

Noise and Vibration Feasibility Study

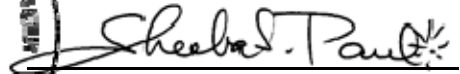
On the Park, Leslie Street and Eglinton Avenue East

Toronto, Ontario

Prepared for:

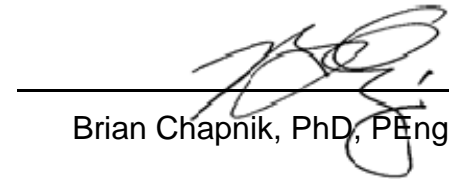
Deltera Inc.
4800 Dufferin Street
Toronto, Ontario
M3H 5S9

Prepared by



Sheeba Paul, MEng, PEng

Reviewed by



Brian Chapnik, PhD, PEng

January 19, 2015

CONTENTS

1	INTRODUCTION AND SUMMARY	1
2	SITE AND AREA DESCRIPTION	2
3	NOISE AND VIBRATION CRITERIA	3
3.1	ROAD AND RAIL NOISE	3
3.2	GROUND-BORNE VIBRATION	4
3.3	RAILWAY CONDITIONS FOR RESIDENTIAL DEVELOPMENTS	5
4	TRANSPORTATION NOISE	5
4.1	ROAD TRAFFIC DATA.....	5
4.2	RAIL TRAFFIC DATA	6
4.3	TRANSPORTATION NOISE PREDICTIONS	6
4.4	TRANSPORTATION NOISE - RECOMMENDATIONS	8
4.5.1	<i>Outdoor Living Areas</i>	8
4.5.2	<i>Ventilation Requirements</i>	8
4.5.3	<i>Building Constructions</i>	8
	<i>Exterior Wall Constructions</i>	9
	<i>Glazing</i>	9
4.5.4	<i>Warning Clauses</i>	10
5	GROUND-BORNE VIBRATION ASSESSMENT	11
5.1	SITE MEASUREMENTS	11
6	IMPLEMENTATION	12
7	CONCLUSIONS	12

FIGURE 1: KEY PLAN

FIGURE 2A: SITE PLAN

FIGURE 2B: OUTDOOR AMENITY SPACE BARRIER REQUIREMENTS

FIGURE 3: VIBRATION MEASUREMENT LOCATIONS

FIGURE 4: VIBRATION LEVELS AND REFERENCE CURVES

APPENDIX A: RAIL TRAFFIC DATA

APPENDIX B: RAIL GUIDELINES

APPENDIX C: ROAD TRAFFIC DATA

1 INTRODUCTION AND SUMMARY

HGC Engineering was retained by Deltera Inc. to perform a Noise and Vibration Feasibility Study for a proposed mixed-use development to be located on the east side of Leslie Street and north of Eglinton Avenue East in the City of Toronto, to support an application for rezoning (ZBA) and Plan of Subdivision. The site is also on the west side of a Canadian Pacific (CP) railway line.

Road traffic on Eglinton Avenue East, Leslie Street, rail traffic on the CP railway line and future GO Transit operations on the railway corridor to the east are considered as the main sources of transportation noise in this area, with road traffic on Don Mills Road and the Don Valley Parkway (DVP) being secondary. Noise from these transportation sources requires that appropriate sound insulation measures be considered for integration into the design of the building envelope to maintain acceptable indoor sound levels. These requirements will be met through the use of appropriate wall and glazing assemblies, which will be implemented during the building design.

Predicted sound levels in the large outdoor amenity space on the 4th floor between Tower A and Tower B facing the railway exceed MOE criteria. A 3.0 m high barrier is required in order to reduce sound levels to within acceptable limits. A 1.1 m high barrier is required for the amenity areas at the northwest and southwest of Towers A and B.

Vibration levels measured at the development site indicate that ground-borne vibrations from the rail corridor to the east satisfy the CP criteria. Additional isolation measures are not anticipated to be required to mitigate vibration from rail pass-bys.

Thus, with suitable controls integrated into the building plans, the proposed development is anticipated to meet MOE and CP guidelines for traffic noise impact. Details of the assessment leading to this conclusion are provided herein.



ACOUSTICS



NOISE



VIBRATION

2 SITE AND AREA DESCRIPTION

The site is located east of Leslie Street, north of Eglinton Avenue East and west of the CP railway line. Don Mills Road and the DVP are beyond. An embankment, approximately 5 to 11 metres tall, separates the site from Eglinton Avenue East. An embankment, approximately 7.5 metres tall, separates the site from Leslie Street. The railway tracks are approximately 12 m east of the site and approximately 20 m east of the closest building wall. A key plan is attached as Figure 1.

There are five existing buildings to the north of the site, including a 2-storey Fire Hall, 13-storey, 16-storey and 20-storey residential buildings and 2-storey parking structure. There are three existing buildings to the south of the subject site containing car dealerships (Toyota on the Park and Lexus on the Park). Currently on the site is the Inn on the Park hotel building and convention centre, which are in the process of being demolished to make way for the new development. The area is considered to be Class I (urban) in terms of its acoustical environment.

The railway corridor to the east of the site is a principal mainline operated by CP railway and includes two tracks. The railway line is a combination of the North Toronto Subdivision and the Bala Subdivision. The North Toronto Subdivision is a line that runs in parallel to Dupont Street and currently includes freight trains only. As indicated by GO Transit personnel there are no GO Trains on the North Toronto corridor but to protect future operations, future GO Trains have been considered. The Bala Subdivision has two tracks. One track splits north of Gerrard Street and goes eastward away from the subject site. The second track of the Bala Subdivision runs north south runs alongside the subject site. The Bala Subdivision (GO Richmond Hill line) is located beyond 300 m of the subject site and therefore the GO Trains on this line have not been included in the analysis. The Bala Subdivision includes operations of the Ontario Northland Railway (ONR), which operates a couple of freight trains during the daytime hours and CP rail that includes freight trains during the nighttime hours.

A site plan dated December 3, 2014 was provided to us electronically. These drawings indicate that the development includes four towers (Tower A is 29-storeys, Tower B is 39-storeys, Tower C is 34-storeys and Tower D is 28-storeys) above 3-storey podiums. There are two blocks of 3-storey townhouses in the centre of the development and 1-storey townhouses along Leslie Street incorporated into the podium of Tower D. Residential suites are shown throughout the development. The ground floor of Tower D shows some retail spaces.

A site plan prepared by Graziani + Corazza Architects Inc. is attached as Figure 2A. Outdoor amenity areas are shown at ground level, east of the townhouses, on the roof of the 1-storey portion between Tower C and Tower D, on the roof of the podium at the southwest and northwest corners of Tower A and Tower B and on the roof of the 3-storey parking garage next to the railway.



ACOUSTICS



NOISE



VIBRATION

Site visits were conducted by HGC Engineering on November 28, 2014 and December 5, 2014 to take vibration measurements on site, and to observe the property and surrounding areas. Two car dealerships neighbour the development site on the south side. During our visit, no audible noise from the car dealership buildings was detected. Nevertheless, a warning clause to inform the future residents of the potential for occasional audible noise is recommended.

3 NOISE AND VIBRATION CRITERIA

3.1 Road and Rail Noise

Criteria for acceptable levels of traffic noise are contained in the Ontario Ministry of Environment (MOE) publication NPC-300, "Environmental Noise Guideline: Stationary and Transportation Sources - Approval and Planning", October 2013. Sound level limits from road and rail traffic sources are summarized in Table I below.

