

349 DAVIS ROAD

TORONTO, ONTARIO

NOISE AND VIBRATION IMPACT STUDY

RWDI #2203169

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SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study (NVIS) to support the Official Plan Amendment and Zoning Bylaw Application submission for the proposed 349 Davis Road development located in Oakville, Ontario. The proposed development will consist of a building comprising: 5 levels of above ground parking, 1 level of commercial office space, and 48 levels of residential properties, for a total height of 58 storeys.

The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade and in the outdoor amenity areas
 - b. Proximity to commercial/industrial land-use
3. Minimum sound isolation performance:
 - a. Suite bedroom window glazing with sound isolation performance up to STC-38.
4. Construction of perimeter noise barriers along the outdoor amenity areas if feasible, with the applicable warning clause.

The site is exposed to noise from the rail corridor to the south-west; and CN movements (Oakville Subdivision). As the distance between the track and the development is greater than 75 metres, vibration impacts are not anticipated at the development, and do not require assessment.

The potential noise impact from stationary sources of sound were evaluated. Based on the noise modeling results, including the evaluation of elevated limits from roadway, levels are predicted to be acceptable.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior during detailed design to ensure that the acoustical design is adequately implemented to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is predicted to meet the applicable sound and vibration criteria.



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1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study (NVIS) to support the Official Plan Amendment and Zoning Bylaw Application submission for the proposed 349 Davis Road development located in Oakville, Ontario. The proposed development will consist of a building comprising: 5 levels of above ground parking, 1 level of commercial office space, and 48 levels of residential properties, for a total height of 58 storeys.. An overview of the site is shown in **Figure 1**.

The site is exposed to noise from road traffic on: Queen Elizabeth Way to the north-east; Trafalgar Road to the east; and Cornwall Road to the south-west. The site is exposed to rail traffic from the rail corridor located approximately 260 m to the south-west, which carries Metrolinx commuter trains and Canadian National (CN) Rail freight trains. The surrounding transport sources are shown in **Figure 2**.

As the distance between the track and the development is greater than 75 metres, vibration impacts are not anticipated at the development, and do not require assessment.

A detailed assessment of nearby stationary sources was conducted. Conservative assumptions for potential noise emissions from Class I and Class II facilities within 300 m from the development property line were included in the stationary source assessment. No Class III facilities were identified within the potential 1000 m zone of influence.

This assessment was completed to support the Official Plan Amendment (OPA) and Zoning Bylaw Application (ZBA) submission as required by the City of Toronto. This assessment was based on design drawings dated September 14th, 2022.

2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources (road and rail), stationary noise sources and rail vibration are adopted from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline (MOE, 2013), with a summary of the applicable criteria included with **Appendix A**.

The proposed development site would be characterized as a "Class 1 Area", which is defined according to NPC-300 as an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum."

3 IMPACT OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

3.1.1 Road Traffic Volume Data

Traffic Volume data for Trafalgar Road, Queen Elizabeth Way, and Cornwall Road was obtained from the sources outlined in Table 3-1.



Table 3-1: Traffic Volume Data Sources

Roadway		Municipality Data Source	Type of Data
Intersection	Modelled Road		
Intersection Trafalgar Road and Queen Elizabeth on/off ramps	Trafalgar Road	Region of Halton	Turning Movement Counts (TMCs) Morning Peak, Afternoon Peak and 8 hour interval
Queen Elizabeth Way	Queen Elizabeth Way	Ministry of Transportation of Ontario	Hourly Counts
Intersection Cornwall Road and Trafalgar Road	Cornwall Road	City of Oakville	Turning Movement Counts (TMCs) Morning and Afternoon Peak

Where hourly counts were not available, TMCs were used to determine the traffic volume and types of vehicles on each link during the AM and PM peaks and 8-hour interval which were assumed to be 9%, 10% and 60% of the Annual Average Daily Traffic (AADT), respectively. No information was available regarding the volume of heavy or medium vehicles on Queen Elizabeth Way, so a conservative value of 20% was assumed.

The maximum AADTs obtained from the approximation of each of these three time periods was used for the AADT for the respective roadway.

An 90%/10% daytime/nighttime split was applied for Trafalgar Road and Cornwall Road. Hourly counts provided for Queen Elizabeth Way were used to determine the daytime/nighttime split.

Traffic volumes for each of the respective roadways were increased at a rate of 2% per year to represent the predicted 10-year horizon volumes.

A summary of the traffic data used is included in **Table 3-2** below with more detailed information included in **Appendix D**.

Table 3-2: Road Traffic Volumes

Roadway	2032 Future Traffic (AADT)	% Day/Night	Speed Limit (km/hr)	% Trucks
Trafalgar Road	47932	90% / 10%	60	3.4%
Queen Elizabeth Way	273608	86% / 14%	100	20.0%
Cornwall Road	14618	90% / 10%	60	4.2%

3.1.2 Rail Traffic Volume Data

Future GO transit rail traffic on the rail corridor, located approximately 260 m to the southeast of the site, was obtained from Metrolinx.

Freight rail volumes are not provided by the rail authorities (CN). As such, typical volumes based on line type (e.g. principal main line, secondary line) have been assumed as a basis for the analysis.



The data used for the analysis is summarized in **Table 3-3**, with details of the data used included in **Appendix D**.

Table 3-3: Rail Volumes and Configuration 2032

Train Type	Daytime	Nighttime	Type of Locomotive	No of Locomotives	No of Cars	Speed (km/h)
Metrolinx	101	21	Electric ¹	1	12	155
	42	8		2	12	155
	60	8	Diesel	1	12	155
	11	4		2	12	155
CN	16	8	Diesel	2	100	100

NOTES:

1. Modelled as diesel for conservatism based on direction from Metrolinx.

3.1.3 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. Using the “building evaluation” feature of Cadna/A, each façade of the residential and commercial buildings was assessed.

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. Daytime sound levels were assessed at the following identified OLAs:

- OLA_01: Lower podium roof, northwest
- OLA_02: Lower podium roof, northeast
- OLA_03: Lower podium roof, southeast
- OLA_04: Lower podium roof, southwest
- OLA_05: Upper podium roof, southeast
- OLA_06: Upper podium roof, southwest

OLAs associated with commercial spaces were not considered in the assessment. The OLAs are indicated in **Figure 3**.

3.1.4 Analysis and Results

Sound levels due to the adjacent transportation (road and rail) sources were predicted using the RLS-90 standard (RLS,1990), and FTA method (FTA, 2018) as implemented in the Cadna/A software package.

To assess the impact of transportation noise on suites, the maximum sound level on each façade was determined with the results summarized in **Table 3-4**. The worst-case noise levels on residential facades were found to occur on the tower, not the upper podium level. Only the tower (residential) and lower podium (commercial office space) façade noise levels have been presented.



Table 3-4: Predicted Ground Transportation Source Sound Levels – Plane of Window

Building Section	Façade	Road		Rail		Combined		Notes
		Day L _{EQ} , 16hr	Night L _{EQ} , 8hr	Day L _{EQ} , 16hr	Night L _{EQ} , 8hr	Day L _{EQ} , 16hr	Night L _{EQ} , 8hr	
Lower Podium	Northwest	72	67	50	48	72	67	1
	Northeast	69	64	59	58	69	65	1
	Southeast	62	57	60	58	64	61	1
	Southwest	69	63	59	57	69	64	1
Tower	Northwest	74	69	48	47	74	69	1
	Northeast	71	66	61	59	72	67	1
	Southeast	57	50	63	61	64	62	1
	Southwest	72	67	60	58	72	67	1

NOTES:

1. The acoustical performance of building components must be specified to meet the indoor sound level criteria. Installation of air conditioning to allow for windows and doors to remain closed, warning clause "Type D". Refer to **Appendix C** for guidance regarding air-conditioning as a noise mitigation measure.

To assess the impact of transportation noise on the qualifying OLAs for the development, predicted sound level results are summarized in **Table 3-5**.

Table 3-5: Transportation Sound Levels in Outdoor Living Areas (OLAs)

Receptor	Description	Daytime L _{EQ} , 16hr (dBA)	Notes
OLA_01	Lower podium roof, northwest	72	1
OLA_02	Lower podium roof, northeast	69	1
OLA_03	Lower podium roof, southeast	65	1
OLA_04	Lower podium roof, southwest	70	1
OLA_05	Upper podium roof, southeast	65	1
OLA_06	Upper podium roof, southwest	64	1

NOTES:

1. Noise mitigation is recommended to meet the ≤55 dBA OLA sound level criterion. If noise controls are not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case, a warning clause "Type B" is recommended.



3.2 Stationary Source Assessment

Stationary sources could be grouped into two categories: Those that have a permit with the Ontario Ministry of the Environment, Conservation and Parks (MECP) through an Environmental Compliance Approval (ECA) or Environmental Activity and Sector Registry (EASR); and those that are exempt from ECA or EASR permit requirements.

In the case where a stationary source has an Environmental Compliance Approval (ECA) or Environmental Activity and Sector Registry (EASR) permit with the MECP, and would be put in a position where it is no longer in compliance with the applicable sound level criteria due to the encroachment of the proposed new development, source specific mitigation and/or formal classification of the proposed development lands as a “Class 4 Area” (refer to C.4.4.2 “Class 4 Area” in NPC-300) would be required. In this case, coordination and agreements between the stationary source owner, proposed new development owner, the land-use planning authority and potentially the MECP would be needed.

In the case where a stationary source is exempt from ECA or EASR permit requirements with the MECP, the noise provisions of the applicable Municipal Code and guidance from NPC-300 would be applicable. In this case, mitigation of sound levels due to stationary sources would be from a due diligence perspective to avoid nuisance complaints from future occupants of the proposed new development. Mitigation could be in the form of mitigation at the source (with agreement from the stationary source owner) and/or mitigation at the receptor through site and building element design (building orientation, acoustical barriers, façade sound insulation design).

3.2.1 Land-Use Compatibility Review (D-6 Guideline Assessment)

The MECP Guideline D-6 (MOE, 1995) was used as a tool to classify the identified industries and assess their potential influence on the proposed development. The classifications and setback guidelines are summarized in **Appendix A**.

There were four Class I or commercial (N/A) operations identified within the 70 m area of influence for Class I industries. There were no Class II operations identified within 300 m and no Class III operations identified within 1 km. A summary of these facilities is provided in **Table 3-6** and **Figure 4**.

Table 3-6: Industries within the minimum recommended separation distance of the proposed development

Name and Address	Type of Operation	Industry Class	Area of Influence	Actual Separation Distance
Balletomane 379 Davis Rd	Dance School	N/A	70 m	60 m
Assured Automotive 359 Davis Rd	Automotive Refinishing	I	70 m	0 m (adjacent)
PWC 354 Davis Rd	Commercial Office	N/A	70 m	40 m
Davis Road Booster Station 320 Davis Rd	Water Infrastructure	I	70 m	35 m

Of the industries described in **Table 3-6**, only Assured Automotive operates under an ECA. The Davis Road Booster Station did not appear to have an ECA or an EASR based on publicly available data, and was assumed to be exempt from environmental permitting requirements. Commercial operations (PWC and Balletomane) are exempt from environmental permits (ECA or EASR).



3.2.2 Stationary Source Modeling

RWDI conducted a land-use compatibility assessment based on the guidance of the Ministry of the Environment D-6 Guideline (MOE, 1995). For facilities within the area of influence, stationary sources of noise surrounding the proposed development were identified using publicly available aerial and street-level imagery.

3.2.2.1 Representative Receptors

The worst-case receptor locations were assessed to evaluate the potential stationary source noise impact.

3.2.2.2 Assumed Sources and Sound Power Levels

Stationary sources of noise surrounding the proposed development were identified using a combination of publicly available aerial imagery and street-level imagery.

RWDI proxy data were used for the sound power levels of the HVAC units, paintbooth exhaust fans, cooling tower and emergency generator included in the model. The assumed sound power levels included in the screening level stationary source assessment are presented in **Table 3-7**. The locations of the sources summarized in **Table 3-7** included in the stationary source assessment are illustrated in **Figure 5**.

Table 3-7: Stationary Source Sound Power Level Assumptions

Source	Proxy Data / Calculation	Sound Power Level (dBA)	Duty Cycle	
			Daytime and Evening (07:00h – 23:00h)	Nighttime (23:00h – 07:00h)
HVAC_1F	Proxy Data	82	Continuous	Continuous
HVAC_2F	Proxy Data	85	Continuous	Continuous
Paint booth exhaust fan	Proxy Data	78	Continuous	Continuous
Makeup Air Unit (MUA)	Proxy Data	90	Continuous	Continuous
Cooling Tower	Proxy Data	100	Continuous	Operating at reduced speed (5 dB reduction)
Generator	Proxy Data	100	Continuous	Continuous

3.2.2.3 Analysis and Results

Stationary source noise modelling was carried out using the Cadna/A software package, a commercially available implementation of the ISO 9613 (ISO, 1994 and ISO, 1996) algorithms. The predicted sound levels are assessed against the applicable limits (refer to **Appendix A**). As roadway traffic is anticipated to dominate the acoustic environment in this area, elevated sound level limits were calculated based on the lowest hour of traffic during daytime and nighttime periods. Elevated limits are expected for all periods on the west, north, and east facades of the building. On the south of the building, the default Class 1 limits would apply during nighttime, with elevated limits during daytime. Note that the podium level was not considered in the assessment of stationary sources as commercial operations are not considered as sensitive receptors for stationary sources under NPC-300.

Permitted Sources – Assured Automotive

The predicted sound levels during the worst-case 1-hour from existing stationary sources are presented in **Table 3-8**. Based on a review of publicly available data, Assured Automotive operates between 8 am and 5 pm. It was assumed that equipment would not operate during nighttime periods (11pm to 7am). Where outdoor noise levels are referenced, they refer to the outdoor areas at the base of the tower, and on the rooftop of the lower podium.



