

# **Noise Feasibility Study**

## **Proposed Residential Development**

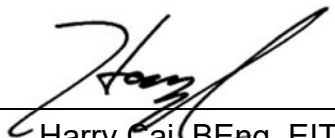
### **1240 Britannia Road West**

### **Mississauga, ON**

Prepared for:

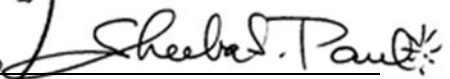
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HGC Project No: 02000150

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Figure 1: Key Plan

Figure 2: Proposed Plan Showing Prediction Locations

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Appendix A: Road Traffic Information

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# 1 Introduction and Summary

HGC Engineering was retained by National Homes Inc. to conduct a noise feasibility study for a proposed residential development located at 1240 Britannia Road in Mississauga, Ontario. The residential development will consist of numerous three-storey townhouse blocks, a two-storey detached dwelling, and a children's outdoor amenity area. The study is required by the Region of Peel and the City of Mississauga as part of the planning and approvals process.

The primary source of noise was determined to be road traffic on Britannia Road West. A secondary source of noise is road traffic on Galesway Boulevard. Road traffic data was obtained from the City of Mississauga and the Region of Peel. The latest noise contours for the Lester B. Pearson International Airport were obtained. These data were used to predict future traffic sound levels at the proposed building façades and outdoor living areas. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP), the Region of Peel and the City of Mississauga to develop noise control recommendations.

The results of the study indicate that future daytime and nighttime sound levels of the proposed townhouse blocks 1-10, 14,15, and the detached house will exceed MECP guideline sound levels and will require noise control measures. Central air conditioning is required for the townhouses adjacent to Britannia Road West. Since the site is located between Noise Exposure Forecast (NEF) 25 and 30 noise contours (approximately NEF 29), forced air ventilation systems with ductwork sized for the future provision of central air conditioning by the occupant is required for all remaining dwelling units in the development. Upgraded glazing construction will also be required for all dwellings adjacent to Britannia Road West. Noise warning clauses are also required for those units to inform future occupants of the traffic noise impacts to address potential sound level excesses. No sources of ground borne vibrations are expected to impact the site area.

With the aforementioned noise mitigation strategies, the proposed development is feasible and consistent with MECP guidelines.

## 2 Site Description and Noise Sources

Figure 1 is a key plan indicating the location of the proposed site. The site is located at the 1240 Britannia Road West, in Mississauga, Ontario. Figure 2 shows the site plan provided by National Homes personnel dated March 20, 2020. The proposed development will consist of three-storey townhouse blocks, a two-storey detached dwelling, and a children's outdoor amenity area.

HGC Engineering personnel visited the site on March 4, 2020 to make observations of the acoustical environment. During the site visit, it was noted that the primary source of noise impacting the site is road traffic noise on Britannia Road West, with some contribution from air traffic. Galesway Boulevard is a secondary source of traffic noise. The site is currently occupied by two existing residential dwellings, which will be demolished for the construction of the proposed townhouse blocks. Areas around the site area is flat and mostly residential. Existing two storey residences surround the site area immediately in all directions. A commercial plaza exists to the north of the site. During the site visit, sound emissions from the commercial plaza were not observed to be audible and is not expected to impact the proposed development. Nevertheless, it is recommended that a warning clause to identify that such commercial uses may be audible at times be included in the property and tenancy agreements. There are no other significant stationary noise sources within 500 m of the subject site.

The subject site is located between the 25 and 30 (approximately at NEF 29) Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours for the Lester B. Pearson International Airport (see Figure 4). Air traffic is expected to have some impact on the subject site and is also considered in the following analysis.

### 3 Noise Level Criteria

#### 3.1 Road Traffic Noise

Guidelines for acceptable levels of road and air traffic noise impacting residential developments are given in the MECP publication NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, release date October 21, 2013, and are listed in Table I below. The values in Table I are energy equivalent (average) sound levels [ $L_{EQ}$ ] in units of A-weighted decibels [dBA].

**Table I: MECP Road Traffic Noise Criteria (dBA)**

Area	Daytime $L_{EQ}$ (16 hour) Road	Nighttime $L_{EQ}$ (8 hour) Road
Outdoor Living Area	55 dBA	--
Inside Living/Dining Rooms	45 dBA	45 dBA
Inside Bedrooms	45 dBA	40 dBA

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time period between 23:00 and 07:00. The term “Outdoor Living Area” (OLA) is used in reference to an outdoor patio, a backyard, a terrace, or other area where passive recreation is expected to occur. Small balconies are not considered OLAs for the purposes of assessment. Terraces greater than 4 m in depth (measured perpendicular to the building façade) are considered to be OLAs.

The guidelines in the MECP publication allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically, and administratively practical.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or greater for the Region of Peel or daytime sound levels outside bedroom or living/dining

room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise.

Warning clauses to notify future residents of possible noise excesses are also required when nighttime sound levels exceed 50 dBA at the plane of the bedroom or living/dining room window and daytime sound levels exceed 55 dBA in the outdoor living area and at the plane of the bedroom or living/dining room window due to road traffic.

### 3.2 Air Traffic Noise

Indoor sound limits due to air traffic are also defined in the MECP in publication NPC-300. The maximum allowable Noise Exposure Forecast (NEF) limits are summarized in Table II.

