YCA engineering Limited

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ENVIRONMENTAL NOISE ASSESSMENT

3171 LAKESHORE ROAD WEST
PROPOSED RESIDENTIAL DEVELOPMENT
PART OF LOT 32, CONCESSION 4
SOUTH OF DUNDAS STREET AND BLOCK 79
REGISTERED PLAN M-257
TOWN OF OAKVILLE

PREPARED FOR:

VOGUE WYCLIFFE (OAKVILLE) LIMITED

July 2019
Y1713A

TABLE OF CONTENTS

1.0 INTRODUCTION

PURPOSE

A residential development has been proposed by Vogue Wycliffe (Oakville) Limited in the Town of Oakville. This report is an analysis of future sound levels within the proposed residential development and describes the types and locations of noise mitigation measures which will be required.

SITE DESCRIPTION AND LOCATION

The proposed residential development will consist of 27 Town Homes and 8 Semi-Detached dwelling units located west of Lakeshore Road West, at more than 200m south of Mississauga Street in the Town of Oakville.

The surrounding land uses are existing residential developments.

KEY PLAN

The location of the proposed development is further indicated by the Key Plan below.

2.0 SOUND LEVEL CRITERIA

The sound level descriptor (L_{eq} in dBA) are for 16 hours (daytime) and 8 hours (night-time) based on MECP Guideline NPC-300.:

Outdoor Activity Areas (7 a.m. – 11 p.m.) – 16 Hr. Leq. = 55 dBA Roads

If daytime outdoor sound levels at the backyards (outdoor activity areas) of residential areas exceed 60 dBA, physical noise attenuation measures such as acoustical fences, increased building setbacks or reorientation of dwellings and lots must be employed to reduce the sound levels. In some cases, outdoor sound levels may be allowed to exceed the above criteria by a maximum of 5 dBA. If such excesses occur, purchasers must be informed of the existence of potentially annoying sound levels by means of warning clauses registered on title.

Aircraft noise impact assessment is based on Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours determined by methods approved by Transport Canada.

Living/Dining Area and Bedroom (7 a.m.–11 p.m.) = 45 dBA Roads,
Living/Dining Area (11 p.m.–7 a.m.) = 45 dBA Roads, 5 NEF/NEP Aircrafts
Bedroom (7 a.m.–11 p.m.) = 0 NEF/NEP Aircrafts
Bedrooms (11 p.m. – 7 a.m.) = 40 dBA Roads, 0 NEF/NEP Aircrafts

Appropriate building components such as walls, doors and windows are chosen with reference to the following. If daytime sound levels at the external dwelling walls are 65 dBA or less (roadways), and 60 dBA or less (railways), then the indoor sound level criteria described above will be achieved using standard (Ontario Building Code) construction methods and building components. If night-time sound levels are 60 dBA or less (roadways) and 55 dBA or less (railways), standard construction methods and building components can be utilized. If the external sound levels exceed the above criteria, then components having extra sound insulation properties may be required.

Ventilation requirements are determined with reference to the following. If night-time sound levels at the bedroom window of a dwelling unit are in the range of 50 to 60 dBA, the ventilation system must be designed to allow the optional installation of central air conditioning at the owner's discretion. If night-time sound levels are greater than 60 dBA, central air conditioning must be installed. If daytime sound levels at the living room/dining room windows are in the range of 55 to 65 dBA, the ventilation system must be designed to allow optional installation of central air conditioning. For daytime sound levels greater than 65 dBA, central air conditioning must be installed.

STATIONARY SOURCES

As per the M.E.C.P. guidelines (Publication NPC-300), this development is considered to be a Class 2 area. The noise produced by a stationary source at the plane of window for noise sensitive spaces is the energy equivalent sound level (L_{EQ}), 50 dBA during daytime and evening time (0700-2300) or 45 dBA during night-time (2300-0700). For outdoor receptors, the energy equivalent sound level (L_{EQ}) is 50 dBA during daytime (0700-1900) or 45 dBA during night-time (1900-0700).

3.0 NOISE SOURCES

ROAD TRAFFIC

The proposed residential development will be located west of Lakeshore Road West, at more than 200m south of Mississauga Street in the Town of Oakville. Therefore, noise generated by Lakeshore Road West has the potential to affect future residents. All other roads within this site are local roadways. Therefore due to distance separation and low traffic volumes, these roads are considered acoustically insignificant.

The traffic information for Lakeshore Road West was obtained from the Town of Oakville dated May 2017. The full day (8hr) traffic count of 7,995 was taken with the addition of 3,998 for the evening count and 500 for the night-time count. The traffic count was projected 1% to the year 2029.The traffic data is summarized in Table 1 below:

TABLE 1: LAKESHORE ROAD WEST TRAFFIC DATA

Projected Annual Average Daily Traffic *	14,500
Percent Trucks	7%
Heavy and Medium trucks ratio	50:50
Speed (km/hr)	50
Number of Lanes	3

* The traffic count provided by the Town of Oakville, projected 1% to the year 2027.

Due to the proximity of the Lester B. Pearson Airport, the proposed residential development has been verified and the proposed site is outside the NEF 25 Noise Contour Line. In addition, the proposed residential development is not impacted by rail traffic and commercial developments.

