 **Environmental Noise Assessment – Kirby
Road from West of Jane Street to
Dufferin Street**

City of Vaughan

SLR Project No: 241.20105.00000

June 2022

SLR 

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Dufferin Street

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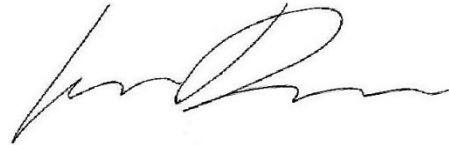
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EXECUTIVE SUMMARY

SLR Consulting (Canada) Ltd., was retained by HDR Inc. on behalf the City of Vaughan (Vaughan) to conduct an environmental transportation noise impact assessment in Vaughan, Ontario. The purpose of the study is to address the proposed Kirby Road roadway improvements from west of Jane Street to Dufferin Street. This work is being done as part of the Municipal Class Environmental Assessment process. This encompasses approximately 4.3 km of improved roadway.

The objectives of this study are as follows:

- to assess future “build” and “no-build” sound levels from road traffic noise sources in the area (i.e., noise levels with and without the proposed project taking place);
- to use these predictions to assess potential impacts according to the applicable guidelines;
- to specify mitigation measures where required; and,
- to assess the potential for construction noise and provide a Code of Practice to minimize potential impacts.

The potential environmental noise impacts of the proposed undertaking have been assessed. Both operational and construction noise impacts have been considered. The conclusions and recommendations are as follows:

- The results show that changes in sound levels resulting from the proposed project are expected to be minor. The highest impact is 2.7 dBA for a home between Laurentian Boulevard and Foot Hills Road.
- Noise impacts are minor and less than the 5 dBA impact criteria in the Noise Protocol. No additional noise mitigation is recommended.
- During the Detail Design of Kirby Road, within the project limits, additional noise analysis is recommended to reassess project sound levels and impacts. There is some uncertainty on both the road traffic volumes and the truck percentages that will be present following the construction of this project and the construction of Kirby Road between Dufferin Street and Bathurst Street. If there are noise impacts greater than the criteria set in provincial or local municipal policies or guidelines, there should be a consideration of providing additional noise mitigation to protect the noise sensitive areas within the project limits.
- Construction noise impacts are temporary in nature but may be noticeable at times in nearby residential NSAs. Methods to minimize construction noise impacts should be included in the Construction Code of Practice, as outlined in **Sections 3.1.3** and **Section 3.3**.

1.0 INTRODUCTION

SLR Consulting (Canada) Ltd., was retained by HDR Inc. on behalf the City of Vaughan (Vaughan) to conduct an environmental transportation noise impact assessment in Vaughan, Ontario. The purpose of the study is to address the proposed Kirby Road roadway improvements from west of Jane Street to Dufferin Street. This work is being done as part of the Municipal Class Environmental Assessment process. This encompasses approximately 4.3 km of improved roadway.

The objectives of this study are as follows:

- to assess future “build” and “no-build” sound levels from road traffic noise sources in the area (i.e., noise levels with and without the proposed project taking place);
- to use these predictions to assess potential impacts according to the applicable guidelines;
- to specify mitigation measures where required; and
- to assess the potential for construction noise and provide a Code of Practice to minimize potential impacts.

A glossary of transportation sound basics can be found in **Appendix A**.

1.1 Project Description

The City of Vaughan is completing the “Municipal Class Environmental Assessment” (Class EA) for Kirby Road roadway improvements from west of Jane Street to Dufferin Street, including the intersections, in accordance with the Class EA document from the Municipal Engineers (October 2000, as amended in 2015). A context plan and an overview of the study area for the project is shown in **Figure 1**. Plans showing the technically preferred alternative are shown in **Appendix B**.

2.0 ROAD TRAFFIC NOISE IMPACTS (OPERATIONAL NOISE)

For roadway projects, operational noise is of primary importance. This section of the report provides an analysis of operational noise impacts from road traffic noise related to this undertaking.

2.1 Applicable Guidelines

There are several transportation noise guidelines that are applicable to this project. Ontario provincial policies and guidelines from the Ministry of Transportation, Ontario (MTO) and the Ministry of the Environment, Conservation and Parks, Ontario (MECP) are directly applicable under the Municipal Class EA process for transportation projects and are discussed in detail in this report.

Ontario has several guidelines and documents related to assessing road traffic noise impacts. The document most applicable to municipal roadway projects is:

- Ontario MECP/MTO, “Joint Protocol”, A Protocol for Dealing with Noise concerns during the Preparation, Review and Evaluation of Provincial Highway’s Environmental Assessments (MTO & MECP, 1986)

In May 2007, the MTO released the *Environmental Guide for Noise* (MTO, 2006) which superseded the Joint Protocol and previous MTO *Quality and Standards Directive QST-A1 Noise Policy and Acoustic Standards for Provincial Highways* (MTO 1992). Currently the *Environmental Guide for Noise* (the Guide) has not been adopted by the MECP for municipal projects. Therefore, the Joint Protocol has been used

for this study. A summary of the effort required under the Joint Protocol is shown in **Table 1**.

Table 1: Summary of Mitigation Efforts Under the MECP/MTO Joint Protocol

Future Sound Levels	Change in Noise Level Above Future “No-Build” Ambient	Mitigation Effort
< 55 dBA	0 to 5 dBA	None
	> 5 dBA	
> 55 dBA	0 to 5 dBA	None
	> 5 dBA	<ul style="list-style-type: none"> Investigate noise control measures on right-of-way. If project cost is not significantly affected introduce noise control measure within right-of-way. Noise control measures, where introduced, should achieve a minimum of 5 dBA attenuation averaged over first row receivers. Mitigated to ambient, as administratively, economically, and technically feasible.

Notes: Values are L_{eq} (16h) levels for municipal roads.

The Joint Protocol sets out an Outdoor Objective sound level of the higher of 55 dBA L_{eq} , or the existing ambient. For sound levels less than 65 dBA either the Guide or the Joint Protocol assesses noise impacts in a similar manner. Only in the case where sound levels exceed 65 dBA, is the Guide more stringent. The evaluation of noise impacts is determined by the change in sound levels from the 2031 “No-Build” scenario to the future “Build” scenario. Assessments are based on a minimum 10-year future horizon year (i.e., traffic volumes 10 years after the completion of the project). Accordingly, a design year of 2031 applies to this project, corresponding to the traffic forecasts provided by HDR Inc.

Noise mitigation is warranted when increases in sound level over the “No-Build” ambient are greater than 5 dBA. Mitigation measures can include changes in vertical profiles and horizontal alignments, and/or noise barriers. Noise mitigation, where applied, must be administratively, economically, and technically feasible, and must provide at least 5 dBA of reduction averaged over the first row of noise-sensitive receivers. Mitigation measures are restricted to within the roadway right-of-way. Off right-of-way noise mitigation, such as window upgrades and air conditioning, is not considered.

2.2 Location of Noise Sensitive Areas Within the Study Area

2.2.1 Definition of Outdoor Living Area (OLA) and Noise Sensitive Areas (NSAs)

Noise impacts from transportation projects are evaluated at noise sensitive receptors commonly referred to as NSAs. The OLA is the part of an outdoor amenity area provided for the quiet enjoyment of the outdoor environment. The OLA is typically an area at ground level accommodating outdoor living activities. For sound level calculation purposes, the usual distance from the dwelling unit wall is 3 m where the actual OLA is not known. The vertical height is 1.5 metres (approximate head-height) above ground level. Where unknown, the side closest to the source of noise is assumed. Paved areas for multiple dwelling residential units are not defined as OLA. The OLA may include private areas used by individual dwelling occupants or “common” areas used by multi-tenant dwelling occupants.

Under the Joint Protocol, NSAs include the following land uses, provided they have an OLA associated with them:

- Private homes (single family units and townhouses);
- Multiple unit buildings such as apartments, provided they have an associated communal OLA;
- Hospitals and nursing homes for the aged, provided they have an OLA for use by patients;
- Schools, educational facilities, and daycare centres where there are OLAs for students;
- Campgrounds that provide overnight accommodation;
- Hotels and motels with outdoor communal OLAs for visitors; and
- Churches and places of worship.

The following land uses are generally not considered to qualify as NSAs:

- Apartment balconies;
- Cemeteries;
- Parks and picnic areas not part of a defined OLA;
- All commercial; and,
- All industrial.

2.2.2 Representative NSAs for Analysis

Thirty-three (33) NSAs have been used in the analysis to represent worst-case potential noise impacts at all nearby noise sensitive land uses within the study area. NSAs were chosen to assess areas with similar overall noise levels and similar changes in noise (“Build” versus “No-Build”). These NSAs and modelled receptor locations are described in **Table 2**. The locations of the representative noise receptors used in the analysis are shown in **Figure 2** to **Figure 6**.

Table 2: Representative NSAs Considered in Analysis

Receptor Location	Description	Approximate Number of NSAs Represented ^[1]
Receptor 1		N/A (homes not built yet)
Receptor 2	2 Adirondack Drive	2
Receptor 3	32 Adirondack Drive	4
Receptor 4	64 Adirondack Drive	4
Receptor 5	64 Adirondack Drive	3
Receptor 6	94 Adirondack Drive	2
Receptor 7	116 Adirondack Drive	3
Receptor 8	156 Adirondack Drive	2
Receptor 9	2 Foot Hills Road	1
Receptor 10	51 Glacier Court	4

Receptor Location	Description	Approximate Number of NSAs Represented ^[1]
Receptor 11	71 Glacier Court	2
Receptor 12	155 Regency View Heights	3
Receptor 13	159 Regency View Heights	2
Receptor 14	169 Regency View Heights	5
Receptor 15	1 Ravineview Drive	6
Receptor 16	2 Ravineview Drive	6
Receptor 17	116 Beaverbrook Drive	3
Receptor 18	108 Beaverbrook Drive	3
Receptor 19	96 Beaverbrook Drive	5
Receptor 20	80 Beaverbrook Drive	5
Receptor 21	68 Beaverbrook Drive	6
Receptor 22	46 Beaverbrook Drive	8
Receptor 23	30 Beaverbrook Drive	2
Receptor 24	132 Bestview Crescent	2
Receptor 25	120 Bestview Crescent	4
Receptor 26	104 Bestview Crescent	3
Receptor 27	88 Bestview Crescent	4
Receptor 28	74 Bestview Crescent	5
Receptor 29	62 Bestview Crescent	2
Receptor 30	58 Bestview Crescent	7
Receptor 31	2932 Kirby Road	1
Receptor 32	2935 Kirby Road	1
Receptor 33	11451 Jane Street	1

Notes: [1] The number refers to only those homes in the immediate vicinity of the selected noise receptor.

2.3 Study Horizons

Under the Noise Protocol a “noise impact” is defined as the difference in projected noise levels at the “No Build” and the projected noise levels at the “Build” year. Traffic volumes from the 2031 year were the best available at the time of this assessment to assess possible noise impacts.

2.4 Study Scenarios

As mentioned above, the “noise impact” for the study area is defined as the difference in projected noise levels between the “No-Build” and “Build” scenarios.

2.5 Road Traffic Data

Traffic volumes for the 2031 “No-Build” and “Build” scenarios for multiple roadways were provided by HDR Inc. and are found in **Appendix C**. The data is further summarized in **Table 3** and **Table 4**. Traffic data was provided as Average Annual Daily Traffic (AADT), with percentage of commercial vehicles, day/night traffic split and posted speeds.

Table 3: 2031 “No-Build” Traffic Volumes

Roadway and Section	Direction	Traffic Volumes (AADT)	Day / Night Split ^[1]	Overall % Commercial Vehicles	Medium / Heavy Truck Split ^[2]	Posted Speed (km/h)
Jane St.	NB	8,018	93/7	4.5	2.9/1.6	80
Jane St.	SB	6,882	93/7	4.5	2.9/1.6	80
Keele St.	NB	7,704	93/7	7.6	4.4/2.3	70
Keele St.	SB	11,096	93/7	7.6	4.4/2.3	70
Dufferin St.	NB	7,526	92/8	2.9	2.0/0.9	70
Dufferin St.	NB	6,974	92/8	2.9	2.0/0.9	70
Kirby Rd., Hwy 400 to Jane St.	WB	5,676	90/10	10.0	5.0/5.0	60
Kirby Rd., Hwy 400 to Jane St.	EB	5,024	90/10	10.0	5.0/5.0	60
Kirby Rd., Jane St. to Keele St.	WB	5,729	91/9	10.0	5.0/5.0	60
Kirby Rd., Jane St. to Keele St.	EB	5,371	91/9	10.0	5.0/5.0	60
Kirby Rd., Keele St. to Dufferin St.	WB	7,031	93/7	10.0	5.0/5.0	60
Kirby Rd., Keele St. to Dufferin St.	EB	6,369	93/7	10.0	5.0/5.0	60
Kirby Rd., Dufferin St. to Bathurst St.	WB	11,850	90/10	10.0	5.0/5.0	60
Kirby Rd., Dufferin St. to Bathurst St.	EB	11,850	90/10	10.0	5.0/5.0	60

Notes: [1] XX / YY is the percentage of vehicle traffic in the 16-hour daytime and 8-hour night-time respectively.
 [2] MM / HH is the percentage of medium trucks and heavy trucks used in the analysis, respectively.

Table 4: 2031 “Build” Traffic Volumes

Roadway and Section	Direction	Traffic Volumes (AADT)	Day / Night Split [1]	Overall % Commercial Vehicles	Medium / Heavy Truck Split [2]	Posted Speed (km/h)
Jane St.	NB	5,798	93/7	4.5	2.9/1.6	80
Jane St.	SB	6,802	93/7	4.5	2.9/1.6	80
Keele St.	NB	10,354	93/7	7.6	4.4/2.3	70
Keele St.	SB	12,146	93/7	7.6	4.4/2.3	70
Dufferin St.	NB	5,538	92/8	2.9	2.0/0.9	70
Dufferin St.	NB	5,362	92/8	2.9	2.0/0.9	70
Kirby Rd., Hwy 400 to Jane St.	WB	6,994	90/10	10.0	5.0/5.0	60
Kirby Rd., Hwy 400 to Jane St.	EB	7,906	90/10	10.0	5.0/5.0	60
Kirby Rd., Jane St. to Keele St.	WB	7,408	91/9	10.0	5.0/5.0	60
Kirby Rd., Jane St. to Keele St.	EB	7,992	91/9	10.0	5.0/5.0	60
Kirby Rd., Keele St. to Dufferin St.	WB	9,523	93/7	10.0	5.0/5.0	60
Kirby Rd., Keele St. to Dufferin St.	EB	8,677	93/7	10.0	5.0/5.0	60
Kirby Rd., Dufferin St. to Bathurst St.	WB	11,850	90/10	10.0	5.0/5.0	60
Kirby Rd., Dufferin St. to Bathurst St.	EB	11,850	90/10	10.0	5.0/5.0	60

Notes: [1] XX / YY is the percentage of vehicle traffic in the 16-hour daytime and 8-hour night-time respectively.
 [2] MM / HH is the percentage of medium trucks and heavy trucks used in the analysis, respectively.

