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May 04, 2020

YCA engineering Limited

Phone: 416-894-3213
hava@ycaengineering.com

9251 Yonge Street, Suite 8557
Richmond Hill, ON L4C 9T3

# NOISE IMPACT STUDY
# - REVISED-

GRAHAM PROPERTY
ESTATE DEVELOPMENT
DRAFT PLAN OF SUBDIVISION
TOWN OF CALEDON

PREPARED FOR:

SUNSHINE GROUP OF COMPANIES
C/O 1296259 ONTARIO INC.

Revised March 2019
December 2016
Y0905D

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9251 Yonge Street, Suite 8557
Richmond Hill, ON L4C 9T3

March 28, 2019

Sunshine Group of Companies
c/o 1296259 Ontario Inc.
17717 Highway #50
Palgrave, Ontario
L0N 1P0

Attention: Mr. Tim Van Stralen, President

**Re: Noise Impact Study - Revised**
**Graham Property Estate Development**
**Draft Plan of Subdivision**
**Town of Caledon**
**Project No. Y0905D**

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Further to the Revised Noise Impact Study dated December 2016, this noise study has been prepared to incorporate the updated traffic data, latest draft plan and grading information dated March 2019 for the above noted residential development with the designated Outdoor Living Areas re-located to the rear of the houses for Lots 1 to 8.

The study addresses noise generated by vehicular traffic on Highway No. 9 to the north and Mount Pleasant Road to the west. The present report recommends noise abatement measures to meet the sound levels acceptable to the Town of Caledon, Region of Peel, Ministry of Transportation and the Ministry of Environment, Conservation and Parks.

We recommend the final grading plans to be reviewed to determine the final noise barrier heights, features and the material/details of the noise barriers.

We recommend that prior to issuance of building permits, once final architectural drawings are available; the acoustical analysis would need to be reviewed to confirm the MOE noise guidelines are met.

Prior to the issuance of occupancy permits, a Professional Engineer qualified to perform acoustical engineering services in Ontario shall certify that the noise control measures have been properly installed and constructed as per the recommendations.

Your assistance in reviewing and approving this report will be very much appreciated. Should you have any questions regarding its contents, please contact the undersigned.

Yours truly,

***YCA ENGINEERING Limited***

Hava Jouharchi, P.Eng.
Senior Project Engineer

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## 1.0 INTRODUCTION

PURPOSE

A residential subdivision has been proposed by Sunshine Group of Companies in the Town of Caledon. The purpose of this report is to present the analysis of anticipated future sound levels within the development using the latest draft plan and grading plan prepared by GHD dated March 2019.

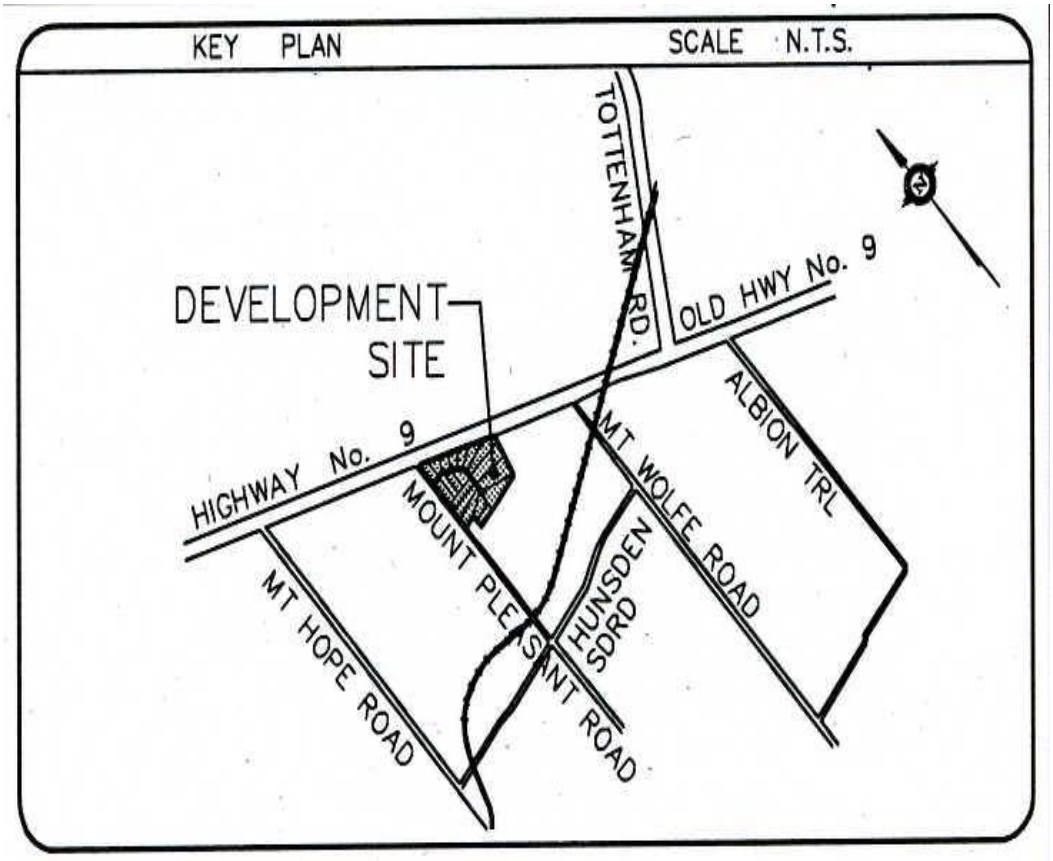
SITE DESCRIPTION AND LOCATION

The proposed development will be comprised of 21 lots with 2 storey detached dwelling units, a storm water management pond and local internal roads. This development is located at the southeast corner of Highway No. 9 and Mount Pleasant Road in the Town of Caledon with the residential properties for Lots 1 to 8 backing onto Highway No. 9.

The surrounding land uses is an existing residential development to the west and existing farm lands to the north and south.

KEY PLAN

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



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## 2.0 SOUND LEVEL CRITERIA

OUTDOOR SOUND LEVEL CRITERIA

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

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

INDOOR SOUND LEVEL CRITERIA

Living and Dining Area and Bedroom (7 a.m.–11 p.m.) = 45 dBA Roads, 40 dBA Railways
Living and Dining Area (11 p.m.–7 a.m.) = 45 dBA Roads, 40 dBA Railways
Bedrooms (11 p.m. – 7 a.m.) = 40 dBA Roads, 35 dBA Railways

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

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

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## 3.0 NOISE SOURCES

ROAD TRAFFIC

As indicated on the Plan (Drawing Y0905D), the proposed development will be located south of Highway No. 9 and east of Mount Pleasant Road. Noise generated by these sources has the potential to affect future residents.