Table 3-8: Assured Automotive Predicted Sound Levels at Worst-Case Location – Continuous Stationary Sources (Permitted)

Worst-case Area	Worst Case L _{EQ,1hr} (dBA)		Sound Level Criteria Class 1 L _{EQ,1hr} (dBA)		Complies with NPC-300 limits (Y/N)
	Day	Night	Day	Night	
Northeast Façade of Tower	50	-	58 ¹	45	Y
Northeast Outdoor Point of Reception	51	-	65 ¹	-	Y

NOTES:

1. Elevated sound level criteria calculated based on the lowest 1-hour traffic volumes during daytime and nighttime.

As shown in **Table 3-8**, the continuous sound levels at the outdoor areas and at the façade due to the permitted existing stationary sources meet the applicable Class 1 sound level criteria.

All Sources – Due Diligence

The acoustical environment at the proposed development as a result of all the significant stationary sources was assessed separately against guidance from NPC-300. The predicted sound levels during the worst-case 1-hour from existing stationary sources are presented in **Table 3-9**.

Table 3-9: Predicted Existing Source Sound Levels – Plane of Window

Worst-case Area	Worst Case L _{EQ,1hr} (dBA)		Sound Level Criteria Class 1 L _{EQ,1hr} (dBA)		Meets with NPC-300 guidance? (Y/N)
	Day	Night	Day	Night	
Normal Operations					
Southeast Façade of Tower	53	49	54 ¹	45	N
Southeast Outdoor Point of Reception	46	-	60 ¹	-	Y
Emergency Generator Testing					
Southwest Façade of Tower	48	48	55	50	Y
Southwest Outdoor Point of Reception Area	50	-	55	-	Y

NOTES:

1. Elevated sound level criteria calculated based on the lowest 1-hour traffic volumes during daytime and nighttime.

The predicted sound levels meet the NPC-300 guidance levels at all locations except the southwest façade of the tower during nighttime. However, it is expected that the requirements to reduce noise from transportation will result in a comfortable indoor acoustic environment, as discussed in Section 3.3.2.



3.3 Recommendations

Based on the noise and vibration assessment results, the following recommendations were determined for the project. Recommendations are provided for both transportation sources and stationary sources.

3.3.1 Transportation Sources

The following recommendations are provided to address transportation sources.

3.3.1.1 Building Façade Components

Due to the elevated transportation sound levels in the area, acoustical design of the façade components including spandrel, window glazing, and exterior doors, are recommended to be specified for the proposed development.

To assess the development’s feasibility, preliminary window glazing, and exterior balcony door sound isolation requirements were determined. These were based on following assumptions:

- Typical residential living room:
 - Glazing 60% of façade, Door: 20% of façade
 - 55% Façade to floor area Ratio
- Typical residential bedroom:
 - Glazing 80% of façade, Door: N/A
 - 81% Façade to floor area Ratio
- Typical office/commercial space:
 - Glazing 80% of façade, Door: N/A
 - 55% Façade to floor area Ratio
- Acoustical character of rooms: High absorption finishes/furniture for bedrooms and intermediate absorption finishes/furniture for living rooms, low absorption finishes/furniture for office spaces.

Based on the predicted plane of window sound levels and the assumptions listed above, recommendations for the minimum sound insulation ratings for the building components were determined using the National Research Council of Canada “BPN-56 method” (NRCC, 1985). The reported results are in terms of Sound Transmission Class (STC) ratings as summarized in **Table 3-10**.

Table 3-10: Recommended Façade Component Minimum Sound Insulation Rating

Building Section	Façade	Window Glazing ¹	Exterior Door ²	Façade Wall
Lower Podium (Commercial Space)	Northwest	27	NA	45
	Northeast	OBC	NA	45
	Southeast	27	NA	45
	Southwest	28	NA	45
Tower (Residential)	Northwest	35	OBC	45
	Northeast	32	OBC	45
	Southeast	36	OBC	45
	Southwest	38	OBC	45

NOTES:

1. “OBC” denotes that the noise insulation design is not required to be specified. Building envelope assemblies meeting the minimum Ontario Building Code (OBC) requirements will also exhibit sufficient noise reduction to meet the interior sound level criteria.
2. No doors have been assumed for office spaces



The maximum requirement for the window glazing was determined to be STC-38, which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units.

Taking into account the assumptions used as a basis to determine the glazing requirements, the applicable indoor transportation source sound level criteria are predicted to be achieved.

We recommend that the façade construction is reviewed during detailed design to ensure that the indoor sound level limits will be met, and that the window/door supplier is requested to provide STC laboratory test reports as part of shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.

3.3.1.2 Ventilation Recommendations

Due to the transportation sound levels at the plane of the façade, central air conditioning is recommended for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective purchasers or tenants should be informed by a warning clause “Type D”.

3.3.1.3 Outdoor Living Areas

Due to exposure to transportation sources along the nearby Queen Elizabeth Way, Trafalgar Road, and the rail corridor, sound levels in OLAs are predicted to be elevated. The combined (rail and road) daytime average sound levels for the OLAs included in the assessment are in the range of 64-72 dBA. To reduce the transportation sound levels in OLAs to meet the applicable criteria, noise barriers are recommended. OLAs are not recommended where noise levels cannot be mitigated to a level of 60 dBA or lower. The majority of OLAs cannot be mitigated to 55 dBA with a barrier of less than 5 metres in height.

The recommended geometry of the noise barriers are included with **Figure 6a** (to meet 55 dBA) and **Figure 6b** (to meet 60 dBA). The barrier heights are summarized in **Table 3-11**. General guidance with respect to noise barrier design is included with **Appendix C**.

Table 3-11: Barrier Height Recommendations for OLAs

Receptor	Description	Predicted OLA Sound Level	Barrier Height (m) to Meet Sound Level Criterion	
		Daytime L_{EQ} , 16hr	≤ 55 dBA ¹	≤ 60 dBA ²
OLA_01	Lower podium roof, northwest	72	>5.0m	3.5m
OLA_02	Lower podium roof, northeast	69	>5.0m	3.0m
OLA_03	Lower podium roof, southeast	65	>5.0m	2.25m
OLA_04	Lower podium roof, southwest	70	>5.0m	2.75m
OLA_05	Upper podium roof, southeast	65	2.5m	1.0m
OLA_06	Upper podium roof, southwest	64	2.5m	1.0m

NOTES:

1. Refer to Figure 6a for barrier geometry to meet 55 dBA.
2. Refer to Figure 6b for barrier geometry to meet 60 dBA. A warning clause “Type B” is recommended in cases where the OLA sound level is >55 dBA (to a maximum of 60 dBA).



3.3.2 Stationary Sources

Permitted stationary sources are predicted to comply with the NPC-300 sound level limits at the proposed development. The potential impact of all stationary sources (including sources exempt from permitting) were evaluated and determined to exceed the NPC-300 sound level guidance by up to 4 dB. However, the requirements to address transportation noise, including the provision for installation of air-conditioning along with design of façade components (i.e., windows, walls, doors) will result in a comfortable indoor acoustic environment. As such, the land use compatibility of the proposed development with respect to the nearby industries is considered acceptable from the noise impact perspective.

Due to the proximity of the proposed development to the commercial and industrial facilities, a warning clause "Type E" is recommended to inform prospective occupants of the potential for audible noise from these facilities.

3.3.3 Warning Clauses

The following warning clauses are recommended for the proposed development:

1. NPC-300 Type B to address transportation sound levels in Outdoor Living Areas (OLAs)
2. NPC-300 Type D to address transportation sound levels at the plane of window
3. NPC-300 Type E to address proximity to commercial/industrial facilities

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. The wording of the recommended warning clauses is included with **Appendix B**.

4 IMPACT OF THE PROPOSED DEVELOPMENT ON ITS SURROUNDINGS AND ON ITSELF

On-site stationary sources for the development are expected to consist of HVAC related equipment in the roof-top as well as various exhaust fans. Further, consideration should be given to control airborne and structure-borne noise generated within the proposed development.

Within the development itself the main sources of noise that are likely to affect the uses of the building are the mechanical systems. The potential noise impact of the commercial component of the development is recommended to be reviewed during detailed design, to ensure the applicable criteria will be met.

Provided that best practices for the acoustical design of the building are followed, noise from building services equipment associated with the development are expected to be feasible to meet the applicable sound level criteria due to the nature (residential/mixed-use) of the proposed development.

We recommend that the potential noise impact of the proposed development is reviewed during detailed design to ensure the applicable sound level criteria will be achieved.

5 CONCLUSIONS

RWDI was retained to prepare a Noise and Vibration Impact Study (NVIS) to support the Official Plan Amendment and Zoning Bylaw Application submission for the proposed 349 Davis Road development located in Oakville, Ontario.

The following noise control measures are recommended for the proposed development:

1. Installation of central air-conditioning so that all suites' windows can remain closed.
2. The inclusion of noise warning clauses related to:
 - a. Transportation sound levels at the building façade and in the outdoor amenity areas
 - b. Proximity to commercial/industrial land-use
3. Minimum sound isolation performance:
 - a. Suite bedroom window glazing with sound isolation performance up to STC-38.
4. Construction of perimeter noise barriers along the outdoor amenity areas if feasible, with the applicable warning clause.

The potential noise impact from stationary sources of sound were evaluated. Based on the noise modeling results, including the evaluation of elevated limits from roadway, levels are predicted to be acceptable.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior during detailed design to ensure that the acoustical design is adequately implemented to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is predicted to meet the applicable sound and vibration criteria.

6 REFERENCES

1. Ontario Ministry of the Environment (MOE), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning (MOE, 2013).
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4. Ontario Ministry of the Environment (MOE) Publication Guideline D-6, "Compatibility Between Industrial Facilities and Sensitive Land Uses", July 1995 (MOE, 1995).
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10. City of Toronto, Municipal Code Chapter 591, Noise ([Link](#), accessed 2020-12-18).



STATEMENT OF LIMITATIONS

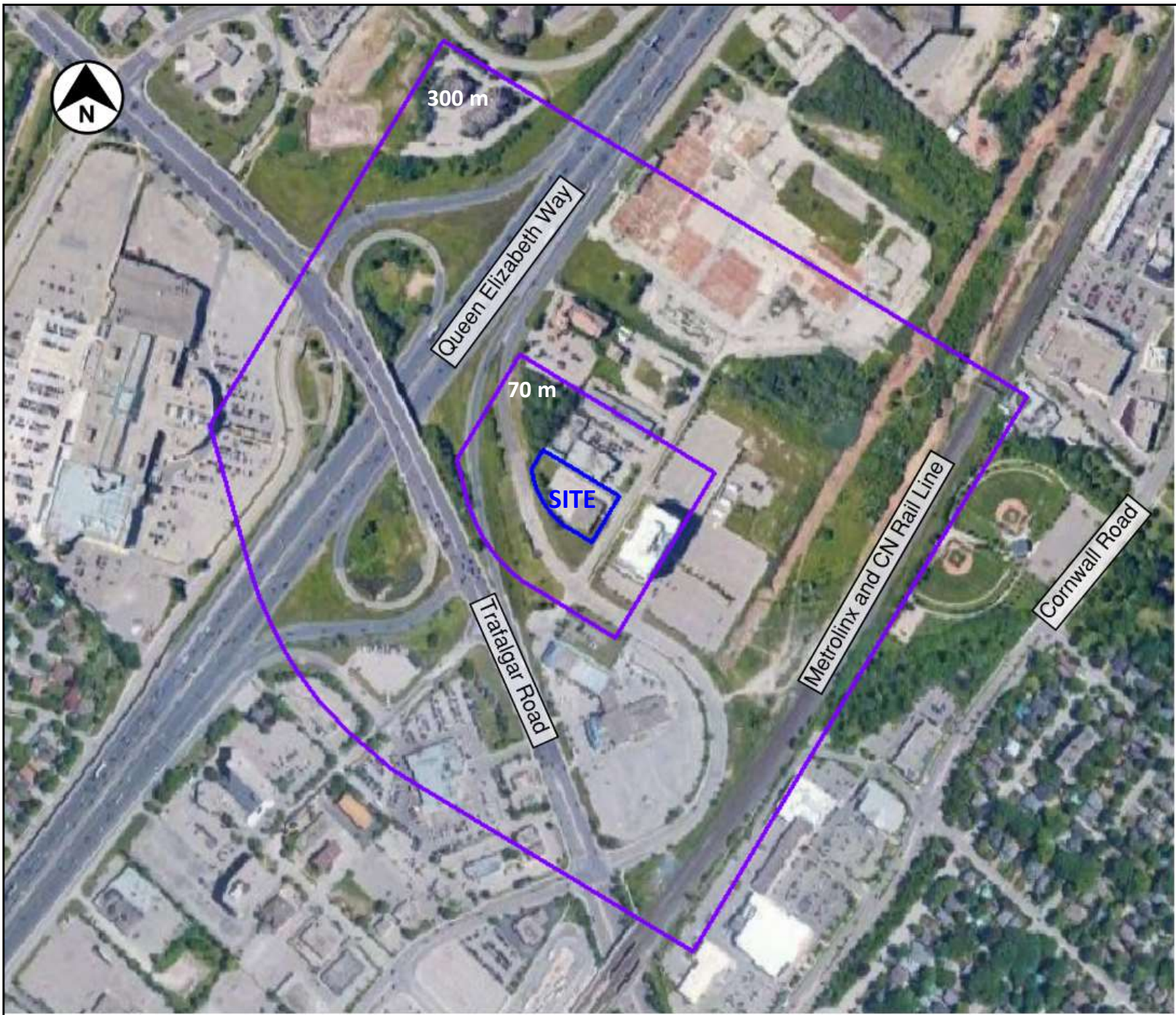
This report entitled Noise and Vibration Impact Study 349 Davis Road was prepared by Rowan Williams Davies and Irwin ("RWDI") for Corbett Land Strategies ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

