HGC ENGINEERING

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Noise and Vibration Impact Study
Proposed Residential Development
1110 Lorne Park Road
City of Mississauga, Ontario

Prepared for:

Jacan Construction
1860 Appleby Line, Unit 28
Burlington, Ontario
L7L 0B7

Prepared by

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Reviewed by

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April 12, 2019

Project No. 01800688

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1 Introduction & Summary

HGC Engineering was retained by Jacan Construction Ltd. to conduct a noise and vibration impact study for a proposed townhouse development to be located at 1110 Lorne Park Road, west of Albertson Crescent, in Mississauga, Ontario. The proposed development will consist of one block of townhouse units for a total of seven dwelling units and associated driveways. Lands surrounding the subject site are primarily existing residential and commercial uses. The study is required by the City of Mississauga as part of the planning and approvals process.

This study reflects the latest plans provided by Eugene Kuan Architect dated April 3, 2019 ("Reissued As Per Planner's Comments") and incorporates comments from a recent meeting with City of Mississauga staff.

The primary sources of noise impacting the site were determined to be road traffic on Lorne Park Road and rail traffic on the GO Transit/Metrolinx railway line. Ultimate average annual daily traffic (AADT) data was obtained from the City of Mississauga. Rail traffic data was obtained from GO Transit/Metrolinx and from HGC Engineering files for recent projects in the area. Relevant traffic data was used to predict future traffic sound levels at the locations of the proposed residential dwelling facades. The predicted sound levels were compared to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP) and the Municipality to develop noise control recommendations.

The sound level predictions indicate that noise control measures need to be incorporated into the building envelope design such that indoor sound levels will comply with the MECP noise criteria. The recommended noise control measures include appropriate external wall (brick or masonry) and window glazing assemblies, and air-conditioning of residential units so that windows can be kept closed. Warning clauses are also recommended to inform future occupants of the traffic noise impacts and the presence of nearby commercial/retail facilities. Further refinement of the glazing areas, refining fixed and sealed versus operable windows, may be required to achieve the required STC for the glazing constructions.

Ground-borne vibration measurements of five GO Train pass-bys were performed on September 27, 2018 at the location of the closest proposed dwelling façade near the

GO Transit/Metrolinx railway. Measured vibration levels were found to be below GO Transit/Metrolinx railway criteria for westbound train pass-bys and exceed the criteria for eastbound train pass-bys. Vibration mitigation measures are not recommended in this case since the momentary excess is minor in nature. A vibration warning clause should be included in the property and tenancy agreements of the dwelling units to inform the future owners and tenants of the possible momentary vibration excesses during rail passbys.

2 Site Description & Noise Sources

The proposed residential development is located south of Lorne Park Road and west of Albertson Crescent, specifically at 1110 Lorne Park Road, in the City of Mississauga, Ontario. Figure 1 shows a key plan of the subject site. A site plan prepared by Eugene Kuan Architect dated April 3, 2019 ("Reissued As Per Planner's Comments") is shown in Figure 2. The proposed development will consist of 1 block of 3-storey townhouse units for a total of seven dwelling units and associated parking areas. A concrete crash wall 2.5 m in height above grade is proposed along the west of the subject site. Appendix A includes building elevations, floor plans and building sections and the derailment protection plan.

A site visit was made by HGC Engineering personnel in September 2018 to make observations of the acoustic environment, to identify the significant noise sources in the vicinity, and to conduct ground-borne vibration measurements. The acoustical environment surrounding the site is urban in nature. There are existing residences to the west, south and southeast. There are existing commercial uses to the east, north and northwest of the subject site. The site is currently vacant. Road traffic on Lorne Park Road and rail traffic on the GO Transit/Metrolinx Lakeshore West line were confirmed to be the primary sources of sound impacting the site. Lorne Park Road consists of one lane in each direction. The railway right of way is to be located approximately 25 m to the west of the closest proposed residential building façade. To the east is the M Salon and Spa, Rankin Automotive and Athans Kitchen. It should be noted that there are existing residences closer to these commercial uses than the proposed residential development. North of the site is a large commercial building with Cuda's Tap and Grill and Forever Blooming Florists closest to the proposed development. Noise from these commercial uses were not audible at the time of the site visit, nonetheless, a noise warning clause is recommended in Section 5.5 to inform future occupants of the presence of nearby

commercial uses and that sounds may be times be audible. There are no other significant sources of stationary noise within 500 m of the subject site. Since the proposed development is located less than 75 m away from a railway right-of-way, a vibration study has been conducted.

3 Noise Level Criteria

3.1 Road and Rail Traffic Noise

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

Table I: MECP Road and Rail Traffic Noise Criteria [dBA]

Space	Daytime L_{EQ} (16 hour) Road/Rail	Nighttime L_{EQ}(8 hour) Road/Rail
Outdoor Living Areas	55 dBA	--
Inside Living/Dining Rooms	45 dBA / 40 dBA	45 dBA / 40 dBA
Inside Bedrooms	45 dBA / 40 dBA	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, a backyard, a terrace or other area where passive recreation is expected to occur. Balconies that are less than 4 m in depth are not considered to be outdoor living areas under MECP guidelines.

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

Indoor guidelines for rail noise are 5 dBA more stringent 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 all dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of bedroom or living/dining room window sound level is greater than 55 dBA due to nighttime and greater than 60 dBA during the daytime hours due to rail traffic noise.

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

Railway guidelines recommend brick veneer or masonry exterior walls 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.

The railways also provide minimum requirements for safety as well as sound and vibration for proposed residential developments located adjacent to their rights-of-way. These refer to minimum required setbacks, berms, fencing and warning clauses. The reader is referred to a copy of GO/Metrolinx requirements for a new development adjacent to a principal main line, which is located in Appendix B.

3.2 Rail Vibration

Guidelines published by the railway authorities require that a vibration assessment be performed for any dwelling within 75 m of a railway right-of-way. GO Transit/Metrolinx guidelines require

measurements of ground-borne vibration when residential dwelling units are to be located within 75 metres of a principal main line.

Vibration is typically measured in terms of oscillatory velocity or acceleration. The GO Transit/Metrolinx guidelines recommend that ground-borne vibration be limited to a vibratory velocity of 0.14 mm/s (17 dB) between 4 and 200 Hz. The limits for acceptable ground-borne vibration are presented as a curve of maximum allowable vibratory acceleration versus frequency. The GO Transit/Metrolinx criteria have been overlaid on the graphs of measured vibration for reference (Figures 3 to 7). GO Transit/Metrolinx guidelines are included in Appendix B.

4 Traffic Noise Assessment

4.1 Road Traffic Data

Road traffic information for Lorne Park Road was obtained from the City of Mississauga, in the form of ultimate AADT values, and is provided in Appendix C. An ultimate AADT of 6 680 vehicles per day, along with a speed limit of 50 km/h, was applied to Lorne Park Road. A commercial vehicle percentage of 2.0% was used in the analysis and was further split into 0.9% and 1.1% for medium and heavy trucks, respectively. Table II summarizes the traffic volume data used in this study.

Table II: Ultimate Road Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Lorne Park Road	Daytime	5 892	54	66	6 012
	Nighttime	655	6	7	668
	Total	**6 546**	**60**	**73**	**6 680**

4.2 Rail Traffic

Rail traffic data for the GO Transit/Metrolinx railway (Oakville Subdivision) was obtained from HGC Engineering project files GO Transit/Metrolinx personnel and is provided in Appendix B in the form of 10 year projected values. Correspondence with Canadian National Railway (CN) included in Appendix B indicated that CN trains no longer operate on this rail line. This rail line is used for passenger trains and is classified as a principal main line. The maximum train speed

passenger trains is 153 kph (95 mph). The maximum allowable speed input in STAMSON 5.04, a computer algorithm developed by the MECP, is 150 kph and was used in the analysis. In conformance with GO Transit assessment requirements, the maximum speeds, maximum number of cars and locomotives per train were used in the traffic noise analysis to yield a worst case estimate of train noise. Table III summarises the rail traffic data used in the analysis.

Table III: Rail Traffic Data Projected to Year 2029

Type of Train	Number of Trains Day/ Night	Number of locomotives	Number of cars	Max Speed (KPH)*
Passenger	20.3 / 4.3	2	10	153
GO (Diesel)	45.0 / 9.0	1	12	153
GO (Electric)	147.0 / 37.0	1	12	153

Note: *The maximum allowable speed input in STAMSON is 150 kph and was used in the analysis.

4.3 Traffic Noise Predictions

To assess the levels of road and rail traffic noise which will impact the study area in the future, sound level predictions were made using STAMSON version 5.04. A sample STAMSON output is included in Appendix D.

Sound levels were predicted at the plane of the top storey bedroom and/or living/dining room windows during daytime and nighttime hours to investigate ventilation requirements. Prediction locations were chosen around the residential site to obtain a representation of the future sound levels at various dwellings as shown in Figure 2. The results of these predictions are summarized in Tables IV and V.

The distance setbacks of the dwellings indicated on the site plan were used in the analysis along with the distance of the units to the roadway and railway. The acoustic recommendations may be subject to modifications if the site plan is changed significantly.

Table IV: Daytime Predicted Future Sound Levels [dBA], Without Mitigation

Unit No.	Description	Daytime - at Façade $L_{EQ(16)}$		Daytime - at Façade Total $L_{EQ(16)}$
		Road	Rail	
1	Backing exposure to railway and flanking Lorne Park Road	57*	73	73
2	Backing exposure to railway and some exposure to Lorne Park Road	56	72	72
4	Backing exposure to railway and some exposure to Lorne Park Road	<55	71	71
5	Backing exposure to railway and some exposure to Lorne Park Road	<55	70	70
7	Backing exposure to railway and some exposure to Lorne Park Road	<55	69	69

Note:
* Adjusted for distance

Table V: Nighttime Predicted Future Sound Levels [dBA], Without Mitigation

Unit No.	Description	Nighttime - at Façade $L_{EQ(8)}$		Nighttime - at Façade Total $L_{EQ(8)}$
		Road	Rail	
1	Backing exposure to railway and flanking Lorne Park Road	51*	69	69
2	Backing exposure to railway and some exposure to Lorne Park Road	<50	68	68
4	Backing exposure to railway and some exposure to Lorne Park Road	<50	67	67
5	Backing exposure to railway and some exposure to Lorne Park Road	<50	66	66
7	Backing exposure to railway and some exposure to Lorne Park Road	<50	65	65

Note:
* Adjusted for distance

5 Traffic Noise Recommendations

The predictions indicate that the future traffic sound levels from the railway and Lorne Park Road will exceed MECP guidelines at all the proposed townhouse units. The following discussion outlines recommendations for ventilation requirements, upgraded building façade constructions and warning clauses to achieve the noise criteria stated in Table I.

5.1 Outdoor Living Areas

The proposed dwelling units have second floor balconies that are less than 4 m in depth. These areas are not considered outdoor living areas under MECP guidelines, and therefore physical mitigation will not be required. Since there is no access from the basement to the ground level area at the rear of the dwellings, access stairs are provided from the second floor balconies to the ground level area.

A crash wall is also proposed along the west of the site as indicated in the site plan. A derailment protection plan is also provided in Appendix A.

5.2 Indoor Living Areas & Ventilation Requirements

Central Air Conditioning

The predicted sound levels outside the top storey windows of all the dwelling units will be greater than 65 dBA during the daytime hours and greater than 60 dBA during nighttime hours due to rail traffic. Central air conditioning systems are required for all the dwelling units in the proposed development so that windows may remain closed. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-300, as applicable.

5.3 Building Façade Constructions

Future sound levels at the facades of all the proposed dwelling units will exceed 60 dBA during daytime hours and 55 dBA during nighttime hours due to rail traffic. MECP guidelines recommend that the windows, walls and doors be designed so that the indoor sound levels comply with MECP noise criteria.

Floor plans and elevation drawings prepared by Eugene Kuan Architect dated June 5, 2018 were reviewed by HGC Engineering and are attached in Appendix A. Calculations have been performed to determine building envelope constructions required to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC), and are based on the predicted outdoor sound levels and the area of the exposed facade components (walls, doors and windows) relative to the floor area of the adjacent room.

Exterior Wall Construction

Brick or masonry exterior walls are indicated on the elevation drawings provided. This exterior wall construction is sufficient to meet the interior sound levels. Any insulated metal exterior door meeting OBC requirements will be sufficient to provide noise insulation. Where sliding patio doors are indicated, these have been included in the window area.

5.3.1 Acoustical Requirements for Glazing

According to the floor plans and building elevations, both the living/dining/family rooms and bedrooms will have window to floor area ratios up to 23% of the room floor area. All windows are proposed to be operable according to correspondence with the project team. The STC requirements may be reduced with the use of inoperable or fixed windows for a portion of the windows. The minimum acoustical requirement (STC) for the glazing elements, including glass in fixed sections, is provided in the following table.

Table VI: Required Minimum Sound Transmission Class (STC)

Unit	Space	STC
1	Master Bedroom	OBC
	Bedrooms	39
	Living Rooms	36
2	Master Bedroom	OBC
	Bedrooms	37
	Living Rooms	37
3 – 4	Master Bedroom	OBC
	Bedrooms	36
	Living Rooms	36
5	Master Bedroom	OBC
	Bedrooms	36
	Living Rooms	35
6 – 7	Master Bedroom	OBC
	Bedrooms	34
	Living Rooms	34

Note: Assuming the entire window is operable.

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

Table VII: Glazing Assemblies for STC Requirements

STC Requirement	Glazing Configuration (STC)
28 – 29	OBC
30 – 31	3(13)3
32 – 33	4(10)4
34	4(19)4
35/36	6(10)4, 5(16)4
37	6(13)4, 6(20)5
39	6L(13)6

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

Additional Analysis

Further refinement of the glazing areas or fixed and sealed versus operable windows may be required to achieve the required STC for the glazing constructions.

5.4 Vibration Measurements

GO Transit/Metrolinx requires an assessment of ground-borne vibration through measurement if building foundations are to be located within 75 metres of the right-of-way.

Measurements of five train pass-bys were performed at the anticipated location of the closest dwelling, approximately 25 m from the railway right of way. The results of the measurements are presented in Figures 3 to 7. Table VIII shows the maximum RMS vibration velocity measurements during each of the train pass-bys.

Table VIII: Peak Vibration Measurements of Train Pass-bys

Train Pass-by	Type of Train	Measured Vibration Level (mm/s)	Criteria (mm/s)
1	GO Train (Eastbound)	0.18	0.14
2	GO Train (Westbound)	0.09	0.14
3	GO Train (Eastbound)	0.18	0.14
4	GO Train (Westbound)	0.09	0.14
5	GO Train (Eastbound and Westbound)	0.18	0.14

The results indicate that vibration levels exceed the GO Transit/Metrolinx criteria from eastbound trains pass-bys and are below the criteria for westbound train pass-bys. On average, the vibration levels from eastbound and westbound train pass-bys are at the GO Transit/Metrolinx criteria at the location of the closest residential façade. Vibration mitigation measures are not required for the proposed development in this case since the momentary excess from eastbound trains is minor in nature. A vibration warning clause should be included in the property and tenancy agreements of the closest dwelling units to inform the future owners and tenants of the possible vibration excesses as indicated in Section 5.5.

5.5 Warning Clauses

The MECP guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for all townhouse units. The following noise warning clauses are required for specific units as indicated in Table IX.

Suggested wording for future dwellings with sound levels exceeding the MECP criteria is given below:

Type 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 and rail traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.

A suitable wording for future dwellings requiring central air conditioning systems is given below.

Type 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 sound level limits of the Municipality and the Ministry of Environment, Conservation and Parks.

Suggested wording for dwelling units near existing commercial facilities is as follows:

Type C:

> Purchasers/tenants are advised that due to the proximity of the adjacent existing commercial uses, noise from these facilities at times be audible.

Suggested wording for future dwellings where vibration excesses is given below.

Type D:

> Purchasers/tenants are advised that due to the proximity of this dwelling to the nearby railway tracks, vibration from rail pass-bys will occasionally be perceptible within this unit.

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

GO Transit's standard warning clause for residential developments located within 300 m of a railway right-of-way (principal main line) is given below.

