

Noise Feasibility Study

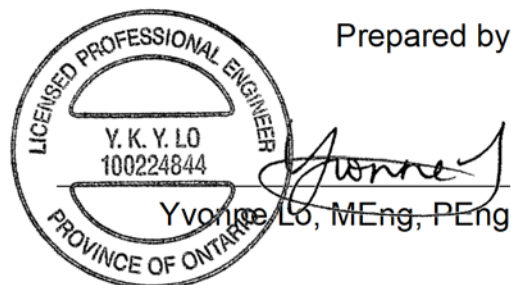
Proposed Mixed-Use/Residential Development

1107 Main Street West, Hamilton, Ontario

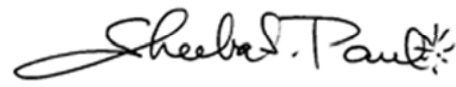
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1 Introduction

HGC Engineering was retained by SRM Architects Inc. to conduct a noise feasibility study for a mixed-use development to be located at 1107 Main Street West in the City of Hamilton, Ontario. The proposed development is to include one 15-storey residential building with a 9-storey mixed-use podium and two levels of underground parking. This study has been prepared as part of the approvals process as required by the City of Hamilton.

This report is being updated to reflect the latest site plan prepared by SRM Architects Inc. dated November 17, 2020 (“Issued for Rezoning”).

The primary noise sources impacting the site are road traffic on Main Street West and Highway 403. Road traffic volume data was obtained from the City of Hamilton and Ministry of Transportation (MTO) personnel. The data was used to estimate future sound levels (L_{EQ}) at the façades of the proposed mixed-use/residential building. The estimated sound levels were compared to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP), and the City of Hamilton.

The results of this study indicate that with suitable noise control measures integrated into the design of the buildings, it is feasible to achieve the indoor MECP guideline sound levels from road traffic sources. The recommended noise control measures include acoustic barriers for large terraces, appropriate wall and window glazing assemblies, and a central air conditioning system. Warning clauses will need to be included in the property, tenancy and rental agreements to warn occupants of potentially audible transportation noise levels and of the nearby religious uses.

An analysis was also conducted to determine the potential impact of noise from rooftop units at the institutional (Synagogue and school) building to the south of the subject site on the proposed building. The analysis was based on a review of the latest site plan, aerial photos and a site visit. Reasonable estimates of the size and tonnage of the rooftop mechanical units have been used based on experience with similar projects. Manufacturer’s sound power data was used in the analysis to estimate sound levels associated with the institutional building on the proposed building.



The results indicate that sound emissions from the institutional building on proposed residential units will be below the MECP minimum exclusionary sound level limits. Physical mitigation measures are not required for the stationary noise sources associated with the existing building.

As of the date that this report was issued, it is understood that the procurement of the Hamilton Light Rail Transit (LRT) system has been cancelled. Nonetheless, the potential impact of the LRT system has been assessed using information obtained from the Environmental Project Report (EPR) prepared for SNC-Lavalin Inc. and Steer Davies Gleave as part of the Hamilton Rapid Transit Preliminary Design and Feasibility Study and in particular the included Noise and Vibration Impact Assessment Report dated August 2, 2011, by J.E. Coulter Associates Ltd. The findings of this report indicate that sound levels from the LRT will be negligible in comparison with overall sound levels from cars/trucks on the roadways, and perceptible tactile vibration and vibration-induced noise is anticipated to be within indicated criteria in the proposed buildings.

2 Site Description & Noise Sources

The site is situated on the south side of Main Street West, between Cline Avenue and Dow Avenue, specifically at 1107 Main Street West, in the City of Hamilton, Ontario. Figure 1 shows a key plan of the subject site. A site plan prepared by SRM Architects Inc. dated November 17, 2020 (“Issued for Rezoning”), is shown in Figure 2. Figure 2 also indicates the sound level prediction locations. The proposed development will consist of one 15-storey mixed-use building above a 9-storey podium and two levels of underground parking. Appendix A includes the preliminary architectural drawings.