4.0 NOISE ASSESSMENT

Drawing Y1713A is based on the latest Concept Plan dated May 2019 showing various noise analysis locations and noise mitigation measures within the proposed residential development.

Sound levels were calculated using the Ministry of Environment's Stamson 5.04 computer based noise prediction model. The noise criteria and warning clauses are listed in Appendix 3. Table 2 lists the unattenuated sound levels at various locations.

TABLE 2: UNATTENUATED SOUND LEVELS

LOCATIONS		DISTANCE TO CENTRELINE OF ROAD (m)	DAYTIME (16 Hr. Leq (dBA))		NIGHT-TIME (8 Hr. Leq (dBA))
			REAR YARD	DWELLING WALL	SECOND STOREY
Semi-Detached Lot 1	Front Wall	80.0[1]	-	52.67	46.97
	Rear Yard	95.0[1]	<55	-	-
Building 3 (Unit 21)	Rear Wall	48.0[1]	-	54.87	48.96
	Rear Yard	50.0[1]	<55	-	-
Building 4 (Unit 26)	Front Wall	15.0[1]	-	65.51	59.16
	Rear Yard	30.0[1]	<55	-	-
Building 6 (Unit 35)	Front Wall	16.0[1]	-	65.07	58.74
	Rear Yard	31.0[1]	<55	-	-

[1] Lakeshore Road West

5.0 RECOMMENDED NOISE MITIGATION MEASURES

5.1 OUTDOOR MEASURES

For Buildings 1, 2 and 3 (All Units), the outdoor amenity areas are expected to be the rear yards. Based on the sound level results in Table 2, the daytime rear yard sound levels at Buildings 1, 2 and 3 are expected to be below 55 dBA in the absence of mitigative measures.

For Buildings 4, 5 and 6 (All Units), the designated outdoor amenity areas are expected to be the balconies/patios on top of the garages facing away from Lakeshore Road and shielded by the buildings. Based on the sound level results in Table 2, the daytime sound levels at the outdoor amenity areas of Buildings 4, 5 and 6 are expected to be below 55 dBA in the absence of mitigative measures.

For all the Semi-Detached Lots, the outdoor amenity areas are expected to be the rear yards. Based on the sound level results in Table 2, the daytime sound levels at the rear yards of the Semi-Detached Lots are expected to be below 55 dBA in the absence of mitigative measures.

Therefore, noise mitigation measures are not required for any of the residential lots/units within the proposed development.

5.2 VENTILATION REQUIREMENTS

Ventilation requirements were determined using the sound levels at the building facades listed in Table 2.

MANDATORY AIR CONDITIONERS

The following units must be constructed with Mandatory air conditioners as per Table 2 sound level results:

- Buildings 4, 5 and 6 (All Units)

The following warning clause Type D must be incorporated into the Development Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of dwelling units at the above locations:

> Warning Clause Type D:
>
> *“This dwelling unit was fitted with a central air conditioner to allow the windows and exterior doors to remain closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment."*

PROVISION FOR AIR CONDITIONERS

The following dwelling units must be constructed with a forced air heating system with ducting sized to accommodate an air conditioning unit, in order to allow the homeowner the option of installing central air conditioning should he or she wish to do so in the future as the sound levels are expected to be above 55dBA during the daytime and above 50dBA during the nighttime.

- Buildings 1, 2 and 3 (All Units)

In addition, the following warning clauses must be incorporated into the Development Agreement, which will be registered on title and should be included in all offers of purchase, sale and lease of the above dwelling units:

> Warning Clause Type C:
>
> *"This unit was fitted with ducting sized to accommodate an air conditioning unit. The installation of air conditioning by the owner will allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of the air conditioning units must not exceed the sound emission standards established by the Ministry of Environment)."*

5.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the M.E.C.P. Detailed floor plans of the proposed dwelling units are required in order to best determine the required building components. Although this information is not yet available for the proposed development, the result is based on the assumption that a living, dining or recreation room is located at the side of the house closest to the roadway and contains three components (two exterior walls and a set of windows). The windows are assumed to be 25% of the floor area and the same side exterior walls are assumed to be 80% of the floor area.

DAYTIME SOUND LEVELS

For the worst case location during daytime, (Lot 16) daytime dwelling wall sound level of 66 dBA was calculated at the first storey living/dining room. To ensure acceptable daytime indoor sound levels, the overall building components must provide an STC rating of 29 for windows and STC 38 for exterior wall construction.

NIGHT-TIME SOUND LEVELS

For the worst case location during night-time, (Lot 16) night-time dwelling wall sound level of 65 dBA was calculated at the second storey bedroom. To ensure acceptable night-time indoor sound levels, the overall building components must provide an STC rating of 26 for windows and STC 35 for exterior wall construction.

BUILDING COMPONENT REQUIREMENTS

The minimum standard window and exterior wall construction of the Ontario Building Code meets STC 30 and STC 38, respectively.

