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Noise Feasibility Study
Proposed Residential Development
Bancroft Drive & Robinson Drive
Sudbury, Ontario

Prepared for:

Erickson Environmental Consultants Inc.
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1 INTRODUCTION AND SUMMARY

HGC Engineering was retained by Erickson EnvironmentalConsultan t Inc. to conduct a noise study for a proposed residential development to be located south of Bancroft Drive, west of Robinson Drive and north of the CP rail line, in the City of Greater Sudbury, Ontario. The study is required by the municipality and the Canadian Pacific Railway (CP) as part of their planning and approvals process.

Rail traffic on the CP Cartier Subdivision and road traffic on Bancroft Drive are the primary noise sources impacting this site. Rail and road traffic data was used to predict future traffic sound levels at various lots in the proposed residential development. The predicted sound levels were compared to the guidelines of the Ministry of Environment, Conservation and Parks (MECP) and CP Rail.

The sound level predictions indicate that the future traffic sound levels will exceed MECP guidelines at all the building facades with exposure to the CP railway line. All dwelling units will require forced air ventilation systems. In addition, upgraded building constructions, such as brick exterior wall construction and upgraded glazing constructions, are required for the dwellings closest to the CP railway line. The MECP guidelines recommend that noise warning clauses be used to inform future owners of the traffic noise impacts and sound level excesses. If the bedroom window area to room floor area ratios do not exceed 40%, minimum STC-28 windows should be provided. If the window area to room floor area ratios exceed 40%, an acoustical consultant should revise the glazing construction requirements based on actual window to floor area ratios. For the remaining units, any exterior walls and glazing constructions meeting the requirements of the Ontario Building Code will provide sufficient sound insulation.

In summary, with suitable controls integrated into the building plans, it is concluded that this proposed development is feasible from the perspective of noise impact. Details of the assessment leading to this conclusion are provided herein.

2 SITE DESCRIPTION AND NOISE SOURCES

Figure 1 shows an aerial imagery illustrating the location of the proposed site. The site is located south of Bancroft Drive, west of Robinson Drive and north of the CP rail line, in the City of Greater Sudbury, Ontario. The proposed development consists of five single detached lots as shown on the concept plan attached as Figure 2.

The area is considered to be Class II (semi-urban) in terms of its acoustical environment. The CP rail line and Bancroft Drive are the dominant noise sources. Surrounding the subject site to the north are existing residences. To the south of Lot 5 is a lift station. During the site visit conducted in November 2021, it was observed that there was a fan and an emergency generator at the lift station. The fan was audible only at a close distance. Due the distance of the equipment to the proposed dwellings, significant noise impact is not expected at the proposed development. A warning clause is recommended to inform future residents of the presence of the lift station and that sounds may be audible at times.

3 NOISE LEVEL CRITERIA

3.1 Road and Rail Traffic Noise

Guidelines for acceptable levels of road and rail traffic noise impacting residential developments are given in the MECP publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning", Part C release date October 21, 2013, and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels [LEQ] in units of A-weighted decibels [dBA].

Table 1: MECP Road and Rail Traffic Noise Criteria (dBA)

Area	Daytime L_{EQ} (16 hour) Road/Rail	Nighttime L_{EQ} (8 hour) Road/Rail
Outdoor Living Area	55 dBA	--
Living/Dining Room	45 dBA / 40 dBA	--
Bedroom	--	40 dBA / 35 dBA

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio,

backyard, terrace, or other area where passive recreation is expected to occur, provided that is has a minimum depth of 4 m, and is outside the exterior building façade and unenclosed.

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

Indoor guidelines are 5 dBA more stringent for rail noise than for road noise, to account for the low frequency (rumbling) character of locomotive sound, and its greater potential to transmit through exterior wall/window assemblies.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where nighttime sound levels outside bedroom and/or living/dining windows exceed 60 dBA or where daytime sound levels exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom windows and/or living/dining windows are in the range of 51 to 60 dBA or when daytime sound levels are in the range of 56 to 65 dBA.

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

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of windows nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise, or when the nighttime sound level is greater than 55 dBA or greater than 60 dBA during the daytime due to rail traffic noise. The use of warning clauses to notify future residents of possible excesses is also required.

MECP guidelines recommend exterior walls built with a masonry veneer or its acoustical equivalent from foundation to rafters as a minimum construction for any dwellings with a 24-hour L_{EQ} that is greater than 60 dBA, and which are within 100 m of the right of way of the railway.