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FIGURES



Site and Surrounding Area

349 Davis Road, Oakville, ON

Drawn by: CGW

Figure: 2

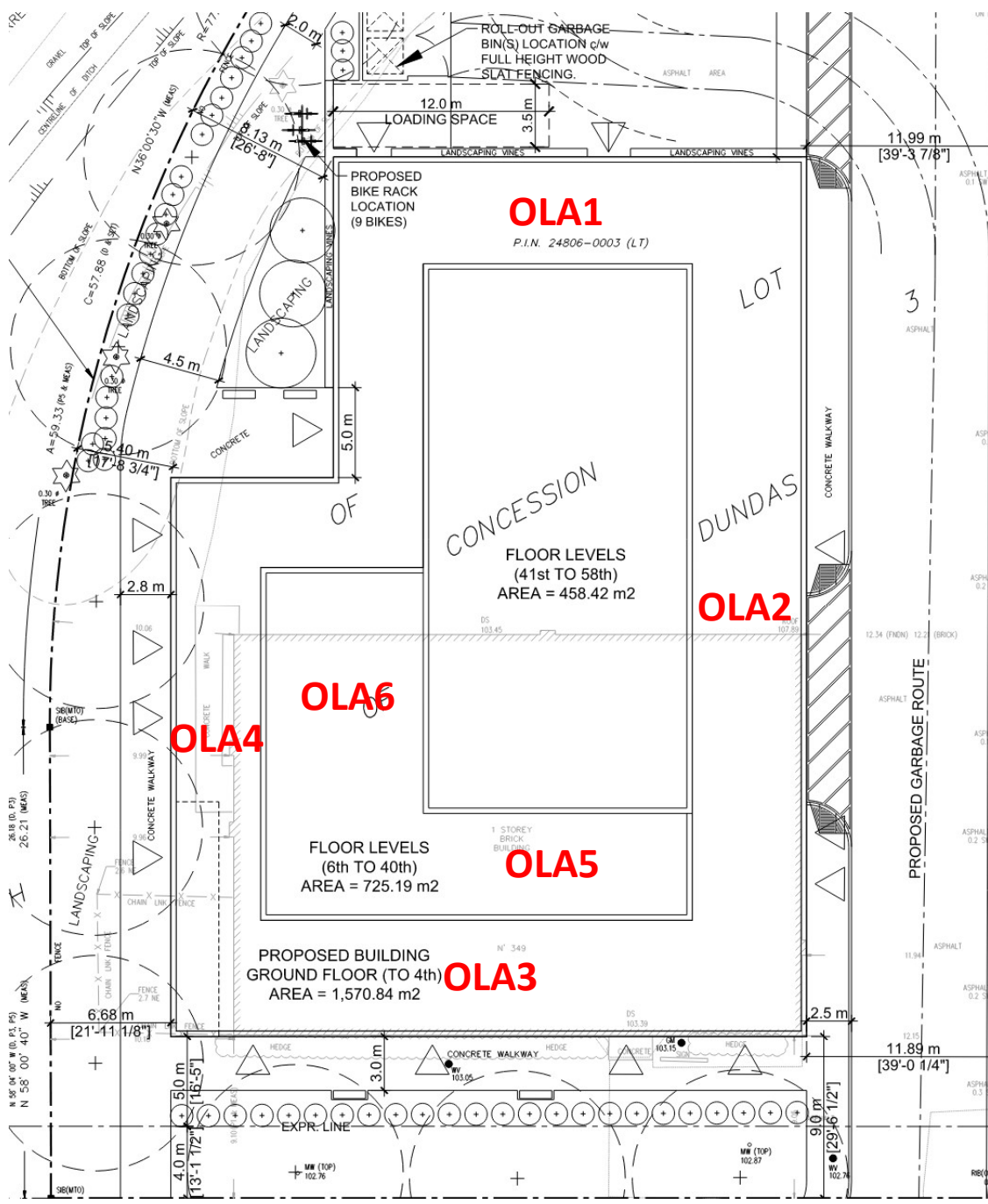
Project #:

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Date:

2022-10-14



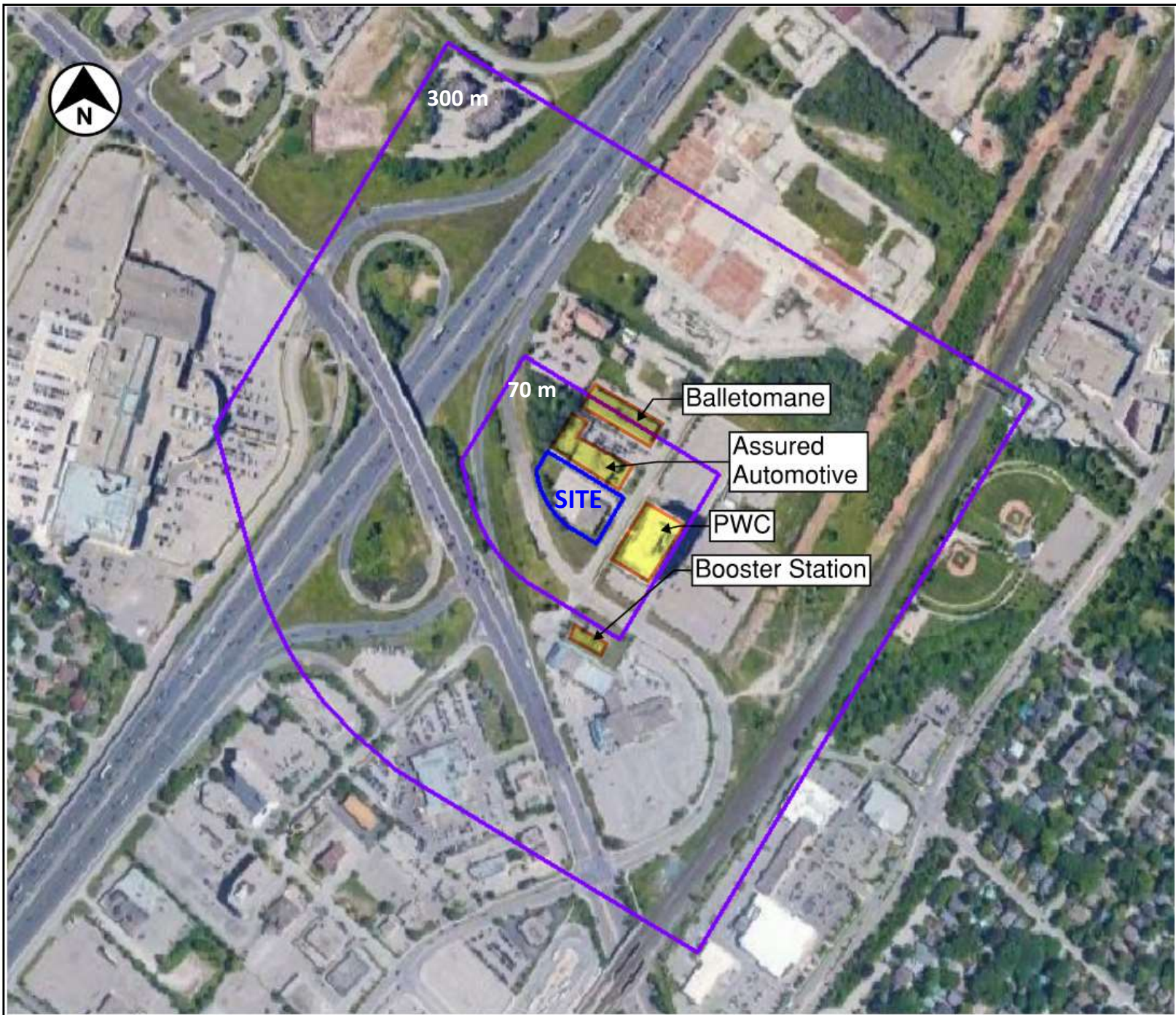


Outdoor Living Areas (OLAs)

349 Davis Road, Oakville, ON

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Project #: 2203169	
Date: 2022-10-14	



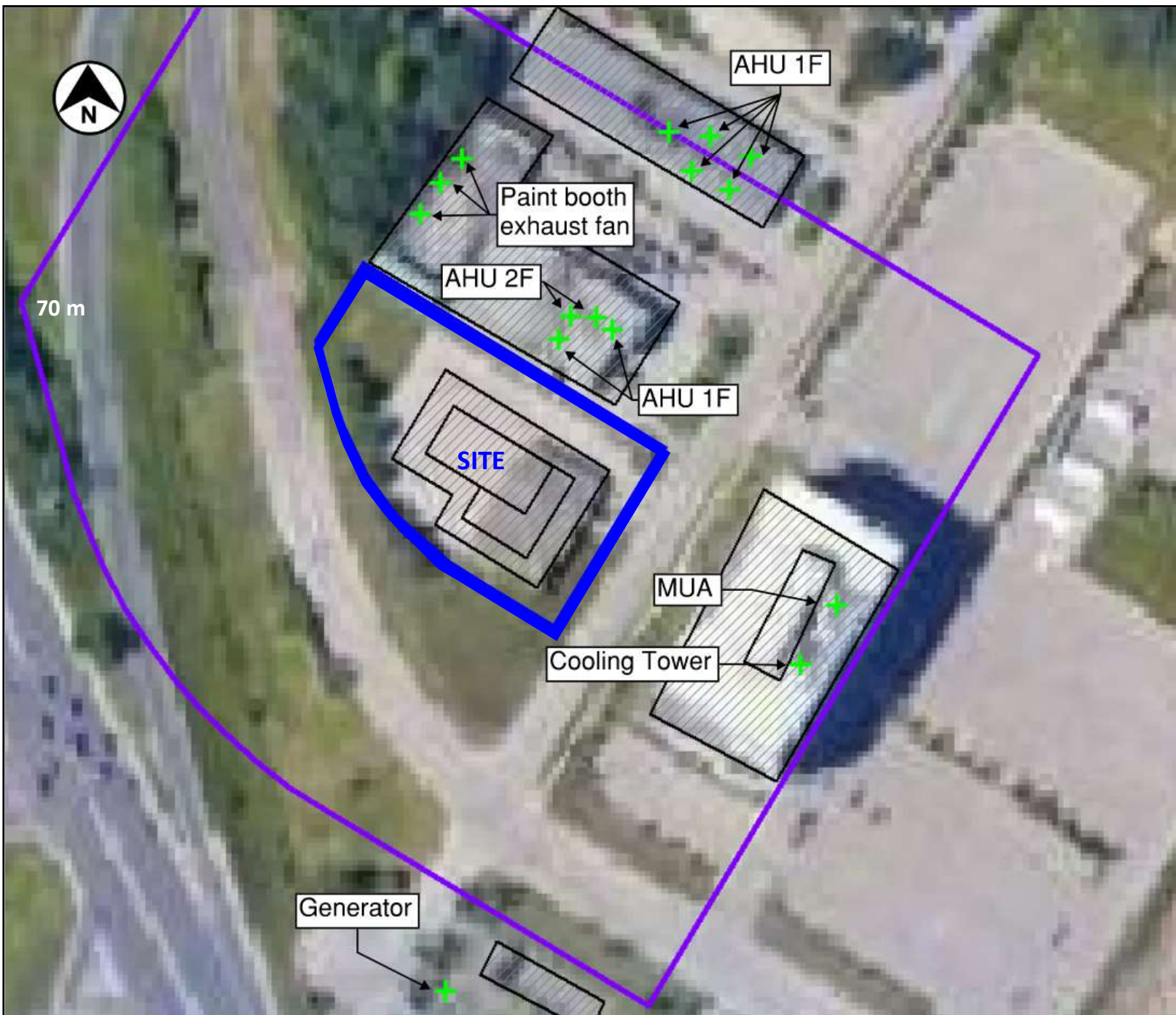


Industries Within D-6 Areas of Influence

349 Davis Road, Oakville, ON

Drawn by: CGW	Figure: 4
Project #: 2203169	
Date: 2022-10-14	





Significant Source Locations

349 Davis Road, Oakville, ON

Drawn by: CGW

Figure: 5

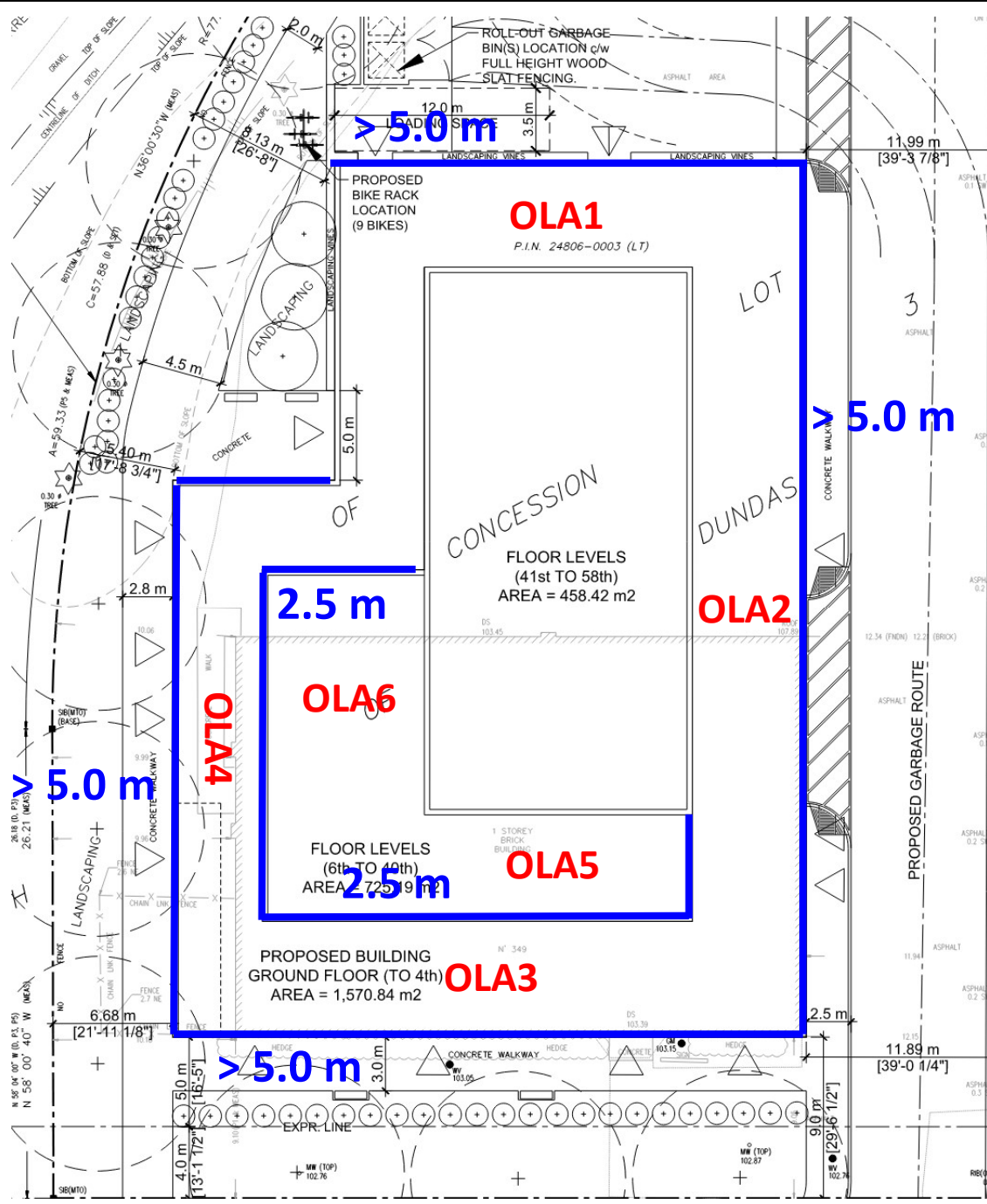
Project #:

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Date:

2022-10-14





Outdoor Living Areas (OLAs) and Proposed Barriers to Meet 55 dBA

349 Davis Road, Oakville, ON

Drawn by: CGW

Figure: 6a

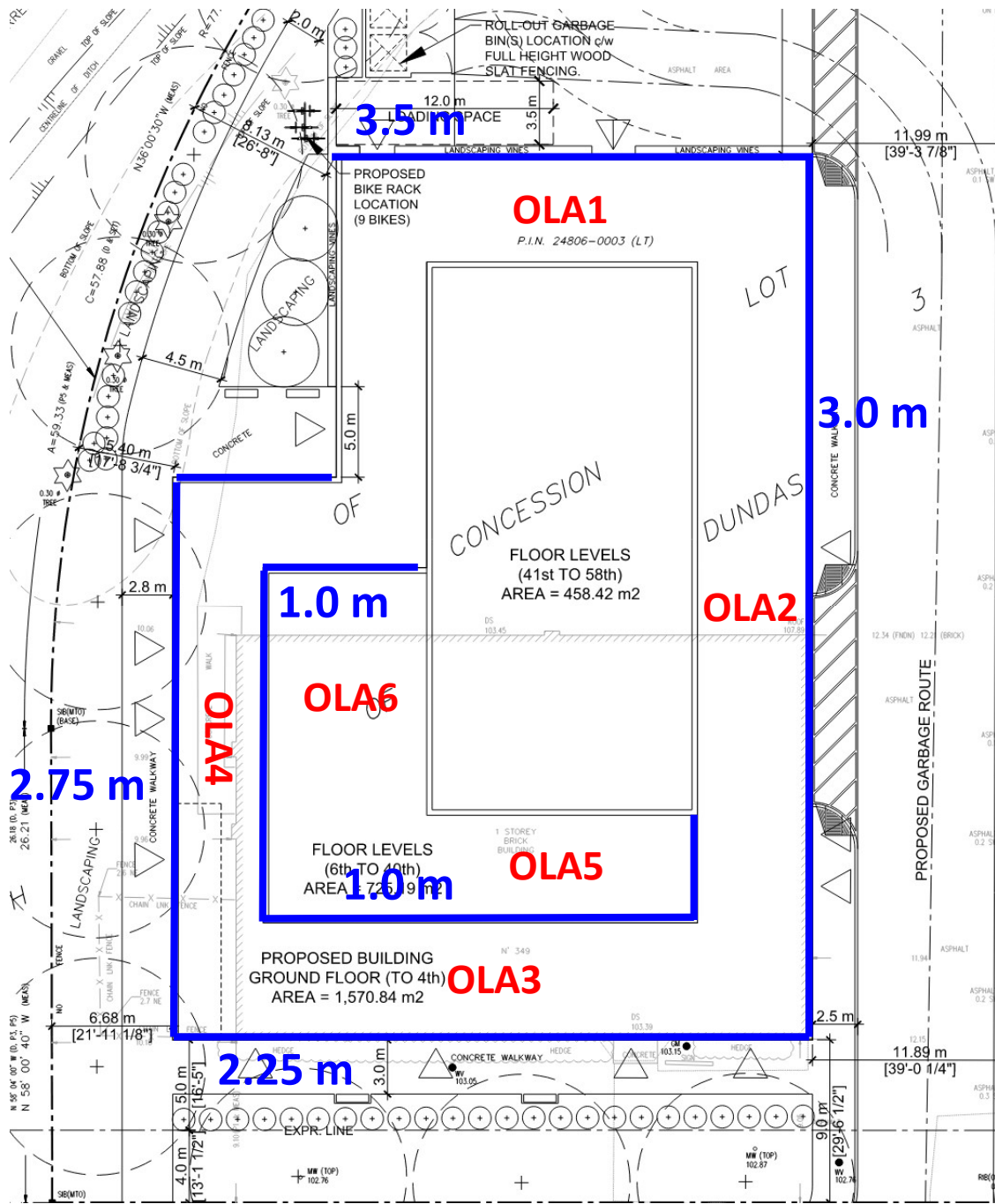
Project #:

2203169

Date:

2022-10-14





Outdoor Living Areas (OLAs) and
Proposed Barriers to Meet 60 dBA

349 Davis Road, Oakville, ON

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Project #: 2203169	
Date: 2022-10-14	



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APPENDIX A

APPENDIX A: CRITERIA

A.1 Transportation Sources

Guidance from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline was used to assess environmental noise generated by transportation-related sources. There are three aspects to consider, which include the following:

- i. Transportation source sound levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) sound insulation design recommendations.
- ii. Transportation source sound levels at the plane of the window, which determines air-conditioning and ventilation system recommendations and associated warning clauses which inform the future occupants that windows and doors must be closed in order to meet the indoor sound level criteria.
- iii. Transportation source sound levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

A.1.1.1 Road and Rail

A.1.1.2 Indoor Sound Level Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in Table 1 for indoor areas of sensitive uses. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed.

Table 1: Indoor Sound Level Criteria for Road and Rail Sources

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
Living Quarters Examples: Living, dining and den areas of residences, hospitals, nursing homes, schools and daycare centres	Road	45 dBA	
	Rail	40 dBA	
Sleeping Quarters	Road	45 dBA	40 dBA
	Rail	40 dBA	35 dBA

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in Table 2 are provided to inform good-practice design objectives.

Table 2: Supplementary Indoor Sound Level Criteria for Road and Rail Sources

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
General offices, reception areas, retail stores, etc.	Road	50 dBA	-
	Rail	45 dBA	-
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Road	45 dBA	-
	Rail	40 dBA	-
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	Road	-	40 dBA
	Rail	-	35 dBA
Sleeping quarters of hotels/motels	Road	-	45 dBA
	Rail	-	40 dBA

A.1.1.3 Outdoor Living Areas (OLAs)

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building.

OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. The sound level criteria for outdoor living areas is summarized in Table 3.

Table 3: Sound Level Criteria – Outdoor Living Area

Assessment Location	Sound Level Criteria (Outdoors)	
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
Outdoor Living Area (OLA) (Combined Road and Rail)	55 dBA	-

A.1.1.4 Outdoor and Plane of Window Sound Levels

In addition to the sound level criteria, noise control measures and requirements for ventilation and warning clauses requirements are recommended for residential land-uses based on predicted transportation source sound levels incident in the plane of window at bedrooms and living/dining rooms, and/or at outdoor living areas. These recommendations are summarized in Table 4 below.

Table 4: Ventilation, Building Component, and Warning Clauses Recommendations for Road/Rail Sources

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h	
Plane of Window (Road)	> 65 dBA	> 60 dBA	Installation of air conditioning to allow windows to remained closed. The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria. Warning clause “Type D” is recommended.
	> 55 dBA	> 50 dBA	Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause “Type C” is recommended. Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause “Type D” is recommended.

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h	
Plane of Window (Rail ^{1,2})	> 60 dBA	> 55 dBA	<p>The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved.</p> <p>Warning clause “Type D” is recommended.</p>
	> 60 dBA ($L_{eq,24hr}$) and < 100m from tracks		<p>Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings.</p> <p>Warning clause “Type D” is recommended.</p>
Outdoor Living Area (Combined Road and Rail ³)	≤ 60 dBA > 55 dBA	-	<p>If sound levels are predicted to exceed 55 dBA, but are less than 60 dBA, noise controls may be applied to reduce the sound level to 55 dBA.</p> <p>If noise control measures are not provided, a warning clause “Type A” is recommended.</p>
	> 60 dBA	-	<p>Noise controls (barriers) should be implemented to meet the 55 dBA criterion.</p> <p>If mitigation is not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case a warning clause “Type B” would be recommended.</p>

Notes:

- Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.
- Some railway companies (e.g. CN, CP) may require that the exterior walls include a brick veneer or masonry equivalent for the façade facing the railway line, regardless of the sound level.
- Whistle noise is not included in the determination of the sound level at the OLA.

A.1.1.5 Rail Layover Sites

NPC-300 provides a sound level limit for rail layover sites to be the higher of the background sound level or 55 dBA $L_{eq,1-hr}$, for any one-hour period.

A.1.1.6 Rail Vibration Criteria

An assessment of rail vibration is generally recommended for developments within 75m of a rail corridor or rail yard, and adjacent to or within a setback of 15m of a transit (subway or light-rail) rail line.

The generally accepted vibration criterion for sensitive land-uses is the threshold of perception for human exposure to vibration, being a vibration velocity level of 0.14 mm/s RMS in any one-third octave band centre frequency in the range of 4 Hz to 200 Hz.

This vibration criterion is based on a one-second exponential time-averaged maximum hold root-mean-square (RMS) vibration velocity level and is consistent with the Railway Associations of Canada (RAC, 2013) guideline, the U.S. Federal Transit Authority (FTA, 2018) criterion for residential land-uses, the Toronto Transit Commission (TTC) guidelines for the assessment of potential vibration impact of future expansion (MOEE/TTC, 1993).

A.1.1.7 Aircraft

Land-use compatibility in the vicinity of airports is addressed in Ministry of the Environment, Conservation, and Parks (MECP) Guideline NPC-300 (MOE, 2013). The guideline provides recommendations for ventilation, and noise control for different Noise Exposure Forecast (NEF) values, which would be based on NEF contour maps available from the airport authority. The NEF values can be expressed as $L_{A,eq,24hr}$ sound levels by using the expression $NEF = L_{A,eq,24hr} - 32$ dBA.

Table 5: Indoor Sound Level Criteria for Aircraft Sources

Assessment Location	Indoor Sound Level Criteria NEF ($L_{eq, 24hr}$) ¹
Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, etc.	NEF- 5 (37 dBA)
Sleeping quarters	NEF-0 (32 dBA)

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in Table 6 are provided to inform good-practice design objectives.

Table 6: Supplementary Indoor Sound Level Criteria for Aircraft Sources

Assessment Location	Indoor Sound Level Criteria ¹
General offices, reception areas, retail stores, etc.	NEF-15 (47 dBA)
Individual or semi-private offices, conference rooms, etc.	NEF-10 (42 dBA)
Sleeping quarters of hotels/motels, theatres, libraries, places of worship, etc.	NEF-5 (37 dBA)

Table 7: NPC-300 Sound Level Criteria for Aircraft (Outdoors)

Assessment Location	Outdoor Sound Level Criteria ¹
Outdoor areas, including OLA	NEF-30 (62 dBA)

Table 8: Ventilation, Building Component, and Warning Clauses Recommendations for Aircraft Sources

Assessment Location	Aircraft Sound Level	NPC-300 Requirements
	NEF (L _{EQ,24-hr})	
Outdoors	≥NEF 30	<p>Air conditioning to allow windows to remained closed.</p> <p>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.</p> <p>Warning clauses “Type D” and “Type B” are recommended.</p>
	<p>< NEF 30</p> <p>≥ NEF 25</p>	<p>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.</p> <p>Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause “Type C” is recommended.</p> <p>Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause “Type D” is recommended.</p>
	< NEF 25	Further assessment not required

A.2 Stationary Sources

A.2.1.1 NPC-300 Sound Level Criteria – Stationary Sources

Guidance from the MECP NPC-300 Environmental Noise Guideline is used to assess environmental noise generated by stationary sources, for example industrial and commercial facilities.

Noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case one-hour average sound level (L_{eq}) for each period of the day. For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and plane of window.

The assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or “Class” of the area. The NPC-300 exclusion limits for continuously operating stationary sources are summarized in Table 9.

