REPORT

1357 Belle Aire Beach Road

Innisfil, Ontario

Noise Impact Study

SACL #B7-310

Nov 13, 2017

Submitted to:

Belle Aire Investment Corporation
c/o Laurel View Homes Inc.
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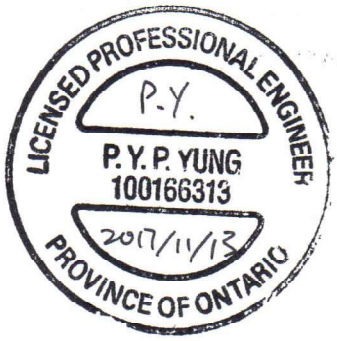

Submitted by:

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Reviewed by:

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1. Introduction

This document is a Noise Impact Study regarding the proposed development at 1357 Belle Aire Beach Road in Innisfil, Ontario (Project). The project will consist of fourteen 3-storey residential townhouse buildings. The objective of this study is to determine if the proposed development can meet the requirements of the Town of Innisfil and Ontario Ministry of the Environment and Climate Change (MOECC) noise guidelines for the Town of Innisfil Site Plan Approval. Noise control recommendations are summarised in Section 4.4.

As per the *Guidelines for New Development in Proximity to Railway Operations*, prepared for the Federation of Canadian Municipalities and the Railway Association of Canada, dated May 2013, the minimum vibration influence area to be considered is 75 m from a railway corridor. Due to the Project buildings being further than 75 m from the rail line, ground-borne vibration due to rail traffic is not expected to be a concern at the Project site and a vibration assessment has not been conducted.

2. Site

The Project is located on Belle Aire Beach Road, approximately 600 m east of 20th Side Road in Innisfil. To the north and east are agricultural zones; however, a residential development is currently proposed to the east. To the west and southwest is a residential area currently under construction. The Metrolinx/GO Transit rail line runs north-south to the east of the site. Southeast beyond the rail line is another residential area. An aerial view of the site is provided in Figure 1. A zoning map is presented in Figure 2.

Proposed for the Project are fourteen 3-storey townhouse buildings on the site, consisting of 93 residential units. A shared outdoor amenity area is located on the southeast portion of the site. The proposed site plan is provided in Figure 3.

3. Noise Sources

A site visit was conducted on October 25, 2017 to identify significant noise sources that may impact the Project. Belle Aire Beach Road and the Metrolinx GO Transit rail line are the primary transportation noise sources near the Project. Road and rail traffic volume data is presented in Appendix B. Noise levels from the significant traffic sources are considered in Section 4.

No stationary noise sources were identified nearby the Project and no future stationary noise sources are expected to be associated with the Project, or with nearby developments.

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4. Transportation Noise Assessment

4.1. Critical Noise Receptors

Critical noise receptors, or Points of Reception (PORs) are those receptors likely to be most affected by the identified noise sources. The critical indoor noise receptors in the proposed development are the residential units that are exposed to Belle Aire Beach Road and to the Metrolinx rail line. Outdoor Living Areas (OLAs) are associated with the back yards of the dwellings and at the shared outdoor amenity area. The POR receptors are assessed at the 3rd floor level, and the OLA receptors at ground level.

The locations of the critical receptors are summarised in Table 1 below and shown in Figure 3.

Table 1: Critical Noise Receptors

Receptor ID	*Receptor Height*	*Receptor Location*
POR1	7.5 m	Dwelling unit 59 northeast corner, exposed to Belle Aire Beach Road and the Metrolinx rail line
POR2	7.5 m	Dwelling unit 75 southeast corner, exposed to Belle Aire Beach Road and the Metrolinx rail line
POR3	7.5 m	Dwelling unit 41 east façade, exposed to Belle Aire Beach Road and the Metrolinx rail line
OLA1	1.5 m	Dwelling unit 59 back yard
OLA2	1.5 m	Dwelling unit 75 back yard
OLA3	1.5 m	Shared outdoor amenity area at southeast area of site

4.2. Sound Level Predictions

Traffic data for Belle Aire Beach Road was obtained from the Town of Innisfil and is presented in Appendix B. Traffic volume on Innisfil Beach Road was projected to the year 2027 based on a 2% per year growth rate. Medium and Heavy truck traffic counts were based on the peak traffic count data for each section of the road. The daytime and nighttime traffic levels were estimated at 92% and 8% for the daytime and nighttime periods, respectively. Medium and heavy truck percentages were also conservatively estimated at 2% and 4%, respectively. The traffic data used in the calculations are summarized in Table 2 below.

Table 2: Road Traffic Data Summary

Parameter	***Belle Aire Beach Road***
Traffic Volume (AADT 2013)	1109
Growth Rate	2.0% per year
Day/Night Split	92% / 8%
Medium Trucks	2%
Heavy Trucks	4%
Speed Limit	80 km/h

Rail traffic volume data for the GO Transit Barrie rail corridor were obtained from Metrolinx. The traffic data are provided in Appendix B and summarised in Table 3. Train volume on the is given in terms of the 10 year time horizon (i.e. 2027 levels). There are a maximum of 12 cars and 1 locomotives per train. The maximum speed of the trains is 129 km/h (or 80 mph).

Table 3: Metrolinx Rail Traffic Data Summary

Parameter	***GO Train***
Number of Diesel Trains 2027 (Day / Night)	36 / 6
Number of Locomotives	1 max
Number of Cars	12 max
Maximum Speed	129 km/h

Calculations of traffic sound levels were performed using STAMSON 5.04, the software implementation of the MOE ORNAMENT and STEAM models, for road and rail traffic respectively, which was developed and published by the MOE for transportation noise prediction. Only daytime sound levels are considered for outdoor amenity areas. The existing grading of the site is a gentle downward slope from Belle Aire Beach Road to the southeast of the Site. Belle Aire Beach Road also has a slight downward grade of 4% from west to east. The rail line is also approximately 4 m below the Site grade at the SE corner. The calculations are performed assuming the existing grade at the site will not change significantly. Note also that due to the Belle Aire Beach Road traffic volumes being lower than the minimum limit for calculation in STAMSON, the traffic volumes have been increased by a factor of 4 in the calculations. A correction factor of -6 dB was then applied to the calculated sound levels to determine the actual predicted sound levels at the receptor locations. The calculated sound levels are as presented below.