Type E:

> Warning: Metrolinx, carrying on business as GO Transit, and its assigns and successors in interest are the owners of lands within 300 metres from the land which is the subject hereof. In addition to the current use of the lands owned by Metrolinx, there may be alterations to or expansions of the rail and other facilities on such lands in the future including the possibility that GO Transit or any railway entering into an agreement with GO Transit to use the Metrolinx lands or Metrolinx and their respective 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 dwellings. Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under its lands.

6 Summary & Recommendations

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

1. A concrete crash wall 2.5 m in height above grade is proposed along the west of the subject site.

2. Central air conditioning is required for all the townhouse units in the proposed development. The location, installation and sound rating of the outdoor condensing units must be compliant with MECP Guideline NPC-300, as applicable.

3. Upgraded glazing constructions will be required for all the dwelling units in the development. Further refinement of the glazing areas or fixed and sealed versus operable windows may be required to achieve the required STC for the glazing constructions. Masonry or brick exterior wall will be required for the exterior facades with exposure to the railway, as indicated in the elevation drawings provided.

4. Noise warning clauses to inform the occupants of the sound level excesses should be placed in the property and tenancy agreements and offers of purchase and sale. The affected townhouse units and appropriate warning clauses are shown in Table IX.

Table IX: Summary of Noise Control Requirements and Noise Warning Clauses

Unit No.	Acoustic Barrier	Ventilation Requirements+	Type of Warning Clause	Exterior Wall Construction	Upgraded Glazing Construction
1	++	Central A/C	A, B, C, D, E	*Brick or masonry equivalent	LRDR: STC-36 MBR - OBC BR: STC-39
2					LRDR: STC-37 MBR - OBC BR: STC-37
3 – 4					LRDR: STC-36 MBR - OBC BR: STC-36
5					LRDR: STC-35 MBR - OBC BR: STC-36
6 – 7					LRDR: STC-34 MBR - OBC BR: STC-34

Notes:
-- no specific requirement
OBC – meeting the minimum requirements of the Ontario Building Code
+ The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.
++ A concrete crash wall 2.5 m in height above grade is proposed along the west of the subject site.
* Brick veneer or masonry exterior construction are required for the façades of the dwelling units with exposure to the railway, as indicated in the elevation drawings.
LRDR – Living room/dining room
MBR – Master Bedroom
BR – Bedroom

6.1 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, installed and constructed.

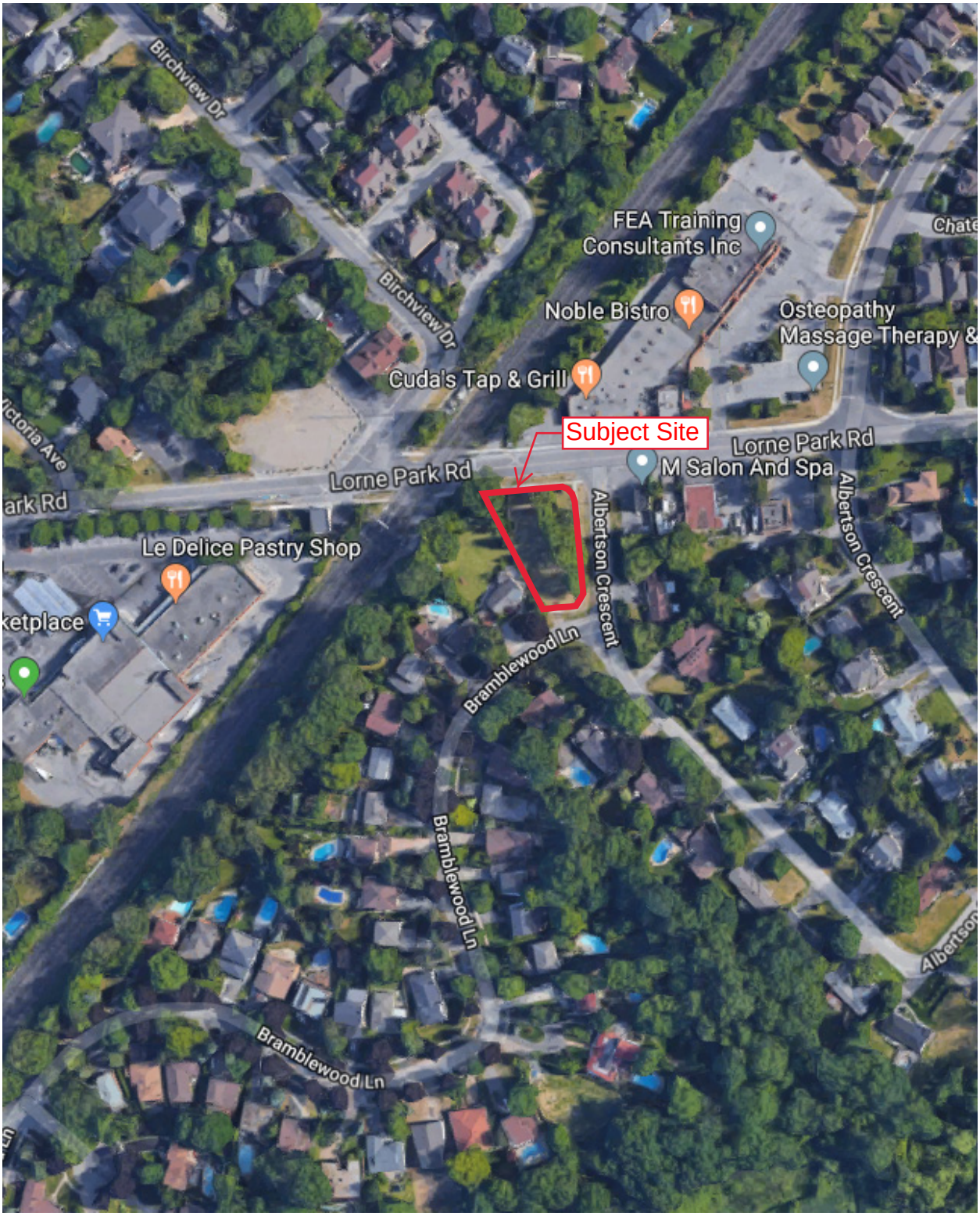
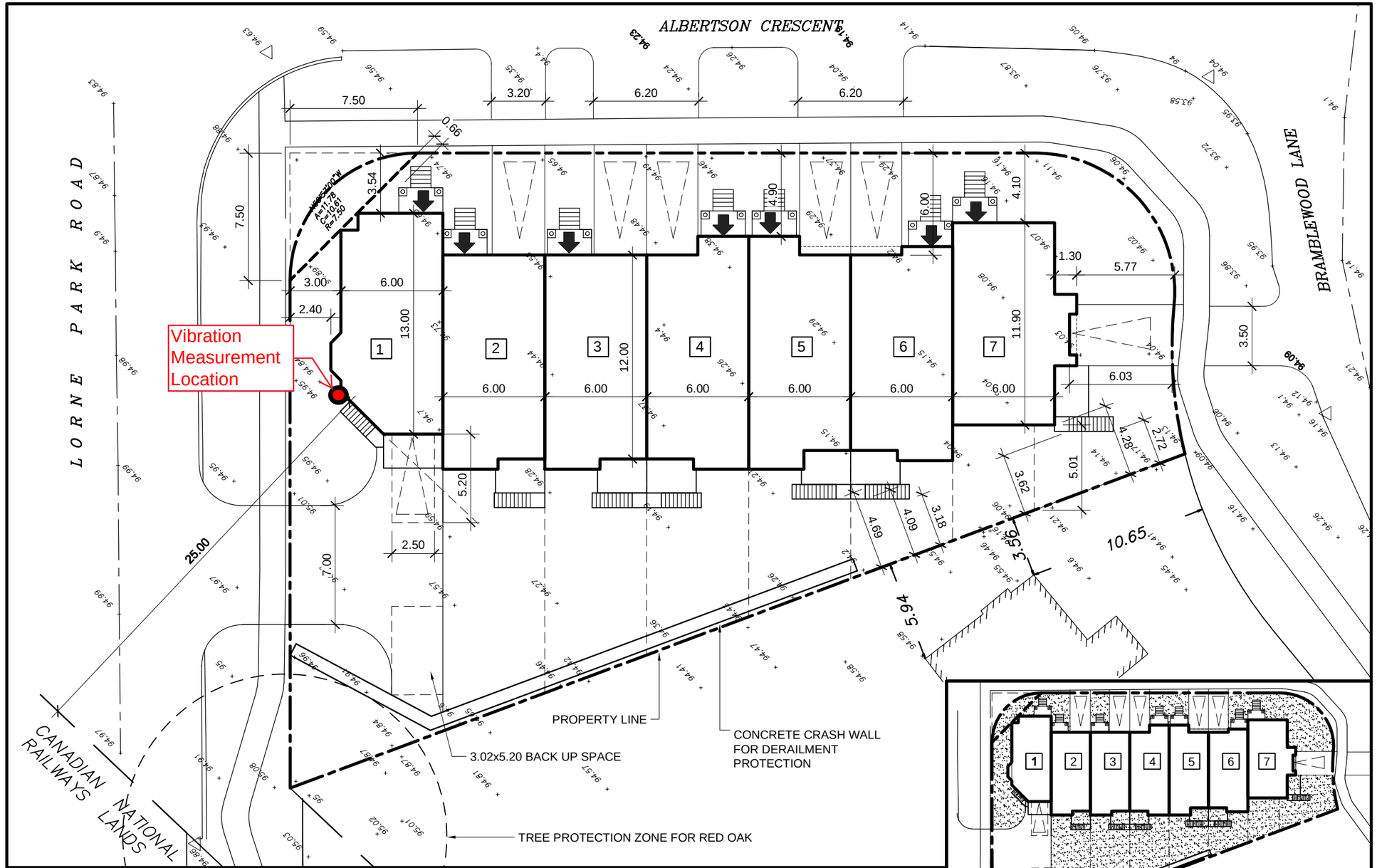


Figure 1: Key Plan



1 / A1 SITE PLAN
SC. 1:250

2 / A1 LANDSCAPING AREA
NTS

DRAWING INDEX

A1	SITE PLAN	A7	FLOOR PLANS
A2	1ST FLOOR LAYOUT	A8	FLOOR PLANS
A3	ROOF PLAN	A9	FLOOR PLANS
A4	FLOOR PLANS	A10	ELEVATIONS
A5	FLOOR PLANS	A11	ELEVATIONS, BUILDING SECTION
A6	FLOOR PLANS	A12	BUILDING SECTION

PROJECT DATA

PROPOSED 7 TOWNHOUSES

LOT AREA	1413.3 M²	
COVERAGE	527.19 M²	37.30%
LANDSCAPE	634.49 M²	44.89%
TOTAL GFA	1,468 M²	

LOT AREA PER UNIT:

UNIT 1	308.75 M²
UNIT 2	197.32 M²
UNIT 3	183.87 M²
UNIT 4	170.44 M²
UNIT 5	156.99 M²
UNIT 6	143.54 M²
UNIT 7	252.39 M²

NOTE: COVERAGE EXCLUDES FRONT PORCHES & BALCONIES

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	05/06/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018
4	REISSUED AS PER PLANNER'S COMMENTS	28/02/2019
5	REISSUED AS PER PLANNER'S COMMENTS	02/04/2019
6	REISSUED AS PER PLANNER'S COMMENTS	03/04/2019

SEAL

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PROJECT

PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

SITE PLAN,
PROJECT DATA

SCALE
AS SHOWN

DRAWN: MD	DATE: MARCH 2017
CHECKED: EK	APPROVED: EK
PROJECT: 1705	SHEET NO.: A1

Figure 2: Proposed Site Plan Showing Vibration Measurement Location

Figure 3a: Pass-by 1 (Eastbound)
Measured Vibratory Velocity Level

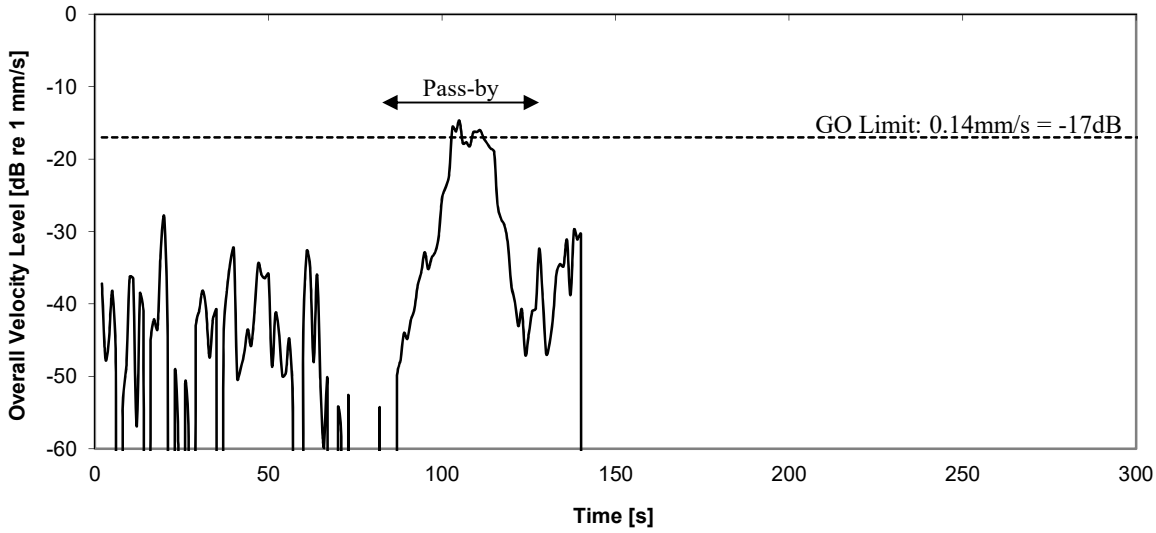


Figure 3b: Pass-by 1 (Eastbound)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

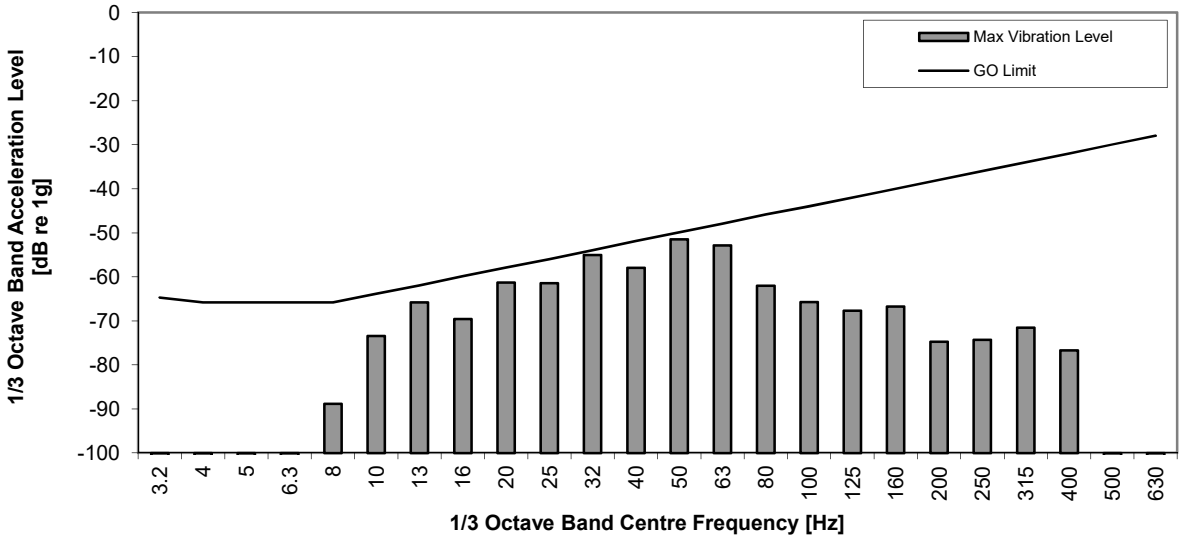


Figure 4a: Pass-by 2 (Westbound)
Measured Vibratory Velocity Level

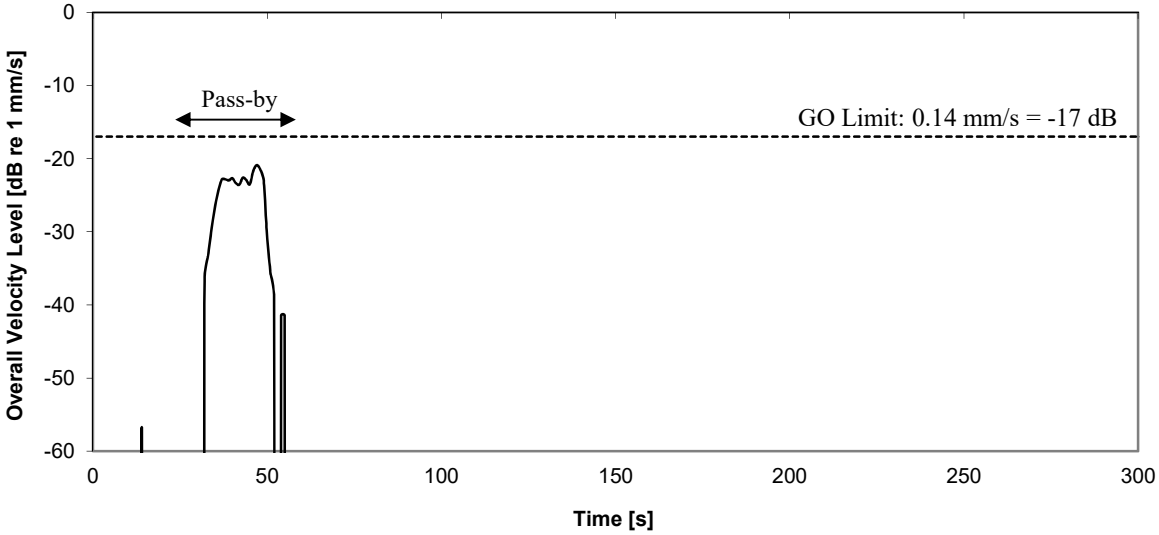


Figure 4b: Pass-by 2 (Westbound)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

