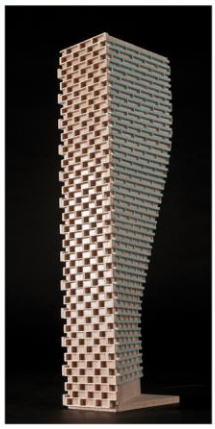
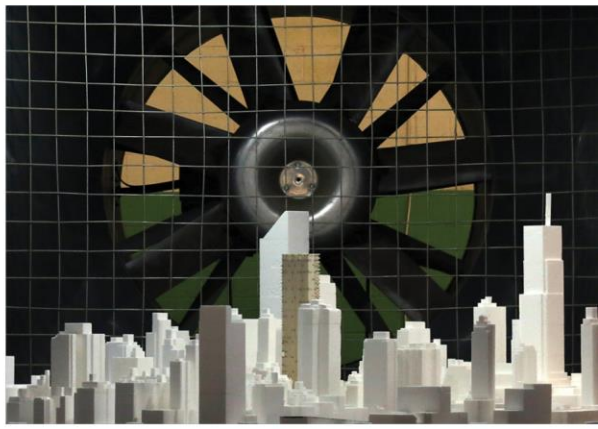
GRADIENTWIND
ENGINEERS & SCIENTISTS

NOISE IMPACT STUDY

25 St. Mary Street
Toronto, Ontario

Report: 20-291 – Noise Impact





June 7, 2021

PREPARED FOR

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EXECUTIVE SUMMARY

This report describes a noise impact study in support of an Official Plan (OPA), Zoning By-law Amendment (ZBA) and Site Plan Control (SPA) Applications for the proposed development at 25 St. Mary Street in Toronto, Ontario. The study site is situated at the southwest corner of the intersection of St. Mary and St. Nicholas Streets. Throughout this report, the St. Mary Street elevation is referred to as the north elevation.

The proposed development comprises a 59-storey tower on the west side and a 54-storey tower on the east side of the study site. The towers are connected by a bridge on Levels 3 and 4. The site is surrounded by low-rise residential and commercial buildings from south to southeast and mid to high-rise residential and mixed-use buildings from east to southwest counter-clockwise. The primary sources of transportation noise are St. Mary Street located along the north of the study site, Yonge Street located to the east, Bay Street located to the west, and Charles Street West to the north. Figure 1 illustrates the site location with the surrounding context.

The noise impact study 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; (iii) sound level limits for stationary noise sources described both in Toronto Municipal Code Chapter 591 and the Ministry of the Environment, Conservation and Parks (MECP) Environmental Noise Guidelines[1]; and (iv) architectural drawings provided by gh3, dated June 7, 2021.

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

Under the City of Toronto's Terms of reference for Noise Impact Studies, an evaluation of noise is to consider (i) the impact of the surroundings on the development, (ii) the impact of the development on the surroundings and (iii) Impacts of the building on itself. The considerations for the aforementioned impacts are described below:

Noise Impact of the Surroundings on the Development

The results of the current analysis indicate that roadway noise levels will range between 34 and 65 dBA during the daytime period (07:00-23:00) and between 27 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs along the development's north façade which is nearest and most exposed to St. Mary Street. The noise levels are generally favourable with only minor requirements for noise control.

As roadway noise levels do not exceed NPC-300 criteria, 65 dBA during daytime and 60 dBA during nighttime, upgraded building components will not be required. Ontario Building Code (OBC, 2012) compliant building components will be sufficient. Figures 3 and 4 illustrate daytime and nighttime noise contours throughout the study site at a height of 4.5 m above grade.

Results of the calculations also indicate that the development will require forced air heating with provisions for the installation of central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, the units in the proposed building will be provided with central air conditioning. Therefore, a Type D Warning Clause will be required in all Lease, Purchase and Sale Agreements as summarized in Section 9.

The noise levels at outdoor living areas do not exceed the NPC-300 criterion, therefore, no mitigation measures are required.

With regard to other sources of noise, the NPC-300 guidelines suggest a review of stationary noise sources. Stationary noise is defined as sources of noise contained within a single property and typically include industrial facilities. There are no such sources in the proximity of the study site influencing the development.