2.6 Noise Model Used

The roadway noise prediction model used is the ORNAMENT road noise prediction algorithms produced by the MECP. The MECP “STAMSON” highway noise prediction model is a computerized version of this

method. Both methods are simplified versions of the United States Federal Highway Administration Method. A Cadna/A implementation of the STAMSON/ ORNAMENT model was used for the noise analysis because of its ability of handle complex ground elevations, multiple barriers, and receptors. The Cadna/A software also considers screening from buildings that are located between the roadways and the NSAs. The sound power levels, and noise source heights used in Cadna/A are found in **Appendix D**.

The noise prediction model relies on the use of vehicle noise emission levels to generate a noise source that can then be assessed at the receptors based on the following factors:

- speeds for the roadways in the area used in the noise analysis;
- pavement surface used for construction of the roadway (hot mix asphaltic pavement for all roadways);
- elevations, contours and locations of all the NSA's near the right-of-way;
- roadway grades;
- intervening rows of homes and barriers;
- type of ground cover, soft or hard ground;
- percentage of commercial traffic; and
- distance from the roadway.

The model uses the following vehicle classifications:

Automobiles	Two axles and four wheels designed primarily for the transportation of nine or fewer passengers, or transportation of cargo (light trucks). This classification includes motorcycles. Generally, the gross vehicle weight is less than 4,500 kilograms.
Medium Trucks	Two axles and six wheels designed for the transportation of cargo. Generally, the gross vehicle weight is greater than 4,500 kilograms but less than 12,000 kilograms.
Heavy Trucks	Three or more axles and designed for the transportation of cargo. Generally, the gross vehicle weight is greater than 12,000 kilograms.

Distances, roadway heights, and receptor locations were obtained from plan drawings supplied by HDR Inc. in addition to aerial photography.

2.7 Detailed Modelling

Table 5 presents a comparison of predicted “No-Build” versus future “Build” sound levels at receptors in the study area during the 16-hour daytime period.

Table 5: 2031 “No-Build” and “Build” Noise Levels

Receptor Location	Approximate Number of NSAs Represented	“No Build” Leq (16h)	“Build” Leq (16h)	Change (“Build” minus “No Build”)	Increase Above 5 dBA (Yes/No)
Rec 1	N/A (No homes built yet)	60.8	60.9	0.1	No
Rec 2	2	56.7	59.4	2.7	No

Receptor Location	Approximate Number of NSAs Represented	"No Build" Leq (16h)	"Build" Leq (16h)	Change ("Build" minus "No Build")	Increase Above 5 dBA (Yes/No)
Rec 3	4	55.6	57.7	2.1	No
Rec 4	4	55.4	57.6	2.2	No
Rec 5	3	56.4	58.5	2.1	No
Rec 6	2	55.0	57.4	2.4	No
Rec 7	3	56.2	58.3	2.1	No
Rec 8	2	55.4	57.2	1.8	No
Rec 9	1	55.6	57.0	1.4	No
Rec 10	4	55.1	56.2	1.1	No
Rec 11	2	56.0	57.1	1.1	No
Rec 12	3	56.2	57.3	1.1	No
Rec 13	2	57.1	58.0	0.9	No
Rec 14	5	57.2	58.1	0.9	No
Rec 15	6	56.7	57.6	0.9	No
Rec 16	6	57.1	58.8	1.7	No
Rec 17	3	56.8	58.6	1.8	No
Rec 18	3	56.6	58.1	1.5	No
Rec 19	5	56.6	57.9	1.3	No
Rec 20	5	57.3	58.5	1.2	No
Rec 21	6	57.3	58.3	1.0	No
Rec 22	8	56.9	58.3	1.4	No
Rec 23	2	54.6	56.1	1.5	No
Rec 24	2	54.4	55.5	1.1	No
Rec 25	4	55.0	56.0	1.0	No
Rec 28	3	54.8	55.5	0.7	No
Rec 27	4	54.8	55.3	0.5	No
Rec 28	5	54.7	55.2	0.5	No
Rec 29	2	55.8	56.5	0.7	No
Rec 30	7	54.9	55.5	0.6	No
Rec 31	1	55.9	56.7	0.8	No
Rec 32	1	56.5	57.7	1.2	No

Receptor Location	Approximate Number of NSAs Represented	“No Build” Leq (16h)	“Build” Leq (16h)	Change (“Build” minus “No Build”)	Increase Above 5 dBA (Yes/No)
Rec 33	1	61.6	60.9	-0.7	No

2.8 Discussion of Noise Impacts

The location of the noise receptors is shown in **Figure 2** to **Figure 6**. The results show that changes in sound levels resulting from the proposed project are expected to be no greater than approximately 2.7 dBA for homes located closest to the Kirby Road and away from a north south crossing roadway. This is considered a noticeable change in sound level. Most homes will have a less than 2.0 dBA increase in sound levels with the improvements. It takes approximately a 3 dBA change¹ in sound levels before most persons perceive a change, therefore slight increases in sound levels are expected to be imperceptible.

The homes with the greatest increase in noise level are on the south side of Kirby Road between Laurentian Boulevard and Foot Hills Road. This increase is caused by an increase in road traffic volumes and the raise in roadway grade relative to the homes. Generally, the very minor changes in sound levels at the rest of the noise receptors is caused by the road widening and minor changes in road traffic volumes on Kirby Road and the north south crossing roadways. An assumption in the noise modelling was made that the existing developer-built noise barriers are in good condition. There is a chance that some of them may have cracks or gaps in them decreasing acoustical effectiveness. Examining their current physical condition is beyond the scope of this noise study.

2.9 Discussion and Investigation of Noise Mitigation

There was no examination of placing new noise barriers to mitigate any changes in noise levels. The noise impacts are relatively low and much less than the 5 dBA impact criteria in the Noise Protocol. As a result, additional noise mitigation is not recommended for this project.

3.0 CONSTRUCTION NOISE IMPACTS

Construction noise impacts are temporary in nature, and largely unavoidable. Although for some periods and types of work, construction noise may be noticeable, with adequate controls, impacts can be minimized. This section of the report provides overview of the by-law and recommends a Code of Practice to minimize impacts.

3.1 Construction Noise and Vibration Assessment Guidelines

3.1.1 MECP Model Municipal Noise Control By-Law

The MECP stipulates limits on noise emissions from individual items of equipment, rather than for overall construction noise. In the presence of persistent noise complaints, sound emission standards for the various types of construction equipment used on the project should be checked to ensure that they meet

¹ See **Appendix A**, Human Perception of Sound, for additional information on changes in sound levels.

the specified limits contained within MECP Publication NPC-115 – “Construction Equipment”. These limits are provided in **Table 6**.

Table 6: NPC-115 Maximum Noise Emission Levels for Typical Construction Equipment

Type of Unit	Maximum Sound Level ^[1] (dBA)	Distance (m)	Power Rating (kW)
Excavation Equipment ^[2]	83	15	< 75
	85	15	> 75
Pneumatic Equipment ^[3]	85	7	-
Portable Compressors	76	7	-

- Notes:**
- [1] Maximum permissible sound levels presented here are for equipment manufactured after January 1, 1981.
 - [2] Excavation equipment includes bulldozers, backhoes, front end loaders, graders, excavators, steam rollers and other equipment capable of being used for similar applications.
 - [3] Pneumatic equipment includes pavement breakers.

3.1.2 Construction Vibration Guidelines

Blasting is not expected to occur as part of this project’s construction processes. Regardless, vibration from construction activities can affect surrounding structures. The vibration limits recommended under Ontario Provincial Standard Specification (OPSS) OPSS MUNI-120 – *General Specification for the Use of Explosives* should be adopted (OPSS 2014). These vibration limits are summarized in **Table 7**.

Table 7: Construction Vibration Limits – OPSS MUNI-120

Element	Frequency	Limit – Peak Particle Velocity (PPV), mm/s
Structures and Pipelines	< 40 Hz	20
	> 40 Hz	50
Concrete and Grout < 72 hours from placement	All	10

These limits would apply to vibration from construction activities such as hoe ramming, pile driving, dumping and excavation. The contractor should assess the potential for vibration impacts from their planned activities prior to the start of construction and mitigate accordingly.

In addition, the contractor should abide by the following MECP vibration document requirements when constructing this undertaking:

- Noise Pollution Control Publication 207 (NPC-207), *Impulse Vibration in Residential Buildings*, (November 1983); and,
- Vibration limits within MECP publication NPC-207 can be supplemented by more detailed construction vibration limits regarding building damage from Chapter 12 of *United States Federal Transit Administration - Transit Noise and Vibration Impact Assessment* (document FTA-VA-90-1003-06 – May 2006).

Where there are overlapping criteria, the more stringent criteria apply. Excerpts from NPC-207 are presented in **Tables 8** and **9**. Full details of the construction vibration limits are provided in their respective documents.

The scope of NPC-207 is defined as follows:

The purpose of this Publication is to provide a method for assessment of impulse vibration measured inside occupied residential buildings, caused by the operation of stationary sources of vibration including, but not limited to, stamping presses and forging hammers.

NPC-207 was drafted to address permanent, rather than temporary, vibration impacts and address perceived vibrations rather than the building damage criteria that are set out in OPSS MUNI-120.

Table 8: Table 207-2: Vibration Limits for Frequent Impulses (20 or More Impulses in Reported Observation Period)

Observation Period in Minutes	Limit on the Average Peak Vibration Velocity in mm/s	
	Day-Time 07:00 – 23:00	Night-Time 23:00 – 07:00
20 minutes or less	0.30	0.30
Less or equal to 60 minutes but more than 20 minutes	0.60	0.30
Less or equal to 120 minutes but more than 60 minutes	1.00	0.30

Notes: Source: NPC-207 – Full details for vibration limits provided in NPC-207

Table 9: Table 207-3: Vibration Limits for Infrequent Impulses (Less than 20 Impulses in Reported Observation Period)

Observation Period in Minutes	Limit on the Average Peak Vibration Velocity of Individual Impulses in mm/s	
	Day-Time 07:00 – 23:00	Night-Time 23:00 – 07:00
120 minutes	10.00	0.30

Notes: Source: NPC-207 – Full details for vibration limits provided in NPC-207

3.1.3 Local Noise Control By-Law

The proposed project lies entirely within the City of Vaughan which has a bylaw restricting noise from construction activities. **Table 10** clearly exempts the City from the need for an exemption to the bylaw for the construction phase of this undertaking. A consolidated copy of the bylaw can be found in **Appendix E**.

Table 10: City of Vaughan Noise Control By-law

Jurisdiction	Bylaw Number	Bylaw Provision
City of Vaughan	062-2018	<p>“Necessary Municipal Work” means work being undertaken by the <i>City</i>, the Region, Transit Authority, or any other level of government, and its agents, and includes but is not limited to any rehabilitation or require maintenance processes and activities within the Public Right of Way or any Highway as defined by the Highway Traffic Act (HTA) of Ontario, using of Construction Equipment that requires work must be performed at times that minimize traffic disruption, including minimizing lane closures or lane restrictions, or both, and includes any works undertaken on Property owned or under the control of the <i>City</i>, Region, or any other level of government. Without forgoing the generality rehabilitation or maintenance processes and activities include but are not limited to:</p> <ul style="list-style-type: none"> • Deck Removal of any Highway; • Intersection rehabilitation and all related work; • All Transit Authority work, including any ancillary Property or facilities and infrastructure; • All other work as determined necessary by the <i>Director of Enforcement</i>, or delegate; <p>10. CONSTRUCTION</p> <p>(1) No person shall, between 1900 hours of one day and 0700 hours of the next day operate or cause to be operated, any <i>Construction Vehicle</i> or <i>Construction Equipment</i> in connection with the <i>Construction</i> of any building or structure, <i>Highway</i>, motor car, steam boiler or other engine or machine;</p> <p>(2) Despite Subsection (1), no person shall operate or cause to be operated any <i>Construction Vehicle</i> or <i>Construction Equipment</i> before 0700 hours and no later than 1900 hours on any Saturday and not at all on Sunday or statutory holidays;</p> <p>Subsection 10. (1) and (2) does not apply to <i>Necessary Municipal Work</i> and <i>Emergency Work</i> as defined by this By-law.</p>

3.2 Anticipated Construction Activities

The following construction activities are anticipated as part of this project:

- Removing some existing surface pavements,
- Construction of the roadway widening, including removal of overburden,
- Paving of new roadway surfaces, and
- repaving of some of the existing roadways.

3.3 Construction Code of Practice Requirements (Mitigation)

To minimize the potential for construction noise impacts, it is recommended that provisions be written into the contract documentation for the contractor, as outlined below:

- Where possible construction should be carried out during the normally allowed hours specified in the by-law found in **Appendix E**. If construction activities are required outside of these hours, the

Contractor should minimize the amount of noise being generated to not be clearly audible in any noise sensitive areas.

- There should be explicit indication that the Contractor is expected to comply with all applicable requirements of the contract.

All equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order. This is also a requirement of the Vaughan noise control by-law.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The potential environmental noise impacts of the proposed undertaking have been assessed. Both operational and construction noise impacts have been considered. The conclusions and recommendations are as follows:

- The results show that changes in sound levels resulting from the proposed project are expected to be minor. The highest impact is 2.7 dBA for a home between Laurentian Boulevard and Foot Hills Road.
- Noise impacts are minor and less than the 5 dBA impact criteria in the Noise Protocol. No additional noise mitigation is recommended.
- During the Detail Design of Kirby Road, within the project limits, additional noise analysis is recommended to reassess project sound levels and impacts. There is some uncertainty on both the road traffic volumes and the truck percentages that will be present following the construction of this project and the construction of Kirby Road between Dufferin Street and Bathurst Street. If there are noise impacts greater than the criteria set in provincial or local municipal policies or guidelines, there should be a consideration of providing additional noise mitigation to protect the noise sensitive areas within the project limits.
- Construction noise impacts are temporary in nature but may be noticeable at times in nearby residential NSAs. Methods to minimize construction noise impacts should be included in the Construction Code of Practice, as outlined in **Sections 3.1.3** and **Section 3.3**.

5.0 REFERENCES

Ontario Ministry of the Environment, Conservation and Parks (MECP) / Ontario Ministry of Transportation (MTO), 1986, "Joint Protocol", *A Protocol for Dealing with Noise Concerns During the Preparation, Review and Evaluation of Provincial Highway's Environmental Assessments*

Ontario Ministry of the Environment, Conservation and Parks (MECP), 1989, Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)

Ontario Ministry of the Environment, Conservation and Parks (MECP), 2000, STAMSON v5.04: Road, Rail and Rapid Transit Noise Prediction Model

Ontario Ministry of the Environment, Conservation and Parks (MECP), 1977b, *Model Municipal Noise Control Bylaw*, which includes Publication NPC-115 – Construction Equipment

Ontario Ministry of the Environment, Conservation and Parks (MECP), 1977c, *Model Municipal Noise Control Bylaw*, which includes Publication NPC-119 – Noise from Blasting

Ontario Ministry of Transportation (MTO), 1992a, Quality and Standards Directive QST-A1, Noise Policy and Acoustic Standards for Provincial Highways

Ontario Ministry of Transportation (MTO), *Environmental Guide for Noise (2006)*, Revised 2008.

Ontario Ministry of the Environment, Conservation and Parks (MECP) Publication NPC-207 - Impulse Vibration in Residential Buildings, Revised November 1983

Ontario Provincial Standard Specification OPSS MUNI 120: *General Specification for the Use of Explosives. Transit Noise and Vibration Impact Assessment, Federal Transit Administration, FTA-VA-90-1003-06*, May 2006

Ontario Ministry of the Environment, Conservation and Parks (MECP), 2013, *Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning, Publication NPC-300*

The City of Vaughan, Noise By-Law Number 06-2018

6.0 STATEMENT OF LIMITATIONS

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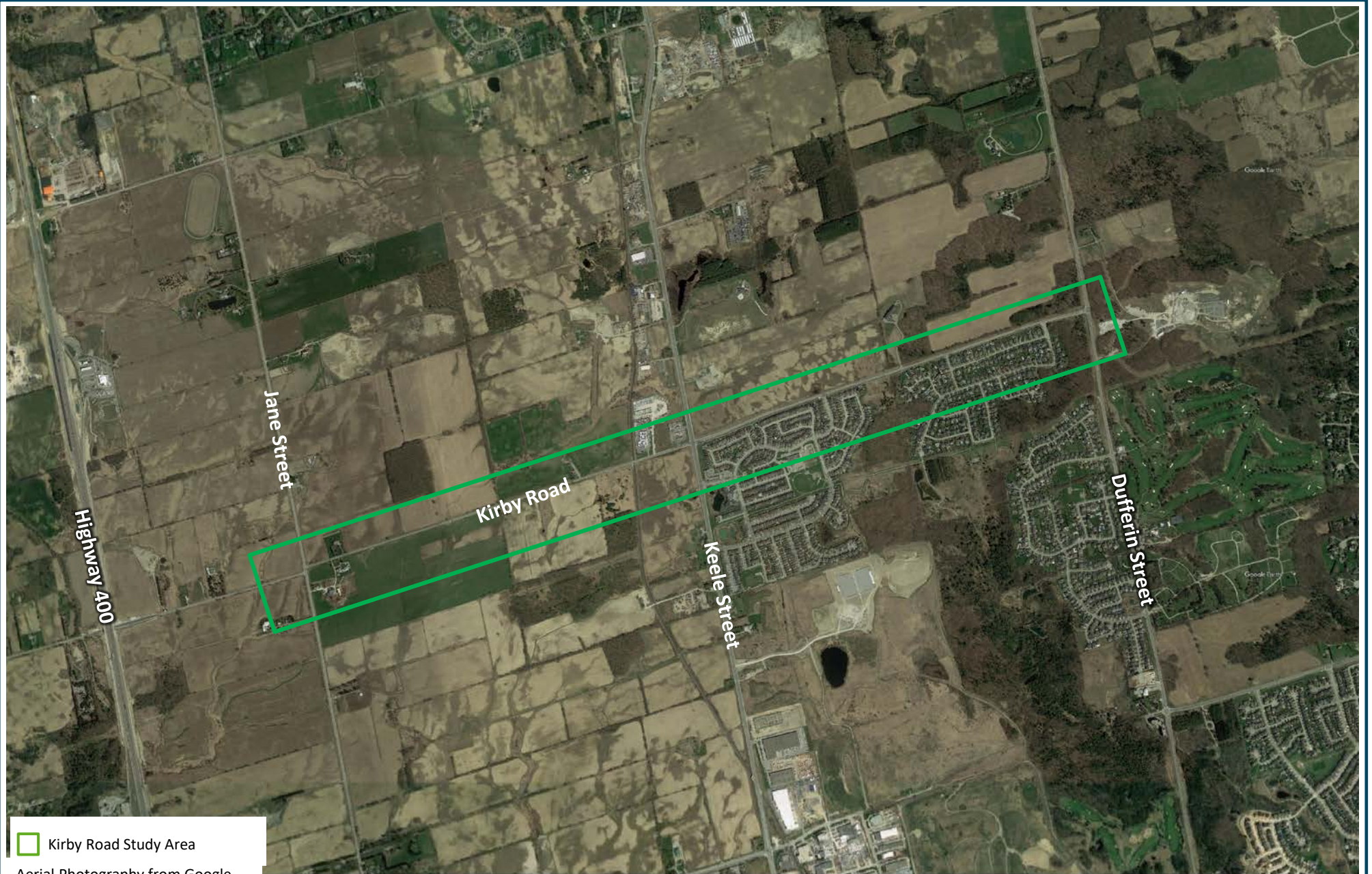
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**Environmental Noise Assessment – Kirby Road from West of Jane
Street to Dufferin Street**

City of Vaughan

SLR Project No: 241.20066.00000



 Kirby Road Study Area

Aerial Photography from Google

CITY OF VAUGHAN

KIRBY ROAD ENVIRONMENTAL ASSESSMENT

SITE AND CONTEXT PLAN

True North



Scale: 1: 25,000

Date: Aug. 26, 2021 Rev 0.0

Project No. 241.20105.00000



METRES

Figure No.

1





-  Noise Sensitive Receptor
-  Existing Noise Barrier

Aerial Photography from Google

CITY OF VAUGHAN

KIRBY ROAD ENVIRONMENTAL ASSESSMENT

NOISE SENSITIVE RECEPTORS 1 TO 3

True North



Scale: 1:2,000

Date: Aug. 26., 2021 Rev 0.0

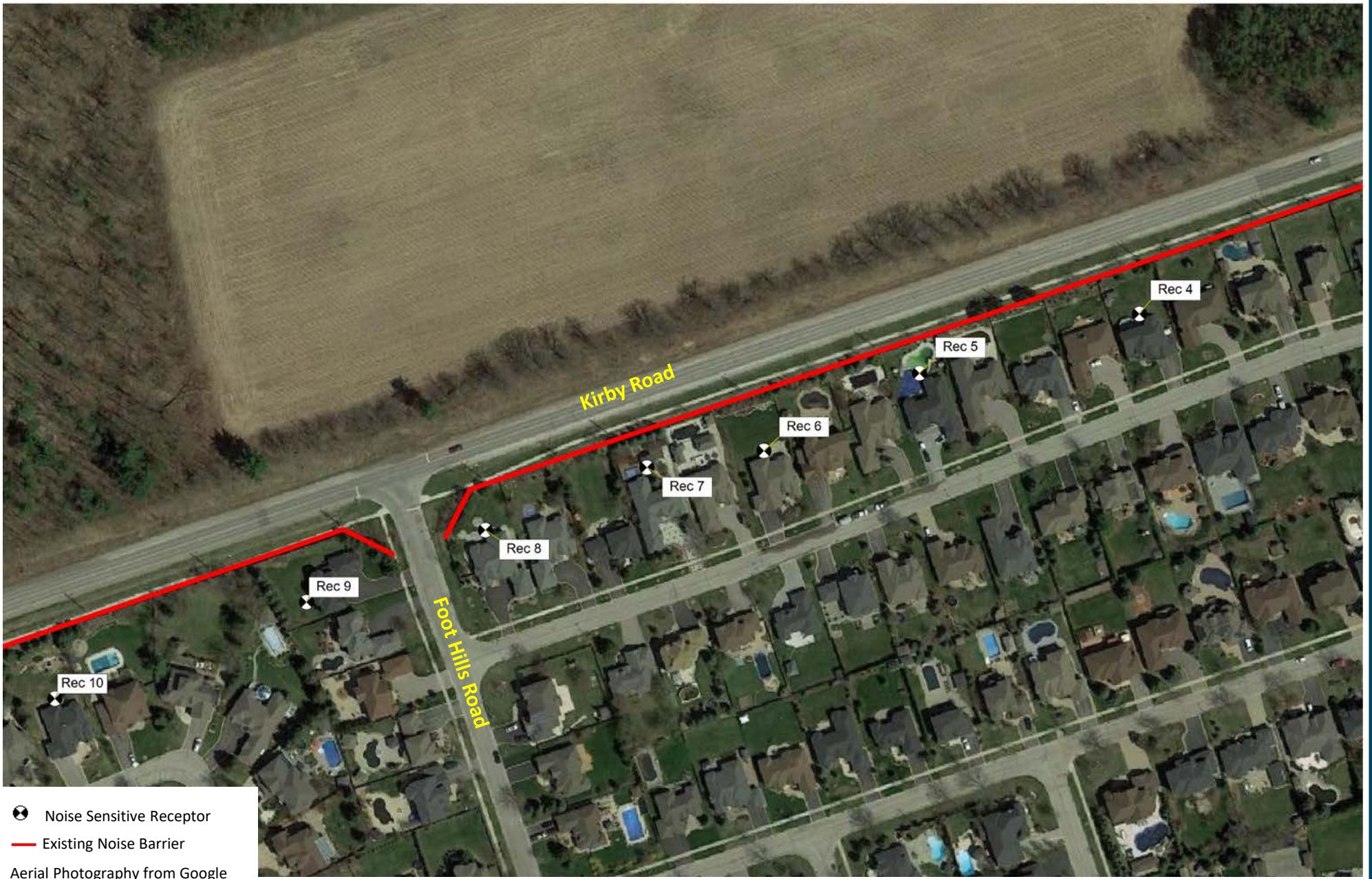
Project No. 241.20105.00000



METRES

Figure No.

2





-  Noise Sensitive Receptor
-  Existing Noise Barrier

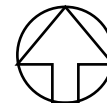
Aerial Photography from Google

CITY OF VAUGHAN

KIRBY ROAD ENVIRONMENTAL ASSESSMENT

NOISE SENSITIVE RECEPTORS 4 TO 10

True North



Scale: 1:2,000

Date: Aug. 26, 2021 Rev 0.0

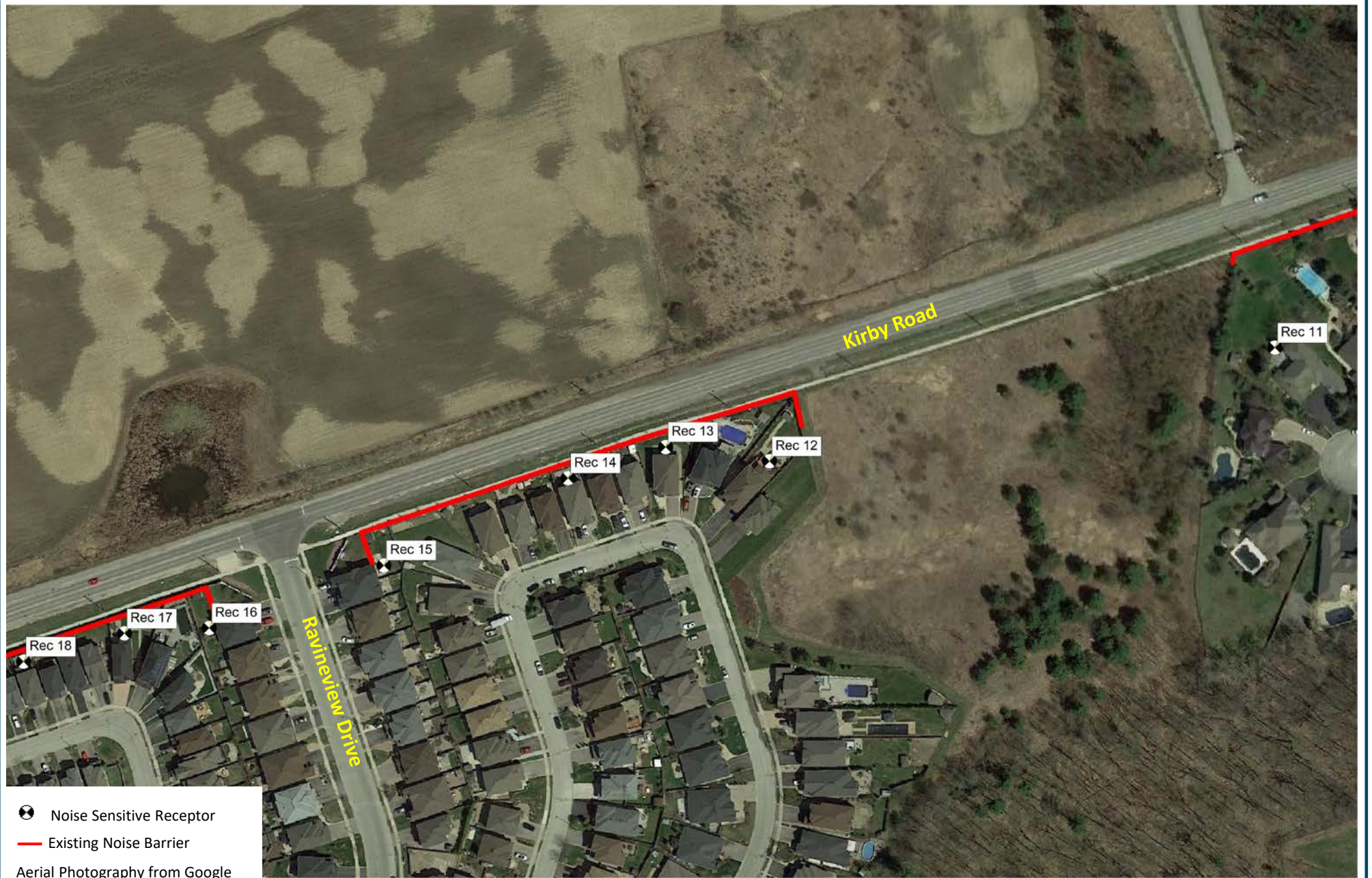
Project No. 241.20105.00000



METRES

Figure No.

