REPORT

2083 OLD LAKESHORE ROAD

BURLINGTON, ONTARIO

NOISE IMPACT STUDY

RWDI #2304294

December 6, 2024

SUBMITTED TO

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VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	December 6, 2024	Submitted for ZBA	Caelan Weber-Martin	Daniel Kremer

EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise Impact Study for the proposed mixed-use development located at 2083 Old Lakeshore Road in Burlington, Ontario. The proposed development will consist of a 27-storey mixed-use tower. This assessment was completed to support the Zoning Bylaw Amendment (ZBA) submission as required by the City of Burlington. 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
3. Minimum sound isolation performance:
    a. In the most impacted areas of the building facing Lakeshore Road, suite window glazing with sound isolation performance of STC-32 is required
    b. Suite exterior balcony door with sound isolation performance ranging from STC-25 to STC-28
4. Construction of noise barriers along the outdoor amenity areas if feasible, with the applicable warning clause.

The potential for elevated noise levels from stationary sources of sound were evaluated. The surrounding area consists of multiple future developments for which detailed information is not available regarding their rooftop mechanical equipment. This assessment assumes that each residential building has been designed such that it will comply with the NPC-300 Class 1 exclusion limits at itself and surrounding buildings. Based on the noise modeling results, some minor exceedances of the NPC-300 Class 1 limits may be experienced along the top floors of the proposed development due to cumulative sound levels from the surrounding residential building mechanical equipment. However, the noise modelling should be refined once more information is available regarding source types and locations for the surrounding developments. Despite minor predicted exceedances, the proposed development is feasible with respect to stationary source noise.

At this stage in design, the noise levels produced by the development on itself and its surroundings could not be quantitatively assessed. However, the effect 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 to the building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis, including the implementation of the recommendations presented in this report, the proposed development is feasible with respect to noise.

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1 INTRODUCTION

RWDI was retained to prepare a Noise Impact Study for the proposed mixed-use development located at 2083 Old Lakeshore Road in Burlington, Ontario. The proposed development will consist of a 27-storey mixed-use tower. The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic from Lakeshore Road to the north, and Old Lakeshore Road/Pearl Street to the south and west.

The nearest operational railway is approximately 2 km to the northwest of the proposed development. Therefore, the assessment of noise and vibration from the rail is not required per the Railway Association of Canada's Guidelines for New Development in Proximity to Railway Operations (RAC, 2013).

A screening level assessment of nearby stationary sources was conducted for buildings located within 70 m of the development.

This assessment was completed in support of the Zoning Bylaw Amendment (ZBA) submission as required by the City of Burlington. This assessment was based on design drawings dated November 18, 2024. A copy of the drawings is included in **Appendix A.**

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 B**.

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 THE EFFECTS OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

3.1.1 Road Traffic Volume Data

A Turning Movement Count (TMC) was obtained from The City of Burlington for the intersection of Lakeshore Road at Pearl Street. The TMC was used to determine the traffic volume and types of vehicles on each link during the AM and PM peaks and 8-hour intervals which were assumed to be 9%, 10% and 60% of the Annual Average Daily Traffic (AADT), respectively. The maximum AADTs obtained from the approximation of each of these three time periods were used for the AADT for the respective roadway.

Traffic volumes for each of the respective roadways were increased at a rate of 2% per year to the horizon year of 2035.

A summary of the traffic data used is included in **Table 1** below with more detailed information included in **Appendix C**.

Table 1: Road Traffic Volumes

Roadway	Segment	2035 Future Traffic (AADT)	% Day/Night	Speed Limit (km/hr)	% Medium Trucks	% Heavy Trucks
Lakeshore Road	East of Pearl Street	14,365	90% /10%	50	6.4	10.3
Pearl Street/Old Lakeshore Road	South of Lakeshore Road	427	90% / 10%	50	4.4	7.1

3.1.2 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 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: Level 3 West Outdoor Amenity Area
- OLA_02: Level 3 East Outdoor Amenity Area
- OLA_03: Level 6 West Outdoor Amenity Area
- OLA_04: Level 6 East Outdoor Amenity Area
- OLA_05: Level 21 Private Terrace
- OLA_06: Level 25 Private Terrace

The OLAs are indicated in **Figure 2**.

3.1.3 Analysis and Results

Sound levels due to the adjacent roads were predicted using emission algorithms from the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) guidelines (MOE, 1989) implemented in the Cadna/A software package.

To assess the effect of transportation noise on suites, the maximum sound level on each façade was determined with the results summarized in **Table 2**. Cardinal directions expressed in the table follow the "Project North" as shown in the drawing package dated November 18, 2024.

Table 2: Predicted Ground Transportation Source Sound Levels – Plane of Window

Building	Façade	Road		Notes
		Day L_{EQ}, 16hr (dBA)	Night L_{EQ}, 8hr (dBA)	
27-Storey Residential Building	North	71	64	1, 2
	East	66	59	1, 2
	South	55	49	-
	West	67	61	1, 2

Note(s):
1. Installation of air conditioning is required to allow for windows and doors to remain closed, with an NPC-300 warning clause "Type D". Refer to **Appendix D** for guidance regarding air-conditioning as a noise mitigation measure.
2. The acoustical performance of building components must be specified to meet the indoor sound level criteria.

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

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

Receptor	Description	Daytime L_{EQ}, 16hr (dBA)	Notes
OLA_01	Level 3 West Outdoor Amenity Area	52	1
OLA_02	Level 3 East Outdoor Amenity Area	59	2
OLA_03	Level 6 West Outdoor Amenity Area	60	2
OLA_04	Level 6 East Outdoor Amenity Area	60	2
OLA_05	Level 21 Private Terrace	41	1
OLA_06	Level 25 Private Terrace	40	1

Note(s):
1. The predicted sound level meets the NPC-300 criterion for OLAs. Noise control measures are not required.
2. For OLA sound levels >55 dBA and ≤60 dBA, noise controls may be applied to meet the 55 dBA criterion. If noise control measures are not provided, a warning clause "Type A" 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, the 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 / Noise By-Law 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 meet the sound level criteria in the local noise by-law and to avoid nuisance complaints from future occupants of the proposed new development.

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 asses their potential influence on the proposed development. No industrial buildings were identified within their potential area of influence. The classifications and setback guidelines are summarized in **Appendix B**.

Surrounding noise sources associated with commercial and residential buildings within a 70 m radius of the proposed development were considered in this assessment. RWDI reviewed the recommended minimum separation distances for Class I, II, and III industry classes for the area from the proposed development. No Class II or III industries were identified within 70 m and 300 m respectively.

Numerous future mixed-use/residential developments are planned for the surrounding lands. Site Plan drawings were obtained for each of the planned surrounding developments within a 70 m radius of the proposed development. The following future developments were considered in this assessment:

- 2072 Lakeshore Road to the west;
- 2069 Lakeshore Road to the northwest;
- 374 Martha Street to the north;
- 2107-2119 Old Lakeshore Road to the east; and
- 2096-2100 Lakeshore Road to the east.

Of the above-planned developments, all have been approved as of the date of this report, except for 2072 Lakeshore Road.

The following existing buildings were also considered in the stationary source assessment:

- Chartwell Martha's Landing Retirement Residence to the northeast; and
- Emma's Back Porch & Water Street Cooker to the south.

3.2.2 Stationary Source Modelling

Stationary sources of noise surrounding the proposed development were identified using a combination of source identification using publicly available aerial and street-level imagery, business listing, and The Ministry of the Environments Access Environment database.

RWDI recognizes that heating and cooling equipment will be required for the surrounding future developments. Details regarding source types and locations associated with future developments are not currently available. This assessment assumes that each of the future developments has been designed such that it will comply with the NPC-300 Class 1 exclusion limits of 50 dBA during the day and 45 dBA during the night at itself and surrounding buildings. One cooling tower was modelled approximately in the center of the residential tower rooftop for each of the surrounding future developments, with the sound level and nighttime operating time adjusted to achieve a maximum sound level of 50 dBA during the day and 45 dBA at night at itself and other surrounding developments.

Emma's Back Porch & Water Street Cooker appears to be permanently closed. However stationary sources associated with this building were conservatively included in the modelling to account for the possibility that the future building use may emit similar noise.

3.2.2.1 Representative Receptors

The worst-case receptor locations were assessed along each façade to evaluate the potential stationary source noise effects on the proposed development. Outdoor Points of Reception (OPORs) were assessed at the worst-case locations within each OLA.

3.2.2.2 Assumed Sources and Sound Power Levels

RWDI proxy data were used for the sound power levels of all stationary sources included in the model. The assumed sound power levels included in the screening level stationary source assessment are presented in **Table 4**. The locations of the sources are summarized in **Table 4** included in the stationary source assessment are illustrated in **Appendix E**, **Figure E.1**.

Table 4: Stationary Source Sound Power Level Assumptions

Source Description	Source ID (as shown in Figure E.1)	Proxy Data / Calculation	Sound Power Level (dBA)	Duty Cycle	
				Daytime and Evening (07:00h – 23:00h)	Nighttime (23:00h – 07:00h)
1-Fan HVAC Unit	HVAC_1F	Proxy Data	82	Continuous	30 minutes/hour
6-Fan HVAC Unit	HVAC_6F	Proxy Data	85	Continuous	30 minutes/hour
Large Make-Up Air Unit	MUA_Large	Proxy Data	88	Continuous	30 minutes/hour
Small Make-Up Air Unit	MUA_Small	Proxy Data	92	Continuous	30 minutes/hour
Kitchen Exhaust Fan	K_Exh	Proxy Data	78	Continuous	30 minutes/hour
Cooling Tower	CT	Proxy Data	89-96[1]	Continuous	20 minutes/hour

Note(s):
1. Cooling Tower sound levels were adjusted for each future development individually to achieve sound levels of 50 dBA during the day and 45 dBA at night at itself and surrounding developments.

The assumed sound power level values and duty-cycles for the stationary sources are based on reasonable assumptions for the source type.

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 Class 1 Area limits.

The predicted cumulative sound levels during the worst-case 1-hour from existing stationary sources are presented in **Table 5**. Cardinal directions expressed in the table follow the "Project North" as shown in the drawing package dated November 18, 2024.

Table 5: Predicted Sound Levels at Worst-case Receptor Locations – Continuous Stationary Sources

Building	Façade	Time Period		Sound Level Criteria Daytime / Nighttime L_{EQ}, 1hr (dBA)	Notes
		Day-Evening 7:00 – 23:00 L_{EQ}, 1hr (dBA)	Night 23:00 – 7:00 L_{EQ}, 1hr (dBA)		
27-Storey Residential Building	North	54	49	50 / 45	Exceeds Class 1 Limits
	East	50	45	50 / 45	Complies with Class 1 Limits
	South	48	45	50 / 45	Complies with Class 1 Limits
	West	53	48	50 / 45	Exceeds Class 1 Limits
OPOR_01	--	49	--[1]	50 / --[1]	Complies with Class 1 Limits
OPOR_02	--	49	--[1]	50 / --[1]	Complies with Class 1 Limits
OPOR_03	--	46	--[1]	50 / --[1]	Complies with Class 1 Limits
OPOR_04	--	49	--[1]	50 / --[1]	Complies with Class 1 Limits
OPOR_05	--	48	--[1]	50 / --[1]	Complies with Class 1 Limits
OPOR_06	--	49	--[1]	50 / --[1]	Complies with Class 1 Limits

Note(s):
1. Outdoor areas are not assessed during the nighttime period.

As shown in **Table 5**, based on the current modelling assumptions, exceedances of 3-4 dB are predicted along the north and west façades of the proposed development.

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
- Acoustical character of rooms: High absorption finishes/furniture for bedrooms and intermediate absorption finishes/furniture for living rooms.

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's "BPN-56 method" (NRCC, 1985). The reported results are in terms of Sound Transmission Class (STC) ratings as summarized in **Table 6**.

Table 6: Recommended Facade Component Minimum Sound Insulation Rating

Portion of Development	Façade	Window Glazing	Exterior Door	Façade Wall
27-Storey Residential Building	North Façade	STC-30	STC-28	STC-45
	East Façade	STC-25	STC-25	STC-45
	West Façade	STC-27	STC-25	STC-45
	Northeast and Northwest Corner Units	STC-32	STC-28	STC-45

The maximum requirement for the window glazing was determined to be STC-32, and STC-28 for the exterior door, which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units. Façade construction meeting the minimum Ontario Building Code is predicted to be sufficient for the south façade.

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 the 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 Lakeshore Road, sound levels in some OLAs are predicted to be elevated. The daytime average sound levels for the OLAs included in the assessment are in the range of 40-60 dBA.

The NPC-300 guideline outlines that if the daytime average sound level in the OLA is greater than 55 dBA and less than or equal to 60 dBA either:

- Noise control measures may be applied to reduce the sound level to 55 dBA; or
- If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause Type A.