Based on traffic data obtained from the Town of Caledon, Mount Pleasant Road traffic volume is low and the Town has banned truck usage on Mount Pleasant Road. Therefore, the traffic volume from Mount Pleasant Road is considered acoustically insignificant.

The CP Railway located to the southeast is approximately 800m from the proposed development. Due to distance separation, the sound level from the railway is considered acoustically insignificant.

Traffic volume information for Highway No. 9 was provided by the Ministry of Transportation and updated March 2019. The updated traffic data is summarized in Table 1 below.

**TABLE 1: HIGHWAY NO. 9 TRAFFIC DATA (UPDATED)**

| | |
|---|---|
| Ultimate Annual Average Daily Traffic * | 22,800 |
| Percent Trucks | 16% |
| Ratio of Heavy and Medium trucks | 50:50 |
| Speed (km/hr) | 80 |
| Number of Lanes | 2 |

* Forecast based the Updated ultimate traffic data provided by the Ministry of Transportation. See Appendix 1 for correspondence.

STATIONARY NOISE SOURCES

The existing No. 9 Auto Wreckers facility along Highway 9 is located at approximately 500m to the north of the proposed residential development. The hours of operation are daytime from 8:00A.M. to 5:00P.M. during weekdays only. Most of the activities within the wrecking yard such as removing parts and auto repairs occur within the buildings with auto storage area at the back of the buildings.

Therefore, based on the nature of the wrecking yard activities and distance separation the sound levels are not expected to negatively impact the proposed residential development.

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## 4.0 NOISE ASSESSMENT

Drawing Y0905D is based on the latest grading plan prepared by GHD dated March 2019 showing various noise analysis locations and noise mitigation measures within the proposed residential development. Sound levels were calculated using the Ministry of Environment's Stamson 5.04 computer based noise prediction model and evaluated with the sound level criteria and warning clauses recommended by the Ministry of Environment. The noise criteria and warning clauses are listed in Appendix 3.

Table 2 lists the unattenuated sound levels at various locations.

**TABLE 2: UNATTENUATED SOUND LEVELS**

| LOTS | SOURCE DISTANCE* (m) | SOUND LEVELS (dBA) | | |
|---|---|---|---|---|
| | | OUTDOOR LIVING AREA (16 hr) Leq[1] | DAYTIME (16 hr) Leq[2] | NIGHT-TIME (8 hr) Leq[3] |
| 1 (Rear Wall) | 105.0 | - | 61 | 54 |
| (Outdoor Living Area) | 100.0 | 60 | - | - |
| 2 (Rear Wall) | 80.0 | - | 63 | 56 |
| (Outdoor Living Area) | 75.0 | 62 | - | - |
| 3 (Rear Wall) | 65.0 | - | 64 | 58 |
| (Outdoor Living Area) | 60.0 | 64 | - | - |
| 4 (Rear Wall) | 70.0 | - | 64 | 57 |
| (Outdoor Living Area) | 60.0 | 64 | - | - |
| 5 (Rear Wall) | 75.0 | - | 64 | 57 |
| (Outdoor Living Area) | 65.0 | 64 | - | - |
| 6 (Rear Wall) | 77.0 | - | 63 | 57 |
| (Outdoor Living Area) | 72.0 | 63 | - | - |
| 7 (Rear Wall) | 105.0 | - | 61 | 54 |
| (Outdoor Living Area) | 100.0 | 60 | - | - |
| 8 (Rear Wall) | 150.0 | - | 59 | 53 |
| (Outdoor Living Area) | 150.0 | 58 | - | - |
| 9 (Side Wall) | 230.0 | - | 56 | 50 |
| (Outdoor Living Area) | 232.0 | 54 | - | - |
| 18 (Front Wall) | 185.0 | - | 56 | 49 |
| (Outdoor Living Area) | 200.0 | 54 | - | - |

* Highway No. 9

1 The receiver locations at the designated outdoor living areas (at the rear yards) taken to be 1.5m off ground and 5m from the rear wall of the house due to the large property size. See Drawing Y0905D showing the location of the proposed OLAs.

2 The receiver locations at the building wall are taken to be 4.5m off ground for daytime

3 The receiver locations at the building wall are taken to be 4.5m off ground for night-time.

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# 5.0 RECOMMENDED NOISE MITIGATION MEASURES

## 5.1 OUTDOOR MEASURES

Table 2 indicates that daytime sound levels at Lots 1 to 7 designated Outdoor Amenity Areas are expected to exceed 60 dBA in the absence of mitigative measures.

The daytime sound level for Lot 8 designated Outdoor Amenity Area is expected to be between 55dBA and 60dBA.

NOISE BARRIERS

In accordance with MOE and the Town of Caledon's policy, mitigative measures are required for Lots 1 to 8 to reduce the sound levels to 55 dBA or less. The noise barrier analysis is based on the Grading Plan dated March 2019 prepared by GHD. Preliminary grades and road grades are included in this report for verification.

The following Table 3 lists the noise barrier heights and sound levels based on the latest grades:

TABLE 3: ATTENUATED OUTDOOR SOUND LEVELS

| LOTS | SOURCE ELEVATION (m) | RECEIVER ELEVATION (m) | TOP OF BERM ELEVATION (m) | ACOUSTIC BARRIER HEIGHT (m)* | SOUND LEVELS (dBA) |
|---|---|---|---|---|---|
| Lot 1 | 310.75 | 308.30 | 308.30 | 2.4 | 55 |
| Lot 2 | 311.25 | 310.30 | 310.30 | 3.0 | 55 |
| Lot 3 | 311.25 | 313.00 | 313.00 | 3.0 | 55 |
| Lot 4 | 310.50 | 312.50 | 312.50 | 3.0 | 55 |
| Lot 5 | 309.25 | 311.70 | 311.70 | 3.0 | 55 |
| Lot 6 | 307.50 | 311.35 | 311.35 | 2.6 | 55 |
| Lot 7 | 305.00 | 310.00 | 310.00 | 1.8 | 55 |
| Lot 8 | 304.75 | 309.55 | 309.55 | 1.8 | 53 |

* Acoustic noise fence and berm combination. Details to be reviewed once the final grading information are available.