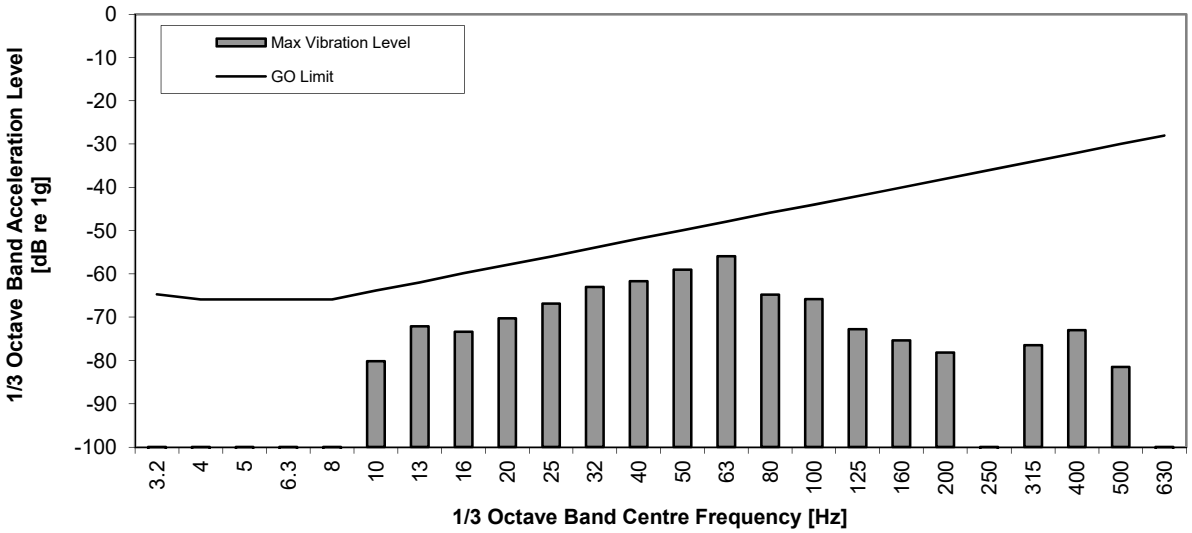


Figure 5a: Pass-by 3 (Eastbound)
Measured Vibratory Velocity Level

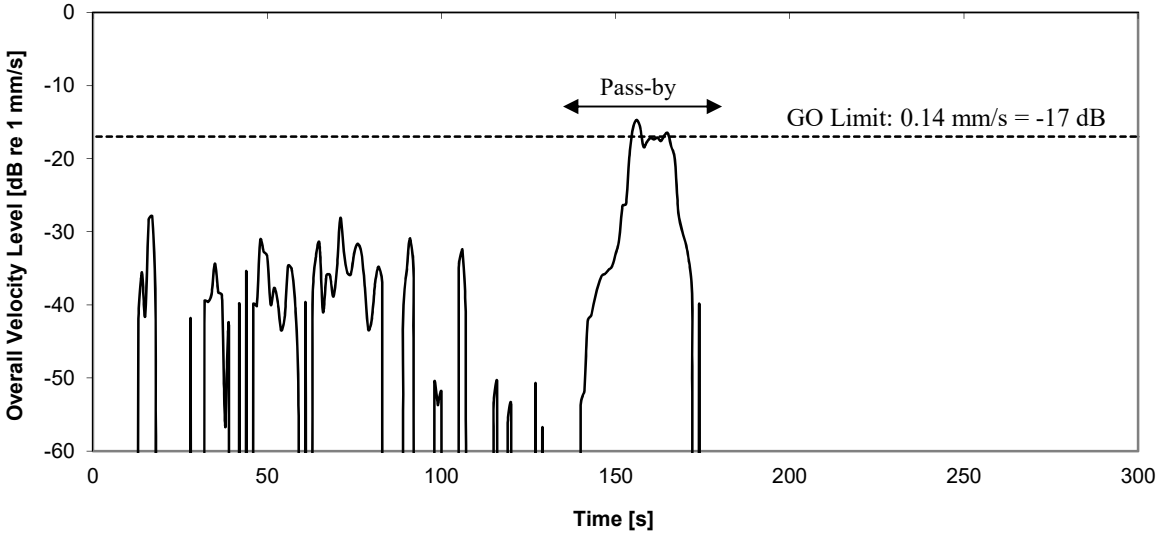


Figure 5b: Pass-by 3 (Eastbound)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

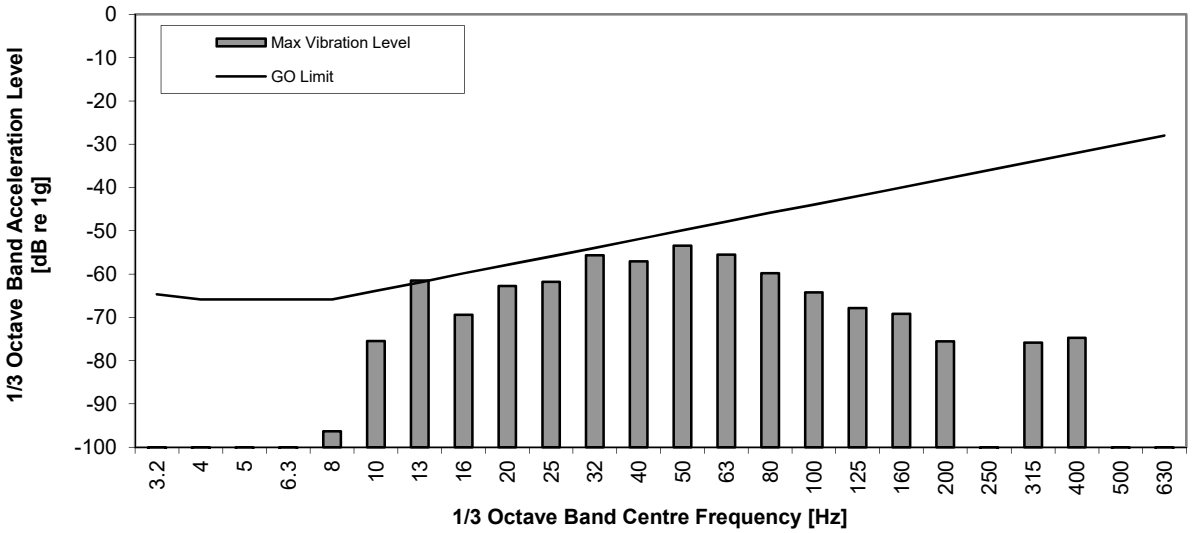


Figure 6a: Pass-by 4 (Westbound)
Measured Vibratory Velocity Level

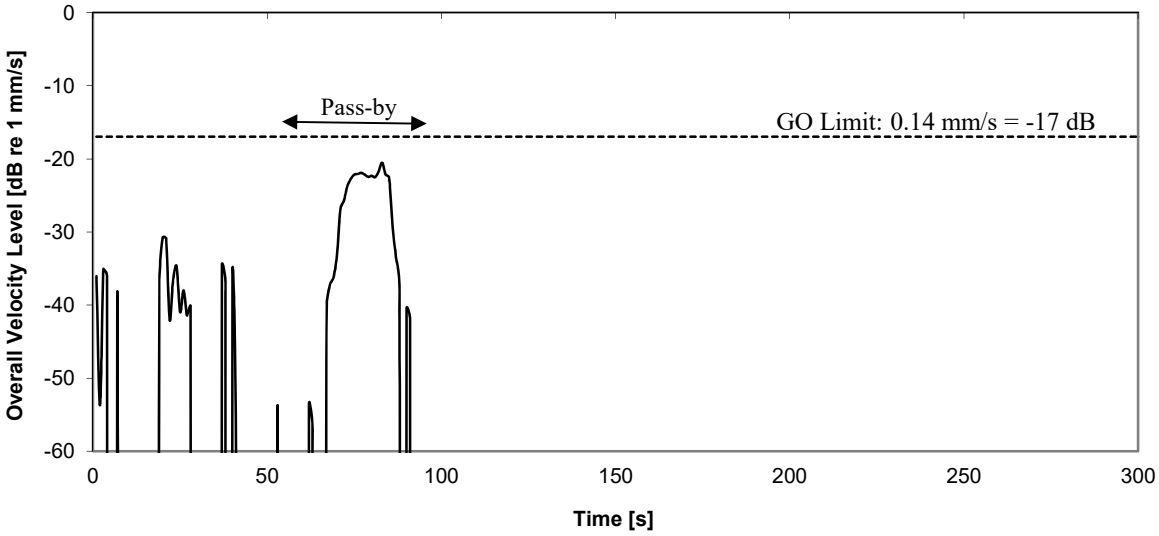


Figure 6b: Pass-by 4 (Westbound)
Acceleration Spectrum @ Peak Level (1 sec. Duration)

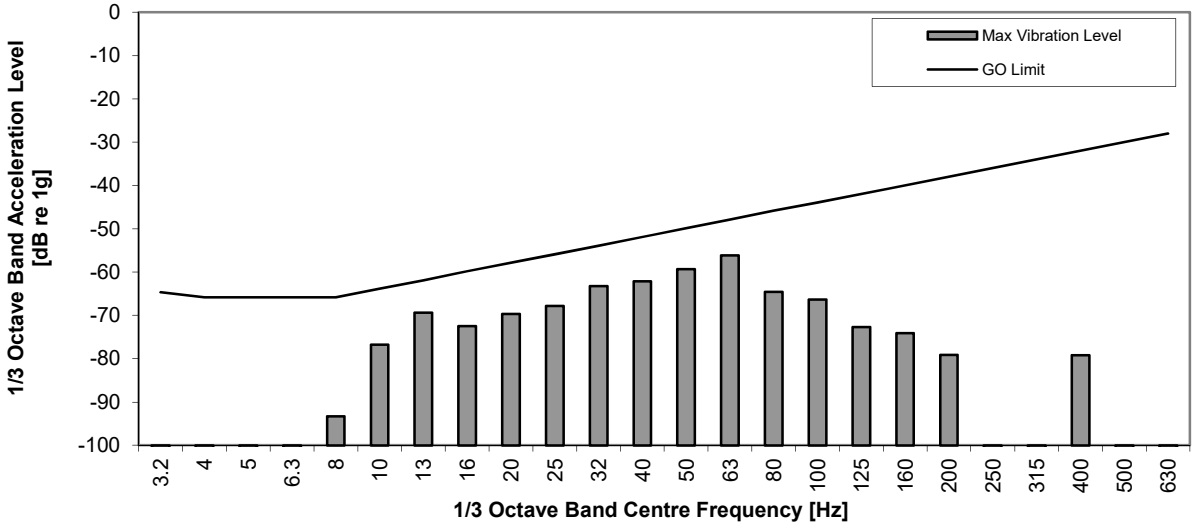


Figure 7a: Pass-by 5 (Eastbound&Westbound)
Measured Vibratory Velocity Level

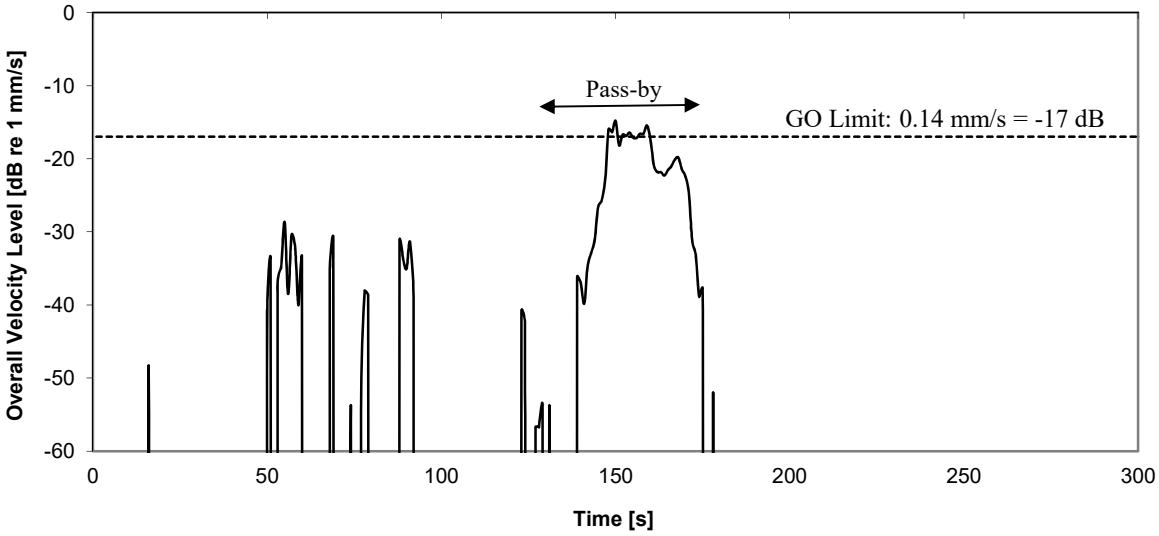
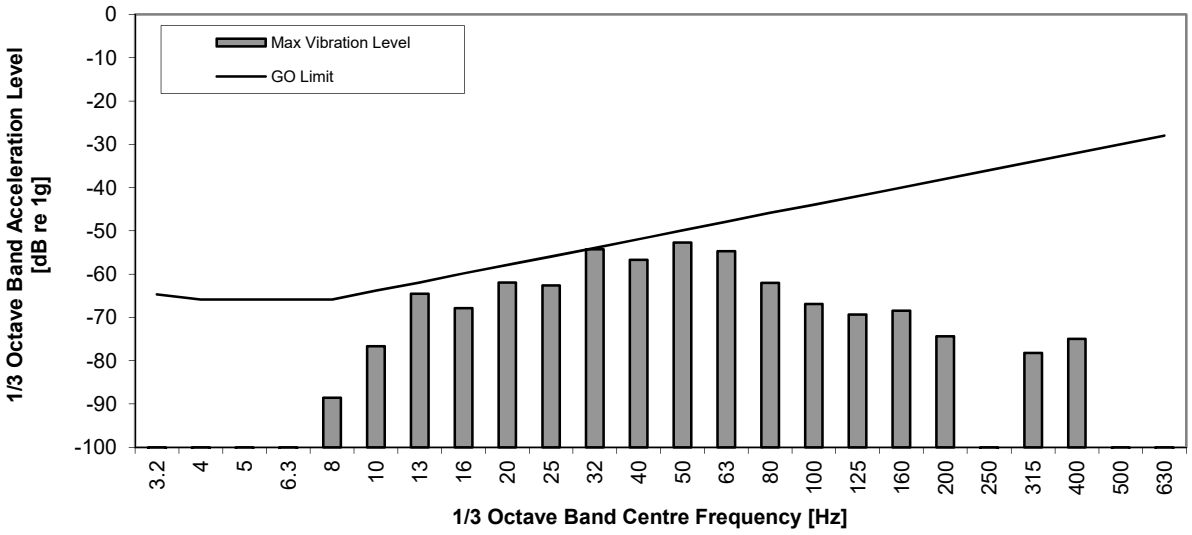
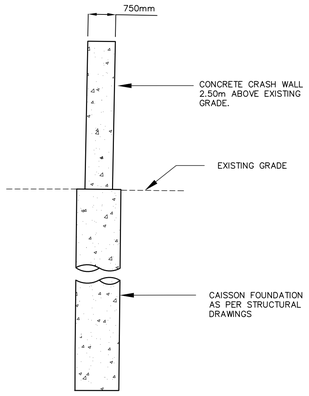


Figure 7b: Pass-by 5 (Eastbound&Westbound)
Acceleration Spectrum @ Peak Level (1 sec. Duration)



APPENDIX A

Supporting Drawings



CRASH WALL/CAISSON SECTION

N.T.S.