**Table II: MECP Air Traffic Noise Criterion**

Area	Indoor NEF/NEP
Living/Dining Room (indoor)	5
Bedroom (indoor)	0

The living/dining/family rooms, dens and bedrooms of the proposed dwelling units are the sensitive receptor locations. Typically, washrooms and kitchens are considered noise insensitive areas. There are no outdoor noise criteria for aircraft noise because there is no effective means of mitigation.

For residential dwellings located between the NEF 25 and 30, the MECP requires that the dwelling be designed with the provision for central air conditioning. This requirement usually implies forced air heating systems with the ducts sized for future installation of central air conditioning by the

occupant. In addition, building components including windows, doors, walls and ceiling/roof must be designed to achieve the indoor sound level criteria in Table II. A warning clause is also required in property and tenancy agreements.

For residential dwellings located between the NEF 30 and 35, the MECP requires that central air conditioning is mandatory with warning clauses in the property and tenancy agreements. In addition, building components including windows, doors, walls and ceiling/roof must be designed to achieve the indoor sound level criteria in Table II.

There are no specific requirements if the dwellings are located in the area where the NEF/NEP contours are less than 25.

## **4 Traffic Sound Level Assessment**

### **4.1 Road Traffic Data**

Traffic data for Britannia Road West was obtained from the Region of Peel in the form of ultimate Average Annual Daily Traffic (AADT) traffic values, and is provided in Appendix A. An ultimate volume of 48 600 vehicles per day at a posted speed limit of 70 km/h was applied for the analysis. Commercial vehicle percentages of 1 % for medium trucks and 5 % for heavy trucks was applied. A day/night split of 89 % / 11 % was used.

Traffic data for Galesway Boulevard was obtained from the City of Mississauga in the form of ultimate AADT traffic values, and is provided in Appendix A. An ultimate volume of 5 000 vehicles per day at a posted speed limit of 50 km/h was applied for the analysis. Commercial vehicle percentages of 1.1 % for medium trucks and 0.9 % for heavy trucks were applied. A day/night split of 90 % / 10 % was used.

Table III summarizes the traffic volume data used in this study.

**Table III: Ultimate Road Traffic Data**

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
<b>Britannia Rd W</b>	Daytime	40 658	432	2 162	43 254
	Nighttime	5 026	54	268	5 346
	<b>Total</b>	<b>45 684</b>	<b>486</b>	<b>2 430</b>	<b>48 600</b>
<b>Galesway Blvd</b>	Daytime	4 410	50	40	4 500
	Nighttime	490	6	5	500
	<b>Total</b>	<b>4 900</b>	<b>55</b>	<b>45</b>	<b>5 000</b>

## 4.2 Road Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix B.

Predictions of the traffic sound levels were chosen around the proposed residential buildings to obtain an appropriate representation of future sound levels at various façades. Sound levels were predicted at the plane of the top storey bedroom and/or living/dining room windows during daytime and nighttime hours to investigate ventilation and façade construction requirements. Sound levels were also predicted in possible OLA's to investigate the need for noise barriers. Figure 2 shows the site plan of the site with prediction locations. The results of these predictions are summarized in Table IV.



**Table IV: Predicted Road Traffic Sound Levels [dBA], Without Mitigation**

Prediction Location	Description	Daytime – in the OLA L <sub>EQ-16 hr</sub>	Daytime – at the Façade L <sub>EQ-16 hr</sub>	Nighttime – at the Façade L <sub>EQ-8 hr</sub>
[A]	Block 4, fronting Britannia Rd W	--	71	65
[B]	Block 15, fronting exposure to Britannia Rd W	<55	62	56
[C]	Block 6, flanking exposure to Britannia Rd W	<55	62	55
[D]	Detached house, fronting Britannia Rd W	<55	64	58
[E]	Block 2, flanking exposure to Britannia Rd W	<55	63	57
[F]	Block 1, flanking onto Galesway Blvd	55	58	51
[G]	Block 13, middle of site	<55	<55	<50
[H]	Block 11, fronting exposure to Galesway Blvd	<55	<55	<50
[I]	Children's Outdoor Amenity Area	<55	--	--

## 5 Discussions and Recommendations

The sound level predictions indicate that the future traffic sound levels will exceed MECP guidelines at the proposed development. The following discussion outlines the recommendations for acoustic barrier requirements, ventilation requirements, upgraded building façade construction, and warning clauses to achieve the noise criteria stated in Table I.

### 5.1 Outdoor Living Areas

The predicted daytime sound levels in the OLA's of the townhouses with rear yards, designated by prediction locations [B], [C], [D], [E], [F], [H], and in the children's amenity area are up to 55 dBA, which are within the MECP guideline sound level limits. No physical noise mitigation measures are required.

The dwelling units fronting onto Britannia Road West and Galesway Boulevard are dual frontage townhouses with an amenity deck above the garage on the shielded side of the buildings. These

decks are not expected to be greater than 4 m in depth, and thus are not evaluated as OLA's. There are no other common outdoor amenity areas indicated on the site plan.

## 5.2 Indoor Living Areas and Ventilation Requirements

### *Air Conditioning*

The predicted future sound levels outside the top storey windows of townhouses adjacent to Britannia Road West, designated by prediction location [A], will be greater than 60 dBA during nighttime hours and/or 65 dBA during daytime hours. To address these excesses, these units need to be equipped with central air conditioning systems so that windows may remain closed. These units are shown in Figure 3. Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300, as applicable.