RWDI recommends targeting 55 dBA for the OLA in this case. Barriers with heights of 1.1 – 1.3 m are required to reduce sound levels to 55 dBA in the OLAs. Recommended barrier heights are shown in **Table 7**. The recommended geometries for the barriers are illustrated in **Figure 3**. General guidance with respect to noise barrier design is included in **Appendix D**.

Table 7: Barrier Height Recommendations for OLAs

Receptor	Description	Predicted OLA Sound Level	Barrier Height (m) to Meet Sound Level Criterion
		Daytime L_{EQ}, 16hr (dBA)	≤ 55 dBA[1]
OLA_01	Level 3 West Outdoor Amenity Area	52	--
OLA_02	Level 3 East Outdoor Amenity Area	59	1.1 m
OLA_03	Level 6 West Outdoor Amenity Area	60	1.3 m
OLA_04	Level 6 East Outdoor Amenity Area	60	1.1 m
OLA_05	Level 21 Private Terrace	41	--
OLA_06	Level 25 Private Terrace	40	--

Note(s):
1. Refer to Figure 3 for barrier geometry to meet 55 dBA. If noise controls are not provided, a warning Clause "Type A" is recommended.

3.3.2 Stationary Sources

Based on the noise modelling results and setback distances, the proposed development is not anticipated to infringe on the compliance of any commercial or industrial operations with environmental noise permits (ECA or EASR).

Based on the current modelling assumptions exceedances of 3-4 dB are predicted along the north and west façades of the proposed development due to cumulative sound levels. The exceedances are only predicted for the top 3 floors and are attributable to the assumed rooftop mechanical equipment associated with the surrounding future residential developments. Similar cumulative sound levels are predicted at each of the surrounding future developments based on the current modelling assumptions. More detail regarding source types and locations for the surrounding future developments would likely alter the predicted results significantly. Since the proposed 2083 Old Lakeshore Road development is not predicted to experience worse sound levels than the other surrounding residential buildings, and the current modelling assumptions are not likely to reflect reality due to the lack of information regarding surrounding stationary sources, the proposed development is predicted to be feasible with respect to stationary source noise.

The stationary source analysis should be refined once more information is available regarding surrounding development source types and locations.

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

3.3.3 Warning Clauses

The following warning clauses are recommended for the proposed development:

1. NPC-300 Type A to address transportation sound levels in Outdoor Living Areas (OLAs) if barriers are not implemented
2. NPC-300 Type D to address transportation sound levels at the plane of window

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 in **Appendix F**.

4 THE EFFECTS 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 mechanical penthouse as well as various exhaust fans. Further, consideration should be given to controlling 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 effect 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 is 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 effect 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 Impact Study for the proposed mixed-use development located in Burlington, 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
3. Minimum sound isolation performance:
    a. In the most impacted areas of the building facing Lakeshore Road, suite window glazing with sound isolation performance of STC-32 is required
    b. Suite exterior balcony door with sound isolation performance ranging from STC-25 to STC-28
4. Construction of perimeter noise barriers along the outdoor amenity areas if feasible, with the applicable warning clause.

The potential for elevated noise levels from stationary sources of sound was evaluated. The surrounding area consists of multiple future developments for which detailed information is not available regarding their rooftop mechanical equipment. This assessment assumes that each residential building has been designed such that it will comply with the NPC-300 Class 1 exclusion limits on itself and surrounding buildings. Based on the noise modelling results, some minor exceedances of the NPC-300 Class 1 limits may be experienced along the top floors of the proposed development due to cumulative sound levels from the surrounding residential building mechanical equipment. However, the noise modelling should be refined once more information is available regarding source types and locations for the surrounding developments. Despite minor predicted exceedances, the proposed development is feasible with respect to stationary source noise.

At this stage in design, the noise levels produced by the development on itself and its surroundings could not be quantitatively assessed. However, the effect 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 to the building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis, including the implementation of the recommendations presented in this report, the proposed development is feasible with respect to noise.

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).
2. Ontario Ministry of the Environment (MOE), 1989, ORNAMENT Ontario Road Noise Analysis Method for Environment and Transportation, Technical Publication (MOE, 1989)
3. Ontario Ministry of the Environment (MOE) Publication Guideline D-6, "Compatibility Between Industrial Facilities and Sensitive Land Uses", July 1995 (MOE, 1995).
4. Controlling Sound Transmission into Buildings (BPN-56), National Research Council Canada (NRCC, 1985).
5. The Railway Association of Canada (RAC), Guidelines for New Development in Proximity to Railway Operations (RAC, 2013).
6. International Organization for Standardization (ISO), 1994b, International Standard ISO 9613-1:1994, Acoustics – Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere. (ISO, 1994)
7. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996)

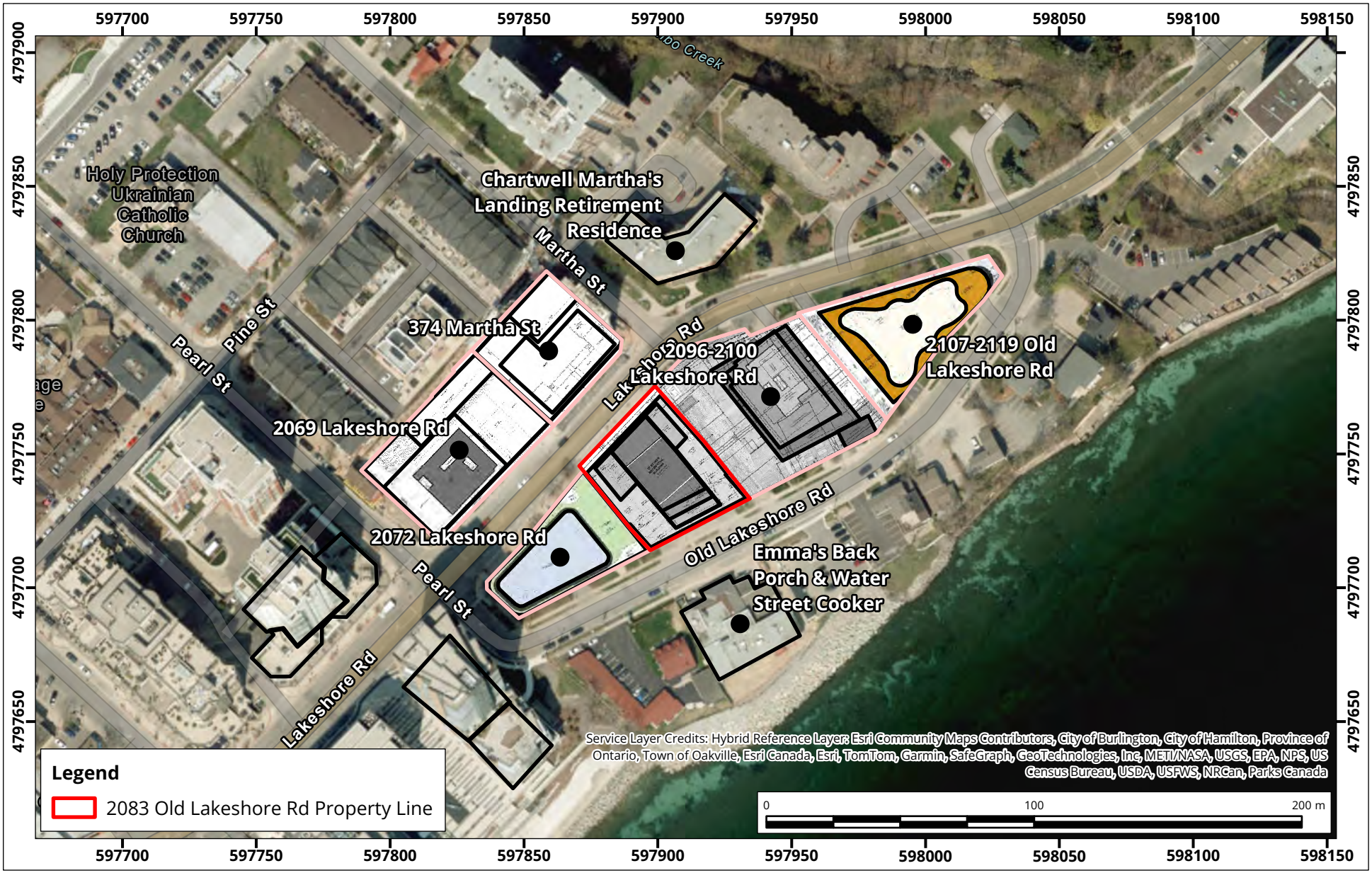
STATEMENT OF LIMITATIONS

This report entitled 2083 Old Lakeshore Road was prepared by Rowan Williams Davies & Irwin ("RWDI") for Rosseau Development Corp ("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 the 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.

FIGURES



Site Context Plan

True North

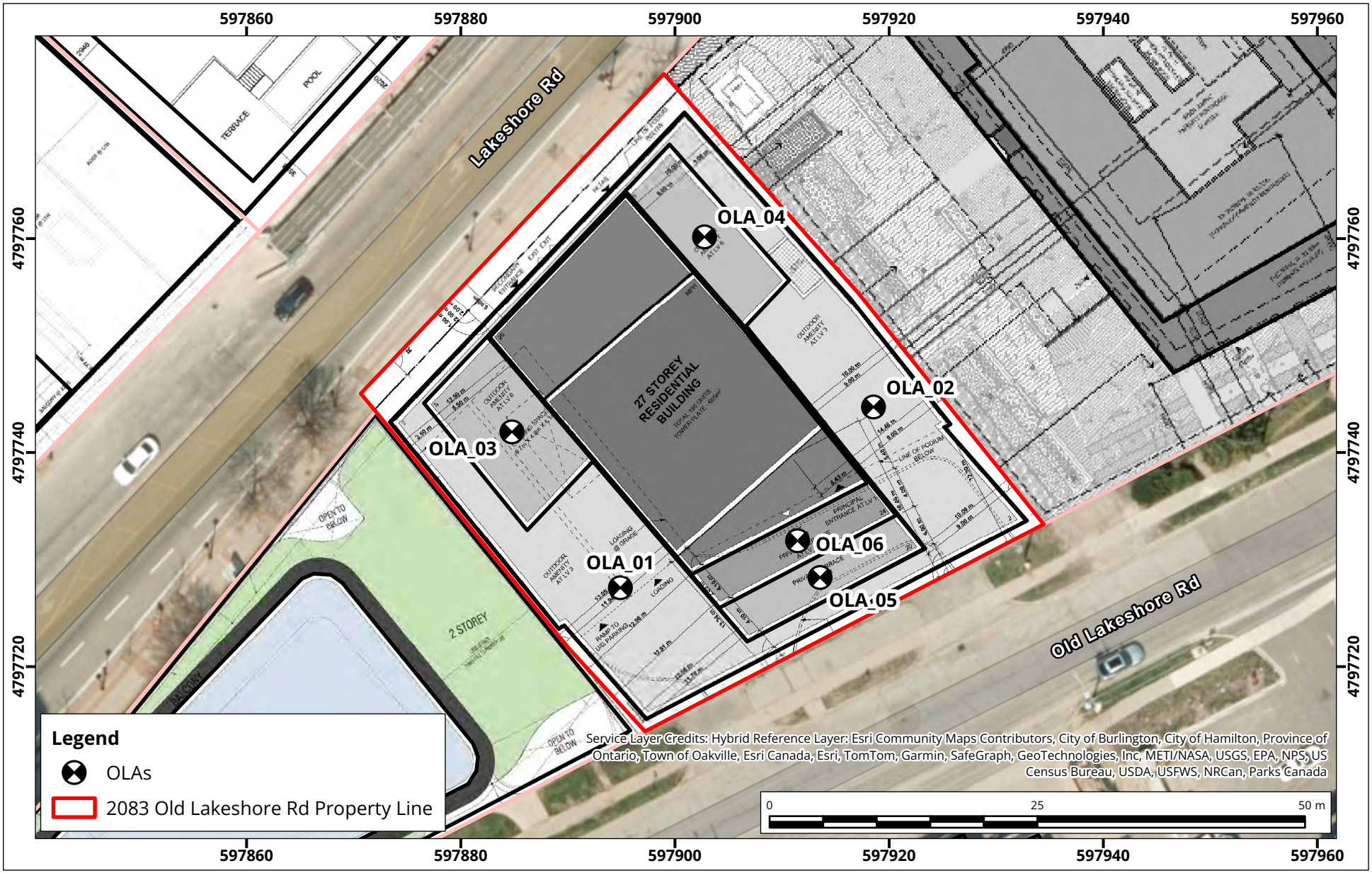
Map Projection: NAD 1983 UTM Zone 17N

2083 Old Lakeshore Road - Burlington, Ontario

Project #: 2304294

Drawn by:CWM	Figure: 1
Approx. Scale:	1:2,000
Date Revised:	Dec 6, 2024

Map Document: M:\AM_Jobs\2023\2304294\03Workitems\20Environmental Noise\Analysis\ArcGIS\2083 Old Lakeshore Road - Burlington, Ontario.aprx



