Environmental Noise Feasibility Study

Argo Neyagawa

Proposed Residential Development

William Halton Parkway and Neyagawa Boulevard
Town of Oakville

December 20, 2023
Project: 123-0189

Prepared for

Argo Neyagawa Corporation

Prepared by:

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VALCOUSTICS
Canada Ltd.

Version History

Version #	Date	Comments
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Proposed Residential Development

William Halton Parkway and Neyagawa Boulevard
Town of Oakville

EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) has been retained to prepare an Environmental Noise Feasibility Study for the proposed residential development at the northwest corner of the intersection of Burnhamthorpe Road (future William Halton Parkway) and Neyagawa Boulevard in support of a joint Official Plan Amendment, Draft Plan of Subdivision and Zoning By Law Amendment submissions to the Town of Oakville and the Regional Municipality of Halton.

The proposed development consists of four medium density residential condominium blocks (Blocks 1, 3, 4 and 5), a mixed-use block (Block 2), a stormwater management pond (Block 6), a trail (Block 7), a Ministry of Transportation (MTO) setback block (Block 8), a block for the future Highway 407 Transitway (Block 9) and two new internal roadways (Streets 'A' and 'B'). The specific product types, locations and configurations within each development block will be determined at the time of the future Site Plan Approval (SPA) applications. For the purpose of this analysis, a Preliminary Concept Plan showing potential building forms within these blocks was used.

The transportation noise sources in the vicinity of the proposed development are road traffic on Highway 407, Burnhamthorpe Road (future William Halton Parkway), Neyagawa Boulevard and Fourth Line. There are no stationary noise sources in the vicinity that are expected to have a significant impact at the subject site.

The sound levels at the site have been determined and compared with the applicable Ministry of the Environment, Conservation and Parks (MECP) guideline limits to determine the requirements for noise mitigation.

For the preliminary concept, to meet the applicable transportation source guideline limits:

- The two high-rise buildings at the southeast corner of the site (Buildings A and B) and the three townhouse blocks at the northwest corner of the site (Townhouse Blocks 1, 4 and 5) require mandatory air conditioning;

- All remaining dwellings along the Highway 407 Transitway block and adjacent to William Halton Parkway, Neyagawa Boulevard, Fourth Line and the stormwater management pond require the provision for adding air conditioning.
- At the high-rise buildings, exterior wall construction meeting Sound Transmission Class (STC) 45 and exterior windows with ratings up to STC 35 will mitigate the indoor sound levels to the indoor criteria.
- At the townhouse buildings, exterior walls meeting STC 37 and exterior windows meeting STC 27 will mitigate the indoor sound level to the indoor criteria. It is expected that these STC ratings can be met using exterior wall and window construction meeting the minimum non-acoustical requirements of the Ontario Building Code (OBC).

1.0 INTRODUCTION

1.1 PROJECT SCOPE

Valcoustics Canada Ltd. (VCL) has been retained to prepare an Environmental Noise Feasibility Study for the proposed development in support of a joint Official Plan Amendment, Draft Plan of Subdivision and Zoning By Law Amendment submissions to the Town of Oakville and the Regional Municipality of Halton.

The potential sound levels and noise mitigation measures required for the proposed development to comply with applicable MECP noise guideline limits are outlined herein.

1.2 SITE DESCRIPTION AND SURROUNDING AREA

The proposed residential development is located at the northwest corner of the intersection of Burnhamthorpe (future William Halton Parkway) and Neyagawa Boulevard. The site is bounded by the following:

- Highway 407 to the north;
- Neyagawa Boulevard, with agricultural land beyond, to the east;
- Burhamthorpe Road (future Willam Halton Parkway), with the King's Christian Collegiate school beyond, to the south; and,
- Fourth Line, with existing residential dwellings and a Natural Heritage System beyond, to the west.

Note, there is an existing residential dwelling on the north side of Burnhamthorpe Road, on the east side of the proposed Stormwater Management Pond, that is currently not part of the subject development site.

A Key Plan showing the site location is provided as Figure 1.

Although the study has been prepared in support of a Draft Plan consisting of blocks, the analysis was done using a Preliminary Concept Plan showing potential building forms within these blocks. The plans referenced in this report are:

- the Draft Plan of Subdivision, prepared by Korsiak Urban Planning, dated December 19, 2023, shown as Figure 2.

- A Preliminary Concept Plan prepared by Gerrard Design, dated December 11, 2023, shown as Figure 3.

Note, the block numbers on Figure 3 were added by VCL for ease of description.

1.3 PROPOSED DEVELOPMENT

The proposed development consists of four medium density residential condominium blocks (Blocks 1, 3, 4 and 5), a mixed-use block (Block 2), a stormwater management pond (Block 6), a trail (Block 7), an MTO setback block (Block 8), a block for the future Highway 407 Transitway (Block 9) and two new internal roadways (Streets 'A' and 'B').

The specific product types, locations and configurations within each development block will be determined at the time of the future Site Plan Approval (SPA) applications. For the purpose of this analysis, a Preliminary Concept Plan showing potential building forms within these blocks was used. Currently, the preliminary concept shows 11 blocks of dual frontage townhouse units, 27 blocks of rear lane townhouse units, 18 blocks of back-to-back townhouse units and two high-rise residential buildings.

The building heights are:

- Dual-frontage townhouse units: 3 storeys (2 storeys plus a loft)
- Rear-lane townhouse units: 3 storeys (2 storeys plus a loft)
- Back-to-back townhouse units: 3 storeys
- Buildings A and B: 15-storeys with an 8-storey podium

The townhouse units will be provided with small private balconies or terraces. It is understood that these balconies and terraces will be less than 4 m in depth.

Since detailed plans for the high-rise buildings have not yet been developed, the locations of the outdoor amenity spaces have not yet been determined. The plans will be developed and the sound barrier requirements will be assessed as part of the future SPA application for that block.

2.0 NOISE SOURCES

2.1 TRANSPORTATION

2.1.1 Road Traffic

The transportation noise source with potential to impact the proposed residential development is road traffic on Highway 407, William Halton Parkway, Neyagawa Boulevard and Fourth Line.

<u>Highway 407</u>

Road traffic volumes (including truck percentages) applicable to the year 2016 for Highway 407 were obtained from the University of Toronto Data Management Group. A multiplication factor of 1.2 was used to convert the 15-hour counts to 24-hour volumes. A day/night split of 90/10 was used. A growth rate of 2% compounded annually was applied to obtain future (year 2044) traffic volumes.

William Halton Parkway, Neyagawa Boulevard and Fourth Line

The future (year 2033 traffic volumes) for William Halton Parkway, Neyagawa Boulevard and Fourth Line were provided by CGH Transportation Inc., the traffic consultants for this project, in the form of peak hour Turning Movement Counts (TMCs). The peak hour traffic volumes were converted to 24-hour volumes by multiplying by 10. The volumes on the roadways were projected to the year 2044 using a growth rate of 2%, compounded annually.

Existing (year 2023) TMCs showing the total truck percentages were also provided by the traffic consultants. For William Halton Boulevard and Neyagawa Boulevard, the truck percentages from the peak hour were used in the assessment. The traffic volumes on Fourth Line were too low to calculate a representative truck volume for the 24-hour period. The traffic volume for Neyagawa Boulevard was therefore applied to Fourth Line in this analysis. Medium and heavy trucks were assumed to be 60% and 40%, respectively of the total truck volume.

The speed limit of 60 km/h on William Halton Parkway, Neyagawa Boulevard and Fourth Line were provided by the traffic consultants. For these roads, the day/night splits were assumed to be 90%/10%, as is typical for well-travelled roadways.

It is noted that the data provided by the traffic consultants also shows the future volumes on the internal roadways and the Highway 407 eastbound off-ramp. These volumes were minor and noise from these roadways would therefore not have a significant impact at the subject site. Thus, these roadways were not considered further in this assessment.