### *Provision for Air Conditioning*

The predicted future sound levels outside the top storey windows of the detached house and townhouses blocks 1, 2, 6-10, 15, and 16, designated by prediction locations [B], [C], [D], [E], and [F], will be between 56 and 65 dBA during the daytime hours and/or between 51 to 60 dBA during the nighttime hours. Furthermore, all dwelling units are located within NEF 25 to NEF 30 noise contours. Thus, all dwelling units require provision for the future installation of central air conditioning systems so that windows may be kept closed. This requirement is typically satisfied through the installation of forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant. The installation of central air conditioning systems will meet and exceed this ventilation requirement. These units are indicated in Figure 3. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

### 5.3 Building Façade Constructions

The predicted sound levels at the dual-frontage townhouses adjacent to Britannia Road will exceed 65 dBA during daytime and/or 60 dBA during nighttime. Furthermore, all dwelling units are located within NEF 25 and NEF 30 noise contours. MECP guidelines stipulate that in such cases, building components including windows, walls, and doors be designed so that the indoor sound levels comply with the noise criteria in Table I for road traffic and Table II for air traffic.

Calculations were performed to determine the acoustical insulation factors to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the anticipated area ratios of the facade components (walls, windows and doors) and the floor area of the adjacent room.

#### *Exterior Wall Constructions*

Brick or masonry exterior wall constructions are recommended for all proposed dwelling units such that noise entering the building through the exterior wall is negligible compared to the windows to allow for less stringent glazing requirements. Sample renderings dated March 9, 2020 show mostly brick construction on all townhouses.

#### *Exterior Doors*

Any insulated metal exterior door meeting OBC requirements will be sufficient to provide noise insulation as long as the exterior doors do not open directly into living/dining rooms or bedrooms. If patio doors are to be used in the dwellings, they must be included in the window area. All exterior doors should include good weather seals to reduce air infiltration to the minimum achievable levels.

#### *Ceiling/Roof System*

Sloped roofs with ventilated attics are recommended above all noise sensitive rooms in the dwelling units. Sample renderings dated March 9, 2020 show peaked roofs with ventilated attics above the top floor rooms in all townhouses. Cathedral ceilings or vaulted ceilings are not recommended. If such constructions are desirable, HGC Engineering should be contacted to provide updated recommendations for upgrades to other building components.



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### *Acoustical Requirements for Glazing*

A summary of the STC requirements is given in Table V for the townhouse façades, based on the possibility of sound entering the building through the windows for all the dwellings. Sound transmission through walls and ceilings were assumed to be negligible due to the proposed brick façade and ventilated attic constructions. Detailed floor plans and building elevations were not available for review at the time of this report. A window to floor ratio of 40% (30% fixed, 10% operable) for living/dining room and 30% (25% fixed, 5% operable) for bedrooms were assumed to determine preliminary window STC ratings required to mitigate road traffic noise levels.

**Table V: Minimum STC Requirements**

Prediction Location	Description	Space	STC Glazing Requirements <sup>+</sup>
[A]	Block 3, 4, and 5 fronting façade adjacent to Britannia Road West	Living/Dining	STC-34
		Bedroom	STC-33
	Block 3, 4, and 5, facades facing away from Britannia Road West	Living/Dining	STC-30
		Bedroom	STC-30
--	All other units	Living/Dining	STC-30
		Bedroom	STC-30

Notes: OBC – Ontario Building Code  
+ Sound entering through windows only.

The glazing requirements can be met using fairly standard sealed units. Operable sections, including doors and operable windows, must be well-fitted and weather-stripped in order to achieve the upper range of target STC values. Acoustical criteria for different facades can be optimized as part of the detail design of the development, when floor plans and elevations for the buildings are available.

Sample window assemblies which may achieve the STC requirements are summarized in Table VI below. Note that acoustic performance varies with manufacture's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required; the STC requirements in Table V are provided as a guideline based on the preliminary drawings. Acoustical test data for the selected assemblies should be requested from the supplier, to ensure that the stated acoustic performance levels will be achieved by their assemblies.

**Table VI: Glazing Assemblies for STC Requirements**

STC Requirement	Glazing Configuration (STC)
30 – 31	3(13)3
32 – 33	4(10)4
34	4(19)4

In Table VI, the number outside parentheses indicate minimum pane thicknesses in millimeters and the number in parentheses indicates the minimum inter-pane gap in millimeters.

Alternative assemblies may be required for operable windows and doors to achieve the required performance values, depending on the nature of seals.

#### ***Further Analysis - Architectural Drawing Review***

When detailed floor plans and building elevations are available for the proposed townhouse buildings, an acoustical consultant should revise the glazing constructions based on actual building components (window, wall, roof) to floor area ratios.

## **6 Warning Clauses**

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all dwelling units with anticipated traffic sound level excesses. The following noise warning clauses are required for specific dwellings as indicated in Table VII.

Suggested wording for future dwellings which have minor sound levels in excess of MECP criteria is given below.

Type A:

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

Suggested wording for future dwellings with sound levels in excess of MECP criteria and will require air conditioning is given below.

Type B:

Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road and air traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria.

Suggested wording for future dwellings which have provisions for central air conditioning to be installed is given below.

Type 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, Conservation and Parks.

Suggest wording for future dwellings which will have central air conditioning units to be installed is given below.

Type D:

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

Suggested wording for future dwelling units in close proximity to commercial buildings is given below.