Table 4: Calculated Sound Levels due to Belle Aire Beach Road and GO Transit Barrie Rail Line

Receptor ID	Road Noise		Rail Noise		Combined Road and Rail Noise	
	Day Leq (16 hrs)	Night Leq (8 hrs)	Day Leq (16 hrs)	Night Leq (8 hrs)	Day Leq (16 hrs)	Night Leq (8 hrs)
POR1	59	51	59	54	62	56
POR2	43	36	61	57	61	57
POR3	38	30	54	50	54	50
OLA1	56	-	57	-	60	-
OLA2	-	-	60	-	60	-
OLA3	43	-	58	-	59	-

In addition, the 24-hour Leq for rail noise impacts was assessed for POR2 to determine building façade requirements. The rail noise 24 hour Leq for POR2 was found to be 60 dBA.

4.3. The STAMSON calculation outputs for all traffic noise predictions are attached in Appendix C.Sound Level Limits

Guidelines for acceptable sound levels of road traffic on residential developments are given in Part C of the MOECC publication NPC-300 "*Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*" dated 2013.

4.3.1. Outdoor Sound Level Limits

The MOECC outdoor sound level limit for traffic noise is as follows:

Table 5: MOECC Outdoor Sound Level Limit

Time Period	Sound Level (Leq)
Day-time (07:00 - 23:00)	55

In addition to the above outdoor levels, the MOECC has a sliding scale to determine the need for outdoor noise reduction measures depending on outdoor sound levels:

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Table 6: MOECC Noise Control Requirements for Outdoor Receptors

Outdoor Sound Level (Day-time Leq)	***Need for Noise Reduction Measures***
56 to 60 dBA	Noise control measures may be implemented. If no noise control measures are planned, a warning clause must be included in the unit title or lease agreement.
Above 60 dBA	Control measures (barriers) required to reduce the Leq to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible. A warning clause is required if resultant Leq exceeds 55 dBA.

4.3.2. Indoor Sound Level Limits

The indoor sound levels limits developed by MOECC for road noise sources are as follows:

Table 7: MOECC Indoor Sound Level Limits – Road and Rail

Room	***Time Period***	***Road Sound Level (Leq)***	***Rail Sound Level (Leq)***
Living rooms	Day-time (07:00 - 23:00)	45 dBA	40 dBA
	Night-time (23:00 - 07:00)	45 dBA	40 dBA
Bedrooms	Day-time (07:00 - 23:00)	45 dBA	40 dBA
	Night-time (23:00 - 07:00)	40 dBA	35 dBA

In addition to the above indoor levels, the MOECC has a sliding scale to determine the need for noise reduction measures depending on the predicted outdoor sound level at the façade of the building:

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Table 8: Combination of Ventilation and Warning Clause Requirements – Road and Rail

ASSESSMENT LOCATION	***Leq***	***VENTILATION REQUIREMENTS***	***WARNING CLAUSE***
PLANE OF BEDROOM, LIVING OR DINING ROOM WINDOW (07:00-23:00)	Greater than 55 dBA to less than or equal to 65 dBA.	Forced air heating with provision for central air conditioning.	Required
	Greater than 65 dBA.	Central air conditioning	Required
PLANE OF BEDROOM, LIVING OR DINING ROOM WINDOW (23:00-07:00)	Greater than 50 dBA to less than or equal to 60 dBA.	Forced air heating with provision for central air conditioning.	Required
	Greater than 60 dBA	Central air conditioning	Required

Table 9: Road Noise Building Component Requirements

ASSESSMENT LOCATION	***Leq***	***BUILDING COMPONENT REQUIREMENTS***
PLANE OF BEDROOM, LIVING OR DINING ROOM WINDOW (07:00-23:00)	Less than or equal to 65 dBA	Building compliant with the Ontario Building Code.
	Greater than 65 dBA	Building components must be designed to achieve indoor sound level criteria.
PLANE OF BEDROOM, LIVING OR DINING ROOM WINDOW (23:00-07:00)	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code.
	Greater than 60 dBA	Building components must be designed to achieve indoor sound level criteria

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Table 10: Rail Noise Building Component Requirements

ASSESSMENT LOCATION	***Leq***	***BUILDING COMPONENT REQUIREMENTS***
PLANE OF BEDROOM, LIVING OR DINING ROOM WINDOW (07:00-23:00)	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code.
	Greater than 60 dBA	Building components must be designed to achieve indoor sound level criteria.
PLANE OF BEDROOM, LIVING OR DINING ROOM WINDOW (23:00-07:00)	Less than or equal to 55 dBA	Building compliant with the Ontario Building Code.
	Greater than 55 dBA	Building components must be designed to achieve indoor sound level criteria

In addition to the above requirements, the exterior walls of the first row of dwellings next to railway tracks must be built to a minimum of brick veneer or masonry equivalent construction, from the foundation to the rafters, when:

1. the 24-hr L_{eq} estimated at the location of a nighttime receptor is greater than 60 dBA, and
2. the dwelling is within 100 metres of the tracks.

4.4. Noise Control Measures

Noise control recommendations for the critical receptors are summarized in Table 11 and discussed in the subsequent sections.

Table 11: Noise Control Measures

Receptor	***Noise Barrier***	***Ventilation***	***Building Components***	***Warning Clause***
POR1	N/A	Forced air heating with provision for central air conditioning	Building compliant with the Ontario Building Code	Type C
POR2	N/A	Forced air heating with provision for central air conditioning.	Building components must be designed to achieve indoor sound level criteria.	Type C
POR3	N/A	Forced air heating with provision for central air conditioning.	Building compliant with the Ontario Building Code	Type C
OLA1	No	N/A	N/A	Type A

Receptor	Noise Barrier	Ventilation	Building Components	Warning Clause
OLA2	No	N/A	N/A	Type A
OLA3	No	N/A	N/A	Type A

4.4.1. Outdoor Living Area

The sound level expected at all OLAs exposed to the road and/or rail sources is below 60 dBA, thus no noise mitigation is necessary for these areas. However, since the levels are above 55 dBA, a Type A warning clause is required for all outdoor areas for units which are exposed to the road and/or rail line. The units of the Project which require the Type A warning clause are 1, 21, 58 and 59 – 93, and are shown in Figure 4.

4.4.2. Ventilation

At a minimum, forced air heating with the provision for installation of central air conditioning at the occupant's discretion is required for all of the residential units of the Project directly exposed to the road and/or rail line. The units of the Project which require forced air heating with the provision for installation of central air conditioning are 1, 21, 40-44, 58, 59 – 93, and are shown in Figure 4.