HGC Engineering visited the site in September 2019 to investigate the site and the surrounding land uses. The acoustical environment surrounding the site is urban. The subject site is currently occupied by two existing church buildings which will be demolished to make way for the proposed development. The surrounding lands consist mainly of residential uses and there are commercial uses to the north of Main Street West. The site visit concluded that the significant noise sources impacting the study area are road traffic noise on Main Street and Highway 403. There is an existing synagogue and associated school to the south of the proposed development. There is mechanical equipment on the roof of the synagogue/school building and this equipment has been included in the noise assessment.



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The proposed Light Rail Transit (LRT) system to be constructed along the centre of Main Street, approximately 20 m north of the closest proposed building facade has been cancelled.

Nonetheless, the potential noise and vibration impacts from the LRT system on the proposed development are discussed in this report in the event that the system is reconsidered in the future.

3 Noise Level Criteria

3.1 Road Traffic

Guidelines for acceptable levels of road traffic noise impacting 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 I 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 Traffic Noise Criteria (dBA)

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

Daytime refers to the period between 07:00 and 23:00. Nighttime refers to the time 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.

The MECP guidelines allow the daytime sound levels in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is recommended to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible. Note that not all OLA’s necessarily require protection, if there are other protected outdoor areas accessible to the residents.

MECP and City of Hamilton guidelines require central air conditioning or other ventilation system to be installed prior to occupancy as an alternative means of ventilation to open windows

for 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. Provision for 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 daytime sound levels at bedroom or living/dining rooms are in the range of 56 dBA to 65 dBA. Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window nighttime sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise.

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

4 Assessment of Traffic Noise on the Proposed Building, Methods & Results

4.1 Noise from the Proposed LRT Line

Information regarding the Hamilton LRT line was obtained from the Noise and Vibration Impact Assessment report prepared by J.E. Coulter Associates Limited as part of the Environmental Project Report (EPR). The findings of the report indicate that there will be a 1 dBA increase in sound level during the nighttime and no change relative to sound levels during the daytime for receptors along Main Street between the McMaster Medical Stop (approximately at University Avenue) and the Highway 403 Ramp, which includes the proposed development. The contribution of the LRT system to the overall sound level from cars, trucks and buses at the location of the proposed development is relatively small and further consideration of the LRT is not required. The supporting documents from the report are attached in Appendix A.

The foregoing impact assessment is provided, despite the LRT project being cancelled, as due diligence in the event that the project is resumed in the future.

4.2 Road Traffic

Projected traffic data for Main Street was obtained from the City of Hamilton. Data was provided in the form of current Turning Movement Counts (TMC), and are provided in Appendix B. The traffic volumes were grown to the year 2030 using a growth rate of 2.5% per year. A commercial vehicle percentage of 3.7% was obtained and split into 1.4% medium trucks and 2.3% heavy trucks. A day/night split of 90%/10% and a speed limit of 50 km/h was used in the analysis. Table II summarizes the road traffic data used in the analysis.

Road traffic data for Highway 403 was obtained from the Ministry of Transportation (MTO) in the form of summer average daily traffic volumes (SADT) for the year 2016, and are provided in Appendix B. The data was projected to the year 2030 using a 2.5% growth rate. A commercial vehicle percentage of 10% was used, split into 3.8% medium trucks and 6.2% heavy trucks, as per the MTO procedures. A day/night split of 85%/15% and a posted speed limit of 100 kph were used in the analysis.

Table II: Forecasted Road Traffic Data (2030)

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Main Street	Daytime	40 162	744	12 219	53 124
	Nighttime	4 462	83	1 358	5 903
	Total	44 624	826	13 576	59 027
Highway 403	Daytime	107 768	4 550	7 424	119 742
	Nighttime	19 018	803	1 310	21 131
	Total	126 786	5 353	8 734	140 873

4.3 Road Traffic Noise Predictions

To assess the levels of road traffic noise which will impact the subject site in the future, sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MECP. Sample STAMSON output is included in Appendix C.