Outdoor Living Areas (OLAs) Locations

Location of Common Outdoor Amenity Areas

Map Projection: NAD 1983 UTM Zone 17N

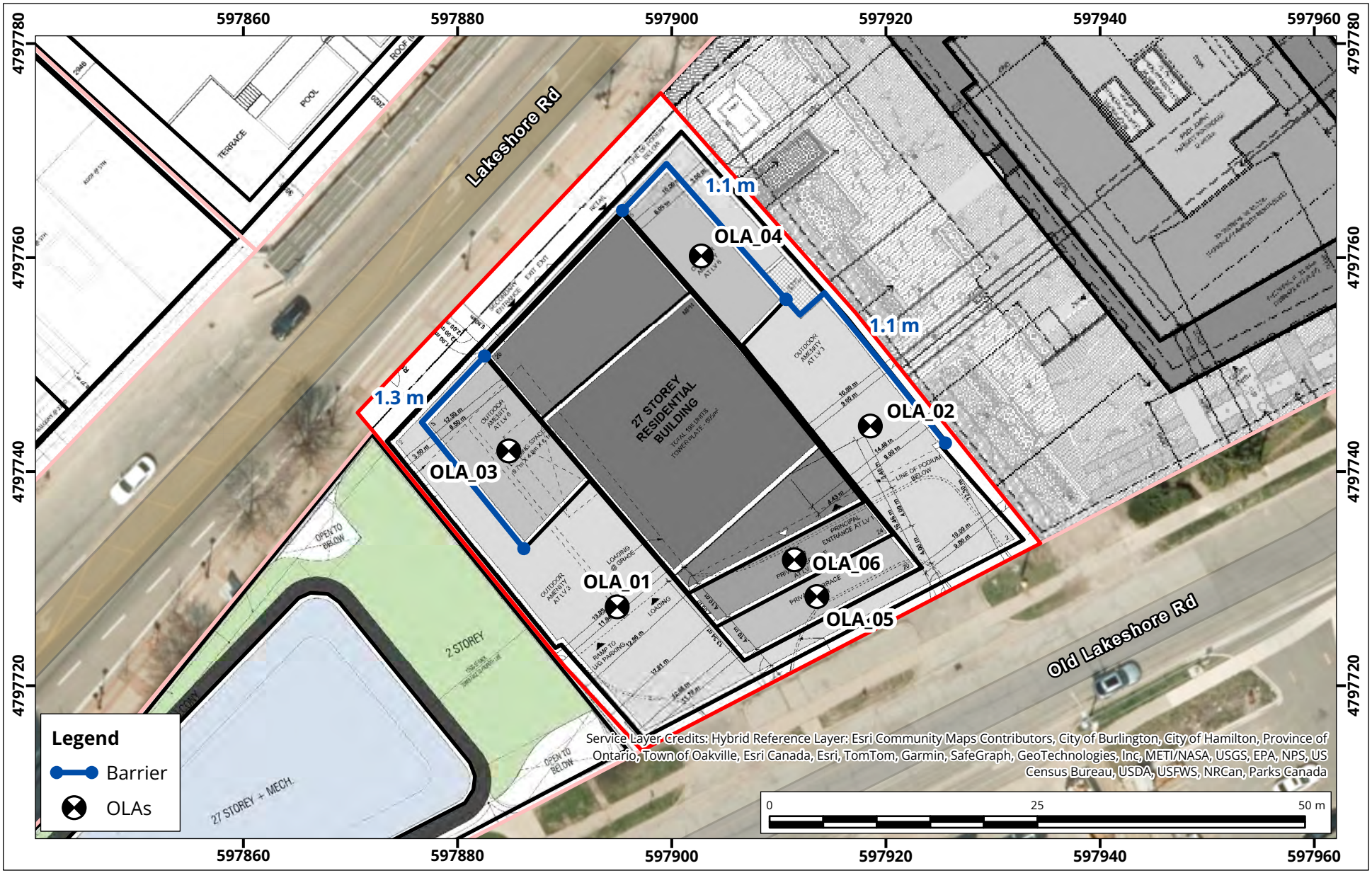
2083 Old Lakeshore Road - Burlington, Ontario

True North

Project #: 2304294

Drawn by:CWM	Figure:	2	
Approx. Scale:	1:500		
Date Revised:	Dec 6, 2024		

Map Document: M:\AM_Jobs\2023\2304294\03Workitems\20Environmental Noise\Analysis\ArcGIS\2083 Old Lakeshore Road - Burlington, Ontario.aprx



Outdoor Living Areas (OLAs) Mitigation to 55 dBA

Recommended Barrier Geometry and Height to meet 55 dBA

Map Projection: NAD 1983 UTM Zone 17N

2083 Old Lakeshore Road - Burlington, Ontario

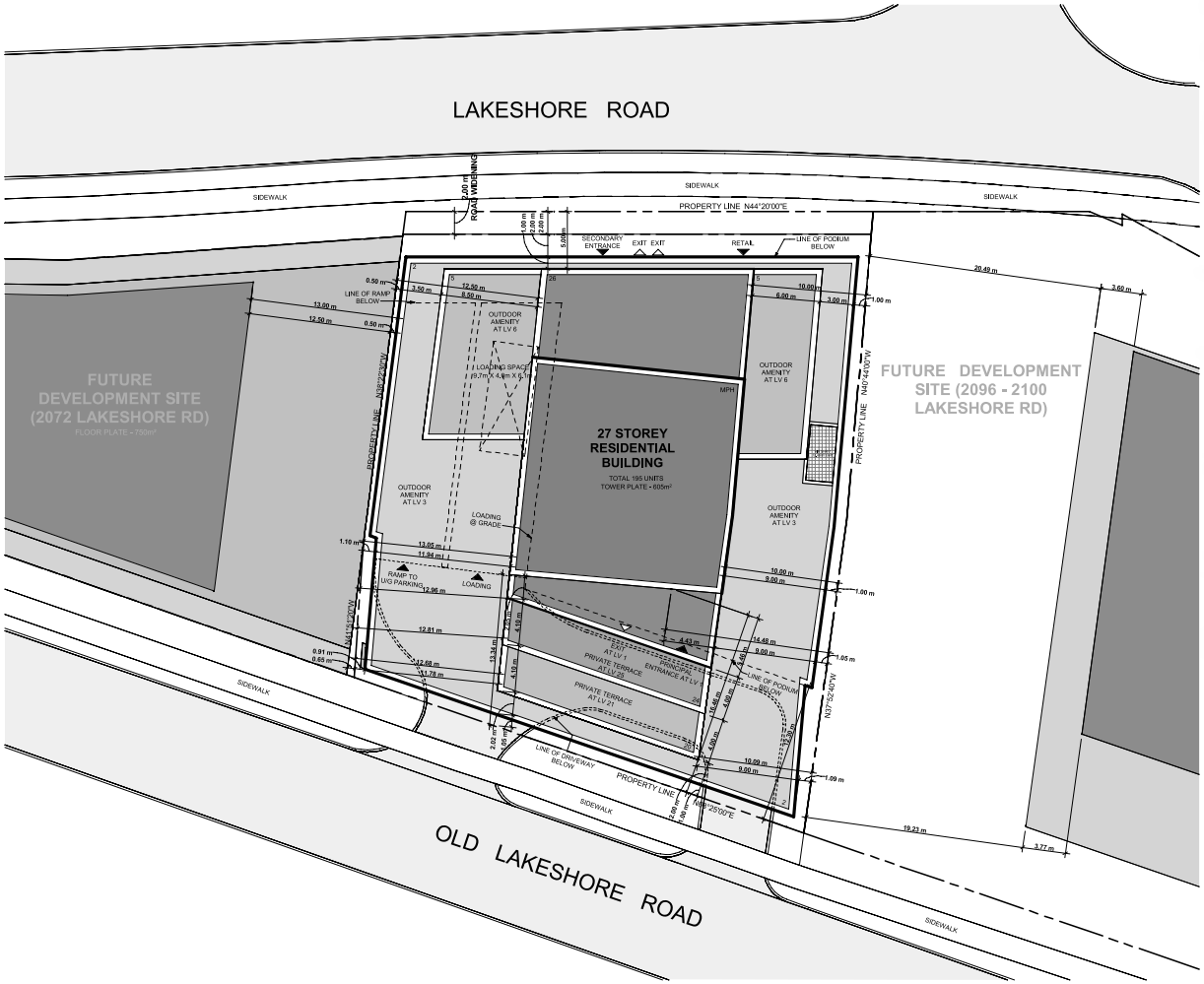
True North

Project #: 2304294

Drawn by:CWM	Figure:	3	
Approx. Scale:	1:500		
Date Revised:	Dec 6, 2024		

Map Document: M:\AM_Jobs\2023\2304294\03WorkItems\20Environmental Noise\Analysis\ArcGIS\2083 Old Lakeshore Road - Burlington, Ontario.aprx

APPENDIX A



1 | Site Plan
Scale: 1 : 200



2 | Project Statistics
NTS

UNDER PROGRESS

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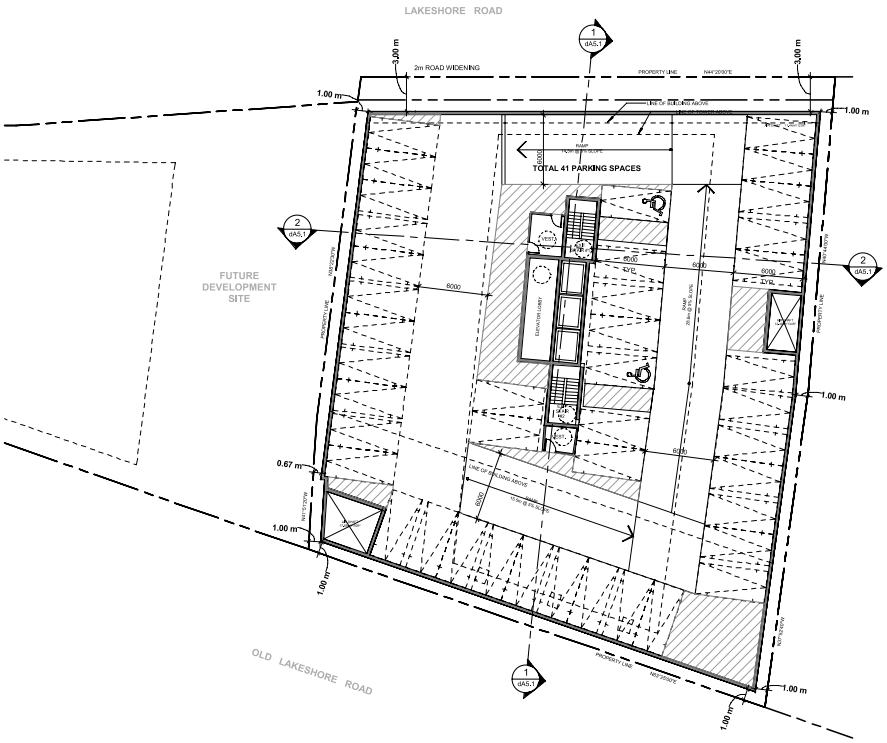
Client:
THE ROSSEAU GROUP

2083 Old Lakeshore Road, Burlington
Proposed Residential Development

Drawing Title:
Site Plan & Project Statistics

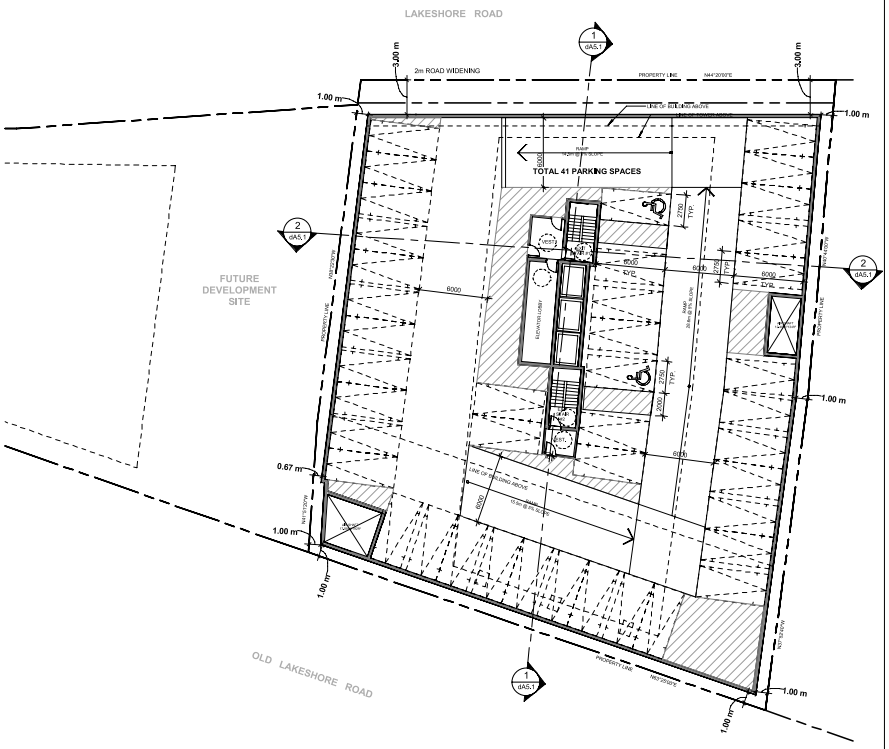
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Drawing No.:
dA1.3

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1 | Floor Plan - Level P5

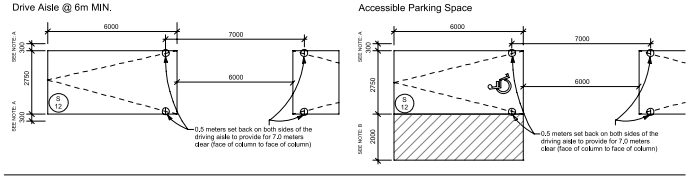
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2 | Floor Plan - Level P4

Scale: 1 : 200

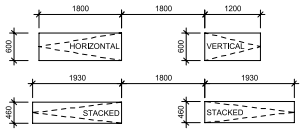
TYPICAL PARKING SPACE:



NOTES:
A. PROVIDE AN ADDITIONAL 300mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1800mm.
B. PROVIDE A 2000mm WALKWAY ON AT LEAST ONE SIDE OF AN ACCESSIBLE PARKING STALL. THIS WALKWAY MAY BE SHARED WITH ADJOINING ACCESSIBLE SPACE.