Table I: Road/Rail Traffic Noise Criteria [dBA]

Area	Daytime L_{EQ} (16 hour)	Night-time L_{EQ} (8 hour)
Outdoor Living Area	55	--
Living or dining areas of residences	45 / 40	45 / 40
Sleeping Quarters (bedrooms)	45 / 40	40 / 35

Daytime refers to the period between 07:00 and 23:00. Night-time refers to the period between 23:00 and 07:00. Living areas include dining rooms, dens, studies, etc. Corridors and washrooms are usually not considered to be noise-sensitive areas.

The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace, a playground, or common areas associated with high-rise multi-unit buildings where passive outdoor recreation is expected to occur. Balconies with a depth of less than 4 meters (measured perpendicular to the building façade) are not considered OLAs under MOE guidelines, and accordingly the noise criteria are not applicable there.

In cases where a minor excess (up to 5 dB) over the sound level limit in an OLA is anticipated, MOE guidelines allow the excess to be addressed by including a warning clause in the titles, deeds or tenancy agreements for the affected dwellings. Where OLA sound levels exceed 60 dBA, physical noise control measures, such as an acoustical barrier, are required.

Where the road traffic noise level (L_{EQ}) outside bedroom windows is greater than 60 dBA at night-time, windows must be designed to achieve the indoor sound level criterion of 40 dBA. In addition, for living room and bedroom windows, where the road traffic noise level (L_{EQ}) is

greater than 65 dBA during the daytime, windows must be designed to achieve the indoor sound level criterion of 45 dBA. Otherwise, any glazing meeting the Ontario Building Code is considered adequate under MOE guidelines.

The indoor and outdoor sound level limits for rail sources are 5 dB more stringent than for road sources, to account for the additional low-frequency (rumble) components of locomotives, hence the façade sound insulation requirements are calculated separately and then combined.

Where the predicted night-time and daytime sound levels exceed the criteria, central air conditioning is required so that windows can remain closed against the noise.

3.2 Ground-Borne Vibration

Criteria for rail vibrations are not provided by the MOE, but are stipulated in guideline documents circulated by CP railway and GO Transit (see Appendix B). These guidelines require that a vibration assessment be performed for any dwelling within 75 m of the railway right-of-way, and that measured levels on the site during any part of a train pass-by should not exceed 0.14 mm/s. Further, GO stipulate that where measured levels on the ground exceed this threshold, isolation measures will be required to ensure that vibration levels impacting residential living areas do not exceed 0.14 mm/s (RMS).

Vibration levels are typically measured in terms of oscillatory velocity or acceleration. The levels discussed in this report are presented in dBG, which refers to decibels of acceleration relative to the acceleration of gravity, as a function of one-third octave band frequencies (Hz). The levels have been plotted against American National Standards Institute (ANSI) criteria and International Standards Organization (ISO) criteria – ANSI-S3.29/ISO-2631-2 – for human perception of tactile vibration while seated. Conformance with these criteria does not guarantee that vibration levels will be imperceptible to all individuals under all conditions, but is nonetheless a reasonable standard for acceptability. Note that these criteria are for the base structure only and do not account for amplification by lightweight structures, finishes, furniture, etc.

The ANSI/ISO criteria do not address noise; vibrations at frequencies over 20 Hz are also of concern for re-radiated noise, even at levels well below the tactile perceptibility threshold. Experience suggests that while the train pass-bys may be audible in the building to some extent, if the levels are confined to about NC-30 (35 dBA) or lower, the audibility of the pass-bys may be considered reasonable. This is consistent with criteria used by the US Federal Transit Administration to assess ground-borne noise intrusions from subways and trains.

3.3 Railway Conditions for Residential Developments

Notwithstanding the noise and vibration criteria outlined above, CP railway and GO Transit publish a recommended list of generic conditions, including specific setbacks, berm heights, and warning clauses, to reduce the incompatibility of residential developments adjacent or in proximity to the railway right-of-way. A copy of this list is included in Appendix B of this report. Some of the listed items relate to noise and vibration control.

4 TRANSPORTATION NOISE

4.1 Road Traffic Data

Traffic data for the key roads in the vicinity of the site were recently obtained from the City of Toronto Traffic Safety Unit and are provided in Appendix C. These data were provided in the form of 24-hour counts and turning movement counts. Traffic volumes were conservatively assumed to grow at a typical rate of 2.5%/year on all roadways, and future average daytime (07:00 to 23:00) and night-time (23:00 to 07:00) hourly volumes that will exist in 10 years (2025) were calculated. An assumed day/night split of 90%/10% was used for roadways without 24-hour traffic data. Commercial percentages were calculated based on turning movement counts, or were assumed based on previous experience, where not available. The posted speed limit on most of the roadways is 60 km/h with the exception of the Don Valley Parkway which has a posted speed limit of 90 km/h. Smaller roadways were not included in this study, as traffic on these small roadways is anticipated to be acoustically insignificant when compared to the other major roadways. Table II summarizes the future traffic volume data used in this study.

Table II: 2025 Projected Road Traffic Data

Location	Day (Hourly Average 7am-11pm)			Night (Hourly Average 11pm – 7am)			Speed (kph)
	Cars	Trucks	Truck %	Cars	Trucks	Truck %	
Eglinton Avenue East	2982	69	2.3 %	648	15	2.3%	60
Leslie Street	941	22	2.3 %	209	5	2.3%	60
Don Mills Road	2197	68	3 %	488	15	3 %	60
Don Valley Parkway northbound	3686	551	13 %	631	94	13 %	90
Don Valley Parkway southbound	2435	364	13 %	675	101	13 %	90

4.2 Rail Traffic Data

Rail traffic data for the North Toronto Subdivision was obtained from similar projects along the same railway line and was originally obtained from Canadian Pacific Railway (provided in Appendix A). As indicated by GO Transit personnel, currently there are no GO Trains operating on the North Toronto line, but to protect their future operations, GO trains have been considered. For GO trains, “ultimate” future volumes were supplied by GO transit, and these volumes were used in this analysis. Rail traffic data for the Bala Subdivision was obtained from similar projects along the railway line and was originally obtained from CP railway and ONR. The Bala Subdivision includes freight train traffic from the ONR and CP. The maximum speed, as well as the average number of cars and locomotives per train was used in the traffic noise analysis to yield a worst cast estimate of train noise. The data was projected to the year 2025 using a 2.5% per year growth rate. The rail volumes used in this study are summarized in Table III.

Table III: Future Rail Traffic Data

Subdivision	Type of Train	No. of engines (average)	No. of cars (average)	Average No. of Pass-bys (07:00-23:00)	Average No. Pass-bys (23:00-07:00)	Speed (km/h)
Bala*	ONR	2	3	2.7	0	96
	CPR	2	15	0	2.7	96
North Toronto+	GO	1	10	36	4	72
	CP	2	41	40	19	72

Note:

* This track is used for occasional freight traffic from CP and ONR to and from downtown Toronto.

+ This is an extension of the busy CP freight line that runs along Dupont Street. There are future provisions to use this line for GO Transit commuter traffic.

4.3 Transportation Noise Predictions

To assess the levels of traffic noise which will impact the site in the future, predictions were made using a numerical computer modelling package (*Cadna-A version 4.4.145*). The model is based on the methods from ISO Standard 9613-2.2, “*Acoustics - Attenuation of Sound During Propagation Outdoors*”, which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures.

The rail lines were included in the model as line sources with sound power levels equivalent to those published by the MOE in the publication entitled, “Sound from Trains – Environmental Analysis Method (STEAM)”, predicted using STAMSON 5.04, a computer algorithm developed by the MOE. The road noise sources have been included in the model using the basic road element included in *Cadna-A*, which follows the German guideline RLS-90 for road traffic noise predictions. Past experience suggests that train sound levels predicted by STEAM are conservative, while road sound levels predicted by RLS-90 are reasonably accurate. The model road traffic values have been qualified on this project and similar projects to be within 1-2 dBA of those predicted in STAMSON 5.04.