We recommend the final grading plans to be reviewed to determine the final noise barrier heights, features and the material/details of the noise barriers.

Following installation of the recommended noise barrier, future outdoor sound levels may exceed 55 dBA at the following locations due to road traffic:

- Lots 1 to 8

A warning clause should therefore be incorporated into the Subdivision Agreement, which will be registered on title and should be included in all offers of purchase and sale or lease of the dwelling units at the above locations. The clause should state:

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Warning Clause No. B

*"Purchasers are advised that despite the inclusion of noise abatement features within the development area, sound levels from future road traffic may be of concern, occasionally interfering with some activities of the dwelling occupants as the sound level will exceed the Ministry of Environment's noise criteria."*

The recommended barriers should be constructed of a material, which provides a minimum surface density of 20 kg per square meter. If desired, the height of the required fencing can be reduced by locating it on an earthen berm, provided that the total fence height remains as described above. In accordance with MOE policy, minimized and localized gaps (25mm maximum) at fence bottoms may be used to accommodate surface drainage, if necessary.

## 5.2 VENTILATION REQUIREMENTS

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

MANDATORY CENTRAL AIR CONDITIONERS

Based on information in Table 2, there are no lots with the mandatory central air conditioning requirement, as the daytime sound levels are below 65 dBA and the night-time sound levels are below 60 dBA.

PROVISION FOR CENTRAL AIR CONDITIONERS

The following units must be constructed with a forced air heating system with ducting sized to accommodate a central air conditioning unit, in order to allow the homeowner the option of installing central air conditioning should he or she wish to do so in the future as per Table 2 sound level results:

- Lots 1 to 9, 18 to 21

The following warning clause Type C must be incorporated into the Subdivision Agreement, which will be registered on title and should be included in all Offers of Purchase, Sale or Lease of the above dwelling units:

Warning Clause Type C:

*"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property)."*

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## 5.3 BUILDING COMPONENTS

Building components within the proposed development were analyzed using the STC (Sound Transmission Class) method recommended by the M.O.E. developed by the National Research Council of Canada (NRC Publication BPN 56). Sample calculation included in Appendix 4.

Detailed floor plans of the proposed dwelling units are required in order to best determine the required building components. Although this information is not yet available for the proposed development, the result is based on the assumption that a living, dining or recreation room is located at the side of the house closest to the roadway and contains three components (two exterior walls and a set of windows). The windows are assumed to be 30% of the floor area and the same side exterior walls are assumed to be 80% of the floor area.

DAYTIME SOUND LEVELS

For the worst case location during daytime (Lot 3), dwelling wall sound level of 64 dBA was calculated at the first storey living/dining room.

To ensure acceptable daytime indoor sound levels of 45dBA from road noise sources, the overall building components must provide an STC rating of 27 for windows and STC 34 for exterior wall construction.

NIGHT-TIME SOUND LEVELS

For the worst case location during night-time (Lot 3), dwelling wall sound level of 58 dBA was calculated at the second storey bedroom.

To ensure acceptable night-time indoor sound levels of 40dBA from road noise sources, the overall building components must provide an STC rating of 24 for windows and STC 31 for exterior wall construction.

BUILDING COMPONENT REQUIREMENTS

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

Therefore, the building components for all residential units are expected to meet the indoor sound levels.

WINDOWS

The following are some window configurations meeting an STC rating of 27, assuming the ratio of window area to room floor area is 30%:

- double glazing 4mm x 4mm thickness with 6mm air space; or
- double glazing 3mm x 3mm thickness with 13mm air space; or
- any other window type yielding a similar or greater STC rating.

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EXTERIOR WALLS

The following exterior wall constructions EW1 or EW5 meet the STC 34 rating, assuming a ratio of wall area to room floor area of 80%:

EW1 — 12.7mm gypsum board, vapour barrier and 38 x 89mm studs with 50mm (or thicker) mineral wool or fibreglass batts in interstud cavities, plus sheathing, wood or metal siding and fibre backer board; or

EW5 — 12.7mm gypsum board, vapour barrier and 38 x 89mm studs with 50mm (or thicker) mineral wool or fiberglass batts in interstud cavities, plus sheathing, 25mm air space and 100mm brick veneer.

Sample window and exterior wall configurations are included in Appendix 4 for additional options.

Please note that the final building components should be determined once building floor plans become available and once dwelling locations and orientations are finalized.

We recommend that prior to issuance of building permits, once final architectural drawings are available; the acoustical analysis would need to be reviewed to confirm the MOE noise guidelines are met.

## 5.4 WARNING CLAUSES

A warning clause must be incorporated into the Subdivision Agreement, which will be registered on title and included in all offers of purchase and sale or lease of the following dwelling units. The clause should state:

- Lots 1 to 9, 18 to 21

  Warning Clause No. A

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

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## 6.0 SUMMARY OF NOISE MITIGATION MEASURES

The summary of noise abatement measures are listed in Table 4 identifying acoustic fence, mandatory central air conditioners, provision for central air conditioners, building components and warning clauses.

**TABLE 4: SUMMARY OF NOISE MITIGATIVE MEASURES**

| LOTS | VENTILATION REQUIREMENTS | BUILDING COMPONENTS | BARRIER REQUIREMENTS | WARNING CLAUSES |
|---|---|---|---|---|
| Lot 1 | Optional air conditioning | OBC* | 2.4m** | Type A, B and C |
| Lots 2, 3, 4 and 5 | Optional air conditioning | OBC* | 3.0m** | Type A, B and C |
| Lot 6 | Optional air conditioning | OBC* | 2.6m** | Type A, B and C |
| Lots 7 and 8 | Optional air conditioning | OBC* | 1.8m** | Type A, B and C |
| Lots 9, 18 to 21 | Optional air conditioning | OBC* | No | Type A and C |
| All other lots within this development | No Requirements | | | |

* OBC: Ontario Building Code Standard.

** Acoustic fence and berm combination. Details to be reviewed once the final grading information are available.

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## 7.0 RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

1. Provision for adding central air conditioning in the future for Lots 1 to 9, 18 to 21.

2. For Lots 1 to 8, the outdoor living areas are proposed to be at the rear yard designated Outdoor Living Areas as shown on Drawing Y0905D.