3





-  Noise Sensitive Receptor
-  Existing Noise Barrier

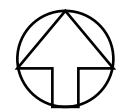
Aerial Photography from Google

CITY OF VAUGHAN

KIRBY ROAD ENVIRONMENTAL ASSESSMENT

NOISE SENSITIVE RECEPTORS 11 TO 18

True North



Scale: 1:2,000

Date: Aug. 26, 2021 Rev 0.0

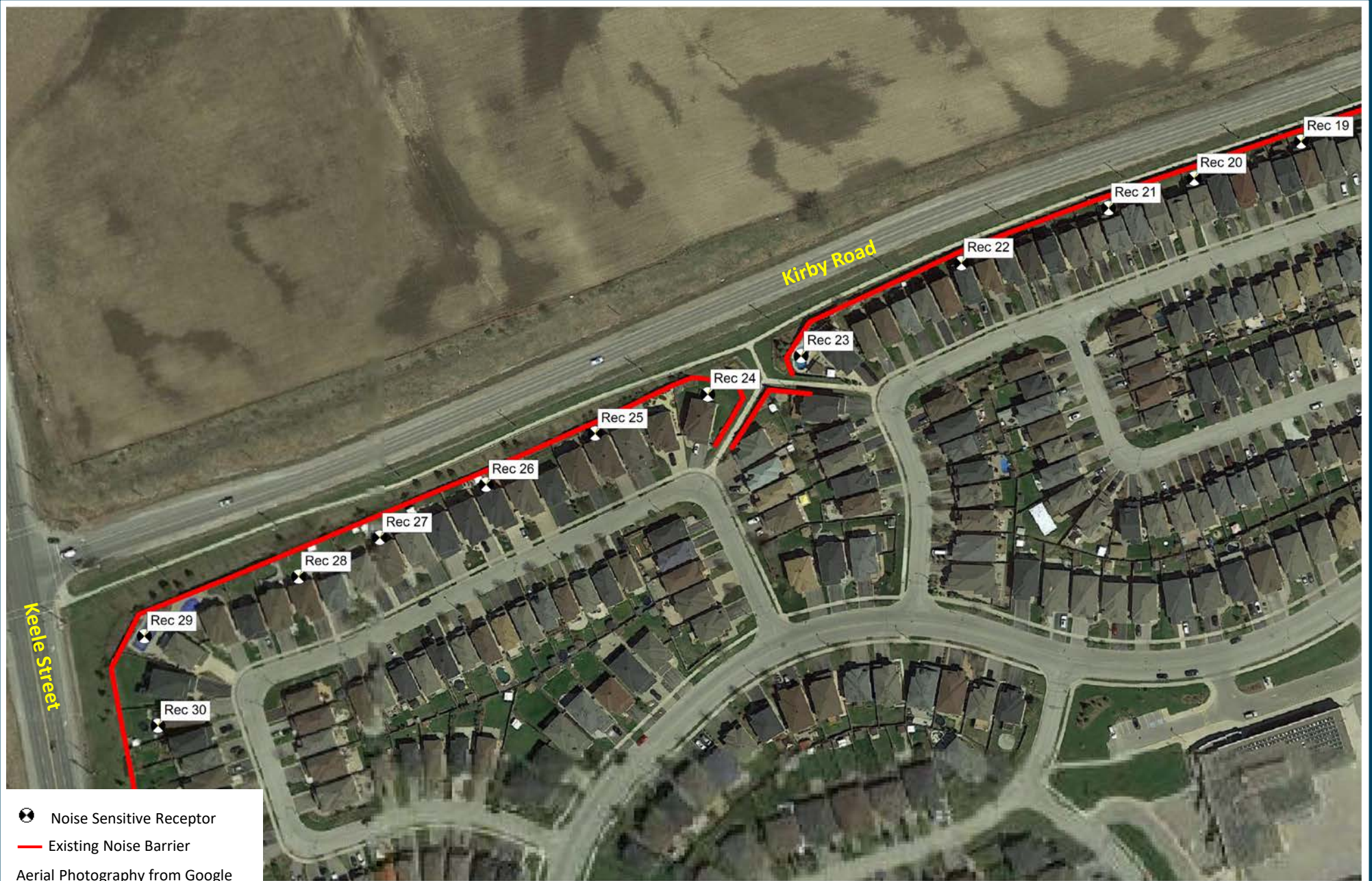
Project No. 241.20105.00000



METRES

Figure No.

4





-  Noise Sensitive Receptor
-  Existing Noise Barrier

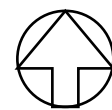
Aerial Photography from Google

CITY OF VAUGHAN

KIRBY ROAD ENVIRONMENTAL ASSESSMENT

NOISE SENSITIVE RECEPTORS 19 TO 30

True North



Scale: 1:2,000

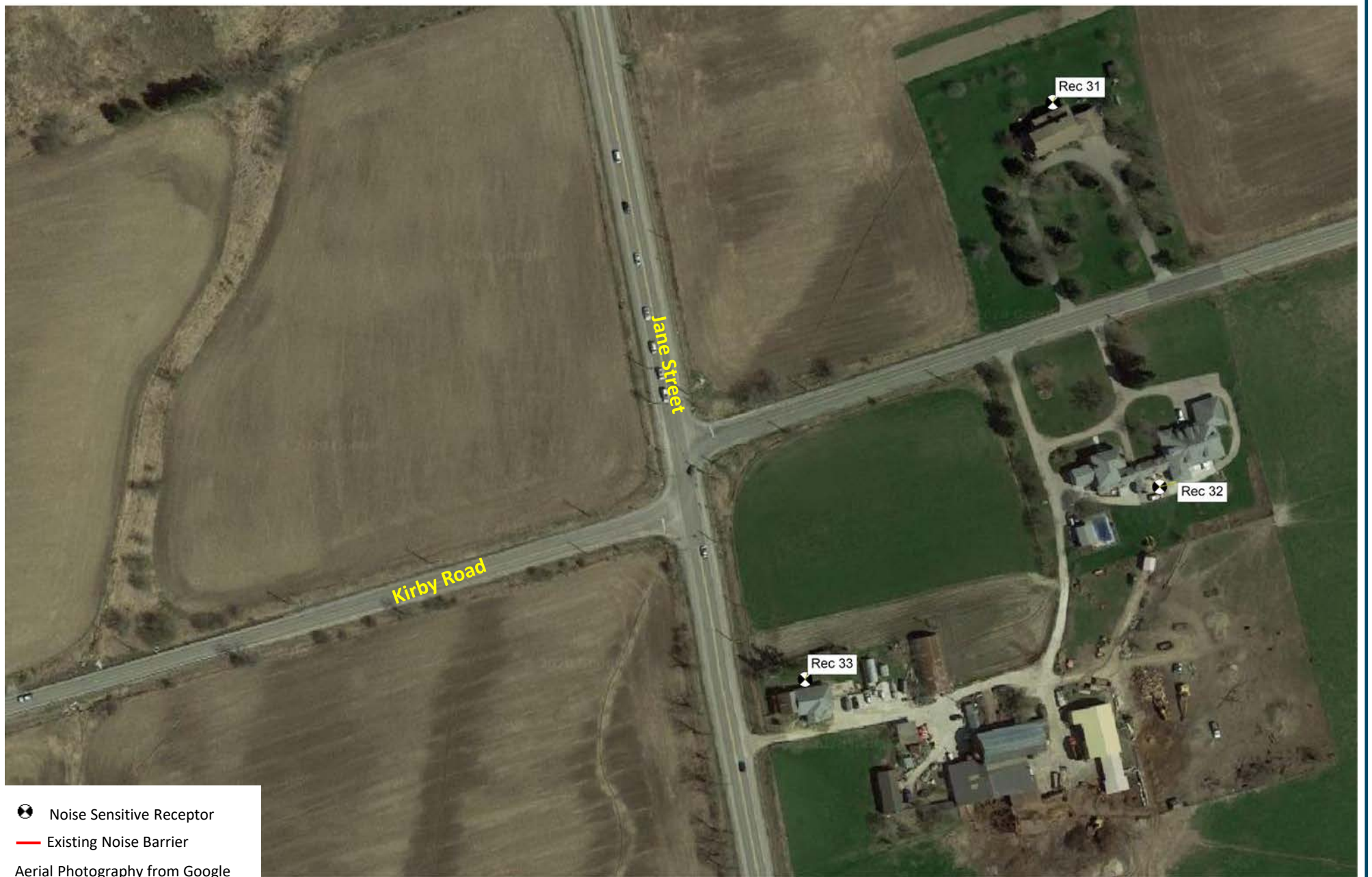
Date: Aug. 26, 2021 Rev 0.0



Project No. 241.20105.00000

METRES

Figure No.
5





-  Noise Sensitive Receptor
-  Existing Noise Barrier

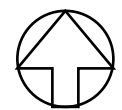
Aerial Photography from Google

CITY OF VAUGHAN

KIRBY ROAD ENVIRONMENTAL ASSESSMENT

NOISE SENSITIVE RECEPTORS 31 TO 33

True North



Scale: 1:2,000

Date: Aug. 26, 2021 Rev 0.0

Project No. 241.20105.00000

METRES

Figure No.
6



APPENDIX A - Terms, Glossary

Environmental Noise Assessment – Kirby Road from West of Jane Street to Dufferin Street

City of Vaughan

SLR Project No: 241.20105.00000

Transportation Sound Basics

Sound Levels

Sound is, in its simplest form, a dynamic, fluctuating pressure, in a fluid medium. That medium can be air, other gases, or liquids such as water. These fluctuations are transmitted by pressure waves through the medium from the source to the receiver. For the majority of transportation engineering purposes, the primary interest is with sound waves in air, with human beings as the receptor. Noise is defined as unwanted sound. The standard practice within the acoustical industry is to use these two terms interchangeably.

Decibels

A decibel (dB) is a logarithmic ratio of a value to a reference level. The general mathematical format is:

$$\text{Level in dB} = 10 \log (\text{Value} / \text{Reference})$$

Any value can be expressed in decibels. Decibels are very, very useful in performing comparisons where there are huge ranges in levels. For example, an acoustical engineer can expect to deal with acoustical energy values ranging from 0.00001 W to 100 W (sound power), and pressures ranging from 0.002 Pa to 200 Pa (sound pressure)¹. For completeness, decibels should always be stated with their reference level (e.g., 20 dB re: 20 μ Pa). However, in practice the reference level is often left out.

Sound Pressure Level

Sound pressure level is what humans experience as sound. Sound waves create small fluctuations around the normal atmospheric pressure. These pressure fluctuations come into contact with eardrums and create the sensation of sound. Sound pressure is measured in decibels, according to the following equation:

$$\text{Sound Pressure Level, dB} = 10 \log (p^2/p_0^2)$$

Where: p = root mean square (r.m.s.) sound pressure, in Pa
 p_0 = reference sound pressure, 20 μ Pa

The reference pressure represents the faintest sound that a “typical” human being can hear. The typical abbreviation for sound pressure level is SPL, although L_p is also often used in equations. “Sound level” or “noise level” are also sometimes used.

Octave Bands

Sounds are composed of varying frequencies or pitches. Human sensitivity to noise varies by frequency, with a greater sensitivity to higher frequency sounds. The propagation of sound also varies by frequency. The unit of frequency is Hertz (Hz), which refers the number of cycles per second (number of wave peaks per second of the propagating sound wave). The typical human hearing response runs from 20 Hz to 20,000 Hz. Frequencies below 20 Hz are generally inaudible, although response is variable, and some individuals may be able to hear or perceive them.

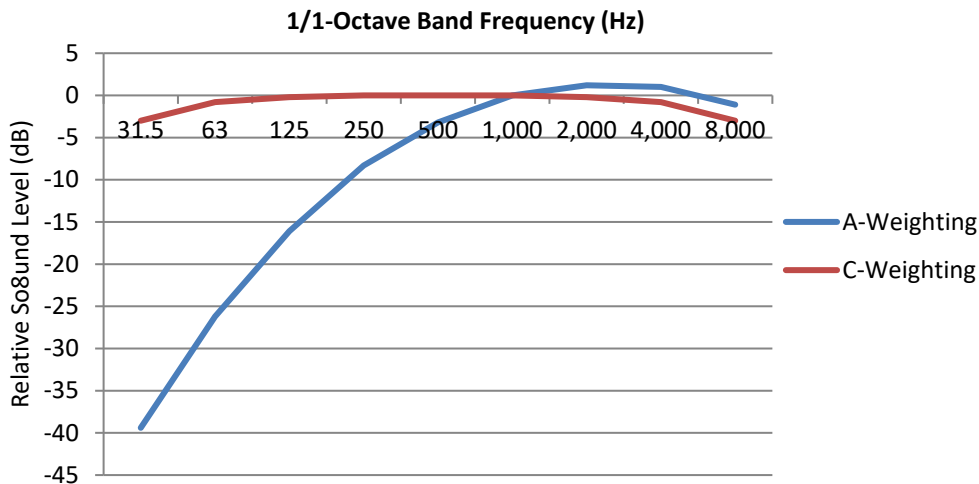
Sound is typically analysed in octave bands or 1/3-octave bands. An octave band is defined as a band or range of sound frequencies where the frequency range doubles for succeeding octave (alternately, the highest frequency in the range is twice the value of the lowest frequency).