Predictions of overall sound levels from all road/rail sources were made at representative facades of each building in the proposed development. The results of these predictions are summarized in Table IV.

Table IV: Maximum Sound Level Predictions [dBA] from Future Traffic

Location	Description	Day (Average Hour 7am-11pm)			Night (Average Hour 11pm-7am)		
		Road	Rail	Total	Road	Rail	Total
Tower A	North	56	68	68	50	69	69
	East	59	71	71	52	71	71
	South	55	64	64	48	64	64
	West	55	52	56	48	53	54
Tower B	North	57	69	69	50	69	69
	East	60	72	72	53	72	72
	South	58	68	68	53	68	68
	West	58	59	61	51	60	60
Tower C	South	59	62	63	52	62	62
Tower D	West	66	42	66	59	42	59
Townhouses	North	52	55	57	45	55	56

Rail traffic noise is anticipated to be dominant with lesser contributions from Eglinton Avenue East and Leslie Street.

4.4 Transportation Noise - Recommendations

The following discussion outlines preliminary recommendations for barriers, building façade constructions, alternative ventilation requirements, and warning clauses to achieve the noise criteria stated in Table I.

4.5.1 Outdoor Living Areas

The main outdoor amenity space is a public walkway and outdoor amenity between the townhouses and Tower A. The predicted sound level is less than 55 dBA in this area due to shielding provided by the proposed and existing buildings.

The predicted sound levels in the outdoor amenity areas on the 3rd floor roof at the southwest and northwest corners of Tower A and Tower B, and on the roof of the 3-storey parking garage next to the railway, exceed 60 dBA. Calculations indicate a 1.1 m high barrier would be required at the southwest and northwest amenity areas to reduce the sound level to less than 60 dBA (See Figure 2B). Calculations indicate a 3.0 m high barrier would be required on the 3rd floor roof of the podium between Tower A and Tower B facing the railway line (see Figure 2B) to reduce sound levels to 60 dBA.

The remaining balconies and private terraces in the development all appear to be less than 4 m in depth; therefore, the OLA limits do not apply.

4.5.2 Ventilation Requirements

The predicted night-time sound levels at most building facades exceed 60 dBA, and thus central air conditioning systems are required so that windows may remain closed.

The predicted nighttime sound levels at the 3-storey townhouses in the center of the site are less than 60 dBA and forced air ventilation systems with ductwork sized for the future installation of central air conditioning by the occupant is required so that windows may remain closed. Installation of central air conditioning systems meets and exceeds the requirement.

4.5.3 Building Constructions

Floor plans and elevations have not yet been sufficiently developed for the detailed acoustical specification of the building envelope.

Exterior Wall Constructions

Elevation drawings are not yet available, but the building exterior walls may consist largely of metal or glass spandrel panels with some areas of precast concrete or masonry. Exterior walls that are not glazed should have sufficient acoustical insulation value such that the noise transmitted through is negligible in comparison with the windows. Spandrel or metal panels with typical sound insulation rating of STC-50 or higher, backed by an independent insulated drywall assembly, should meet these requirements.

Glazing

For the purposes of this preliminary analysis, typical window-to-floor areas were assumed to be 50% (i.e. 40% fixed, 10% operable relative to floor area). Based upon this assumption, the glazing for residential suites with direct exposure to CP rail line should achieve the sound transmission class ratings shown in Table V.

Table V: Preliminary Glazing Requirements*

Location	Description	Space	Glazing STC Requirement**
Tower A	North	LR/DR	34
		BR	40
	East	LR/DR	37
		BR	42
	South	LR/DR	30
		BR	35
West	LR/DR	OBC	
	BR	OBC	
Tower B	North	LR/DR	35
		BR	40
	East	LR/DR	38
		BR	43
	South	LR/DR	34
		BR	39
West	LR/DR	OBC	
	BR	32	
Tower C	South	LR/DR	30
		BR	33
Tower D	West	LR/DR	OBC
		BR	OBC
Townhouses (at center of site)	North	LR/DR	OBC
		BR	OBC

Note: Based on assumed 50% window-to-floor area ratio

** Requirements are for fixed glazing units, operable elements (windows/doors) can be up to 3 points lower without affecting these recommendations.

These results indicate that the glazing along the east side of the development (east facades of Tower B and Tower A) facing the rail line must achieve a sound transmission class (STC) rating of at least 40 for the living/dining rooms and at least 42/43 for the bedrooms in order to achieve the target indoor sound level criteria. Lower STC rating may be achieved by using smaller window areas relative to the floor area especially in bedrooms. Façades with less exposure to the rail corridor are less impacted, and accordingly a lower STC would be acceptable while still meeting the indoor targets. Acoustical criteria for different facades can be optimized as part of the detail design of the building envelope, if required.

These calculations assume insignificant sound transmission through the walls in comparison with the windows; exterior wall assemblies with a rating of STC-50 or higher should be incorporated.

4.5.4 Warning Clauses

MOE guidelines recommend that appropriate warning clauses be included in the property titles, purchase and sale agreements, and tenancy agreements of properties where anticipated traffic sound level excesses are identified. The actual wording of the warning clause depends on the nature of the excess. For this site, two clauses are recommended as follows.

- (a) Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road/rail traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of the Environment's noise criteria.
- (b) 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 Ministry of Environment's noise criteria.
- (c) Purchasers/tenants are advised that due to the proximity of this development to nearby retail and commercial facilities, sound levels from the facilities may at times be audible.

CP railway generally require specific warning clauses to protect their interests if the site is close to a major railway corridor. Wording for such a clause is included in the guideline document provided in Appendix B, and reads as follows:

Warning: CP Railway or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations 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 dwelling(s). CP Railway will not be responsible for any complaints or claims arising from the use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

In addition, GO Transit generally require specific warning clauses to protect their interests if the site is close to a major railway corridor. Wording for such a clause is included in the guideline document provided in Appendix B, and reads as follows:

Warning: GO Transit or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations 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 dwelling(s). GO Transit will not be responsible for any complaints or claims arising from the use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

5 GROUND-BORNE VIBRATION ASSESSMENT

5.1 Site Measurements

To assess the potential ground-borne vibration impact on the development due to the Bala and North Toronto Subdivisions, HGC Engineering measured vibration levels impacting the development site. The measurements were performed during busy morning peak hours on November 28, 2014. Vibration measurements were conducted outside at grade. Vibration measurement locations are shown in Figure 3. A total of 3 freight train pass-bys were measured during our site visit.

The vibration data was analyzed and compared to criteria as outlined in Section 3.2. Some additional predictions were also undertaken, adjusting the measured levels to account for the different factors likely to affect the vibration path in the new development. These adjustments include higher foundation losses due to coupling of the soil to the new heavier building foundation (i.e., assumed to be poured concrete on caissons), floor-to-floor attenuation up to the first residential level and amplification due to suspended structures.

When vibrations from train pass-bys were at a maximum, they were dominated by low-frequency peaks in the 20-50 Hz range. Maximum vibration levels from measured train pass-bys are shown in Figure 4. The measurements indicate vibration levels are below the ANSI/ISO criteria for tactile perceptibility, and were less than the target outlined above with respect to re-radiated noise. It is concluded that ground-borne vibration from rail pass-by events is not a concern for this development.

6 IMPLEMENTATION

Upon review and approval of this feasibility study by the City, CP railway and GO Transit, all recommendations set forth in the study shall be secured through the Conditions of Site Plan Approval and/or the Building Permit, to the satisfaction of the City, CP and GO Transit.

Appropriate warning clauses should be included in all future development agreements for each dwelling unit in this development. Suggested wording for warning clauses has been provided herein, and may be adjusted as necessary to suit the requirements of the City and the railways.