WINDOWS

The following are some window configurations meeting an STC rating of 29, assuming the ratio of window area to room floor area is 25%:

- double glazing 3mm x 3mm thickness with 13mm air space (Casements/Fixed) or
- double glazing 3mm x 3mm thickness with 20mm air space (Sliders) or
- any other window type yielding a similar or greater STC rating

EXTERIOR WALLS

Assuming a ratio of wall area to room floor area of 80%, exterior walls of EW-5 construction will be acceptable:

EW5	12.7mm gypsum board, vapour barrier and 38 x 89mm studs with 50mm (or thicker) mineral wool or fiberglass batts in interstud cavities, plus sheathing, 25mm air space and siding/stucco

Sample window and exterior wall configurations have been provided in Appendix 4.

5.4 WARNING CLAUSES

The following warning clause Type A must be incorporated into the Development Agreement, which will be registered on title and included in all offers of purchase and sale or lease of the dwelling units listed below.

- Buildings 1, 2, 3,4, 5 and 6 (All Units)

Warning Clause Type A

"Purchasers are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound level will exceed the Ministry of Environment's noise criteria."

6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of noise abatement measures are listed in the following Table 3 identifying sound barriers, mandatory central air conditioners, provision for central air conditioners, building components and warning clauses.

TABLE 3: SUMMARY OF NOISE MITIGATION MEASURES

BLOCKS/UNITS	VENTILATION REQUIREMENTS	BUILDING COMPONENTS	SOUND BARRIERS	WARNING CLAUSES
Buildings 4, 5 and 6 (All Units)	Mandatory air conditioning	Windows: OBC* Walls: OBC	No	Type A, D
Buildings 1, 2 and 3 (All Unit)	Provision for air conditioning	Windows: OBC* Walls: OBC	No	Type A, C
All Semi-Detached Lots	No Requirements			

* OBC: Ontario Building Code Standard

7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Mandatory air conditioning is required for Buildings 4, 5 and 6 (All Units).

2. Provision for air conditioning in the future for Buildings 1, 2 and 3 (All Units).

3. Standard window construction will be acoustically acceptable for all dwelling units within the proposed residential development.

4. Prior to the issuance of occupancy permits, the Town's building inspector or a Professional Engineer qualified to perform acoustical engineering services in Ontario shall certify that the noise control measures have been properly installed and constructed as per the recommendations of Halton Region.

5. All applicable warning clauses shall be listed in the Town of Oakville's Site Plan Agreement and also be inserted in the Agreements of Purchase and Sale or Lease and registered on title.