4.4.3. Building Components

Building components including glazing specifications and exterior wall construction for all of the residential dwellings, except unit 75, for the Project meeting minimum Ontario Building Code (OBC) requirements will be sufficient for the indoor noise levels to meet the MOECC criteria.

Since the 24-hour Leq at Unit 75 is 60 dBA, a brick veneer or masonry equivalent façade is not required; however, building components for unit 75 must be designed to meet indoor sound level limits. This can be achieved by ensuring that the building façade components be designed to meet minimum STC criteria. As the layouts of the townhouses are not yet available, SACL has calculated the maximum area of each building component of a room using typical constructions, which are provided below. If a component with a higher STC rating than these typical constructions is used, then the maximum allowable area of that component may increase. Table 12 shows these maximum areas as a percentage of the floor area of that room and the minimum STC requirement of the associated construction.

Table 12: Building Envelope Requirements – Unit 75 South and East Façades

Component	Maximum Component Area Percentage Versus Floor Area of Room	STC Required
Solid Exterior	200%	STC 38
Fixed Glazing	40%	STC 30
Operable Glazing	20%	STC 27

Examples of minimum constructions for exterior wall and glazing were determined to provide a basis for the final design and are presented below, and meet the STC requirements above.

Exterior Wall

12.7 mm gypsum board
Vapour barrier
38 x 89 mm studs
50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities
Sheathing
Wood siding or Metal siding and fibre backer board

Operable and Fixed Glazing

Operable and fixed glazing consisting of two 2 mm panes of glass separated by a minimum airspace of 6 mm can achieve the STC required.

4.4.4. Warning Clauses

Since no noise mitigation is necessary at the outdoor amenity areas and the sound levels are over 55 dBA of units 1, 21, 58, and 59 – 93 of the Project, the following 'Type A' warning clause should be inserted in the development agreements for those units:

> "Purchasers/tenants are advised that sound levels due to increasing road 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 and Climate Change."

Since forced air heating with the provision for the addition of central air conditioning is required for units 1, 21, 40-44, 58, and 59 – 93 of the Project, the following 'Type C' warning clause should be inserted in all development agreements for those units:

> "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 and Climate Change."

5. Concluding Comments

The road and rail noise impacts at the proposed 1357 Belle Aire Beach Road townhouse development have been determined based on the 2027 future expected transportation (rail and road) traffic volumes. With the incorporation of the noise control measures as presented in Section

4.4 of this report, the noise impact of the transportation noise sources on the proposed residential development will meet MOECC and Town of Innisfil noise criteria. The noise control measures can be met through appropriate design of the building components and the installation of forced-air heating with the provision for central air conditioning. Noise barriers are not necessary. There are no known existing or proposed significant stationary noise sources that may impact the Project.