Table 9: NPC-300 Exclusion Limits – Continuous and Quasi-Steady Impulsive Stationary Sources ($L_{Aeq-1hr}$)

Time Period	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime 0700-1900h	50 dBA	50 dBA	50 dBA	50 dBA	45 dBA	45 dBA	55 dBA	60 dBA
Evening 1900-2300h	50 dBA	50 dBA	45 dBA	50 dBA	40 dBA	40 dBA	55 dBA	60 dBA
Nighttime 2300-0700h	--	45 dBA	--	45 dBA	--	40 dBA	--	55 dBA

Notes:

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.
2. Class 1, 2 and 3 sound level criteria apply to a window that is assumed to be open.
3. Class 4 area criteria apply to a window that is assumed closed. Class 4 area requires formal designation by the land-use planning authority.
4. Sound level criteria for emergency backup equipment (e.g. generators) operating in non-emergency situations such as testing or maintenance are 5 dB greater than the applicable sound level criteria for stationary sources.

For impulsive sound, other than quasi-steady impulsive sound, from a stationary source, the sound level criteria at a POR is expressed in terms of the Logarithmic Mean Impulse Sound Level (L_{LM}), and is summarized in Table 10.

Table 10: NPC-300 Exclusion Limits – Impulsive Stationary Sources (L_{LM})

Time Period	Number of Impulses in Period of One-Hour	Class 1 and 2 Areas		Class 3 Areas		Class 4 Areas	
		Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime (0700-2300h)	9 or more	50 dBAI	50 dBAI	45 dBAI	45 dBAI	55 dBAI	60 dBAI
Nighttime (2300-0700h)		-	45 dBAI	-	40 dBAI	-	55 dBAI
Daytime (0700-2300h)	7 to 8	55 dBAI	55 dBAI	50 dBAI	50 dBAI	60dBAI	65 dBAI
Nighttime (2300-0700h)		-	50 dBAI	-	45 dBAI	-	60 dBAI
Daytime (0700-2300h)	5 to 6	60 dBAI	60 dBAI	55 dBAI	55 dBAI	65 dBAI	70 dBAI
Nighttime (2300-0700h)		-	55 dBAI	-	50 dBAI	-	65 dBAI
Daytime (0700-2300h)	4	65 dBAI	65 dBAI	60 dBAI	60 dBAI	70 dBAI	75 dBAI
Nighttime (2300-0700h)		-	60 dBAI	-	55 dBAI	-	70 dBAI
Daytime (0700-2300h)	3	70 dBAI	70 dBAI	65 dBAI	65 dBAI	75 dBAI	80 dBAI
Nighttime (2300-0700h)		-	65 dBAI	-	60 dBAI	-	75 dBAI
Daytime (0700-2300h)	2	75 dBAI	75 dBAI	70 dBAI	70 dBAI	80 dBAI	85 dBAI
Nighttime (2300-0700h)		-	70 dBAI	-	65 dBAI	-	80 dBAI
Daytime (0700-2300h)	1	80 dBAI	80 dBAI	75 dBAI	75 dBAI	85 dBAI	90 dBAI
Nighttime (2300-0700h)		-	75 dBAI	-	70 dBAI	-	85 dBAI

Notes:

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.

A.2.1.2 D-Series Guidelines

The MECP D-series guidelines (MOE, 1995) provide direction for land use planning to maximize compatibility of industrial uses with adjacent land uses. The goal of Guideline D-6 is to minimize encroachment of sensitive land uses on industrial facilities and vice versa, in order to address potential incompatibility due to adverse effects such as noise, odour and dust.

For each class of industry, the guideline provides an estimate of potential influence area and states that this influence area shall be used in the absence of the recommended technical studies. Guideline D-6 also recommends a minimum separation distance between each class of industry and sensitive land uses (see Table 11). Section 4.10 of D-6 identifies exceptional circumstances with respect to redevelopment, infill and mixed-use areas. In these cases, the guideline suggests that separation distances at, or less than, the recommended minimum separation distance may be acceptable if a justifying impact assessment is provided.

Table 11: Summary of Guideline D-6

Industry Class	Definition	Potential Influence Area	Recommended Minimum Separation Distance (property line to property line)
Class I	Small scale, self-contained, daytime only, infrequent heavy vehicle movements, no outside storage.	70 m	20 m
Class II	Medium scale, outdoor storage of wastes or materials, shift operations and frequent heavy equipment movement during the daytime.	300 m	70 m
Class III	Large scale, outdoor storage of raw and finished products, large production volume, continuous movement of products and employees during daily shift operations.	1000 m	300 m

Guideline D-6 provides criteria for classifying industrial land uses, based on their outputs, scale of operations, processes, schedule and intensity of operations. Table 12 provides the classification criteria and examples.

Table 12: Guideline D-6 Industrial Categorization Criteria

Criteria	Class I	Class II	Class III
Outputs	<ul style="list-style-type: none"> • Sound not audible off property • Infrequent dust and/ or odour emissions and not intense • No ground-borne vibration 	<ul style="list-style-type: none"> • Sound occasionally audible off property • Frequent dust and/ or odour emissions and occasionally intense • Possible ground-borne vibration 	<ul style="list-style-type: none"> • Sound frequently audible off property • Persistent and intense dust and/ or odour emissions • Frequent ground-borne vibration
Scale	<ul style="list-style-type: none"> • No outside storage • Small scale plant or scale is irrelevant in relation to all other criteria 	<ul style="list-style-type: none"> • Outside storage permitted • Medium level of production 	<ul style="list-style-type: none"> • Outside storage of raw and finished products • Large production levels
Process	<ul style="list-style-type: none"> • Self-contained plant or building which produces / stores a packaged product • Low probability of fugitive emissions 	<ul style="list-style-type: none"> • Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions 	<ul style="list-style-type: none"> • Open process • Frequent outputs of major annoyances • High probability of fugitive emissions
Operation / Intensity	<ul style="list-style-type: none"> • Daytime operations only • Infrequent movement of products and/or heavy trucks 	<ul style="list-style-type: none"> • Shift operations permitted • Frequent movements of products and/or heavy trucks with majority of movements during daytime hours 	<ul style="list-style-type: none"> • Continuous movement of products and employees • Daily shift operations permitted
Examples	<ul style="list-style-type: none"> • Electronics Manufacturing • Furniture refinishing • Beverage bottling • Auto parts • Packaging services • Dairy distribution • Laundry and linen supply 	<ul style="list-style-type: none"> • Magazine printing • Paint spray booths • Metal command • Electrical production • Dairy product manufacturing • Feed packing plant 	<ul style="list-style-type: none"> • Paint and varnish manufacturing • Organic chemicals manufacturing • Breweries • Solvent recovery plant • Soap manufacturing • Metal manufacturing

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APPENDIX B

APPENDIX B: WARNING CLAUSES

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Warning clauses may be used individually or in combination.

The following warning clauses are recommended based on the applicable guidelines; however, wording may be modified/customized during consultation with the planning authority to best suit the proposed development:

A.1 Transportation Sources

NPC-300 Type A: Recommended to address surface transportation sound levels in OLAs if sound level is in the range of >55 dBA but \leq 60 dBA, and noise controls have not been provided.

"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

NPC-300 Type B: Recommended to address surface transportation sound levels in OLAs if the sound level is in the range of >55 dBA but \leq 60 dBA, and noise controls have been provided. Recommended to address outdoor aircraft sound levels \geq NEF 30.

"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

NPC-300 Type C: Applicable for low and medium density developments only, recommended to address transportation sound levels at the plane of window.

"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

NPC-300 Type D: Recommended to address transportation sound levels at the plane of window.

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

Proximity to Railway Line: Metrolinx/CN/CP/VIA Warning Clause for developments that are within 300 metres of the right-of-way

"Warning: [Canadian National Railway Company] [Metrolinx / GO] [Canadian Pacific Railway Company] [VIA Rail Canada Inc.] or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR/Metrolinx/GO/CPR/VIA will not responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."

A.2 Stationary Sources

NPC-300 Type E: Recommended to address proximity to commercial/industrial land-use

"Purchasers/tenants are advised that due to the proximity of the adjacent industrial/commercial land-uses, noise from the industrial/commercial land-uses may at times be audible."

NPC-300 Type F: Recommended to for Class 4 Area Notification

"Purchasers/tenants are advised that sound levels due to the adjacent industry (facility) (utility) are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."

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APPENDIX C

APPENDIX C: NOISE MITIGATION GUIDANCE

B.1 Acoustic/Noise Barrier

Generally, noise controls to attenuate transportation sound levels at Outdoor Living Areas (OLAs) would consist of the implementation of acoustic/noise barriers with materials that would meet the guidance included in NPC-300, for example:

- A wall, berm, wall/berm combination or similar structure, used as a noise control measure, and high enough to break the line-of-sight between the source and the receptor.
- The minimum surface density (face weight) is 20 kg/m²
 - Many materials could satisfy the surface density requirement, e.g. wood, glass, concrete, Plexiglas, Acrylite.
 - The required thickness can be determined by dividing the 20 kg/m² face weight by the material density (kg/m³). Typically, this would imply:
 - 50 mm (2") thickness of wood
 - 13 mm (0.5") thickness of lighter plastic (like Plexiglas or PVC)
 - 6 mm (0.25") thickness of heavier material (like aluminum, glass, concrete)
- The barrier should be structurally sound, appropriately designed to withstand wind and snow load, and constructed without cracks or surface gaps. Joints between panels may need to be overlapped to ensure surfaces are free of gaps, particularly for wood construction.
- Any gaps under the barrier that are necessary for drainage purposes should be minimized and localized, so that the acoustical performance of the barrier is maintained.
- If a sound absorptive face is to be included in the barrier design, the minimum noise reduction coefficient is recommended to be NRC 0.7.

B.2 Building Ventilation and Air Conditioning

The use of air conditioning itself is not a noise control measure; however, it allows for windows and doors to remain closed, thereby reducing the indoor sound levels.

NPC-300 provides the following guidance with respect to implementation of building ventilation and air conditioning:

- a. the noise produced by the proposed ventilation system in the space served does not exceed 40 dBA. In practice, this condition usually implies that window air conditioning units are not acceptable;
- b. the ventilation system complies with all national, provincial and municipal standards and codes;
- c. the ventilation system is designed by a heating and ventilation professional; and
- d. the ventilation system enables the windows and exterior doors to remain closed.

Air conditioning systems also need to comply with Publication NPC-216, and/or any local municipal noise by-law that has provisions relating to air conditioning equipment.

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APPENDIX D

Trafalgar Rd @ Cornwall Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Halton Region
Site #: 0000003365
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 2
Count date: 6-Nov-2019

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2842
 North Entering: 1522
 North Peds: 36
 Peds Cross: \times

Heavys	10	4	17	31
Trucks	5	3	9	17
Cars	372	561	541	1474
Totals	387	568	567	



Heavys	39
Trucks	15
Cars	1266
Totals	1320

East Leg Total: 2044
 East Entering: 985
 East Peds: 15
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
24	10	832	866



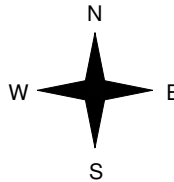
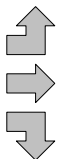
Trafalgar Rd

Cars	Trucks	Heavys	Totals
524	10	26	560
381	5	13	399
24	1	1	26
929	16	40	



Cornwall Rd

Heavys	Trucks	Cars	Totals
5	3	344	352
11	2	428	441
2	0	57	59
18	5	829	



Trafalgar Rd



Cars	Trucks	Heavys	Totals
1020	11	28	1059



Peds Cross: \times
 West Peds: 14
 West Entering: 852
 West Leg Total: 1718

Cars	642	Cars	79	398	51	528
Trucks	4	Trucks	0	2	0	2
Heavys	7	Heavys	1	8	0	9
Totals	653	Totals	80	408	51	



Peds Cross: \times
 South Peds: 10
 South Entering: 539
 South Leg Total: 1192

Comments

Trafalgar Rd @ Cornwall Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 14:00:00

One Hour Peak

From: 12:00:00
To: 13:00:00

Municipality: Halton Region
Site #: 0000003365
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 2
Count date: 6-Nov-2019

Weather conditions:
Cloudy/Dry
Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2590
North Entering: 1295
North Peds: 33
Peds Cross: \times

Heavys	2	1	7	10
Trucks	2	5	9	16
Cars	288	467	514	1269
Totals	292	473	530	



Heavys	20
Trucks	26
Cars	1249
Totals	1295

East Leg Total: 1874
East Entering: 940
East Peds: 37
Peds Cross: \times

Heavys	7
Trucks	10
Cars	631
Totals	648

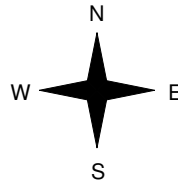


Trafalgar Rd

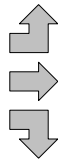
Cars	558	Trucks	11	Heavys	11	Totals	580
Cars	302	Trucks	8	Heavys	5	Totals	315
Cars	45	Trucks	0	Heavys	0	Totals	45
Totals	905	Totals	19	Totals	16	Totals	



Cornwall Rd



Heavys	7
Trucks	6
Cars	300
Totals	313
Heavys	7
Trucks	7
Cars	330
Totals	344
Heavys	0
Trucks	0
Cars	55
Totals	55
Totals	14
Totals	13
Totals	685



Cornwall Rd



Peds Cross: \times
West Peds: 4
West Entering: 712
West Leg Total: 1360

Cars	567	Cars	41	391	60	492
Trucks	5	Trucks	0	9	0	9
Heavys	1	Heavys	0	2	0	2
Totals	573	Totals	41	402	60	



Trafalgar Rd

Peds Cross: \times
South Peds: 5
South Entering: 503
South Leg Total: 1076

Comments

Trafalgar Rd @ Cornwall Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 15:30:00

To: 16:30:00

Municipality: Halton Region
Site #: 0000003365
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 2
Count date: 6-Nov-2019

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 2825
 North Entering: 1297
 North Peds: 20
 Peds Cross: \times

Heavys	6	1	12	19
Trucks	1	2	2	5
Cars	309	462	502	1273
Totals	316	465	516	



Heavys	32
Trucks	10
Cars	1486
Totals	1528

East Leg Total: 2188
 East Entering: 1244
 East Peds: 11
 Peds Cross: \times

Heavys	18
Trucks	8
Cars	853
Totals	879

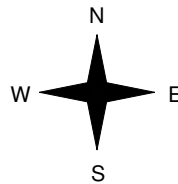


Trafalgar Rd

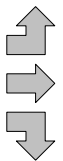
Cars	666	Trucks	6	Heavys	15	Totals	687
	482		6		11		499
	56		2		0		58
Totals	1204	14	26				