TYPICAL BICYCLE PARKING SPACE:

Walkway:	1800mm Min.
Vertical Parking Space:	1200mm (L) x 600mm (W)
Horizontal Parking Space:	1800mm (L) x 600mm (W)
Stacked Parking Space:	1930mm (L) x 460mm (W)



3 | Vehicle and Bicycle Parking Space Legend and Notes

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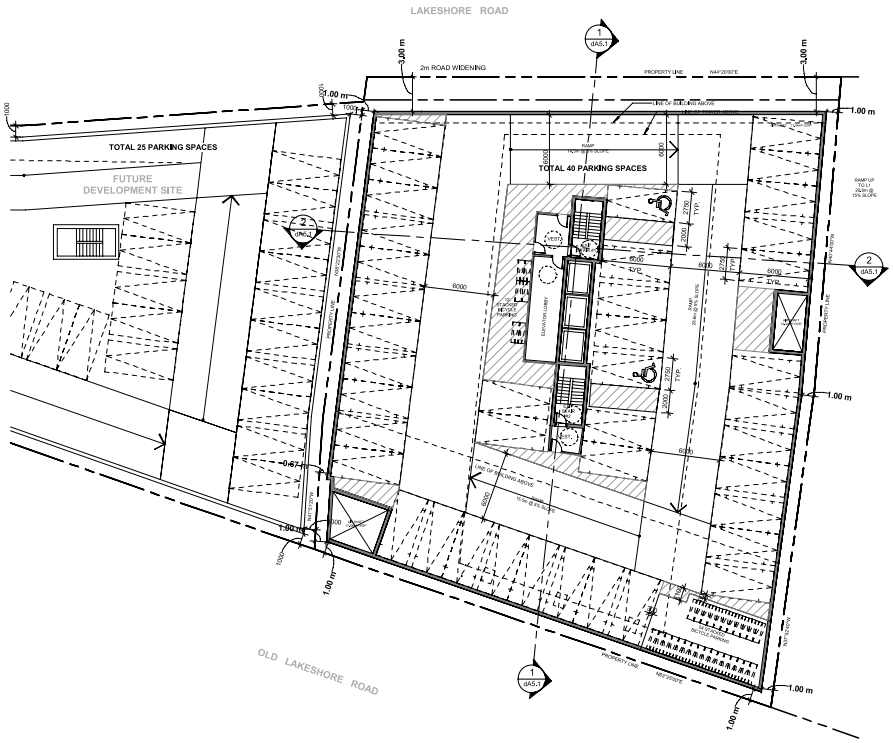
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Drawing Title:
P5 to P4 Floor Plans

Scale: 1 : 200
Drawn by: Author
Checked by: Checker
Project No.: 22-047
Date: 07/12/23
Drawing No.:

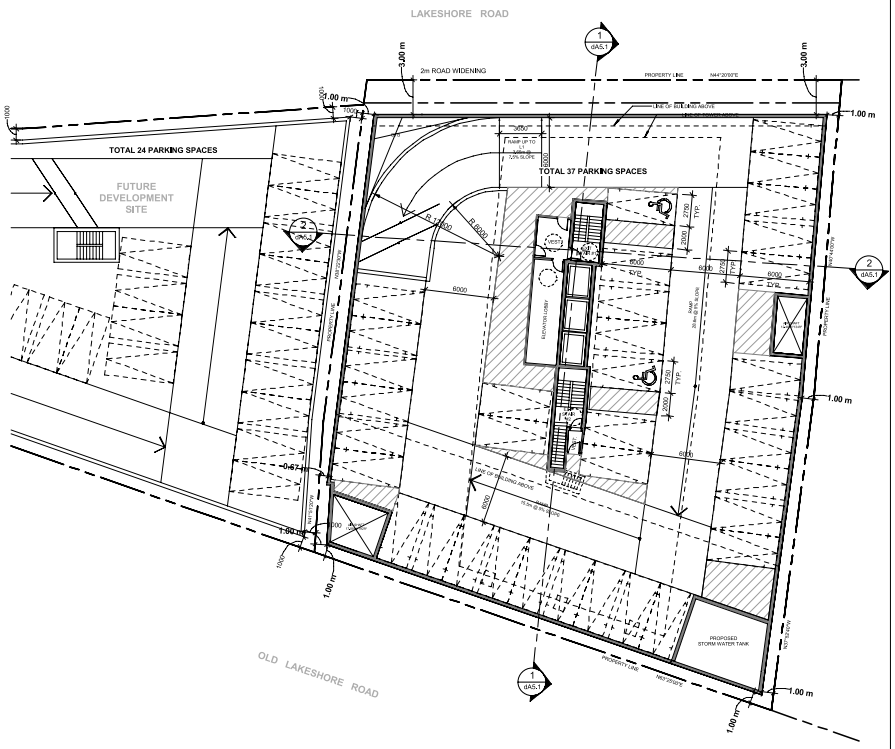
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Plot Date: 7/29/2024 4:49:23 PM File Path: C:\Users\jdb\Desktop\22-047_2083 Old Lakeshore_Project_Appended.rvt



1 | Floor Plan - Level P3-P2

Scale: 1 : 200

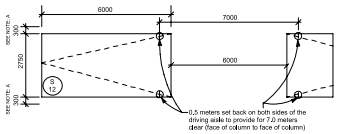


2 | Floor Plan - Level P1

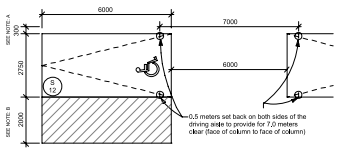
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TYPICAL PARKING SPACE:

Drive Aisle @ 6m MIN.



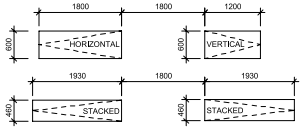
Accessible Parking Space



NOTES:
A. PROVIDE AN ADDITIONAL 300mm FOR PARKING SPACE WIDTH WHEN OBSTRUCTIONS OCCUR BETWEEN THE FRONT AND REAR 1800mm.
B. PROVIDE A 2000mm WALKWAY ON AT LEAST ONE SIDE OF AN ACCESSIBLE PARKING STALL. THIS WALKWAY MAY BE SHARED WITH ADJOINING ACCESSIBLE SPACE.

TYPICAL BICYCLE PARKING SPACE:

Walkway:	1800mm Min.
Vertical Parking Space:	1200mm (L) x 600mm (W)
Horizontal Parking Space:	1800mm (L) x 600mm (W)
Stacked Parking Space:	1930mm (L) x 460mm (W)



3 | Vehicle and Bicycle Parking Space Legend and Notes

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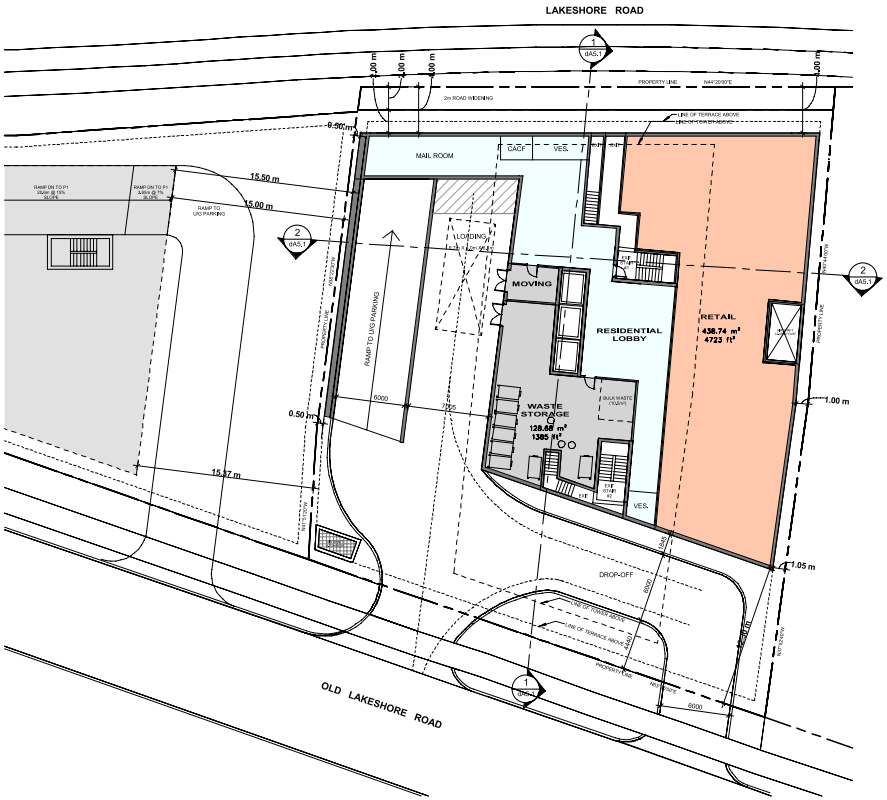
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Checked by: Checker
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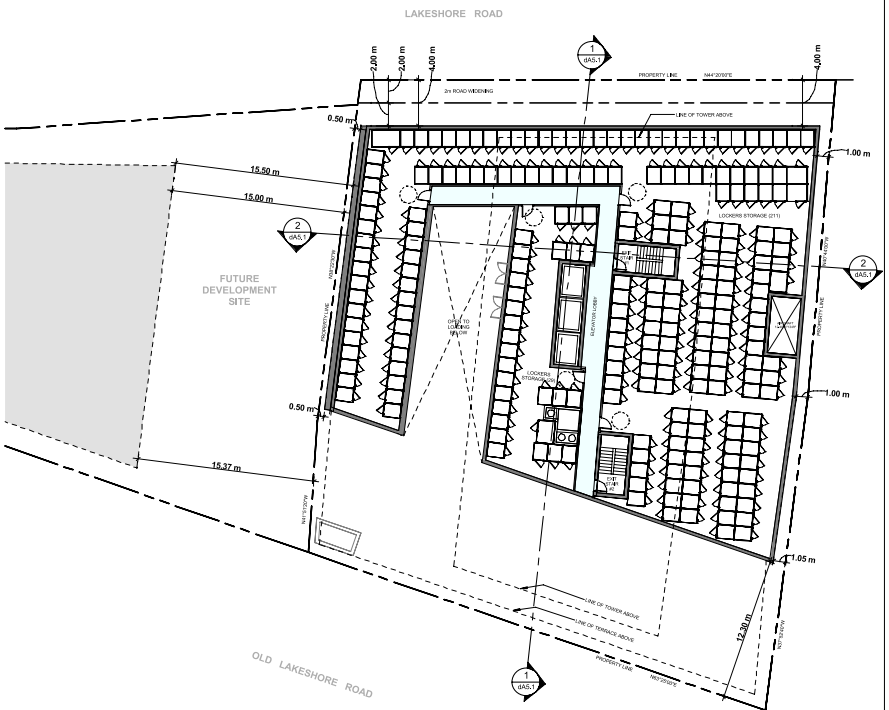
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1 | Floor Plan Level 1

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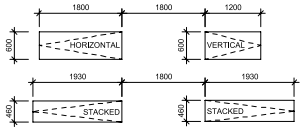


2 | Floor Plan Level 2

Scale: 1 : 200

TYPICAL BICYCLE PARKING SPACE:

Walkway:	1800mm Min.
Vertical Parking Space:	1200mm (L) x 600mm (W)
Horizontal Parking Space:	1800mm (L) x 600mm (W)
Stacked Parking Space:	1930mm (L) x 460mm (W)



3 | Vehicle and Bicycle Parking Space Legend and Notes

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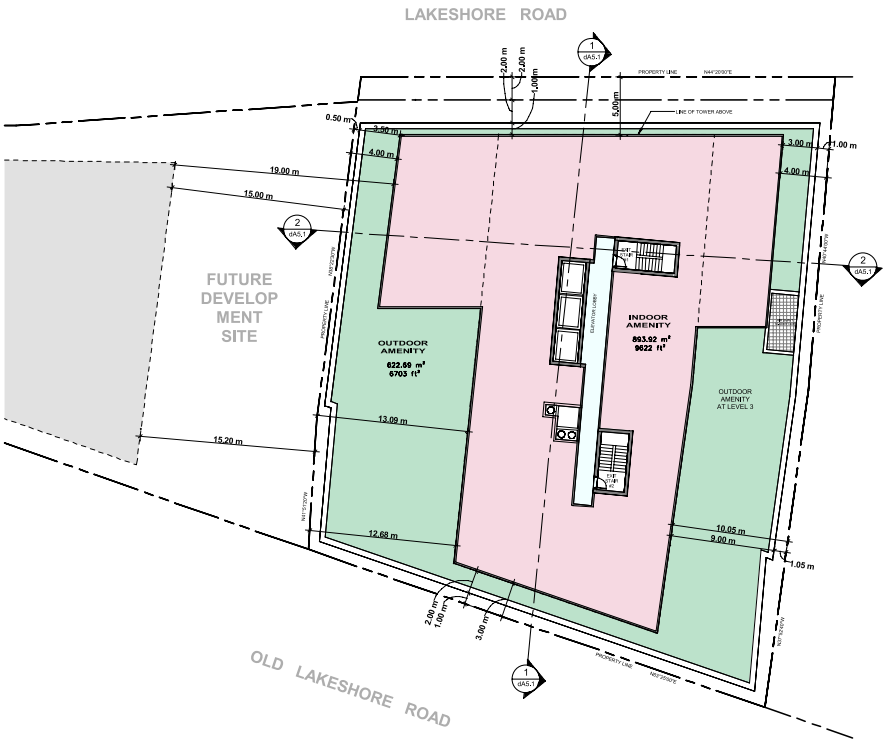
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THE ROSSEAU GROUP

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Proposed Residential Development

Drawing Title:
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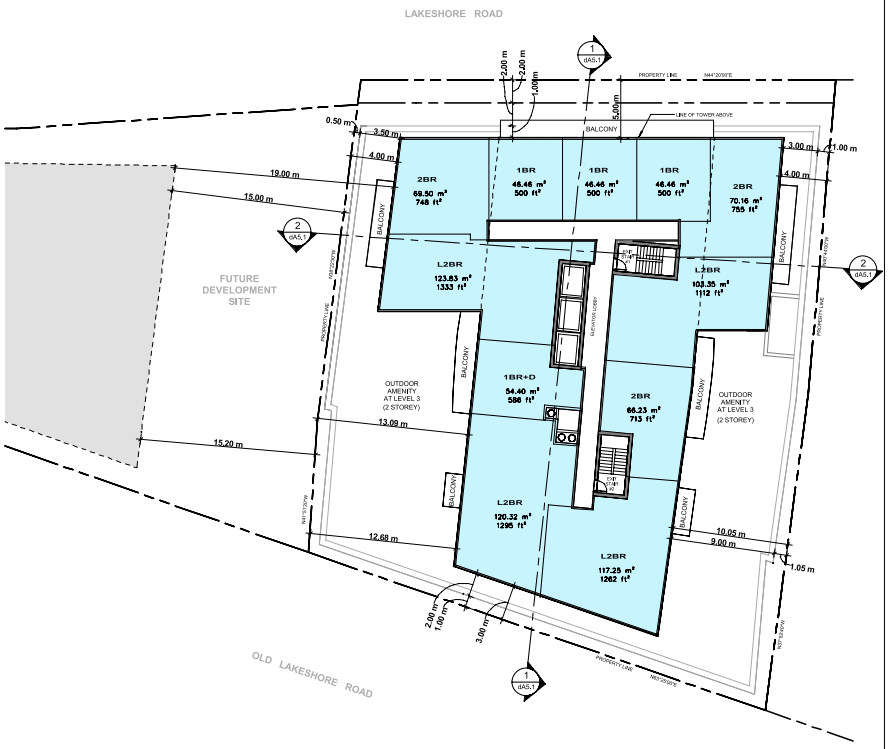
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1 | Floor Plan Level 3

Scale: 1 : 200



2 | Floor Plan Level 4-5

Scale: 1 : 200

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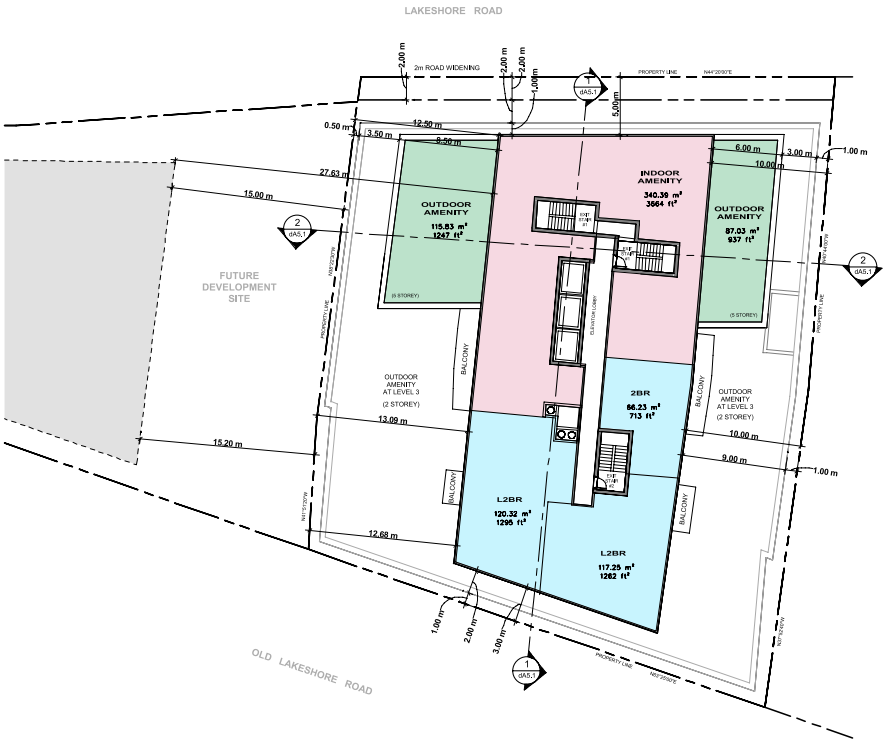
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THE ROSSEAU GROUP

2083 Old Lakeshore Road, Burlington
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Drawing Title:
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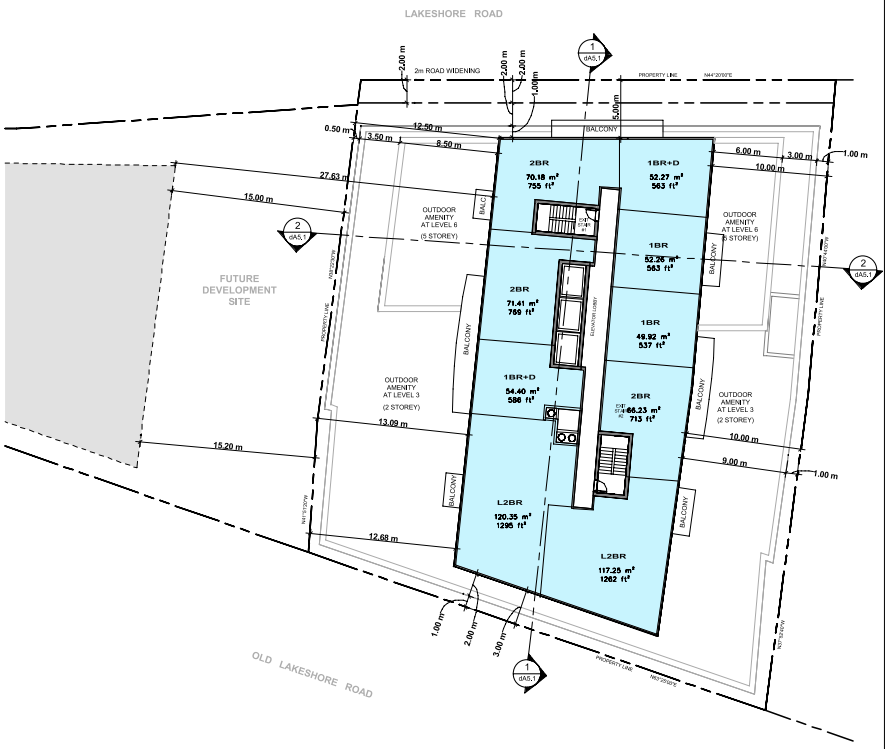
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1 | Floor Plan Level 6

Scale: 1 : 200



2 | Floor Plan Level 7-15

Scale: 1 : 200

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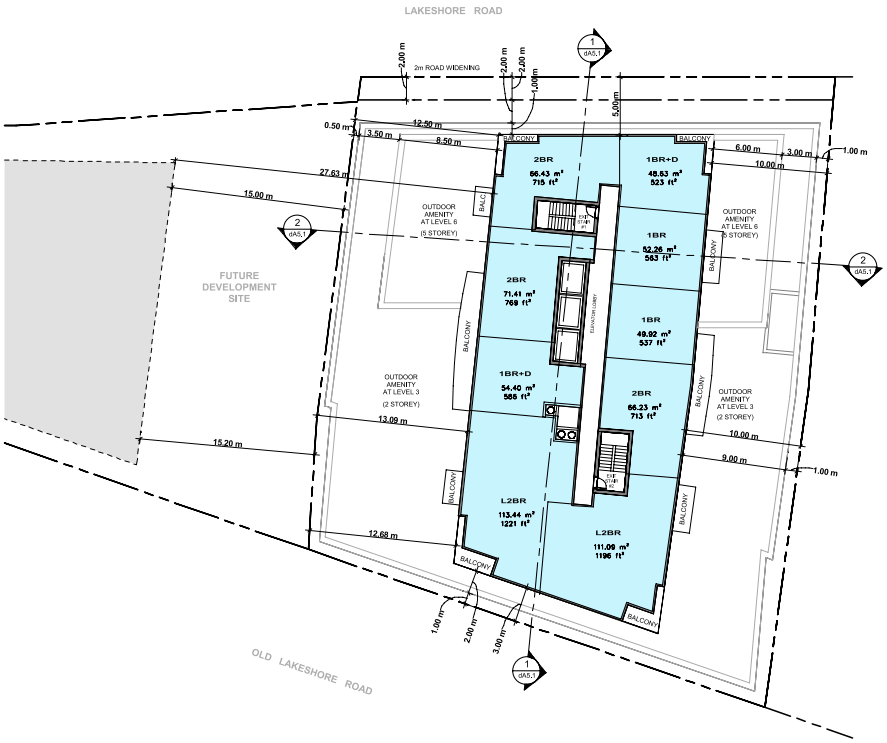
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THE ROSSEAU GROUP

2083 Old Lakeshore Road, Burlington
Proposed Residential Development

Drawing Title:
Level 6 to 15 Floor Plans

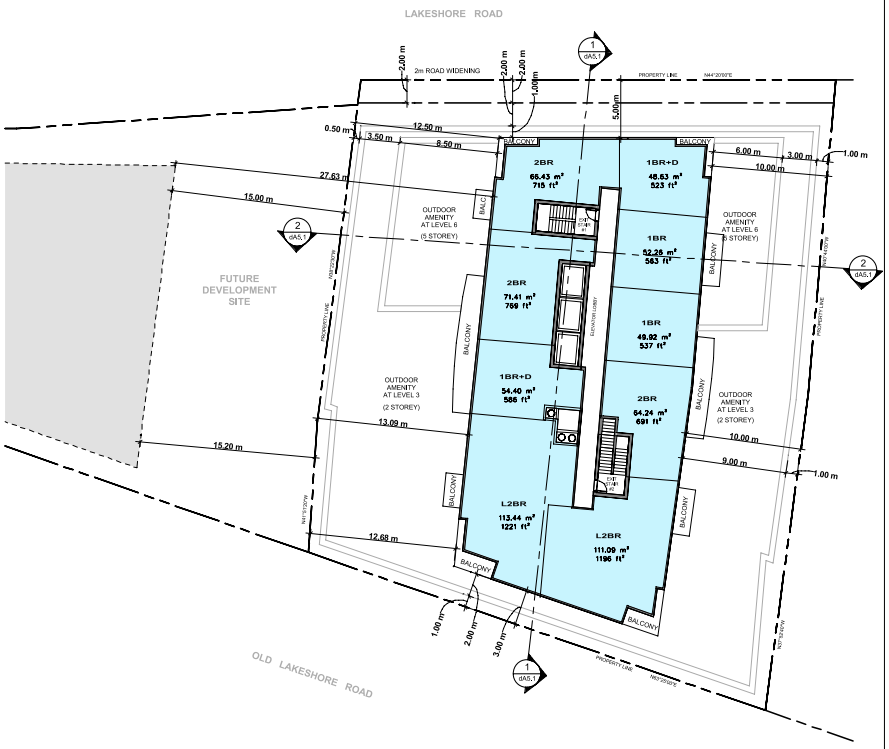
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Plot Date: 7/26/2024 4:49:28 PM File Path: C:\Users\jkirkor\Desktop\22-047_2083 Old Lakeshore_Project_Appended\dA2.5.rvt