CP Rail policies further stipulate that masonry construction, or an equivalent construction is required for the first row of dwellings facing the railway right of way. Appendix A provides the CP principal mainline requirements for residential developments adjacent to a railway right of way.

4 TRAFFIC NOISE PREDICTIONS

4.1 Road Traffic

Traffic data for Bancroft Drive was obtained from Peak Hour Traffic volumes, and is provided in Appendix B. Commercial vehicle percentages of 4.0% was assumed and split into 2.5% heavy trucks and 1.5% medium trucks for the analysis. A 90/10 day/night volume split was applied to the volume. A posted speed limit of 50 km/h was used. Traffic volumes were conservatively assumed to grow at a rate of 2.5% per year to the year of 2032. The resulting future traffic volumes are listed in Table 2.

Table 2: 2032 Projected Road Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Bancroft Drive	Daytime	6 031	94	157	6 282
	Nighttime	670	10	17	698
	Total	**6 701**	**105**	**175**	**6 981**

4.2 Rail Traffic

Rail traffic data for typical operations of the CP Cartier Subdivision was obtained from CP personnel for a development to the west and is provided in Appendix B. This data was projected to the year 2032 using a growth rate of 2.5%. The Cartier Subdivision is used for way freight operations and is a continuously welded principal mainline with two tracks. The maximum permissible train speed in the area of the site is 72 km/h (45 mph) for freight trains. This maximum speed, as well as the maximum number of cars and locomotives per train was used in the traffic noise analysis to yield a worst cast estimate of train noise. Table 3 summarises the rail traffic data used in the analysis.

Table 3: 2032 Projected Rail Traffic Data

Type of Train	Maximum Number of locomotives Day/Night	Maximum Number of cars Day/Night	Maximum Speed (km/h)	Current Volume Day/Night	Projected Daytime (07:00-23:00) trains	Projected Night-time (23:00-07:00) train
Freight	4	180	72	8/4	11	6

4.3 Traffic Noise Predictions

To assess the levels of rail traffic noise which will impact the site in the future, predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix C. There are no at-grade crossings in the vicinity of the site and thus whistle noise is not included in the assessment.

Predictions of the traffic sound levels were made at various locations. Building locations were assumed to be located as shown on the concept plan. The results of these predictions are summarized in Table 4. Should the site plan be changed significantly, the acoustic requirements may be subject to modification.

Table 4: Predicted Daytime Traffic Sound Levels [dBA], Without Mitigation

Prediction Location	Daytime – $L_{EQ-16\ hr}$ Road/ Rail/ Total	Nighttime – $L_{EQ-8\ hr}$ Road/ Rail/ Total
Lot 1	<55 / <55/ <55	<50 / 53 / 53
Lot 1 OLA	<55 / <55/ <55	-- / -- / --
Lot 3	<55 / 56 / 56	<50 / 56 / 56
Lot 3 OLA	<55 / 55 / 55	-- / -- / --
Lot 5	<55 / 59 / 59	<50 / 59 / 59
Lot 5 OLA	-- / 59 / 59	-- / -- / --

4.4 Traffic Noise Recommendations

The sound level predictions indicate that the future traffic sound levels will exceed MECP guidelines at the building facades with exposure to the CP railway line. The following discussion outlines preliminary recommendations ventilation requirements, building façade constructions, and warning clauses to achieve the noise criteria stated in Table 1.

4.4.1 Outdoor Living Areas

The predicted sound levels at the OLAs with exposure to the railway will be less than 60 dBA. There are no requirements for acoustic barriers. A warning clause is required to inform future residents of the rail traffic noise impact. The predicted sound levels in the remaining OLA are 55 dBA or less. There are no requirements for acoustic barriers.

A safety berm is typically required for residential dwellings adjacent to a principal mainline. CP personnel should be contacted to clarify the requirements, if any.

4.4.2 Minimum Distance Setbacks

For noise control and safety reasons, the CP policies typically stipulate that the minimum required setback between a new dwelling and a principal mainline right of way is typically 30 meters. The nearest dwelling units in the proposed development will be located approximately 100 metres from the railway right-of-way meeting the CP requirement.

4.4.3 Indoor Living Areas

The predicted sound levels at the facades of all dwellings are in the range of 51 to 60 dBA during the nighttime hours. All dwellings will require forced air ventilation systems with ducts sized to accommodate the future installation of central air conditioning by the occupant. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300.