   A 2.4m high noise barrier is required for Lot 1. 3.0m high noise barrier is required for Lots 2, 3, 4 and 5. A 2.6m high noise barrier is required for Lot 6 and a 1.8m high noise barrier is required for Lots 7 and 8 to achieve a sound level limit of 55dBA or less at the designated Outdoor Living Areas..

3. We recommend the final grading plans to be reviewed to determine the final noise barrier heights, features and the material/details of the noise barriers.

4. All applicable warning clauses shall be listed in the Town of Caledon's Subdivision Agreement and also be included in all Agreements of Purchase, Sale or Lease and registered on title.

5. We recommend that prior to issuance of building permits, once final architectural drawings, final grading plans are available; the acoustical analysis would need to be reviewed to confirm the MOE noise guidelines are met.

6. Prior to the issuance of occupancy permits, a Professional Engineer qualified to perform acoustical engineering services in Ontario shall certify that the noise control measures have been properly installed and constructed as per the noise study recommendations.

CONCLUSION

This report has determined that sound levels acceptable to the Town of Caledon, Region of Peel, Ministry of Transportation and Ministry of Environment, Conservation and Parks will be achieved using commonly practiced abatement measures. These are described in the preceding sections of this report and are summarized on Drawing Y0905D.

Respectfully submitted,

***YCA ENGINEERING** Limited*


Hava Jouharchi, P.Eng.
Senior Project Engineer

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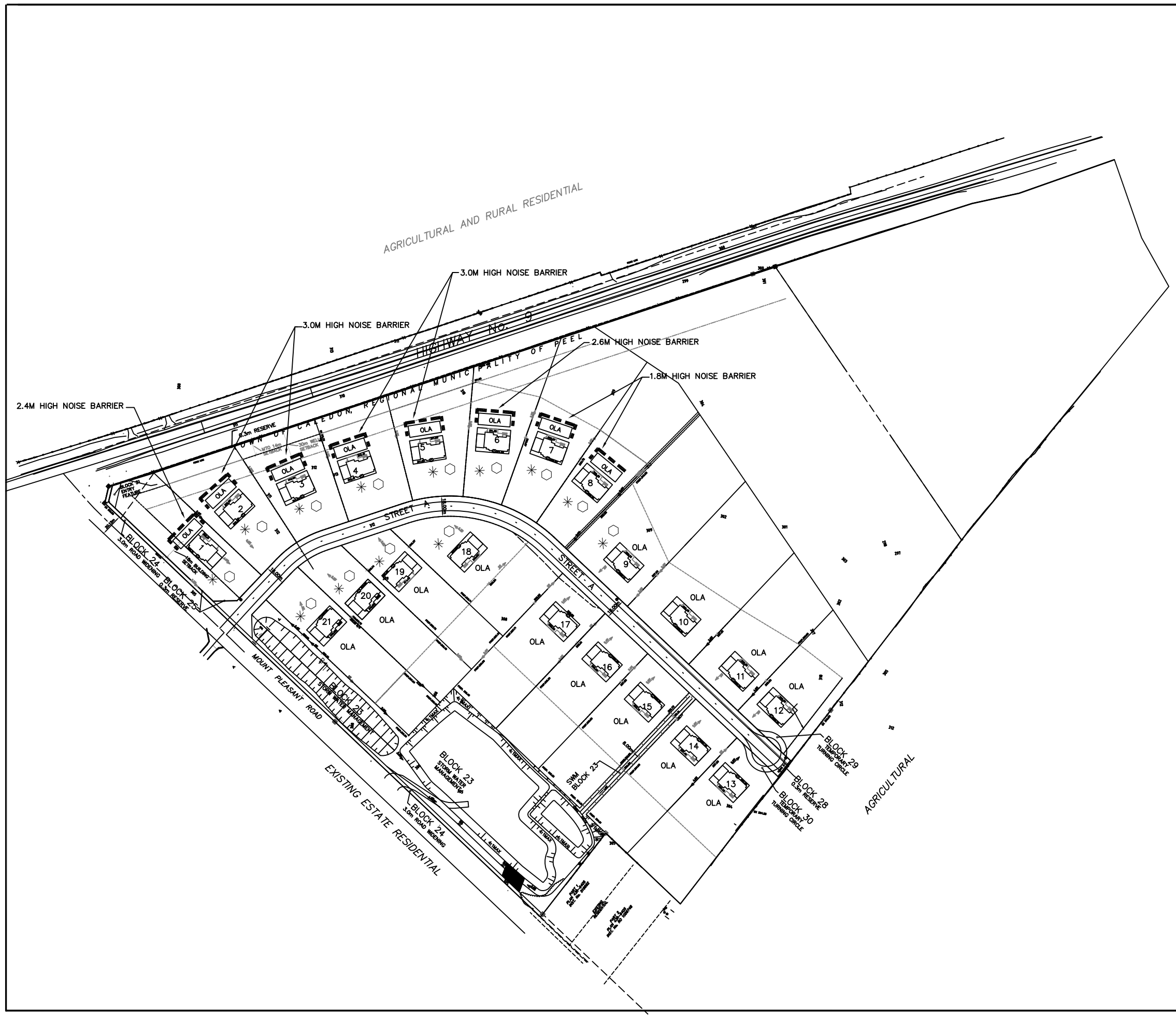


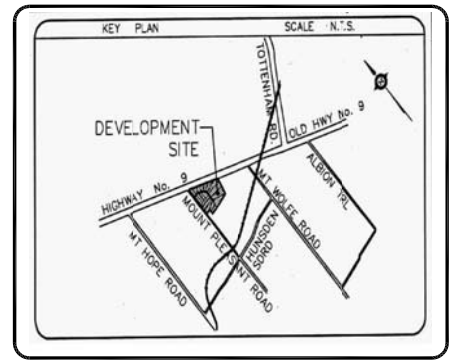


KEY PLAN

LEGEND:

- ⬡ OPTIONAL CENTRAL AIR CONDITIONING AND WARNING CLAUSE C
- ✳ WARNING CLAUSE A
- OLA DESIGNATED OUTDOOR LIVING AREA
- ▬▬ PROPOSED NOISE BARRIER AND WARNING CLAUSE B