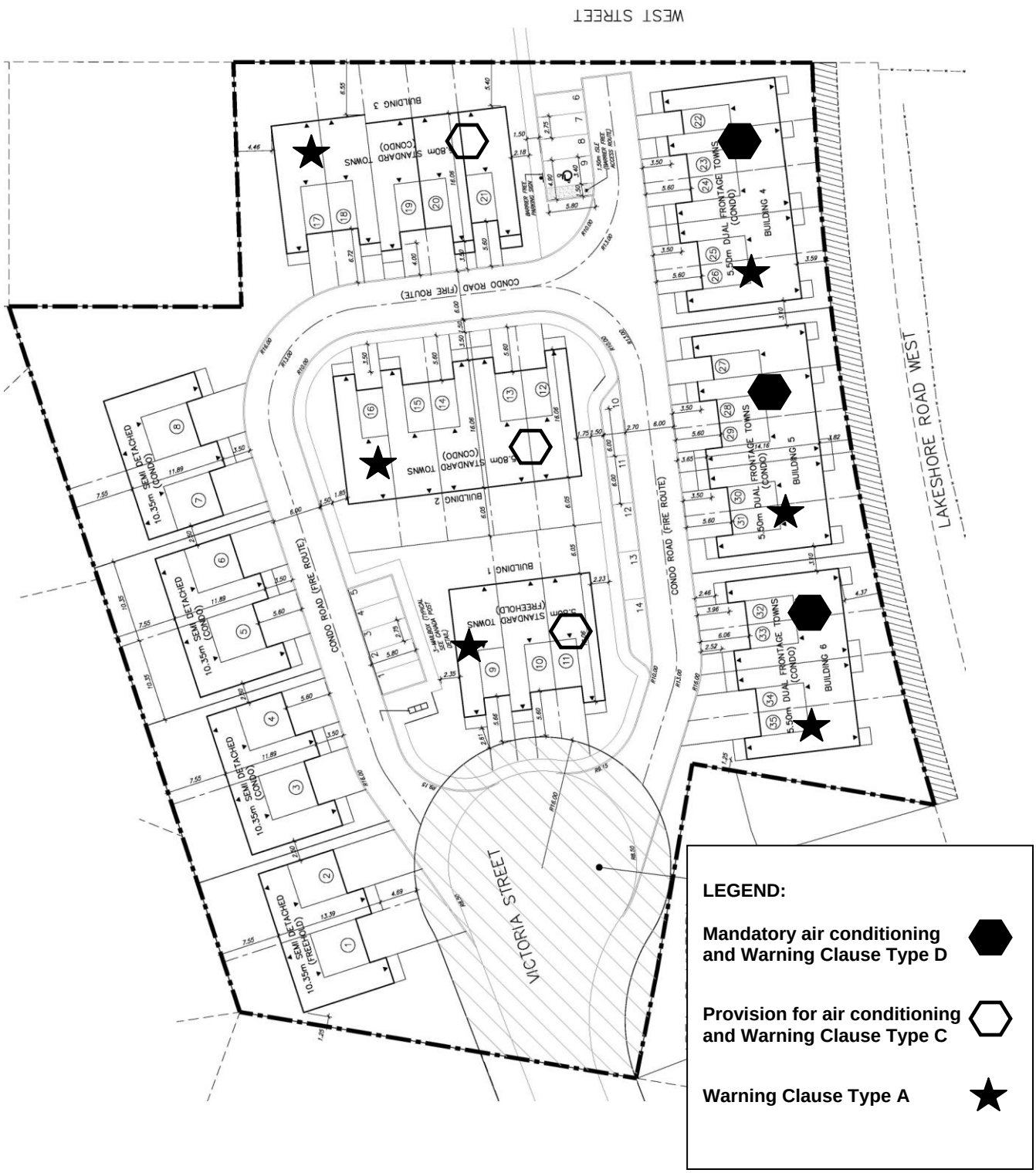
CONCLUSION

This report has determined that sound levels acceptable to the Ministry of Environment, Conservation and Parks, Town of Oakville are expected to be achieved using the abatement measures in this report and as shown on the attached Drawing Y1713A.

Respectfully submitted,

YCA ENGINEERING Limited

Hava Jouharchi, P.Eng.
Senior Project Eng.



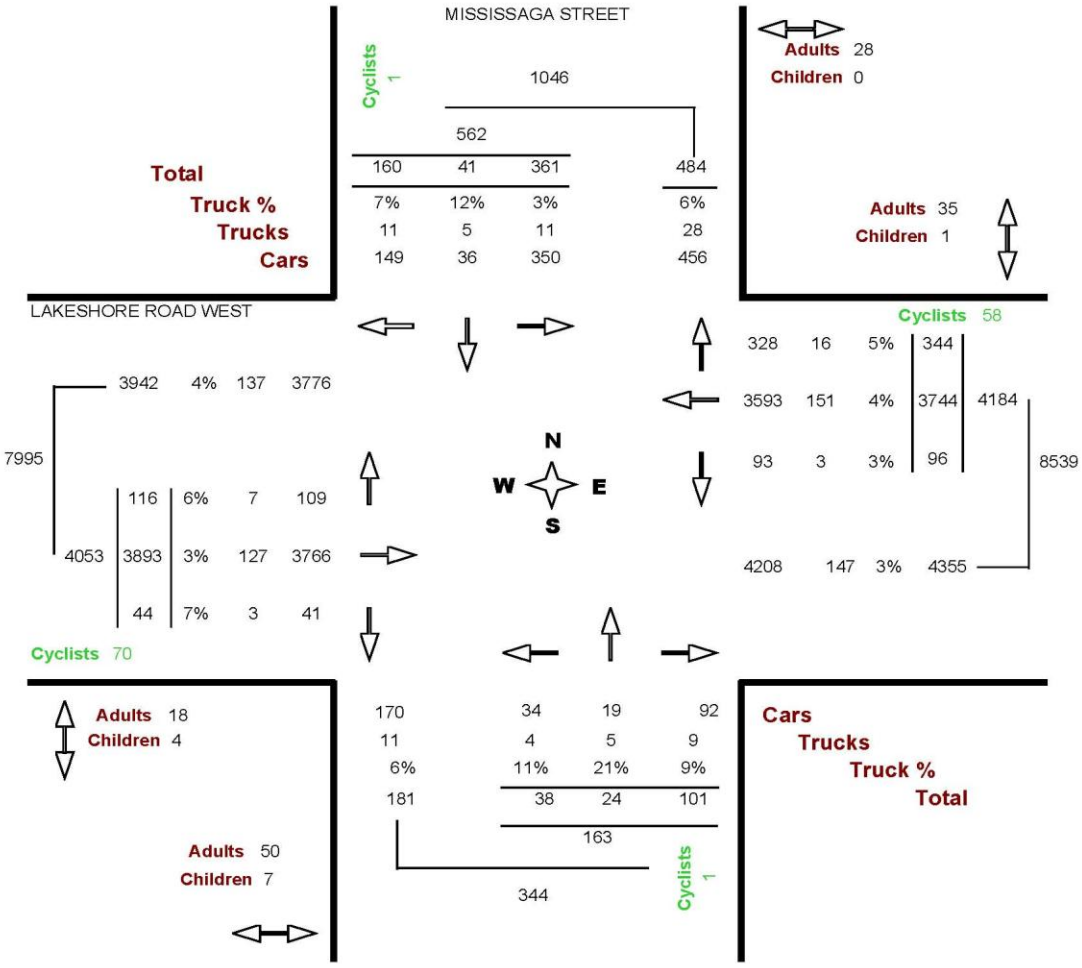
DRAWING Y1713A
3171 Lakeshore Road West
SITE PLAN

APPENDIX 1

TRAFFIC DATA

Turning Movements Count - Full Study Report

Location..... LAKESHORE ROAD WEST @ MISSISSAGA STREET
Municipality..... OAKVILLE
GeoID..... 30078201
Count Date..... Tuesday, 15 September, 2015