Other sources of noise such as people's use of horns, shouting, ringing of bells, amplified music or public address systems, and etcetera, are controlled through Noise By-laws and are exempt from evaluation as per NPC-300.

Noise Impacts of the Development on Surroundings

The building's HVAC systems have the potential to generate noise impacts on the surroundings. At the time of the writing of this study, the mechanical systems of the building were unknown, and could not be evaluated. Through judicious selection of the equipment, and locating larger pieces of equipment on the high roof or away from noise-sensitive areas, the required sound level limits can be maintained. Where necessary, noise control features can be implemented into the design which includes silencers, noise screens, or administrative controls. A study for the stationary noise impacts of the proposed development shall be performed once mechanical plans, and HVAC and emergency equipment data for the proposed building become available. This study should assess the impacts of stationary noise from outdoor mechanical equipment on surrounding noise-sensitive areas including parks and open spaces and the building itself. This study should include recommendations for any noise control measures that may be necessary to ensure noise levels fall below Toronto Municipal Code Chapter 591 and NPC-300 limits.

The noise generated by loading, unloading, packing, unpacking, and handling waste containers are not considered stationary noise sources as per NPC-300. However, these operations shall be conducted only from 7 a.m. to 11 p.m. during the weekdays and from 9 a.m. to 11 p.m. during the weekends and statutory holidays as per Toronto Municipal Code Chapter 591.

To limit the noise impacts due to construction, activities shall be conducted from 7 a.m. to 7 p.m. during the weekdays and from 9 a.m. to 7 p.m. during the weekends and statutory holidays as per the Toronto Municipal Code Chapter 591 requirements. Further details of noise due to construction can be found in the Construction Management Plan prepared by Litho. Under NPC-300, construction noise is exempt from the definition of a stationary noise source.

Noise Impact of the Building on Itself

The development is a proposed multi-tenant residential building as such noise impacts of the building on itself are generally evaluated during the design development stage. The noise inside the building can be categorized as occupant noise or mechanical noise.

Occupant noise control involves the selection of suitable vertical and horizontal separations between noise-generating and noise-sensitive spaces. Separations are selected based on the minimum requirements of the Ontario Building Code (2012), as well as best practices for specific demising walls and floors based on usage. A minimum sound transmission class (STC)[2] rating of 50 between units and any noise-generating space is recommended by the building code. A minimum STC 55 between units and elevators or garbage shafts is recommended. STC ratings represent laboratory conditions for an ideal partition installed in a perfectly isolated test chamber. As-built partitions in the field are expected to have somewhat lower values (typically 3 to 5 points lower) due to unavoidable flanking transmission. So, to obtain the required values as the Apparent Sound Transmission Class (ASTC) in the field testing, a prudent design will select partitions with STC ratings at least 5 points higher than required by code to account for flanking paths of sound transmission. A building acoustics design review, which considers occupant noise control measures as well as the vibration impacts of the mechanical equipment serving the building, shall be performed to evaluate the noise and vibration impacts of the proposed development on itself during the design development phase.

Mechanical noise in occupied buildings arises from several sources, which include air moving equipment and plumbing noise. The operation of air-moving equipment represents one of the principal sources of noise that influences the entire building. Noise from air moving equipment and other mechanical sources is controlled with reference to Noise Criteria (NC) curves, according to room type and function. The NC is a single value measure that represents a family of curves that relate acceptable noise levels in decibels as a function of frequency. Targeted NC levels for various occupied rooms are NC 30 for bedrooms, NC 35 for kitchens and utility rooms, and NC 40 for corridors and common areas.

[2] Sound Transmission Class is a single number rating of walls or floors determined in the laboratory according to ASTM Standard E90 to attenuate sound from one space to another. The corresponding number for the same as-built partition in the field is referred to as the Apparent Sound Transmission Class (ASTC) determined according to ASTM E336

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Tenblock to undertake a noise impact study in support of an Official Plan (OPA) and Zoning By-law Amendment (ZBA) application as well as a Site Plan Control Application (SPA) for the proposed development located at 25 St. Mary Street in Toronto, Ontario. This report summarizes the methodology, results, and recommendations related to the noise impact of surroundings, including transportation, on the proposed development and the noise impact of the proposed development on the neighbouring area.