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# PLAN OF SUBDIVISION NOISE MITIGATION MEASURES

## GRAHAM PROPERTY ESTATE DEVELOPMENT

TOWN OF CALEDON

DRAWING: Y0905D

Scale: NTS

DATE: March 2019

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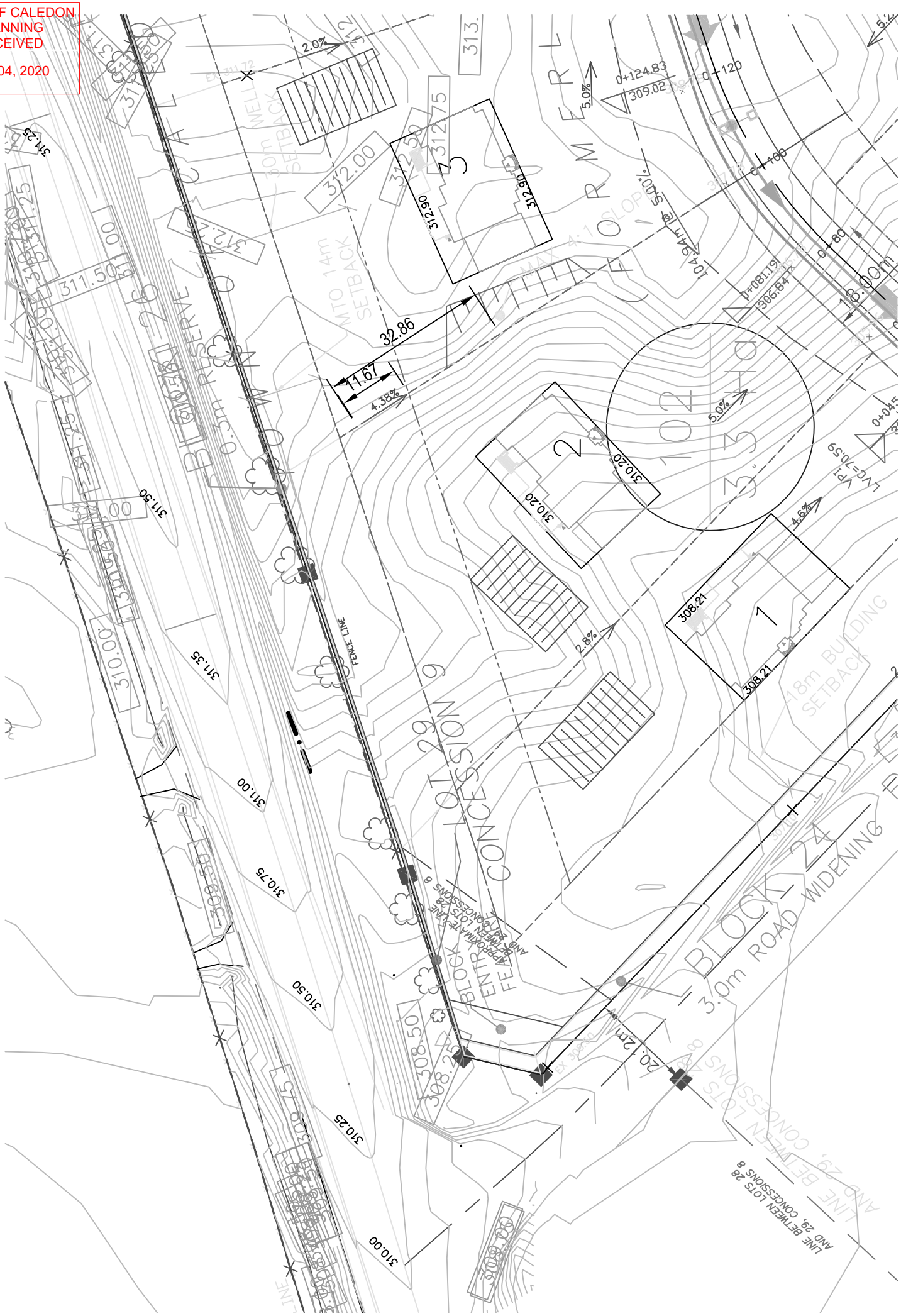

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# APPENDIX 1

# TRAFFIC DATA

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**From:** Alam, Ahsan (MTO) [Ahsan.Alam@ontario.ca]
**Sent:** Friday, March 22, 2019 9:52 AM
**To:** Hava Jouharchi
**Cc:** Tai, Arthur (MTO)
**Subject:** RE: Traffic Data Confirmation, Hwy 9 (Mar.21,19)

Hi Hava,

The information remains almost the same as was given in 2015.

Existing number of thorough lanes = 2
Ultimate AADT = 22,800
Percentage of trucks = 16%
Posted speed = 80 km/h

Thanks,
Ahsan

**From:** Hava Jouharchi <hava@ycaengineering.com>
**Sent:** March 21, 2019 4:57 PM
**To:** Alam, Ahsan (MTO) <Ahsan.Alam@ontario.ca>
**Subject:** Traffic Data Confirmation, Hwy 9 (Mar.21,19)

Good Afternoon Ahsan,
Could you please re-confirm the following traffic data obtained from MTO from January 2015 for Highway 9 north of Mount Pleasant Road (east of Hwy 50) in the Town of Caledon.

- Ultimate AADT: 22,800
- Percentage of Trucks: 15%
- Posted speed: 80km/h
- Ultimate # of lanes: 2

Thank you in advance.
Hava

*Hava Jouharchi, P.Eng.*
*Senior Project Engineer*

***YCA Engineering Ltd.***
*9251 Yonge Street, Suite 8557*
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**From:** Afaq, Syed (MTO) [Syed.Afaq@ontario.ca]
**Sent:** Tuesday, January 20, 2015 3:00 PM
**To:** Hava Jouharchi
**Subject:** RE: Traffic Data Confirmation

Hi Hava: The traffic forecast are still valid for Highway 9 east of Highway 50 in Caledon.

Thanks,

**Syed Salman Afaq**, P.Eng., CAPM, PTP
Planner
Systems Analysis & Forecasting Office
**Ministry of Transportation**
Policy & Planning Division
Tel: 416-585-7307

**From:** Hava Jouharchi [mailto:hava@ycaengineering.com]
**Sent:** January-09-15 9:18 AM
**To:** Afaq, Syed (MTO)
**Subject:** Traffic Data Confirmation

Good Morning Syed,
Could you please confirm the following traffic data obtained from MTO in May 2010 for Highway 9 north of Mount Pleasant Road (east of Hwy 50) in the Town of Caledon.