Turning Movement Count - Details Report

Location..... LAKESHORE ROAD WEST @ MISSISSAGA STREET

Municipality..... OAKVILLE

Count Date..... Tuesday, September 15, 2015

	MISSISSAGA STREET										LAKESHORE ROAD WEST									
	North Approach					South Approach					East Approach					West Approach				
Time Period	LT	TH	RT	Cyclists	Ped	LT	TH	RT	Cyclists	Ped	LT	TH	RT	Cyclists	Ped	LT	TH	RT	Cyclists	Ped
07:00 07:15	5	0	1	0	0	1	0	2	0	2	1	24	4	2	0	2	141	1	1	0
07:15 07:30	10	0	2	0	2	0	0	0	0	3	0	25	2	3	0	2	202	0	1	2
07:30 07:45	26	1	5	0	0	1	0	6	0	2	0	46	8	2	2	4	245	0	5	0
07:45 08:00	28	1	1	0	2	1	1	4	0	0	0	38	7	1	0	9	260	3	0	0
Hourly Total	69	2	9	0	4	3	1	12	0	7	1	133	21	8	2	17	848	4	7	2
08:00 08:15	24	1	3	0	1	2	0	7	0	0	3	58	5	0	0	4	246	2	3	2
08:15 08:30	18	0	7	0	0	0	1	4	0	1	1	70	7	0	0	8	224	1	2	0
08:30 08:45	17	1	7	0	0	1	0	6	0	0	3	65	8	0	0	6	202	4	0	0
08:45 09:00	11	1	6	0	0	2	0	4	0	3	3	56	7	0	3	5	182	2	0	0
Hourly Total	70	3	23	0	1	5	1	21	0	4	10	249	27	0	3	23	854	9	5	2
11:00 11:15	5	0	1	0	4	1	0	7	1	0	2	79	11	1	1	4	85	2	3	0
11:15 11:30	7	0	3	0	2	0	0	1	0	0	3	80	6	1	0	0	90	1	2	0
11:30 11:45	2	0	1	0	0	2	1	5	0	3	3	97	10	3	0	3	90	0	0	0
11:45 12:00	5	2	6	0	1	0	0	2	0	3	3	100	6	2	2	4	81	2	3	0
Hourly Total	19	2	11	0	7	3	1	15	1	6	11	356	33	7	3	11	346	5	8	0
12:00 12:15	11	1	3	0	0	2	0	4	0	1	4	95	10	3	0	2	85	1	3	4
12:15 12:30	6	3	3	0	0	0	0	4	0	1	1	97	11	4	2	3	81	0	2	1
12:30 12:45	8	3	1	0	1	1	1	2	0	0	1	95	8	0	1	2	82	1	1	0
12:45 13:00	8	3	3	0	0	0	1	3	0	0	4	100	7	0	0	3	85	1	7	0
Hourly Total	33	10	10	0	1	3	2	13	0	2	10	387	36	7	3	10	333	3	13	5
13:00 13:15	6	0	7	0	0	1	2	2	0	0	9	78	9	0	0	1	64	2	0	0
13:15 13:30	12	1	1	0	1	1	1	2	0	0	0	89	10	0	2	3	92	2	3	2
13:30 13:45	10	2	3	0	4	2	1	3	0	0	0	84	7	4	3	3	90	1	3	0
13:45 14:00	10	1	5	0	2	3	2	4	0	0	4	89	9	1	3	5	95	2	3	0
Hourly Total	38	4	16	0	7	7	6	11	0	0	13	340	35	5	8	12	341	7	9	2
15:00 15:15	14	2	11	0	0	1	1	1	0	9	2	152	11	3	1	5	105	2	3	6
15:15 15:30	12	4	10	0	0	1	0	0	0	0	2	147	14	1	0	3	103	1	7	0
15:30 15:45	9	0	6	0	1	1	4	3	0	2	2	154	14	2	0	4	102	1	0	1
15:45 16:00	7	1	4	0	1	0	1	3	0	0	0	154	9	1	3	2	77	0	2	0
Hourly Total	42	7	31	0	2	3	6	7	0	11	6	607	48	7	4	14	387	4	12	7
16:00 16:15	14	1	6	0	0	0	1	3	0	4	1	205	23	1	0	4	94	1	2	0
16:15 16:30	6	0	6	0	0	1	1	0	0	2	1	212	11	2	3	2	108	0	0	0
16:30 16:45	11	0	9	0	1	0	1	3	0	4	4	211	21	5	4	6	101	2	0	0
16:45 17:00	16	1	10	1	2	1	0	5	0	1	1	210	28	1	0	2	83	1	0	0
Hourly Total	47	2	31	1	3	2	3	11	0	11	7	838	83	9	7	14	386	4	2	0
17:00 17:15	13	5	9	0	1	2	1	1	0	2	15	191	16	9	0	0	113	1	4	0
17:15 17:30	9	2	6	0	1	4	0	2	0	6	8	241	17	1	0	5	99	0	3	4
17:30 17:45	10	3	8	0	0	2	2	3	0	4	6	214	16	3	3	5	100	3	4	0
17:45 18:00	11	1	6	0	1	4	1	5	0	4	9	188	12	2	3	5	86	4	3	0
Hourly Total	43	11	29	0	3	12	4	11	0	16	38	834	61	15	6	15	398	8	14	4
Grand Total	361	41	160	1	28	38	24	101	1	57	96	3744	344	58	36	116	3893	44	70	22
Truck %	3%	12%	7%			11%	21%	9%			3%	4%	5%			6%	3%	7%		

From: Hava Jouharchi
Sent: Monday, May 1, 2017 2:40 PM
To: 'lin.rogers@oakville.ca'
Subject: Traffic Data Request, Oakville (May1,17)

Good Afternoon Lin,
I have been requested to prepare a Noise Study for a proposed residential development in the Town of Oakville. Map of the location is attached.