--End--

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Figures

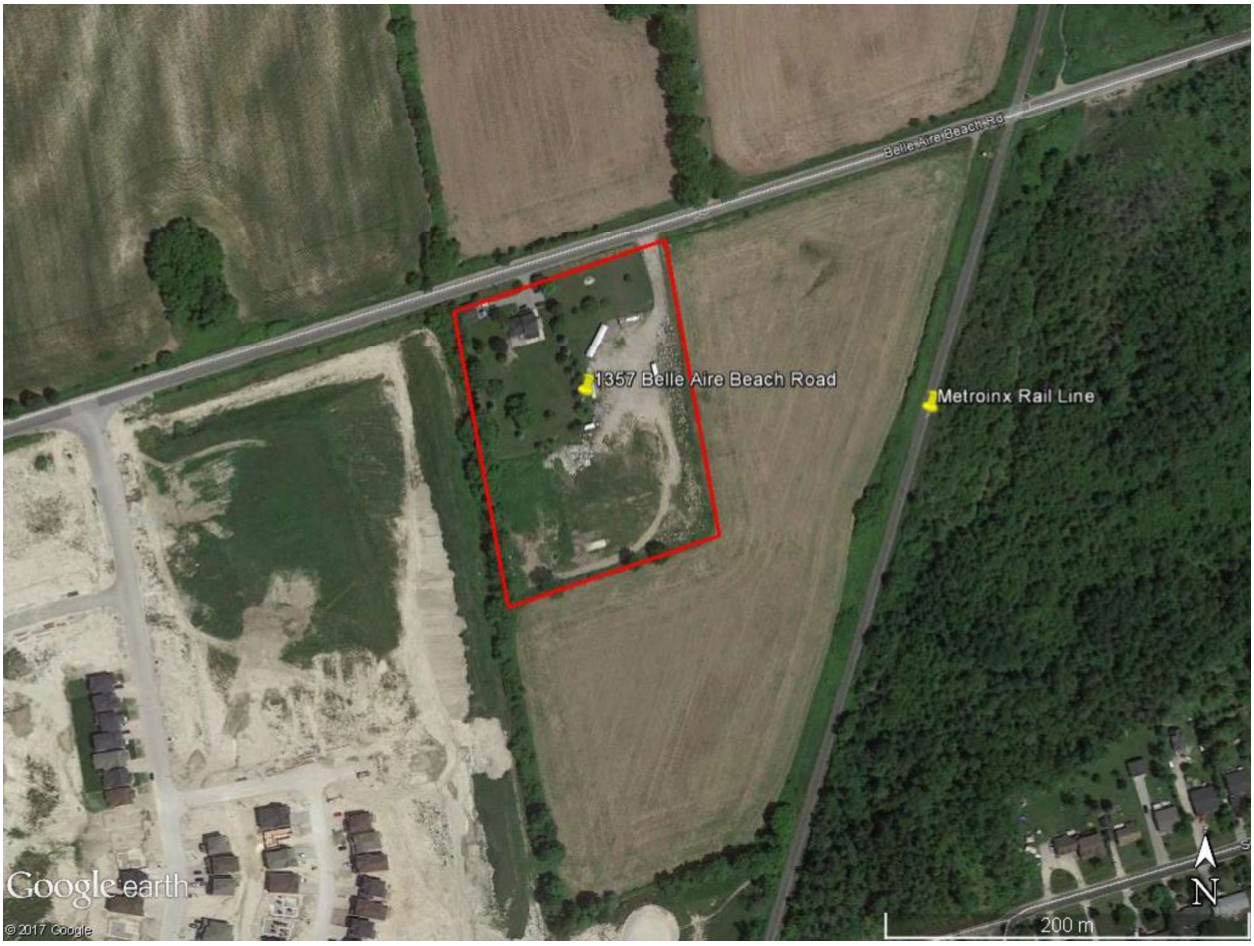

Figure 1. Site Aerial Photo

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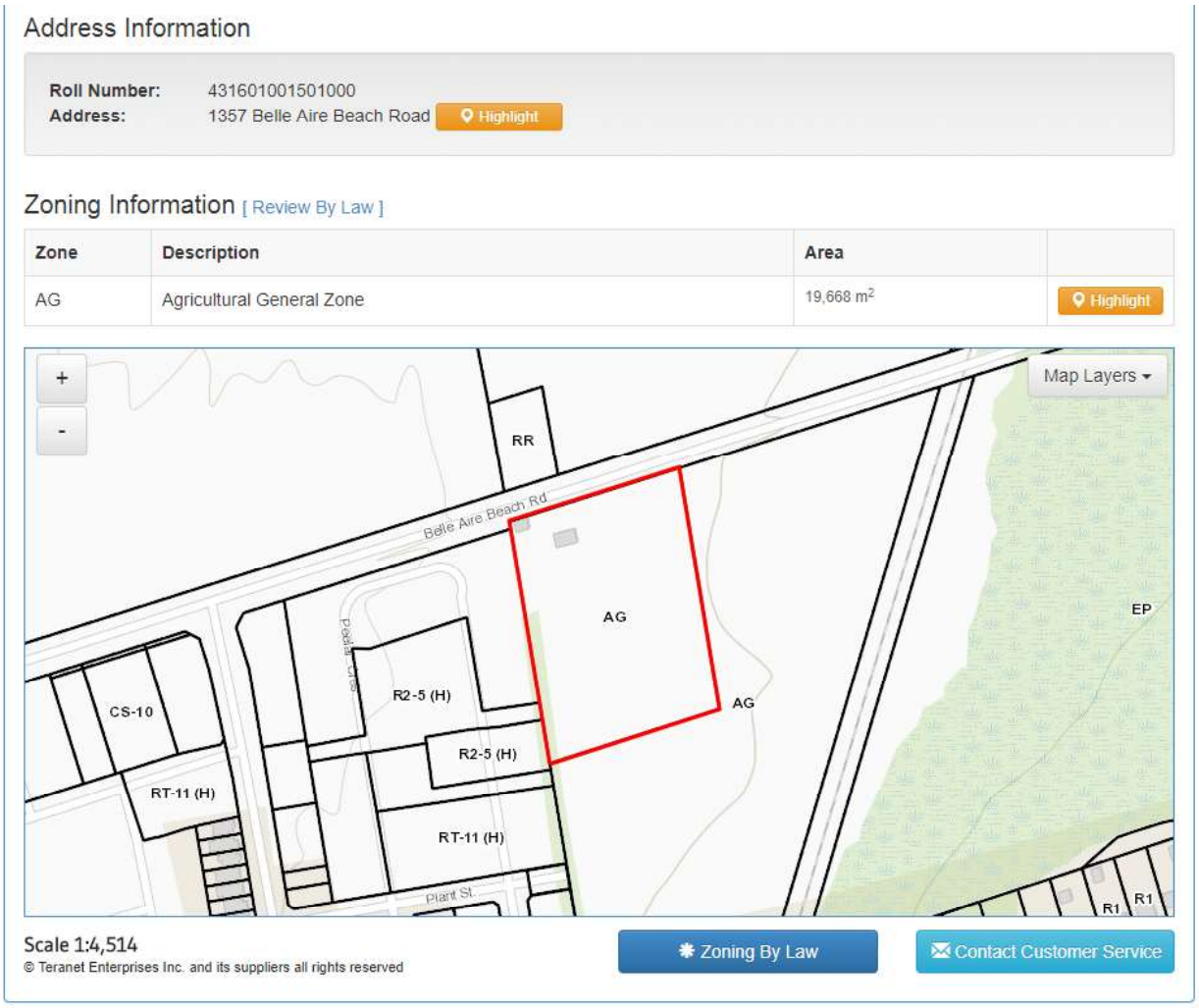

Disclaimer:

THIS IS NOT A PLAN OF SURVEY. Zoning information presented here is a representation sourced from Geographic Information Systems. In the event of a discrepancy between the zoning information contained on this website and the information contained in the records and zoning by-law of the municipality, the information contained in the records and zoning by-law of the municipality shall be deemed accurate. Under no circumstances shall the municipality be liable for any direct, indirect, special, punitive, incidental, or consequential damages arising out of the use of, or the inability to use this zoning tool. Zoning maps should always be referred to in conjunction with the text of the zoning by-law. Terms of Use

Figure 2. Zoning Map

Figure 3. Proposed Site Plan and Receptor Locations

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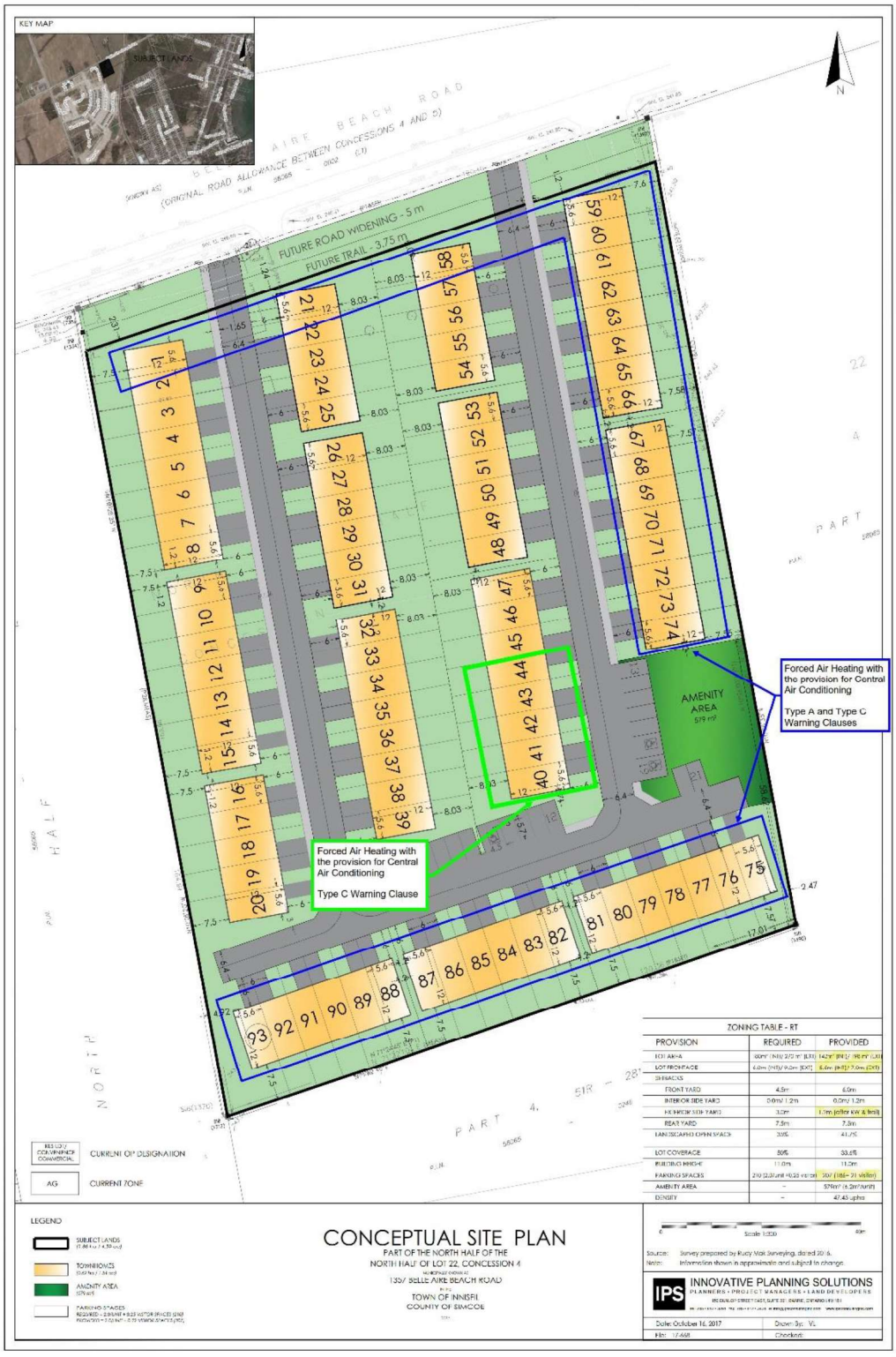