7 CONCLUSIONS

Measurements and modelling have been undertaken to assess the noise and vibration impact of surrounding sources on the proposed development at On the Park at Leslie Street and Eglinton Avenue East, in Toronto.

Background sound levels from future road traffic on the surrounding roadways and rail traffic noise in the adjacent rail corridor have been predicted. Preliminary recommendations for suitable building constructions are provided in Section 4.5.3 above. Warning clauses are recommended to advise residents of road and rail traffic noise concerns.

Predicted sound levels exceed MOE criteria in the outdoor amenity space on the 4th floor between Tower A and Tower B facing the railway. A 3.0 m tall barrier would be required to reduce sound levels to within criteria. A 1.1 m high barrier is required for the amenity areas at the northwest and southwest of Towers A and B.

Based on the measurements conducted on site, vibration impacts from by rail traffic on the Bala and North Toronto rail line are anticipated to be within reasonable limits, and additional control measures are not anticipated to be required.

With the integration of suitable noise control measures into the building design, compatibility with the surrounding environment is anticipated to be achieved. Hence, the proposed development is considered to be feasible from a noise and vibration perspective.

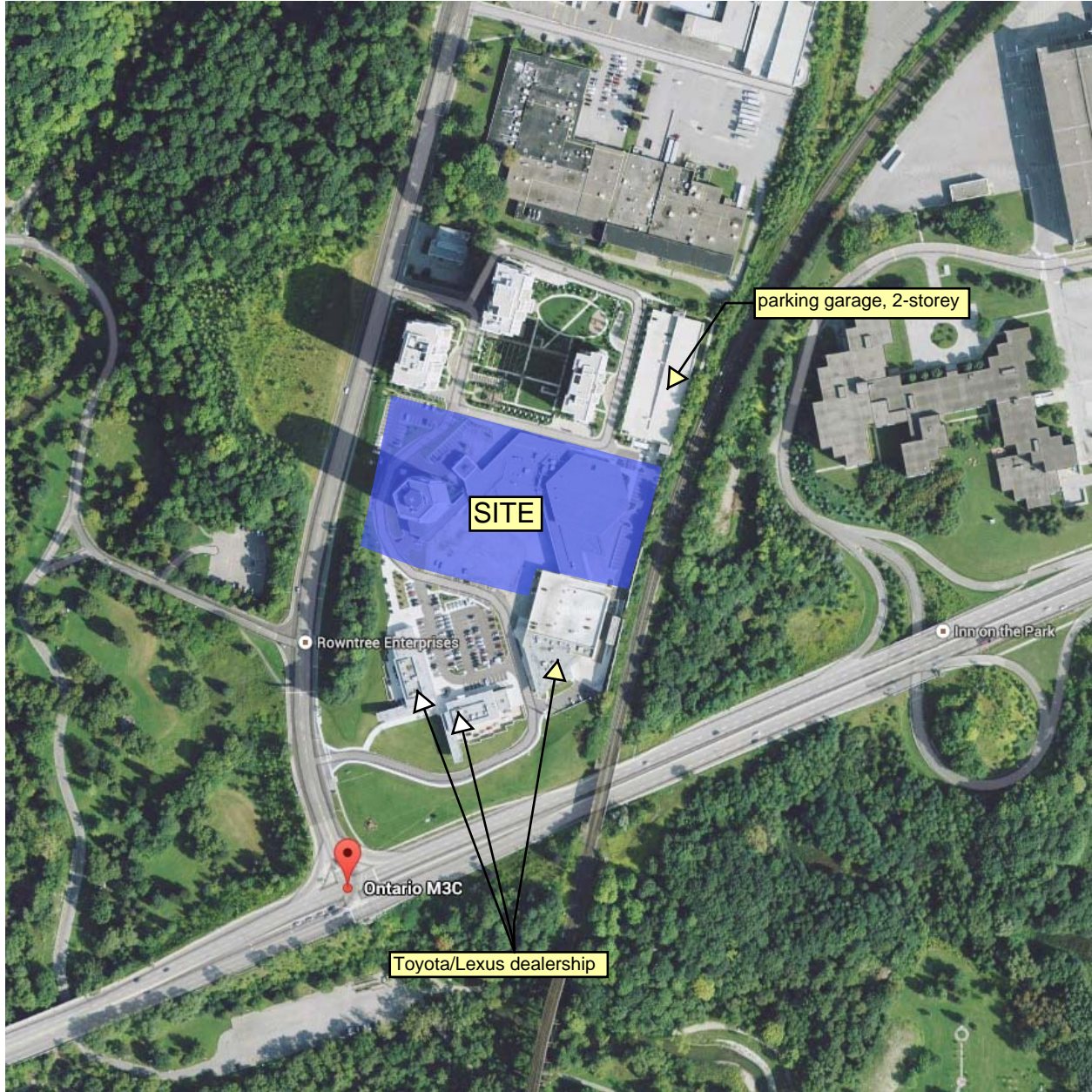
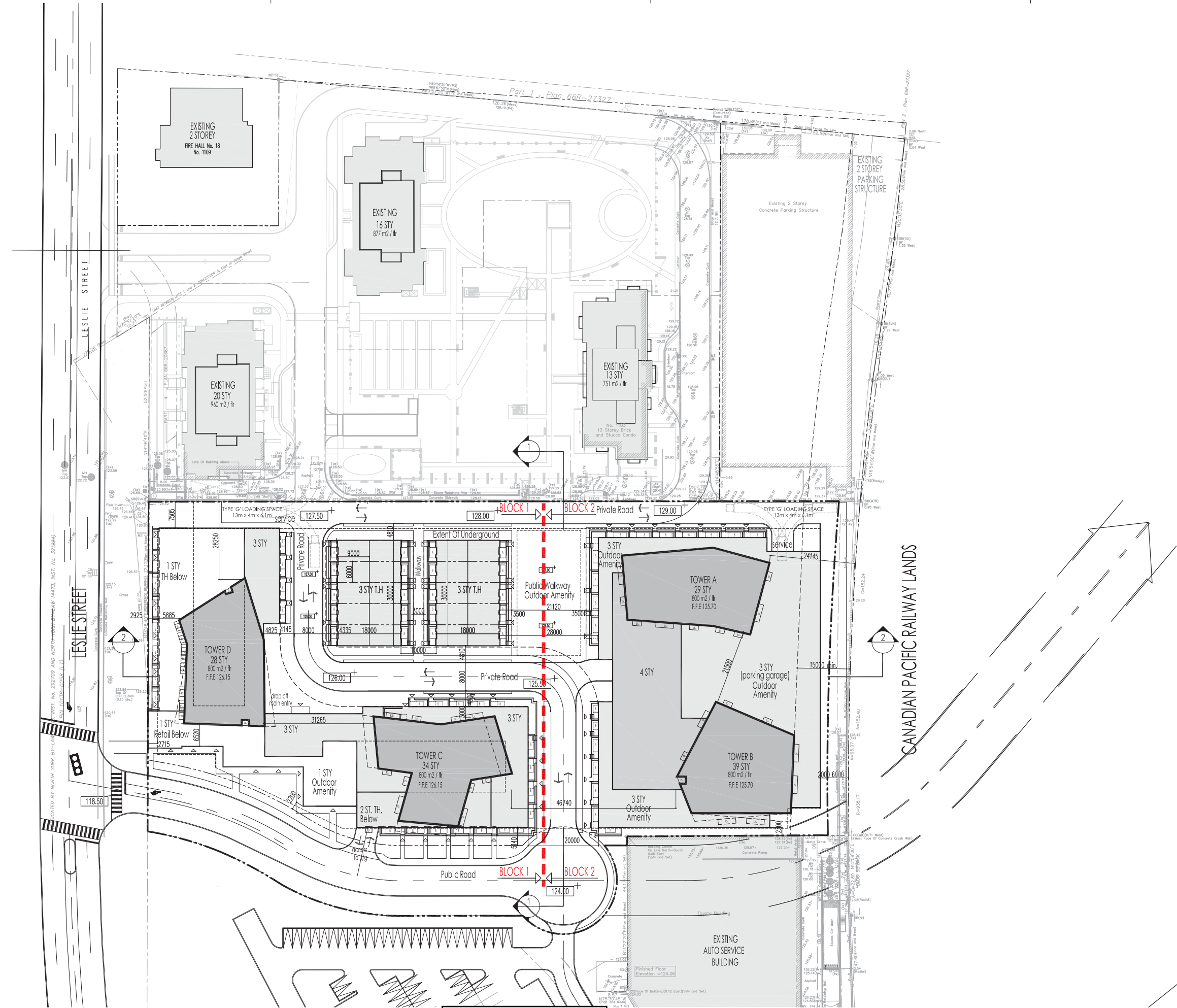