TABLE 1 ROAD TRAFFIC DATA

Roadway	Year	24-Hour Volume [2]	% Trucks		Speed Limit (km/hr)	Day/Night Split (%)
			Medium	Heavy		
Highway 407 Eastbound[1]	2016 (2044)	23 534 (40 973)	11.3	3.7	100	90/10
Highway 407 Westbound[1]	2016 (2044)	25 306 (44 058)	9.3	3.1	100	90/10
William Halton Parkway[2]	2033 (2044)	24 620 (30 612)	3.7	2.4	60	90/10
Neyagawa Boulevard[2]	2033 (2044)	8 500 (10 569)	0.7	0.4	60	90/10
Fourth Line[3]	2033 (2044)	1 760 (2 188)	0.7	0.4	60	90/10

Notes:

(1) Year 2016 traffic volumes and truck percentages were obtained from the University of Toronto Data Management Group. A multiplication factor of 1.2 was used to convert the 15-hour counts to 24-hour volumes. A growth rate of 2% compounded annually was applied to obtain future (year 2044) traffic volumes. The day/night split was assumed.

(2) Year 2033 traffic volumes obtained from the traffic consultants for this project. Peak hour volumes were converted to 24-hour volumes by multiplying by a factor of 10. A growth rate of 2% compounded annually was applied to obtain future (year 2044) traffic volumes. Total truck percentages were calculated from existing counts. Medium and heavy trucks were assumed to be 60% and 40% of the total truck volume. The day/night split was assumed.

(3) Year 2033 traffic volumes obtained from the traffic consultants for this project. Peak hour volumes were converted to 24-hour volumes by multiplying by a factor of 10. A growth rate of 2% compounded annually was applied to obtain future (year 2044) traffic volumes. Truck percentages were assumed to be the same as Neyagawa Boulevard. The day/night split was assumed.

2.1.2 Highway 407 Transitway

A future bus rapid transitway is planned along Highway 407. A block for this Transitway is provided along the north property line of the subject site. An "Environmental Project Report" dated August 13, 2020 was prepared for the Transitway. Appendix K of this report is a "Noise and Vibration Impact Assessment" prepared by Arcadis Canada Inc. dated June 2020 (Reference 4). The report indicated that, in general, the sound levels at the dwellings in the vicinity of the Transitway would largely be dominated by noise from Highway 407 itself. In the vicinity of the site, the report assessed the sound levels at three existing dwellings at the north end of Fourth Line (i.e. the dwellings closest to the Transitway). At the two dwellings adjacent to the planned Transitway, the addition of the Transitway would result in minor (1.6 dBA and 1.8 dBA) increases in sound levels. No change in sound level was predicted at the third dwelling, which was not immediately adjacent. The report also concluded that the Transitway would not have a significant vibration impact at the neighbouring receptors. Thus, to account for the Transitway, a +1.8 dBA adjustment was added to the predicted daytime and nighttime sound levels due to Highway 407 at the first row of dwellings adjacent to the Transitway.

2.2 STATIONARY SOURCES

The existing King's Christian Collegiate School is located to the south of the subject site, on the south side of Burnhamthorpe Road (future William Halton Parkway). The main noises associated with the school are expected to be the rooftop mechanical units. A preliminary assessment of the noise impact from the school indicated that sound levels at the subject site were predicted to be within the noise guideline limits (see Appendix B). Thus, the noise impact from the school has not been considered further in this assessment.

3.0 ENVIRONMENTAL NOISE GUIDELINES

3.1 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

The applicable noise guidelines for new residential developments are those in MECP Publication NPC-300, "*Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning.*"

The environmental noise guidelines of the MECP as provided in the NPC-300 document are discussed briefly in the following sections. Additional information is provided in Appendix C for the NPC-300 guidelines.

3.1.1 Architectural Elements

During daytime and evening hours (0700 to 2300), the indoor criterion for road noise is a 16-hour $L_{eq,Day}$ of 45 dBA for sensitive spaces such as living/dining rooms, dens, and bedrooms. At night (2300 to 0700 hours), the indoor criterion for road noise is $L_{eq,Night}$ of 45 dBA for sensitive spaces such as living/dining rooms and dens, and 40 dBA for bedrooms and sleeping quarters.

The architectural design of the building envelopes (walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound level limits, based on the applicable outdoor sound levels predicted on the building facades.

3.1.2 Ventilation Requirements

In accordance with the MECP noise guidelines for transportation noise sources, if the daytime sound level ($L_{eq,Day}$) at the exterior face of a noise-sensitive window is greater than 65 dBA, means must be provided such that windows can be kept closed for noise control purposes, and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA inclusive, there need only be the provision for adding central air conditioning at a later date. A warning clause advising the occupants of the potential noise interference with some activities is also required. At nighttime, air conditioning would be required when the sound level exceeds 60 dBA ($L_{eq,Night}$) at a noise sensitive window. The provision for adding air conditioning is required when the nighttime sound level is greater than 50 dBA.

3.1.3 Outdoor Living Areas

For outdoor amenity areas (OLAs), the guideline sound level limit is a daytime sound level ($L_{eq,Day}$) of 55 dBA, with an excess not more than 5 dBA (i.e. an upper allowable design limit of 60 dBA) considered acceptable if it is not feasible to achieve the 55 dBA objective for technical, economic or administrative reasons. In these cases, warning clauses must be provided and registered on title. Nighttime sound level limits are not applicable for OLA's.

It should be noted that for road traffic sources, a balcony/terrace is considered an OLA if it is elevated, is the only OLA for the occupant, and it is 4 m in depth or greater.

3.2 REGION OF HALTON

The Region of Halton Noise guidelines are listed in the Abatement Guidelines (part of the Regional Official Plan Guidelines) and the Region of Halton Noise Abatement Policy for Regional Roads (Retrofit Locations) and New Developments. The Region's criteria for OLA's is 55 dBA. The Region has a minimum sound barrier height of 2.4 m and a maximum sound barrier height of 3.5 m, where a sound barrier is needed adjacent to Regional Roads. Also, the criteria for traffic noise prediction is required to be based on the 20-year traffic forecast for the adjacent regional roads.

4.0 ASSESSMENT

4.1 ANALYSIS METHOD

The equivalent sound energy levels in terms of $L_{eq,Day}$ and $L_{eq,Night}$ were determined using ORNAMENT – STAMSON V5.04, the computerized road traffic noise prediction software of the MECP.

At the conceptual townhouse blocks, the daytime and nighttime sound levels were assessed at a 3rd storey/loft height of 7.5 m above grade for the townhouse units. Buildings A and B were assessed at a height of 43.5 m above grade. These heights represent the top floor windows, the worst-case locations.

Inherent screening of each proposed building facade due to its orientation to the noise source, as well as screening from the proposed buildings within the development, was included in the assessment.

4.2 RESULTS

At the conceptual townhouse blocks, the highest daytime/nighttime sound levels of 67 dBA/61 dBA are predicted to occur at the dwelling at the northwest corner of the site (closest to Highway 407). At the high-rise buildings, the highest daytime/nighttime sound levels of 69 dBA/63 dBA are predicted to occur at the south facade of Building A (adjacent to William Halton Parkway).

The predicted sound levels are summarized in Table 2.

Sample calculations are provided in Appendix D.