The location of the site is west of Lakeshore Road West, south of Mississauga Street.

Could you please provide the following traffic data for Lakeshore Road West at your earliest convenience:

- Ultimate/Forecasted traffic volume – The horizon year for your study was not indicated. Please use a 1% per year growth rate to 2021. Should you require a growth rate beyond 2021, please contact Syed Rizvi, Transportation Engineer – West District, who is copied here for growth rates beyond 2021.
- Percentage of trucks – Please use current TMCs for this information. Kindly contact Yaron Levgoren, Traffic Technician, who is copied here for counts within your study area.
- Heavy to medium truck ratio – Please use current TMCs for this information. Kindly contact Yaron Levgoren, Traffic Technician, who is copied here for counts within your study area.
- Posted Speed – Posted speed is 50 km/h
- Number of lanes – Generally Lakeshore Road West is a 3-lane cross-section. However, please use aerial mapping to confirm the number of lanes within your study area.

Thanks you in advance
Hava

Hava Jouharchi, P.Eng.
Senior Project Engineer

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APPENDIX 2

STAMSON 5.04
SOUND LEVEL CALCULATIONS

```
STAMSON 5.04        SUMMARY REPORT        Date: 23-07-2019 17:01:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: ablg3rw.te           Time Period: Day/Night 16/8 hours
Description: Building 3, Rear Wall

Road data, segment # 1: Lakeshore Rd (day/night)
-----------------------------------------------
Car traffic volume  : 12137/1349  veh/TimePeriod  *
Medium truck volume :   457/51    veh/TimePeriod  *
Heavy truck volume  :   457/51    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  14500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.50
    Heavy Truck  % of Total Volume     :   3.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Lakeshore Rd (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   5.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  48.00 / 48.00  m
Receiver height           :   4.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Lakeshore Rd      !     1.37 !    54.87 !    54.87
--------------------+---------+---------+---------
                       Total                 54.87 dBA

Result summary (night)
----------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Lakeshore Rd      !     1.37 !    48.96 !    48.96
--------------------+---------+---------+---------
                       Total                 48.96 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 54.87
                           (NIGHT): 48.96
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 23-07-2019 17:03:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: ablg3ry.te           Time Period: Day/Night 16/8 hours
Description: Building 3, Rear Yard

Road data, segment # 1: Lakeshore Rd (day/night)
-----------------------------------------------
Car traffic volume  : 12137/1349  veh/TimePeriod  *
Medium truck volume :   457/51    veh/TimePeriod  *
Heavy truck volume  :   457/51    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  14500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.50
    Heavy Truck  % of Total Volume     :   3.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Lakeshore Rd (day/night)
-----------------------------------------------
Angle1   Angle2           : -70.00 deg   5.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -70.00 deg   Angle2 : 5.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :  10.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.50 m
Barrier elevation         :   0.00 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Lakeshore Rd     !     1.37 !    53.61 !    53.61 *
--------------------+---------+---------+---------
                      Total                  53.61 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 23-07-2019 17:02:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: ablg4fw.te           Time Period: Day/Night 16/8 hours
Description: Building 4, Front Wall

Road data, segment # 1: Lakeshore Rd (day/night)
----------------------------------------------
Car traffic volume  : 12137/1349  veh/TimePeriod  *
Medium truck volume :   457/51    veh/TimePeriod  *
Heavy truck volume  :   457/51    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  14500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.50
    Heavy Truck  % of Total Volume     :   3.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Lakeshore Rd (day/night)
----------------------------------------------
Angle1   Angle2          : -90.00 deg   90.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      1       (Absorptive ground surface)
Receiver source distance :  15.00 / 15.00  m
Receiver height          :   4.50 / 7.50   m
Topography               :      1       (Flat/gentle slope; no barrier)

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Lakeshore Rd     !     1.37 !    65.51 !    65.51
--------------------+---------+---------+---------
                      Total                  65.51 dBA

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Lakeshore Rd     !     1.37 !    59.16 !    59.16
--------------------+---------+---------+---------
                      Total                  59.16 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 65.51
                           (NIGHT): 59.16
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 23-07-2019 17:02:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: ablg4ola.te          Time Period: Day/Night 16/8 hours
Description: Building 4, OLA

Road data, segment # 1: Lakeshore Rd (day/night)
-----------------------------------------------
Car traffic volume  : 12137/1349  veh/TimePeriod  *
Medium truck volume :   457/51    veh/TimePeriod  *
Heavy truck volume  :   457/51    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  14500
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.50
    Heavy Truck  % of Total Volume     :   3.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Lakeshore Rd (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -35.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -35.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   2.00 / 2.00   m
Source elevation          :   0.00 m
Receiver elevation        :   2.80 m
Barrier elevation         :   2.80 m

Data for Segment # 2: Lakeshore Rd (day/night)
-----------------------------------------------
Angle1   Angle2           : -35.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   1.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -35.00 deg   Angle2 : 90.00 deg
Barrier height            :   4.00 m
Barrier receiver distance :   2.00 / 2.00   m
Source elevation          :   0.00 m
Receiver elevation        :   2.80 m
Barrier elevation         :   2.80 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Lakeshore Rd     !     1.37 !    54.16 !    54.16 *
 2.Lakeshore Rd     !     1.37 !    44.26 !    44.26
--------------------+---------+---------+---------
                      Total                  54.58 dBA
```