Type E:

Purchasers are advised that due to the proximity of the existing commercial buildings, sound levels from the facilities may be at times be audible.

These sample clauses are provided by the MECP as examples, and can be modified by the Municipality as required.



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## 7 Impact of the Development on Itself

Section 5.9.1 of the Ontario Building Code (OBC) specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls must meet or exceed STC-50. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

## 8 Impact of the Development on the Environment

It is expected that any increase in local traffic associated with the development will not be substantial enough to affect noise levels significantly.

Sound levels from stationary (non-traffic) sources of noise such as rooftop air-conditioners, cooling towers, exhaust fans, etc. should not exceed the minimum one-hour  $L_{EQ}$  ambient (background) sound level from road traffic, at any potentially impacted residential point of reception, to comply with municipal code. Based on the levels observed during our site visit, the typical minimum ambient sound levels in the area are expected to be in the range of 50 dBA or more during the day and 45 dBA or more at night. Thus any electro-mechanical equipment associated with this development (e.g. emergency generator testing, fresh-air handling equipment, etc.) should be designed with these targets in mind such that they do not result in noise impact beyond these ranges.



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## 9 Summary and Recommendations

The following list and Table VII summarize the recommendations made in this report. The reader is referred to Figure 3 and previous sections of the report where these recommendations are applied and discussed in more detail.

1. Central air conditioning will be required for the townhouse blocks adjacent to Britannia Road West.
2. Forced air ventilation systems with ductwork sized for future installation of central air conditioning systems will be required for all other dwelling units in the development.
3. Upgraded building constructions are required as noted in Section 5.3. When detailed floor plans and building elevations are available for the dwelling units with exposure to the major roadway, window glazing construction should be refined on actual window to floor ratios.
4. The use of warning clauses in the property and tenancy agreements is recommended to inform future residents of traffic noise issues.



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**Table VII: Summary of Noise Control Requirements and Noise Warning Clauses**

Prediction Location	Block Number	Description	Acoustic Barrier	Ventilation Requirements*	Type of Warning Clause	Upgraded Glazing Constructions
[A]	Block 3, Block 4, Block 5	Façade fronting Britannia Rd W	--	Central A/C	B, D, E	LR/DR: STC-34+ BR: STC-33+
	Block 3, Block 4, Block 5	Façades facing away from Britannia Rd W	--	Central A/C	B, D, E	LR/DR: STC-30+ BR: STC-30+
[B]	Block 15	Fronting exposure to Britannia Rd W	--	Forced Air	A, C, E	LR/DR: STC-30+ BR: STC-30+
[C]	Block 6	Flanking exposure to Britannia Rd W				
[D]	--	Detached custom house, fronting Britannia Rd W				
[E]	Block 2	Block 2, flanking exposure to Britannia Rd W				
[F]	Block 1, Block 8, Block 9, Block 10	Block 1, flanking onto Galesway Blvd				
[G]	Block 13, Block 14	Block 13, middle of site				
[H]	Block 11, Block 12	Block 11, fronting exposure to Galesway Blvd				
[I]	--	Children's Outdoor Amenity	--	--	--	--
--	Block 7	Blocks impacted only by air traffic	--	Forced Air	A, C, E	LR/DR: STC-30+ BR: STC-30+

Notes:

\* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.

✓ Outdoor living areas require acoustic barriers.

-- No specific requirement.

OBC – Ontario Building Code

LR/DR – Living Room/Dining Room

BR – Bedroom

+ When detailed floor plans and building elevations are available for the dwelling units with exposure to the major roadways, window glazing construction should be refined on actual window to floor ratios.

## 9.1 Implementation

To ensure that the noise control recommendations outlined above are properly implemented, it is recommended that:

1. Prior to the issuance of building permits for this development, a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should review the detailed architectural plans and building elevations to refine glazing requirements based on actual window to floor areas ratios.
2. Prior to the issuance of occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated, installed, and constructed.