4.4.4 Building Facade Constructions

Future traffic sound levels at the facades of the closest dwelling units Lots 3 to 5 with exposure to the CP railway line will exceed 55 dBA at night. MECP guidelines recommend that the windows, walls and doors be designed so that the indoor sound levels comply with MECP noise criteria.

The building floor plans and elevations were not yet available for review by HGC Engineering at the time of this report, but preliminary calculations have been performed to determine the building envelope constructions likely to be required to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the area ratios of the facade components (walls, windows, and doors) and the anticipated floor area of the adjacent room.

Exterior Wall Constructions

MECP and CP guidelines typically require brick or masonry equivalent exterior walls from foundations to rafters as a minimum construction for any dwellings that are in the first row of dwellings adjacent to and with exposure to a rail line, this applies to Lots 4 to 5.

Acoustical Requirements for Glazing

Lots 1 to 2

Any double-glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the north facade.

Lot 3

The minimum necessary specification for the building envelope is Acoustical Insulation Factor, AIF-26 for the bedrooms on the south façade facing the railway, based on the possibility of sound entering the buildings through windows and walls. A well-sealed thermopane unit having a Sound Transmission Class (STC) rating of 28 would provide sufficient noise insulation for the bedrooms provided the window area to room floor area ratio does not exceed 40%. Any glazing construction meeting the minimum OBC requirements will provide sufficient sound insulation for the living/dining room and windows to bedrooms on the north façade.

Lots 4 to 5

The minimum necessary specification for the building envelope is Acoustical Insulation Factor, AIF-26 for the bedrooms on the south façade facing the railway, based on the possibility of sound entering the buildings through windows, since the exterior wall is assumed to be brick. A well-sealed thermopane unit having a Sound Transmission Class (STC) rating of 28 would provide sufficient noise insulation for the bedrooms provided the window area to room floor area ratio does not exceed 40%. Any glazing construction meeting the minimum OBC requirements will provide sufficient sound insulation for the

living/dining room and windows to bedrooms on the north façade.

If the window area to bedroom floor area ratios exceed 40% for Lots 3 to 5 on the south façade facing the railway, an acoustical consultant should revise the glazing construction requirements based on actual window to floor area ratios.

4.4.5 Warning Clauses

The MECP guidelines recommend that the following warning clauses be included in the property agreements for the proposed residential development with anticipated traffic sound level excesses.

Suitable wording for future dwellings where the indoor sound level exceeds the criteria is given below.

Type A:

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

Suggested wording for future dwellings requiring forced air ventilation systems is given below.

Type B:

> This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. The installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the municipality and the Ministry of the Environment, Conservation and Parks.

Suitable wording for informing future residents of the nearby lift station and that sounds from these facilities may at times be audible is given below.

Type C:

> Purchasers are advised of the proximity of nearby lift station, the sound from which may at times be audible.

CP's standard warning clause which is required for all residential developments located within 300 m of their mainlines is given below.

Type D:

> Warning: Canadian Pacific Railways Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land subject hereof. There may be alteration to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. CPR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

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

5 RECOMMENDATIONS

The following recommendations and Table 5 are provided in regard to noise mitigation for road and rail traffic noise for the proposed development.

1. A safety berm is typically required for residential dwellings adjacent to a principal mainline. CP personnel should be contacted to clarify the requirements for this development.

2. Forced air ventilation systems are required for all dwellings.

3. Brick or masonry veneer exterior walls from foundations to rafters as a minimum construction and upgraded glazing constructions are required for the first row of homes closest to the railway (Lots 4 and 5).

4. For the three units closest to the railway, a well-sealed thermopane unit having a Sound Transmission Class (STC) rating of 28 would provide sufficient noise insulation for the bedrooms provided the window area to room floor area ratio does not exceed 40%. If the ratio exceeds 40%, an acoustical consultant shall refine the glazing construction requirement based on the actual percentages.

5. Warning clauses should be included in the Property agreements to inform future owners about noise concerns from transportation sources and the presence of the nearby lift station.

The reader is referred to the previous sections of the report where these recommendations are discussed in more detail.