PROPOSED TOWNHOSE DEVELOPMENT

ALBERTSON CRESCENT

(BY REGISTERED PLAN 431)

P.I.N. 13447-0461 (LT)

LORNE PARK ROAD

BRAMBLEWOOD LANE

SIDEWALK

PROPERTY LINE

BLOCK A - PROPOSED 3 STOREYS TOWNHOUSES

UNIT #1

UNIT #2

UNIT #3

UNIT #4

UNIT #5

OUTLINE OF ABOVE FLOOR

NEW ASPHALT DRIVE WAY

BLOCK B - PROPOSED 3 STOREYS TOWNHOUSES

UNIT #6

UNIT #7

UNIT #8

LANDSCAPE

97.46 TW

1.30m

97.08TW

97.08TW

96.70 TW

PROPERTY LINE

30.0m

N26°14'20"W

MINIMUM SETBACK

HEDGE

PART 1, PLAN 43R-6524

CONCRETE CAISSON/CRASH WALL – SEE SECTION THIS DRAWING.

LINE OF EXISTING TREE CANOPY. SEE ARBORIST REPORT FOR TREE PROTECTION HOARDING AND DETAILS.

RAILWAYS LANDS

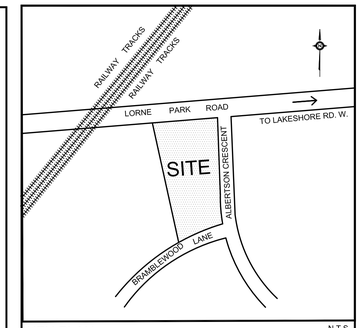
NATIONAL CANADIAN PACIFIC RAILWAY TRACKS

BLOCK 'A' REGISTERED PLAN 820 (LT)

LOT 13 REGISTERED PLAN 820

P.I.N. 13488-0489 (LT)

P.I.N. 13488-0498 (LT)



KEY PLAN N.T.S.

BENCHMARK

CITY OF MISSISSAUGA BENCHMARK No. 132 (CGVD 1928 : PRE 1978)

LOCATED ON THE SOUTH FACE AT THE EAST CORNER OF A RID BRICK HOUSE, No. 1023, ON THE NORTH SIDE OF LORNE PARK ROAD, 68 METRES WEST OF LAKESHORE ROAD WEST.

ELEVATION 93.63 m.

TO OBTAIN GEODETIC ELEVATIONS (1978 G.S.C. RE ADJUSTMENT) SUBTRACT 0.121 METRES FROM THE VALUES SHOWN HEREON.

BEARING NOTE

BEARINGS ARE UTM GRID AND ARE REFERRED TO THE NORTHERLY LIMIT OF PART 1, PLAN 43R-34375 HAVING A BEARING OF N84°02'20"E.

No.	Date	Description	By	Ck.

REVISIONS

JSW+ associates
CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
PLANNERS
Tel: (905)889-8100 Fax: (905)889-6616

TOWNHOUSE DEVELOPMENT

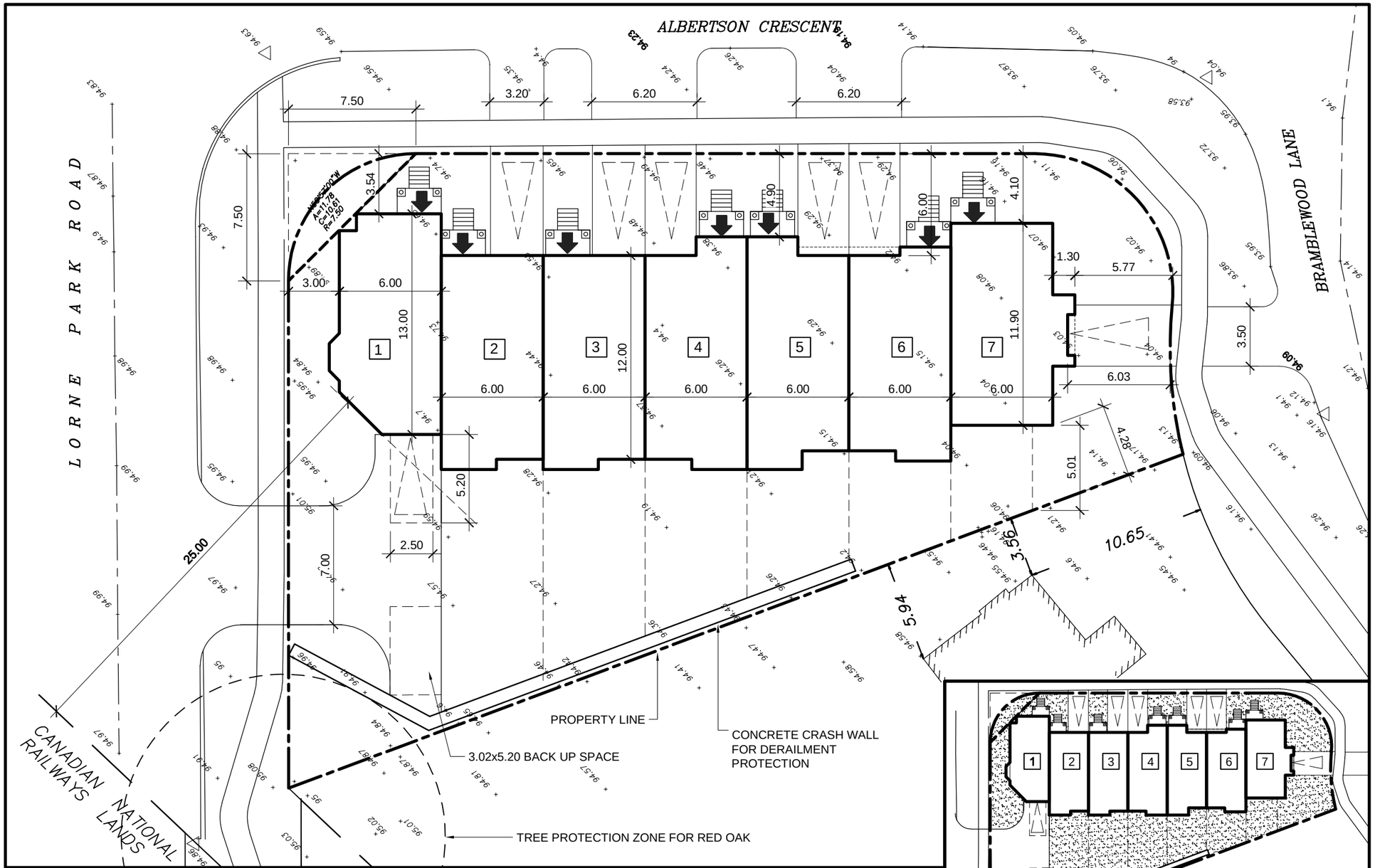
CITY OF MISSISSAUGA

1110 LORNE PARK ROAD

REGION OF PEEL

DERAILMENT PROTECTION PLAN

Scale: 1:100	
Designed: L.R.	Checked: L.R.
Drawn: W.G.	Date: NOVEMBER 2017
Job No. 17-40	Drawing No. DP-1



1 / A1 SITE PLAN
SC. 1:250

2 / A1 LANDSCAPING AREA
NTS

DRAWING INDEX

A1	SITE PLAN	A7	FLOOR PLANS
A2	1ST FLOOR LAYOUT	A8	FLOOR PLANS
A3	ROOF PLAN	A9	FLOOR PLANS
A4	FLOOR PLANS	A10	ELEVATIONS
A5	FLOOR PLANS	A11	ELEVATIONS, BUILDING SECTION
A6	FLOOR PLANS	A12	BUILDING SECTION

PROJECT DATA

PROPOSED 7 TOWNHOUSES

LOT AREA	1413.3 M²	
COVERAGE	527.19 M²	37.30%
LANDSCAPE	634.49 M²	44.89%
TOTAL GFA	1,468 M²	

LOT AREA PER UNIT:

UNIT 1	308.75 M²
UNIT 2	197.32 M²
UNIT 3	183.87 M²
UNIT 4	170.44 M²
UNIT 5	156.99 M²
UNIT 6	143.54 M²
UNIT 7	252.39 M²

NOTE: COVERAGE EXCLUDES FRONT PORCHES & BALCONIES

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	05/06/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018
4	REISSUED AS PER PLANNER'S COMMENTS	28/02/2019

SEAL

PROJECT NORTH

eka
EUGENE KUAN ARCHITECT
SUITE 205
1 WEST PEARCE STREET
RICHMOND HILL ON. L4B 3K3

TEL: (905) 882-8817
FEX: (905) 882-8918

PROJECT

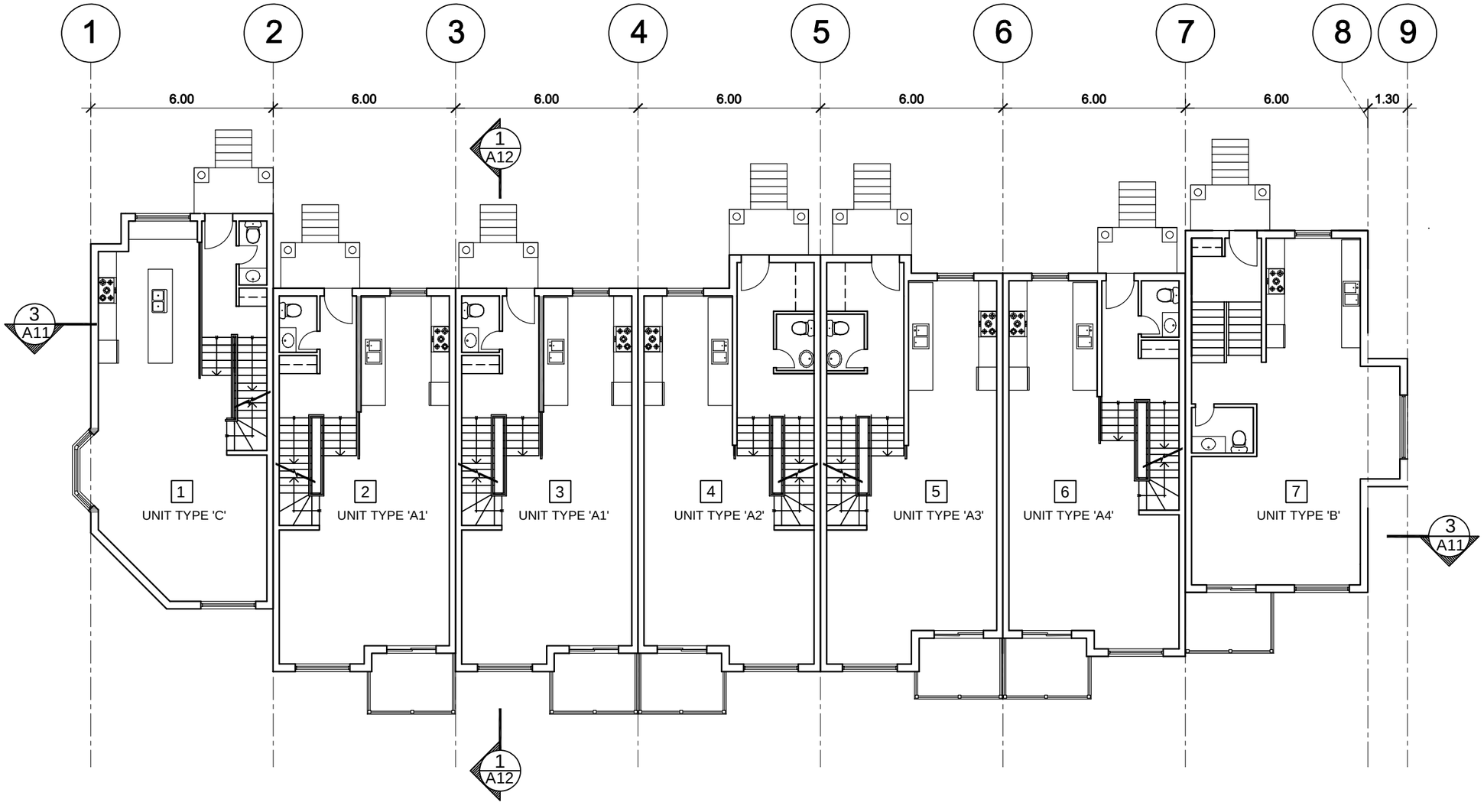
PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

SITE PLAN,
PROJECT DATA

SCALE
AS SHOWN

DRAWN: MD	DATE: MARCH 2017
CHECKED: EK	APPROVED: EK
PROJECT: 1705	SHEET NO.: A1



1/A2 1ST FLOOR LAYOUT
SC. 1:150

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR PLANNING SUBMISSION	31/10/2018
3	REISSUED AS PER PLANNER'S COMMENTS	28/02/2019