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Figure 1: Key Plan



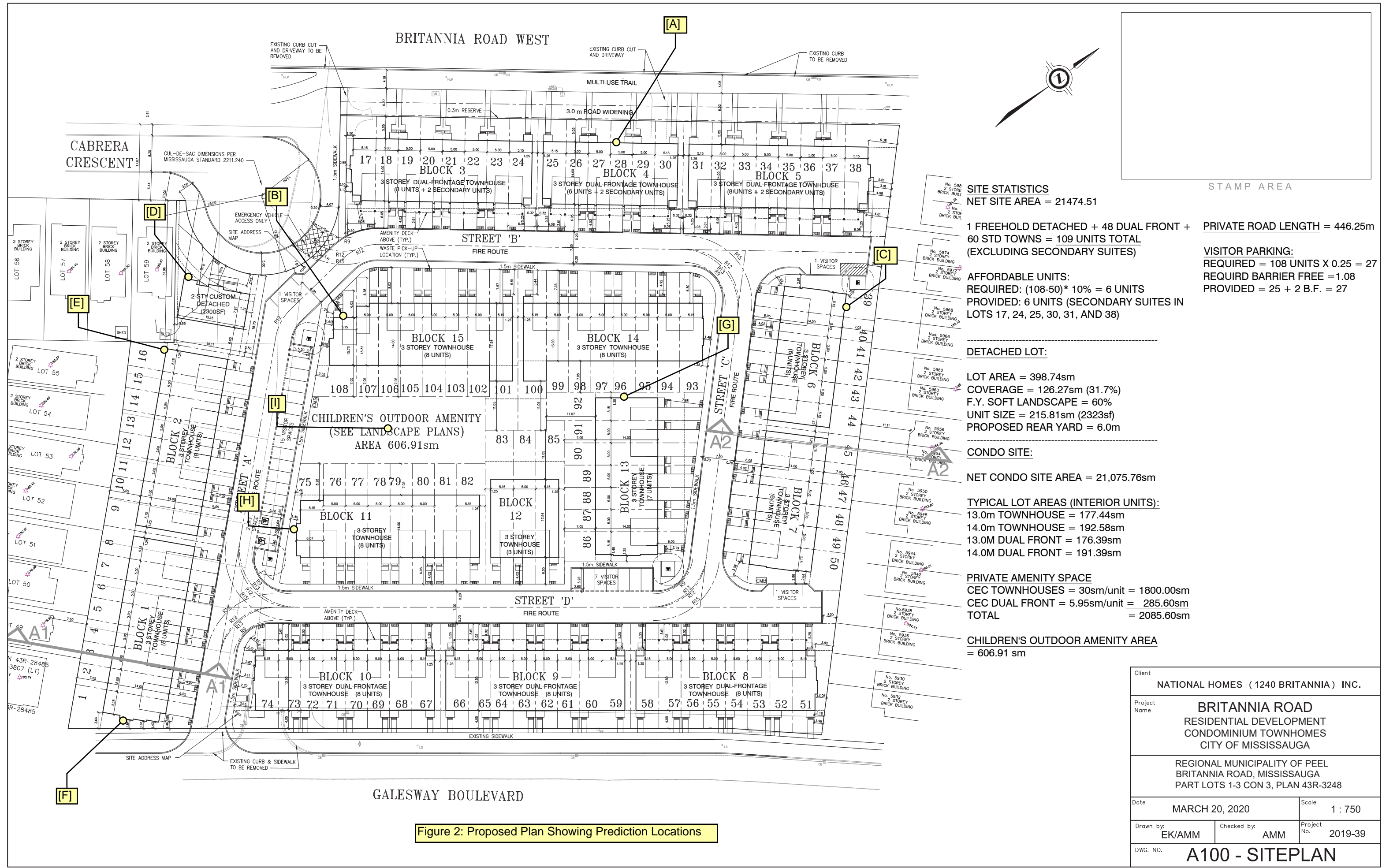


Figure 2: Proposed Plan Showing Prediction Locations

SITE STATISTICS

NET SITE AREA = 21474.51

1 FREEHOLD DETACHED + 48 DUAL FRONT + 60 STD TOWNS = 109 UNITS TOTAL (EXCLUDING SECONDARY SUITES)

AFFORDABLE UNITS:  
REQUIRED: (108-50) \* 10% = 6 UNITS  
PROVIDED: 6 UNITS (SECONDARY SUITES IN LOTS 17, 24, 25, 30, 31, AND 38)

DETACHED LOT:

LOT AREA = 398.74sm  
COVERAGE = 126.27sm (31.7%)  
F.Y. SOFT LANDSCAPE = 60%  
UNIT SIZE = 215.81sm (2323sf)  
PROPOSED REAR YARD = 6.0m

CONDO SITE:

NET CONDO SITE AREA = 21,075.76sm

TYPICAL LOT AREAS (INTERIOR UNITS):  
13.0m TOWNHOUSE = 177.44sm  
14.0m TOWNHOUSE = 192.58sm  
13.0M DUAL FRONT = 176.39sm  
14.0M DUAL FRONT = 191.39sm

PRIVATE AMENITY SPACE  
CEC TOWNHOUSES = 30sm/unit = 1800.00sm  
CEC DUAL FRONT = 5.95sm/unit = 285.60sm  
TOTAL = 2085.60sm

CHILDREN'S OUTDOOR AMENITY AREA  
= 606.91 sm

STAMP AREA

PRIVATE ROAD LENGTH = 446.25m

VISITOR PARKING:  
REQUIRED = 108 UNITS X 0.25 = 27  
REQUIRE BARRIER FREE = 1.08  
PROVIDED = 25 + 2 B.F. = 27

Client	NATIONAL HOMES ( 1240 BRITANNIA ) INC.		
Project Name	BRITANNIA ROAD RESIDENTIAL DEVELOPMENT CONDOMINIUM TOWNHOMES CITY OF MISSISSAUGA		
	REGIONAL MUNICIPALITY OF PEEL BRITANNIA ROAD, MISSISSAUGA PART LOTS 1-3 CON 3, PLAN 43R-3248		
Date	MARCH 20, 2020	Scale	1 : 750
Drawn by:	EK/AMM	Checked by:	AMM
DWG. NO.	A100 - SITEPLAN		
		Project No.	2019-39