Figure 1 - Key Plan

This drawing, as an instrument of service, is provided by and is the property of Graziani + Corazza Architects Inc. The contractor must verify and accept responsibility for all dimensions and conditions on site and must notify Graziani + Corazza Architects Inc. of any variations from the supplied information. Graziani + Corazza Architects Inc. is not responsible for the accuracy of survey, structural, mechanical, electrical, etc., engineering information shown on this drawing. Refer to the appropriate engineering drawings before proceeding with the work. Construction must conform to all applicable codes and requirements of the authorities having jurisdiction. Unless otherwise noted, no investigation has been undertaken or reported on by this office in regards to the environmental condition of this site. This drawing is not to be used for construction purposes until countersigned by the Architect.

This drawing is not to be scaled. All architectural symbols indicated on this drawing are graphic representations only.

- 1. SEPT.22.2014 ISSUED TO CONSULTANTS BC
- 2. OCT.7.2014 RE-ISSUED TO CONSULTANTS BC



G

GRAZIANI + CORAZZA ARCHITECTS INC.

1300 Sheppard Ave. E., Suite 100, Mississauga, Ontario L4W 1G3
Phone: 905.795.3801 Fax: 905.795.2844 www.gc-architects.com

PROPOSED RESIDENTIAL DEVELOPMENT
ON THE PARK

TORONTO	ONTARIO
Project Architect:	B. GRAZIANI
Assistant Designer:	M. FAUSTINO
Drawn By:	C. BARBOSA-CARLOS
Checked By:	D. BIASE
Plot Date:	Dec 03, 2014
Job #	1216.14

**SITE PLAN
OVERALL SITE VIEW**

1:500 A102

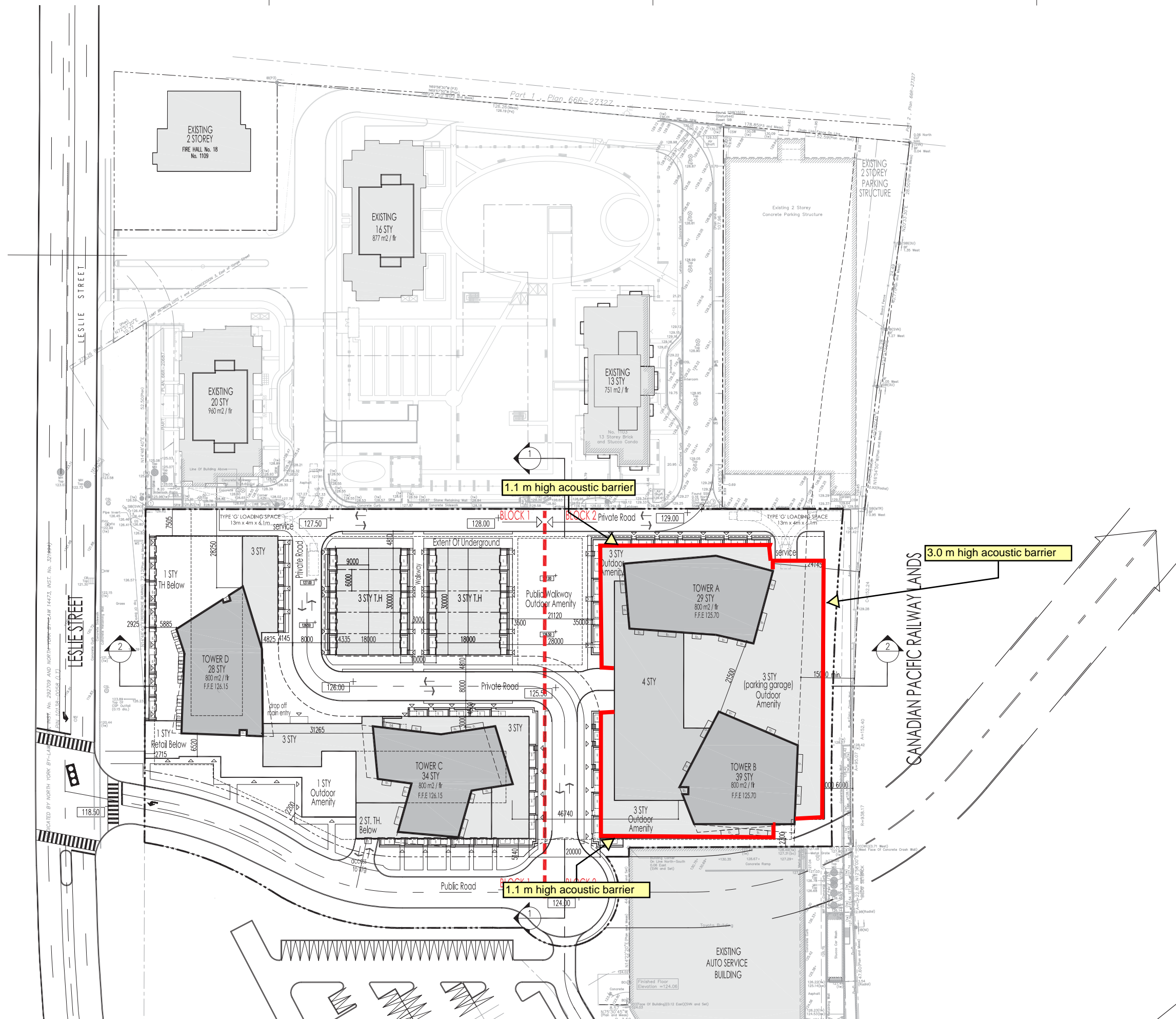
TITLEBLOCK SIZE: 610 x 915


Figure 2A - Site Plan

This drawing, as an instrument of service, is provided by and is the property of Graziani + Corazza Architects Inc. The contractor must verify and accept responsibility for all dimensions and conditions on site and must notify Graziani + Corazza Architects Inc. of any variations from the supplied information. Graziani + Corazza Architects Inc. is not responsible for the accuracy of survey, structural, mechanical, electrical, etc., engineering information shown on this drawing. Refer to the appropriate engineering drawings before proceeding with the work. Construction must conform to all applicable codes and requirements of the authorities having jurisdiction. Unless otherwise noted, no investigation has been undertaken or reported on by this office in regards to the environmental condition of this site. This drawing is not to be used for construction purposes until countersigned by the Architect.

This drawing is not to be scaled. All architectural symbols indicated on this drawing are graphic representations only.