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PROJECT

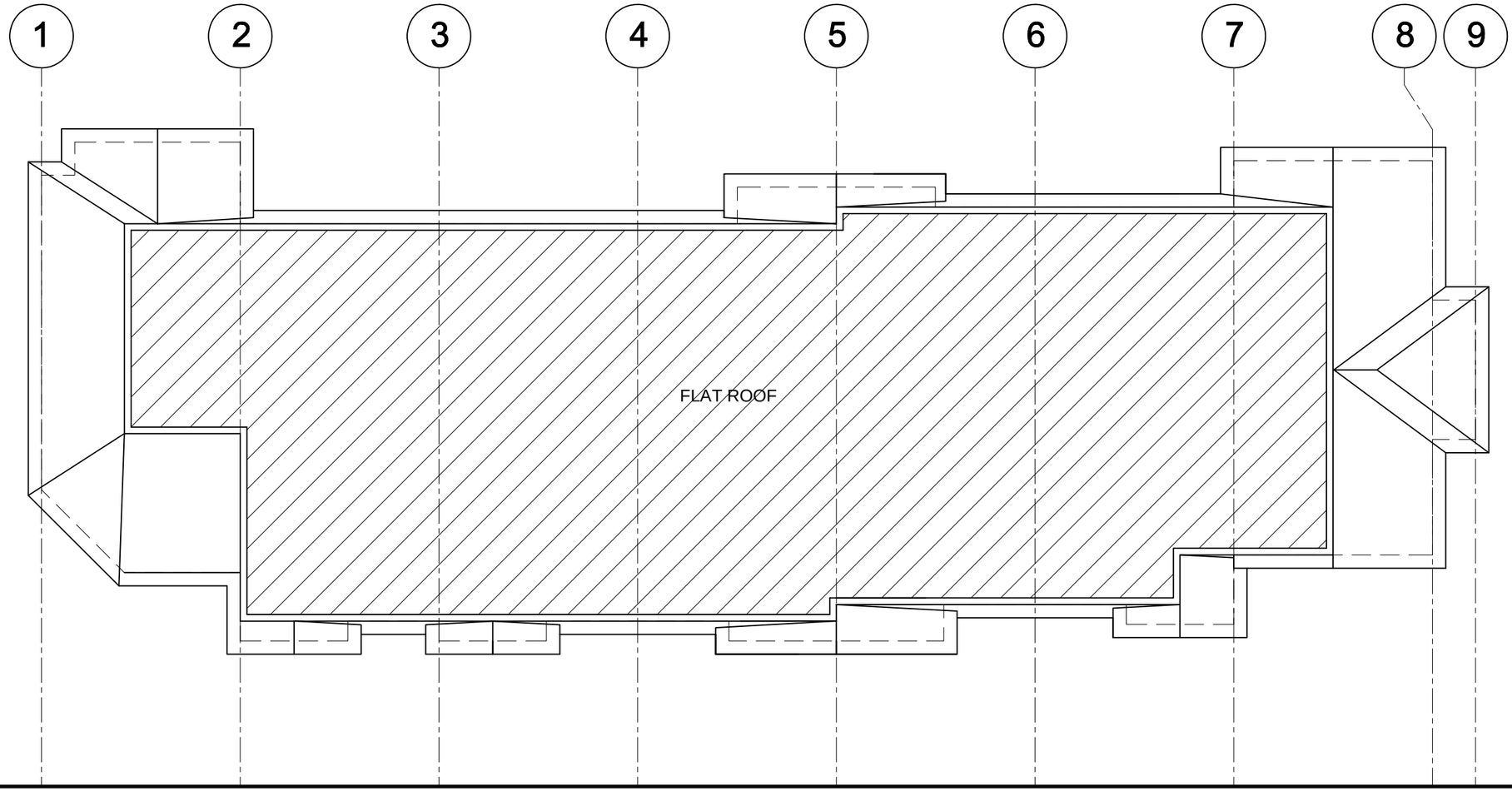
PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

1ST FLOOR LAYOUT

SCALE AS SHOWN

DRAWN	DATE
MD	MARCH 2017
CHECKED	APPROVED
EK	EK
PROJECT	SHEET NO.
1705	A2



1 / A3 ROOF PLAN
SC. 1:150

TOTAL ROOF AREA	577.35 M²
TOTAL FLAT ROOF AREA	411.26 M² (71.23%)

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR PLANNING SUBMISSION	31/10/2018
3	REISSUED AS PER PLANNER'S COMMENTS	28/02/2019

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PROJECT

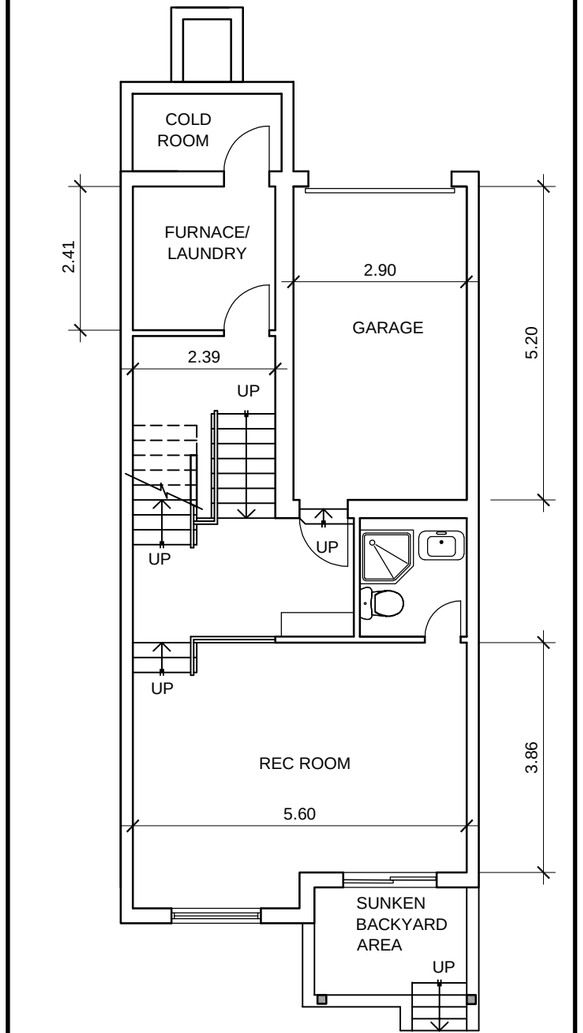
PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

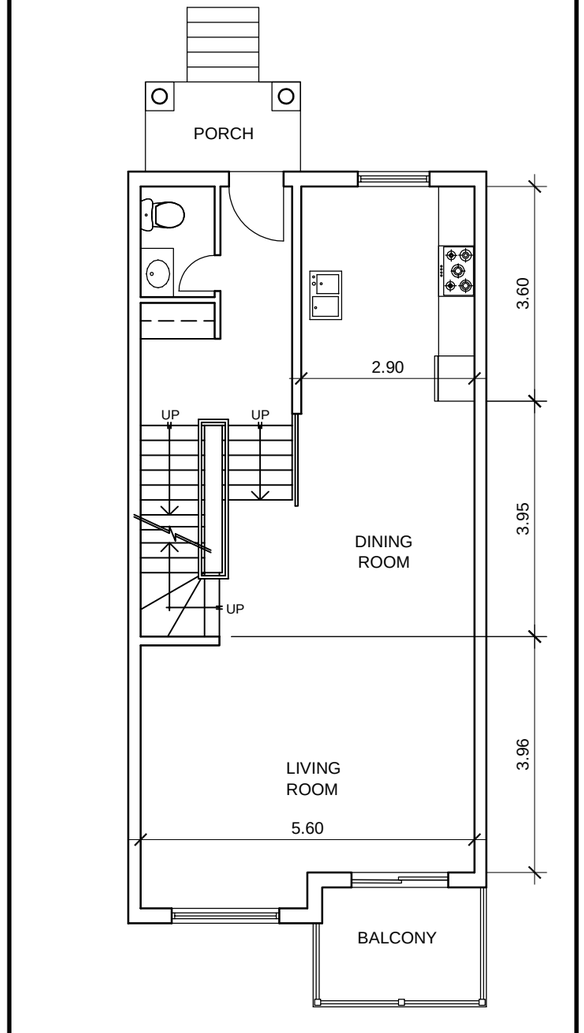
ROOF PLAN

SCALE
AS SHOWN

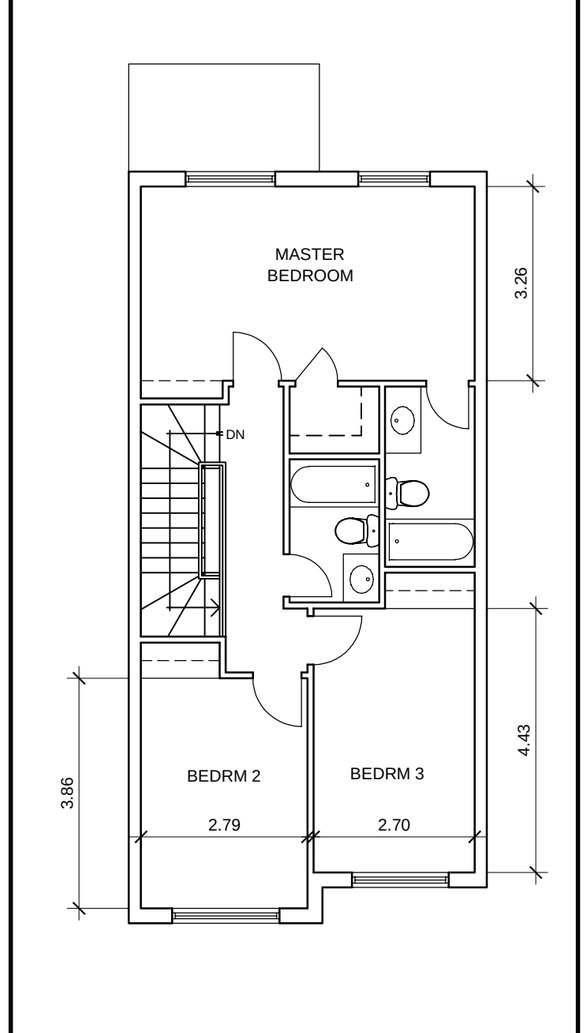
DRAWN MD	DATE MARCH 2017
CHECKED EK	APPROVED EK
PROJECT 1705	SHEET NO. A3



1 A4 MIDDLE UNIT TYPE 'A1' - BASEMENT PLAN
SC. 1:100



2 A4 MIDDLE UNIT TYPE 'A1' - 1ST FLOOR PLAN
SC. 1:100



3 A4 MIDDLE UNIT TYPE 'A1' - 2ND FLOOR PLAN
SC. 1:100

UNIT 'A1'

BASEMENT AREA	57 M²
1ST FLOOR AREA	74 M²
2ND FLOOR AREA	74 M²

NOTE: BASEMENT AREA EXCLUDES COLD ROOM AND GARAGE

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

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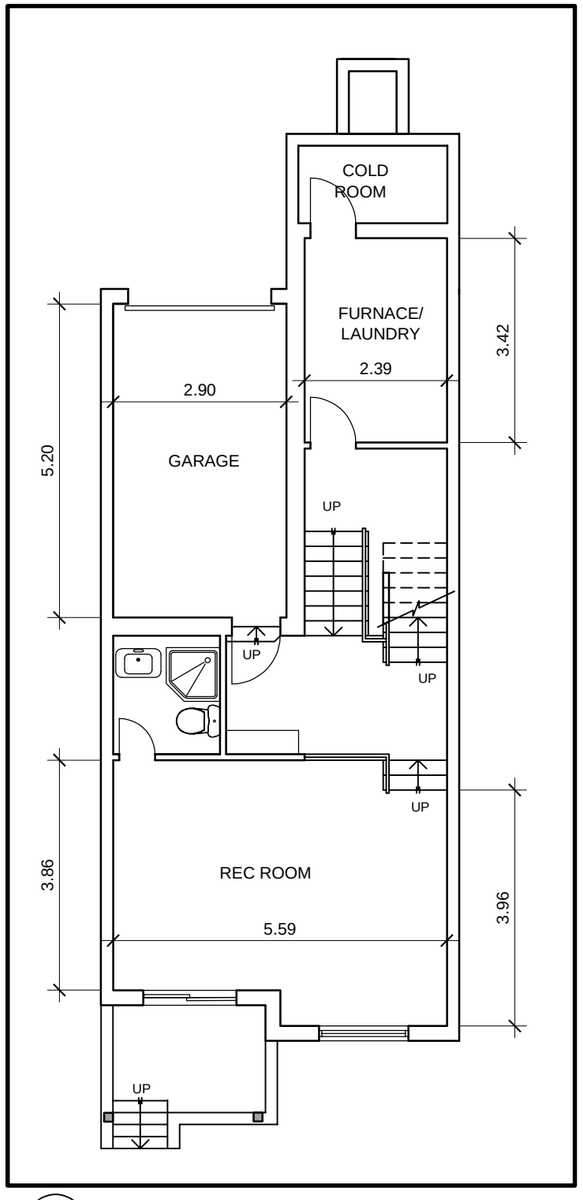
PROJECT
PROPOSED TOWNHOUSE AT 1110 LORNE PARK ROAD MISSISSAUGA, ON.

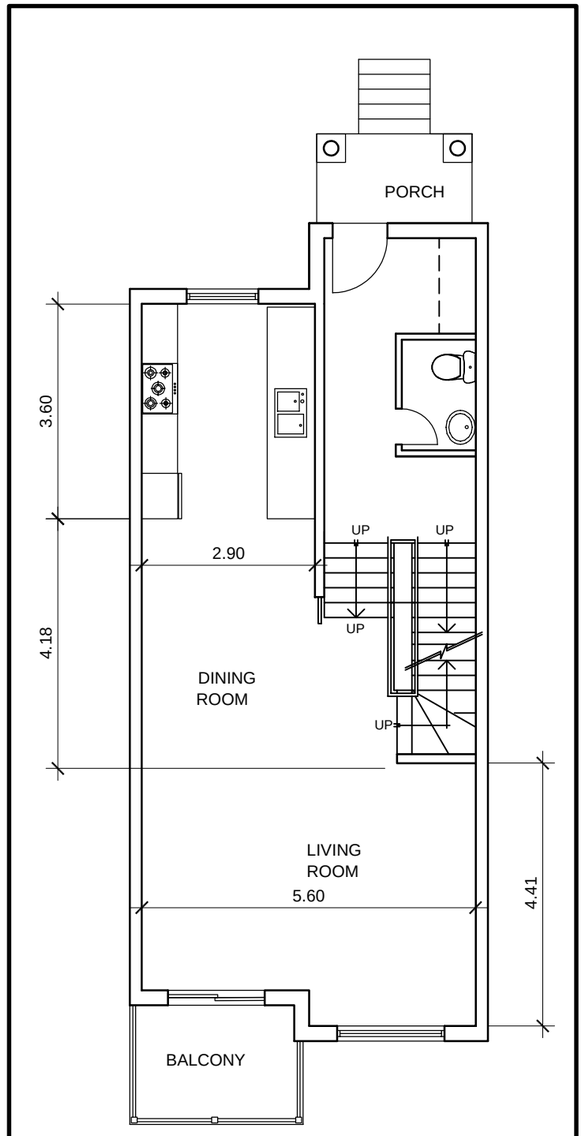
SHEET TITLE
FLOOR PLANS

SCALE AS SHOWN

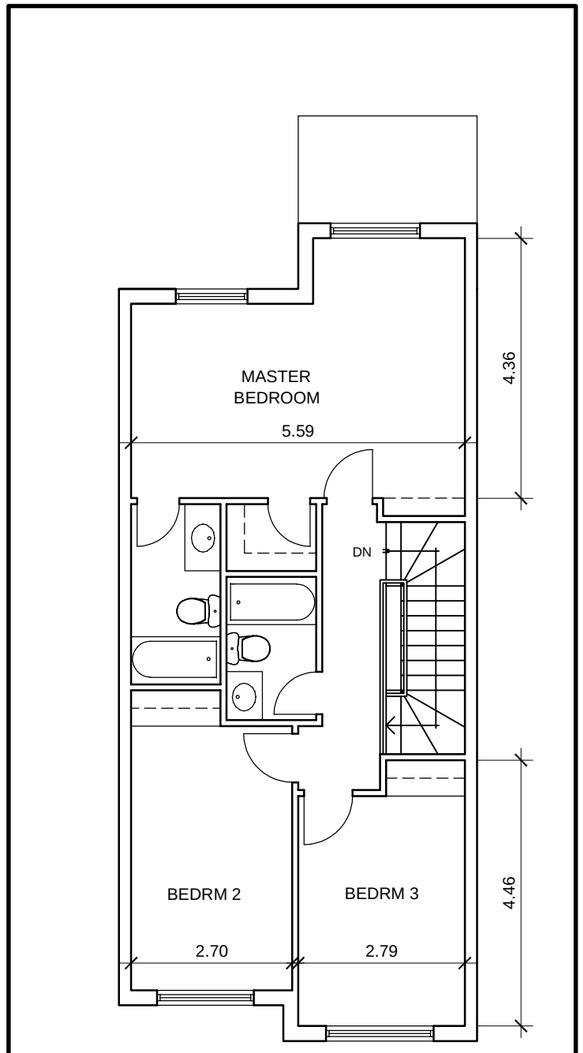
DRAWN MD	DATE MARCH 2017
CHECKED EK	APPROVED EK
PROJECT 1705	SHEET NO. A4



1 / A5 MIDDLE UNIT TYPE 'A2' - BASEMENT PLAN
SC. 1:100



2 / A5 MIDDLE UNIT TYPE 'A2' - 1ST FLOOR PLAN
SC. 1:100



3 / A5 MIDDLE UNIT TYPE 'A2' - 2ND FLOOR PLAN
SC. 1:100

UNIT 'A2'