Figure 4. Project Noise Mitigation Recommendations

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Appendices

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APPENDIX A: Innisfil Traffic Counts

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Table 4-4: Existing Screenline Traffic Analysis – East-West Daily 2-way Traffic

No.	Link	Daily 2-way Capacity	Daily 2-way Traffic Volume	V/C Ratio
West of Highway 400*				
602	INNISFIL BEACH ROAD	14,000	13,403	0.96
603	7TH LINE	10,000	302	0.03
604	6TH LINE	10,000	287	0.03
605	5TH LINE	10,000	299	0.03
606	4TH LINE	10,000	1,009	0.10
607	3RD LINE	10,000	92	0.01
609	HIGHWAY 89	20,000	16,700	0.84
6	Total	84,000	32,092	0.38
East of Highway 400				
701	9TH LINE	10,000	1,540	0.15
702	INNISFIL BEACH ROAD	20,000	14,324	0.72
703	7TH LINE	10,000	72	0.01
704	6TH LINE	10,000	281	0.03
705	5TH LINE	10,000	66	0.01
706	4TH LINE	10,000	1,145	0.11
707	3RD LINE	10,000	156	0.02
708	2ND LINE	10,000	108	0.01
709	COUNTY ROAD 89	20,000	7,367	0.37
710	14TH LINE	10,000	90	0.01
7	Total	120,000	25,149	0.21
West of 20 Side Road				
801	BIG BAY POINT ROAD	10,000	4,719	0.47
802	MAPLEVIEW DRIVE	10,000	1,662	0.17
803	LOCKHART ROAD	10,000	4,066	0.41
804	10TH LINE	10,000	3,502	0.35
805	9TH LINE	10,000	3,194	0.32
806	INNISFIL BEACH ROAD	20,000	11,357	0.57
807	7TH LINE	10,000	3,073	0.31
808	6TH LINE	10,000	876	0.09
809	5TH LINE	10,000	666	0.07
810	KILLARNEY BEACH ROAD	10,000	2,590	0.26
811	3RD LINE	10,000	270	0.03
812	2ND LINE	10,000	260	0.03
813	SHORE ACRES DRIVE	16,000	4,809	0.30
814	GILFORD ROAD	10,000	1,050	0.11
815	14TH LINE	10,000	90	0.01
8	Total	166,000	42,186	0.25
East of 20 Side Road				
901	BIG BAY POINT ROAD	10,000	3,879	0.39
902	MAPLEVIEW DRIVE	10,000	953	0.10
903	LOCKHART ROAD	10,000	4,177	0.42
904	10TH LINE	10,000	2,158	0.22
905	9TH LINE	10,000	2,614	0.26
906	INNISFIL BEACH ROAD	10,000	10,986	1.10
907	7TH LINE	10,000	5,985	0.60
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
909	BELLE AIRE BEACH ROAD	10,000	1,109	0.11
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
911	3RD LINE	10,000	582	0.06
912	2ND LINE	10,000	642	0.06
913	SHORE ACRES DRIVE	10,000	1,760	0.18
914	GILFORD ROAD	10,000	1,016	0.10
915	14TH LINE	10,000	337	0.03
9	Total	150,000	40,494	0.27
V/C Ratio Legend			V/C Ratio between 0.85 and 1 (Somewhat Busy)	
			V/C Ratio > 1 (Busy)	

*Volumes on 9th Line, 2nd Line, and 14th Line west of Highway 400 were not available

Wong, Galen

From: Brandon Gaffoor <Brandon.Gaffoor@metrolinx.com>
Sent: 2017/10/12 9:26 AM
To: Wong, Galen
Subject: RE: Rail Traffic Data request - Lefroy

Hi Galen,

Further to your request, the subject site (Belle Aire Beach Road and 20th Sideroad) is located adjacent to GO Transit's Barrie rail corridor.

It's anticipated that GO Service along this corridor will be comprised of electric trains within (at least) a 10 year time horizon. The preliminary midterm weekday train volume forecast at this location, including both revenue and equipment trips is in the order of 42 trains (36 day, 6 night). Trains will be comprised of a single locomotive and up to 12 passenger cars.

The current maximum design speed of this corridor is 80 mph (129 km/h).

With respect to future electrified rail service, it should be noted that Metrolinx has not made a final decision regarding the electric train technology or technologies to be deployed. Similarly, we are only beginning to understand potential noise and vibration implications associated with electrification. We can, however, provide the following interim information which may be helpful

1. At lower speeds, train noise is dominated by the powertrain. At higher speeds, train noise is dominated by the wheel- track interaction. Hence, at higher speeds, the noise level and spectrum of electric trains is expected to be very similar, if not identical, to those of equivalent diesel trains.