Table 5: Summary of Noise Control Requirements

Lot	Acoustic Barrier	Ventilation Requirements	Type of Warning Clause	Exterior Wall	Glazing AIF Requirements
1, 2	--	Forced Air	A, B, C, D	OBC	OBC
3	--	Forced Air	A, B, C, D	OBC	LR/DR: OBC BR: STC-28(1)
4, 5	--	Forced Air	A, B, C, D	Brick	LR/DR: OBC BR: STC-28(1)

Notes:
-- no specific requirement
(1) The bedroom window area to room floor area ratio shall not exceed 40% on the south façade facing the railway
* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.
LR/DR – Living Room/Dining Room
BR – Bedroom
OBC – Ontario Building Code Requirements
Brick – Brick or masonry equivalent exterior walls

5.1 Implementation

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

1) Prior to the issuance of building permits for this development, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly incorporated.

2) Prior to assumption of the subdivision, the Municipality's building inspector or a Professional Engineer qualified to perform acoustical engineering services in the Province of Ontario should certify that the noise control measures have been properly installed and constructed.

Figure 1: Aerial Plan

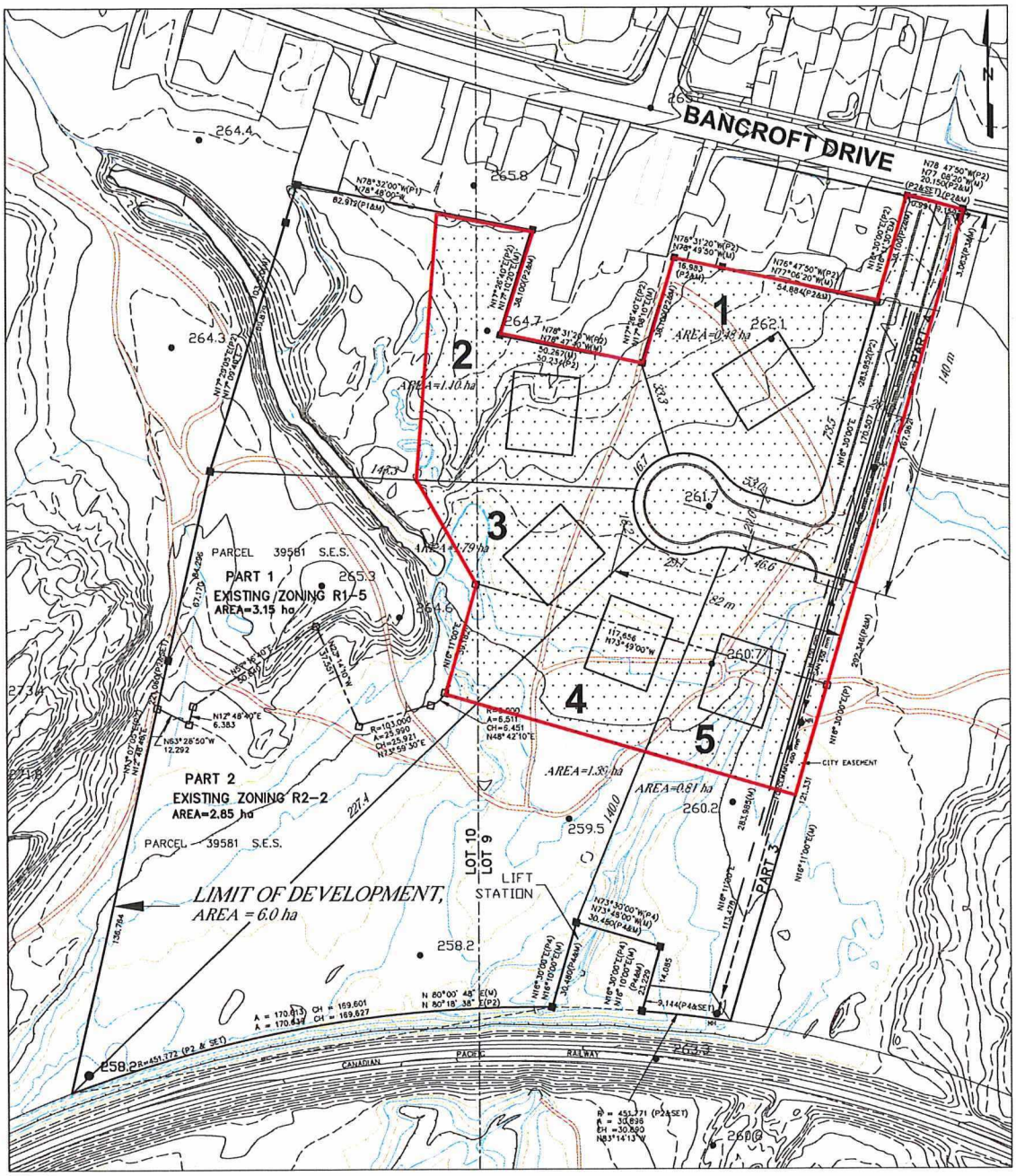

Figure 2: Concept Plan

APPENDIX A
CP Railway Mainline Requirements

PRINCIPAL MAIN LINE REQUIREMENTS

1. Berm, or combination berm and noise attenuation fence, having extensions or returns at the ends, to be erected on adjoining property, parallel to the railway right-of-way with construction according to the following:

   a) Minimum total height 5.5 metres above top-of-rail;
   b) Berm minimum height 2.5 metres and side slopes not steeper than 2.5 to 1.
   c) Fence, or wall, to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre (4 lb/sq.ft.) of surface area.

   No part of the berm/noise barrier is to be constructed on railway property.

   A clause should be inserted in all offers of purchase and sale or lease, and be registered on title or included in the lease for each dwelling affected by any noise and vibration attenuation measures, advising that any berm, fencing, or vibration isolation features implemented are not to be tampered with or altered, and further that the owner shall have the sole responsibility for and shall maintain these features.

   Dwellings must be constructed such that the interior noise levels meet the criteria of the appropriate Ministry. A noise study should be carried out by a professional noise consultant to determine what impact, if any, railway noise would have on residents of proposed subdivisions and to recommend mitigation measures, if required. The Railway may consider other measures recommended by the study.

2. Setback of dwellings from the railway right-of-way to be a minimum of 30 metres. While no dwelling should be closer to the right-of-way than the specified setback, an unoccupied building, such as a garage, may be built closer. The 2.5 metre high earth berm adjacent to the right-of-way must be provided in all instances.

3. Ground vibration transmission to be estimated through site tests. If in excess of the acceptable levels, all dwellings within 75 metres of the nearest track should be protected. The measures employed may be:

   a) Support the building on rubber pads between the foundation and the occupied structure so that the maximum vertical natural frequency of the structure on the pads is 12 Hz;
   b) Insulate the building from the vibration originating at the railway tracks by an intervening discontinuity or by installing adequate insulation outside the building, protected from the compaction that would reduce its effectiveness so that vibration in the building became unacceptable; or
   c) Other suitable measures that will retain their effectiveness over time.

4. A clause should be inserted in all offers of purchase and sale or lease and in the title deed or lease of each dwelling within 300m of the railway right-of-way, warning prospective purchasers or tenants of the existence of the Railway's operating right-of-way; the possibility of alterations including the possibility that the Railway may expand its operations, which expansion may affect the living environment of the residents notwithstanding the inclusion of noise and vibration attenuating measures in the design of the subdivision and individual units, and that the Railway will not be responsible for complaints or claims arising from the use of its facilities and/or operations.

5. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway, and be substantiated by a drainage report to be reviewed by the Railway.

6. A 1.83 metre high chain link security fence be constructed and maintained along the common property line of the Railway and the development by the developer at his expense, and the developer is made aware of the necessity of including a covenant running with the lands, in all deeds, obliging the purchasers of the land to maintain the fence in a satisfactory condition at their expense.

7. Any proposed utilities under or over railway property to serve the development must be approved prior to their installation and be covered by the Railway's standard agreement.