BASEMENT AREA	61 M²
1ST FLOOR AREA	78 M²
2ND FLOOR AREA	78 M²

NOTE: BASEMENT AREA EXCLUDES COLD ROOM AND GARAGE

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

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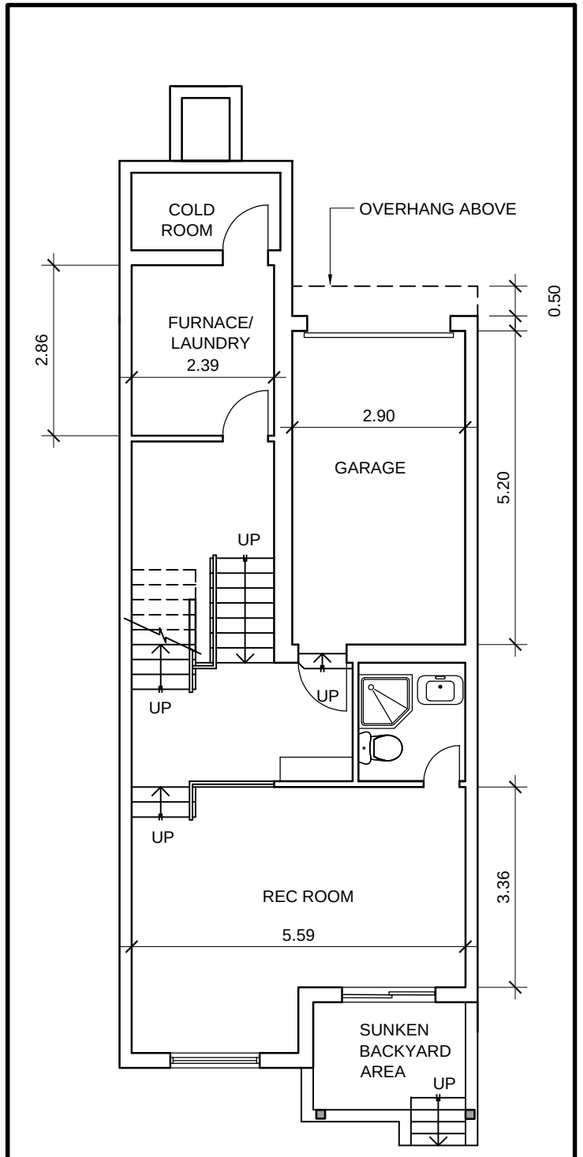
PROJECT
PROPOSED TOWNHOUSE AT 1110 LORNE PARK ROAD MISSISSAUGA, ON.

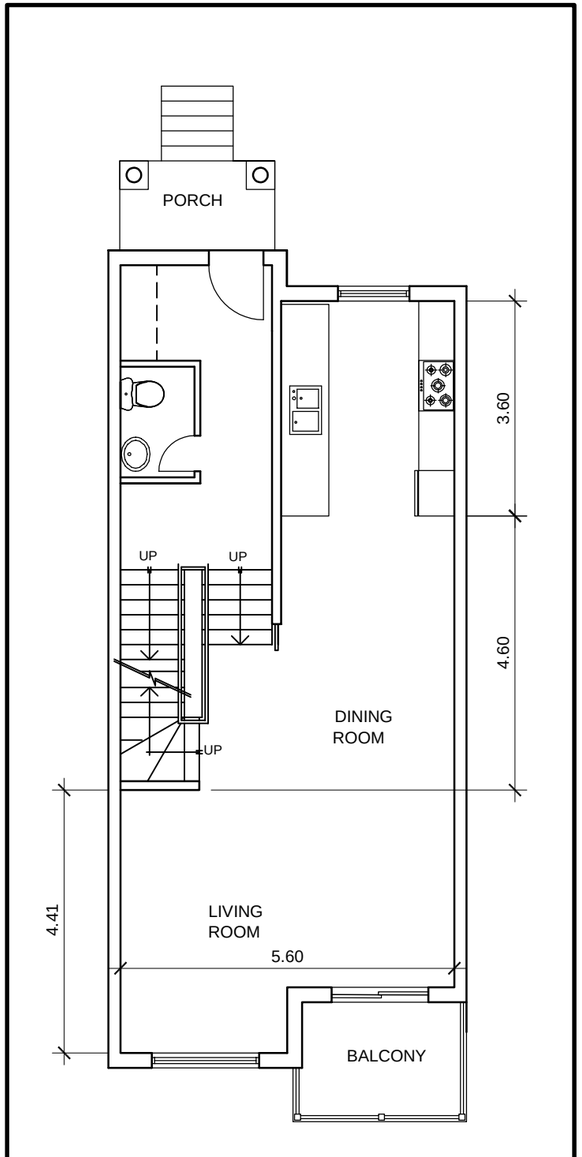
SHEET TITLE
FLOOR PLANS

SCALE AS SHOWN

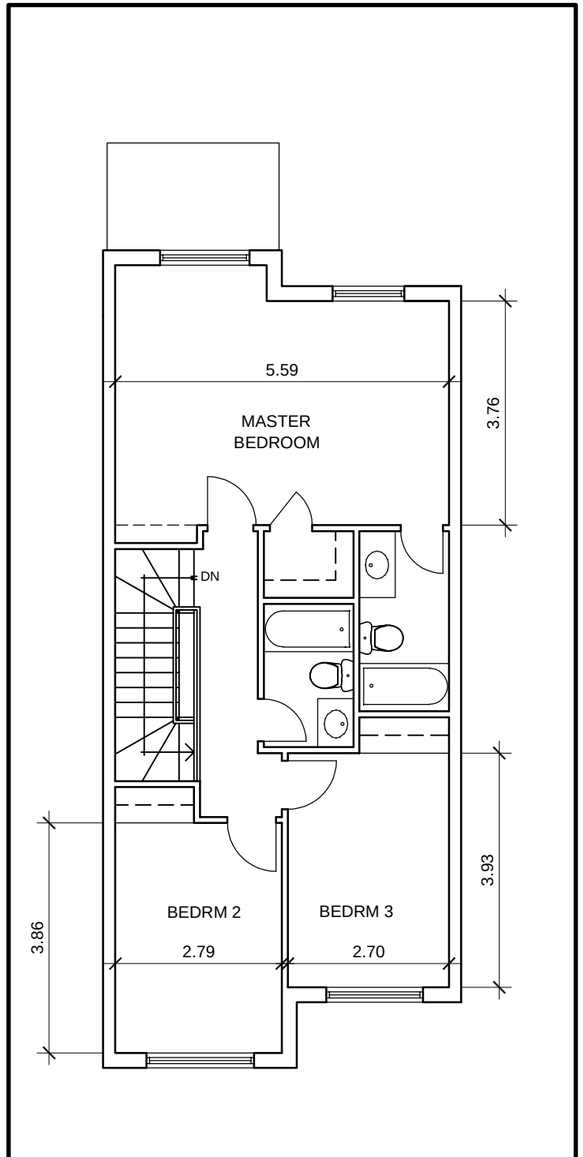
DRAWN MD	DATE MARCH 2017
CHECKED EK	APPROVED EK
PROJECT 1705	SHEET NO. A5



1 A6 MIDDLE UNIT TYPE 'A3' - BASEMENT PLAN
SC. 1:100



2 A6 MIDDLE UNIT TYPE 'A3' - 1ST FLOOR PLAN
SC. 1:100



3 A6 MIDDLE UNIT TYPE 'A3' - 2ND FLOOR PLAN
SC. 1:100

UNIT 'A3'

BASEMENT AREA	59 M²
1ST FLOOR AREA	78 M²
2ND FLOOR AREA	78 M²

NOTE: BASEMENT AREA EXCLUDES COLD ROOM AND GARAGE

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

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PROJECT NORTH

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PROJECT

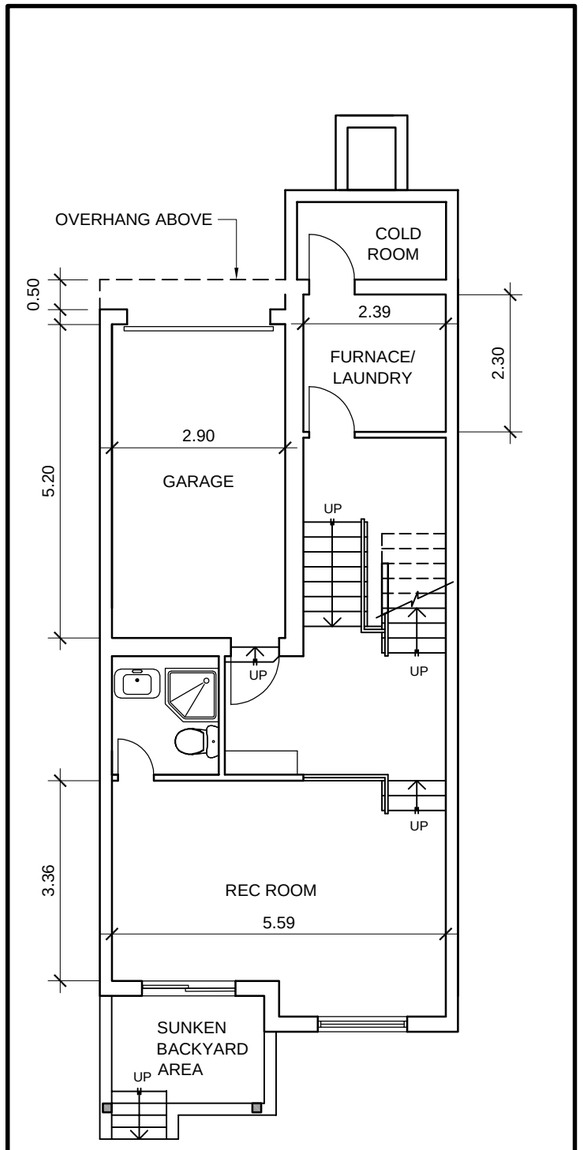
PROPOSED TOWNHOUSE AT 1110 LORNE PARK ROAD MISSISSAUGA, ON.

SHEET TITLE

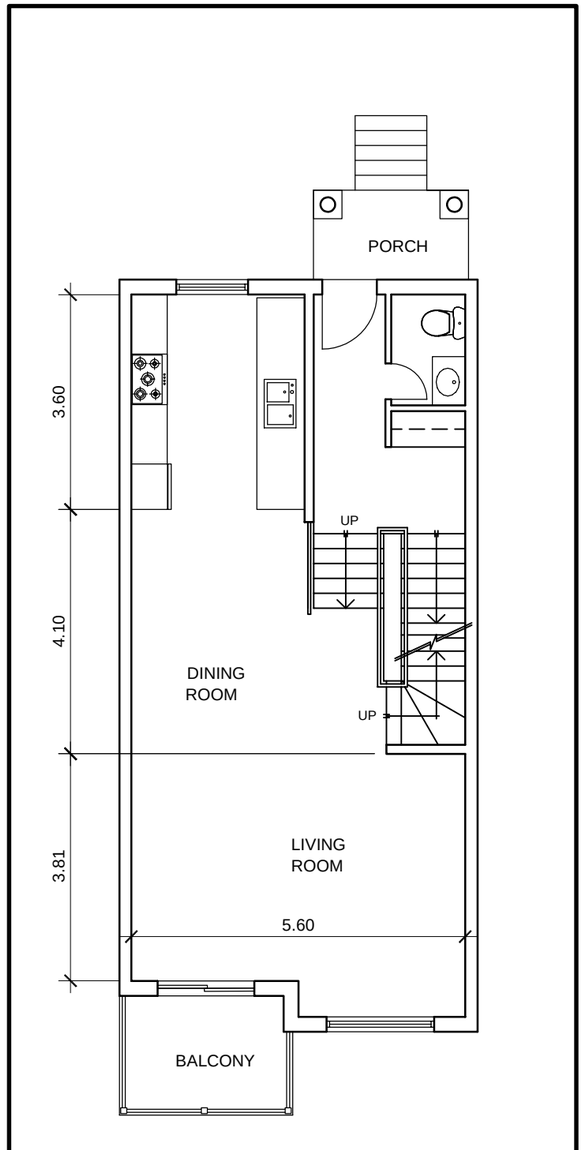
FLOOR PLANS

SCALE AS SHOWN

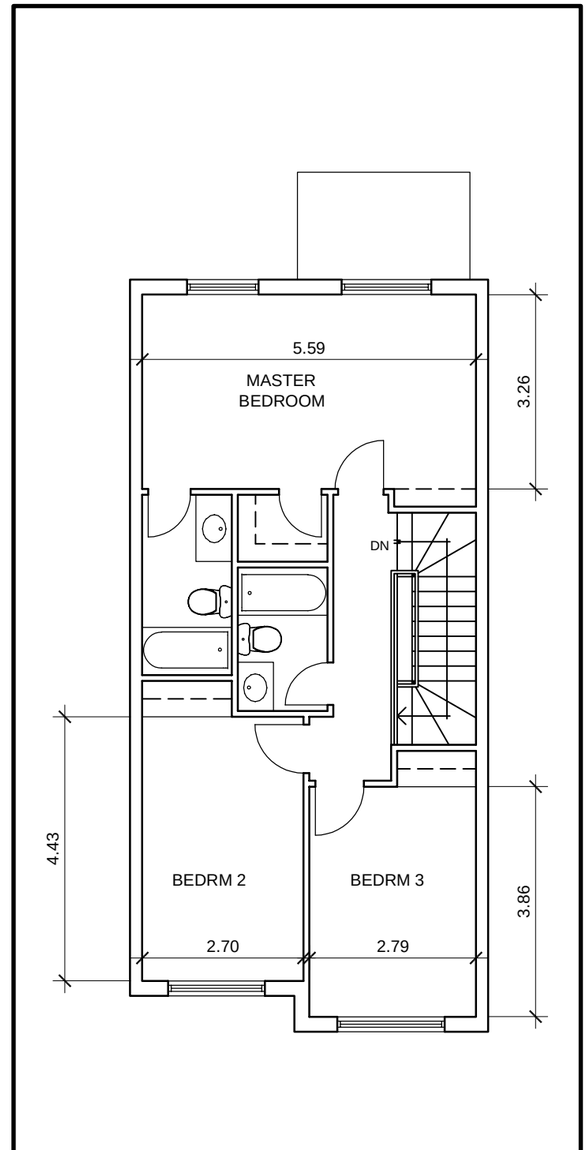
DRAWN MD	DATE MARCH 2017
CHECKED EK	APPROVED EK
PROJECT 1705	SHEET NO. A6



1 A7 MIDDLE UNIT TYPE 'A4' - BASEMENT PLAN
SC. 1:100



2 A7 MIDDLE UNIT TYPE 'A4' - 1ST FLOOR PLAN
SC. 1:100



3 A7 MIDDLE UNIT TYPE 'A4' - 2ND FLOOR PLAN
SC. 1:100

UNIT 'A4'

BASEMENT AREA	56 M²
1ST FLOOR AREA	74 M²
2ND FLOOR AREA	74 M²

NOTE: BASEMENT AREA EXCLUDES COLD ROOM AND GARAGE

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

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PROJECT

PROPOSED TOWNHOUSE AT 1110 LORNE PARK ROAD MISSISSAUGA, ON.