TABLE 2 PREDICTED UNMITIGATED OUTDOOR SOUND LEVELS

Location	Source	Distance (m)[1]	$L_{eq\ Day}$ (dBA)[2]	$L_{eq\ Night}$ (dBA)[2]
R1 – Townhouse Block 1 North Facade	Highway 407 Eastbound	152	65	58
	Highway 407 Westbound	170	64	57
	TOTAL	**---**	**67**[3]	**61**[3]
R2 – Townhouse Block 8 North Facade	Highway 407 Eastbound	222	61	55
	Highway 407 Westbound	241	61	54
	Neyagawa Boulevard	172	42	36
	TOTAL	**---**	**64**[3]	**58**[3]
R3 – Townhouse Block 10 North Facade	Highway 407 Eastbound	253	61	55
	Highway 407 Westbound	271	60	54
	Neyagawa Boulevard	36	53	46
	TOTAL	**---**	**64**[3]	**58**[3]
R4 – Townhouse Block 10 East Facade	Highway 407 Eastbound	253	58	52
	Highway 407 Westbound	271	58	51
	Neyagawa Boulevard	36	56	49
	TOTAL	**---**	**62**[3]	**56**[3]
R5 – Townhouse Block 12 East Facade	Highway 407 Eastbound	366	54	48
	Highway 407 Westbound	385	54	47
	William Halton Parkway	200	51	44
	Neyagawa Boulevard	35	56	50
	TOTAL	**---**	**60**	**54**
R6 – Townhouse Block 13 East Facade	William Halton Parkway	195	50	43
	Neyagawa Boulevard	45	53	47
	TOTAL	**---**	**55**	**48**
R7 – Building B North Facade	Highway 407 Eastbound	418	65	58
	Highway 407 Westbound	436	64	58
	Neyagawa Boulevard	39	56	49
	TOTAL	**---**	**68**	**61**

…/cont'd

TABLE 2 PREDICTED UNMITIGATED OUTDOOR SOUND LEVELS (continued)

Location	Source	Distance (m)[1]	$L_{eq\ Day}$ (dBA)[2]	$L_{eq\ Night}$ (dBA)[2]
R8 – Building B East Facade	Highway 407 Eastbound	445	61	55
	Highway 407 Westbound	463	61	54
	William Halton Parkway	122	58	52
	Neyagawa Boulevard	38	59	53
	TOTAL	**---**	**66**	**60**
R9 – Building A Eat Facade	William Halton Parkway	22	66	60
	Neyagawa Boulevard	47	58	51
	TOTAL	---	**68**	**60**
R10 – Building A South Facade	William Halton Parkway	22	69	63
	Neyagawa Boulevard	47	56	49
	TOTAL	**---**	**69**	**63**
R11 – Building A North Facade	Highway 407 Eastbound	531	61	54
	Highway 407 Westbound	549	61	54
	TOTAL	**---**	**64**	**57**
R12 – Townhouse Block 51 South Facade	William Halton Parkway	59	57	50
R13 – Townhouse Block 56 South Facade	William Halton Parkway	30	65	59
R14 – Townhouse Block 53 West Facade	William Halton Parkway	96	60	53
	Fourth Line	101	46	39
	TOTAL	**---**	**60**	**53**
R15 – Townhouse Block 41 West Facade	Highway 407 Eastbound	476	53	46
	Highway 407 Westbound	494	52	46
	William Halton Parkway	126	53	46
	Fourth Line	11	57	51
	TOTAL	**---**	**60**	**54**
R16 – Townhouse Block 30 West Facade	Fourth Line	23	50	44
R17 – Townhouse Block 34 West Facade	Highway 407 Eastbound	266	56	50
	Highway 407 Westbound	285	56	49
	Fourth Line	11	54	48
	TOTAL	**---**	**60**	**54**
R18 – Townhouse Block 23 North Facade	Highway 407 Eastbound	268	53	46
	Highway 407 Westbound	286	52	46
	TOTAL	**---**	**56**	**49**

Notes:

(1) Distance to the building facade from the centreline of the roadway

(2) Sound levels were assessed at a height of 7.5 m above grade for the townhouse units and 43.5 m above grade for Buildings A and B.

(3) 1.8 dB has been added to the predicted sound levels due to Highway 407 to account for the addition of the Transitway.

4.3 NOISE CONTROL REQUIREMENTS

The noise control requirements can be generally classified into two categories which are interrelated, but which the designer can treat separately for the most part:

- Architectural elements to achieve acceptable indoor noise guideline limits; and,
- Design features to protect the OLAs.

The applicable noise control requirements are summarized in Table 3, and the notes to Table 3.

TABLE 3 MINIMUM NOISE CONTROL MEASURES

Location	Air Conditioning[1]	Exterior Walls[2]	Exterior Windows[3]	Sound Barrier[4]	Warning Clauses[5]
Building A	Mandatory	STC 45	Up to STC 35	To be determined. See Note 4	A + B + D
Building B	Mandatory	STC 45	Up to STC 35	To be determined. See Note 4	A + B
Townhouse Blocks 1, 4 and 5	Mandatory	STC 37	STC 27	None	A + B
Townhouse Blocks 2, 3, 6, 7, 8, 9, 10, 11, 12, 20, 21, 31, 32, 33, 34, 39, 40, 41, 43 and 53	Provision for adding air conditioning	No special acoustical requirements	No special acoustical requirements	None	A + C
Townhouse Blocks 55 and 56	Provision for adding air conditioning	No special acoustical requirements	No special acoustical requirements	None	A + C + D
All other dwellings	None	No special acoustical requirements	No special acoustical requirements	-	-

Notes to Table 3 on the following page.

Notes to Table 3:

(1) Where means must be provided to allow windows to remain closed for road noise control purposes, a commonly used technique is that of air central conditioning.

(2) STC - Sound Transmission Class Rating (Reference ASTM-E413).

The requirements are based on assumed wall and window areas and should be confirmed once detailed floor plans and elevations are available.

(3) STC - Sound Transmission Class Rating (Reference ASTM-E413). A sliding glass walkout door should be considered as a window and be included in the percentage of glazing.

The requirements are based on assumed wall and window areas and should be confirmed once detailed floor plans and elevations are available.

(4) Acoustic fences/sound barriers must be of solid construction having a minimum face density of 20 kg/m^2 with no gaps, cracks or holes. A variety of materials are available, including concrete, masonry, glass, wood, specialty composite materials, or a combination of the above.

The locations and dimensions of the common outdoor amenity areas at Buildings A and B have not yet been determined. The sound barrier requirements for these blocks should be determined at the Site Plan Approval stage.

(5) Warning clauses to be included in Occupancy Agreements:

A. "Purchasers 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 may occasionally interfere with some activities of the dwelling occupants as the sound level may exceed the noise guidelines of the Municipality and the Ministry of the Environment."

B. "This dwelling 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 noise criteria of the municipality and the Ministry of the Environment."

C. "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."

D. "Purchasers are advised that due to the proximity of the school, noise from this facility may at times be audible."

(6) All exterior doors shall be fully weather-stripped.

4.3.1 Architectural Elements

The indoor noise guidelines can be achieved by using appropriate construction for exterior walls, windows and doors. Floor plans and elevations are currently not available. The requirements were therefore calculated using assumed (typical) wall and window areas. In determining the worst-case architectural requirements for the residential townhouse blocks, wall and window areas were assumed to be 80% and 30%, respectively, on each facade of a corner room with both facade exposed to the noise sources. For the high-rise buildings, wall and window areas were assumed to be 20% and 80%, respectively, on each facade of a corner room with both facade exposed to the noise sources.

Based on the predicted sound levels:

- For Buildings A and B, exterior wall construction meeting a minimum STC 45 and exterior windows meeting STC 35 will mitigate the will be sufficient to achieve the indoor noise guidelines of the MECP.
- For three townhouse blocks at the northwest corner of the site (Townhouse Blocks 1, 4 and 5), exterior wall construction meeting STC 37 and exterior windows meeting STC 27 will be sufficient to achieve the indoor noise guidelines of the MECP.
- At all other dwellings, exterior wall and window construction meeting the minimum non-acoustical requirements of the OBC will be sufficient to meet the indoor noise criteria.