- 1. SEPT.22.2014 ISSUED TO CONSULTANTS BC
- 2. OCT.7.2014 RE-ISSUED TO CONSULTANTS BC




GRAZIANI + CORAZZA
 ARCHITECTS INC.
 1320 Sheppard Ave. E., Suite 100, Mississauga, Ontario L4W 1G3
 Phone: 905.795.3861 Fax: 905.795.2844 www.gc-architects.com

PROPOSED RESIDENTIAL DEVELOPMENT
ON THE PARK

TORONTO	ONTARIO
Project Architect:	B. GRAZIANI
Assistant Designer:	M. FAUSTINO
Drawn By:	C. BARBOSA-CARLOS
Checked By:	D. BIASE
Plot Date:	Dec 03, 2014
Job #	1216.14

SITE PLAN
OVERALL SITE VIEW

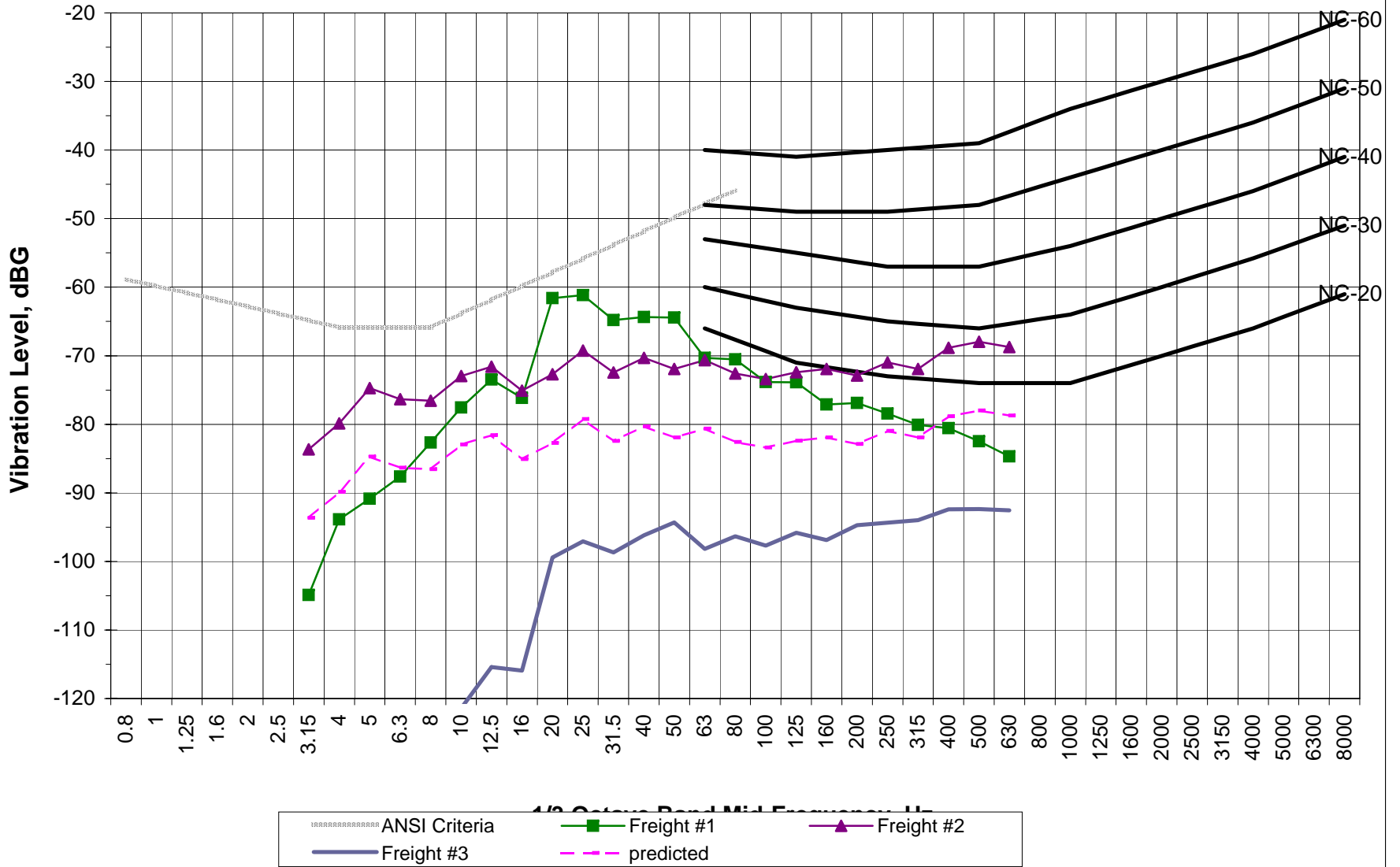
 1:500 **A102**
 TITLEBLOCK SIZE: 610 x 915

Figure 2B - 4th Floor Amenity Space



Figure 3 - Vibration Measurement Locations

Figure 4 - Vibration Vs. Criteria



APPENDIX A

Rail Traffic Data



ACOUSTICS



NOISE



VIBRATION

Sheeba Paul

From: Adam Snow <Adam.Snow@gotransit.com>
Sent: December-18-14 10:51 AM
To: Sheeba Paul
Subject: RE: Train Traffic Data Verification (Leslie St and Eglinton Ave E) Toronto

Hello Sheeba – As previously noted, GO Transit does not currently operate on the North Toronto corridor – but in the interests of protecting for future operations you may use the information provided in July 2010 as the basis for your analysis. I do not have speed information for this line but for the purposes of the analysis please assume the freight train speed provided by CP.

The Bala Subdivision (GO Richmond Hill line) is located beyond 300 metres from the subject site and as such you do not need to consider rail traffic on that line.

I trust that this information meets your needs. Please let me know if you need anything else.

Thanks,

Adam

Adam Snow
Third Party Projects Officer
GO Transit - Rail Corridor Management Office
335 Judson Street | Toronto | Ontario | M8Z 1B2
T: 416-354-7746
C: 416-528-4864
F: 416-354-7731
E-mail: Adam.Snow@gotransit.com
www.gotransit.com

From: Sheeba Paul [mailto:spaul@hgcengineering.com]
Sent: Wednesday, December 17, 2014 5:46 PM
To: Adam Snow; Adam Snow; Adam Snow
Subject: RE: Train Traffic Data Verification (Leslie St and Eglinton Ave E) Toronto

Hello Adam

HGC Engineering is performing a noise study for the site at Inn on the Park in Toronto.

Please find attached a Google link for your reference.

<https://www.google.ca/maps/search/Rowntree+Enterprises/@43.7192221,-79.3517422,16z>

It appears there are 2 railway lines.

1) One is the North Toronto Subdivision which is the main CP freight line. I have data from you from Dupont and Avenue Road project which is attached.

2) The other line is the Bala Subdivision from the south. I also have data from a site we did at DeFries Street

Subdivision	Type of Train	No. of engines (max)	No. of cars (max)	Average No. of Pass-bys (07:00-23:00)	Av (23:00-07:00)
Bala	GO	1	12	36	
	ONR	2	3	2.7	
	CPR	2	15	0	

These two lines merge near our site at Leslie Street and Eglinton Avenue East.

The GO Line from downtown Toronto appears to split north of Gerrard Street and goes east and northward far away from our site.

Can you please confirm the rail data for the GO portion of the two railway lines? From what I understand there are no GO Trains on the railway line at Eglinton Ave E and Leslie Street.

Thank you.

Ms. Sheeba Paul, MEng, PEng
Senior Engineer, Associate

CELEBRATING 20 YEARS | 1994-2014

HGC Engineering [NOISE](#) / [VIBRATION](#) / [ACOUSTICS](#)

Howe Gastmeier Chapnik Limited

2000 Argentia Road, Plaza One, Suite 203, Mississauga, Ontario, Canada L5N 1P7

t: 905.826.4044 e: spaul@hgcengineering.com

Visit our new website! www.hgcengineering.com Follow Us – [LinkedIn](#) | [Twitter](#) | [YouTube](#)

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is unauthorized and may be illegal.