- Ultimate AADT: 22,800
- Percentage of Trucks: 15%
- Posted speed: 80km/h
- Ultimate # of lanes: 2

Thank you in advance.
Hava

*Hava Jouharchi, P.Eng.*
*Senior Project Engineer*

***YCA Engineering Ltd.***
*9251 Yonge Street, Suite 8557*
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*Email: hava@ycaengineering.com*

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## Hava Jouharchi

**From:** Liu, Cherry (MTO) [Cherry.Liu@ontario.ca]
**Sent:** May-17-10 11:07 AM
**To:** hava@ycaengineering.com
**Cc:** Khan, Muhammad (MTO)
**Subject:** Re: Traffic data (Confirmation/Update)

Hi, Hava:

Please see updates of traffic information as requested below:

Highway 9, east of Hwy 50 in the Town of Caledon

- Ultimate AADT: 22,800
- Percentage of Trucks: 15%
- Posted speed: 80km/h
- Ultimate # of lanes: 2

Best regards,

Cherry

Cherry Qing Liu P.Eng.
Planner
Systems Analysis and Forecasting Office
Ministry of Transportation
Cherry.Liu@ontario.ca
Tel: (416) 585-7309
Fax: (416) 585-7324

---

**From:** Hava Jouharchi [mailto:hava@ycaengineering.com]
**Sent:** May 11, 2010 9:59 AM
**To:** Khan, Muhammad (MTO)
**Subject:** Traffic data (Confirmation/Update)

Hello Muhammad,
Please confirm or provide an update for the following traffic data from 2007 for Highway 9, east of Hwy 50 in the Town of Caledon.

- Ultimate AADT: 22,800
- Percentage of Trucks: 13%
- Posted speed: 80km/h
- Ultimate # of lanes: 2

Thank you in advance.
Hava

*Hava Jouharchi, P.Eng.*
*Senior Project Engineer*

***YCA Engineering***
*A7-1390 Major Mackenzie Drive, Suite 155*
*Richmond Hill, ON, L4S 0A1*

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# APPENDIX 2

# STAMSON 5.04
# SOUND LEVEL CALCULATIONS

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```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 09:54:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 1rwe.te              Time Period: Day/Night 16/8 hours
Description: Lot 1, Rear Wall

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (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  : 105.00 / 105.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 310.75 m
Receiver elevation        : 308.30 m
Barrier elevation         : 308.30 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    60.90 !    60.90 *
--------------------+---------+---------+---------
                      Total                  60.90 dBA
  * Bright Zone  !

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    54.35 !    54.35 *
--------------------+---------+---------+---------
                      Total                  54.35 dBA
  * Bright Zone  !


TOTAL Leq FROM ALL SOURCES (DAY): 60.90
                           (NIGHT): 54.35
```

TOWN OF CALEDON
PLANNING
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May 04, 2020

```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 10:44:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 1rye.te              Time Period: Day/Night 16/8 hours
Description: Lot 1, OLA

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (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  : 100.00 / 100.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.40 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 310.75 m
Receiver elevation        : 308.30 m
Barrier elevation         : 308.30 m

Result summary (day)
--------------------
                    !  source  !   Road    !  Total
                    !  height  !   Leq     !   Leq
                    !    (m)   !  (dBA)    !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    55.11 !    55.11
--------------------+---------+---------+---------
                      Total                  55.11 dBA
```

TOWN OF CALEDON
PLANNING
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May 04, 2020

```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 09:55:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 3rwe.te              Time Period: Day/Night 16/8 hours
Description: Lot 3, Rear Wall

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (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  :  65.00 / 65.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 311.25 m
Receiver elevation        : 313.00 m
Barrier elevation         : 313.00 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    64.15 !    64.15 *
--------------------+---------+---------+---------
                      Total                  64.15 dBA
  * Bright Zone  !

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    57.61 !    57.61 *
--------------------+---------+---------+---------
                      Total                  57.61 dBA
  * Bright Zone  !


TOTAL Leq FROM ALL SOURCES (DAY): 64.15
                           (NIGHT): 57.61
```

TOWN OF CALEDON
PLANNING
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May 04, 2020

```
STAMSON 5.04         SUMMARY REPORT         Date: 28-03-2019 09:00:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 3ryf.te               Time Period: Day/Night 16/8 hours
Description: Lot 3, OLA

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   50.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 50.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 311.25 m
Receiver elevation        : 313.00 m
Barrier elevation         : 313.00 m
Road data, segment # 2: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     1 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 2: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           :  50.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  60.00 / 60.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  50.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 307.00 m
Receiver elevation        : 313.00 m
Barrier elevation         : 313.00 m

Result summary (day)
--------------------
                    !  source  !   Road    !  Total
                    !  height  !   Leq     !   Leq
                    !    (m)   !  (dBA)    !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    54.23 !    54.23
 2.Highway 9        !     1.68 !    48.49 !    48.49
--------------------+---------+---------+---------
                      Total                  55.26 dBA
```

TOWN OF CALEDON
PLANNING
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May 04, 2020

```
STAMSON 5.04         SUMMARY REPORT         Date: 25-03-2019 09:55:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 5rwe.te               Time Period: Day/Night 16/8 hours
Description: Lot 5, Rear Wall

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17442/1938  veh/TimePeriod  *
Medium truck volume :  1539/171   veh/TimePeriod  *
Heavy truck volume  :  1539/171   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.50
    Heavy Truck  % of Total Volume     :   7.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (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  :  70.00 / 70.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 309.25 m
Receiver elevation        : 311.70 m
Barrier elevation         : 311.70 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.65 !    64.02 !    64.02 *
--------------------+---------+---------+---------
                      Total                  64.02 dBA
  * Bright Zone  !

Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.65 !    57.49 !    57.49 *
--------------------+---------+---------+---------
                      Total                  57.49 dBA
  * Bright Zone  !