2. Along with electrification, Metrolinx will intensify service levels along all of its corridors to deliver the promised Regional Express Rail (RER) service. Everything else being equal, this will likely result in an overall increase in train noise emissions.

Given the above considerations, it would be prudent, for the purposes of acoustical analyses, to either use established model pre-sets for electrified trains or conservatively assume that the acoustical characteristics of electrified and diesel trains are equivalent. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the near future.

Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

I trust that this information is useful. Please feel free to contact me should you have any additional questions.

Brandon Gaffoor, B.E.S.
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From: Wong, Galen [mailto:GWong@ThorntonTomasetti.com]
Sent: October-11-17 5:01 PM
To: Brandon Gaffoor; Adam Snow
Subject: RE: Rail Traffic Data request - Lefroy

APPENDIX B: STAMSON Calculations

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STAMSON 5.0        NORMAL REPORT        Date: 27-10-2017 14:04:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por1.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Metrolinx (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. GO Train    !  36.0/6.0   ! 129.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Metrolinx (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  : 169.00 / 169.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   6.00 m
Reference angle           :   0.00


Results segment # 1: Metrolinx (day)
-----------------------------------

LOCOMOTIVE (0.00 + 58.34 + 0.00) = 58.34 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.22  71.82 -12.88  -0.60   0.00   0.00   0.00  58.34
-------------------------------------------------------------------

WHEEL (0.00 + 49.88 + 0.00) = 49.88 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.33  64.70 -13.99  -0.83   0.00   0.00   0.00  49.88
-------------------------------------------------------------------

Segment Leq : 58.92 dBA

Total Leq All Segments: 58.92 dBA


Results segment # 1: Metrolinx (night)
-------------------------------------

LOCOMOTIVE (0.00 + 53.56 + 0.00) = 53.56 dBA
```

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.22	67.05	-12.88	-0.60	0.00	0.00	0.00	53.56

WHEEL (0.00 + 45.11 + 0.00) = 45.11 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.33	59.93	-13.99	-0.83	0.00	0.00	0.00	45.11

Segment Leq : 54.14 dBA

Total Leq All Segments: 54.14 dBA

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

Car traffic volume	:	5062/440	veh/TimePeriod *
Medium truck volume	:	108/9	veh/TimePeriod *
Heavy truck volume	:	215/19	veh/TimePeriod *
Posted speed limit	:	80	km/h
Road gradient	:	4	%
Road pavement	:	1	(Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	:	4436
Percentage of Annual Growth	:	2.00
Number of Years of Growth	:	14.00
Medium Truck % of Total Volume	:	2.00
Heavy Truck % of Total Volume	:	4.00
Day (16 hrs) % of Total Volume	:	92.00

Data for Segment # 1: BABR (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	:	20.00 / 20.00	m
Receiver height	:	7.50 / 7.50	m
Topography	:	3	(Elevated; no barrier)
Elevation	:	2.00 m	
Reference angle	:	0.00	

Results segment # 1: BABR (day)

Source height = 1.41 m

ROAD (0.00 + 64.83 + 0.00) = 64.83 dBA

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

```
-------------------------------------------------------------------------------
   -90      90    0.42  67.64    0.00  -1.78  -1.03    0.00    0.00    0.00  64.83
-------------------------------------------------------------------------------

Segment Leq : 64.83 dBA

Total Leq All Segments: 64.83 dBA


Results segment # 1: BABR (night)
---------------------------------

Source height = 1.42 m

ROAD (0.00 + 57.26 + 0.00) = 57.26 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      90    0.42  60.07    0.00  -1.78  -1.03    0.00    0.00    0.00  57.26
-------------------------------------------------------------------------------

Segment Leq : 57.26 dBA

Total Leq All Segments: 57.26 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 65.82
                           (NIGHT): 58.98
```


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```
STAMSON 5.0        NORMAL REPORT        Date: 27-10-2017 14:08:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por2.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Metrolinx (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. GO Train    !  36.0/6.0   ! 129.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Metrolinx (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  :  95.00 / 95.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   4.00 m
Reference angle           :   0.00


Results segment # 1: Metrolinx (day)
-----------------------------------

LOCOMOTIVE (0.00 + 60.78 + 0.00) = 60.78 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.28  71.82 -10.30  -0.74   0.00   0.00   0.00  60.78
-------------------------------------------------------------------

WHEEL (0.00 + 52.60 + 0.00) = 52.60 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.39  64.70 -11.14  -0.96   0.00   0.00   0.00  52.60
-------------------------------------------------------------------

Segment Leq : 61.39 dBA

Total Leq All Segments: 61.39 dBA


Results segment # 1: Metrolinx (night)
-------------------------------------

LOCOMOTIVE (0.00 + 56.01 + 0.00) = 56.01 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
```

```
   -90     90    0.28  67.05 -10.30  -0.74   0.00   0.00   0.00  56.01
-------------------------------------------------------------------------

WHEEL (0.00 + 47.83 + 0.00) = 47.83 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90    0.39  59.93 -11.14  -0.96   0.00   0.00   0.00  47.83
-------------------------------------------------------------------------

Segment Leq : 56.62 dBA

Total Leq All Segments: 56.62 dBA


Road data, segment # 1: BABR (day/night)
----------------------------------------
Car traffic volume  :  5062/440   veh/TimePeriod  *
Medium truck volume :   108/9     veh/TimePeriod  *
Heavy truck volume  :   215/19    veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     4 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   4436
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  14.00
    Medium Truck % of Total Volume      :   2.00
    Heavy Truck  % of Total Volume      :   4.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 1: BABR (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  : 159.00 / 159.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   3.00 m
Reference angle           :   0.00


Results segment # 1: BABR (day)
-------------------------------

Source height = 1.41 m

ROAD (0.00 + 49.38 + 0.00) = 49.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     90    0.39  67.64   0.00 -14.28  -3.98   0.00   0.00   0.00  49.38
```

```
-------------------------------------------------------------------------------

Segment Leq : 49.38 dBA

Total Leq All Segments: 49.38 dBA


Results segment # 1: BABR (night)
---------------------------------

Source height = 1.42 m

ROAD (0.00 + 41.81 + 0.00) = 41.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.39  60.07   0.00 -14.28  -3.98   0.00   0.00   0.00  41.81
-------------------------------------------------------------------------------

Segment Leq : 41.81 dBA

Total Leq All Segments: 41.81 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 61.66
                           (NIGHT): 56.76
```