SHEET TITLE

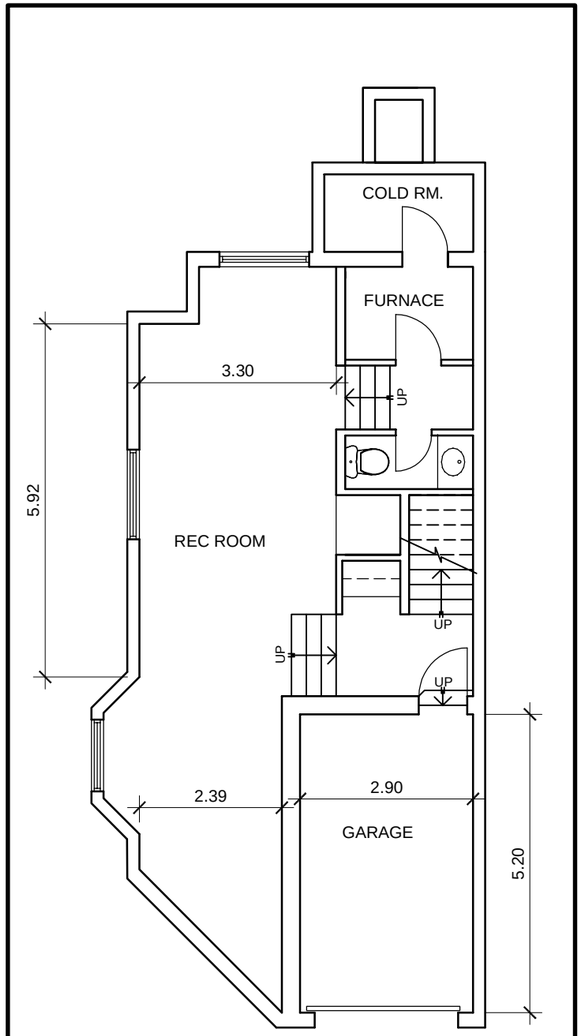
FLOOR PLANS

SCALE AS SHOWN

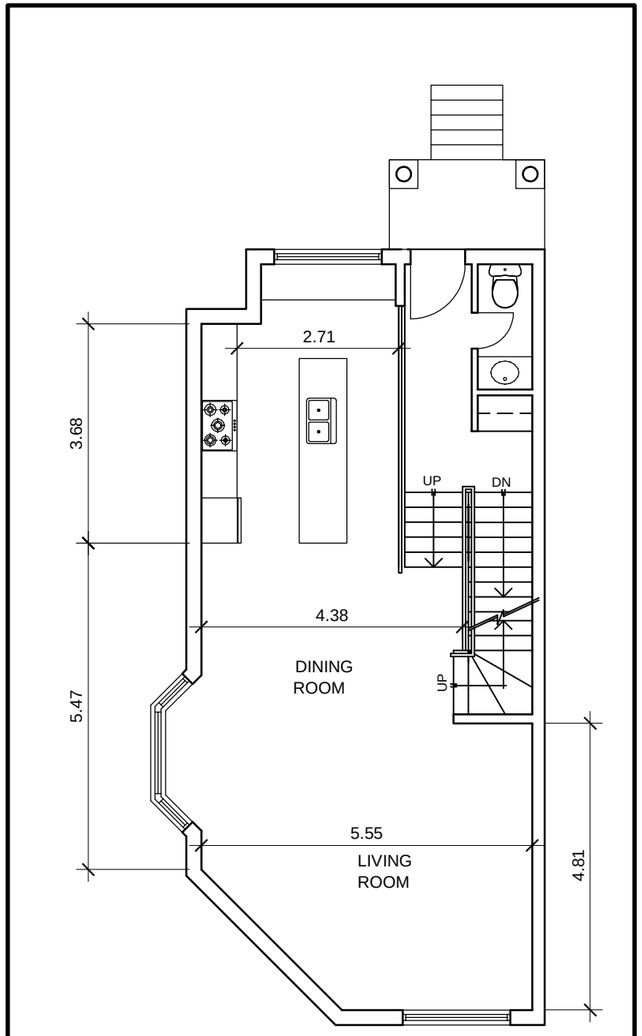
DRAWN MD | DATE MARCH 2017

CHECKED EK | APPROVED EK

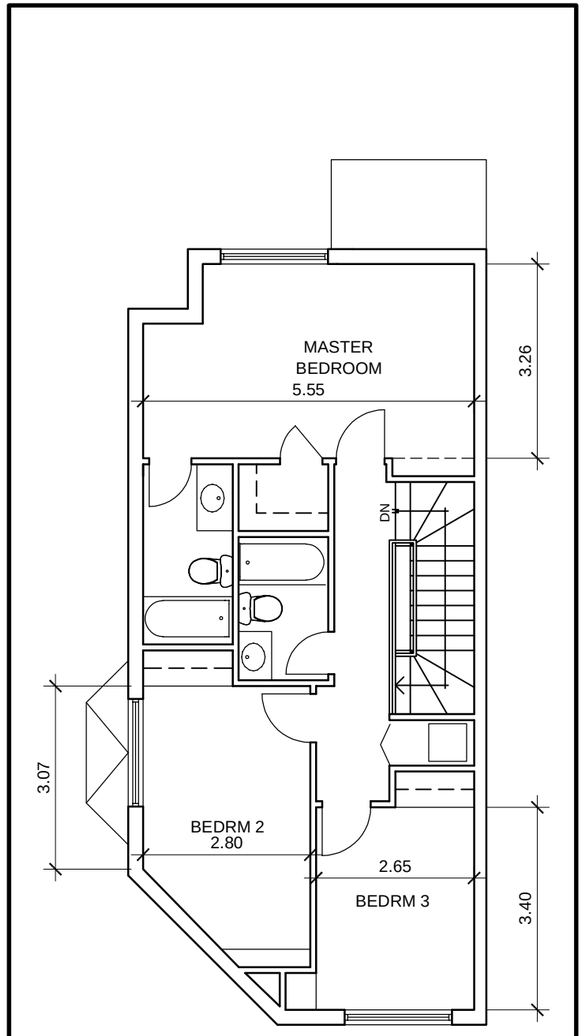
PROJECT 1705 | SHEET NO. A7



1 A8 END UNIT TYPE 'C' - BASEMENT PLAN
SC. 1:100



2 A8 END UNIT TYPE 'C' - 1ST FLOOR PLAN
SC. 1:100



3 A8 END UNIT TYPE 'C' - 2ND FLOOR PLAN
SC. 1:100

UNIT 'C'

BASEMENT AREA	59 M²
1ST FLOOR AREA	75 M²
2ND FLOOR AREA	75 M²

NOTE: BASEMENT AREA EXCLUDES COLD ROOM AND GARAGE

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

eka
EUGENE KUAN ARCHITECT
SUITE 205
1 WEST PEARCE STREET
RICHMOND HILL ON. L4B 3K3

TEL: (905) 882-8817
FEX: (905) 882-8918

PROJECT

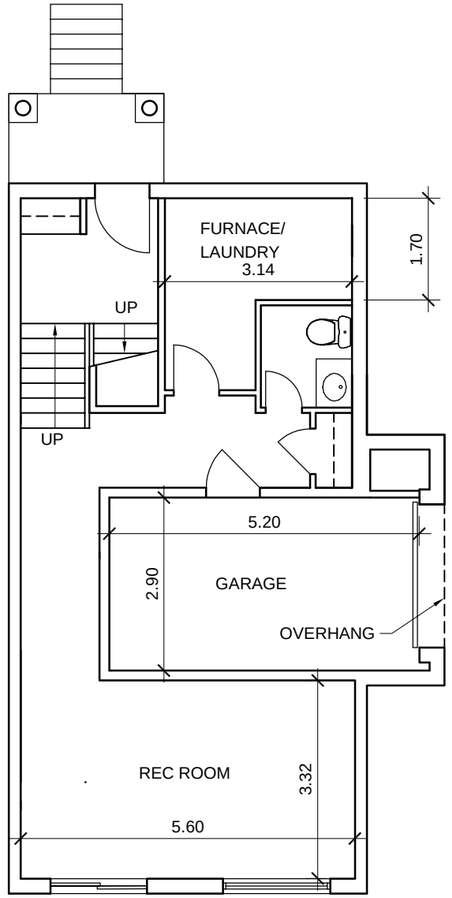
PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

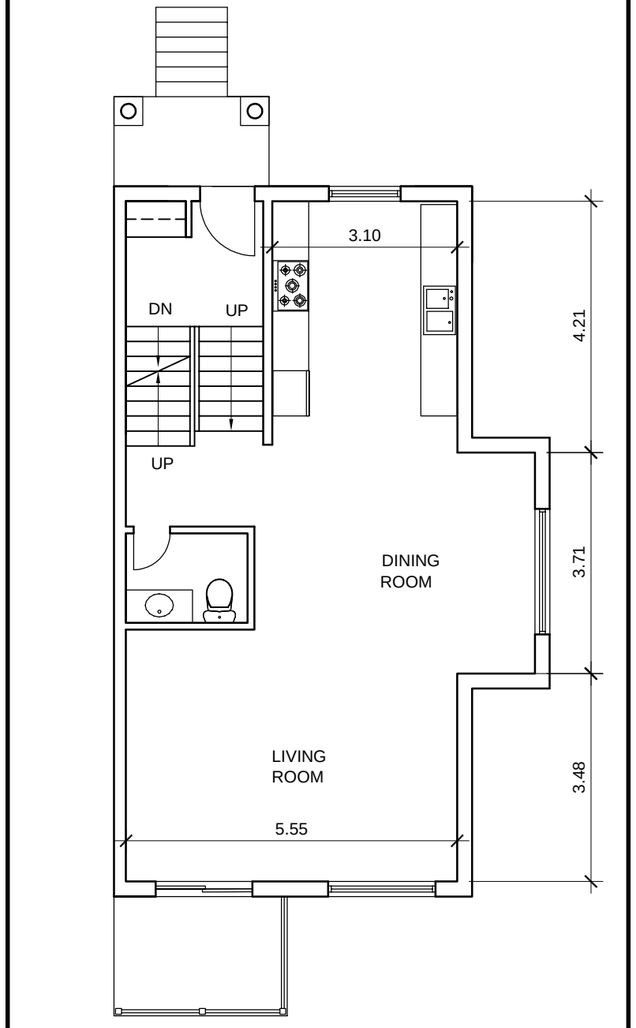
FLOOR PLANS

SCALE
AS SHOWN

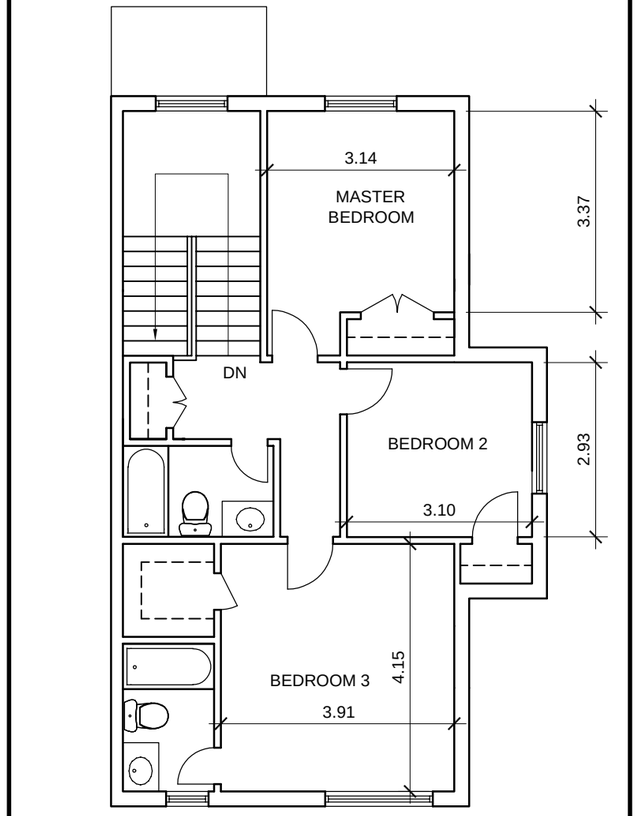
DRAWN: MD	DATE: MARCH 2017
CHECKED: EK	APPROVED: EK
PROJECT: 1705	SHEET NO.: A8



1 / A9 END UNIT TYPE 'B' - BASEMENT PLAN
SC. 1:100



2 / A9 END UNIT TYPE 'B' - 1ST FLOOR PLAN
SC. 1:100



3 / A9 END UNIT TYPE 'B' - 2ND FLOOR PLAN
SC. 1:100

UNIT 'B'	
BASEMENT AREA	59 M²
1ST FLOOR AREA	77 M²
2ND FLOOR AREA	77 M²

NOTE: BASEMENT AREA EXCLUDES COLD ROOM AND GARAGE

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

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EUGENE KUAN ARCHITECT
SUITE 205
1 WEST PEARCE STREET
RICHMOND HILL ON. L4B 3K3

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PROJECT

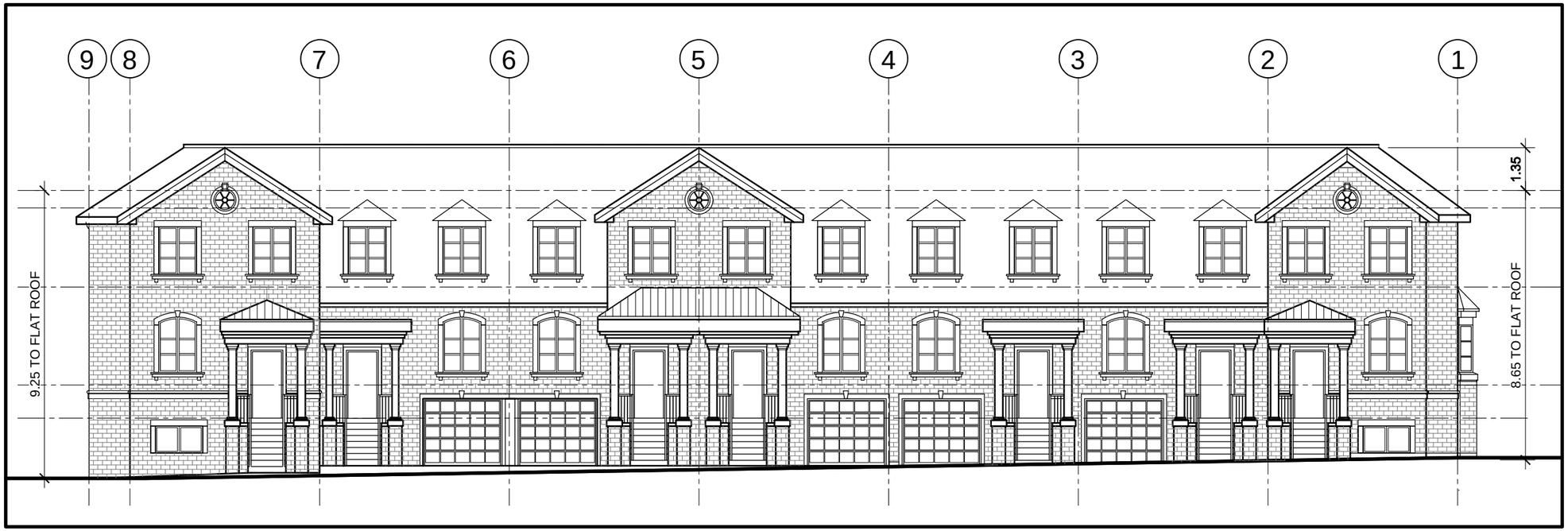
PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