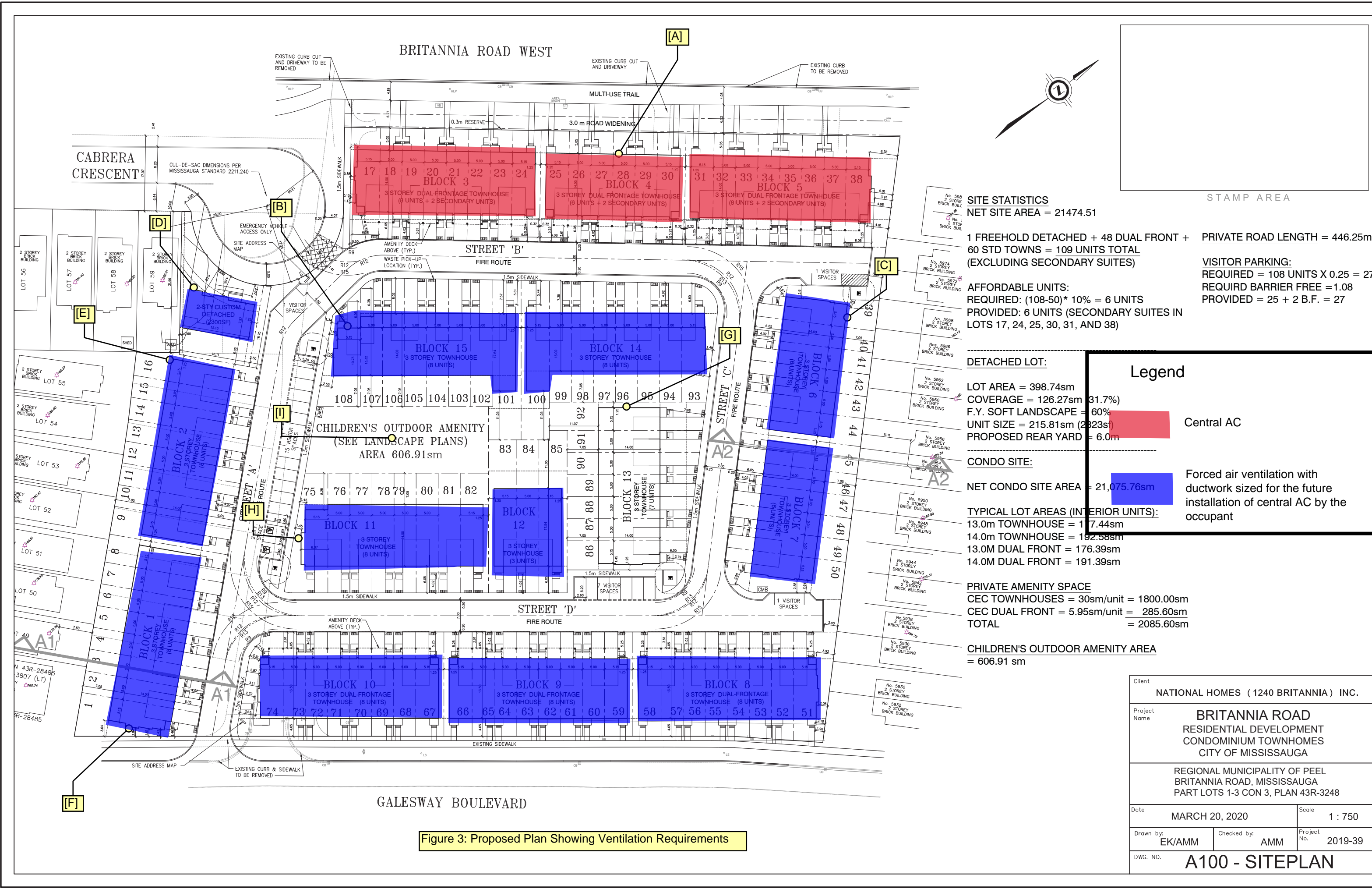


Figure 3: Proposed Plan Showing Ventilation Requirements

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14.0m DUAL FRONT = 191.39sm

PRIVATE AMENITY SPACE  
CEC TOWNHOUSES = 30sm/unit = 1800.00sm  
CEC DUAL FRONT = 5.95sm/unit = 285.60sm  
TOTAL = 2085.60sm

CHILDREN'S OUTDOOR AMENITY AREA  
= 606.91 sm

STAMP AREA

Legend

Central AC

Forced air ventilation with ductwork sized for the future installation of central AC by the occupant

Client	NATIONAL HOMES ( 1240 BRITANNIA ) INC.		
Project Name	BRITANNIA ROAD RESIDENTIAL DEVELOPMENT CONDOMINIUM TOWNHOMES CITY OF MISSISSAUGA		
	REGIONAL MUNICIPALITY OF PEEL BRITANNIA ROAD, MISSISSAUGA PART LOTS 1-3 CON 3, PLAN 43R-3248		
Date	MARCH 20, 2020	Scale	1 : 750
Drawn by:	EK/AMM	Checked by:	AMM
DWG. NO.	A100 - SITEPLAN		
		Project No.	2019-39

# Appendix A

## Road Traffic Information



ACOUSTICS



NOISE



VIBRATION



Date: March 10, 2020  
From: Sheeba Paul- HGC Engineering  
Re: Britannia Road - 330M West of Terry Fox Way/Silken Lauman Way

Sheeba,  
As per your request, we are providing the following traffic data:

	Existing	Ultimate
24 Hour Traffic Volume	37,164	48,600
# of Lanes	6	6
Day/Night Split	89/11	89/11
Day Trucks (% of Total Volume)	1% Medium 5.0% Heavy	1% Medium 5.0% Heavy
Night Trucks (% of Total Volume)	0.8% Medium 1.0% Heavy	0.8% Medium 1.0% Heavy
Right-of-Way Width	45 meters	
Posted Speed Limit	70 km/h	

Please note:

1. The current volume is not the Annual Average Daily Traffic, but the averaged raw volumes over three data collection days. If you need the Annual Average Traffic Volume, please visit the Peel Open Data website below:  
<http://opendata.peelregion.ca/data-categories/transportation/traffic-count-stations.aspx>
2. The ultimate volume is the planned volume during a level of service 'D' where a 2 second vehicle headway and a volume to capacity ratio of 0.9 is assumed. Traffic signals and hourly variations in traffic are also incorporated into the ultimate volume.