TOTAL Leq FROM ALL SOURCES (DAY): 64.02
                           (NIGHT): 57.49
```

TOWN OF CALEDON
PLANNING
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May 04, 2020

```
STAMSON 5.04        SUMMARY REPORT        Date: 28-03-2019 09:00:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 5ryf.te              Time Period: Day/Night 16/8 hours
Description: Lot 5, OLA

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17442/1938  veh/TimePeriod  *
Medium truck volume :  1539/171   veh/TimePeriod  *
Heavy truck volume  :  1539/171   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.50
    Heavy Truck  % of Total Volume     :   7.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -20.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 311.50 m
Receiver elevation        : 311.70 m
Barrier elevation         : 311.70 m
Data for Segment # 2: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -20.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -20.00 deg   Angle2 : 30.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 309.25 m
Receiver elevation        : 311.70 m
Barrier elevation         : 311.70 m
Data for Segment # 3: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           :  30.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  30.00 deg   Angle2 : 90.00 deg
Barrier height            :   3.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 306.00 m
Receiver elevation        : 311.70 m
Barrier elevation         : 311.70 m

Result summary (day)
--------------------
                    !  source  !   Road    !  Total
                    !  height  !   Leq     !   Leq
                    !   (m)    !  (dBA)    !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.65 !    51.94 !    51.94
 2.Highway 9        !     1.65 !    48.35 !    48.35
 3.Highway 9        !     1.65 !    50.09 !    50.09
--------------------+---------+---------+---------
                      Total                 55.14 dBA
```

TOWN OF CALEDON
PLANNING
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May 04, 2020

```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 09:56:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 6rwe.te              Time Period: Day/Night 16/8 hours
Description: Lot 6, Rear Wall

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  77.00 / 77.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 309.00 m
Receiver elevation        : 311.35 m
Barrier elevation         : 311.35 m
Data for Segment # 2: Highway 9 (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  :  77.00 / 77.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 302.00 m
Receiver elevation        : 311.35 m
Barrier elevation         : 311.35 m
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    60.59 !    60.59 *
 2.Highway 9        !     1.65 !    60.36 !    60.36 *
--------------------+---------+---------+---------
                      Total                  63.49 dBA
  * Bright Zone  !
Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    54.05 !    54.05 *
 2.Highway 9        !     1.65 !    53.83 !    53.83 *
--------------------+---------+---------+---------
                      Total                  56.95 dBA
  * Bright Zone  !

TOTAL Leq FROM ALL SOURCES (DAY): 63.49
                           (NIGHT): 56.95
```

TOWN OF CALEDON
PLANNING
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```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 10:45:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 6rye.te              Time Period: Day/Night 16/8 hours
Description: Lot 6, OLA

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  72.00 / 72.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   2.60 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 309.00 m
Receiver elevation        : 311.35 m
Barrier elevation         : 311.35 m

Data for Segment # 2: Highway 9 (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  :  72.00 / 72.00  m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   2.60 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 302.00 m
Receiver elevation        : 311.35 m
Barrier elevation         : 311.35 m
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    53.16 !    53.16
 2.Highway 9        !     1.65 !    51.28 !    51.28
--------------------+---------+---------+---------
                      Total                  55.33 dBA
```

TOWN OF CALEDON
PLANNING
RECEIVED

May 04, 2020

```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 09:56:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 8rwe.te              Time Period: Day/Night 16/8 hours
Description: Lot 8, Rear Wall

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 150.00 / 150.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 10.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 305.00 m
Receiver elevation        : 309.55 m
Barrier elevation         : 309.55 m
Data for Segment # 2: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           :  10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 150.00 / 150.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  10.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 300.75 m
Receiver elevation        : 309.55 m
Barrier elevation         : 309.55 m
Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    56.67 !    56.67 *
 2.Highway 9        !     1.68 !    55.36 !    55.36 *
--------------------+---------+---------+---------
                      Total                  59.07 dBA
  * Bright Zone  !
Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    50.13 !    50.13 *
 2.Highway 9        !     1.68 !    48.82 !    48.82 *
--------------------+---------+---------+---------
                      Total                  52.53 dBA
  * Bright Zone  !

TOTAL Leq FROM ALL SOURCES (DAY): 59.07
                           (NIGHT): 52.53
```

TOWN OF CALEDON
PLANNING
RECEIVED

May 04, 2020

```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 10:46:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 8rye.te              Time Period: Day/Night 16/8 hours
Description: Lot 8, OLA

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
----------------------------------------------
Angle1   Angle2           : -70.00 deg   10.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 150.00 / 150.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -70.00 deg   Angle2 : 10.00 deg
Barrier height            :   1.80 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 305.00 m
Receiver elevation        : 309.55 m
Barrier elevation         : 309.55 m

Data for Segment # 2: Highway 9 (day/night)
----------------------------------------------
Angle1   Angle2           :  10.00 deg   80.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 150.00 / 150.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  10.00 deg   Angle2 : 80.00 deg
Barrier height            :   1.80 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 300.75 m
Receiver elevation        : 309.55 m
Barrier elevation         : 309.55 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    50.64 !    50.64
 2.Highway 9        !     1.68 !    49.28 !    49.28
--------------------+---------+---------+---------
                      Total                  53.02 dBA
```

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```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 09:56:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 9swd.te              Time Period: Day/Night 16/8 hours
Description: Lot 9, Side Wall

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17237/1915  veh/TimePeriod  *
Medium truck volume :  1642/182   veh/TimePeriod  *
Heavy truck volume  :  1642/182   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   8.00
    Heavy Truck  % of Total Volume     :   8.00
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (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  : 230.00 / 230.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 304.00 m
Receiver elevation        : 309.12 m
Barrier elevation         : 309.12 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    56.17 !    56.17 *
--------------------+---------+---------+---------
                      Total                  56.17 dBA
  * Bright Zone  !
Result summary (night)
----------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.68 !    49.63 !    49.63 *
--------------------+---------+---------+---------
                      Total                  49.63 dBA
  * Bright Zone  !

TOTAL Leq FROM ALL SOURCES (DAY): 56.17
                           (NIGHT): 49.63
```

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```
STAMSON 5.04        SUMMARY REPORT        Date: 25-03-2019 10:46:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 9ryd.te              Time Period: Day/Night 16/8 hours
Description: Lot 9, OLA

Road data, segment # 1: Highway 9 (day/night)
----------------------------------------------
Car traffic volume  : 17442/1938  veh/TimePeriod  *
Medium truck volume :  1539/171   veh/TimePeriod  *
Heavy truck volume  :  1539/171   veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     2 %
Road pavement       :     1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
    24 hr Traffic Volume (AADT or SADT):  22800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.50
    Heavy Truck  % of Total Volume     :   7.50
    Day (16 hrs) % of Total Volume     :  90.00
Data for Segment # 1: Highway 9 (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 232.00 / 232.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 311.00 m
Receiver elevation        : 309.12 m
Barrier elevation         : 309.12 m

Data for Segment # 2: Highway 9 (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  : 232.00 / 232.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          : 304.00 m
Receiver elevation        : 309.12 m
Barrier elevation         : 309.12 m

Result summary (day)
--------------------
                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !    (m)   !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Highway 9        !     1.65 !    50.33 !    50.33 *
 2.Highway 9        !     1.65 !    51.64 !    51.64 *
--------------------+---------+---------+---------
                      Total                  54.04 dBA
```