¹ Equivalent to Sound Power Levels ranging from 70 to 140 dB and Sound Pressure Levels ranging from 20 dB to 140 dB

A-Weighting

When the overall sound pressure level is expressed as a single value (i.e., not expressed in frequency band levels) the variation in human frequency response must be accounted for. People do not hear low frequency noise as well as noise in mid or high frequencies. To account for this, frequency-weighting networks have been developed to better account for human hearing response. The most frequently used networks are the A-Weighting and C-Weighting.

The A-Weighting network was developed to correspond to how humans hear low to medium levels of noise, such as those typically generated by road traffic. The A-Weighting is the most frequently used scheme, and the majority of noise guidelines are expressed in A-Weighted decibel values, denoted as “dBA” levels. C-Weighted “dBC” values are sometimes used in assessing low-frequency noise impacts, which are generally not of concern in transportation noise impact assessment. The A-Weighting and C-Weighting values are shown in the following figure.



A-Weighting and C-Weighting Networks

Ranges of Sound Levels

People experience a wide range of sound levels in their daily activities. The table below presents a graphical comparison of “typical” noise levels which might be encountered, and the general human perception of the level. Sound levels from 40 to 65 dBA are in the faint to moderate range. The vast majority of the outdoor noise environment, even within the busiest city cores, will lie within this area. Sound levels from 65 to 90 dBA are perceived as loud. This area includes very noisy commercial and industrial spaces. Sound levels greater than 85 dBA are very loud to deafening and may result in hearing damage.

Ranges of Sound Levels

Sound Levels		
Human Perception	SPL in dBA	Sources of Noise
Deafening	125	Sonic booms
	120	Threshold of Feeling / Pain
	115	Maximum level, hard rock band concert
	110	Accelerating Motorcycle at a few feet away
Very Loud	105	Loud auto horn at 3 m away
	100	Dance club / maximum human vocal output at 1 m distance
	95	Jack hammer at 15 m distance
	90	Indoors in a noisy factory
Loud	85	Heavy truck pass-by at 15 m distance
	80	School cafeteria / noisy bar; Vacuum cleaner at 1.5 m
	75	Near edge of major highway
	70	Inside automobile at 60 km/h
	65	Normal human speech (unraised voice) at 1 m distance
Moderate	60	Typical background noise levels in a large department store
	55	General objective for outdoor sound levels; typical urban sound level (24h)
	50	Typical suburban / semi-rural sound level (24h)
	45	Typical noise levels in an office due to HVAC; typical rural levels (24h)
Faint	40	Typical background noise levels in a library
	35	
	30	Broadcast Studio
	25	Average whisper
Very Faint	20	Deep woods on a very calm day
	15	
	10	
	5	Human breathing
	0	Quietest sound that can be heard

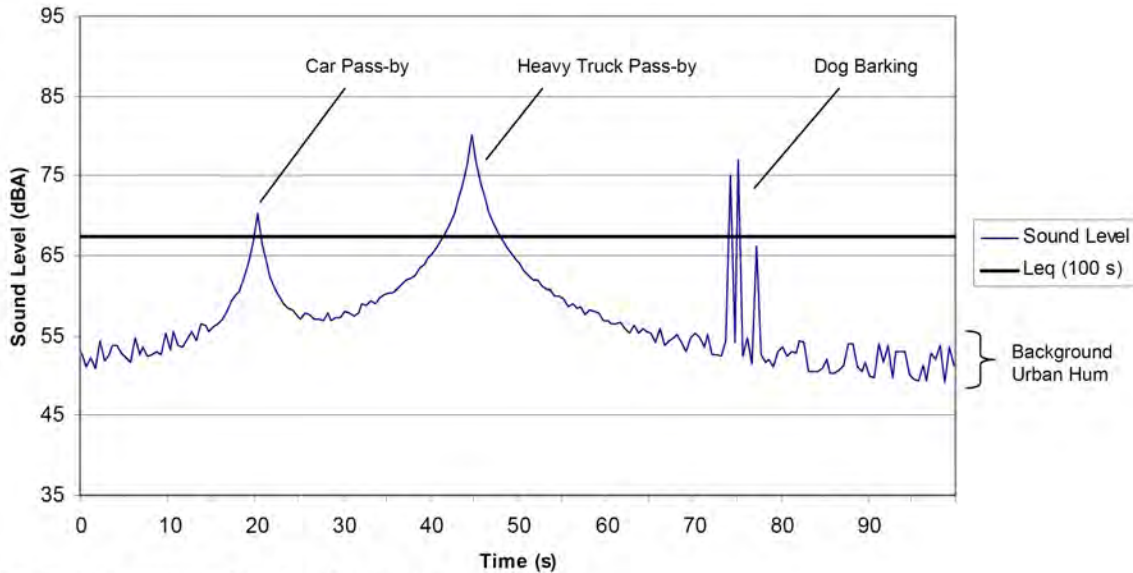
Noise Descriptors – L_{eq} Values

At this time, the best available research indicates that long-term human responses to noise are best evaluated using energy equivalent sound exposure levels (L_{eq} values), in A-Weighted decibels (L_{eq} values in dBA)^{2,3} including adjustments to account for particularly annoying characteristics of the sounds being analyzed.

Sound levels in the ambient environment vary each instant. In a downtown urban environment, the background noise is formed by an “urban hum”, composed of noise from distant road traffic and from commercial sources. As traffic passes near a noise receptor, the instantaneous sound level may increase as a vehicle approaches, and then decrease as it passes and travels farther away. The energy equivalent sound exposure level L_{eq} is the average sound level over the same period of time with same acoustical energy as the actual environment (i.e., it is the average of the sound energy measured over a time period T). As a time-average, all L_{eq} values must have a time period associated with them. This is typically placed in brackets beside the L_{eq} tag. For example, a thirty-minute L_{eq} measurement would be reported as an L_{eq} (30 min) value. The L_{eq} concept is illustrated in the following figure, showing noise levels beside a small roadway, over a 100 second time period, with two vehicle pass-bys:

² Berglund and Lindvall, Community Noise, 1995.

³ ISO 1996:2003(E), Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures.



The L_{eq} Concept

In this example, the background “urban hum” is between 47 and 53 dBA. A car passes by at 20 seconds. As it approaches, the noise level increases to a maximum, and then decreases as it speeds away. At 45 seconds, a heavy truck passes by. Near 75 seconds, a dog barks three times. The maximum sound level (L_{max}) over the period is 80 dBA and the minimum is 47 dBA. For almost 50 % of the time, the sound level is lower than 55 dBA.

The L_{eq} (100s) for the example is 67 dBA, which is much higher than the statistical mean sound level of 55 dBA. This illustrates that the L_{eq} value is very sensitive to loud noise events, which contain much more sound energy (as sound is ranked on a logarithmic scale) than the normal background. It is also sensitive to the number of events during the time period, and the duration of those events. If only the truck had passed by during the measurement (no car and no dog barks), the L_{eq} (100s) would be 66 dBA. If only the car and dog barks had occurred, the L_{eq} (100s) would be 61 dBA. This shows that the truck pass-by is the dominant event in our example, due to its level and duration.

The ability of the L_{eq} metric to account for the three factors of level, duration and frequency of events makes it a robust predictor of human response to noise. It is for this reason that the vast majority of noise standards are based on L_{eq} values.

Typical Durations for L_{eq} Analyses

For transportation noise impact analyses, the following durations are typically used:

- L_{eq} (24h) – The sound exposure level over then entire 24-hour day
- L_{eq} Day – Either: L_{eq} (15h), from 7am to 10 pm; or L_{eq} (16h), from 7am to 11 am
- L_{eq} Night – Either: L_{eq} (9h), from 10 pm to 7 am; or L_{eq} (8h), from 11 pm to 7 am
- L_{dn} – A special L_{eq} (24h) value with a 10 dB night-time penalty applied to overnight sound levels (10pm to 7am)
- L_{eq} (1-h) – The sound exposure over a 1-hour time period

L_{eq} (24h) values are appropriate for examining impacts of transportation noise sources with small changes in sound exposure levels over the 24-hour day. For example, freeway noise levels are generally consistent over the 24-hour day. Therefore, for freeways, there is little difference between L_{eq} (24h) values and the corresponding L_{eq} Day and L_{eq} Night values.

L_{eq} Day values, covering off the AM-peak and PM-peak travel periods, are generally appropriate for examining the impacts of non-freeway highways and municipal arterial roadways. The vast majority of noise associated with these sources is concentrated in the daytime hours, where typically, 85% to 90% of the daily road traffic will occur.⁴ Thus, if reasonable sound levels occur during the daytime (and appropriate guideline limits are met), they will also occur (and be met) at night.

To account for increased annoyance with noise overnight in a single value, the U.S. Environmental Protection Agency (U.S. EPA) developed the L_{dn} metric (also known as DNL). It is a special form of the L_{eq} (24h) with a +10 dB night-time penalty. L_{dn} values and a related metric, the day-evening-night level (L_{den}) are also used in some European guidelines. L_{dn} values are not used in Provincial jurisdictions in evaluating transportation noise. Instead, guideline limits for separate L_{eq} Day and L_{eq} Night periods are generally used.

L_{eq} (1-h) values are the average sound levels over a one-hour time period. These tend to fluctuate more over the day, as traffic levels can fluctuate significantly hour to hour. L_{eq} (1-h) values are useful in assessing the impact of transportation sources which also vary hourly, and which may vary in a different manner than the background traffic. These values are often used to assess haul route noise impacts, for example.

Some transportation noise sources may have significant traffic levels occurring overnight. For example, freight rail traffic in heavily used corridors can be shifted to over-night periods, with daytime track use being reserved for freight switcher traffic and passenger traffic. In situations such as this, an assessment of both daytime and night-time noise impacts may be appropriate.

Typical Background Sound Levels

Typical ambient background sound levels removed from direct influence of roads, railways and air traffic are:

- Urban areas: 55 dBA during the day, 45 dBA at night;
- Sub-urban / semi-rural areas: 50 dBA during the day, 45 dBA at night; and
- Rural area: 45 dBA during the day, 40 dBA at night.

Human Response to Changes in Sound Levels

The human ear does not interpret changes in sound level in a linear manner. The general subjective human perception of changes in sound level is shown in the following table.

⁴ Based on research conducted by Ontario Ministry of Transportation and provided in the *MTO Environmental Office Manual Technical Areas – Noise*. Daytime refers to a 16 hour day from 7am to 11 pm.

Subjective Human Perception of Changes in Sound Levels^{5,6}

Change in Broadband Sound Level (dB)	Human Perception of Change
<3	Imperceptible change
3	Just-perceptible change
4 to 5	Clearly noticeable change
6 to 9	Substantial change
>10 and more	Very substantial change (half or twice as loud)
>20 and more	Very substantial change (much quieter or louder)

Notes:

Adapted from Bies and Hansen, p53, and MOE Noise Guidelines for Landfill Sites, 1998. Applies to changes in broadband noise sources only (i.e., increases or decreases in the same noise or same type of noise only). Changes in frequency content or the addition of tonal or temporal changes would affect the perception of the change.

The above table is directly applicable to changes in sound level where the noise sources are of the same general character. For example, existing road traffic noise levels can be directly compared to future road traffic noise levels, using the above relationships. In comparing road traffic noise to road plus rail traffic noise, the different frequency and temporal nature of the noise means that the rail noise may be more noticeable. Adjustments for the nature of the new sound can be applied to better account for temporal and frequency differences.

For transportation noise sources, research conducted by the U.S. Environmental Protection Agency indicates that a 5 dB change in sound levels is required to trigger a change in large-scale community response to noise. This correlates to a clearly noticeable increase in noise levels.

Decay of Noise with Distance

Noise levels decrease with increasing distance from a source of noise. The rate of decay is partially dependent on the nature of the ground between the source: whether it is hard (acoustically reflective) or soft (acoustically absorptive). Transportation noise sources in general act as *line sources* of sound. For line sources, the rate of decay is approximately:

- Hard ground: 3 dB for each doubling of distance from the source
- Soft ground: 5 dB for each doubling of distance from the source

⁵ Bies, D.A., and C.H Hansen 1988. Engineering Noise – Theory and Practice, 2nd Ed. E & E & FN Spon, London, p 53.

⁶ Ontario Ministry of the Environment 1998. Noise Guidelines for Landfill Sites. Queen’s Printer for Ontario.

APPENDIX B – Technically Preferred Alternative

Environmental Noise Assessment – Kirby Road from West of Jane Street to Dufferin Street

City of Vaughan

SLR Project No: 241.20105.00000



APPENDIX C – Road Traffic Data

Environmental Noise Assessment – Kirby Road from West of Jane Street to Dufferin Street

City of Vaughan

SLR Project No: 241.20105.00000

Kirby Road EA
Traffic Data for Noise Study

Along Kirby Road

Kirby Road Segment		Existing Traffic Data										Build Out				AADT								
		2019		Directional Traffic Volumes (Per Lane, Daily)		ATR						2031		2031 Directional Traffic Volumes (Per Lane, Daily)		2031		2031		2031				
		From	To	AADT	EB	WB	No of Lanes	AM PK Hr	AADT	% Day (7 AM - 11 PM)	Factor	Daily Truck %	Daily Med Truck Split	Daily Heavy Truck Split	Posted Speed (km/h)	AM PK Hr	AADT	EB	WB	AM PK Hr	AADT	EB	WB	Daily Future Truck %
Highway 400	Jane Street	5,750	2,629	3,121	1 per direction	648	5,750	90%	8.87	8.10%	4.90%	3.20%	60	1,194	10,700	5,024	5,676	1,658	14,900	7,906	6,994	10%	50%/50% division	1 per direction
Jane Street	Keele Street	6,300	3,060	3,240	1 per direction	664	6,300	91%	9.49	8.10%	4.90%	3.20%	60	1,172	11,100	5,371	5,729	1,557	15,400	7,992	7,408	10%	50%/50% division	2 per direction
Keele Street	Dufferin Street	8,600	4,100	4,500	1 per direction	869	8,600	93%	9.90	4.01%	3.67%	0.34%	60	1,326	13,400	6,369	7,031	1,794	18,200	8,677	9,523	10%	50%/50% division	2 per direction

Notes:
0.476771 0.5232288

% Day and Truck % was assumed to be similar to other segments for Kirby Road (between Highway 400 and Jane Street)

85th percentile speed was assumed to be 10 km/h over the posted speed for Kirby Road (between Highway 400 and Jane Street)

All 85th percentile speed are based on existing conditions data

Existing AADT calculated using available TMCs

Build out AADT calculated using EMME outputs for the year 2031

Clarifications:

The horizon year for the Kirby Road EA was set for the year 2031 (year for which the NVNCTMP EMME model was built). The Kirby Road extension (between Dufferin Street and Bathurst Street) is assumed to be built and in place by 2031 and is included in the model. The extension is assumed to be in place at the time of this construction year (2026).