This 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; (iii) sound level limits for stationary noise sources described both in Toronto Municipal Code Chapter 591 and the Ministry of the Environment, Conservation and Parks (MECP) Environmental Noise Guidelines[3]; and (iv) architectural drawings provided by gh3, dated June 7, 2021.

2. TERMS OF REFERENCE

The focus of this noise impact study is the proposed mixed-use high-rise development located at 25 St. Mary Street in Toronto, Ontario. The study site is situated on the east end of a rectangular parcel of land bounded by St. Mary Street to the north, St. Nicholas Street to the east, Inkerman Street to the south, and Bay Street to the west.

The development comprises a 59-storey tower to the west and a 54-storey tower to the east of the study site, both topped with a mechanical penthouse that sets-back from all elevations. A bridge links east and west towers at Levels 3 and 4. The development has four levels of underground parking. Access to underground parking is provided from the west side of the west tower. The west tower's ground level comprises a residential lobby, loading dock, access to underground parking as well as mailroom, pet wash and the first level and access to daycare. A covered walkway separates the north (residential) end of the west tower from the daycare at the south end. At level 2 the floorplates extend to the north and east,

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

cantilevering over grade level entrances, and joining the north and south ends of the podium, while an outdoor daycare terrace extends to the south, cantilevering over grade. A 521 m² area at the southeast corner of the site is dedicated as a park area.

The development consist of 259 rental replacement units, Total (including rental replacement) is 1143 residential units. The east tower's ground level consists of retail areas located on the east side with entrances from St. Nicholas Street, a residential lobby, mailroom and indoor amenity areas. The second level of the west tower comprises the second level of the daycare located on to the south of the tower as well as residential units. The second floor of the east tower and the connected Levels 3 and 4 are reserved for residential units. The rooftop of the connecting bridge between the two towers creates an outdoor amenity area. The west and east towers rise with unform floorplates from Level 6 to Level 9. Level 9 of the west tower is reserved for indoor amenity space. The building sets-back from all elevations at Level 9 accommodating an outdoor amenity terrace to the south. The west and east tower rises with uniform residential floorplates to Level 59 and 54, respectively. Levels 5 and 22 of the east tower, and Levels 9 and 30 of the west tower are reserved for indoor amenity space. East tower includes an amenity balcony at Level 22 and west tower at Level 30. The gross floor area of the development is 81,915 m².

The site is surrounded by low-rise residential and commercial buildings from south to southeast and mid to high-rise residential and mixed-use buildings from east to southwest counter-clockwise. The primary sources of transportation noise are St. Mary Street located along the north of the study site, Yonge Street located to the east, Bay Street located to the west, and Charles Street West to the north. Figure 1 illustrates the site location with the surrounding context.

The stationary noise impact of surroundings on the proposed development, and the stationary noise impact of the proposed development on the neighbouring area and on itself are assessed in the following sections of this study.

3. OBJECTIVES

Under the City of Toronto's Terms of reference for Noise Impact Studies, an evaluation of noise is to consider (i) the impact of the surroundings on the development, (ii) the impact of the development on the surroundings and (iii) impacts of the building on itself.

To this end the study evaluated (i) future noise levels on the study buildings produced by local roadway traffic, (ii) noise impacts of the surrounding stationary noise sources on the building and the noise impacts of the building on the surrounding environment and on itself, and (iii) explore potential noise mitigation where required.

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 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 Transportation Noise

4.2.1 Criteria for Transportation 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) [4]

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[5]. Therefore, where 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[6].

For designated Outdoor Living Areas (OLAs), the sound level limit is 55 dBA during the daytime period. A 5 dBA excess above the limit is acceptable only in cases where the required noise control measures are not feasible for technical, economic, or administrative reasons.