Cornwall Rd



Heavys	11
Trucks	1
Cars	355
Totals	367
	7
	2
	368
Totals	377
	0
	0
	66
Totals	66
	18
	3
	789



Cornwall Rd



Cars	921	Trucks	4	Heavys	19	Totals	944
------	-----	--------	---	--------	----	---------------	------------

Peds Cross: \times
 West Peds: 10
 West Entering: 810
 West Leg Total: 1689

Cars	584	Cars	62	465	51	578
Trucks	4	Trucks	1	3	0	4
Heavys	1	Heavys	1	6	0	7
Totals	589	Totals	64	474	51	



Peds Cross: \times
 South Peds: 10
 South Entering: 589
 South Leg Total: 1178

Comments

Trafalgar Rd @ Cornwall Rd

Total Count Diagram

Municipality: Halton Region
Site #: 0000003365
Intersection: Trafalgar Rd & Cornwall Rd
TFR File #: 2
Count date: 6-Nov-2019

Weather conditions:
 Cloudy/Dry
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Trafalgar Rd runs N/S

North Leg Total: 20494
 North Entering: 10081
 North Peds: 211
 Peds Cross: \times

Heavys	46	24	84	154
Trucks	36	34	57	127
Cars	2464	3617	3719	9800
Totals	2546	3675	3860	



Heavys	184
Trucks	112
Cars	10117
Totals	10413

East Leg Total: 14725
 East Entering: 7655
 East Peds: 165
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
114	88	5716	5918



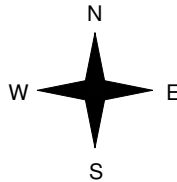
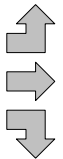
Trafalgar Rd

Cars	Trucks	Heavys	Totals
4221	61	107	4389
2827	47	62	2936
316	12	2	330
7364	120	171	



Cornwall Rd

Heavys	Trucks	Cars	Totals
41	22	2614	2677
49	43	2698	2790
3	4	448	455
93	69	5760	



Trafalgar Rd



Cars	Trucks	Heavys	Totals
6831	105	134	7070



Peds Cross: \times
 West Peds: 77
 West Entering: 5922
 West Leg Total: 11840

Cars	4381
Trucks	50
Heavys	29
Totals	4460



Cars	425	3282	414	4121
Trucks	5	29	5	39
Heavys	6	36	1	43
Totals	436	3347	420	

Peds Cross: \times
 South Peds: 60
 South Entering: 4203
 South Leg Total: 8663

Comments



Railway Properties

1 Administration Rd
Concord, ON L4K 1B9

Telephone: 905-760-5007
Fax: 905-760-5010

The following information generally describes CN's internal classification system. For confirmation of the classification for a particular rail line, please contact CN directly.

Principal Main Line

- traffic volume generally exceeds 10 trains per day
- high speeds, usually exceeding 80 kph (50 mph)
- includes heavy trains with 3 or 4 locomotives per train, commuter and passenger trains

Secondary Main Line

- traffic volume generally exceeds 10 trains per day
- high speeds, usually exceeding 80 kph (50 mph)
- trains generally of light to moderate weight with 3 or 4 locomotives per train
- majority of traffic may be commuter and passenger trains

Principal Branch Line

- regular scheduled traffic, usually less than 5 trains per day
- low speeds, generally limited to 50 kph (30 mph)
- trains generally of light to moderate weight with 1 or 2 locomotives per train but may include heavier trains with more units

Secondary Branch Line

- intermittent, unscheduled traffic, usually less than 1 train per day
- low speeds, generally limited to 50 kph (30 mph)
- trains generally of light to moderate weight with 1 locomotive per train

Spur Line

- unscheduled traffic on a demand basis
- low speeds, limited to 24kph (15 mph)
- trains generally of light to moderate weight with 1 locomotive per train

SEVEN DAY HOURLY REPORT

Station 1:	QEWDE0270DWS					
HIGHWAY:	QEW	STREAM:	SINGLE ROADWAY	DIRECTION:	FORT ERIE BOUND	
LHRS / OFFSET:	10135 / 0.3	LOCATION:	(43.463, -79.682)	CONFIDENCE LEVEL:	95%	
DESCRIPTION	EAST OF TRAFALGAR					

HOUR-ENDING	MON	TUE	WED	THU	FRI	SAT	SUN
	17-Jun-19	18-Jun-19	19-Jun-19	20-Jun-19	21-Jun-19	22-Jun-19	23-Jun-19
	Loops	Loops	Loops	Loops	Loops	Loops	Loops
01:00	1411	1321	1541	1656	1700	2776	2981
02:00	657	726	794	925	934	1503	1691
03:00	505	571	616	644	741	908	1124
04:00	444	917	665	665	742	705	708
05:00	779	907	1101	1145	1064	618	576
06:00	1956	1946	1930	1883	1971	1116	761
07:00	4651	4661	4670	4219	4593	2252	1361
08:00	6132	6441	6044	5522	6203	3568	2302
09:00	5814	5857	5328	4545	6190	5342	3542
10:00	5294	5646	5042	5365	5810	6535	5150
11:00	4964	5670	5844	5631	6134	6707	6309
12:00	5388	5648	5995	5431	6019	5979	6510
13:00	5640	5829	5792	5812	6126	5624	6244
14:00	5764	5834	5849	5412	5930	5167	6205
15:00	6219	5676	5802	5591	6075	5891	6310
16:00	5984	5424	5248	5414	5727	6352	6053
17:00	6380	5608	5764	5843	5789	6550	5976
18:00	6055	5940	6214	5769	6047	6330	6332
19:00	5451	5947	6012	5588	5816	6062	5752
20:00	5069	5958	5607	5101	5692	5177	5335
21:00	4488	4908	4748	4759	5429	4763	5107
22:00	3695	4167	4215	4226	4572	4361	4735
23:00	2911	3466	3408	3364	3874	4252	3770
23:59	2229	2783	3075	2814	3387	3927	2584

24 Hr Total	97,880	101,851	101,304	97,324	106,565	102,465	97,418
A.M. Total	37,995	40,311	39,570	37,631	42,101	38,009	33,015
P.M. Total	59,885	61,540	61,734	59,693	64,464	64,456	64,403
Noon-Noon		100,196	101,110	99,365	101,794	102,473	97,471
Highest Hour Starting	16:00	07:00	17:00	16:00	07:00	10:00	11:00
Highest Hour Volume	6,380	6,441	6,214	5,843	6,203	6,707	6,510
ADT =	100,687	AWD =		100,616			

ADT (Average Daily Traffic)-The average daily volume of the days being displayed

LHRS (Linear Highway Reference

AWD (Average Weekday Traffic) - The average weekday traffic based on data taken from Monday @noon to Friday @noon.

SEVEN DAY HOURLY REPORT

Station 1:	QEWE0271DES												
	HIGHWAY:	QEW	STREAM:	HOV	DIRECTION:	TORONTO BOUND							
	LHRS / OFFSET:	10135 / 0.2	LOCATION:	(43.462, -79.683)	DESCRIPTION:	TRAFALGAR							
Station 2:	QEWE0270DES												
	HIGHWAY:	QEW	STREAM:	SINGLE ROADWAY	DIRECTION:	TORONTO BOUND							
	LHRS / OFFSET:	10135 / 0.2	LOCATION:	(43.462, -79.683)	DESCRIPTION:	TRAFALGAR							
													CONFIDENCE LEVEL: 95%

HOUR-ENDING	MON		TUE		WED		THU		FRI		SAT		SUN	
	17-Jun-19		18-Jun-19		19-Jun-19		20-Jun-19		21-Jun-19		22-Jun-19		23-Jun-19	
	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2	VDS1	VDS2
	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops	Loops
01:00	190	1155	98	948	108	1025	104	1032	120	1061	243	1684	930	3120
02:00	56	569	42	600	54	662	44	656	47	648	117	1059	276	1434
03:00	32	481	35	478	26	481	24	549	29	546	67	756	113	933
04:00	53	657	35	656	31	653	33	650	39	673	59	661	80	699
05:00	145	1462	117	1383	117	1436	112	1433	121	1368	51	880	59	692
06:00	1231	4859	1205	4709	1177	4800	1061	4532	1120	4412	161	1517	102	1067
07:00	1657	5849	1688	5915	1630	5745	1587	5230	1531	5363	346	2254	167	1390
08:00	1659	5869	1622	5922	1611	5666	1591	5254	1561	5639	557	2908	227	1699
09:00	1605	5489	1573	5568	1612	5409	1485	5002	1486	5475	816	3820	464	2504
10:00	1196	4595	1388	4858	1409	4844	1171	4625	1368	4922	1329	4657	866	3575
11:00	1059	4717	1297	4965	1398	5055	1176	4762	1526	5162	1542	4951	1239	4370
12:00	998	4750	1058	5016	1062	5065	1463	5022	1509	4917	1718	5115	1651	5055
13:00	831	4507	1091	4936	1106	4898	1466	4920	1450	4984	1580	4867	1649	4964
14:00	939	4474	1105	4771	1195	4897	1380	4963	1376	4999	1506	4762	1661	4776
15:00	993	4696	1228	5158	1208	5125	1167	4925	1419	5061	1667	4956	1479	4645
16:00	1003	4799	1521	5276	1369	5227	1450	5194	1228	4643	1633	5004	1669	5122
17:00	1507	5115	1608	5276	1455	4371	1584	5191	1635	4896	1611	4920	1562	4943
18:00	1594	5236	1570	5128	1652	4916	1583	5077	1596	4913	1642	4966	1585	4882
19:00	1082	4456	1262	4707	1287	4358	1038	4136	1612	4945	1581	5025	1534	5077
20:00	917	3883	909	4219	1144	4465	1136	4150	1314	4832	1443	4565	1572	4914
21:00	642	3378	722	3634	763	3775	731	3533	1093	3822	1208	4094	1497	4609
22:00	514	2838	641	3290	681	3308	592	3092	817	3554	1308	4068	1418	4347
23:00	376	2286	380	2335	411	2594	411	2428	720	2589	1227	3887	839	3126
23:59	159	1673	219	1764	203	1811	259	1826	436	2322	1015	3472	482	2230

24 Hr Total	20,438	87,793	22,414	91,512	22,709	90,586	22,648	88,182	25,153	91,746	24,427	84,848	23,121	80,173
A.M. Total	9,881	40,452	10,158	41,018	10,235	40,841	9,851	38,747	10,457	40,186	7,006	30,262	6,174	26,538
P.M. Total	10,557	47,341	12,256	50,494	12,474	49,745	12,797	49,435	14,696	51,560	17,421	54,586	16,947	53,635
Noon-Noon			20,715	88,359	22,491	91,335	22,325	88,492	23,254	89,621	21,702	81,822	23,595	81,124
Highest Hour Starting	07:00	07:00	06:00	07:00	17:00	06:00	07:00	07:00	16:00	07:00	11:00	11:00	15:00	15:00
Highest Hour Volume	1,659	5,869	1,688	5,922	1,652	5,745	1,591	5,254	1,635	5,639	1,718	5,115	1,669	5,122
VDS 1 ADT =		22,987	VDS 2 ADT =		87,834	VDS1 AWD =		22,196	VDS2 AWD =		89,452			

ADT (Average Daily Traffic)-The average daily volume of the days being displayed
 LHRS (Linear Highway Reference
 AWD (Average Weekday Traffic) - The average weekday traffic based on data taken from Monday @noon to Friday @noon.



Intersection Layout Sheet

Contract # 9015-E-0009

Work Order # 029

Date: 2018 Aug 14 Day: Tue 1 Hrs: 7-9 + 11-14 + 15-18

Location: QEW @ Trafalgar Rd IC-118 Ramps: SRT 1

Reg/Mun: CR Town/City: Oakville Area: _____

File Name: 2101350000 Device Gretch / Jamar Unit # 121 Interval 1: (AM) NN / PM

Observer: Renat Shuliko Weather: Clear / Clear Road Condition: Dry / Dry

LHRS & OIS: 10135 0.00 Comments: _____

GPS: B-Star IV

Datum: WGS 84 (Y) N

Lat: 43.459954

Long: -79.682791

SIGNALIZED (Y) N

If intersection is unsignalized;

Sign Type: Stop / Yield

Sign Size: _____ cm x _____ cm

Sign Condition:

NA: New / Good / Poor / Missing

SA: New / Good / Poor / Missing

WA: New / Good / Poor / Missing

EA: New / Good / Poor / Missing

Photograph all approach's including all Signs (Y) N

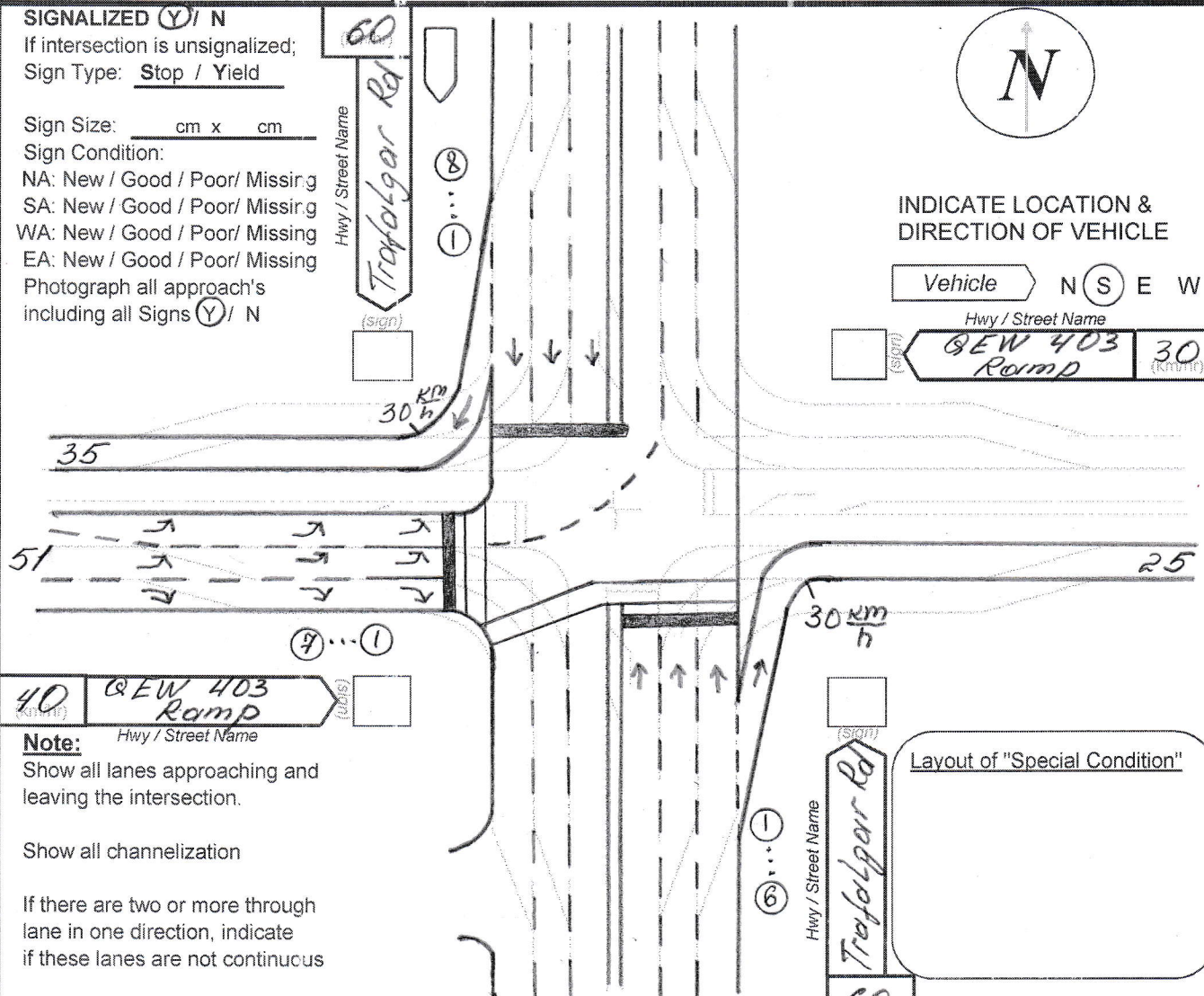


INDICATE LOCATION & DIRECTION OF VEHICLE

Vehicle N (S) E W

Hwy / Street Name

QEW 403 30
Ramp (KMPH)



40 QEW 403
Ramp (KMPH)

Note:

Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

Show pedestrian crosswalks

Layout of "Special Condition"



TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Ministry of Transportation

Description: **Trafalgar Rd IC-118 South Ramps**

Region: **CENTRAL**

Survey Type: **TM – Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **S**

LHRS: **10135**

End Date: **14-Aug-2018 (Tue)**

Int. Type: **T - W**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Total Count		Number of hours: 8				
Trafalgar Road						
Ped. 97	Total Vehicles	4% (T +LT) 2353	4% (T +LT) 11066	0% (T +LT) 0	↑ 16709	Ped. 0 Not Configured
←	2353	↙	↓	↘	↑	0 0% (T +LT)
	5941	↗		←	0 0% (T +LT)	
	0	→		↓	0 0% (T +LT)	
	3382	↘	↙	↑	↗	3422 →
QEW Off-Ramp 51; 51	14448	0	10768	3422	Total Vehicles	Ped. 0
	Ped. 6	↓	0% (T +LT)	3% (T +LT)	3% (T +LT)	
Trafalgar Road						

AM Peak Hour Report		Start Time: 07:45				
Trafalgar Road						
Ped. 3	Total Vehicles	4% (T +LT) 300	3% (T +LT) 1915	0% (T +LT) 0	↑ 1655	Ped. 0 Not Configured
←	300	↙	↓	↘	↑	0 0% (T +LT)
	752	↗		←	0 0% (T +LT)	
	0	→		↓	0 0% (T +LT)	
	570	↘	↙	↑	↗	460 →
QEW Off-Ramp 51; 51	2485	0	903	460	Total Vehicles	Ped. 5
	Ped. 1	↓	0% (T +LT)	5% (T +LT)	3% (T +LT)	
Trafalgar Road						

Midday Peak Hour Report		Start Time: 12:15				
Trafalgar Road						
Ped. 16	Total Vehicles	6% (T +LT) 291	4% (T +LT) 1315	0% (T +LT) 0	↑ 2186	Ped. 0 Not Configured
←	291	↙	↓	↘	↑	0 0% (T +LT)
	782	↗		←	0 0% (T +LT)	
	0	→		↓	0 0% (T +LT)	
	415	↘	↙	↑	↗	401 →
QEW Off-Ramp 51; 51	1730	0	1404	401	Total Vehicles	Ped. 4
	Ped. 1	↓	0% (T +LT)	3% (T +LT)	5% (T +LT)	
Trafalgar Road						

PM Peak Hour Report		Start Time: 17:00				
Trafalgar Road						
Ped. 13	Total Vehicles	3% (T +LT) 245	3% (T +LT) 1217	0% (T +LT) 0	↑ 3103	Ped. 0 Not Configured
←	245	↙	↓	↘	↑	0 0% (T +LT)
	882	↗		←	0 0% (T +LT)	
	0	→		↓	0 0% (T +LT)	
	348	↘	↙	↑	↗	410 →
QEW Off-Ramp 51; 51	1565	0	2221	410	Total Vehicles	Ped. 4
	Ped. 1	↓	0% (T +LT)	2% (T +LT)	1% (T +LT)	
Trafalgar Road						



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **Trafalgar Rd IC-118 South Ramps**

Region: **CENTRAL**

Survey Type: **TM - Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **S**

LHRS: **10135**

End Date: **14-Aug-2018 (Tue)**

Int. Type: **T - W**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches														Minor Road Approaches										Total Veh.													
	North Trafalgar Road							South Trafalgar Road							West QEW Off-Ramp 51: Ramp(s): 51					Not Configured																		
	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Heavy Trucks			Ped								
←	↑	→	←	↑	→	←	↑	→	←		↑	→	←	↑	→	←	↑	→	←		↑	→	←	↑	→	←	↑	→	←		↑	→						
Period 1																																						
07:00	0	387	80	0	8	2	0	10	0	0	0	111	89	0	4	2	0	8	0	0	106	0	100	1	0	2	4	0	1	1							915	
07:15	0	495	74	0	6	3	0	8	3	0	0	148	113	0	3	2	0	7	0	0	119	0	107	3	0	5	0	0	0	0	1							1096
07:30	0	467	73	0	11	2	0	9	1	0	0	169	94	0	5	1	0	9	1	0	133	0	104	6	0	1	2	0	0	2							1088	
07:45	0	538	71	0	3	5	0	9	0	0	0	218	104	0	9	0	0	8	1	1	185	0	154	6	0	1	0	0	0	2							1312	
08:00	0	501	70	0	5	0	0	11	0	0	0	189	111	0	4	1	0	9	1	0	137	0	129	2	0	1	1	0	2	0							1174	
08:15	0	443	74	0	5	5	0	11	0	0	0	219	104	0	2	3	0	6	1	0	211	0	157	2	0	4	2	0	2	1							1251	
08:30	0	367	74	0	8	0	0	14	1	0	0	231	128	0	4	2	0	4	4	0	202	0	120	3	0	0	1	0	0	0							1163	
08:45	0	386	57	0	6	1	0	12	1	0	0	212	87	0	6	2	0	8	1	0	210	0	157	5	0	1	4	0	2	1							1158	
Period 2																																						
11:00	0	253	74	0	8	2	0	9	1	0	0	290	84	0	4	3	0	5	5	0	162	0	102	2	0	2	3	0	1	3							1010	
11:15	0	303	70	0	8	1	0	1	1	0	0	294	97	0	8	2	0	6	1	0	127	0	107	1	0	0	0	0	2	3							1029	
11:30	0	265	57	0	5	4	0	10	1	0	0	288	83	0	8	2	0	6	2	0	159	0	105	4	0	2	5	0	3	4							1009	
11:45	0	330	75	0	8	2	0	5	3	0	0	320	121	0	7	3	0	6	0	1	155	0	100	3	0	2	2	0	6	6							1148	
12:00	0	281	67	0	4	1	0	10	2	0	0	318	94	0	5	2	0	9	0	0	187	0	95	4	0	5	2	0	3	3							1089	
12:15	0	293	67	0	12	0	0	3	0	0	0	344	98	0	6	6	0	6	2	1	188	0	87	4	0	4	4	0	2	5							1126	
12:30	0	321	58	0	3	3	0	7	3	0	0	319	106	0	5	2	0	4	1	0	195	0	99	3	0	2	7	0	0	7							1138	
12:45	0	331	80	0	7	3	0	6	1	0	0	375	86	0	6	3	0	6	1	0	181	0	103	4	0	3	3	0	1	2							1200	
13:00	0	316	69	0	8	3	0	8	4	0	0	317	92	0	6	2	0	10	2	0	182	0	110	9	0	0	2	0	4	2							1144	
13:15	0	290	76	0	5	2	0	6	1	0	0	331	84	0	2	1	0	5	1	0	159	0	92	4	0	1	4	0	2	4							1066	
13:30	0	271	57	0	2	3	0	10	0	0	0	288	99	0	3	5	0	8	3	0	188	0	103	7	0	0	2	0	2	2							1051	
13:45	0	342	72	0	4	4	0	6	1	0	0	305	93	0	4	3	0	3	1	0	135	0	109	5	0	5	0	0	1	2							1093	
Period 3																																						
15:00	0	270	65	0	2	1	0	8	3	0	0	308	107	0	4	3	0	10	1	0	178	0	84	4	0	2	5	0	3	6							1058	
15:15	0	307	72	0	1	2	0	4	3	0	0	315	115	0	3	2	0	4	1	1	161	0	98	2	0	2	1	0	4	8							1097	