Sheeba Paul

From: Adam Snow [Adam.Snow@gotransit.com]

Sent: July 8, 2010 11:52 AM

To: Sheeba Paul

Subject: RE: rail traffic data request

Hi Sheeba - There is no GO service on this line at present, but there are expectations that there will be in the future, although we have not established specific numbers. According to the GO 2020 Plan, service will include "peak-period, peak direction rail service every thirty minutes or better". For the purposes of your analysis you could adopt our standard '40 trains a day' (36 day/4 night) service level that we have used in the past, so that at least some level of GO service is considered.

I hope that this helps.

Best regards,

Adam

From: Sheeba Paul [mailto:spaul@hgcengineering.com]

Sent: Thursday, July 08, 2010 11:14 AM

To: Adam Snow

Subject: RE: rail traffic data request

Hi Adam

Sorry to bug you about this one.

Please let me know if there are any GO Trains on this line. If there are no GO Trains, then my calculations are done. If there are GO Trains, can you let me know when I can expect the data.

Thank you.

Ms. Sheeba Paul, PEng

HGC Engineering
Howe Gastmeier Chapnik Limited
2000 Argentia Road
Plaza One, Suite 203
Mississauga, Ontario, Canada L5N 1P7

Phone (905) 826-4044

Fax (905) 826-4940

spaul@hgcengineering.com

www.hgcengineering.com

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is unauthorized and may be illegal.

From: Sheeba Paul

Sent: July 7, 2010 12:58 PM

08/07/2010

To: Adam Snow
Subject: RE: rail traffic data request

Hi Adam,

I am just wondering if there are GO Trains which use the CP railway line that crosses Avenue Road in the City of Toronto. I have attached a Google link for your reference.

http://maps.google.ca/maps?f=q&source=s_q&hl=en&geocode=&q=avenue+road+and+pears+avenue,+toronto,+ontario&ll=43.674611,-79.396745&sspn=0.002479,0.004801&gl=ca&ie=UTF8&hq=&hnear=Avenue+Rd+%26+Pears+Ave,+Toronto,+Toronto+Division,+Ontario&ll=43.675368,-79.396906&spn=0.010243,0.019205&t=h&z=16

Please let me know.

Thank you.

Ms. Sheeba Paul, PEng

HGC Engineering
Howe Gastmeier Chapnik Limited
2000 Argentinia Road
Plaza One, Suite 203
Mississauga, Ontario, Canada L5N 1P7

Phone (905) 826-4044
Fax (905) 826-4940

spaul@hgcengineering.com
www.hgcengineering.com

This e-mail and any attachments may contain confidential and privileged information. If you are not the intended recipient, please notify the sender immediately by return e-mail, delete this e-mail and destroy any copies. Any dissemination or use of this information by a person other than the intended recipient is unauthorized and may be illegal.

Sheeba Paul

From: Orest Rojik <Orest_Rojik@cpr.ca>
Sent: August-23-12 2:31 PM
To: Sheeba Paul
Subject: RE: Train Traffic Data Request

Sheeba,

Please amend the data from 2010 to reflect changes in our operations. Revised information through July 2012 is as follows:

1. Number of freight trains between 0700 & 2300: 26 average (20 minimum, 31 maximum)
Number of freight trains between 2300 & 0700: 13 average (6 minimum, 19 maximum)
2. Number of freight cars per train: 64 average (150 maximum)
Number of locomotives per train: 2 average (5 maximum)
3. Whistle signals are not routinely sounded through the study area.
4. Maximum permissible speed: 35 mph for westbound trains
45 mph for eastbound trains
(use a 50/50 split for volumes)
5. The double track on this corridor is comprised of continuously welded rail.
6. An additional major noise source to consider is the at-grade rail crossing between CPR and CNR to the north of the site. There are two diamond crossings located here which emit considerable noise and vibration.

Orest Rojik SR/WA | Right-of-Way Representative Ontario | 800-1290 Central Parkway West, Mississauga, ON L5C 4R3 |
Canadian Pacific 905-803-3425

From: Sheeba Paul [<mailto:spaul@hgcengineering.com>]
Sent: Wednesday, August 01, 2012 11:00 AM
To: Orest Rojik
Subject: re: Train Traffic Data Request

Hi Orest,

HGC Engineering is performing a noise study for a proposed development at 1136 Dupont Street, Toronto, Ontario. The railway line abuts the property to the north. A Google link is attached for your reference.

<http://maps.google.ca/maps?q=1136+Dupont+Street,+Toronto,+ON&hl=en&ll=43.669742,-79.437976&spn=0.004579,0.010332&sll=43.341722,->

79.795246&sspn=0.036829,0.082655&oq=1136+Dupont+&gl=ca&hnear=1136+Dupont+St,+Toronto,+Ontario+M6H+2A2&t=h&z=17

Typically we need daytime volumes, night-time volumes, number of locomotives, number of cars, speed of trains, speed and whistle information.

We have some rail traffic data for this railway line in our files (from a project at Avenue and Davenport). The data is attached.

Please review and let me know if we need new data.

Also, we need to perform vibration measurements on the site. Do you have an idea when the trains go by more frequently? Morning, afternoon or evening?

Thank you.

Ms. Sheeba Paul, MEng. PEng.



HGC Engineering
Howe Gastmeier Chapnik Limited
2000 Argentia Road
Plaza One, Suite 203
Mississauga, Ontario, Canada L5N 1P7
Phone (905) 826-4044
Fax (905) 826-4940

----- IMPORTANT NOTICE - AVIS IMPORTANT ----- Computer viruses can be transmitted via email. Recipient should check this email and any attachments for the presence of viruses. Sender and sender company accept no liability for any damage caused by any virus transmitted by this email. This email transmission and any accompanying attachments contain confidential information intended only for the use of the individual or entity named above. Any dissemination, distribution, copying or action taken in reliance on the contents of this email by anyone other than the intended recipient is strictly prohibited. If you have received this email in error please immediately delete it and notify sender at the above email address. Le courrier électronique peut être porteur de virus informatiques. Le destinataire doit donc passer le présent courriel et les pièces qui y sont jointes au détecteur de virus. L'expéditeur et son employeur déclinent toute responsabilité pour les dommages causés par un virus contenu dans le courriel. Le présent message et les pièces qui y sont jointes contiennent des renseignements confidentiels destinés uniquement à la personne ou à l'organisme nommé ci-dessus. Toute diffusion, distribution, reproduction ou utilisation comme référence du contenu du message par une autre personne que le destinataire est formellement interdite. Si vous avez reçu ce courriel par erreur, veuillez le détruire immédiatement et en informer l'expéditeur à l'adresse ci-dessus. -----
----- IMPORTANT NOTICE - AVIS IMPORTANT -----



**CANADIAN
PACIFIC**

Real Estate

Suite 800
1290 Central Parkway West
Mississauga ON
L5C 4R3

Fax (905) 803-3228

July 7, 2010

HGC Engineering
2000 Argentia Road
Plaza One, Suite 203
Mississauga, ON L5N 1P7

Attention: Sheeba Paul, PEng

Dear Madam:

RE: CPR RAIL TRAFFIC – NORTH TORONTO

This has reference to your letter requesting rail traffic data in the vicinity of Avenue Road and Dupont Street in the City of Toronto. For your information, the study area is in proximity of our North Toronto Subdivision, which is classified as a principal main line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 31 trains
Number of freight trains between 2300 & 0700: 15 trains
2. Number of freight cars per train: 41 average (140 maximum)
Number of locomotives per train: 2 average (5 maximum)
3. Whistle signals are not routinely sounded through the study area.
4. Maximum permissible speed: 45 mph for eastbound trains
5. The double track on this corridor is comprised of continuously welded rail.