1 | 11 Floor Plan - Level 16-19

Scale: 1 : 200



2 | 11 Floor Plan - Level 20

Scale: 1 : 200

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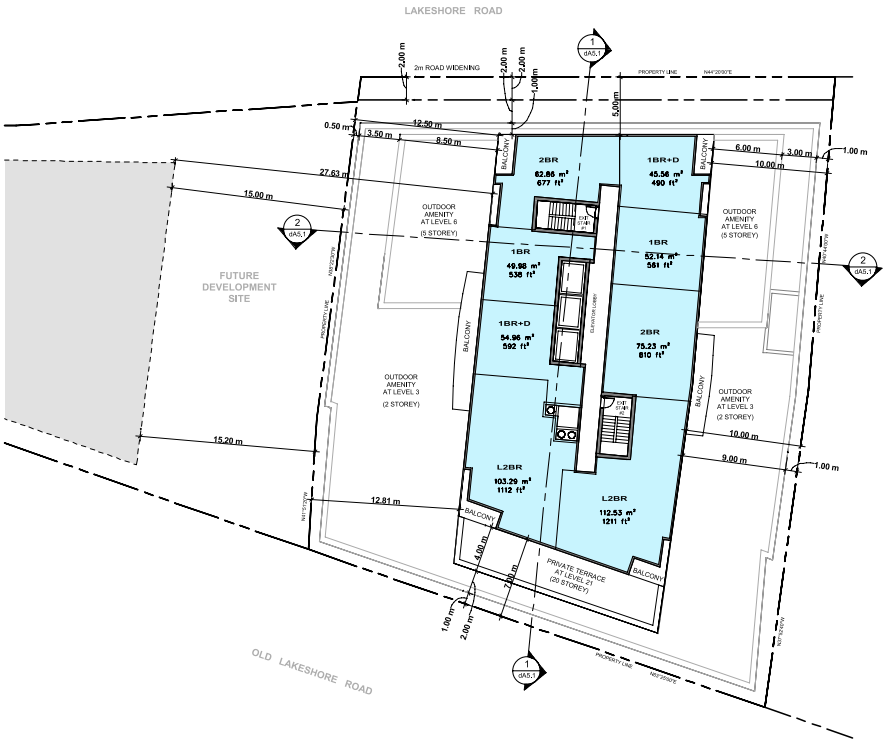
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THE ROSSEAU GROUP

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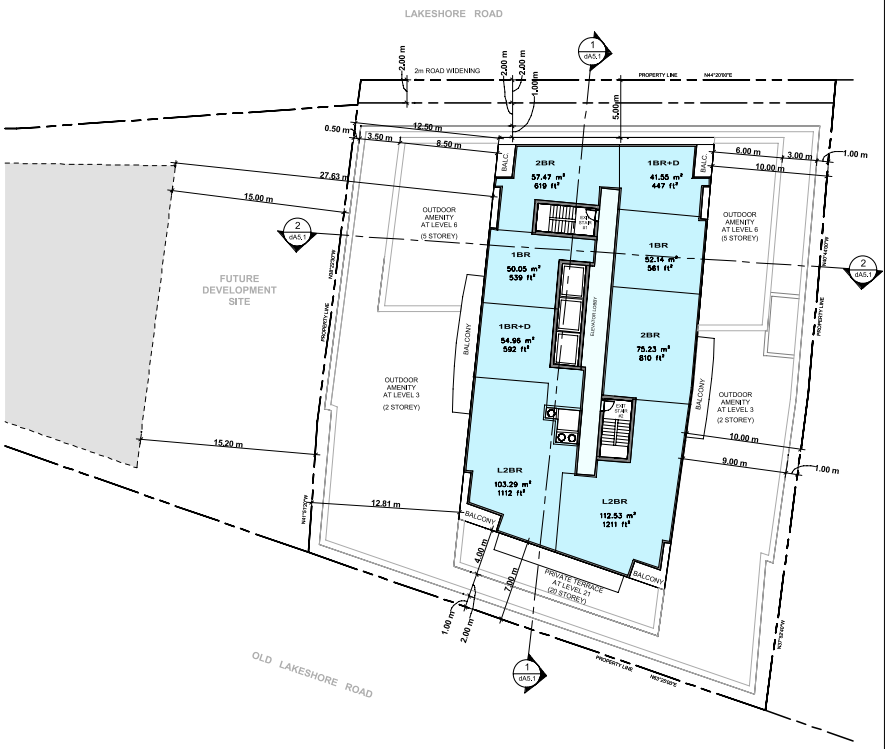
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Drawing No.:
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Plot Date: 11/29/2023 4:09:28 PM File Path: C:\Users\jb\Documents\Revit Central Files\2083 Old Lakeshore_Project_Jaganmohan.rvt



1 | Floor Plan Level 21-23
Scale: 1 : 200



2 | Floor Plan Level 24
Scale: 1 : 200

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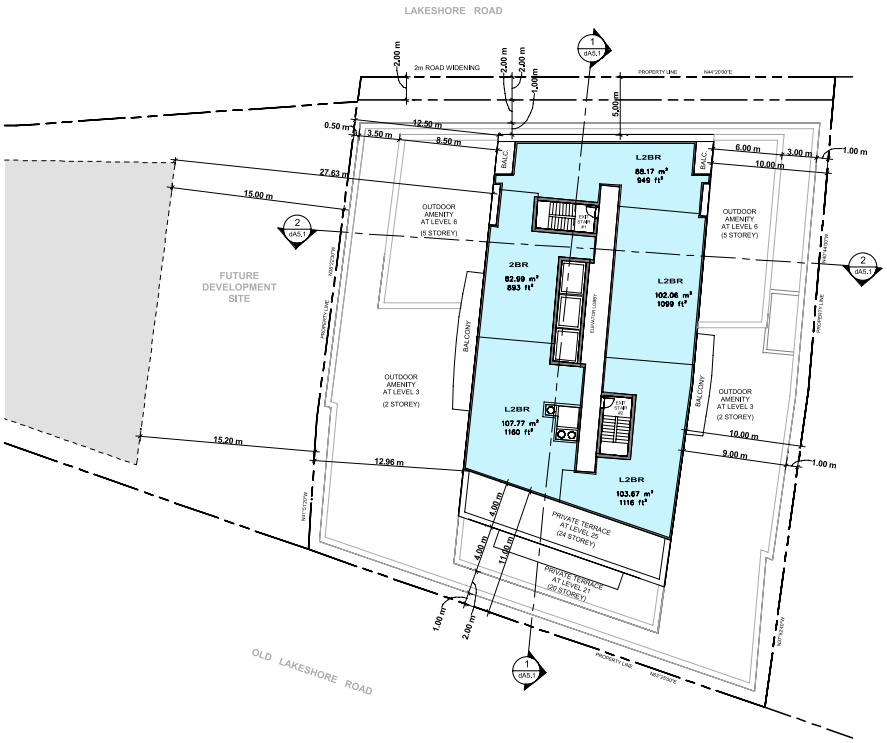
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THE ROSSEAU GROUP

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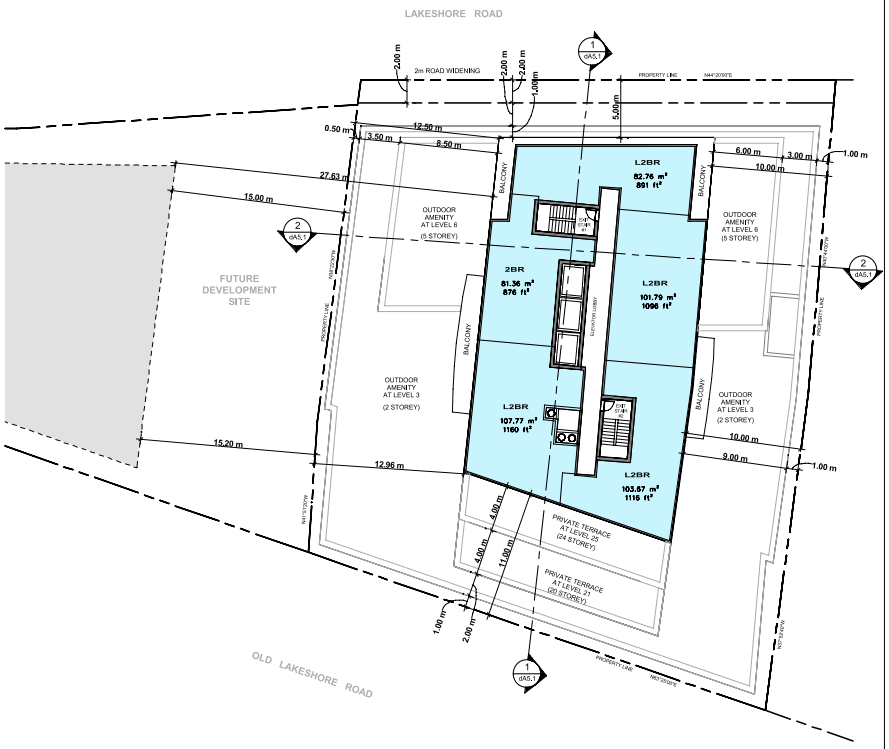
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1 | Floor Plan Level 25
Scale: 1 : 200



2 | Floor Plan Level 26-27
Scale: 1 : 200

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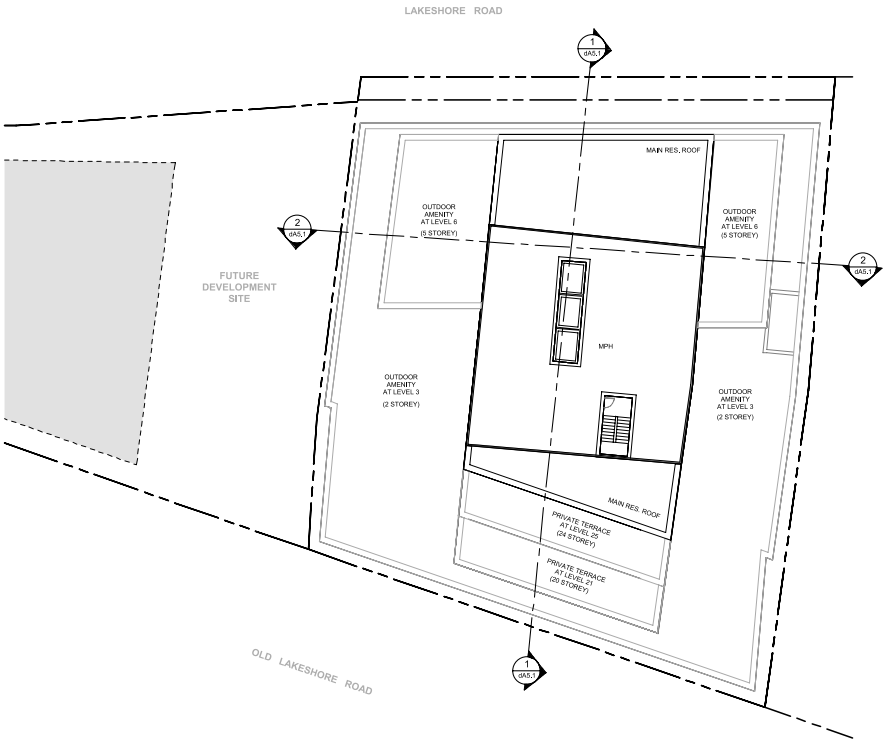
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Drawing Title:
Level 25 to 27 Floor Plans

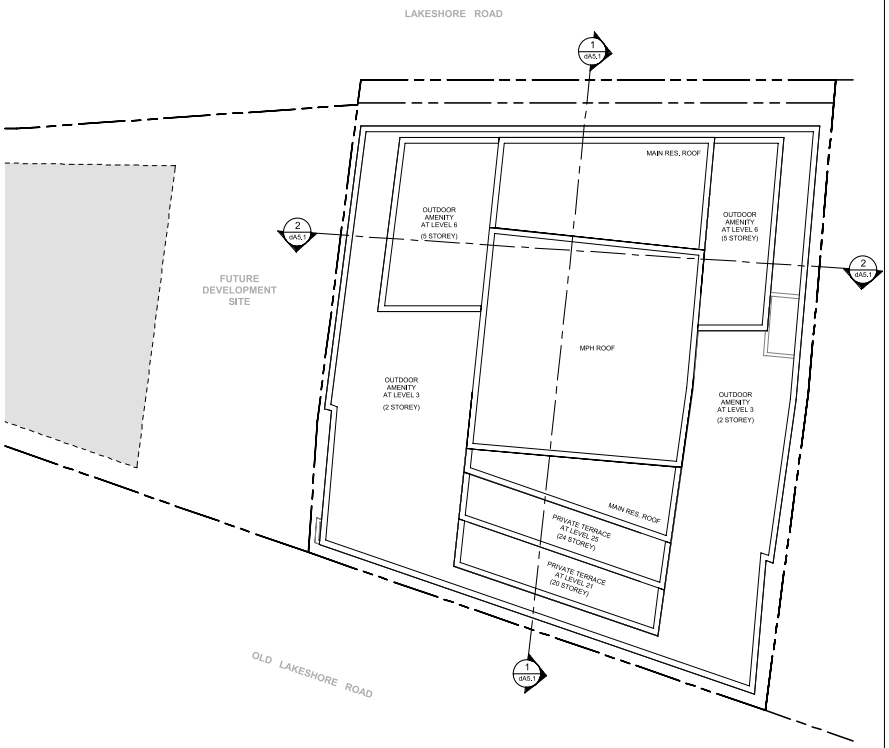
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1 | Floor Plan Level MPH

Scale: 1 : 200



2 | Roof Plan

Scale: 1 : 200

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Drawing Title:
MPH Floor Plan & Roof Plan

Scale: 1 : 200
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dA2.9

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APPENDIX B

CRITERIA

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.