APPENDIX 3

SOUND LEVEL CRITERIA

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

ENVIRONMENTAL NOISE GUIDELINE
Stationary and Transportation Sources - Approval and Planning
Publication NPC-300

August 2013

Day-time Outdoor Sound Level Limit

Table C-1 gives the equivalent sound level (L_{eq}) limit for designated Outdoor Living Areas. The limit applies to the entire day-time period from 07:00 to 23:00.

TABLE C-1
Sound Level Limit for Outdoor Living Areas
Road and Rail

Time Period	*L_{eq}(16) (dBA)*
16 hr, 07:00 - 23:00	*55*

Indoor Sound Level Limit

Table C-2 gives the equivalent sound level (L_{eq}) limits and the applicable time periods for the indicated types of indoor space. The specified sound level criteria are minimum requirements and apply to the indicated indoor spaces with the windows and doors closed.

TABLE C- 2
Indoor Sound Level Limits (Road and Rail)

Type of Space	*Time Period*	*L_{eq} (Time Period) (dBA)*	
		Road	*Rail*
Living/dining, den areas of residences, nursing/retirement homes, hospitals, schools, day-care centers, etc.	*07:00-23:00*	*45*	*40*
Living/dining areas of residences, nursing/retirement homes, hospitals, etc. (except schools or daycare centres)	*23:00 - 07:00*	*45*	*40*
Sleeping quarters	*07:00-23:00*	*45*	*40*
Sleeping quarters	*23:00 - 07:00*	*40*	*35*

SUPPLEMENTARY NOISE LIMITS

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-9.

TABLE C-9

Indoor Sound Level Limits (Road and Rail)

Type of Space	*Time Period*	*L_{eq} (Time Period) (dBA)*	
		Road	*Rail*
General offices, reception areas, retail stores, etc.	*16 hours between 07:00-23:00*	*50*	*45*
Living/dining areas of residences, hospitals, schools, nursing/retirement, homes day-care centers, theatres, place of worship, libraries, individual or semi-private offices, conference rooms, reading rooms etc.	*16 hours between 07:00-23:00*	*45*	*40*
Sleeping quarters of hotels/motels	*8 hours between 23:00 - 07:00*	*45*	*40*
Sleeping quarters of residences, hospitals, nursing/retirement homes etc	*8 hours between 23:00 - 07:00*	*40*	*35*

SUMMARY OF MINIMUM NOISE CONTROL AND VENTILATION REQUIREMENTS FOR ROAD AND RAIL NOISE

TABLE 1

COMBINATION OF ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
OUTDOOR, VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	*L_{eq} (16 hr) (dBA)*	*VENTILATION REQUIREMENTS*	*OUTDOOR CONTROL MEASURES*	*WARNING CLAUSE*
OUTDOOR LIVING AREA (OLA)	*Less than or equal to 55 dBA*	*N/A*	*None required*	*Not required*
	Greater than 55 dBA to less than or equal to 60 dBA	*N/A*	*Control measures (barriers) not required but should be considered*	*Required if resultant L_{eq} exceeds 55 dBA Type A*
	Greater than 60 dBA	*N/A*	*Control measures (barriers) required to reduce the L_{eq} below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible*	*Required if resultant L_{eq} exceeds 55 dBA Type B*
PLANE OF LIVING ROOM WINDOW	*Greater than 50 dBA to less than or equal to 55 dBA*	*None required*	*N/A*	*Not required*
	Greater than 55 dBA to less than or equal to 65 dBA	*Forced air heating with provision for central air conditioning*	*N/A*	*Required Type C*
	Greater than 65 dBA	*Central air conditioning*	*N/A*	*Required Type D*

TABLE 2

COMBINATION OF ROAD AND RAIL NOISE, NIGHT-TIME (2300 - 0700)
VENTILATION AND WARNING CLAUSE REQUIREMENTS

ASSESSMENT LOCATION	*L_{eq}(8hr) (dBA)*	*VENTILATION REQUIREMENTS*	*WARNING CLAUSE*
PLANE OF BEDROOM WINDOW	*Greater than 50 dBA to less or equal to 60 dBA*	*Forced air heating with provision for central air conditioning*	*Required Type C*

	Greater than 60 dBA	*Central air conditioning*	*Required Type D*

TABLE 3
ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)
BUILDING COMPONENT REQUIREMENTS

ASSESSMENT LOCATION		***L_{eq} (16 hr)***	***BUILDING COMPONENT REQUIREMENTS***
PLANE OF LIVING ROOM WINDOW	*ROAD*	*Less than or equal to 65 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 65 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*
	RAIL	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 60 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*