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```
STAMSON 5.0        NORMAL REPORT        Date: 27-10-2017 14:10:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: por3.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: GO TrainN (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. GO Train    !  36.0/6.0   ! 129.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: GO TrainN (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  : 145.00 / 145.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -90.00 deg   Angle2 : -55.00 deg
Barrier height            :   9.00 m
Barrier receiver distance :  32.00 / 32.00  m
Source elevation          :   0.00 m
Receiver elevation        :   5.00 m
Barrier elevation         :   5.00 m
Reference angle           :   0.00


Rail data, segment # 2: GO TrainS (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !   1.0/1.0   !  80.0 !  1.0 ! 10.0 !Diesel! Yes

Data for Segment # 2: GO TrainS (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  : 145.00 / 145.00 m
Receiver height           :   7.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :  10.00 deg   Angle2 : 90.00 deg
Barrier height            :   9.00 m
Barrier receiver distance :  52.00 / 52.00  m
Source elevation          :   0.00 m
```

```
Receiver elevation        :   5.00 m
Barrier elevation         :   5.00 m
Reference angle           :   0.00


Results segment # 1: GO TrainN (day)
-----------------------------------

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        7.50 !        5.62 !        10.62
       0.50 !        7.50 !        4.85 !         9.85

LOCOMOTIVE (0.00 + 47.39 + 52.53) = 53.69 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -55   0.00  71.82  -9.85  -7.11   0.00   0.00  -7.46  47.39
-------------------------------------------------------------------------
   -55      0   0.41  71.82 -13.84  -5.44   0.00   0.00   0.00  52.53
-------------------------------------------------------------------------

WHEEL (0.00 + 39.48 + 44.31) = 45.54 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -55   0.00  64.70  -9.85  -7.11   0.00   0.00  -8.25  39.48
-------------------------------------------------------------------------
   -55      0   0.51  64.70 -14.88  -5.51   0.00   0.00   0.00  44.31
-------------------------------------------------------------------------

Segment Leq : 54.31 dBA


Results segment # 2: GO TrainS (day)
-----------------------------------

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        7.50 !        4.45 !         9.45
       0.50 !        7.50 !        3.20 !         8.20

LOCOMOTIVE (26.75 + 30.02 + 0.00) = 31.69 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     10   0.41  53.15 -13.84 -12.56   0.00   0.00   0.00  26.75
-------------------------------------------------------------------------
    10     90   0.00  53.15  -9.85  -3.52   0.00   0.00  -9.76  30.02
-------------------------------------------------------------------------
```


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WHEEL (17.71 + 20.67 + 0.00) = 22.45 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	10	0.51	45.15	-14.88	-12.56	0.00	0.00	0.00	17.71
10	90	0.00	45.15	-9.85	-3.52	0.00	0.00	-11.11	20.67

Segment Leq : 32.18 dBA

Total Leq All Segments: 54.34 dBA

Results segment # 1: GO TrainN (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	7.50	5.62	10.62
0.50	7.50	4.85	9.85

LOCOMOTIVE (0.00 + 42.62 + 47.76) = 48.92 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.00	67.05	-9.85	-7.11	0.00	0.00	-7.46	42.62
-55	0	0.41	67.05	-13.84	-5.44	0.00	0.00	0.00	47.76

WHEEL (0.00 + 34.71 + 39.54) = 40.77 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-55	0.00	59.93	-9.85	-7.11	0.00	0.00	-8.25	34.71
-55	0	0.51	59.93	-14.88	-5.51	0.00	0.00	0.00	39.54

Segment Leq : 49.54 dBA

Results segment # 2: GO TrainS (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	4.50	2.53	7.53
0.50	4.50	1.27	6.27

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```
LOCOMOTIVE (28.87 + 31.01 + 0.00) = 33.08 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     10   0.50  56.16 -14.73 -12.56   0.00   0.00   0.00  28.87
-------------------------------------------------------------------------
    10     90   0.00  56.16  -9.85  -3.52   0.00   0.00 -11.77  31.01
-------------------------------------------------------------------------

WHEEL (19.83 + 21.14 + 0.00) = 23.54 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
     0     10   0.60  48.16 -15.76 -12.57   0.00   0.00   0.00  19.83
-------------------------------------------------------------------------
    10     90   0.06  48.16 -10.44  -3.72   0.00   0.00 -12.86  21.14
-------------------------------------------------------------------------

Segment Leq : 33.54 dBA

Total Leq All Segments: 49.65 dBA


Road data, segment # 1: BABR (day/night)
----------------------------------------
Car traffic volume  :  5062/440   veh/TimePeriod  *
Medium truck volume :   108/9     veh/TimePeriod  *
Heavy truck volume  :   215/19    veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     4 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   4436
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: BABR (day/night)
--------------------------------------
Angle1   Angle2           :   0.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 124.00 / 124.00 m
Receiver height           :   7.50 / 7.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   3.00 m
Reference angle           :   0.00


Results segment # 1: BABR (day)
-------------------------------
```

Source height = 1.41 m

ROAD (0.00 + 44.05 + 0.00) = 44.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	15	0.39	67.64	0.00	-12.77	-10.81	0.00	0.00	0.00	44.05

Segment Leq : 44.05 dBA

Total Leq All Segments: 44.05 dBA

Results segment # 1: BABR (night)

Source height = 1.42 m

ROAD (0.00 + 36.48 + 0.00) = 36.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	15	0.39	60.07	0.00	-12.77	-10.81	0.00	0.00	0.00	36.48

Segment Leq : 36.48 dBA

Total Leq All Segments: 36.48 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.73
(NIGHT): 49.85

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```
STAMSON 5.0        NORMAL REPORT        Date: 27-10-2017 14:11:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola1.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Metrolinx (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. GO Train    !  36.0/6.0   ! 129.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Metrolinx (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  : 163.00 / 163.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   6.00 m
Reference angle           :   0.00


Results segment # 1: Metrolinx (day)
-----------------------------------

LOCOMOTIVE (0.00 + 56.27 + 0.00) = 56.27 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.41  71.82 -14.56  -0.99   0.00   0.00   0.00  56.27
-------------------------------------------------------------------

WHEEL (0.00 + 47.86 + 0.00) = 47.86 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
   -90     90   0.51  64.70 -15.65  -1.19   0.00   0.00   0.00  47.86
-------------------------------------------------------------------