Road and Rail

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 $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 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 $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 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

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 $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h
Outdoor Living Area (OLA) (Combined Road and Rail)	55 dBA	-

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 $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 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.
Plane of Window (Rail [1, 2])	> 60 dBA	> 55 dBA	The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved. Warning clause "Type D" is recommended.
	> 60 dBA ($L_{eq,\ 24hr}$) and < 100m from tracks		Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings. Warning clause "Type D" is recommended.
Outdoor Living Area (Combined Road and Rail [3])	≤ 60 dBA > 55 dBA	-	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. If noise control measures are not provided, a warning clause "Type A" is recommended.
	> 60 dBA	-	Noise controls (barriers) should be implemented to meet the 55 dBA criterion. 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.

Note(s):

1. Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.
2. 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.
3. Whistle noise is not included in the determination of the sound level at the OLA.

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 $L_{eq,1\text{-}hr,}$ for any one-hour period.

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.

GO, Freight, VIA Train

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, and the U.S. Federal Transit Authority (FTA, 2018) criterion for residential land-uses.

TTC Streetcar/Subway

If the predicted rms vertical vibration velocity from the Line exceeds 0.1 mm/sec, mitigation methods shall be applied during the detailed design to meet this criterion to the extent technologically, economically, and administratively feasible.

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 Toronto Transit Commission (TTC) guidelines for the assessment of potential vibration impact of future expansion (MOEE/TTC, 1993).

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 = $L_{Aeq,24hr}$ -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 ($L_{EQ,24\text{-}hr}$)	
Outdoors	≥NEF 30	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 clauses “Type D” and “Type B” are recommended.
	< NEF 30 ≥ NEF 25	The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria. 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.
	< NEF 25	Further assessment not required

Stationary Sources

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.

Continuous Sources – Regular Operations

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 (LAeq-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

Note(s):

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.

Continuous Sources - Emergency Equipment Testing

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.

In addition, the operation of emergency equipment under maintenance and testing conditions is assessed separately from all other stationary noise sources.

Impulsive 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}). As with the continuous noise sources, 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.

A summary of the exclusionary sound level limits is summarized in **Table 10.**

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

Time Period	Number of Impulses in Period of 1-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

Note(s):

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

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 [1]	Recommended Minimum Separation Distance [1]
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

Note(s):

1. Measured from Property Line to Property Line.

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	• Sound not audible off property • Infrequent dust and/ or odour emissions and not intense • No ground-borne vibration	• Sound occasionally audible off property • Frequent dust and/ or odour emissions and occasionally intense • Possible ground-borne vibration	• Sound frequently audible off property • Persistent and intense dust and/ or odour emissions • Frequent ground-borne vibration
Scale	• No outside storage • Small scale plant or scale is irrelevant in relation to all other criteria	• Outside storage permitted • Medium level of production	• Outside storage of raw and finished products • Large production levels
Process	• Self-contained plant or building which produces / stores a packaged product • Low probability of fugitive emissions	• Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions	• Open process • Frequent outputs of major annoyances • High probability of fugitive emissions
Operation / Intensity	• Daytime operations only • Infrequent movement of products and/or heavy trucks	• Shift operations permitted • Frequent movements of products and/or heavy trucks with majority of movements during daytime hours	• Continuous movement of products and employees • Daily shift operations permitted
Examples	• Electronics Manufacturing • Furniture refinishing • Beverage bottling • Auto parts • Packaging services • Dairy distribution • Laundry and linen supply	• Magazine printing • Paint spray booths • Metal command • Electrical production • Dairy product manufacturing • Feed packing plant	• Paint and varnish manufacturing • Organic chemicals manufacturing • Breweries • Solvent recovery plant • Soap manufacturing • Metal manufacturing

APPENDIX C

201177-LAKESHORE RD @ PEARL ST

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

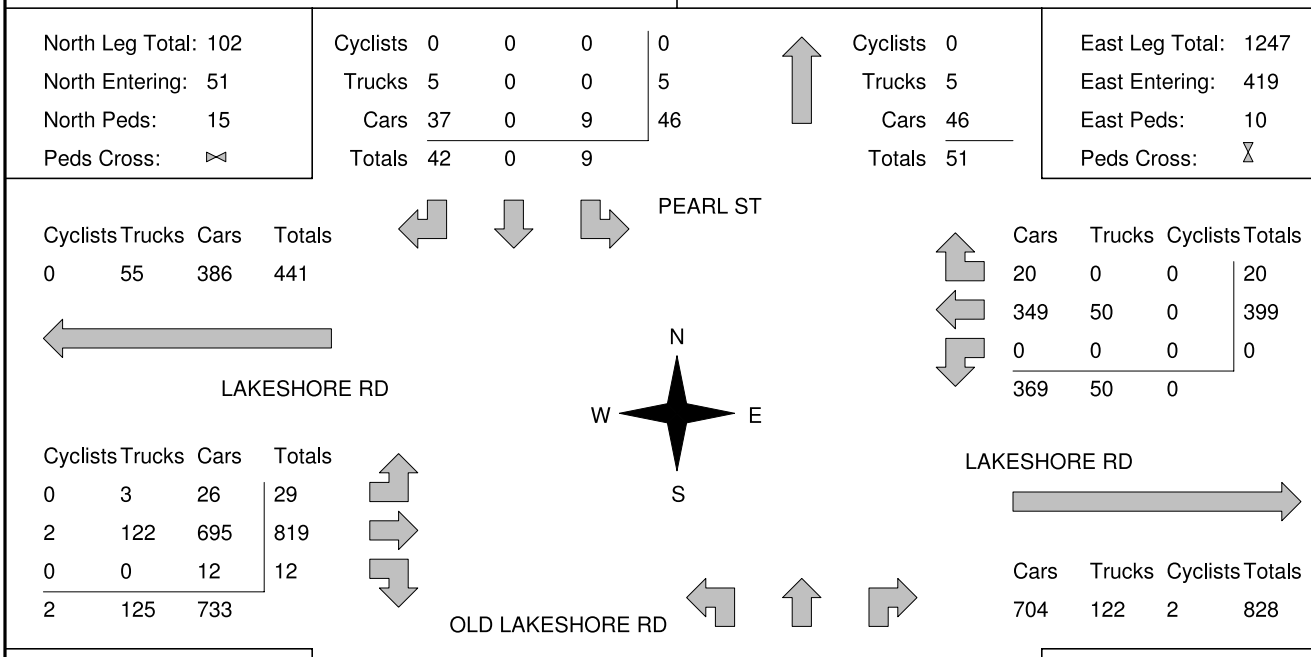
Municipality: Burlington
Site #: 2011770000
Intersection: LAKESHORE RD & PEARL ST
TFR File #: 1
Count date: 4-May-2022

Weather conditions:
Sunny

Person(s) who counted:
Tanya

**** Signalized Intersection ****

Major Road: LAKESHORE RD runs W/E



Comments

201177-LAKESHORE RD @ PEARL ST

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

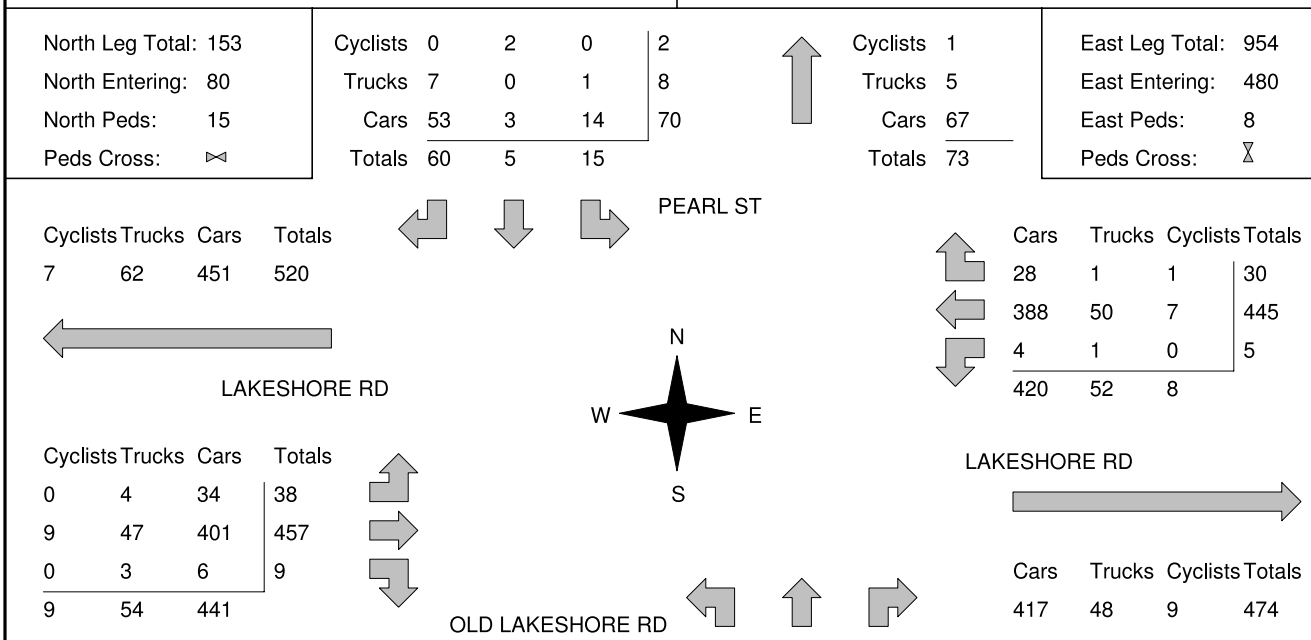
Municipality: Burlington
Site #: 2011770000
Intersection: LAKESHORE RD & PEARL ST
TFR File #: 1
Count date: 4-May-2022