Predictions of the traffic sound levels were made at various façades with exposure to the road traffic noise sources, as shown in Figure 2. The results of these predictions are summarized in Table III. The acoustic recommendations will be subject to modifications if the building envelopes or heights are changed significantly. The worst case prediction locations were chosen

at the top floors of the proposed building, to investigate ventilation and building façade construction requirements and in the outdoor amenity areas to investigate acoustic barrier requirements.

Table III: Predicted Future Sound Levels, [dBA]

Prediction Location	Description	Daytime – at Façade/OLA L _{EQ(16)}	Nighttime – at Façade L _{EQ(8)}
A	North Façade	77	70
B	East Façade	76	70
C	South Façade	71	66
D	South Façade	72	67
E	West Façade	76	70
F	G/F Amenity Space	<55	--
G	10/F Terrace *	61	--
H	10/F Terrace *	61	--

Note:

* Assuming a minimum 1.07 m high solid parapet or guard.

5 Discussion & Recommendations

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

5.1 Outdoor Living Areas

The predicted sound level in the outdoor amenity area indicated on the site plan in the interior of the development on the ground floor (Prediction Location [F]) will be less 55 dBA. Physical mitigation will not be required.

The predicted sound level at the 10th floor terraces (Prediction Location [G] and [H]) will be 61 dBA, 6 dBA in excess of the MECP's limit. Physical mitigation in the form of an acoustic barrier 2.0 m in height will reduce sound levels to below 60 dBA.

The acoustic barrier should be of a solid construction with a surface density of no less than 20 kg/m². It may be constructed from a variety of materials such as wood, brick, pre-cast

concrete, tempered glass or other concrete/wood composite systems provided that it is free of gaps or cracks. The heights and extents of the barriers should be chosen to reduce the sound levels in the OLA's to below 60 dBA and as close to 55 dBA as is technically, administratively and economically feasible, subject to the approval of the municipality respecting any applicable height by-laws.

The dwelling units within the proposed development may have balconies and patios that are less than 4 m in depth. These areas are not considered to be outdoor amenity areas under MECP guidelines, and are therefore exempt from traffic noise assessment.

5.2 Indoor Living Areas & Ventilation Requirements

At all of the façades of the proposed building the predicted night-time sound levels exceed 60 dBA and the daytime levels exceed 65 dBA. To address these traffic noise excesses, MECP guidelines recommend that the residential suites be equipped with central air conditioning to allow windows to remain closed.

In general, window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall sound insulating properties of the envelope. Acceptable units are those that are housed in their own closet with an access door for maintenance. Any outdoor air conditioning unit or rooftop mechanical units should be located, installed, and selected with an appropriate sound emission rating to comply with MECP guidelines NPC-300.

5.3 Building Façade Constructions

Predicted sound levels at the building facades were used to determine sound insulation requirements of the building envelope. Future daytime sound levels at the façades of the proposed building will exceed 65 dBA during the daytime and/or 60 dBA during the nighttime. 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 building elevations prepared by SRM Architects Inc. dated January 10, 2020 ("Issued for Coordination") were reviewed by HGC Engineering. Calculations were performed to determine the acoustical insulation factors to maintain indoor sound levels within MECP



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guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building facades, and the area ratios of the facade components (windows and walls) and the floor area of the adjacent room. Based on the modelling, assumptions, and criteria described above, the acoustical requirements for the façades are described in Table IV. Note that these are minimums for the entire assembly (including patio doors, awning windows, and mullions) and that test data should be provided to verify.

Table IV: Minimum STC Requirements for Glazing at Specific Façades

Façade	Space	Glazing STC ^{1, 2}
North	Living/Dining	STC-38
	Bedroom	STC-38
	Bedroom*	STC-40
East	Living/Dining	STC-37
	Bedroom	STC-38
South	Living/Dining	STC-33
	Bedroom	STC-35
	Bedroom*	STC-39
West	Living/Dining	STC-37
	Bedroom	STC-38

Note:

¹ Based on calculated window to floor area ratios.

² STC requirement refers to installed performance, including sound transmitted through mullions in window-wall systems and seals on operable windows and doors. Test data should be provided where available.

