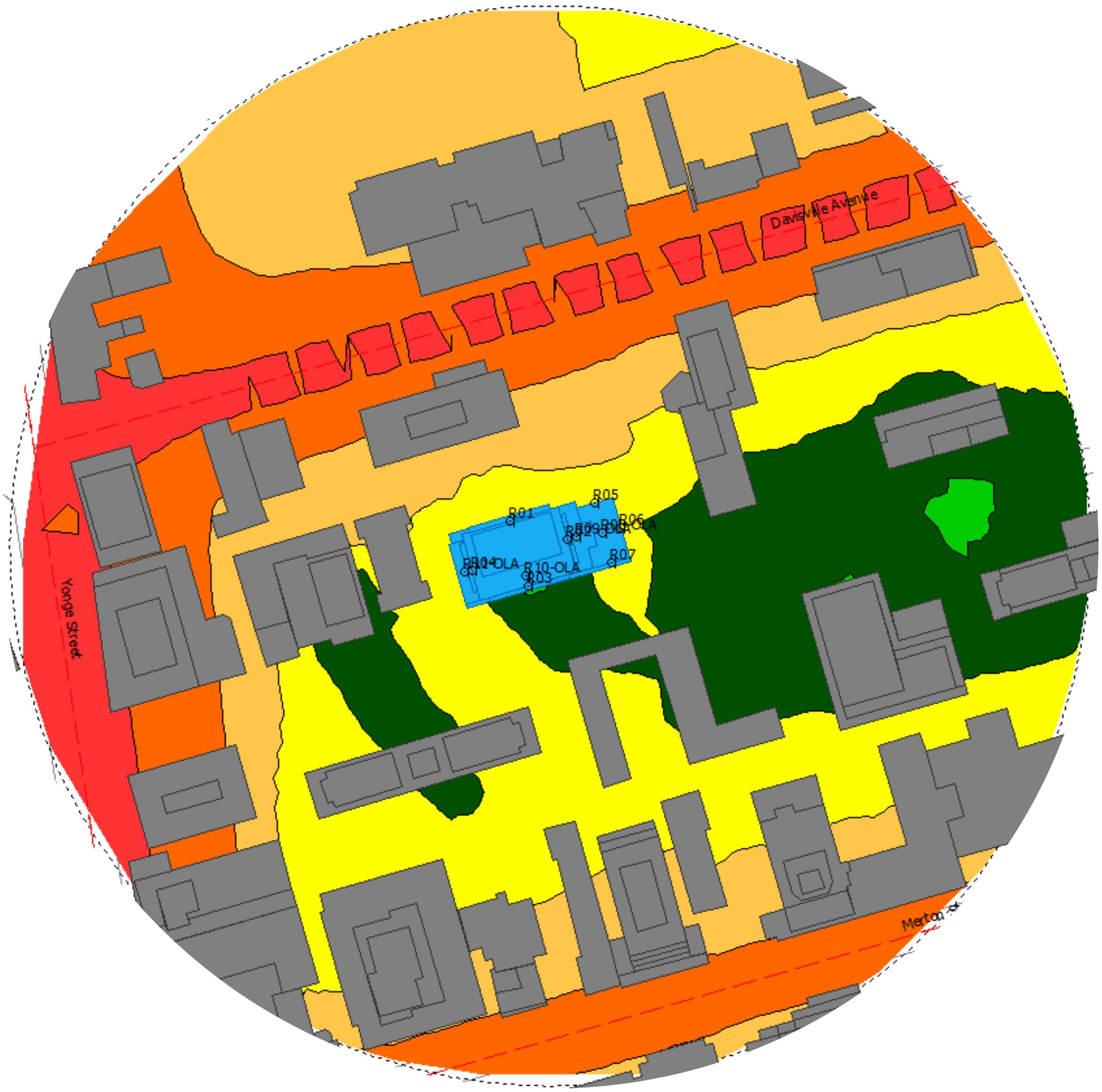


FIGURE 6: NIGHTTIME NOISE CONTOURS (121.5 M ABOVE GRADE)

80 – 85 dB
75 – 80 dB
70 – 75 dB
65 – 70 dB
60 – 65 dB
55 – 60 dB
50 – 55 dB
45 – 50 dB
40 – 45 dB
35 – 40 dB
0 – 35 dB