The Region's schedule of other surrounding construction projects, which will influence traffic on Kirby Road is based on the Region's TMP https://www.york.ca/wps/wcm/connect/yorkpublic/0d954ef4-12b6-4ac7-931a-39a3d1269dff/2019-Approved_20x24.pdf?MOD=AJPERES&CVID=mLVM9gU

The Kirby Road extension will be in construction in a few years after before it is fully built and open to traffic.

The Kirby Rd between Jane St and Bathurst St would serve the future residential area in North Vaughan. Since it was identified as one of freight corridors in the Region's 2016 TMP (Map 11, Transportation Master Plan | York Region) with its connection to Hwy 400 and further to the GTA West, 10% truck percentage for Kirby Rd in the future would be recommended. It's a general practice at the Region to assume the 50%/50% division between medium and heavy trucks for the future.

The assumed in-service date for the Kirby Road improvements between Jane and Dufferin, the road link between Dufferin and Bathurst, plus the implementation of the GTA West, which will trigger more truck traffic in this area is 2031.

Intersecting Roads to Kirby Road

Intersecting Roads	Existing Traffic Data										Do Nothing				Build Out				AADT								
	2019		Directional Traffic Volumes (Per Lane, Daily)		ATR						2031		2031 Directional Traffic Volumes (Per Lane, Daily)		2031		2031 Directional Traffic Volumes (Per Lane, Daily)		2031		2031		2031				
	From TMC	AAADT	NB	SB	No of Lanes	AM PK Hr	AADT	% Day (7 AM - 11 PM)	Factor	Daily Truck %	Daily Med Truck Split	Daily Heavy Truck Split	Posted Speed	AM PK Hr	AADT	NB	SB	AM PK Hr	AADT	NB	SB	AM PK Hr	AADT	EB	WB	Daily Future Truck %	Daily Med/Heavy Truck Split
Jane Street	11,900	5,583	6,317	1 per direction	1,176	11,900	93%	10.12	4.50%	2.90%	1.60%	80	1,430	14,500	6,882	8,018	1,156	12,600	5,798	6,802	1,156	12,600	5,798	6,802	4.50%	1.60%	1 per direction
Keele Street	18,300	3,721	5,429	2 per direction	2,202	18,300	93%	8.31	6.70%	4.40%	2.30%	70	2,256	18,700	3,852	5,548	2,377	22,500	5,177	6,073	2,377	22,500	5,177	6,073	6.70%	2.30%	2 per direction
Dufferin Street	13,100	6,798	6,302	1 per direction	1,295	13,100	92%	10.12	2.90%	2.00%	0.90%	70	1,434	14,500	7,526	6,974	1,104	10,900	5,538	5,362	1,104	10,900	5,538	5,362	2.90%	0.90%	1 per direction

Notes:

85th percentile speed was assumed to be 10 km/h over the posted speed for Dufferin Street

All 85th percentile speed are based on existing conditions data

Existing AADT calculated using available TMCs

Build out AADT calculated using EMME outputs for the year 2031

The decrease in AADT for some intersecting roads is the result of Kirby Road Extension and the diversion of traffic to other roads

APPENDIX D - Noise Output

Environmental Noise Assessment – Kirby Road from West of Jane Street to Dufferin Street

City of Vaughan

SLR Project No: 241.201005.00000

O R N A M E N T - Sound Power Emissions & Source Heights

Ontario Road Noise Analysis Method for Environment and Transportation

Future "do-nothing" 2031 Traffic Data

Roadway	Description 1	Description 2	Data Source	Speed (kph)	Period (h)	Total Traffic Volumes	Percent in Period	Total Traffic in Period	Auto %	Med %	Hvy %	Auto	Med	Heavy	Road Gradient (%)	Cadna/A Ground Absorption G	Raw PWL (dBA)	Calibration Adjustment	PWL for Modelling (dBA)	Source Height, s (m)
Jane St. NB	Flat	Daytime	HDRINC	80	16	8,018	93%	7,457	95.5%	2.90%	1.60%	7,121	216	119	0	0.00	82.2	0.00	82.2	1.1
Jane St. SB	Flat	Daytime	HDRINC	80	16	6,882	93%	6,400	95.5%	2.90%	1.60%	6,112	186	102	0	0.00	81.6	0.00	81.6	1.1
Keele St. NB	Flat	Daytime	HDRINC	70	16	7,704	93%	7,165	93.3%	4.40%	2.30%	6,685	315	165	0	0.00	81.6	0.00	81.6	1.2
Keele St. SB	Flat	Daytime	HDRINC	70	16	11,096	93%	10,319	93.3%	4.40%	2.30%	9,628	454	237	0	0.00	83.2	0.00	83.2	1.2
Dufferin St. NB	Flat	Daytime	HDRINC	70	16	7,526	92%	6,924	97.1%	2.00%	0.90%	6,723	138	62	0	0.00	79.6	0.00	79.6	1.0
Dufferin St. SB	Flat	Daytime	HDRINC	70	16	6,974	92%	6,416	97.1%	2.00%	0.90%	6,230	128	58	0	0.00	79.3	0.00	79.3	1.0
Kirby Rd., Hwy 400 to Jane St., WB	Flat	Daytime	HDRINC	60	16	5,676	90%	5,108	90.0%	5.00%	5.00%	4,598	255	255	0	0.00	80.5	0.00	80.5	1.5
Kirby Rd., Hwy 400 to Jane St., EB	Flat	Daytime	HDRINC	60	16	5,024	90%	4,522	90.0%	5.00%	5.00%	4,069	226	226	0	0.00	80.0	0.00	80.0	1.5
Kirby Rd., Jane St. to Keele St., WB	Flat	Daytime	HDRINC	60	16	5,729	91%	5,213	90.0%	5.00%	5.00%	4,692	261	261	0	0.00	80.6	0.00	80.6	1.5
Kirby Rd., Jane St. to Keele St., EB	Flat	Daytime	HDRINC	60	16	5,371	91%	4,888	90.0%	5.00%	5.00%	4,399	244	244	0	0.00	80.3	0.00	80.3	1.5
Kirby Rd., Keele St. to Dufferin St., WB	Flat	Daytime	HDRINC	60	16	7,031	93%	6,539	90.0%	5.00%	5.00%	5,885	327	327	0	0.00	81.6	0.00	81.6	1.5
Kirby Rd., Keele St. to Dufferin St., EB	Flat	Daytime	HDRINC	60	16	6,369	93%	5,923	90.0%	5.00%	5.00%	5,331	296	296	0	0.00	81.1	0.00	81.1	1.5
Kirby Rd. Extn. East of Dufferin St., WB	Flat	Daytime	Kirby Rd EA, 2031 "Build"	60	16	11,850	90%	10,665	90.0%	5.00%	5.00%	9,599	533	533	0	0.00	83.7	0.00	83.7	1.5
Kirby Rd. Extn. East of Dufferin St., EB	Flat	Daytime	Kirby Rd EA, 2031 "Build"	60	16	11,850	90%	10,665	90.0%	5.00%	5.00%	9,599	533	533	0	0.00	83.7	0.00	83.7	1.5

Future "With Widening" 2031 Traffic Data

Roadway	Description 1	Description 2	Data Source	Speed (kph)	Period (h)	Total Traffic Volumes	Percent in Period	Total Traffic in Period	Auto %	Med %	Hvy %	Auto	Med	Heavy	Road Gradient (%)	Cadna/A Ground Absorption G	Raw PWL (dBA)	Calibration Adjustment	PWL for Modelling (dBA)	Source Height, s (m)
Jane St. NB	Flat	Daytime	HDRINC	80	16	5,798	93%	5,392	95.5%	2.90%	1.60%	5,149	156	86	0	0.00	80.8	0.00	80.8	1.1
Jane St. SB	Flat	Daytime	HDRINC	80	16	6,802	93%	6,326	95.5%	2.90%	1.60%	6,041	183	101	0	0.00	81.5	0.00	81.5	1.1
Keele St. NB	Flat	Daytime	HDRINC	70	16	10,354	93%	9,629	93.3%	4.40%	2.30%	8,984	424	221	0	0.00	82.9	0.00	82.9	1.2
Keele St. SB	Flat	Daytime	HDRINC	70	16	12,146	93%	11,296	93.3%	4.40%	2.30%	10,539	497	260	0	0.00	83.6	0.00	83.6	1.2
Dufferin St. NB	Flat	Daytime	HDRINC	70	16	5,538	92%	5,095	97.1%	2.00%	0.90%	4,947	102	46	0	0.00	78.3	0.00	78.3	1.0
Dufferin St. SB	Flat	Daytime	HDRINC	70	16	5,362	92%	4,993	97.1%	2.00%	0.90%	4,790	99	44	0	0.00	78.2	0.00	78.2	1.0
Kirby Rd., Hwy 400 to Jane St., WB	Flat	Daytime	HDRINC	60	16	6,994	90%	6,295	90.0%	5.00%	5.00%	5,665	315	315	0	0.00	81.4	0.00	81.4	1.5
Kirby Rd., Hwy 400 to Jane St., EB	Flat	Daytime	HDRINC	60	16	7,906	90%	7,115	90.0%	5.00%	5.00%	6,404	356	356	0	0.00	81.9	0.00	81.9	1.5
Kirby Rd., Jane St. to Keele St., WB	Flat	Daytime	HDRINC	60	16	7,408	91%	6,741	90.0%	5.00%	5.00%	6,067	337	337	0	0.00	81.7	0.00	81.7	1.5
Kirby Rd., Jane St. to Keele St., EB	Flat	Daytime	HDRINC	60	16	7,992	91%	7,273	90.0%	5.00%	5.00%	6,545	364	364	0	0.00	82.0	0.00	82.0	1.5
Kirby Rd., Keele St. to Dufferin St., WB	Flat	Daytime	HDRINC	60	16	9,523	93%	8,856	90.0%	5.00%	5.00%	7,971	443	443	0	0.00	82.9	0.00	82.9	1.5
Kirby Rd., Keele St. to Dufferin St., EB	Flat	Daytime	HDRINC	60	16	8,677	93%	8,070	90.0%	5.00%	5.00%	7,263	403	403	0	0.00	82.5	0.00	82.5	1.5
Kirby Rd. Extn. East of Dufferin St., WB	Flat	Daytime	Kirby Rd EA, 2031 "Build"	60	16	11,850	90%	10,665	90.0%	5.00%	5.00%	9,599	533	533	0	0.00	83.7	0.00	83.7	1.5
Kirby Rd. Extn. East of Dufferin St., EB	Flat	Daytime	Kirby Rd EA, 2031 "Build"	60	16	11,850	90%	10,665	90.0%	5.00%	5.00%	9,599	533	533	0	0.00	83.7	0.00	83.7	1.5



APPENDIX E - Noise By-law

Environmental Noise Assessment – Kirby Road from West of Jane Street to Dufferin Street

City of Vaughan

SLR Project No: 241.20105.00000

THE CITY OF VAUGHAN

BY-LAW

BY-LAW NUMBER 062-2018

A By-law to regulate Noise.

WHEREAS the Municipal Act, R.S.O. 2001, Section 129. (1) Paragraphs 1, 2 and 3 authorize municipalities to pass by-laws to prohibit and regulate *Noise*;

AND WHEREAS a recognized body of scientific and technological knowledge exists by which Sound and vibration may be substantially reduced;

AND WHEREAS it is in the public interest to reduce the *Noise* level in the City of Vaughan, so as to preserve, protect, and promote public health, safety, welfare, and the peace and quiet of the inhabitants of the City;

AND WHEREAS it is the policy of the Council of The Corporation of City of Vaughan to regulate such *Sound* or vibration, or nuisance;

NOW THEREFORE the Council of The Corporation of City of Vaughan enacts as follows:

1. TITLE

This By-law shall be referred to as "The Noise Control By-Law".

2. APPLICABILITY AND SCOPE

Schedule 3 lists *Ministry NPC Publications* that inform various provisions included in this By-law, as well as detail regulation of *Noise* that is outside of City's jurisdiction. This By-law does not apply to *Noise* that falls explicitly under provincial jurisdiction and for which regulation is prescribed by *Ministry NPC Publications*.