TVIS II - Traffic Volume Information System
Turning Movement 15 Minute Report

Description: **Trafalgar Rd IC-118 South Ramps**

Region: **CENTRAL**

Survey Type: **TM – Interchange**

Hwy: **QEW**

Start Date: **14-Aug-2018 (Tue)**

I/C Side: **S**

LHRS: **10135**

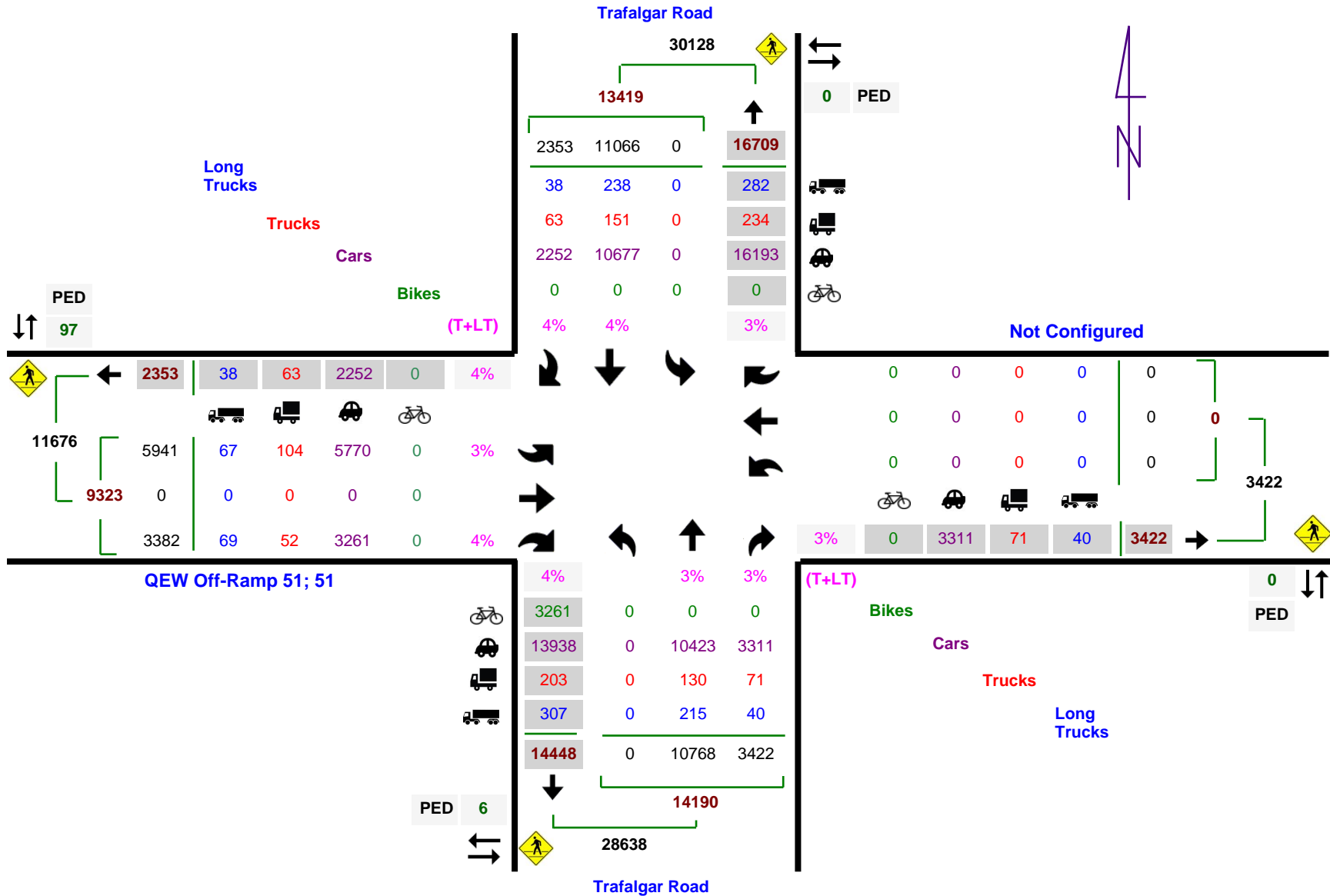
End Date: **14-Aug-2018 (Tue)**

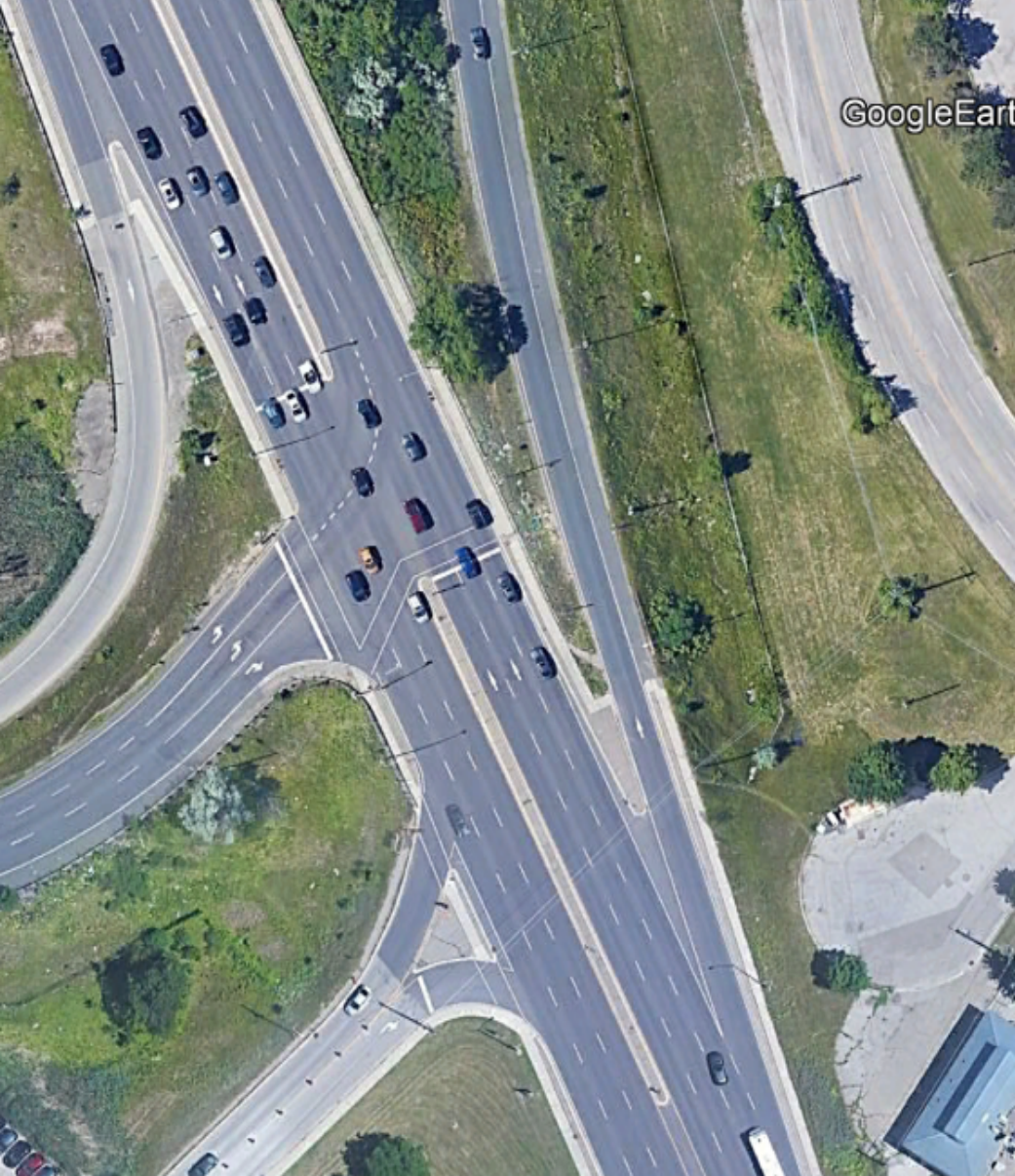
Int. Type: **T - W**

Offset: **0**

Schedule Summary: **TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00**

Start Time	Major Road Approaches										Minor Road Approaches										Total Veh.										
	North					South					West					Not Configured															
	Trafalgar Road					Trafalgar Road					QEW Off-Ramp 51: Ramp(s): 51																				
	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Heavy Trucks			Ped	
	←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←	↑	→	←	↑	→	←	↑	→		←
15:30	0	287	88	0	2	3	0	9	2	0	0	342	119	0	7	3	0	6	1	0	184	0	84	3	0	2	0	0	4	3	1146
15:45	0	304	75	0	3	3	0	2	0	0	0	317	118	0	1	3	0	4	0	0	199	0	101	4	0	0	2	0	5	1	1141
16:00	0	298	99	0	4	0	0	7	1	0	0	440	123	0	2	2	0	10	1	0	195	0	68	4	0	0	3	0	4	3	1261
16:15	0	271	79	0	2	2	0	3	0	0	0	363	123	0	2	2	0	1	1	1	233	0	93	1	0	1	2	0	3	3	1182
16:30	0	303	67	0	2	3	0	6	0	0	0	512	119	0	0	6	0	14	0	0	195	0	93	2	0	0	1	0	3	6	1326
16:45	0	278	75	0	2	0	0	3	0	0	0	358	116	0	1	0	0	3	4	0	232	0	61	1	0	1	0	0	3	3	1138
17:00	0	299	74	0	3	1	0	9	0	0	0	559	107	0	3	0	0	6	0	0	205	0	70	0	0	0	1	0	1	3	1338
17:15	0	274	52	0	0	1	0	6	2	0	0	507	130	0	3	2	0	8	1	1	277	0	81	0	0	1	1	0	2	2	1348
17:30	0	306	63	0	1	1	0	7	3	0	0	567	85	0	0	0	0	8	1	0	187	0	102	3	0	1	2	0	3	1	1340
17:45	0	300	48	0	3	0	0	9	0	0	0	549	82	0	3	1	0	8	1	0	203	0	86	2	0	1	1	0	0	7	1297





From: [Amy Patenaude](#)
To: [Claire Graham-White](#); [Remi Larmandieu](#); [Gillian Redman](#)
Subject: FW: 349 Davis Road - Traffic Request - RWDI Project # 2203169
Date: Wednesday, June 15, 2022 2:00:44 PM
Attachments: [image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)

Metrolinx data.

Amy

SUMMER HOURS: Our organization is moving to summer hours from May 30 through September 2. I will be finished work at 12:30 most Friday afternoons during this time. Enjoy your summer.

Amy Patenaude | Senior Technical/Administrative Assistant
Americas Noise/Acoustics/Vibration
RWDI
Direct Line: 226-314-1280

From: Rail Data Requests <RailDataRequests@metrolinx.com>
Sent: June 15, 2022 1:45 PM
To: Amy Patenaude <Amy.Patenaude@rwdi.com>
Subject: RE: 349 Davis Road - Traffic Request - RWDI Project # 2203169

Hi Amy,

Further to your request dated June 7, 2022, the subject lands (349 Davis Road) are located within 300 metres of the Metrolinx Oakville Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel and electric trains. The GO rail fleet combination on this Subdivision will consist of up to 2 locomotives and 12 passenger cars. The typical GO rail weekday train volume forecast near the subject lands, including both revenue and equipment trips is in the order of 255 trains. The planned detailed trip breakdown is listed below:

	1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives		1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives
Day (0700-2300)	60	11	101	42	Night (2300-0700)	8	4	21	8

The current track design speed near the subject lands is 95 mph (155 km/h).

There are *anti-whistling by-laws* in affect near the subject lands at Fourth Line. With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO rail network and we are currently working towards the next phase. Options have been studied as part of the Transit Project Assessment Process (TPAP) for the GO Expansion program, currently in the procurement phase. The successful proponent team will be responsible for selecting and delivering the right trains and infrastructure to unlock the benefits of GO Expansion. The contract is in a multi-year

procurement process and teams have submitted their bids to Infrastructure Ontario and Metrolinx for evaluation and contract award. GO Expansion construction will get underway in late 2022 or 2023.

However, we can advise that train noise is dominated by the powertrain at lower speeds and by the wheel-track interaction at higher speeds. Hence, the noise level and spectrum of electric trains is expected to be very similar at higher speeds, if not identical, to those of equivalent diesel trains.

Given the above considerations, it would be prudent at this time, for the purposes of acoustical analyses for development in proximity to Metrolinx corridors, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future once the proponent team is selected.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

It should be noted that this information only pertains to Metrolinx rail service. It would be prudent to contact other rail operators in the area directly for rail traffic information pertaining to non-Metrolinx rail service.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

Regards,

Tara Kamal Ahmadi

Junior Analyst

Third Party Projects Review, Capital Projects Group

Metrolinx | 20 Bay Street | Suite 600 | Toronto | Ontario | M5J 2W3



From: Amy Patenaude <Amy.Patenaude@rwdi.com>

Sent: June 15, 2022 7:42 AM

To: Rail Data Requests <RailDataRequests@metrolinx.com>

Subject: FW: 349 Davis Road - Traffic Request - RWDI Project # 2203169

EXTERNAL SENDER: Do not click any links or open any attachments unless you trust the sender and know the content is safe.
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Good Day,

I have been asked to follow up with you on the data requested last week. Could you kindly provide an estimated timeframe for receipt?

Thank you.

Amy

SUMMER HOURS: Our organization is moving to summer hours from May 30 through September 2.

I will be finished work at 12:30 most Friday afternoons during this time. Enjoy your summer.

Amy Patenaude | Senior Technical/Administrative Assistant
Americas Noise/Acoustics/Vibration
RWDI
Direct Line: 226-314-1280

From: Amy Patenaude
Sent: June 7, 2022 4:29 PM
To: Rail Data Requests <RailDataRequests@metrolinx.com>
Cc: Gillian Redman <Gillian.Redman@rwdi.com>
Subject: 349 Davis Road - Traffic Request - RWDI Project # 2203169

Good Afternoon,

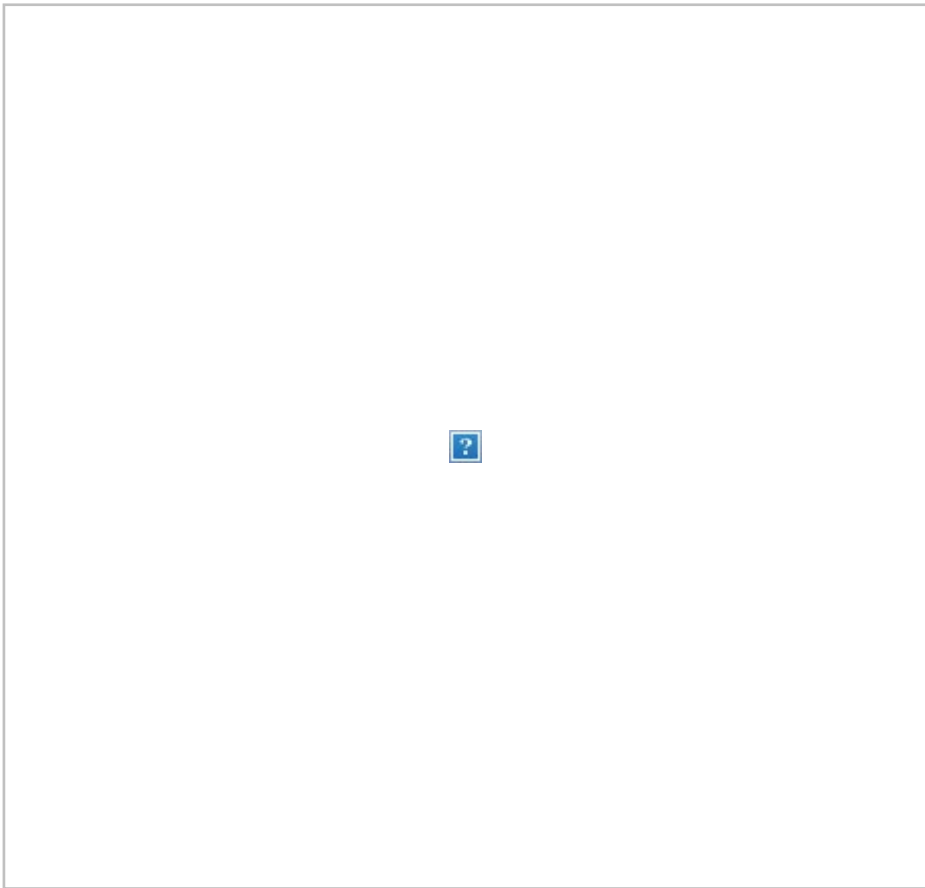
We are a noise study for the above-referenced address and require rail data for Lakeshore East Corridor, east of Oakville GO station.

We are looking for:

- Growth rate per annum for a 10-year period
- Day and night train volumes
- Average number of cars per train
- Number of Locomotives per train
- Maximum permissible speed
- Whistles used at crossings in the area
- Type of track (continuously welded, or jointed)
- Any idling of locomotive in the vicinity, and approximate duration of idling

Thank you.

Amy



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Amy Patenaude | Senior Technical/Administrative Assistant
Americas Noise/Acoustics/Vibration

RWDI
600 Southgate Drive, Guelph, ON N1G 4P6 Canada
Direct Line: 226-314-1280 | Fax: (519) 823-1316
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