If you require further assistance, please contact me at (905) 791-7800 ext. 4810

Regards,

Brenden Lavoie  
Transportation Analyst, Transportation System Planning  
Transportation Division, Public Works, Region of Peel  
10 Peel Centre Drive, Suite B, 4th Floor, Brampton, ON, L6T 4B9  
E: [brenden.lavoie@peelregion.ca](mailto:brenden.lavoie@peelregion.ca) • W: 905-791-7800 x4810

Date: 03-Mar-20

## NOISE REPORT FOR PROPOSED DEVELOPMENT

### REQUESTED BY:

Name: Sheeba Paul

Company: HGC Engineering



### PREPARED BY:

Name: Bertuen Mickle

Tel#: (905) 615-3200

Location: Galesway Blvd - from Whitehorn Ave to Brookhaven Way

ID#: 457

## ON SITE TRAFFIC DATA

Specific	Street Names				
	Galesway Blvd				
AADT:	5,000				
# of Lanes:	2 Lanes				
% Trucks:	2%				
Medium/Heavy Trucks Ratio:	55/45				
Day/Night Traffic Split:	90/10				
Posted Speed Limit:	50 km/h				
Gradient of Road:	<2%				
Ultimate R O W:	23m				

Comments: Ultimate Traffic Data only



## **Appendix B**

Sample STAMSON 5.04 Output

STAMSON 5.0                      NORMAL REPORT                      Date: 25-03-2020 22:36:34  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a.te                      Time Period: Day/Night 16/8 hours  
 Description: **Daytime and nighttime sound levels, prediction location [A], Block 4, fronting Britannia Rd W**

Road data, segment # 1: Britannia EB (day/night)

```
-----
Car traffic volume   : 20329/2513   veh/TimePeriod   *
Medium truck volume :   216/27     veh/TimePeriod   *
Heavy truck volume  :  1081/134    veh/TimePeriod   *
Posted speed limit  :    70 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): 24300
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 1.00
Heavy Truck % of Total Volume     : 5.00
Day (16 hrs) % of Total Volume    : 89.00
```

Data for Segment # 1: Britannia EB (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 : 21.00 / 21.00 m
Receiver height  : 7.50 / 7.50 m
Topography      : 1 (Flat/gentle slope; no barrier)
Reference angle  : 0.00
```

Road data, segment # 2: Britannia WB (day/night)

```
-----
Car traffic volume   : 20329/2513   veh/TimePeriod   *
Medium truck volume :   216/27     veh/TimePeriod   *
Heavy truck volume  :  1081/134    veh/TimePeriod   *
Posted speed limit  :    70 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): 24300
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 1.00
Heavy Truck % of Total Volume     : 5.00
Day (16 hrs) % of Total Volume    : 89.00
```



Data for Segment # 2: Britannia WB (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 : 37.00 / 37.00 m
Receiver height       :   7.50 / 7.50 m
Topography           :      1           (Flat/gentle slope; no barrier)
Reference angle       :   0.00
  
```

Results segment # 1: Britannia EB (day)

Source height = 1.50 m

ROAD (0.00 + 69.06 + 0.00) = 69.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	90	0.48	72.36	0.00	-2.16	-1.14	0.00	0.00	0.00

```

-----
SubLeq
---
-90    90    0.48  72.36    0.00  -2.16  -1.14    0.00    0.00    0.00
69.06
-----
---
  
```

Segment Leq : 69.06 dBA

Results segment # 2: Britannia WB (day)

Source height = 1.50 m

ROAD (0.00 + 65.42 + 0.00) = 65.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	90	0.48	72.36	0.00	-5.80	-1.14	0.00	0.00	0.00

```

-----
SubLeq
---
-90    90    0.48  72.36    0.00  -5.80  -1.14    0.00    0.00    0.00
65.42
-----
---
  
```

Segment Leq : 65.42 dBA

Total Leq All Segments: 70.62 dBA

Results segment # 1: Britannia EB (night)

Source height = 1.50 m

ROAD (0.00 + 63.00 + 0.00) = 63.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									
-----									
-90	90	0.48	66.31	0.00	-2.16	-1.14	0.00	0.00	0.00
63.00									
-----									
---									

Segment Leq : 63.00 dBA

Results segment # 2: Britannia WB (night)

Source height = 1.50 m

ROAD (0.00 + 59.36 + 0.00) = 59.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									
-----									
-90	90	0.48	66.31	0.00	-5.80	-1.14	0.00	0.00	0.00
59.36									
-----									
---									

Segment Leq : 59.36 dBA

Total Leq All Segments: 64.56 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.62  
(NIGHT): 64.56



STAMSON 5.0                      NORMAL REPORT                      Date: 25-03-2020 22:37:00  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b.te                      Time Period: Day/Night 16/8 hours  
 Description: **Daytime and nighttime sound levels at prediction location [B], Block 15, fronting exposure to Britannia Rd W**