Notes on the requirements:

- For windows, standard double-glazing configurations meeting the minimum non-acoustical requirements of the OBC would be expected to achieve STC 27. The window frames themselves must also be designed to ensure that the overall sound isolation performance of the entire window unit meets the sound isolation requirements. This needs to be confirmed by the window manufacturer through the submission of acoustical test data.
- For the high-rise exterior walls, a typical spandrel panel exterior wall construction with a backup assembly (gypsum board on independent row of studs) would be expected to achieve the requirement of STC 45.
- For the townhouse exterior walls, construction meeting the minimum non-acoustical requirements of the OBC is expected to meet STC 37.
- If exterior walls with higher STC ratings are used, the window STC requirements may decrease.
- The final sound isolation requirements with respect to architectural elements should be reviewed when final architectural plans are developed. Wall and window constructions should also be reviewed at this point to ensure that they will meet the sound isolation performances to achieve the indoor noise guideline requirements of the MECP.

4.3.2 Ventilation Requirements

The analysis shows:

- The high-rise buildings (Buildings A and B) and the three townhouse blocks at the northwest corner of the site (Townhouse Blocks 1, 4 and 5) require mandatory air conditioning.
- All remaining dwellings along the Transitway and adjacent to William Halton Parkway, Neyagawa Boulevard, Fourth Line and the stormwater management pond require the provision for adding air conditioning.

4.3.3 Outdoor Living Area Requirements

There are no grade-level outdoor amenity spaces associated with the townhouse units. All balconies and terraces are expected to be less than 4 m in depth and would therefore not qualify as OLAs under the MECP guidelines. Thus, sound barriers are not required at these locations for noise control purposes.

The plans for the high-rise buildings are currently very preliminary. The locations and dimensions of the common outdoor amenity areas have not been determined. If the common outdoor amenity areas consist of balconies or terraces greater than 4 m in depth, sound barriers may be required. A detailed assessment of the sound barrier requirements for these buildings should be done as part of the future Site Plan Approval submission.

4.4 WARNING CLAUSES

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing/future noise sources. Where the sound level guidelines are exceeded, warning clauses should be registered on title, or included in the development agreement that is registered on title. The warning clauses should also be included in the agreements of Offers of Purchase and Sale and/or lease/rental agreements.

Applicable warning clauses for the proposed development are included in Table 3 and the Notes to Table 3.

5.0 CONCLUSIONS

With appropriate design and the recommendations outlined in this report, the proposed residential development is considered feasible and a suitable acoustical environment can be provided for the occupants of the dwellings.

Future occupants will be made aware of the potential noise impacts through warning clauses, as per MECP guidelines.

6.0 REFERENCES

1. PC STAMSON 5.04, “Computer Program for Road Traffic Noise Assessment”, Ontario Ministry of the Environment and Climate Change.

2. Building Practice Note No. 56: “Controlling Sound Transmission into Building”, by J.D. Quirt, Division of Building Research, National Council of Canada, September 1985.

3. “Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning”, MECP Publication NPC-300, October 2013.

4. “Noise and Vibration Impact Assessment, Highway 407 Transitway: West of Brant Street to West of Hurontario Street”, Arcadis Canada Inc., June 2020.

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No.	Revision/Issue	Date

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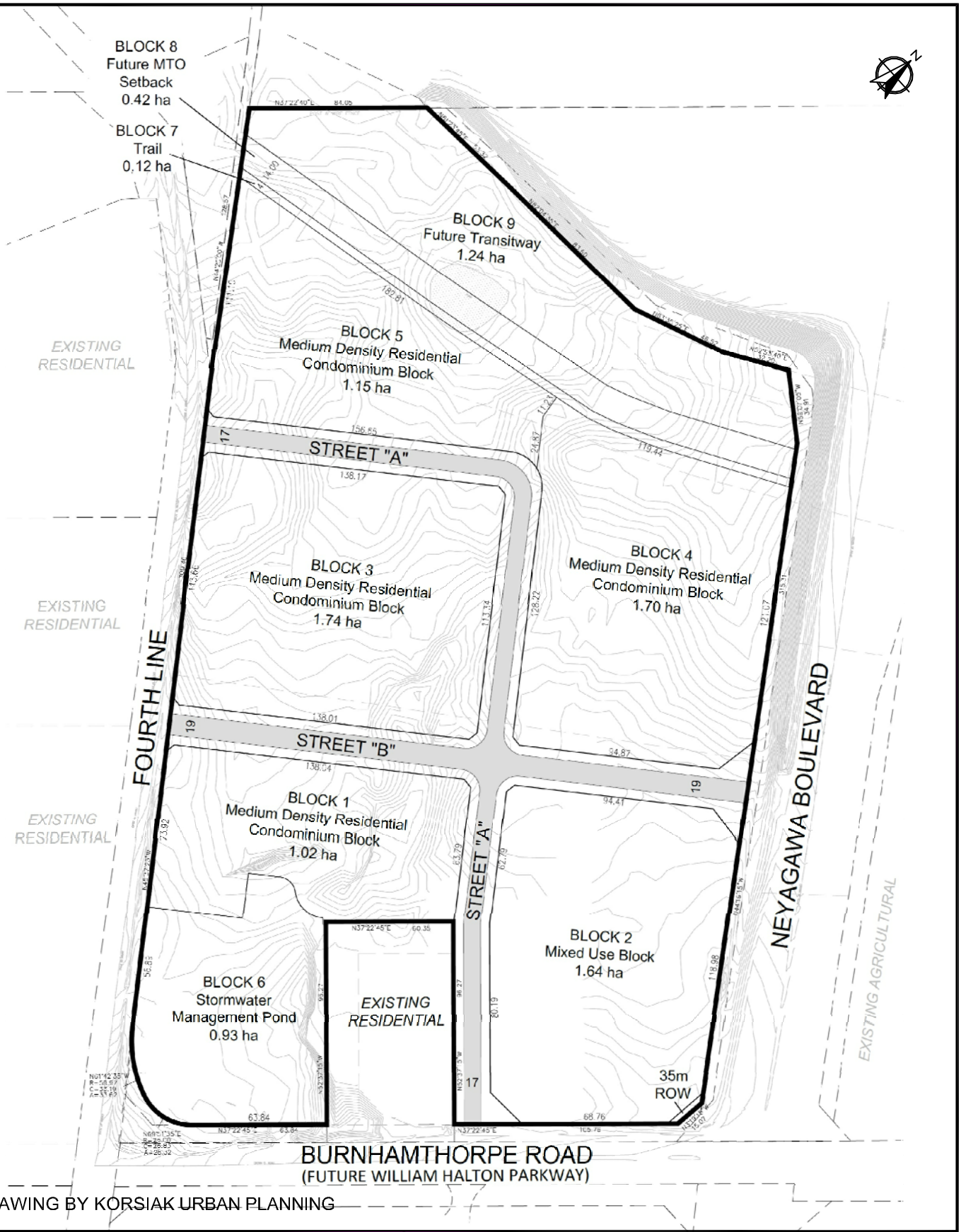
Title	Project No.	Date
Key Plan	123-0189	Dec. 19, 2023
Project Name	**Scale**	**Figure**
Argo Neyagawa	N.T.S.	1