* Bedrooms at the corner units

OBC – any construction meeting the minimum requirements of the Ontario Building Code

According to the floor plans and building elevations, the bedrooms/sleeping quarters and living/dining rooms will have window areas up to 150% and 60% of the room floor area, respectively.

Sample window assemblies which may achieve the STC requirements are summarized in Table V below. Note that acoustic performance varies with manufacturer's construction details, and these are only guidelines to provide some indication of the type of glazing likely to be required. 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.

Table V: Window Constructions Satisfying STC Requirements

STC Requirement	Sample Glazing Configuration (STC)
28 – 29	Any double glazed unit
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
38	6(25)5, 6L(13)6
39	6(25)6
40	8(13)6

In Table V, the numbers outside the parentheses indicate minimum pane thicknesses in millimetres and the number in parentheses indicates the minimum inter-pane gap in millimetres. “L” indicates a laminated pane. OBC indicates any glazing construction meeting the minimum requirements of the Ontario Building Code.

Operable sections include sliding glass doors and operable windows, and provided that they include a good seal, will not significantly affect overall performance. Operable windows and sliding glass doors must be well-fitted and weather-stripped.

Further Analysis

When detailed floor plans and building elevations showing the extent of sliding doors, windows and spandrel sections are available, the glazing requirements should be refined based on actual window to floor area ratios. When high STC ratios are required, window glazing areas may be reduced to achieve lower STC values.

5.4 Warning Clauses

MECP guidelines recommend that appropriate warning clauses be used in the Development Agreements and in purchase, sale and lease agreements (typically by reference to the Development Agreements), to inform future owners and occupants about noise concerns from transportation sources in the area. The following clauses are recommended:

- (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 traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment, Conservation and Parks.
- (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, Conservation and Parks' noise criteria.
- (c) Purchasers/tenants are advised that due to the proximity of the existing commercial facilities, noise from these facilities may at times be audible.

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

6 Ground Borne Vibration Assessment

As mentioned above, the proposed Hamilton Light Rail Transit (LRT) system has been cancelled. Nonetheless, the potential noise and vibration impacts from the LRT system on the proposed development have been assessed in the event that plans for the LRT system are resumed in the future.

The Light Rail Transit (LRT) system was proposed to operate along the centre of Main Street West. There will be 2 tracks, the closer one located approximately 20 m from the north façade of the proposed building.

Vibration-induced sound levels are presented, factoring in the possible degree of isolation applied to the track, the proximity to the track, and the operating speed of the LRT vehicles. According to the LRT system plan, the nearest proposed stop is the Longwood LRT Stop, approximately 400 metres to the east of the development. It is assumed that streetcars will



operate at the posted speed limit of 60 km/h when passing the site. The report presents three levels of vibration isolation, as follows:

- “Level 1: Embedded, soft rubber”
- “Level 2: Embedded, more resilient than Level 1; thicker material”
- “Level 3: Floating slab on a concrete rail bed mounted on rubber isolators (mats)”

According to the report, at a distance greater than 20 metres and at a speed of 60 km/h, ground-borne vibration from the LRT is more critical than vibration-induced noise due to the damping characteristics of clayey soils which reduce sound levels in octave bands that are perceptible to human hearing. The report indicates that residential receptors located more than 20 metres or more from the centerline of the track will meet the guideline ground-borne vibration limit without any addition vibration control measures. Nonetheless, Level 1 isolation will be provided to further limit the vibration-induced sound levels at the location of the proposed building. Vibration induced noise and perceptible ground-borne vibration from the LRT vehicles are therefore not anticipated to be an issue for this development.

7 Stationary Noise Sources

7.1 Criteria for Stationary Sources of Sound

Stationary sources of noise are defined as all sources that emit noise within a commercial or industrial facility boundary. The existing rooftop mechanical equipment on the roof of the adjacent synagogue/school to the south of the subject site can be classified as stationary sources of sound.

The Ministry of the Environment, Conservation and Parks (MECP) provides guidelines for the assessment of stationary noise sources. NPC-300 “Environment Noise Guideline Stationary and Transportation sources – Approval and Planning” referenced with regard to traffic noise is also intended for use in the planning of noise sensitive land uses adjacent to residential buildings.