Segment Leq : 56.86 dBA

Total Leq All Segments: 56.86 dBA


Results segment # 1: Metrolinx (night)
-------------------------------------

LOCOMOTIVE (0.00 + 51.50 + 0.00) = 51.50 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------
```


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```
   -90     90    0.41  67.05 -14.56  -0.99   0.00   0.00   0.00  51.50
-------------------------------------------------------------------------

WHEEL (0.00 + 43.09 + 0.00) = 43.09 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90    0.51  59.93 -15.65  -1.19   0.00   0.00   0.00  43.09
-------------------------------------------------------------------------

Segment Leq : 52.09 dBA

Total Leq All Segments: 52.09 dBA


Road data, segment # 1: BABR (day/night)
------------------------------------
Car traffic volume  :  5062/440   veh/TimePeriod  *
Medium truck volume :   108/9     veh/TimePeriod  *
Heavy truck volume  :   215/19    veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     4 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   4436
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  14.00
    Medium Truck % of Total Volume      :   2.00
    Heavy Truck  % of Total Volume      :   4.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 1: BABR (day/night)
--------------------------------------
Angle1   Angle2           : -45.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  24.00 / 24.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   2.00 m
Reference angle           :   0.00


Results segment # 1: BABR (day)
-------------------------------

Source height = 1.41 m

ROAD (0.00 + 62.15 + 0.00) = 62.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -45     90    0.60  67.64   0.00  -3.27  -2.22   0.00   0.00   0.00  62.15
```

```
-------------------------------------------------------------------------------

Segment Leq : 62.15 dBA

Total Leq All Segments: 62.15 dBA


Results segment # 1: BABR (night)
---------------------------------

Source height = 1.42 m

ROAD (0.00 + 54.58 + 0.00) = 54.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -45     90   0.60  60.07   0.00  -3.27  -2.22   0.00   0.00   0.00  54.58
-------------------------------------------------------------------------------

Segment Leq : 54.58 dBA

Total Leq All Segments: 54.58 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 63.28
                           (NIGHT): 56.52
```


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```
STAMSON 5.0        NORMAL REPORT        Date: 27-10-2017 14:12:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola2.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Metrolinx (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. GO Train    !  36.0/6.0   ! 129.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Metrolinx (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  :  96.00 / 96.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   4.00 m
Reference angle           :   0.00


Results segment # 1: Metrolinx (day)
-----------------------------------

LOCOMOTIVE (0.00 + 58.90 + 0.00) = 58.90 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.47  71.82 -11.81  -1.11   0.00   0.00   0.00  58.90
-------------------------------------------------------------------------

WHEEL (0.00 + 50.74 + 0.00) = 50.74 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.57  64.70 -12.66  -1.30   0.00   0.00   0.00  50.74
-------------------------------------------------------------------------

Segment Leq : 59.52 dBA

Total Leq All Segments: 59.52 dBA


Results segment # 1: Metrolinx (night)
-------------------------------------

LOCOMOTIVE (0.00 + 54.13 + 0.00) = 54.13 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
```

```
   -90     90   0.47  67.05 -11.81  -1.11   0.00   0.00   0.00  54.13
-------------------------------------------------------------------------

WHEEL (0.00 + 45.97 + 0.00) = 45.97 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.57  59.93 -12.66  -1.30   0.00   0.00   0.00  45.97
-------------------------------------------------------------------------

Segment Leq : 54.75 dBA

Total Leq All Segments: 54.75 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 59.52
                           (NIGHT): 54.75
```

```
STAMSON 5.0        NORMAL REPORT        Date: 27-10-2017 14:14:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola3.te              Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: Metrolinx (day/night)
-----------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. GO Train    !  36.0/6.0   ! 129.0 !  1.0 ! 12.0 !Diesel! Yes

Data for Segment # 1: Metrolinx (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  : 119.00 / 119.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
No Whistle
Elevation                 :   5.00 m
Reference angle           :   0.00


Results segment # 1: Metrolinx (day)
-----------------------------------

LOCOMOTIVE (0.00 + 57.86 + 0.00) = 57.86 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.44  71.82 -12.91  -1.05   0.00   0.00   0.00  57.86
-------------------------------------------------------------------------

WHEEL (0.00 + 49.60 + 0.00) = 49.60 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90   0.54  64.70 -13.85  -1.25   0.00   0.00   0.00  49.60
-------------------------------------------------------------------------

Segment Leq : 58.46 dBA

Total Leq All Segments: 58.46 dBA


Results segment # 1: Metrolinx (night)
-------------------------------------

LOCOMOTIVE (0.00 + 53.09 + 0.00) = 53.09 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
```

```
   -90     90    0.44  67.05 -12.91  -1.05   0.00   0.00   0.00  53.09
-------------------------------------------------------------------------

WHEEL (0.00 + 44.83 + 0.00) = 44.83 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     90    0.54  59.93 -13.85  -1.25   0.00   0.00   0.00  44.83
-------------------------------------------------------------------------

Segment Leq : 53.69 dBA

Total Leq All Segments: 53.69 dBA


Road data, segment # 1: BelleAire (day/night)
---------------------------------------------
Car traffic volume  :  4739/412   veh/TimePeriod  *
Medium truck volume :   377/33    veh/TimePeriod  *
Heavy truck volume  :   269/23    veh/TimePeriod  *
Posted speed limit  :    80 km/h
Road gradient       :     4 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   4436
    Percentage of Annual Growth         :   2.00
    Number of Years of Growth           :  14.00
    Medium Truck % of Total Volume      :   7.00
    Heavy Truck  % of Total Volume      :   5.00
    Day (16 hrs) % of Total Volume      :  92.00

Data for Segment # 1: BelleAire (day/night)
-------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 128.00 / 128.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :   3.00 m
Reference angle           :   0.00


Results segment # 1: BelleAire (day)
------------------------------------

Source height = 1.50 m

ROAD (0.00 + 48.87 + 0.00) = 48.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    15     90    0.57  68.90   0.00 -14.62  -5.41   0.00   0.00   0.00  48.87
```

```
-------------------------------------------------------------------------------

Segment Leq : 48.87 dBA

Total Leq All Segments: 48.87 dBA


Results segment # 1: BelleAire (night)
-----------------------------------

Source height = 1.49 m

ROAD (0.00 + 41.24 + 0.00) = 41.24 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    15     90   0.57  61.27   0.00 -14.62  -5.41   0.00   0.00   0.00  41.24
-------------------------------------------------------------------------------

Segment Leq : 41.24 dBA

Total Leq All Segments: 41.24 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 58.91
                           (NIGHT): 53.93
```


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