BASE DRAWING BY KORSIAK URBAN PLANNING

No.	Revision/Issue	Date

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Title	Project No.	Date
Draft Plan of Subdivision	123-0189	Dec. 19, 2023
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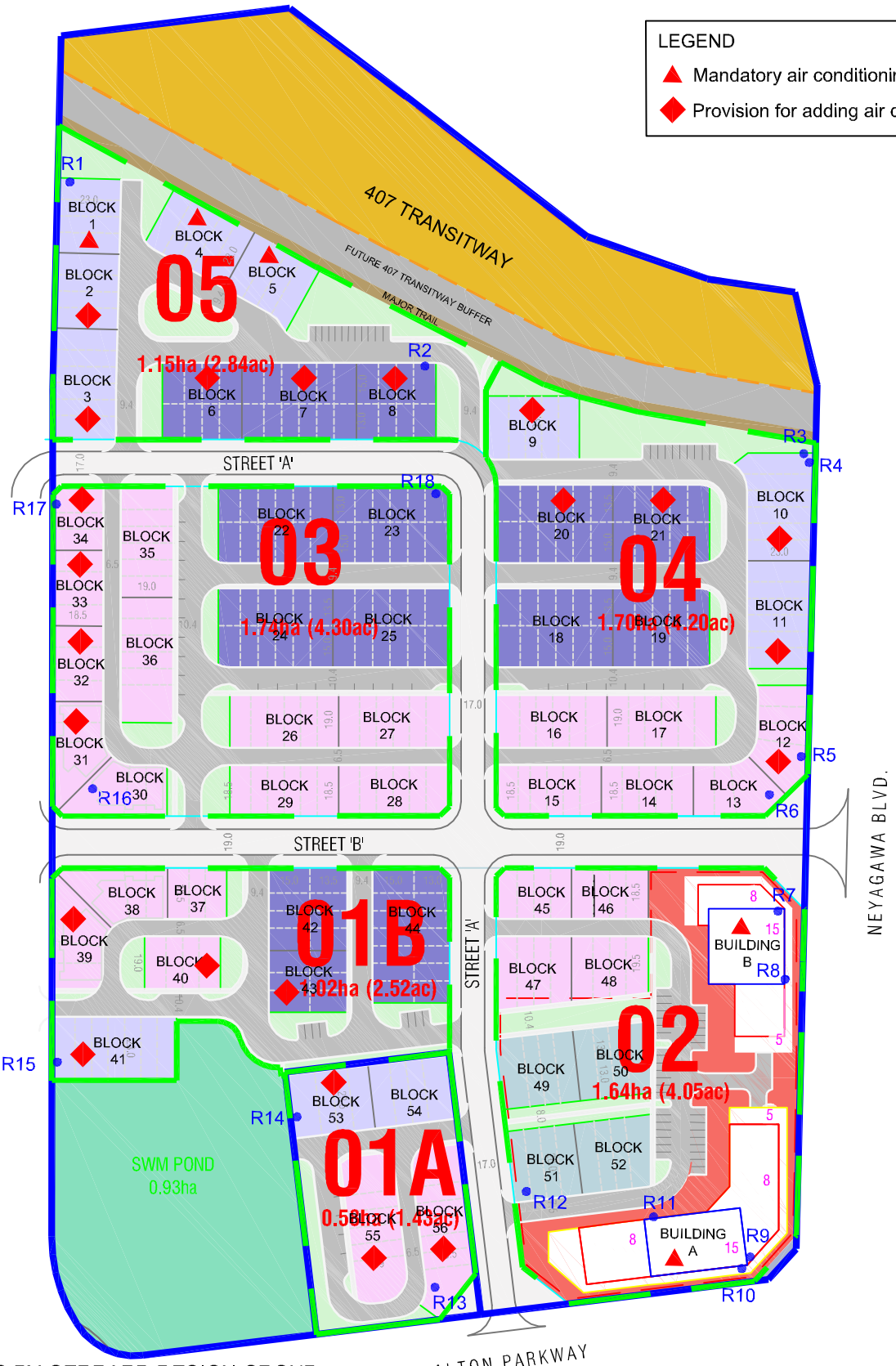

BASE DRAWING BY GERRARD DESIGN GROUP

No.	Revision/Issue	Date

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Title	Project No.	Date
Preliminary Concept Plan	123-0189	Dec. 19, 2023
Project Name	**Scale**	**Figure**
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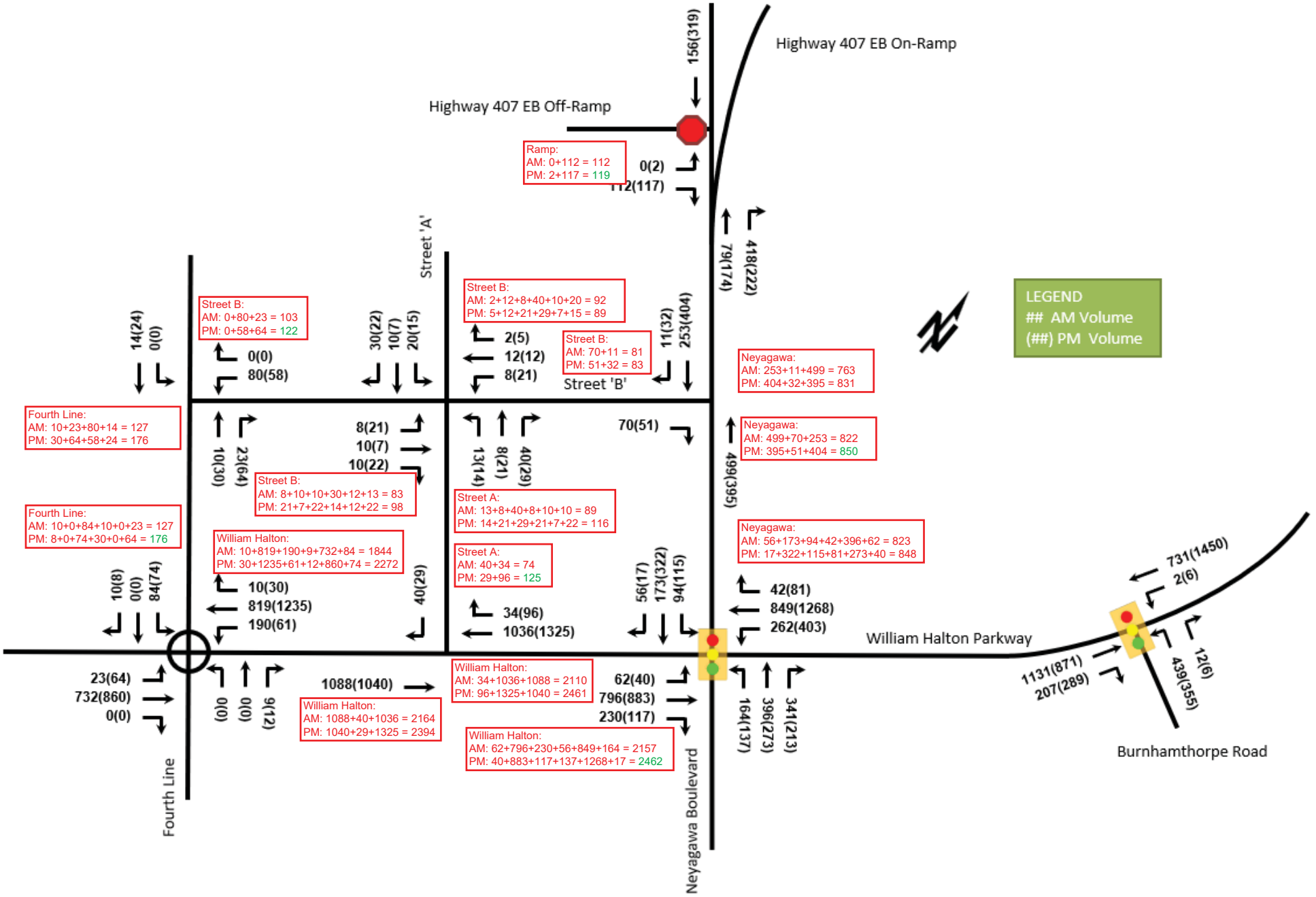
APPENDIX A
ROAD TRAFFIC DATA