APPENDIX B
Rail Traffic Data

Date: Wednesday September 19, 2012 **Conditions:** Cloudy

	west approach- Bancroft Dr						east approach- Bancroft Dr						south approach- Brentwood Crt						north approach- Shelbourne St					
	ALL VEHICLES			HEAVY VEHICLES			ALL VEHICLES			HEAVY VEHICLES			ALL VEHICLES			HEAVY VEHICLES			ALL VEHICLES			HEAVY VEHICLES		
Start Time	EBT	EBL	EBR	EBT	EBL	EBR	WBT	WBL	WBR	WBT	WBL	WBR	NBT	NBL	NBR	NBT	NBL	NBR	SBT	SBL	SBR	SBT	SBL	SBR
3:30:00 PM	38	7	0	2	1	0	24	1	1	2	0	0	0	1	0	0	0	0	0	2	7	0	1	1
3:45:00 PM	42	5	0	1	2	0	30	0	0	2	0	0	0	2	0	0	0	0	0	2	4	0	1	0
4:00:00 PM	33	4	5	2	0	0	45	0	3	4	0	0	0	2	0	0	0	0	0	2	9	0	0	1
4:15:00 PM	46	8	1	2	0	0	28	0	1	2	0	1	0	2	0	0	0	0	0	1	4	0	0	1
4:30:00 PM	60	12	4	2	0	0	43	1	0	1	0	0	0	0	0	0	0	0	0	2	8	0	0	2
4:45:00 PM	64	4	0	1	0	0	46	1	2	1	0	0	0	0	0	0	0	0	0	2	5	0	0	0
5:00:00 PM	67	8	3	0	0	0	33	0	1	1	0	0	0	0	0	0	0	0	0	0	10	0	0	0
5:15:00 PM	67	10	1	1	0	0	37	1	2	1	0	0	0	4	0	0	0	0	0	2	3	0	0	0
5:30:00 PM	52	5	2	1	0	0	43	0	0	0	0	0	0	1	0	0	0	0	0	2	3	0	0	0
5:45:00 PM	41	7	0	1	0	0	26	0	0	2	0	0	0	2	0	0	0	1	0	0	4	0	0	0
Peak Hour																								
4:30:00 PM	258	34	8	4	0	0	159	3	5	4	0	0	0	4	0	0	0	0	0	6	26	0	0	2
heavy %	2%	0%	0%				3%	0%	0%					0%	0%	0%			0%	0%	8%			

	west approach- Bancroft Dr				east approach- Bancroft Dr				south approach- Birmingham Dr			
	ALL VEHICLES		HEAVY VEHICLES		ALL VEHICLES		HEAVY VEHICLES		ALL VEHICLES		HEAVY VEHICLES	
Start Time	EBT	EBR	EBT	EBR	WBT	WBL	WBT	WBL	NBL	NBR	NBL	NBR
4:30:00 PM	58	4	2	0	44	0	1	0	0	0	0	0
4:45:00 PM	60	6	1	0	45	0	1	0	4	0	0	0
5:00:00 PM	63	5	0	0	31	0	1	0	3	0	0	0
5:15:00 PM	62	7	1	0	37	0	1	0	3	0	0	0
Peak Hour												
4:30:00 PM	243	22	4	0	157	0	4	0	10	0	0	0
heavy %	2%	0%			3%	0%			0%	0%		

Bancroft Dr Peak Hour Total: 426
AADT: 4260 (Peak = 10% of AADT)

Date: Thursday September 20, 2012 **Conditions:** Rainy

	west approach- Bancroft Dr						east approach- Bancroft Dr						south approach- Brentwood Crt						north approach- Shelbourne St					
	ALL VEHICLES			HEAVY VEHICLES			ALL VEHICLES			HEAVY VEHICLES			ALL VEHICLES			HEAVY VEHICLES			ALL VEHICLES			HEAVY VEHICLES		
Start Time	EBT	EBL	EBR	EBT	EBL	EBR	WBT	WBL	WBR	WBT	WBL	WBR	NBT	NBL	NBR	NBT	NBL	NBR	SBT	SBL	SBR	SBT	SBL	SBR
7:00:00 AM	20	3	0	2	1	0	27	0	0	1	0	0	0	1	0	0	0	0	0	2	4	0	0	0
7:15:00 AM	17	6	1	2	1	0	44	0	1	3	0	0	0	0	0	0	0	0	0	1	12	0	0	1
7:30:00 AM	28	2	0	4	0	0	47	0	1	4	0	0	0	2	1	0	0	0	0	1	3	0	1	1
7:45:00 AM	21	6	0	0	1	2	48	0	0	0	0	0	0	4	0	0	0	0	0	3	11	0	1	0
8:00:00 AM	26	2	1	2	0	0	35	0	0	1	0	0	0	2	0	0	0	0	0	1	7	0	0	0
8:15:00 AM	23	5	1	0	0	0	38	0	2	2	0	0	0	3	0	0	0	0	0	0	7	0	0	0
8:30:00 AM	26	4	0	2	0	0	45	0	3	1	0	1	0	2	0	0	0	0	1	1	16	0	0	1
8:45:00 AM	35	8	1	3	0	0	44	0	0	1	0	0	0	2	0	0	0	0	0	1	5	0	0	0
9:00:00 AM	21	4	0	3	0	0	29	0	2	0	0	1	0	1	0	0	0	0	0	0	3	0	0	0
9:15:00 AM	18	8	3	2	1	1	16	1	2	2	0	0	0	0	1	0	0	1	0	2	5	0	0	1
Peak Hour																								
8:00:00 AM	110	19	3	7	0	0	162	0	5	5	0	1	0	9	0	0	0	0	1	3	35	0	0	1
heavy %	6%	0%	0%				3%	0%	20%					0%	0%	0%			0%	0%	3%			