3. DEFINITIONS

In this By-Law,

"Applicant" includes any person or persons seeking in writing from the *Director of Enforcement*, an exemption of either a temporary or permanent nature from the provisions and requirements of this By-law;

"City" means the municipal corporation of the City of Vaughan or the geographic area of the City of Vaughan as the context requires;

"Class 4 Area" means a Class 4 area within the meaning of the *Ministry NPC Publication 300-Stationary and Transportation Sources*;

"Construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earth moving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and Highway building, concreting, equipment installation and alteration and the structural installation of Construction components and materials in any form or for any purpose, and includes any work in connection therewith;

"Construction Equipment" means any equipment or device designed and intended for use in Construction, or material handling, including but not limited to, air compressors, pile drivers, pneumatic or hydraulic tools, bulldozers, tractors, excavators, trenchers, cranes, derricks, loaders, scrapers, pavers, generators, off Highway haulers or trucks, ditchers, compactors and rollers, pumps, concrete mixers, graders, or other Vehicle intended to haul, move, transport and/or material handling equipment;

"Construction Site" means the area or portion of land used for Construction or any other area used for any purpose related to the Construction or for any related purpose;

"Conveyance" includes a Vehicle and any other device used to transport a person or persons or goods from place to place but does not include any Vehicle or device operated only within the premises of a person;

"Council" means the Council of *City* of Vaughan;

"dBA" means the Sound level in decibels obtained when using a Sound level meter with the A-weighting;

"Director of Enforcement" means the person occupying the position of the Department Head/Director of By- law & Compliance, Licensing & Permit Services of the *City* of Vaughan or authorized delegate;

"Director of Environmental Services" means the person occupying the position of the Department Head/Director of Environmental Services of the *City* of Vaughan or authorized delegate;

“Effective Muffler” means a muffler in good working order and in constant operation to prevent excessive or unusual Noise or excessive smoke but it does not include a cut-out muffler, straight exhaust gutted muffler, Hollywood muffler, by-pass or similar device;

“Emergency Work” means any necessary work, activities or actions to be undertaken by the *City* to address an immediate danger to the health or safety of any person;

"Enforcement Officer" means a person appointed by the Council of the *City* of Vaughan as a Municipal Law Enforcement Officer, pursuant to s.15.2 of the Police Services Act, to enforce the provisions of this By-law or a sworn member of York Regional Police, Ontario Provincial Police, Royal Canadian Mounted Police, or any other person so authorized;

“Environmental Compliance Approval” means a Certificate of Approval issued under section 9 of the Environmental Protection Act, a Renewable Energy Approval issued under section 47.3 of the Environmental Protection Act, a *Ministry* approval issued under Part II.1 of the Environmental Protection Act, or an approval or decision made under the Environmental Assessment Act.

“Exempted Employment Area” means an industrial or commercial location that is adjacent to a *Class 4 Area* and which possesses a *Ministry*-approved *Environmental Compliance Approval* that outlines allowed activities, and is listed under Schedule 5 in this By-law;

"Highway" includes a common and public Highway, as defined under the Highway Traffic Act R.S.O. 1990 and includes any bridge, trestle, viaduct, or other structure forming part of the Highway designed and intended for, or used by, the general public for the passage of Vehicles;

"Ministry" means the Ministry of the Environment and Climate Change;

"Motor Vehicle" means any Motorized Conveyance and includes any automobile, motorcycle and any other Vehicle propelled or driven otherwise than by muscular power, but does not include the cars of electric or steam railways, or other Motor Vehicle running only upon rails, or a motorized snow Vehicle, traction engine, farm tractor, self-propelled implement of husbandry or road building machine;

"Motorized Conveyance" means a Conveyance propelled or driven otherwise than by muscular, gravitational or wind power;

"Municipality" means the land within the geographic limit of *City of Vaughan* and *City* shall have a concurrent meaning;

"Necessary Municipal Work" means work being undertaken by the *City*, the Region, Transit Authority, or any other level of government, and its agents, and includes but is not limited to any rehabilitation or require maintenance processes and activities within the Public Right of Way or any Highway as defined by the Highway Traffic Act (HTA) of Ontario, using of Construction Equipment that requires work must be performed at times that minimize traffic disruption, including minimizing lane closures or lane restrictions, or both, and includes any works undertaken on Property owned or under the control of the *City*, Region, or any other level of government. Without forgoing the generality rehabilitation or maintenance processes and activities include but are not limited to:

- Deck Removal of any Highway;
- Intersection rehabilitation and all related work;
- All Transit Authority work, including any ancillary Property or facilities and infrastructure;
- All other work as determined necessary by the *Director of Enforcement*, or delegate;

"Noise" means unwanted *Sound*;

"Notice" means any notice required to be given by the *City* to the *Owner* with respect to this By-law, such *Notice* shall either be delivered or sent by prepaid registered mail to the *Owner's* address, as provided to the Clerk's Department. A *Notice* includes an order issued under sections 444 and 445 of the Municipal Act, 2001, as amended. In the event such *Notice* is mailed, it is deemed delivered on the third business day after mailing;

"NPC Publication" means a specified publication of the Noise Pollution Control Section of the Pollution Control Branch of the Ministry named in Schedule 3 of this By-Law;

"Owner" means the registered owner of the *Property*;

"Permit" means and includes any *Permit* or written authorization of a temporary or permanent nature, issued by the *Director of Enforcement*, which provides an exemption(s) to specified terms and conditions of this By-law and may prescribe additional required conditions for the *Permit Holder*;

"Permit Holder" means any person or persons to whom the *Director of Enforcement* has been issued a permit;

"Point of Reception" means any point on a *Property* or a location where *Noise* from a *Stationary Source* is received, in accordance with *Ministry NPC Publication-300 - Stationary and Transportation Sources*;

"Property" means a building or structure or part thereof and includes the lands appurtenant thereto and all mobile homes, buildings and/or any mobile or temporary structures and includes all vacant lands;

"Public Right of Way" means any public or common areas which are open to use by members of the general public, including pedestrians or Vehicles, such as, but not limited to a footpath, sidewalk, and Highway as defined by this by-law;

"Quiet Zone" means all lands located within a distance of 250 meters of all exterior walls of a hospital, nursing home, or seniors retirement facility;

"Refuse Compacting Equipment" means a Vehicle fitted in order to compact and transport refuse;

"Residential Area" means an area of the Municipality designated for residential use in *City of Vaughan Zoning By-Law*, which includes land, buildings and structures intended for human habitation;

"Sound Amplifying System" means any system of loudspeakers, amplifiers, microphones or reproducers or any combination of such equipment, including electronic devices or electro-mechanical transducers, used in the reproduction or amplification of music, speech or other Sounds;

"Sound Reproduction Device" means a device intended primarily for the production or reproduction of Sound, including, but not limited to, any musical instrument, radio receiver, television receiver, tape recorder, phonograph, loudspeakers or Sound Amplifying System;

"Source" or "Source of Sound or Vibration" means an activity, matter, thing, or tangible personal *Property* or real *Property*, from which *Sound* or vibration is emitted;

"Sound" is an oscillation in pressure, stress, particle displacement or particle velocity, in a medium with internal forces (e.g. elastic, viscous), or the superposition of such propagated oscillations, which may cause an auditory sensation;

"Special Event" has the same meaning as defined in the *City's Special Event By-law* or successor by-law;

"Stationary Source" means a Source of *Sound* or combination of Sources of *Sound* that are included and normally operated within the *Property* lines of a facility and includes the premises of a person as one *Stationary Source* unless the dominant *Source* on the premises is *Construction Equipment* or a *Conveyance*. It encompasses all the activities taking place within the *Property* boundary of the facility, including regular on-site traffic and material handling such as on-site movement of trucks and trailers and routine loading and unloading activity.

"Vehicle" includes a *Motor Vehicle*, trailer, traction engine, farm tractor, road-building machine, motorcycle, bicycle and any *Vehicle* drawn, propelled or driven by any kind of power, including muscular power, but does not include a motorized snow *Vehicle* or the cars of electric or steam railways running only upon rails.

4. PROHIBITIONS

- (1) No person shall emit or cause to permit the emission of *Sound* resulting:
- (a) from a *Stationary Source* such that the level of resultant *Sound* at a *Point of Reception* located in a *Residential Area* or *Quiet Zone* exceeds the applicable *Sound* level limits prescribed in the applicable *NPC Publications* listed in Schedule 3;
 - (b) from any act listed in Schedule 1 - General Prohibitions for which the *Sound* can be heard at a *Point of Reception*;
 - (c) from any act listed in Schedule 2 - Prohibitions by Time and Place, if it can be heard at a *Point of Reception* in a *Residential Area* or *Quiet Zone* at a prohibited time, unless the *Sound* is generated in an *Exempted Employment Area* and can be heard in a *Class 4 Area*, and the act(s) in the *Exempted Employment Area* are subject to a valid *Ministry-issued Environmental Compliance Approval* that states that the specific act(s) of Schedule 2 are permitted, and the act(s) being conducted are in compliance with the *Environmental Compliance Approval*.

5. PRE-EMPTION

Where more than one provision in Section 4(1) applies to a *Source of Sound*, the less restrictive provision shall prevail.

6. UNUSUAL NOISE, NOISE LIKELY TO DISTURB

No person shall make any unusual *Noise* or *Noise* likely to disturb the inhabitants of the *City* in a *Residential Area*.

7. BELLS, HORNS, SHOUTING

No person shall ring any bell, *Sound* any horn, or shout in a manner likely to disturb the inhabitants of the *City* provided that nothing herein contained shall prevent:

- (1) the ringing of bells, or electronic reproduction of the *Sound* of bells, in connection with any church, chapel, meeting house or religious service;
- (2) the ringing of fire bells or fire alarms or the making of any other *Noise* for the purpose of giving notice of fire or any other danger or any unlawful act for a continuous period of time of twenty (20) minutes or less.

8. AIR CONDITIONERS, HEAT PUMPS, AND SIMILAR DEVICES

No person shall use or operate or cause to be used or operated any residential air conditioner, heat pump, or similar device, the *Noise* from which has a level greater than 61 *dBA* when measured at the *Point of Reception*.

9. PUMP OR FILTRATION SYSTEMS

No person shall use or operate or cause to be used or operated any pump, filtration system or similar device for an outdoor swimming pool, hot tub, spa, fountain or water feature, the *Noise* from which has a level greater than 55 *dBA* when measured at the *Point of Reception* or in compliance with Schedule 3, *NPC Publication-300 - Stationary and Transportation Sources*.

10. CONSTRUCTION

- (1) No person shall, between 1900 hours of one day and 0700 hours of the next day operate or cause to be operated, any *Construction Vehicle* or *Construction Equipment* in connection with the *Construction* of any building or structure, *Highway*, motor car, steam boiler or other engine or machine;
- (2) Despite Subsection (1), no person shall operate or cause to be operated any *Construction Vehicle* or *Construction Equipment* before 0700 hours and no later than 1900 hours on any Saturday and not at all on Sunday or statutory holidays;

Subsection 10. (1) and (2) does not apply to *Necessary Municipal Work* and *Emergency Work* as defined by this By-law.

11. LOADING AND UNLOADING

- (1) No person shall load or unload any transport truck, commercial *Vehicle*, or any other *Vehicle* used to transport anything whatsoever, including but not limited to goods, materials, fill, debris and waste, between 19:00 of one day and 07:00 of the next day, or at any time on Sundays and Statutory Holidays, so as to make or cause *Noises* that disturb, or tend to disturb the quiet, peace, rest, enjoyment, comfort or convenience of the neighbourhood in a *Residential Area*.
- (2) Subsection 11. (1) does not apply to waste removal operations undertaken by the *City* as authorized by the *Director of Enforcement* or *Director of Environmental Services*.

12. MUFFLERS

No person shall discharge into the open air, on any *Property* other than a *Highway*, the exhaust of any *Motor Vehicle* except through a muffler or other device, which effectively prevents loud or explosive *Noises*.

13. MOTOR SPORTS

- (1) No person shall operate or permit the operation of racing competitions between *Motor Vehicles* on a *Property* other than a *Highway* within the *City*, whether or not an admission fee is charged, unless:
 - (a) the competitions are held at a permanent facility;
 - (b) all *Motor Vehicles* are properly equipped with *Effective Mufflers*; and
 - (c) such competitions are not carried out between 2300 hours of one day and 1000 hours of the next day.
- (2) Subsection (1) shall not apply to permanent go-kart operations on a *Property* other than a *Highway*.

14. GO-KART ACTIVITIES

No person shall operate or permit the operation of go-kart activities on a *Property* other than a *Highway* within the *City*, whether or not an admission fee is charged, unless,

- (1) the activities are held at a permanent go-kart facility;
- (2) all go-karts are equipped with *Effective Mufflers*, and
- (3) such activities are not carried out between 2300 hours of one day and 0700 hours of the next day.

15. UNNECESSARY MOTOR VEHICLE NOISE

No person shall cause or permit unnecessary *Motor Vehicle Noise* such as the *Sounding* of the horn, or revving of engine, or the squealing of tires of any *Motor Vehicle* on any *Property* other than a *Highway*.

16. SOUND REPRODUCTION OR AMPLIFICATION DEVICES

- (1) No person in a *Residential Area* shall operate or use or cause to be operated or used any *Sound Reproduction Device* during any time of day so as to disturb the peace and comfort of any person in any dwelling house, or other type of residence.
- (2) In addition to Subsection (1), *Noise* from a *Sound Reproduction Device*, when measured in any dwelling house, apartment house, or any other type of residence in a *Residential Area*, shall be compliant with the limits set in Schedule 3, *NPC Publication-300 - Stationary and Transportation Sources*.
- (3) No person shall operate or use or cause to be operated or used any *Sound Reproduction Device* on any *Highway* or other public place.
- (4) No person shall operate or use or cause to be operated or used any *Sound Reproduction Device* originating from or in connection with the operation of any commercial establishment at any time.
- (5) Subsections (1) and (3) do not apply to prevent:
 - (a) the use of *Sound Reproduction Devices* in the *City's* parks provided that the user has a *Permit* from or the written permission of the *City* to do so and the user otherwise complies with the provisions of this By-law, including the *Noise* level maximum herein provided;
 - (b) the amplification of the *Sound* of the ringing of bells or the playing of chimes in connection with, any church, chapel, meeting house or religious service, or the City Hall between 0900 hours and 2100 hours of the same day;
 - (c) the use of musical instruments by street musicians on the *Highway* or other public place, provided that it does not disturb the peace, enjoyment and comfort or convenience of individuals or the public.

17. EXEMPTIONS

- (1) The provisions of this By-law shall not apply to the *City* or Regional Municipality of York, the Province of Ontario, the Government of Canada or any of their agents when the emission of *Sound* is in connection with work undertaken for the immediate health, safety or welfare of the inhabitants of the *City*.
- (2) The provisions of this By-law shall not apply to preclude musicians or performers providing outdoor entertainment involving *Sound Reproduction Devices* during *Special Events* that have been granted a *Special Events Permit* by the *City*.
- (3) The provisions of this By-law shall not apply to agricultural operations and agricultural processing activities in areas zoned for agricultural use, as per the Zoning By-law or its successor by-law.
- (4) The provisions of this By-law shall not apply to snow removal activities conducted by the *City*, Regional Municipality of York, or the Province of Ontario.
- (5) Nothing in this By-law shall prevent the clearing of snow from designated fire routes.