Highway 407 EB On-Ramp
Highway 407 EB Off-Ramp
156(319)
Ramp:
AM: 0+112 = 112
PM: 2+117 = 119
0(2)
112(117)
418(222)
79(174)
Street 'A'
Street B:
AM: 0+80+23 = 103
PM: 0+58+64 = 122
14(24)
0(0)
0(0)
80(58)
30(22)
10(7)
20(15)
Street B:
AM: 2+12+8+40+10+20 = 92
PM: 5+12+21+29+7+15 = 89
2(5)
12(12)
8(21)
Street B:
AM: 70+11 = 81
PM: 51+32 = 83
Street 'B'
11(32)
253(404)
LEGEND
AM Volume
(##) PM Volume
Neyagawa:
AM: 253+11+499 = 763
PM: 404+32+395 = 831
Fourth Line:
AM: 10+23+80+14 = 127
PM: 30+64+58+24 = 176
10(30)
23(64)
8(21)
10(7)
10(22)
13(14)
8(21)
40(29)
70(51)
Neyagawa:
AM: 499+70+253 = 822
PM: 395+51+404 = 850
496(395)
Street B:
AM: 8+10+10+30+12+13 = 83
PM: 21+7+22+14+12+22 = 98
Street A:
AM: 13+8+40+8+10+10 = 89
PM: 14+21+29+21+7+22 = 116
Fourth Line:
AM: 10+0+84+10+0+23 = 127
PM: 8+0+74+30+0+64 = 176
Neyagawa:
AM: 56+173+94+42+396+62 = 823
PM: 17+322+115+81+273+40 = 848
William Halton:
AM: 10+819+190+9+732+84 = 1844
PM: 30+1235+61+12+860+74 = 2272
Street A:
AM: 40+34 = 74
PM: 29+96 = 125
10(8)
0(0)
84(74)
10(30)
819(1235)
190(61)
40(29)
34(96)
1036(1325)
56(17)
173(322)
94(115)
42(81)
849(1268)
262(403)
William Halton Parkway
731(1450)
2(6)
12(6)
439(355)
1131(871)
207(289)
23(64)
732(860)
0(0)
0(0)
0(0)
9(12)
1088(1040)
William Halton:
AM: 1088+40+1036 = 2164
PM: 1040+29+1325 = 2394
William Halton:
AM: 34+1036+1088 = 2110
PM: 96+1325+1040 = 2461
62(40)
796(883)
230(117)
164(137)
396(273)
341(213)
William Halton:
AM: 62+796+230+56+849+164 = 2157
PM: 40+883+117+137+1268+17 = 2462
Fourth Line
Neyagawa Boulevard
Burnhamthorpe Road

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Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	07:00:00	From:	07:45:00
To:	10:00:00	To:	08:45:00

Intersection: Neyagawa Blvd & Burnhamthorpe Rd W - William Halton Pkwy
Site Code: 2336300001
Count Date: Nov 07, 2023

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Neyagawa Blvd runs N/S

6/527 = 1.1% trucks

North Approach

	Out	In	Total
Cars	175	346	521
Trucks	5	1	6
Bicycles	0	0	0
	180	**347**	**527**

Neyagawa Blvd

Bicycles	0	0	0	0
Trucks	0	5	0	0
Cars	38	126	11	0
Totals	**38**	**131**	**11**	**0**

Peds: 0

43/896 = 4.8% trucks

East Approach

	Out	In	Total
Cars	442	410	852
Trucks	36	7	43
Bicycles	1	0	1
	479	**417**	**896**

Burnhamthorpe Rd W

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	26	**26**
0	5	59	**64**
0	12	148	**160**

Peds: 0

Peds: 0

William Halton Pkwy

Totals	Cars	Trucks	Bicycles
1	1	0	0
8	8	0	0
105	99	6	0
365	334	30	1

Peds: 1

West Approach

	Out	In	Total
Cars	233	215	448
Trucks	17	12	29
Bicycles	0	0	0
	250	**227**	**477**

29/477 = 6.1% trucks

Neyagawa Blvd

Totals	**84**	**313**	**341**	**0**
Cars	78	312	339	0
Trucks	6	1	2	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	729	608	1337
Trucks	9	47	56
Bicycles	0	1	1
	738	**656**	**1394**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
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Peak Hour Diagram

Specified Period		One Hour Peak	
From:	16:00:00	From:	16:45:00
To:	19:00:00	To:	17:45:00

Intersection: Neyagawa Blvd & Burnhamthorpe Rd W - William Halton Pkwy
Site Code: 2336300001
Count Date: Nov 07, 2023

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Neyagawa Blvd runs N/S

5/534 = 0.9% trucks

North Approach

	Out	In	Total
Cars	274	255	529
Trucks	1	4	5
Bicycles	0	0	0
	275	**259**	**534**

Neyagawa Blvd

Bicycles	0	0	0	0
Trucks	0	1	0	0
Cars	8	251	14	1
Totals	**8**	**252**	**14**	**1**

Peds: 0

9/819 = 1.1% trucks

East Approach

	Out	In	Total
Cars	490	320	810
Trucks	6	3	9
Bicycles	0	0	0
	496	**323**	**819**

Burnhamthorpe Rd W

Bicycles	Trucks	Cars	Totals	
0	0	1	**1**	
0	0	14	**14**	
0	1	23	**24**	
0	0	66	**66**	

Peds: 0

Peds: 0

William Halton Pkwy

Totals	Cars	Trucks	Bicycles
1	1	0	0
29	28	1	0
33	33	0	0
433	428	5	0

Peds: 2

West Approach

	Out	In	Total
Cars	104	90	194
Trucks	1	1	2
Bicycles	0	0	0
	105	**91**	**196**

2/196 = 1.0% trucks

Totals	**49**	**215**	**284**	**0**
Cars	48	212	282	0
Trucks	1	3	2	0
Bicycles	0	0	0	0

Neyagawa Blvd

South Approach

	Out	In	Total
Cars	542	745	1287
Trucks	6	6	12
Bicycles	0	0	0
	548	**751**	**1299**

Cars - Trucks - Bicycles

Comments

Peak Hour Diagram

Specified Period
From: 07:00:00
To: 10:00:00

One Hour Peak
From: 07:45:00
To: 08:45:00

Intersection: Fourth Line & Burnhamthorpe Rd W
Site Code: 2336300002
Count Date: Nov 07, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Burnhamthorpe Rd W runs E/W

North Approach

	Out	In	Total
Cars	3	2	5
Trucks	0	0	0
Bicycles	0	0	0
	3	**2**	**5**

Fourth Line

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	3	0
Totals	**0**	**0**	**3**	**0**

Peds: 0

East Approach

	Out	In	Total
Cars	162	23	185
Trucks	19	11	30
Bicycles	0	0	0
	181	**34**	**215**

Burnhamthorpe Rd W

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	0	**0**
0	9	15	**24**
0	0	0	**0**

Peds: 1

Peds: 0

Burnhamthorpe Rd W

Totals	Cars	Trucks	Bicycles
0	0	0	0
2	2	0	0
23	14	9	0
156	146	10	0

Peds: 0

West Approach

	Out	In	Total
Cars	15	14	29
Trucks	9	9	18
Bicycles	0	0	0
	24	**23**	**47**

Fourth Line

Totals	**0**	**0**	**7**	**0**
Cars	0	0	5	0
Trucks	0	0	2	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	5	146	151
Trucks	2	10	12
Bicycles	0	0	0
	7	**156**	**163**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	16:00:00	From:	16:45:00
To:	19:00:00	To:	17:45:00

Intersection: Fourth Line & Burnhamthorpe Rd W
Site Code: 2336300002
Count Date: Nov 07, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Burnhamthorpe Rd W runs E/W

North Approach

	Out	In	Total
Cars	3	2	5
Trucks	11	5	16
Bicycles	0	0	0
	14	**7**	**21**

Fourth Line

Bicycles	0	0	0	0
Trucks	1	0	10	0
Cars	0	0	3	0
Totals	**1**	**0**	**13**	**0**

Peds: 0

East Approach

	Out	In	Total
Cars	59	20	79
Trucks	8	10	18
Bicycles	0	0	0
	67	**30**	**97**

Burnhamthorpe Rd W

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	0	**0**
0	0	5	**5**
0	0	0	**0**

Peds: 5

Peds: 4

Burnhamthorpe Rd W

Totals	Cars	Trucks	Bicycles
2	2	0	0
7	2	5	0
10	8	2	0
48	47	1	0

Peds: 3

West Approach

	Out	In	Total
Cars	5	8	13
Trucks	0	3	3
Bicycles	0	0	0
	5	**11**	**16**

Fourth Line

Totals	**0**	**0**	**10**	**0**
Cars	0	0	10	0
Trucks	0	0	0	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	10	47	57
Trucks	0	1	1
Bicycles	0	0	0
	10	**48**	**58**

Cars - Trucks - Bicycles

Comments

APPENDIX B

PRELIMINARY STATIONARY NOISE ASSESSMENT

APPENDIX B

PRELIMINARY STATIONARY NOISE ASSESSMENT

NOISE SOURCES

The stationary noise source with potential for impact the proposed development is the King's Christian Collegiate School to the south of the side, on the south side of William Halton Parkway. The main noise sources associated with this facility are the rooftop HVAC units.