Weather conditions:
Sunny

Person(s) who counted:
Tanya

**** Signalized Intersection ****

Major Road: LAKESHORE RD runs W/E



Comments

201177-LAKESHORE RD @ PEARL ST

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

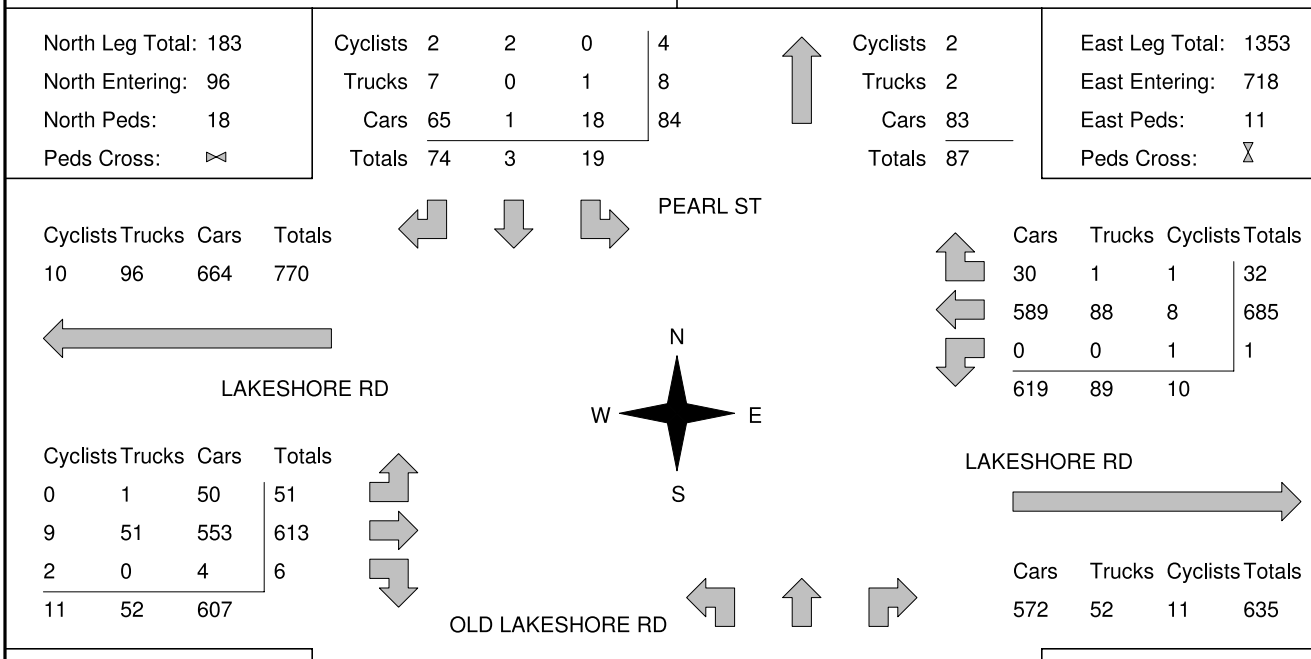
Municipality: Burlington
Site #: 2011770000
Intersection: LAKESHORE RD & PEARL ST
TFR File #: 1
Count date: 4-May-2022

Weather conditions:
Sunny

Person(s) who counted:
Tanya

**** Signalized Intersection ****

Major Road: LAKESHORE RD runs W/E



Comments

201177-LAKESHORE RD @ PEARL ST

Total Count Diagram

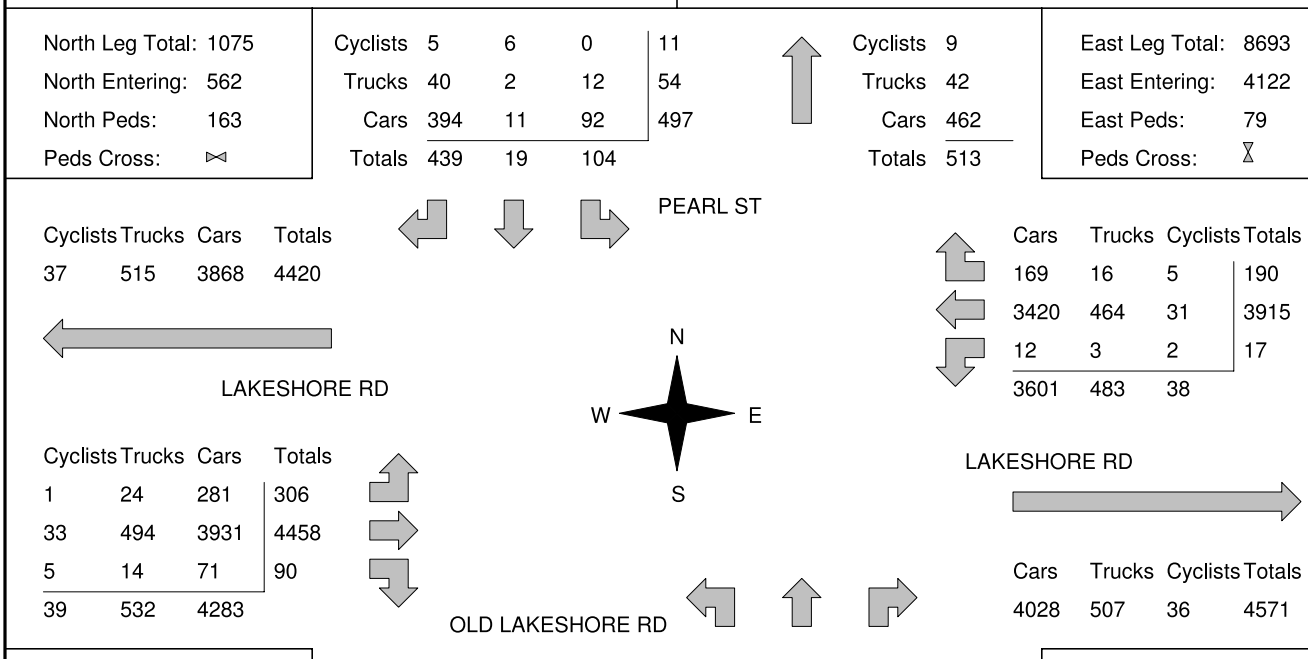
Municipality: Burlington
Site #: 2011770000
Intersection: LAKESHORE RD & PEARL ST
TFR File #: 1
Count date: 4-May-2022

Weather conditions:
Sunny

Person(s) who counted:
Tanya

**** Signalized Intersection ****

Major Road: LAKESHORE RD runs W/E



Comments

201177-LAKESHORE RD @ PEARL ST
Traffic Count Summary

Intersection: LAKESHORE RD & PEARL ST | **Count Date:** 4-May-2022 | **Municipality:** Burlington

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	4	0	33	37	9	39
9:00:00	9	0	42	51	15	53
11:00:00	0	0	0	0	0	0
12:00:00	15	2	48	65	25	70
13:00:00	15	0	73	88	20	94
14:00:00	15	5	60	80	15	102
15:00:00	0	0	0	0	0	0
16:00:00	18	3	61	82	26	100
17:00:00	17	4	69	90	29	105
18:00:00	11	5	53	69	24	91
Totals:	104	19	439	562	163	654

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	1	0	1	2	3
9:00:00	0	2	0	2	9
11:00:00	0	0	0	0	0
12:00:00	4	0	1	5	15
13:00:00	6	0	0	6	21
14:00:00	15	5	2	22	21
15:00:00	0	0	0	0	0
16:00:00	16	1	1	18	19
17:00:00	7	5	3	15	15
18:00:00	17	4	1	22	17
Totals:	66	17	9	92	120

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	2	280	14	296	1	1031
9:00:00	0	399	20	419	10	1279
11:00:00	0	0	0	0	0	0
12:00:00	2	388	21	411	2	851
13:00:00	6	445	29	480	12	948
14:00:00	5	445	30	480	8	984
15:00:00	0	0	0	0	0	0
16:00:00	1	651	16	668	15	1204
17:00:00	1	671	33	705	13	1369
18:00:00	0	636	27	663	18	1310
Totals:	17	3915	190	4122	79	8976

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	23	708	4	735	0
9:00:00	29	819	12	860	4
11:00:00	0	0	0	0	0
12:00:00	48	377	15	440	16
13:00:00	45	406	17	468	13
14:00:00	38	457	9	504	15
15:00:00	0	0	0	0	0
16:00:00	30	493	13	536	7
17:00:00	46	610	8	664	18
18:00:00	47	588	12	647	26
Totals:	306	4458	90	4854	99

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	6	25	39	46	58	59	60	77

APPENDIX D

NOISE MITIGATION GUIDANCE

Acoustic/Noise Barrier

Transportation Noise

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/m^2
    - 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/m^2 face weight by the material density (kg/m^3). Typically, this would imply:
        - 50 mm (2”) thickness of wood
        - 13 mm (0.5") thickness of lighter plastic (like Plexiglas or PVC)
        - 10 mm (0.4") 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.

Mechanical Equipment

Noise controls to attenuate mechanical equipment sound levels at Outdoor Points of Reception (OPOR) would consistent with the of the implementation of acoustic/noise barriers for Transportation sources, with the exception of the following:

- The minimum surface density (face weight) is **10** kg/m^2.

All other barrier quality and characteristics would be consistent with the details provided above.

Building Ventilation and Air Conditioning

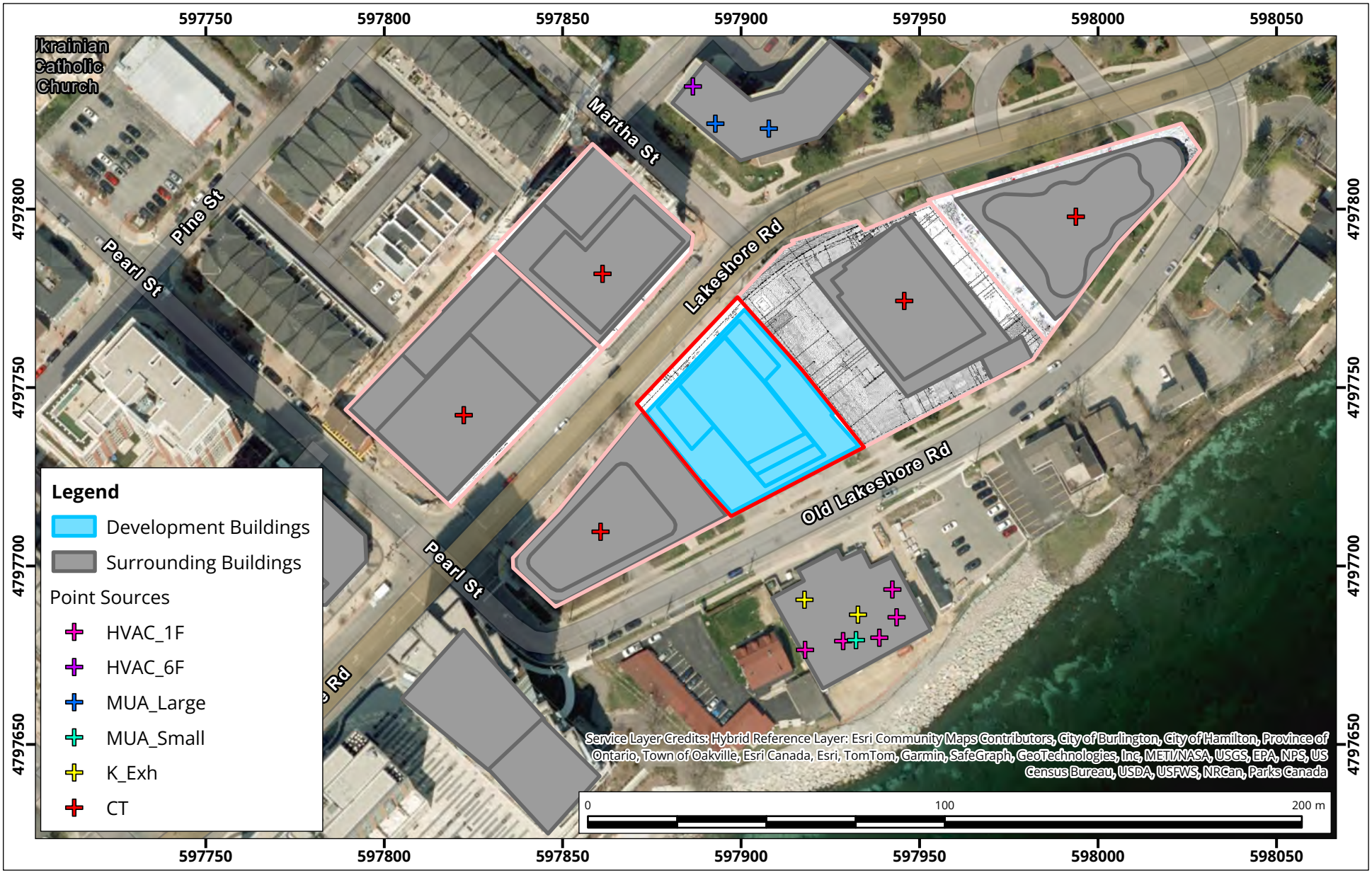
The use of air conditioning itself is not a noise control measure; however, it allows for windows and doors to remain closed, thereby reducing the indoor sound levels.

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.

APPENDIX E



Stationary Sources

Location of Stationary Sources in Relation to the Proposed Development

True North

Map Projection: NAD 1983 UTM Zone 17N

2083 Old Lakeshore Road - Burlington, Ontario

Project #: 2304294

Drawn by:CWM	Figure: E.1
Approx. Scale:	1:1,500
Date Revised:	Dec 6, 2024

Map Document: M:\AM_Jobs\2023\2304294\03WorkItems\20Environmental Noise\Analysis\ArcGIS\2083 Old Lakeshore Road - Burlington, Ontario.aprx

APPENDIX F

WARNING CLAUSES

All NPC-300 warning clauses are presented as general guidance for context. However, not all warning clauses may apply to this proposed development. See the report body text for which warning clauses are recommended.

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.

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 ≤ 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 ≤ 60 dBA, and noise controls have been provided. Recommended to address outdoor aircraft sound levels ≥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."

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."