18. EXEMPTED EMPLOYMENT AREAS

- (1) The *Director of Enforcement* is delegated the authority to include a location as an *Exempted Employment Area* in Schedule 5, when such location:
 - (a) is a commercial or industrial location adjacent to a *Class 4 Area* that is identified on Schedule 4 of this By-law; and
 - (b) has a *Ministry-approved Environmental Compliance Approval* in good standing that lists the activities that may be performed at that location.
- (2) *Exempted Employment Areas* are permitted to perform activities listed in their *Ministry-approved Environmental Compliance Approval*, including those activities that do not meet the requirements listed in Schedule 2 of this By-law.
- (3) For activities not listed in an *Environmental Compliance Approval*, the other provisions of this By-law continue to apply.
- (4) If, in the opinion of the *Director of Enforcement*, a location designated as an *Exempted Employment Area* no longer meets the conditions of Section 18(1)(a) or (b), the *Director of Enforcement* shall send a *Notice* to the *Owner* of the location designated as an *Exempted Employment Area* advising of their opinion and the basis for it.

- (5) An *Owner* in receipt of a Notice under Section 18(4) shall have 60 days from the date of the Notice to respond to the *Director of Enforcement* and establish how the location meets the conditions of Section 18(1)(a) and (b).
- (6) Failure by the *Owner* in receipt of a *Notice* under Section 18(4) to respond within 60 days of the date of the said *Notice* shall result in the subject location no longer designated an *Exempted Employment Area*, effective immediately.
- (7) If, upon the receipt and review of a response to a Notice under Section 18(4), the *Director of Enforcement* is still of the opinion that the location no longer meets the conditions of Section 18(1)(a) or (b), the *Director of Enforcement* shall bring the matter before Council for a final determination.
- (8) With respect to a matter under Section 18(7), Council may:
 - (a) uphold the determination made by the *Director of Enforcement*;
 - (b) overturn the determination made by the *Director of Enforcement*; and/or
 - (c) establish conditions under which the location may continue to be designated as an *Exempted Employment Area*.

19. DELEGATED AUTHORITY TO GRANT EXEMPTIONS

- (1) The *Director of Enforcement* is delegated the authority to grant an exemption for an event subject to the following conditions:
 - (a) The event relates to live or recorded music or involves the use of a *Sound Amplifying System* or *Sound Reproduction Device* operated in a reasonable manner in the context of the *Special Event*;
 - (b) The event shall not create *Noise* to exceed 55 *dBA* when measured at the *Point of Reception*;
 - (c) Any activity that is lawfully carried out pursuant to a *Special Event Permit* issued by the *City* is subject to any conditions imposed on the *Special Event Permit*. Where there is a conflict between a condition imposed on the *Special Event Permit* and this By-law, the requirements of this By-law shall prevail;
 - (d) The breach of any conditions imposed by this Section shall nullify the *Special Event Permit*;
 - (e) An *Enforcement Officer* may monitor the activity at the *Special Event*, the cost of which will be borne by the *Special Event Permit Holder* at a rate of remuneration established under the *City of Vaughan Fees & Charges By-law*.

20. EXEMPTION - CONSTRUCTION EQUIPMENT

- (1) The *Director of Enforcement* is delegated the authority to grant an exemption to Subsection 7(1) for *Construction Equipment* utilized during prohibited hours subject to the following conditions:
 - (a) the use of Construction Equipment shall not exceed the established Noise levels of Schedule 3, *NPC Publication-115*, Construction Equipment;
 - (b) the duration of the exemption requested shall not exceed 90 days in length;
 - (c) the application for exemption complies with the provisions of s.19 (2).

- (2) An application for exemption from the provisions of the *Noise by-law* for *Construction Equipment* shall be made in writing to the *Director of Enforcement* at least sixty (60) days prior to the commencement of the use of the *Construction Equipment* for which the exemption is sought and shall include the following:
 - (a) the name and address of the *Applicant*;
 - (b) the name and address of the business represented by the *Applicant*, if applicable;
 - (c) the *Source* of the *Sound* or vibration in respect of which the exemption is sought;
 - (d) the provision of this By-law from which the exemption is sought;
 - (e) the date and time of commencement of the *Construction*, for which the exemption is sought;
 - (f) the time of conclusion for each day for the use of the *Construction Equipment* for which the exemption is sought;
 - (g) the duration of the use of the *Construction Equipment*, for which the exemption is sought;
 - (h) the location of the Construction for which the exemption is sought;
 - (i) rationale for granting an exemption;
 - (j) the name of the contact person or persons who will be supervising the use of the *Construction Equipment*, and
 - (k) payment of the application fee as described in the *City of Vaughan Fee Bylaw*.

- (3) The *Director of Enforcement* may require the *Applicant* to provide documentation confirming that notification of the use of *Construction Equipment* has been given to the affected parties including but not limited to community associations, business improvement areas and adjacent residents and businesses.
- (4) Where the *Director of Enforcement* requires monitoring of *Sound* levels resulting from the *Construction*, the monitoring shall be conducted at the *Applicant's* expense as outlined in the *City of Vaughan Fees & Charges By-law*.

21. EXEMPTION - TEMPORARY MOTOR RACING COMPETITIONS

- (1) The *Director of Enforcement* is delegated the authority to grant an exemption for motor racing competitions at temporary venues subject to the following conditions:
 - (a) the competition does not exceed three (3) days in length; and
 - (b) the event shall not create *Noise* to exceed 65 *dba* at any *Point of Reception*.
- (2) An application for exemption from the provisions of the *Noise By-law* for motor racing competitions at temporary venues shall be made in writing to the *Director of Enforcement* at least sixty (60) days prior to the commencement of the temporary motor competition for which the exemption is sought and shall include the application provisions as outlined in Section 20 (2), and may include any other conditions as determined by the *Director of Enforcement*.
- (3) The *Director of Enforcement* may require the *Applicant* to provide documentation confirming that notification of the motor racing competition at a temporary venue has been given to the affected parties including but not limited to community associations, business improvement areas and adjacent residents and businesses.
- (4) Where the *Director of Enforcement* requires monitoring of *Sound* levels resulting from the event or activity, the monitoring shall be conducted at the *Applicant's* expense as outlined in the *City's Fee By-law*.

22. ENFORCEMENT

This By-law shall be enforced by any *Enforcement Officer* or person duly authorized by the *City*.

23. OFFENCE AND PENALTIES

- (1) Every person who contravenes any of the provisions of this By-law is guilty of an offence.

- (2) Every person who is convicted of an offence under this By-law is liable to a fine as provided for in the Provincial Offences Act, R.S.O. 1990, Chap. P.33
- (3) When a person has been convicted of an offence under this by-law,
 - (a) the Ontario Court (Provincial Division) of the *City of Vaughan*, or
 - (b) any court of competent jurisdiction thereafter may, in addition to any other penalty imposed on the person convicted, issue an order prohibiting the continuation or repetition of the offence or the doing of any act or thing by the person convicted directed toward the continuation or repetition of the offence.

24. INTERPRETATION

- (1) It is declared that if any Section, Subsection or part or parts thereof be declared by any Court of Law to be bad, illegal or ultra vires, such Section, Subsection or part or parts shall be deemed to be severable and all parts hereof are declared to be separate and independent and enacted as such.
- (2) In this by-law, a word interpreted in the singular number has a corresponding meaning when used in the plural.

Schedules "1", "2", "3", "4", "5" and any Publications NPC annexed hereto are hereby declared to form part of this By-law.

25. EFFECTIVE DATE

This By-law shall come into effect on the 11th day of April, 2018

Enacted by City of Vaughan Council this 11th day of April, 2018.

Hon. Maurizio Bevilacqua, Mayor

Todd Coles, Deputy City Clerk

Schedule 1

General Prohibitions

1. Racing of any *Motorized Conveyance* other than in a racing event regulated by law.
2. The operation of a *Motor Vehicle* in such a way that the tires squeal.
3. The operation of any combustion engine shall not discharge into the open air, on any *Property* other than a *Highway*, the exhaust of any *Motor Vehicle* except through a proper muffler or legal device which effectively prevents loud or explosive *Noises*.
4. The operation of a *Vehicle* or a *Vehicle* with a trailer resulting in banging, clanking, squealing or other like *Sounds* due to improperly secured load or equipment;
5. The operation of an engine or motor in, or on, any *Motor Vehicle* or item of attached auxiliary equipment for a continuous period exceeding five minutes, while such *Vehicle* is stationary in a *Residential Area* or, unless,
 - (a) The *Vehicle* is in an enclosed structure constructed so as to effectively prevent excessive *Noise* emission; or,
 - (b) The original equipment manufacturer specifically recommends a longer idling period for normal and efficient operation of the *Motor Vehicle* in which case such recommended period shall not be exceeded;
 - (c) Operation of such engine or motor is essential to a basic function of the *Vehicle* or equipment, including but not limited to, operation of ready mixed concrete trucks, lift platforms or refuse compactors and heat exchange systems; or,
 - (d) Weather conditions justify the use of heating or refrigerating systems powered by the motor or engine for the safety and welfare of the operator, passengers or animals, or preservation of perishable cargo; or,
 - (e) Prevailing low temperatures make longer idling periods necessary, immediately after starting the motor or engine; or,
 - (f) The idling is for the purpose of cleaning and flushing the radiator and associated circulation system for seasonal change or antifreeze, cleaning of the fuel system, carburetor or the like, when such work is performed other than for profit.

6. The operation of a *Motor Vehicle* horn or other warning device except where required or authorized by law in accordance with good safety practices.
7. The operation of any item of *Construction Equipment* shall not discharge into the open air, on any *Property* other than a *Highway* the exhaust except through a proper muffler or legal device, which effectively prevents loud or explosive *Noises*.

Schedule 2

Time and Place Prohibited Periods

No.	Activity	When it is prohibited in the <i>Quiet Zone</i>	When it is prohibited in a <i>Residential</i>
1	The operation of any auditory signaling device, including but not limited to the ringing of bells or gongs and the blowing of horns or sirens or whistles, or the production, reproduction or amplification of any similar <i>Sounds</i> by-law; or unless required in accordance with good safety practices.	at any time	19:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
2	The operation of any electronic device or group of connected electronic devices incorporating one or more loudspeakers or other electro mechanical transducers, and intended for the production, reproduction or amplification of <i>Sound</i> .	at any time	23:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
3	Loading, unloading, delivering, packing, unpacking, or otherwise handling any containers, produce, materials, or refuse whatsoever, unless necessary for the maintenance of essential services.	19:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)	19:00 hrs. of one day to 07:00 hrs. next day and all day Sundays and Statutory Holidays
4	The operation of any <i>Construction Equipment</i> in connection with <i>Construction</i> .	17:00 hrs. of one day to 07:00 hrs. next day and all day Sundays and Statutory Holidays	19:00 hrs. of one day to 07:00 hrs. next day and all day Sundays and Statutory Holidays
5	The detonation of fireworks or explosive devices	at any time	23:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
6	The operation of a combustion engine which is, or is used in, or is intended for use in, a toy or a model or replica of a larger device, which model or replica has no function other than amusement and which is not a <i>Conveyance</i> .	at any time	19:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
7	The operation of any powered rail car including but not limited to refrigeration cars, locomotives or self-propelled passenger cars, while stationary on <i>Property</i> not owned or controlled by a railway governed by The Canada Railway Act.	at any time	23:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)

No.	Activity	When it is prohibited in the <i>Quiet Zone</i>	When it is prohibited in a <i>Residential</i>
8	The operation of any <i>Motorized Conveyance</i> other than on a <i>Highway</i> or other place intended for its operation, in which " <i>Motorized Conveyance</i> " includes, but is not limited to snowmobiles, mopeds, go-carts, track bikes and trail bikes.	at any time	19:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
9	The venting, release or pressure relief of air, steam or other gaseous material, product or compound from any autoclave, boiler, pressure vessel, pipe, valve, machine, device or system.	at any time	23:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
10	Persistent barking, calling or whining or other similar persistent <i>Noise</i> making by any domestic pet.	at any time	at any time
11	The operation of any powered or non-powered tool for domestic purposes other than snow removal.	17:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)	21:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
12	The operation of solid waste bulk lifts or <i>Refuse Compacting Equipment</i> .	17:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)	19:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
13	The operation of commercial car wash with air-drying equipment.	17:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)	22:00 hrs. of one day to 07:00 hrs. next day (09:00 hrs. on Sundays)
14	The operation of a power assisted hang glider or Para foil.	at any time	at any time
15	The operation of any item of snow making equipment.	at any time	at any time
16	The operation of a <i>Sound</i> emitting pest control device.	at any time	at any time
17	The discharge of firearms.	at any time	at any time

Schedule 3

Index of *NPC Publications*

<i>NPC Publication-101</i>	Technical Definitions Publication
<i>NPC Publication-102</i>	Instrumentation
<i>NPC Publication-103</i>	Procedures
<i>NPC Publication-104</i>	Sound Level Adjustments
<i>NPC Publication-115</i>	Construction Equipment
<i>NPC Publication-117</i>	Domestic Outdoor Power Tools
<i>NPC Publication-118</i>	Motorized Conveyances
<i>NPC Publication-119</i>	Blasting
<i>NPC Publication-206</i>	Road Traffic
<i>NPC Publication-300</i>	Stationary and Transportation Sources

Schedule 4

City of Vaughan Class 4 Designated Areas

Tesmar Holdings Inc., part of Lot 15, Concession 4, being Parts 1 to 9 Incl. on Plan 65R32119, City of Vaughan, Regional Municipality of York.

Schedule 5

City of Vaughan Exempted Employment Areas

805062 Ontario Limited, a wholly owned subsidiary of Granite Real Estate Investment Trust and Granite REIT Inc., and its lessee, Magna International Inc., part of Lot 15, Concession 4, being Parts 1, 2, 11, 12, 13, 14, 15, 16 on 65R-34051, City of Vaughan, Regional Municipality of York. Municipally known as 401 Caldari Road, Vaughan, ON L4K 5P1.