The locations of the units were determined using aerial imagery. Typical sound power levels for HVAC units with 1 to 4 fans were used to model these units. The source ID's, sound levels and operating times used in this assessment summarized in Table B1. The source locations are shown on Figure B1.

TABLE B1 NOISE SOURCE SUMMARY

Source ID	Source Description	Source Sound Power Level (dBA)	Operating Time		Source Height (m)
			Day/Eve (0700 to 2300 hours)	Night (2300 to 0700 hours)	
RTU01	2-fan HVAC	88	60	15	1.8
RTU02	1-fan HVAC	76	60	15	1.8
RTU03	2-fan HVAC	88	60	15	1.8
RTU04	2-fan HVAC	88	60	15	1.8
RTU05	2-fan HVAC	88	60	15	1.8
RTU06	1-fan HVAC	76	60	15	1.8
RTU07	1-fan HVAC	76	60	15	1.8
RTU08	2-fan HVAC	88	60	15	1.8
RTU09	1-fan HVAC	76	60	15	1.8
RTU10	1-fan HVAC	76	60	15	1.8
RTU11	1-fan HVAC	76	60	15	1.8
RTU12	2-fan HVAC	88	60	15	1.8
RTU13	2-fan HVAC	88	60	15	1.8
RTU14	2-fan HVAC	88	60	15	1.8
RTU15	1-fan HVAC	76	60	15	1.8
RTU16	1-fan HVAC	76	60	15	1.8
RTU17	2-fan HVAC	88	60	15	1.8
RTU18	2-fan HVAC	88	60	15	1.8
RTU19	2-fan HVAC	88	60	15	1.8
RTU20	2-fan HVAC	88	60	15	1.8
RTU21	2-fan HVAC	88	60	15	1.8
RTU22	2-fan HVAC	88	60	15	1.8

…/cont'd

TABLE B1 NOISE SOURCE SUMMARY (continued)

Source ID	Source Description	Source Sound Power Level (dBA)	Operating Time		Source Height (m)
			Day/Eve (0700 to 2300 hours)	Night (2300 to 0700 hours)	
RTU23	2-fan HVAC	88	60	15	1.8
RTU24	1-fan HVAC	76	60	15	1.8
RTU25	2-fan HVAC	88	60	15	1.8
RTU26	1-fan HVAC	76	60	15	1.8
RTU27	2-fan HVAC	88	60	15	1.8
RTU28	1-fan HVAC	76	60	15	1.8
RTU29	3-fan HVAC	93	60	15	2
RTU30	3-fan HVAC	93	60	15	2
RTU31	4-fan HVAC	94	60	15	2
RTU32	4-fan HVAC	94	60	15	2

ENVIRONMENTAL NOISE GUIDELINES

The applicable noise guidelines for use in development applications for both stationary sources and sensitive land uses are those in MECP Publication NPC-300, *"Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning"*. The environmental noise guidelines of the MECP, as provided in Publication NPC-300, are discussed briefly below.

The site and lands around the site are considered Class 1 – i.e., an area where the ambient sound environment is dominated by "urban hum", primarily traffic noise in this case, 24 hours per day. This is due to the proximity to the area road network.

The MECP requires a predictable "worst case" one-hour operating scenario be analysed. This would typically occur when the background ambient sound level is at a minimum and the noise generated from the stationary noise sources is at a maximum. The predictable worst case is not the absolute worst-case operation that could occur on a site but is "a planned and predictable mode of operation".

The guideline limits apply to the outdoor plane of window of habitable spaces such as living/dining/family rooms and sleep areas as well at outdoor amenity locations. There are no indoor sound level limits provided for stationary sources.

MECP Publication NPC-300 states that the guideline limits shall be defined by the higher of the ambient sound level (typically due to road traffic noise), or the minimum exclusion limits, in any hour of the day. The minimum exclusion limits are 50 dBA during the daytime (0700 to 1900 hours) and evening (1900 to 2300 hours), and 45 dBA at night (2300 to 0700 hours). Sound levels are assessed using one-hour L_{eq} (dBA), the energy equivalent continuous sound level. The sound level limits apply at a noise sensitive plane of window (at all times) or at an outdoor point of reception in the daytime and evening only. The sound level limits do not apply to outdoor points of reception at night.

To be conservative, the minimum exclusion limits were used for all receptors in this assessment.

ANALYSIS METHOD

A 3-D acoustic model of the proposed development and surrounding area was developed using CadnaA V2023 MR1 environmental noise modeling software, which follows the protocol of ISO Standard 9613-2, "*Acoustics – Attenuation of Sound During Propagation Outdoors*", to predict sound levels at each of the receptor locations. Hard ground (G = 0) was used for paved areas and the stormwater management point. Soft ground (G = 1) was used elsewhere. Two orders of sound reflection were included in the acoustical model.

The sound level predictions at the proposed buildings were done using the building evaluation feature in the CadnaA acoustic model. This method calculates the sound levels on a grid of receivers over each building facade at each storey of the building. The point receptors shown in Figure B1 were added at the worst-case locations for ease of reporting.

ASSESSMENT RESULTS

As shown on Figure B1, the highest daytime/evening sound level of 50 dBA and the highest nighttime sound level of 44 dBA are predicted to occur at receptors R02 and R03, representing the south facades of the townhouse blocks directly across from the school. These sound levels are within the Class 1 minimum exclusion limits. Thus, mitigation measures are not required.

VALCOUSTICS Canada Ltd.
consulting acoustical engineers

Title	Date	Figure
Predicted Sound Levels due to School (dBA)	Dec. 13, 2023	B1
Project Name: Argo Neyagawa	Project No.: 123-0189	

J:\2023\1230189\000\Analysis\Cadna\2023-07-19 Preliminary\2023-07-19 Argo Neyagawa, Oakville.cna

Date Plotted: 13.12.23

APPENDIX C
ENVIRONMENTAL NOISE GUIDELINES

APPENDIX C
ENVIRONMENTAL NOISE GUIDELINES

MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP)

Reference: MECP Publication NPC-300, October 2013: "Environmental Noise Guideline, Stationary and Transportation Source - Approval and Planning".