TABLE 4
ROAD AND RAIL NOISE, NIGHT-TIME (2300-0700)
BUILDING COMPONENT REQUIREMENTS

ASSESSMENT LOCATION		***L_{eq} (8 hr)***	***BUILDING COMPONENT REQUIREMENTS***
PLANE OF BEDROOM WINDOW	*ROAD*	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 65 dBA	*Building components (walls, windows, etc.) must bed designed to achieve indoor sound level criteria*
	RAIL	*Less than or equal to 60 dBA*	*Building compliant with the Ontario Building Code*
		Greater than 60 dBA	*Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria*

TABLE 5
FACADE REQUIREMENT FOR RAIL NOISE ONLY - 24 HOURS

ASSESSMENT LOCATION	***DISTANCE TO RAILWAY (m)***	***L_{eq} (24 hr) (dBA)***	***NOISE CONTROL REQUIREMENT***
PLANE OF BEDROOM WINDOW	*Less than 100 m*	*Less than or equal to 60 dBA*	*No additional requirement*
		Greater than 60 dBA	*Brick veneer or acoustically equivalent*
	Greater than 100 m	*Less than or equal to 60 dBA*	*No additional requirement*
		Greater than 60 dBA	*No additional requirement*

TABLE B- 1
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq dBA)
Outdoor Points of Reception

Time of Day	*Class 1 Area*	*Class 2 Area*	*Class 3 Area*	*Class 4 Area*
07:00-19:00	*50*	*50*	*45*	*55*
19:00 -23:00	*50*	*45*	*40*	*55*

TABLE B- 2
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq dBA)
Plane of Window of Noise Sensitive Spaces

Time of Day	*Class 1 Area*	*Class 2 Area*	*Class 3 Area*	*Class 4 Area*
07:00-19:00	*50*	*50*	*45*	*60*
19:00 -23:00	*50*	*50*	*40*	*60*
23:00-07:00	*45*	*45*	*40*	*55*

WARNING CLAUSES

The following warning clauses may be used individually or in combination:

TYPE A:

"Purchasers are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound level will exceed the Ministry of Environment's noise criteria."

TYPE C:

"This unit was fitted with ducting sized to accommodate an air conditioning unit. The installation of air conditioning by the owner will allow windows and exterior doors to be kept closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment. (Note: care should be taken to ensure that the condenser unit is located in an area that is not sensitive to noise. The sound rating of the air conditioning units must not exceed the sound emission standards established by the Ministry of Environment)."

TYPE D:

"This dwelling unit was fitted with a central air conditioner to allow the windows and exterior doors to remain closed, thereby achieving indoor sound levels within the limits recommended by the Ministry of Environment."

APPENDIX 4

SAMPLE WINDOW AND EXTERIOR WALL CONFIGURATIONS

WINDOW STC RATINGS

STC	Double Glazing of indicated glass thickness					Triple Glazing	
	2mm and 2mm glass	**3mm and 3mm glass**	**4mm and 4mm glass**	**3mm and 6mm glass**	**6mm and 6mm glass**	**3mm 3mm and 3mm glass**	**3mm 3mm and 6mm glass**
	Interpane Spacing (mm)					Interpane Spacing (mm)	
27	6						
28	13						
29	15	6					
30	18	13	6				
31	22	16	13	6	6	6,6	
32	28	20	16	13	13	6,10	6,6
33	35	25	20	16	16	6,15	6,10
34	42	32	25	20	20	6,20	6,15
35	50	40	32	25	24	6,30	6,20
36	63	50	40	32	30	6,40	6,30
37	80	63	50	40	37	6,50	6,40
38	100	80	63	55	50	6,65	6,50
39	125	100	80	75	70	6,80	6,65
40	150	125	100	95	90	6,100	6,80
41		150	125	110	100		6,100
42			150	135	125		

Source: National Research Council, Division of Building Research

EXPLANATORY NOTES:

1. STC data listed in the table are for the well-fitted weather-stripped units that can be opened. The STC values apply only when the windows are closed. For windows fixed and sealed to the frame, add three to the STC given in the table.

2. If the interpane spacing or glass thickness for a specific double-glazed window is not listed in the table, the nearest listed values should be used.

3. If the interpane spacing for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacing are nearest the actual combined spacing.

4. The STC data listed in the table are for typical windows, but details of glass mounting, window seals, etc., may result in slightly different performance for some manufacturer's products. If the laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used.

EXTERIOR WALL STC RATINGS

Wall Configuration	EW1	EW2	EW3	EW4	EW1R	EW2R	EW3R	EW5	EW4R	EW6	EW7 EW5R	EW8
STC Rating	**38**	**40**	**43**	**46**	**47**	**48**	**49**	**54**	**55**	**57**	**58**	**62**

Source: National Research Council, Division of Building Research

NOTES:

1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.

- EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
- EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
- EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
- EW4 denotes the common structure, plus sheathing and 20 mm stucco.
- EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
- EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
- EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
- EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.

2 R signifies the mounting of the interior gypsum board on resilient clips.

3 An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25 to 50 mm), 25 mm air space, and 100 mm brick veneer has the same STC as EW6.

4 An exterior wall described in EW1 with the addition of rigid insulation (25 to 50 mm) between the sheathing and the external finish has the same STC as EW2.