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**PROJECT NO.: Y0905**
**PROJECT NAME: Graham Property**
**NOISE SOURCE: Highway No. 9**
**LOCATION: Lot 3**

| Number of components: | **DAY-TIME (7:00-23: 00)** | **NIGHT-TIME (23:00-7:00)** |
|---|---|---|
| Predicted Sound Level | 64 dBA | 58 dBA |
| Correction for reflection | 3 dBA | 3 dBA |
| Outdoor Sound Level | 67 dBA | 61 dBA |
| Indoor Sound Level Limit | 45 dBA | 40 dBA |
| Required Noise Reduction (NR) | 22 dBA | 21 dBA |
| Angle from __0_ to __90__ degree ($C_1$ Correction from table 7.7) | 0 dBA | 0 dBA |
| **SUM** | 22 dBA | 24 dBA |

| **WALL COMPONENT:** | **DAY-TIME (7:00-23:00)** | **NIGHT-TIME (23:00-7:00)** |
|---|---|---|
| SUM | 22 dBA | 21 dBA |
| Transmits ____33__ % of sound energy (C2 from table7.8) | 5 dBA | 5 dBA |
| Wall area _____ m2 __80__ % of floor area Room floor area m2 | | |
| Room absorption category (C3 from table 7.9) | 0 dBA | -2 dBA |
| Noise spectrum type (from figure 7.5) | 7 dBA | 7 dBA |
| Component category (from table 7.10) | | |
| **REQUIRED STC** | 34 dBA | 31 dBA |

| **WINDOW COMPONENT:** | **DAY-TIME (7:00-23:00)** | **NIGHT-TIME (23:00-7:00)** |
|---|---|---|
| SUM | 22 dBA | 21 dBA |
| Transmits __33__ % of sound energy (C2 from table7.8) | 5 dBA | 5 dBA |
| Window area _____ m2 ___30__ % of floor area Room floor area m2 | | |
| Room absorption category (C3 from table 7.9) | -4 dBA | -6 dBA |
| Noise spectrum type (from figure 7.5) | 4 dBA | 4 dBA |
| Component category (from table 7.10) | | |
| **REQUIRED STC** | 27 dBA | 24 dBA |

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# APPENDIX 3

# SOUND LEVEL CRITERIA

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# MINISTRY OF THE ENVIRONMENT

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

*August 2013*

### Day-time Outdoor Sound Level Limit

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

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

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

### Indoor Sound Level Limit

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

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

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

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## SUPPLEMENTARY NOISE LIMITS

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

**TABLE C-9**
**Indoor Sound Level Limits (Road and Rail)**

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

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

**TABLE 1**
**COMBINATION OF ROAD AND RAIL NOISE, DAY-TIME (0700 - 2300)**
**OUTDOOR, VENTILATION AND WARNING CLAUSE REQUIREMENTS**

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

**TABLE 2**
**COMBINATION OF ROAD AND RAIL NOISE, NIGHT-TIME (2300 - 0700)**
**VENTILATION AND WARNING CLAUSE REQUIREMENTS**

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

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

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

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

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

***TABLE 5***
***FACADE REQUIREMENT FOR RAIL NOISE ONLY - 24 HOURS***

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

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

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

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

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

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## ***WARNING CLAUSES***

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

*TYPE A:*

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

*TYPE B:*

*"Purchasers are advised that despite the inclusion of noise abatement features within the development area, sound levels from road traffic may be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level will exceed the Ministry of Environment and Climate Change's noise criteria."*

*TYPE C:*

*"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment and Climate Change's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)"*

*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 Municipality's and the Ministry of the Environment and Climate Change's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)"*

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# APPENDIX 4

# SAMPLE WINDOW AND EXTERIOR WALL CONFIGURATIONS

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**PROJECT NO.: Y0905D**
**PROJECT NAME: Graham Property**
**NOISE SOURCE: Highway 9**
**LOCATION: Lot 2**

## BUILDING COMPONENTS - STC Calculation

| Number of components: | **DAY-TIME (7:00-23: 00)** | **NIGHT-TIME (23:00-7:00)** |
|---|---|---|
| Predicted Sound Level | 64 dBA | 58 dBA |
| Correction for reflection | 3 dBA | 3 dBA |
| Outdoor Sound Level | 70 dBA | 64 dBA |
| Indoor Sound Level Limit | 45 dBA | 40 dBA |
| Required Noise Reduction (NR) | 25 dBA | 24 dBA |
| Angle from __0_ to __90__ degree ($C_1$ Correction from table 7.7) | 0 dBA | 0 dBA |
| | 25 dBA | 24 dBA |

| **WALL COMPONENT:** | **DAY-TIME (7:00-23:00)** | **NIGHT-TIME (23:00-7:00)** |
|---|---|---|
| SUM | 25 dBA | 24 dBA |
| Transmits ____33__ % of sound energy (C2 from table7.8) | 5 dBA | 5 dBA |
| Wall area _____ m2 __80__ % of floor area<br>Room floor area m2 | | |
| Room absorption category (C3 from table 7.9) | 0 dBA | -2 dBA |
| Noise spectrum type (from figure 7.5) | 7 dBA | 7 dBA |
| Component category (from table 7.10) | | |
| **REQUIRED STC** | 37 dBA | 34 dBA |

| **WINDOW COMPONENT:** | **DAY-TIME (7:00-23:00)** | **NIGHT-TIME (23:00-7:00)** |
|---|---|---|
| SUM | 25 dBA | 24 dBA |
| Transmits __33__ % of sound energy (C2 from table7.8) | 5 dBA | 5 dBA |
| Window area _____ m2 ___25__ % of floor area<br>Room floor area m2 | | |
| Room absorption category (C3 from table 7.9) | -4 dBA | -6 dBA |
| Noise spectrum type (from figure 7.5) | 4 dBA | 4 dBA |
| Component category (from table 7.10) | | |
| **REQUIRED STC** | 30 dBA | 27 dBA |

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# WINDOW STC RATINGS

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

Source: National Research Council, Division of Building Research

EXPLANATORY NOTES:

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

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

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

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

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# EXTERIOR WALL STC RATINGS

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

Source: National Research Council, Division of Building Research

NOTES:

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

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

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

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

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