[4] Adapted from Table C-2, Part C, Section 3.2.3 of NPC-300
[5] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[6] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

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
Yonge Street	Major Arterial	40	**30,000**
Bay Street	Major Arterial	40	**15,000**
St. Mary Street	Collector	30	**12,000**
Charles Street West	Collector	30	**12,000**

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 first reflections 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, as per NPC-300 requirements for noise level predictions.
- The day/night split for all roads was taken to be 92% / 8%, 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 fifteen (15) locations at the façades as Plane of Window (POW) receptors.
- Four (4) receptor locations were chosen as OLA receptors located at outdoor amenity areas, one at grade, one at Outdoor Daycare area on Level 2, and on each outdoor amenity terrace on Levels 5 and 9, at 1.5 metres above the walking surface.
- The locations of the receptors are illustrated in Figure 2.

5. NOISE IMPACT OF THE SURROUNDINGS ON THE DEVELOPMENT

The results of the current analysis indicate that roadway noise levels will range between 34 and 65 dBA during the daytime period (07:00-23:00) and between 27 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs along the development's north façade which is nearest and most exposed to St. Mary Street. The noise levels are generally favourable with only minor requirements for noise control.

As roadway noise levels do not exceed NPC-300 criteria, 65 dBA during daytime and 60 dBA during nighttime, upgraded building components will not be required. Ontario Building Code (OBC, 2012) compliant building components will be sufficient. Figures 3 and 4 illustrate daytime and nighttime noise contours throughout the study site at a height of 4.5 m above grade.

Results of the calculations also indicate that the development will require forced air heating with provisions for the installation of central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, the units in the proposed building will be provided with central air conditioning. Therefore, a Type D Warning Clause will be required in all Lease, Purchase and Sale Agreements as summarized in Section 9.

The noise levels at outdoor living areas do not exceed the NPC-300 criterion, therefore, no mitigation measures are required.

With regard to other sources of noise, the NPC-300 guidelines suggest a review of stationary noise sources. Stationary noise is defined as sources of noise contained within a single property and typically include industrial facilities. There are no such sources in the proximity of the study site influencing the development.

Other sources of noise such as people's use of horns, shouting, ringing of bells, amplified music or public address systems, and etcetera, are controlled through Noise By-laws and are exempt from evaluation as per NPC-300.

6. NOISE IMPACTS OF THE DEVELOPMENT ON SURROUNDINGS

The building's HVAC systems have the potential to generate noise impacts on the surroundings. At the time of the writing of this study, the mechanical systems of the building were unknown, and could not be evaluated. Through judicious selection of the equipment, and locating larger pieces of equipment on the high roof or away from noise-sensitive areas, the required sound level limits can be maintained. Where necessary, noise control features can be implemented into the design which includes silencers, noise screens, or administrative controls. A study for the stationary noise impacts of the proposed development shall be performed once mechanical plans, and HVAC and emergency equipment data for the proposed building become available. This study should assess the impacts of stationary noise from outdoor mechanical equipment on surrounding noise-sensitive areas including parks and open spaces and the building itself. This study should include recommendations for any noise control measures that may be necessary to ensure noise levels fall below Toronto Municipal Code Chapter 591 and NPC-300 limits.

The noise generated by loading, unloading, packing, unpacking, and handling waste containers are not considered stationary noise sources as per NPC-300. However, these operations shall be conducted only from 7 a.m. to 11 p.m. during the weekdays and from 9 a.m. to 11 p.m. during the weekends and statutory holidays as per Toronto Municipal Code Chapter 591.

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7. NOISE IMPACT OF THE BUILDING ON ITSELF

The development is a proposed multi-tenant residential building as such noise impacts of the building on itself are generally evaluated during the design development stage. The noise inside the building can be categorized as occupant noise or mechanical noise.

Occupant noise control involves the selection of suitable vertical and horizontal separations between noise-generating and noise-sensitive spaces. Separations are selected based on the minimum requirements of the Ontario Building Code (2012), as well as best practices for specific demising walls and floors based on usage. A minimum sound transmission class (STC)7 rating of 50 between units and any noise-generating space is recommended by the building code. A minimum STC 55 between units and elevators or garbage shafts is recommended. STC ratings represent laboratory conditions for an ideal partition installed in a perfectly isolated test chamber. As-built partitions in the field are expected to have somewhat lower values (typically 3 to 5 points lower) due to unavoidable flanking transmission. So, to obtain the required values as the Apparent Sound Transmission Class (ASTC) in the field testing, a prudent design will select partitions with STC ratings at least 5 points higher than required by code to account for flanking paths of sound transmission. A building acoustics design review, which considers occupant noise control measures as well as the vibration impacts of the mechanical equipment serving the building, shall be performed to evaluate the noise and vibration impacts of the proposed development on itself during the design development phase.

