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May 14, 2021

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City of Burlington

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**Re: 441 Maple Avenue – At-Grade OLA
RWDI Reference No. 2004859**

Dear Ms. Simpson,

RWDI was retained to prepare a Noise Feasibility Study for a proposed residential development to be located at 441 Maple Avenue in Burlington, Ontario. This letter is an addendum to RWDI's Noise Feasibility Study (Noise Study) dated October 23, 2020 and addresses comments by the City of Burlington outlined in their Interoffice Memorandum, dated March 22, 2021.

City of Burlington Comments

We have reviewed the Environmental Noise Feasibility Study dated October 23, 2020 prepared by RWDI, and offer the following comments/questions:

- 1. Section 2.1.3 indicates that the ground level outdoor patio was not assessed because it is less than 4m deep, the City would consider the whole at-grade exterior area on the east side of the building as an OLA, not just the patio, as presumably residents will also use the landscape area for recreation. Please provide confirmation that the outdoor living area can be mitigated to comply with NPC-300. Please also note that although NPC-300 indicates that 60dBA would be acceptable with warning clauses, we do not automatically accept. If 55dBA cannot be achieved with mitigation, please provide table outlining barrier heights to achieve 55dBA, it has to be demonstrated that it is not feasible either physically to construct or financially, to accept more than 55dBA for the OLA. The City has not generally accepted less than 58dBA for an OLA.*
- 2. Please provide an addendum letter to address the at-grade OLA*

RWDI Response

As requested RWDI has completed an Outdoor Living Area (OLA) assessment to include the landscaped area as part of the overall at-grade OLA for the 441 Maple Ave development. To ensure an acceptable noise environment at the at-grade OLA, Better Life Retirement Residence has elected to upgrade the 1.8 m tall wood screen fence surrounding the at-grade OLA to an acoustic barrier.



Ms. Annette Simpson
 City of Burlington
 RWDI #2004859
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To achieve the required acoustic performance from the acoustic fence, the wooden barrier will need to meet 20 kg/m² in surface density and must have no gaps or cracks upon construction.

Construction options for the all-wood acoustic fence can include the following:

- Tongue and groove boards of 2" thickness (minimum true thickness 1.5")
- Two layers of 1" thickness (e.g., barn boards) with the seams offset from each other.

In addition, seams at the posts should be well connected so that a twisting post does not create any gaps. Moisture egress can be allowed at the bottom provided that there is less than 2" between the bottom of the fence and the ground below. Cedar construction is preferred for longevity.

Sound levels due to Lakeshore Road at the At-Grade OLA were assessed using a spreadsheet implementation of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) algorithms. The updated sound-level calculations for the At-Grade OLA are provided in Attachment A and the results summarized in Table 1 below.

Table 1: Predicted Sound Levels at the At-Grade OLA

Receptor	Barrier	Predicted Sound Level	Sound Level Limit	Meets Limit
		Daytime (07:00-23:00h)		
Outdoor Living Area At - Grade Patio and Landscaped Area	No Barrier	58 dBA	55 dBA	No
	1.8 m Tall Acoustic Fence	53 dBA		Yes

Conclusion

RWDI has completed an Outdoor Living Area (OLA) assessment to include the landscaped area as part of the overall At-Grade OLA for the 441 Maple Ave development as per City of Burlington comments. RWDI has determined that converting the 1.8 m wood screen fence to an acoustic fence will ensure that sound levels at the At-Grade OLA will comply with the 55 dBA sound level limit provided the fence construction adheres to the recommendations outlined in this letter.

Yours truly,

RWDI

Khalid Hussein, P.Eng.
Noise and Vibration Engineer

Jessica Confalone, B.E.Sc., MMI
Project Manager



ORNAMENT

Ontario Road Noise Analysis Method for ENvironment and Transportation
version 2.09

Job No. 204859
Job Name 441 Maple Ave, Burlington

Scenario

ROAD CHARACTERISTICS

SOURCE-RECEIVER-BARRIER-TOPOGRAPHY CHARACTERISTICS

ID	Description	Time Period	Number of Vehicles			Speed (km/h)	Road Gradient (%)	Two Way? (y/n)	Pavement Type	Road Viewable Angle		Source-Receiver Distance (m)	Ground Type (Hard/Soft)	Topography Type	Source Height (m)	Road Elevation (m asl)	Receptor Height (m)	Receptor Elevation (m asl)	Ground Elevation Change (m)			Barrier Height (m)	Barrier Elevation (m asl)	Barrier-Receiver Distance (m)	Barrier Viewable Angle		Total Segment L _{eq} (dBA)
			Autos	Medium	Heavy					θ ₁	θ ₂								Elevation Change (m)	Hor. Dist a (m)	Hor. Dist b (m)				θ ₁	θ ₂	
OLA - Outdoor Patio	Lakeshore Ave	16	24095	638	1020	50	0	y	1	-35	35	102.0	Hard	A	1.4	0.0	1.5	0.0									58
																							Without Acoustic Barrier		OLA - Outdoor Patio		58
OLA - Outdoor Patio	Lakeshore Ave	16	24095	638	1020	50	0	y	1	-35	35	102.0	Hard	A	1.4	0.0	1.5	0.0				1.8	0.0	13.0	-35	35	53
																							With Acoustic Barrier		OLA - Outdoor Patio		53

Traffic Data	2031 AADT	Post Comments	Autos	Medium	Heavy	Day	Night
Maple Avenue North Leg	13905		95.1%	1.9%	3.0%	90%	10%
Lakeshore Rd South Leg	12142	Growth Rate	91.8%	3.1%	5.0%		
Lakeshore Rd East Leg	28614	1%	93.6%	2.5%	4.0%		
North Shore Blvd West Leg	30156		93.8%	2.4%	3.8%		

Intersection	AADT Year	Year	Source	AADT Prediction	Volume	Major Volume	Minor Volume	North Approach AADT	South Approach AADT	East Approach AADT	West Approach AADT
MAPLE AVE @ NORTH SHORE BLVD E (201174)		2018	2018	Count	37263	24734	12529	12218	10669	25142	26497