SPACE	SOURCE	TIME PERIOD	CRITERION
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Road Rail Aircraft	07:00 to 23:00 07:00 to 23:00 24-hour period	45 dBA 40 dBA NEF/NEP 5
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	Road Rail Aircraft	23:00 to 07:00 23:00 to 07:00 24-hour period	45 dBA 40 dBA NEF/NEP 5
Sleeping quarters	Road Rail Aircraft	07:00 to 23:00 07:00 to 23:00 24-hour period	45 dBA 40 dBA NEF/NEP 0
Sleeping quarters	Road Rail Aircraft	23:00 to 07:00 23:00 to 07:00 24-hour period	40 dBA 35 dBA NEF/NEP 0
Outdoor Living Areas	Road and Rail	07:00 to 23:00	55 dBA up to 60 dBA allowed in some cases
Outdoor Point of Reception	Aircraft Stationary Source Class 1 Area Class 2 Area Class 3 Area Class 4 Area	24-hour period 07:00 to 19:00(1) 19:00 to 23:00(1) 07:00 to 19:00(2) 19:00 to 23:00(2) 07:00 to 19:00(3) 19:00 to 23:00(3) 07:00 to 19:00(4) 19:00 to 23:00(4)	NEF/NEP 30# 50* dBA 50* dBA 50* dBA 45* dBA 45* dBA 40* dBA 55* dBA 55* dBA

...../cont'd

SPACE	SOURCE	TIME PERIOD	CRITERION
Plane of a Window of Noise Sensitive Spaces	Stationary Source		
	Class 1 Area	07:00 to 19:00(1)	50* dBA
		19:00 to 23:00(1)	50* dBA
		23:00 to 07:00(1)	45* dBA
	Class 2 Area	07:00 to 19:00(2)	50* dBA
		19:00 to 23:00(2)	50* dBA
		23:00 to 07:00(2)	45* dBA
	Class 3 Area	07:00 to 19:00(3)	45* dBA
		19:00 to 23:00(3)	45* dBA
		23:00 to 07:00(3)	40* dBA
	Class 4 Area	07:00 to 19:00(4)	60* dBA
		19:00 to 23:00(4)	60* dBA
		23:00 to 07:00(4)	55* dBA

Notes:

\# may not apply to in-fill or re-development.
* or the minimum hourly background sound level $L_{eq}(1)$, due to road traffic, if higher.
(1) Class 1 Area : Urban
(2) Class 2 Area : Urban during day; rural-like evening and night
(3) Class 3 Area : Rural
(4) Class 4 Area: Subject to land use planning authority's approval

APPENDIX D

SAMPLE CALCULATIONS – TRANSPORTATION NOISE ANALYSIS

```
STAMSON 5.04        NORMAL REPORT        Date: 18-12-2023 11:20:57
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: r8.te                Time Period: Day/Night 16/8 hours
Description: R8 - Building B - East Facade

Road data, segment # 1: Hwy 404 EB (day/night)
----------------------------------------------
Car traffic volume  : 31345/3483  veh/TimePeriod  *
Medium truck volume :  4167/463   veh/TimePeriod  *
Heavy truck volume  :  1364/152   veh/TimePeriod  *
Posted speed limit  :   100 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):  23534
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  28.00
    Medium Truck % of Total Volume     :  11.30
    Heavy Truck  % of Total Volume     :   3.70
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Hwy 404 EB (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 445.00 / 445.00 m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Hwy 404 WB (day/night)
----------------------------------------------
Car traffic volume  : 34736/3860  veh/TimePeriod  *
Medium truck volume :  3688/410   veh/TimePeriod  *
Heavy truck volume  :  1229/137   veh/TimePeriod  *
Posted speed limit  :   100 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):  25306
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  28.00
    Medium Truck % of Total Volume     :   9.30
    Heavy Truck  % of Total Volume     :   3.10
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 2: Hwy 404 WB (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 463.00 / 463.00 m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 3: William H (day/night)
--------------------------------------------
Car traffic volume  : 25870/2874  veh/TimePeriod  *
Medium truck volume :  1019/113   veh/TimePeriod  *
Heavy truck volume  :   661/73    veh/TimePeriod  *
Posted speed limit  :    60 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):  24620
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  11.00
    Medium Truck % of Total Volume     :   3.70
    Heavy Truck  % of Total Volume     :   2.40
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: William H (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -8.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 122.00 / 122.00 m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 4: Neyagawa (day/night)
--------------------------------------------
Car traffic volume  :  9407/1045  veh/TimePeriod  *
Medium truck volume :    67/7     veh/TimePeriod  *
Heavy truck volume  :    38/4     veh/TimePeriod  *
Posted speed limit  :    60 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):   8500
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  11.00
    Medium Truck % of Total Volume     :   0.70
    Heavy Truck  % of Total Volume     :   0.40
    Day (16 hrs) % of Total Volume     :  90.00
```

```
Data for Segment # 4: Neyagawa (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  :  38.00 / 38.00  m
Receiver height           :  43.50 / 43.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Hwy 404 EB (day)
-------------------------------------

Source height = 1.39 m

ROAD (0.00 + 61.22 + 0.00) = 61.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  78.95   0.00 -14.72  -3.01   0.00   0.00   0.00  61.22
-------------------------------------------------------------------------------

Segment Leq : 61.22 dBA

Results segment # 2: Hwy 404 WB (day)
-------------------------------------

Source height = 1.33 m

ROAD (0.00 + 60.84 + 0.00) = 60.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.00  78.75   0.00 -14.89  -3.01   0.00   0.00   0.00  60.84
-------------------------------------------------------------------------------

Segment Leq : 60.84 dBA

Results segment # 3: William H (day)
-------------------------------------

Source height = 1.24 m

ROAD (0.00 + 58.35 + 0.00) = 58.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     -8   0.00  70.86   0.00  -9.10  -3.41   0.00   0.00   0.00  58.35
-------------------------------------------------------------------------------

Segment Leq : 58.35 dBA
```

Results segment # 4: Neyagawa (day)

Source height = 0.80 m

ROAD (0.00 + 59.10 + 0.00) = 59.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	63.14	0.00	-4.04	0.00	0.00	0.00	0.00	59.10

Segment Leq : 59.10 dBA

Total Leq All Segments: 66.06 dBA

Results segment # 1: Hwy 404 EB (night)

Source height = 1.39 m

ROAD (0.00 + 54.69 + 0.00) = 54.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	72.43	0.00	-14.72	-3.01	0.00	0.00	0.00	54.69

Segment Leq : 54.69 dBA

Results segment # 2: Hwy 404 WB (night)

Source height = 1.33 m

ROAD (0.00 + 54.31 + 0.00) = 54.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	72.22	0.00	-14.89	-3.01	0.00	0.00	0.00	54.31

Segment Leq : 54.31 dBA

Results segment # 3: William H (night)

Source height = 1.24 m

ROAD (0.00 + 51.80 + 0.00) = 51.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-8	0.00	64.32	0.00	-9.10	-3.41	0.00	0.00	0.00	51.80

Segment Leq : 51.80 dBA

```
Results segment # 4: Neyagawa (night)
--------------------------------------

Source height = 0.78 m

ROAD (0.00 + 52.52 + 0.00) = 52.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.00  56.55   0.00  -4.04   0.00   0.00   0.00   0.00  52.52
-------------------------------------------------------------------------------

Segment Leq : 52.52 dBA

Total Leq All Segments: 59.51 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 66.06
                           (NIGHT): 59.51
```

STAMSON 5.04 NORMAL REPORT Date: 18-12-2023 11:21:32
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: r16.te Time Period: Day/Night 16/8 hours
Description: **R16 - Block 30 - West Facade**

Road data, segment # 1: Fourth Line (day/night)

Car traffic volume : 1948/216 veh/TimePeriod *
Medium truck volume : 14/2 veh/TimePeriod *
Heavy truck volume : 8/1 veh/TimePeriod *
Posted speed limit : 60 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): 1760
Percentage of Annual Growth : 2.00
Number of Years of Growth : 11.00
Medium Truck % of Total Volume : 0.70
Heavy Truck % of Total Volume : 0.40
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Fourth Line (day/night)

Angle1 Angle2 : -78.00 deg 24.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 23.00 / 23.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Fourth Line (day)

Source height = 0.80 m

ROAD (0.00 + 50.45 + 0.00) = 50.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-78	24	0.50	56.32	0.00	-2.79	-3.08	0.00	0.00	0.00	50.45

Segment Leq : 50.45 dBA

Total Leq All Segments: 50.45 dBA

```
Results segment # 1: Fourth Line (night)
----------------------------------------

Source height = 0.82 m

ROAD (0.00 + 44.09 + 0.00) = 44.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -78     24   0.50  49.95   0.00  -2.79  -3.08   0.00   0.00   0.00  44.09
-------------------------------------------------------------------------------

Segment Leq : 44.09 dBA

Total Leq All Segments: 44.09 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 50.45
                           (NIGHT): 44.09
```