FLOOR PLANS,
BUILDING SECTION

SCALE
AS SHOWN

DRAWN	DATE
MD	MARCH 2017
CHECKED	APPROVED
EK	EK
PROJECT	SHEET NO.
1705	A9



1 / A10 EAST ELEVATION
SC. 1:150

2 / A10 WEST ELEVATION
SC. 1:150

NOTES AND REVISIONS

1	**ISSUED FOR** REVIEW	29/03/2018
2	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

eka
EUGENE KUAN ARCHITECT
SUITE 205
1 WEST PEARCE STREET
RICHMOND HILL ON. L4B 3K3

TEL: (905) 882-8817
FEX: (905) 882-8918

PROJECT

PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

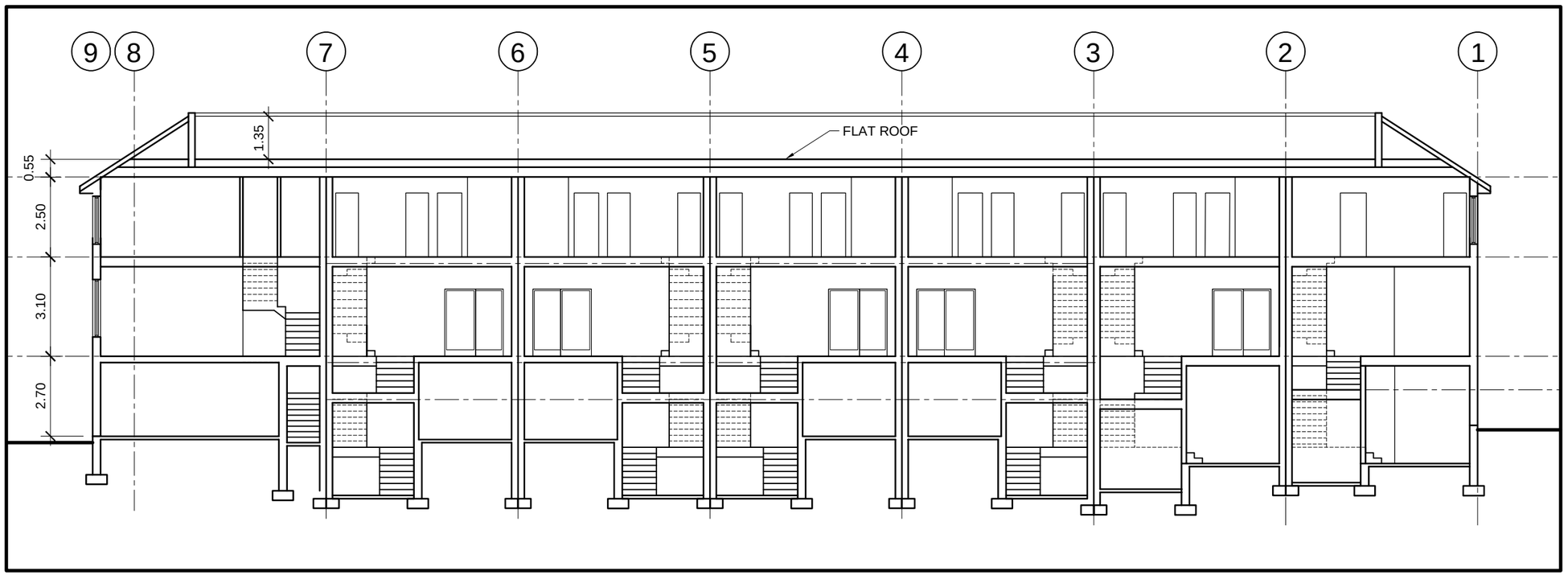
ELEVATIONS

SCALE AS SHOWN

DRAWN MD	DATE MARCH 2017
CHECKED EK	APPROVED EK
PROJECT 1705	SHEET NO. A10

1 A11 NORTH ELEVATION
SC. 1:150

2 A11 SOUTH ELEVATION
SC. 1:150



3 A11 BUILDING SECTION
SC. 1:150

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

eka
EUGENE KUAN ARCHITECT
SUITE 205
1 WEST PEARCE STREET
RICHMOND HILL ON. L4B 3K3

TEL: (905) 882-8817
FEX: (905) 882-8918

PROJECT

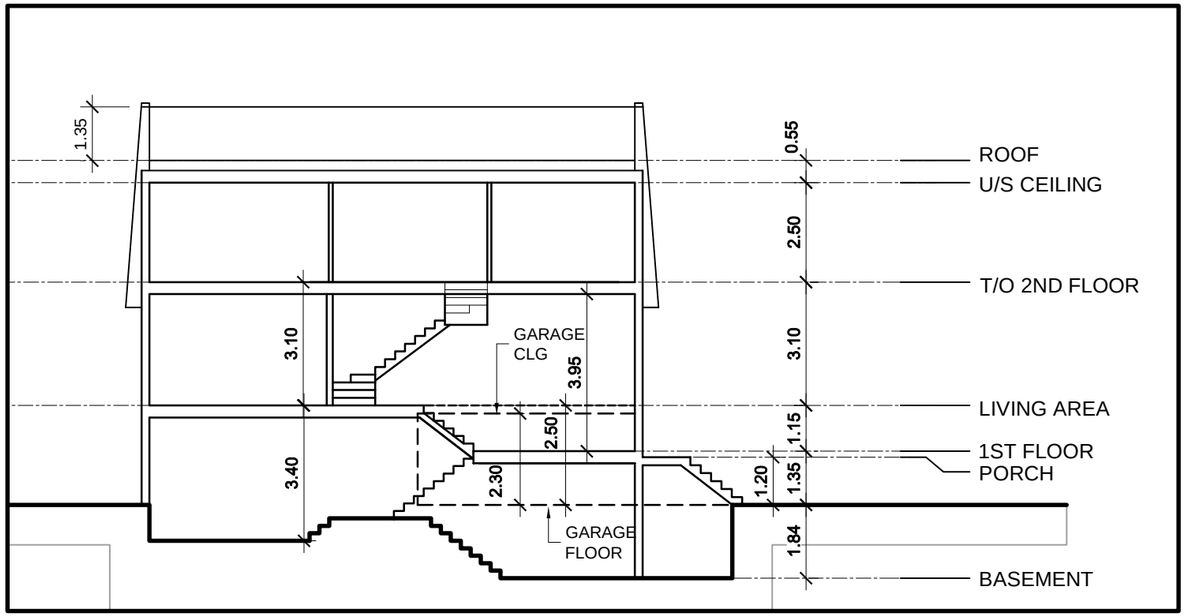
PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

ELEVATIONS,
SECTION

SCALE AS SHOWN

DRAWN MD	DATE MARCH 2017
CHECKED EK	APPROVED EK
PROJECT 1705	SHEET NO. A11



1 / A12 UNIT TYPE 'A' TYPICAL CROSS SECTION
SC. 1:150

NOTES AND REVISIONS

1	ISSUED FOR REVIEW	29/03/2018
2	ISSUED FOR REVIEW	29/10/2018
3	ISSUED FOR PLANNING SUBMISSION	31/10/2018

SEAL

PROJECT NORTH

eka
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SUITE 205
1 WEST PEARCE STREET
RICHMOND HILL ON. L4B 3K3

TEL: (905) 882-8817
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PROJECT

PROPOSED TOWNHOUSE AT
1110 LORNE PARK ROAD
MISSISSAUGA, ON.

SHEET TITLE

SECTION

SCALE
AS SHOWN

DRAWN	DATE
MD	MARCH 2017
CHECKED	APPROVED
EK	EK
PROJECT	SHEET NO.
1705	A12

APPENDIX B

Road Traffic Data

NOISE REPORT FOR PROPOSED DEVELOPMENT

Date:	September 17, 2018

REQUESTED BY:

Name:	Yvonee Lo
Company	HGC Engineering

PREPARED BY:

Name:	Jacqueline Hunter
Tel#:	905-615-3200

Location:	Lorne Road Road, north of Lakeshore Road W
Look Up ID#:	

ON SITE TRAFFIC DATA

Specific	Street Names				
	Lorne Park Road	Lakeshore Road W			
AADT:	6,680	22,240			
# of Lanes:	4 lanes	4 lanes			
% Trucks:	2%	3%			
Medium/Heavy Trucks Ratio:	45/55	45/55			
Day/Night Traffic Split:	90/10	90/10			
Posted Speed Limit:	50 km/h	50 km/h			
Gradient of Road:	< 2%	< 2%			
Ultimate R O W:	20 m	35m			

Comments:	Ultimate Traffic Only

APPENDIX C

Rail Guidelines and Traffic Data

Sheeba Paul

From: Brandon Gaffoor <Brandon.Gaffoor@metrolinx.com>
Sent: June-13-18 11:55 AM
To: Victor Garcia
Cc: Adam Snow; Ivan Cheung
Subject: RE: Rail Traffic Data Verification

Hello Victor,

Further to your request dated May 16, 2018 (attached below), the subject site (is in proximity to Cawthra Road and Atwater Avenue in the City of Mississauga) is located in close proximity to GO Transit's Lakeshore West rail corridor.

It's anticipated that GO service on these lines will be comprised of a mix of both diesel and electric trains within (at least) a 10-year time horizon. The combined preliminary midterm weekday train volume forecast at this location, including both revenue and equipment trips is in the order of 238 trains (54 diesel: 45 day, 9 night; 184 electric: 147 day, 37 night). Trains will be comprised of a single locomotive and up to 12 passenger cars.

The maximum track design speed is 95 mph (153 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.

It should be also noted that VIA operates trains in this area and it would be prudent to contact them directly for rail traffic information.

I trust this information is useful. Should you have any questions, please feel free to contact myself.

BRANDON GAFFOOR, B.E.S.
Junior Analyst – Third Party Projects
Third Party Properties and Utilities (3PUP) – RER Implementation
Metrolinx
20 Bay Street | Suite 600 | Toronto | M5J 2E3
T: 416.202.7294 C: 647.289.1958

METROLINX

From: Victor Garcia [mailto:vgarcia@hgcengineering.com]
Sent: June-13-18 10:29 AM
To: Brandon Gaffoor
Cc: Adam Snow
Subject: RE: Rail Traffic Data Verification

Hi Brandon,

Have you had a chance to look into the request below?

Thanks,

Victor Garcia, P.Eng
HGC Engineering **NOISE | VIBRATION | ACOUSTICS**
Howe Gastmeier Chapnik Limited
t: 905.826.4044

From: Victor Garcia
Sent: May-16-18 12:12 PM
To: 'Brandon Gaffoor' <Brandon.Gaffoor@metrolinx.com>
Cc: Adam Snow <Adam.Snow@metrolinx.com>
Subject: Rail Traffic Data Verification

Good afternoon,

We are currently updating a study for a proposed residential development located at Cawthra Rd and Atwater Ave in Mississauga, Ontario. A google link is included for your reference:

https://goo.gl/maps/g6rVA7m5Bt62

Is the attached data valid for this site?

Thanks,

Victor Garcia, P.Eng
Project Engineer

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**: vgarcia@hgcengineering.com
Visit our website – www.hgcengineering.com **Follow Us** – LinkedIn | Twitter | YouTube

Available on most trains.

Offert dans la plupart des trains.

TORONTO → LONDON → WINDSOR

TRAIN		71	73	83	75 *	81	79
DAYS / JOURS		1234567	1234567	1234567	1234567	1234567	1234567
BUSINESS AFFAIRES		✓ [1]	✓ [1]	✓	✓	✓	✓
Toronto, ON	DP	06:45	12:15	16:35	17:30	17:30	19:35
Oakville		07:10	12:40		17:56	17:56	19:59
Aldershot		07:25	12:58	17:13	18:12	18:12	20:13
Brantford		07:53	13:27	17:43	18:44	18:44	20:41
Woodstock		08:25	13:55	18:12	19:14	19:14	21:09
Ingersoll		08:38					21:23
London	AR	09:00	14:23	18:49	19:55	19:55	21:45
	DP	09:05	14:30		20:01		21:50
Glencoe		09:34					22:19
Chatham		10:13	15:39		21:04		22:53
Windsor, ON	AR	11:02	16:30		21:56		23:44

[1] Business class is not available on Saturdays. / La classe Affaires n'est pas offerte les samedis.

✈ Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes. / Voyagez entre la gare Union et l'aéroport Pearson à bord des trains UP Express. Trajet de 25 minutes et départs toutes les 15 minutes.

Checked baggage is available on this train at certain stations only. For more information, please call VIA Rail (1 888 842-7245) or visit our website (viarail.ca). / L'enregistrement des bagages est offert pour ce train à certaines gares seulement. Pour plus d'information, veuillez appeler VIA Rail (1 888 842-7245) ou visiter notre site Web (viarail.ca).

* Baggage car available on Monday and Thursday. / Voiture à bagages disponible lundi et jeudi.

WINDSOR → LONDON → TORONTO

TRAIN		82	70	80	72*	76	78
DAYS / JOURS		1234567	1234567	1234567	1234567	1234567	1234567
BUSINESS AFFAIRES		✓	✓	✓	✓	✓[1]	✓[1]
Windsor, ON	DP		05:30		09:05	13:45	17:45
Chatham			06:18		09:51	14:30	18:32
Glencoe					10:23	15:03	19:04
London	AR		07:20		10:56	15:37	19:36
	DP	06:25	07:30	07:30	11:02	15:43	19:42
Ingersoll			07:52	07:52			20:02
Woodstock		06:56	08:07	08:07	11:31		20:14
Brantford		07:28	08:41	08:41	12:02	16:40	20:45
Aldershot			09:21	09:21	12:34	17:13	21:15
Oakville			09:38	09:38	12:48	17:27	21:29
Toronto, ON	AR	08:35	10:04	10:04	13:11	17:52	21:51

[1] Business class is not available on Saturdays. / La classe Affaires n'est pas offerte les samedis.

✈ Travel between Union Station and Pearson Airport on UP Express trains in 25 minutes, with departures every 15 minutes. / Voyagez entre la gare Union et l'aéroport Pearson à bord des trains UP Express. Trajet de 25 minutes et départs toutes les 15 minutes.

Checked baggage is available on this train at certain stations only. For more information, please call VIA Rail (1 888 842-7245) or visit our website (viarail.ca). / L'enregistrement des bagages est offert pour ce train à certaines gares seulement. Pour plus d'information, veuillez appeler VIA Rail (1 888 842-7245) ou visiter notre site Web (viarail.ca).

* Baggage car available on Tuesday and Friday. / Voiture à bagages disponible seulement mardi et vendredi.

APPENDIX D

Sample STAMSON 5.04 Output

STAMSON 5.0 NORMAL REPORT Date: 12-04-2019 13:46:40
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: lot1.te Time Period: Day/Night 16/8 hours
Description: **Predicted sound level at Unit 1, with backing exposure to the railway and flanking exposure to Lorne Park Road.**

Rail data, segment # 1: CN (day/night)

Train Type	Trains	Speed (km/h)	# loc /Train	# Cars /Train	Eng type	Cont weld
* 1. Passenger	20.3/4.3	150.0	2.0	10.0	Diesel	Yes
2. GO (Diesel)	45.0/9.0	150.0	1.0	12.0	Diesel	Yes
3. GO (Elec)	147.0/37.0	150.0	1.0	12.0	Elec	Yes

* The identified number of trains have been adjusted for future growth using the following parameters:

Train type: No Name	Unadj. Trains	Annual % Increase	Years of Growth
1. Passenger	19.8/4.2	2.50	1.00

Data for Segment # 1: CN (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	: 25.00 / 25.00	m
Receiver height	: 7.10 / 7.10	m
Topography	: 1	(Flat/gentle slope; no barrier)
No Whistle		
Reference angle	: 0.00	

Results segment # 1: CN (day)

LOCOMOTIVE (0.00 + 71.13 + 0.00) = 71.13 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.42	76.24	-3.14	-1.97	0.00	0.00	0.00	71.13

WHEEL (0.00 + 67.91 + 0.00) = 67.91 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.52	73.40	-3.38	-2.12	0.00	0.00	0.00	67.91

Segment Leq : 72.82 dBA

Total Leq All Segments: 72.82 dBA

Results segment # 1: CN (night)

LOCOMOTIVE (0.00 + 67.31 + 0.00) = 67.31 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.42	72.43	-3.14	-1.97	0.00	0.00	0.00	67.31

WHEEL (0.00 + 64.67 + 0.00) = 64.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-45	90	0.52	70.16	-3.38	-2.12	0.00	0.00	0.00	64.67

Segment Leq : 69.20 dBA

Total Leq All Segments: 69.20 dBA

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

Car traffic volume : 5892/655 veh/TimePeriod *
Medium truck volume : 54/6 veh/TimePeriod *
Heavy truck volume : 66/7 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 6680
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 0.90
Heavy Truck % of Total Volume : 1.10
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Lorne Park (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 : 15.00 / 15.00 m
Receiver height : 7.10 / 7.10 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Lorne Park (day)

Source height = 1.02 m

```
ROAD (0.00 + 56.60 + 0.00) = 56.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.51  60.80   0.00   0.00  -4.20   0.00   0.00   0.00
56.60
-------------------------------------------------------------------------
--

Segment Leq : 56.60 dBA

Total Leq All Segments: 56.60 dBA

Results segment # 1: Lorne Park (night)
---------------------------------------

Source height = 1.01 m

ROAD (0.00 + 49.98 + 0.00) = 49.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.51  54.18   0.00   0.00  -4.20   0.00   0.00   0.00
49.98
-------------------------------------------------------------------------
--

Segment Leq : 49.98 dBA

Total Leq All Segments: 49.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.92
                           (NIGHT): 69.25
```