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8. RESULTS

8.1 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 (m)	Plane of Window Receptor Location	Roadway Noise Level (dBA)	
			Day	Night
1	26.6	North Façade – West Tower	65	57
2	192.4	North Façade – West Tower	53	45
3	192.4	East Façade – West Tower	45	37
4	26.6	South Façade – West Tower	34	27
5	192.4	South Façade – West Tower	48	40
6	192.4	West Façade – West Tower	46	38
7	26.6	West Façade – West Tower	53	46
8	163.6	North Façade – East Tower	53	45
9	14.6	North Façade – East Tower	65	57
10	163.6	East Façade – East Tower	48	40
11	14.6	East Façade – East Tower	53	46
12	163.6	South Façade – East Tower	50	43
13	14.6	South Façade – East Tower	39	31
14	163.6	West Façade – East Tower	44	36
15	4.5	East Façade – East Tower	54	46
16	17.6	OLA – Rooftop of Bridge-Outdoor Amenity (North-Level 5)	43	N/A*
17	29.6	OLA – Outdoor Amenity (South-Level 9)	32	N/A*
18	8.6	OLA – Outdoor Daycare (South-Level 2)	40	N/A*
19	1.5	OLA – Grade Level (Parkland Dedication)	35	N/A*

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

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The noise levels at outdoor living areas do not exceed the NPC-300 criterion, therefore, no mitigation measures are required.

9. DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

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Results of the calculations also indicate that the development will require forced air heating with provisions for the installation of central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, the units in the proposed building will be provided with central air conditioning. Therefore, a Type D Warning Clause will be required in all Lease, Purchase and Sale Agreements:

> *"This building 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 the Environment."*

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The development is a proposed multi-tenant residential building as such noise impacts of the building on itself are generally evaluated during the design development stage. The noise inside the building can be categorized as occupant noise or mechanical noise.

Occupant noise control involves the selection of suitable vertical and horizontal separations between noise-generating and noise-sensitive spaces. Separations are selected based on the minimum requirements of the Ontario Building Code (2012), as well as best practices for specific demising walls and floors based on usage. A minimum sound transmission class (STC)[8] rating of 50 between units and any noise-generating space is recommended by the building code. A minimum STC 55 between units and elevators or garbage shafts is recommended. STC ratings represent laboratory conditions for an ideal partition installed in a perfectly isolated test chamber. As-built partitions in the field are expected to have somewhat lower values (typically 3 to 5 points lower) due to unavoidable flanking transmission. So, to obtain the required values as the Apparent Sound Transmission Class (ASTC) in the field testing, a prudent design will select partitions with STC ratings at least 5 points higher than required by code to account for flanking paths of sound transmission. A building acoustics design review, which considers occupant noise control measures as well as the vibration impacts of the mechanical equipment serving the building, shall be performed to evaluate the noise and vibration impacts of the proposed development on itself during the design development phase.

Mechanical noise in occupied buildings arises from several sources, which include air moving equipment and plumbing noise. The operation of air-moving equipment represents one of the principal sources of noise that influences the entire building. Noise from air moving equipment and other mechanical sources is controlled with reference to Noise Criteria (NC) curves, according to room type and function. The NC is a single value measure that represents a family of curves that relate acceptable noise levels in decibels as a function of frequency. Targeted NC levels for various occupied rooms are NC 30 for bedrooms, NC 35 for kitchens and utility rooms, and NC 40 for corridors and common areas.

[8] Sound Transmission Class is a single number rating of walls or floors determined in the laboratory according to ASTM Standard E90 to attenuate sound from one space to another. The corresponding number for the same as-built partition in the field is referred to as the Apparent Sound Transmission Class (ASTC) determined according to ASTM E336

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.