	west approach- Bancroft Dr				east approach- Bancroft Dr				south approach- Birmingham Dr			
	ALL VEHICLES		HEAVY VEHICLES		ALL VEHICLES		HEAVY VEHICLES		ALL VEHICLES		HEAVY VEHICLES	
Start Time	EBT	EBR	EBT	EBR	WBT	WBL	WBT	WBL	NBL	NBR	NBL	NBR
8:00:00 AM	27	0	2	0	30	0	1	0	5	0	0	0
8:15:00 AM	22	1	0	0	37	0	2	0	3	0	0	0
8:30:00 AM	27	0	2	0	44	0	2	0	4	0	0	0
8:45:00 AM	35	1	3	0	40	0	1	0	4	0	0	0
Peak Hour												
8:00:00 AM	111	2	7	0	151	0	6	0	16	0	0	0
heavy %	6%	0%			4%	0%			0%	0%		

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January 14, 2019

Via email: machan@hgcengineering.com

Mandy Chan
HGC Engineering
2000 Argentia Road
Plaza One, Suite 203
Mississauga, Ontario L5N 1P7

Dear Sir/Madam:

Re: Rail Traffic Volumes, CP Mileage 75.0, Cartier Subdivision, Dorsett Drive, Sudbury

This is in reference to your request for rail traffic data in the vicinity of Dorsett Drive in the Greater Sudbury Region. The study area is located at mile 75.0 of our Cartier Subdivision, which is classified as a Principal Main Line line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 8
   Number of freight trains between 2300 & 0700: 4
2. Maximum cars per train freight: 180
3. Number of locomotives per train: 2 (4 max.)
4. Maximum permissible train speed: 45 mph
5. There are no grade crossings in the study area, however, the whistle may be sounded if deemed necessary by the train crew for safety reasons at any time.
6. There are 2 mainline tracks with continuously welded rail.

The information provided is based on recent rail traffic. Variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer needs.

Yours truly,

Josie Tomei SR/WA
Specialist Real Estate Sales & Acquisitions – Ontario

APPENDIX C
Sample Stamson Outputs

```
STAMSON 5.0        NORMAL REPORT        Date: 29-03-2022 14:52:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5.te                  Time Period: Day/Night 16/8 hours
Description: Predicted daytime and nighttime sound levels at the upper storey windows of
the south façade of Lot 5.

Rail data, segment # 1: CP (day/night)
-------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
* 1.              !  11.0/5.5   !  72.0 !  4.0 !180.0 !Diesel! Yes
* The identified number of trains have been adjusted for
  future growth using the following parameters:

Train type:          ! Unadj. ! Annual % ! Years of !
 No  Name            ! Trains ! Increase !  Growth  !
--------------------+--------+----------+----------+
  1.                 !   8.0/4.0   !    2.50  !   13.00  !

Data for Segment # 1: CP (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  : 118.00 / 118.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

Results segment # 1: CP (day)
------------------------------
LOCOMOTIVE (0.00 + 58.75 + 0.00) = 58.75 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -45     90   0.50  74.22 -13.39  -2.08   0.00   0.00   0.00  58.75
-------------------------------------------------------------------------

WHEEL (0.00 + 50.54 + 0.00) = 50.54 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -45     90   0.60  67.08 -14.33  -2.22   0.00   0.00   0.00  50.54
-------------------------------------------------------------------------
Segment Leq : 59.36 dBA

Total Leq All Segments: 59.36 dBA

Results segment # 1: CP (night)
------------------------------
LOCOMOTIVE (0.00 + 58.75 + 0.00) = 58.75 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -45     90   0.50  74.22 -13.39  -2.08   0.00   0.00   0.00  58.75
-------------------------------------------------------------------------

WHEEL (0.00 + 50.54 + 0.00) = 50.54 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -45     90   0.60  67.08 -14.33  -2.22   0.00   0.00   0.00  50.54
-------------------------------------------------------------------------
Segment Leq : 59.36 dBA
Total Leq All Segments: 59.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.36
                           (NIGHT): 59.36
```