The information provided is based on average rail traffic and variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer demands.

Yours truly,

Orest Rojik
Area Manager Support

(905) 803-3425
e-mail: orest_rojik@cpr.ca

By e-mail



**CANADIAN
PACIFIC**
OFFICIAL SUPPORTER

APPENDIX B

Rail Guidelines



ACOUSTICS



NOISE



VIBRATION



CANADIAN PACIFIC RAILWAY

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.
-



PRINCIPAL MAIN LINE REQUIREMENTS

- A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 30 metres in conjunction with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.5 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.
- B. Noise attenuation barrier shall be adjoining and parallel to the railway rights-of-way, having returns at the ends, and a minimum total height of 5.5 metres above top-of-rail. Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre of surface area. Subject to the review of the noise report, GO Transit may consider other measures recommended by an approved Noise Consultant.
- C. Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ± 3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.
- D. The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.
- E. The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way.

Warning: The Greater Toronto Transit Authority, carrying on business as GO Transit, and its assigns and successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that GO Transit or any railway entering into an agreement with GO Transit to use the right-of-way or their assigns or successors as aforesaid may expand their 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 dwelling(s). GO Transit will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way.

- F. Any proposed alterations to the existing drainage pattern affecting the railway right-of-way must receive prior concurrence from GO Transit and be substantiated by a drainage report to the satisfaction of GO Transit.
- G. The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the safety berm, fencing and vibration isolation measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of GO Transit.
- H. The Owner enter into an Agreement stipulating how GO Transit's concerns will be resolved and will pay GO Transit's reasonable costs in preparing and negotiating the agreement.
- I. The Owner may be required to grant GO Transit an environmental easement for operational emissions, registered on title against the subject property in favour of GO.

APPENDIX C

Road Traffic Data



ACOUSTICS



NOISE



VIBRATION

24-Hour Count Summary Report

DON MILLS RD	STAT CODE	ARTERY CODE	COUNT DATE	AM PFAK	AM PFAK HOUR	PM PFAK	PM PFAK HOUR	OFF HOUR PFAK	OFF HOUR PFAK HOUR	24 HOUR Total
Northbound		Category: 24 HOUR								
DON MILLS RD N/B S OF EGLINTON AVE	2340	2340	3/11/10 Thu	1,334	08:00 - 09:00	2,037	16:00 - 17:00	1,727	14:30 - 15:30	21,330
				Northbound Total:		<u>1,334</u>	<u>2,037</u>	<u>1,727</u>		<u>21,330</u>
				Northbound Average:		<u>1,334</u>	<u>2,037</u>	<u>1,727</u>		<u>21,330</u>
Southbound		Category: 24 HOUR								
DON MILLS RD S/B N OF EGLINTON AVE	2341	2341	3/11/10 Thu	1,696	08:15 - 09:15	1,628	17:15 - 18:15	1,230	10:30 - 11:30	18,939
				Southbound Total:		<u>1,696</u>	<u>1,628</u>	<u>1,230</u>		<u>18,939</u>
				Southbound Average:		<u>1,696</u>	<u>1,628</u>	<u>1,230</u>		<u>18,939</u>
DON MILLS RD				<u>3,030</u>		<u>3,665</u>		<u>2,957</u>		<u>40,269</u>
Comment:										

Turning Movement Count Summary Report

EGLINTON AVE AT LESLIE ST (PX 453)

Survey Date: 2014-May-03 (Saturday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND					EASTBOUND					SOUTHBOUND					WESTBOUND					Peds	Bike	Other	
		Exits	Left	Thru	Right	Total	Exits	Left	Thru	Right	Total	Exits	Left	Thru	Right	Total	Exits	Left	Thru	Right	Total				
08:30-09:30 AM PEAK	CAR	813	0	0	0	0	967	505	713	0	1,218	0	254	0	675	929	1,520	0	845	308	1,153	N	14	23	0
	TRK	15	0	0	0	0	17	11	11	0	22	0	6	0	18	24	37	0	19	4	23	S	0	0	0
	BUS	6	0	0	0	0	9	6	9	0	15	0	0	0	7	7	22	0	15	0	15	E	13	3	0
TOTAL:		834	0	0	0	0	993	522	733	0	1,255	0	260	0	700	960	1,579	0	879	312	1,191				
16:00-17:00 PM PEAK	CAR	1,335	0	0	0	0	1,750	951	1,253	0	2,204	0	497	0	849	1,346	1,898	0	1,049	384	1,433	N	8	0	0
	TRK	6	0	0	0	0	13	2	7	0	9	0	6	0	4	10	7	0	3	4	7	S	0	0	0
	BUS	10	0	0	0	0	17	9	16	0	25	0	1	0	9	10	28	0	19	1	20	E	6	0	0
TOTAL:		1,351	0	0	0	0	1,780	962	1,276	0	2,238	0	504	0	862	1,366	1,933	0	1,071	389	1,460				
OFF HR AVG	CAR	1,152	0	0	0	0	1,638	813	1,197	0	2,010	0	441	0	848	1,289	2,000	0	1,152	339	1,491	N	11	5	0
	TRK	18	0	0	0	0	24	9	13	0	22	0	11	0	8	19	16	0	8	9	17	S	0	0	0
	BUS	10	0	0	0	0	17	9	16	0	25	0	1	0	10	11	27	0	17	1	18	E	8	1	0
TOTAL:		1,180	0	0	0	0	1,679	831	1,226	0	2,057	0	453	0	866	1,319	2,043	0	1,177	349	1,526				
07:30-09:30 2 HR AM	CAR	1,318	0	0	0	0	1,631	793	1,163	0	1,956	0	468	0	1,205	1,673	2,593	0	1,388	525	1,913	N	22	23	0
	TRK	34	0	0	0	0	32	21	16	0	37	0	16	0	27	43	68	0	41	13	54	S	0	0	0
	BUS	12	0	0	0	0	16	12	16	0	28	0	0	0	12	12	33	0	21	0	21	E	14	3	0
TOTAL:		1,364	0	0	0	0	1,679	826	1,195	0	2,021	0	484	0	1,244	1,728	2,694	0	1,450	538	1,988				
16:00-18:00 2 HR PM	CAR	2,438	0	0	0	0	3,392	1,725	2,406	0	4,131	0	986	0	1,654	2,640	3,745	0	2,091	713	2,804	N	13	0	0
	TRK	12	0	0	0	0	27	5	14	0	19	0	13	0	8	21	15	0	7	7	14	S	0	0	0
	BUS	24	0	0	0	0	32	23	31	0	54	0	1	0	17	18	49	0	32	1	33	E	11	1	0
TOTAL:		2,474	0	0	0	0	3,451	1,753	2,451	0	4,204	0	1,000	0	1,679	2,679	3,809	0	2,130	721	2,851				
07:30-18:00 8 HR SUM	CAR	8,365	0	0	0	0	11,573	5,771	8,356	0	14,127	0	3,217	0	6,249	9,466	14,334	0	8,085	2,594	10,679	N	77	41	0
	TRK	118	0	0	0	0	152	63	80	0	143	0	72	0	66	138	147	0	81	55	136	S	0	0	0
	BUS	75	0	0	0	0	116	72	112	0	184	0	4	0	67	71	189	0	122	3	125	E	57	8	0
TOTAL:		8,558	0	0	0	0	11,841	5,906	8,548	0	14,454	0	3,293	0	6,382	9,675	14,670	0	8,288	2,652	10,940				

Total 8 Hour Vehicle Volume: 35,069

Total 8 Hour Bicycle Volume: 53

Total 8 Hour Intersection Volume: 35,122

Comment: COUNTED DURING DVP CLOSURE MAY 3, 2014