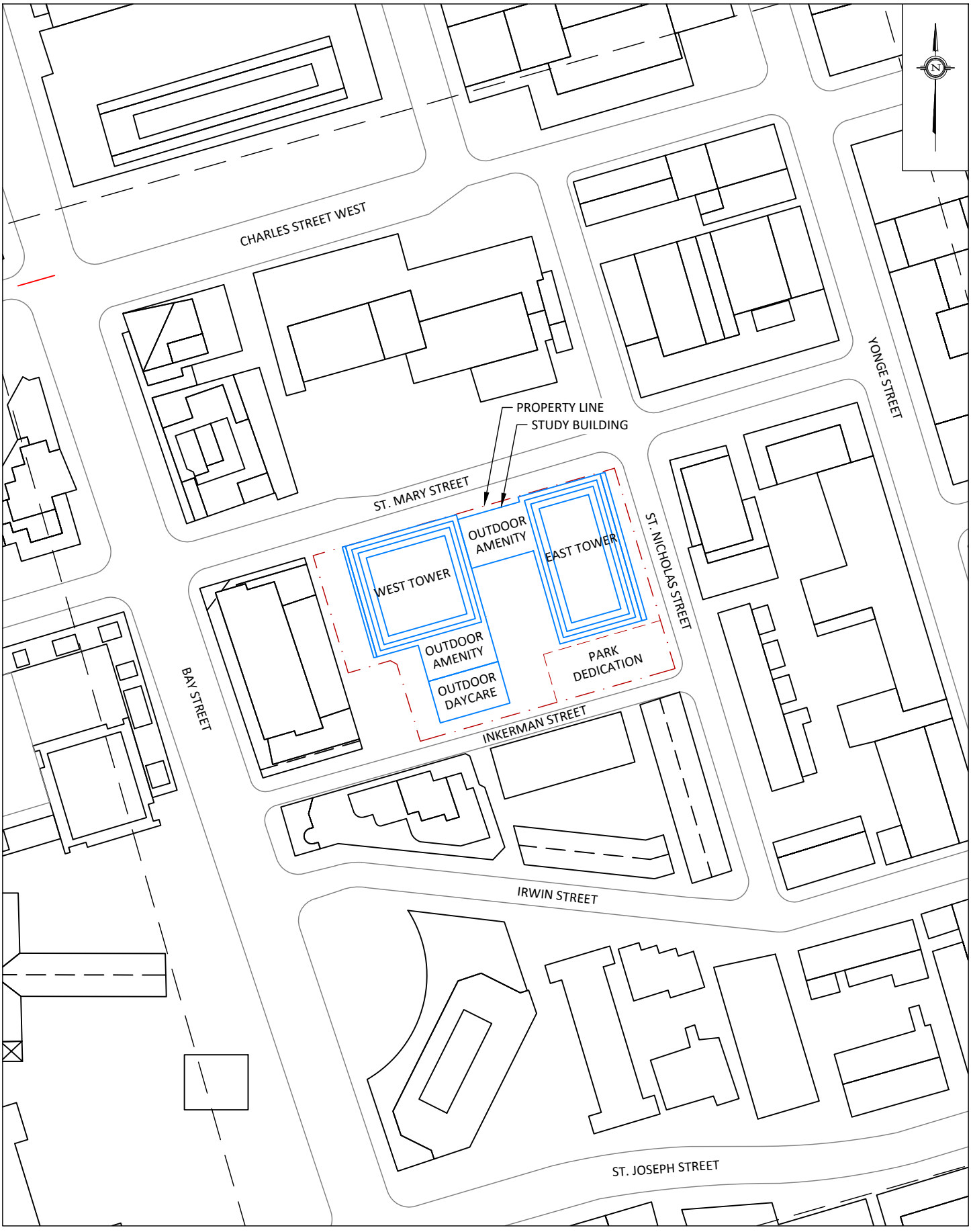
Sincerely,

Gradient Wind Engineering Inc.

Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File #20-291 - Noise Impact



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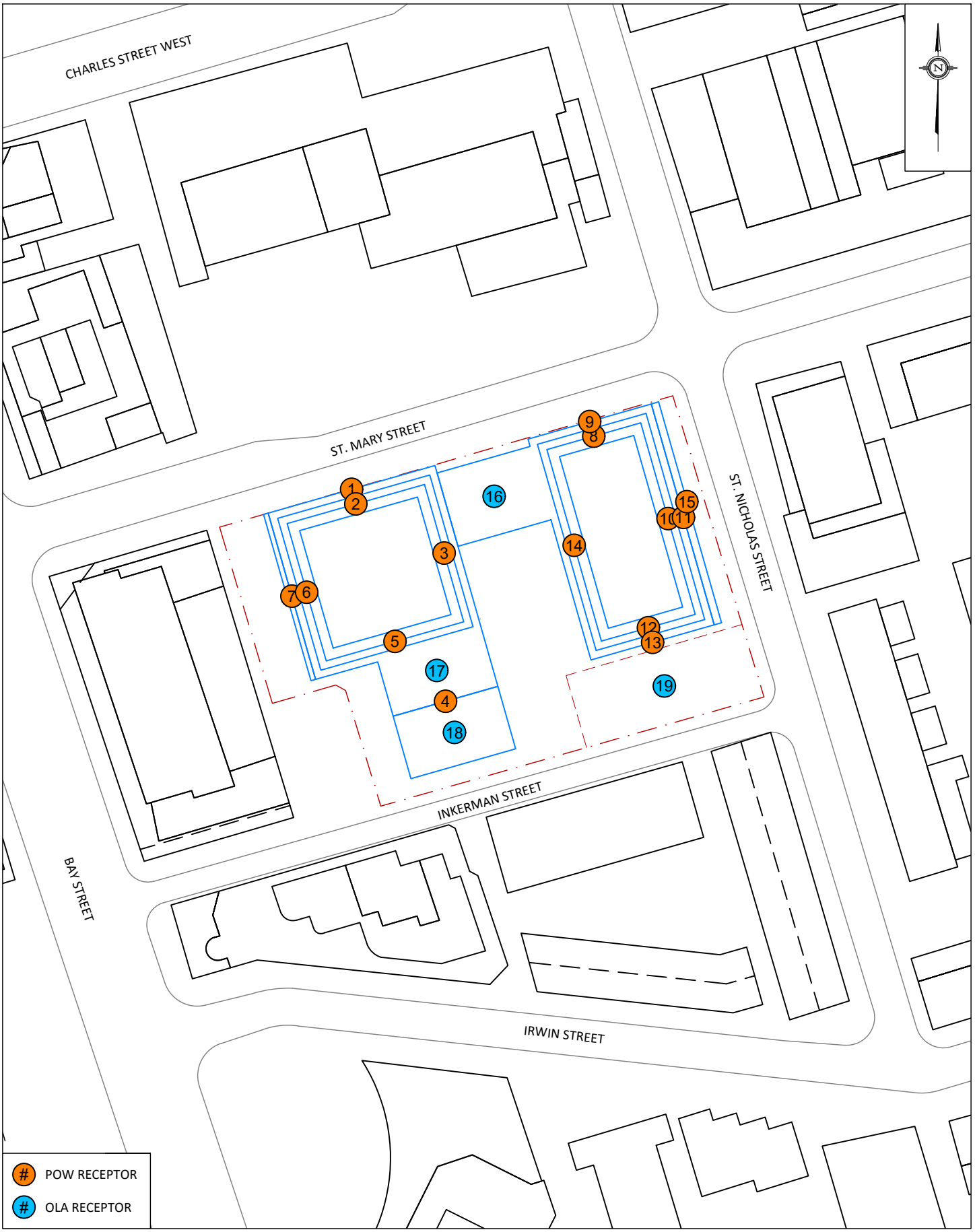
PROJECT	291 SAINT MARY STREET, TORONTO NOISE IMPACT AND VIBRATION STUDY
SCALE	1:1500 Approx.
DRAWING NO.	20-291-1
DATE	JUNE 7, 2021
DRAWN BY	N.M.P. & E.K.
DESCRIPTION	FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	291 SAINT MARY STREET, TORONTO NOISE IMPACT AND VIBRATION STUDY
SCALE	1:1000 Approx.
DRAWING NO.	20-291-2
DATE	JUNE 7, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

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