Road data, segment # 1: Britannia EB (day/night)

```
-----
Car traffic volume   : 20329/2513   veh/TimePeriod   *
Medium truck volume :   216/27     veh/TimePeriod   *
Heavy truck volume  :   1081/134    veh/TimePeriod   *
Posted speed limit  :    70 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): 24300
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 1.00
Heavy Truck % of Total Volume     : 5.00
Day (16 hrs) % of Total Volume    : 89.00
```

Data for Segment # 1: Britannia EB (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 : 61.00 / 61.00 m
Receiver height  : 7.50 / 7.50 m
Topography      : 2           (Flat/gentle slope; with barrier)
Barrier angle1   : 0.00 deg   Angle2 : 90.00 deg
Barrier height   : 10.00 m
Barrier receiver distance : 45.00 / 45.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle  : 0.00
```

Road data, segment # 2: Britannia WB (day/night)

```
-----
Car traffic volume   : 20329/2513   veh/TimePeriod   *
Medium truck volume :   216/27     veh/TimePeriod   *
Heavy truck volume  :   1081/134    veh/TimePeriod   *
Posted speed limit  :    70 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): 24300  
 Percentage of Annual Growth : 0.00  
 Number of Years of Growth : 0.00  
 Medium Truck % of Total Volume : 1.00  
 Heavy Truck % of Total Volume : 5.00  
 Day (16 hrs) % of Total Volume : 89.00

Data for Segment # 2: Britannia WB (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 : 78.00 / 78.00 m
Receiver height  : 7.50 / 7.50 m
Topography      :          2          (Flat/gentle slope; with
barrier)
Barrier angle1   : 0.00 deg   Angle2 : 90.00 deg
Barrier height    : 10.00 m
Barrier receiver distance : 45.00 / 45.00 m
Source elevation  : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation  : 0.00 m
Reference angle   : 0.00
  
```

Results segment # 1: Britannia EB (day)

Source height = 1.50 m

Barrier height for grazing incidence

```

-----
Source      ! Receiver      ! Barrier      ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.50 !          7.50 !          3.07 !          3.07
  
```

ROAD (59.20 + 47.60 + 0.00) = 59.49 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj  
 SubLeq

```

-----
---
-90      0    0.48  72.36   0.00  -9.02  -4.15   0.00   0.00   0.00
59.20
  
```

```

-----
---
0        90    0.00  72.36   0.00  -6.09  -3.01   0.00   0.00 -15.67
47.60
  
```

Segment Leq : 59.49 dBA



Results segment # 2: Britannia WB (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	4.04	4.04

ROAD (57.62 + 48.92 + 0.00) = 58.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	0	0.48	72.36	0.00	-10.60	-4.15	0.00	0.00	0.00
57.62									

0	90	0.00	72.36	0.00	-7.16	-3.01	0.00	0.00	-13.27
48.92									

Segment Leq : 58.17 dBA

Total Leq All Segments: 61.89 dBA

Results segment # 1: Britannia EB (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	3.07	3.07

ROAD (53.14 + 41.54 + 0.00) = 53.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	0	0.48	66.31	0.00	-9.02	-4.15	0.00	0.00	0.00
53.14									

0	90	0.00	66.31	0.00	-6.09	-3.01	0.00	0.00	-15.67
41.54									



-----  
 ---  
 Segment Leq : 53.43 dBA

Results segment # 2: Britannia WB (night)  
 -----

Source height = 1.50 m

Barrier height for grazing incidence  
 -----

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
1.50	!	7.50	!
		4.04	!
			4.04

ROAD (51.56 + 42.86 + 0.00) = 52.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-----  
 ---  
 -90      0      0.48   66.31    0.00 -10.60   -4.15    0.00    0.00    0.00  
 51.56

-----  
 ---  
 0      90      0.00   66.31    0.00 -7.16   -3.01    0.00    0.00 -13.27  
 42.86

-----  
 ---  
 Segment Leq : 52.11 dBA

Total Leq All Segments: 55.83 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.89  
 (NIGHT): 55.83





STAMSON 5.0                      NORMAL REPORT                      Date: 25-03-2020 22:37:16  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: f.te                      Time Period: Day/Night 16/8 hours  
 Description: **Daytime and nighttime sound levels at prediction location**  
**[F] Block 1, flanking onto Galesway Blvd**

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

```
-----
Car traffic volume   : 4410/490   veh/TimePeriod  *
Medium truck volume :    50/6    veh/TimePeriod  *
Heavy truck volume  :    41/5    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): 5000
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 1.10
Heavy Truck % of Total Volume     : 0.90
Day (16 hrs) % of Total Volume    : 90.00
```

Data for Segment # 1: Galesway (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     :   7.50 / 7.50 m
Topography          :      1      (Flat/gentle slope; no barrier)
Reference angle     :   0.00
```

Results segment # 1: Galesway (day)

Source height = 0.98 m

ROAD (0.00 + 57.76 + 0.00) = 57.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
---
-90    90    0.50  58.93  0.00  0.00  -1.17  0.00  0.00  0.00
57.76
-----
---
```

Segment Leq : 57.76 dBA

Total Leq All Segments: 57.76 dBA

Results segment # 1: Galesway (night)

-----

Source height = 1.00 m

ROAD (0.00 + 51.40 + 0.00) = 51.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-----									
---									
-90	90	0.50	52.57	0.00	0.00	-1.17	0.00	0.00	0.00
51.40									
-----									
---									

Segment Leq : 51.40 dBA

Total Leq All Segments: 51.40 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.76  
(NIGHT): 51.40