The criteria is based on the background sound level at sensitive points of reception (which are typically residences) in the quietest hour that the source can be in operation. Background sound includes sound from road traffic and natural sounds, but excludes the sources under assessment. For relatively quiet areas where background sound may fall to low levels during some hours,

NPC-300 stipulates various minimum limits. In Class 1 areas, these limits are 50 dBA for daytime periods (07:00 to 23:00) and 45 dBA at night (23:00 to 07:00).

Source sound levels for typical rooftop mechanical units and assumed operational information (outlined below) were used as input to a predictive computer model (*Cadna-A version 2021 MRI (32 bit) : build 188.5100*), in order to estimate the sound levels from the existing religious building at the proposed development. The computer model is based on the methods from ISO Standard 9613-2.2, “Acoustic – 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. Assumptions regarding the operating duty cycles of the equipment (100% during the daytime, and 50% during the nighttime) were included based on our experience with other projects.

7.2 Assessment of Existing Stationary Noise Sources and their Impact on Proposed Sensitive Receptors

A sound power level of 80 dBA was estimated for the rooftop mechanical equipment located as shown in Figure 3 based on manufacturer’s data for similar equipment used in past projects. The results of this assessment indicate a sound level of 47 dBA during the daytime and 44 dBA during nighttime at the proposed building as shown in Figures 4 and 5. These predicted sound levels are less than the MECP minimum exclusionary limit of 50 dBA during the daytime hours and 45 dBA during the nighttime hours, based on a typical worst-case operating scenario.

It is concluded that sound from the existing rooftop mechanical equipment associated with the adjacent religious building are anticipated to comply with the MECP guidelines at the proposed building and physical mitigation is not required.

7.3 Impact of the Development on Itself

Section 5.9.1 of the Ontario Building Code (OBC) specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls should meet or exceed STC-50. Walls separating a suite from a noisy space such as a refuse chute, or elevator shaft, should meet or exceed STC-55. In



addition, it is recommended that the floor/ceiling constructions separating suites from any amenity or commercial spaces also meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

8 Summary of Recommendations

Sound levels due to road traffic will exceed MECP guidelines at the facades of the proposed mixed-use building. The following recommendations and Table VI are provided with regard to noise mitigation.

For transportation noise sources

1. Central air conditioning systems are required for the proposed building. It is understood that all residential suites will be provided with air conditioning, thus satisfying the ventilation requirement. The location, installation and sound ratings of the air conditioning devices should comply with NPC-300, as applicable.
2. When detailed floor plans and building elevations are available, an acoustical consultant should provide revised glazing constructions based on actual window to floor area ratios.
3. Warning clauses should be used to inform future owners of the road traffic noise issues, the presence of nearby commercial/institutional facilities.



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

Prediction Location	Description	Acoustic Barrier	Ventilation Requirements*	Warning Clause	Upgraded Building Constructions
A	North Façade	--	Central Air Conditioning	A, B, C	See Table V
B	East Façade	--			
C	South Façade	--			
D	South Façade	--			
E	West Façade	--			
F	G/F Amenity Space	--	--	--	--
G	10/F Terrace	✓	--	--	--
H	10/F Terrace	✓	--	--	--

Notes:

-- no specific requirement

* The location, installation and sound rating of the air conditioning condensers must be compliant with MECP Guideline NPC-300, as applicable.

✓ Acoustic barrier with heights as indicated in Section 5.1 required.

OBC – Ontario Building Code

For stationary noise sources

1. The predicted sound levels from the existing rooftop mechanical equipment at the adjacent institutional building will be below the MECP minimum exclusionary limits. Physical mitigation will not be required.
2. Tarion Builder's Bulletin B19R requires that the internal design of condominium projects integrates suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the buildings on its residents. If B19R certification is needed, an acoustical consultant is required to review the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels. Outdoor sound emissions should also be checked to ensure compliance with the City of Hamilton noise by-law.

8 Implementation

To ensure that the noise control recommendations outlined above are properly included in the building design and properly implemented in the final construction, it is recommended that:

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



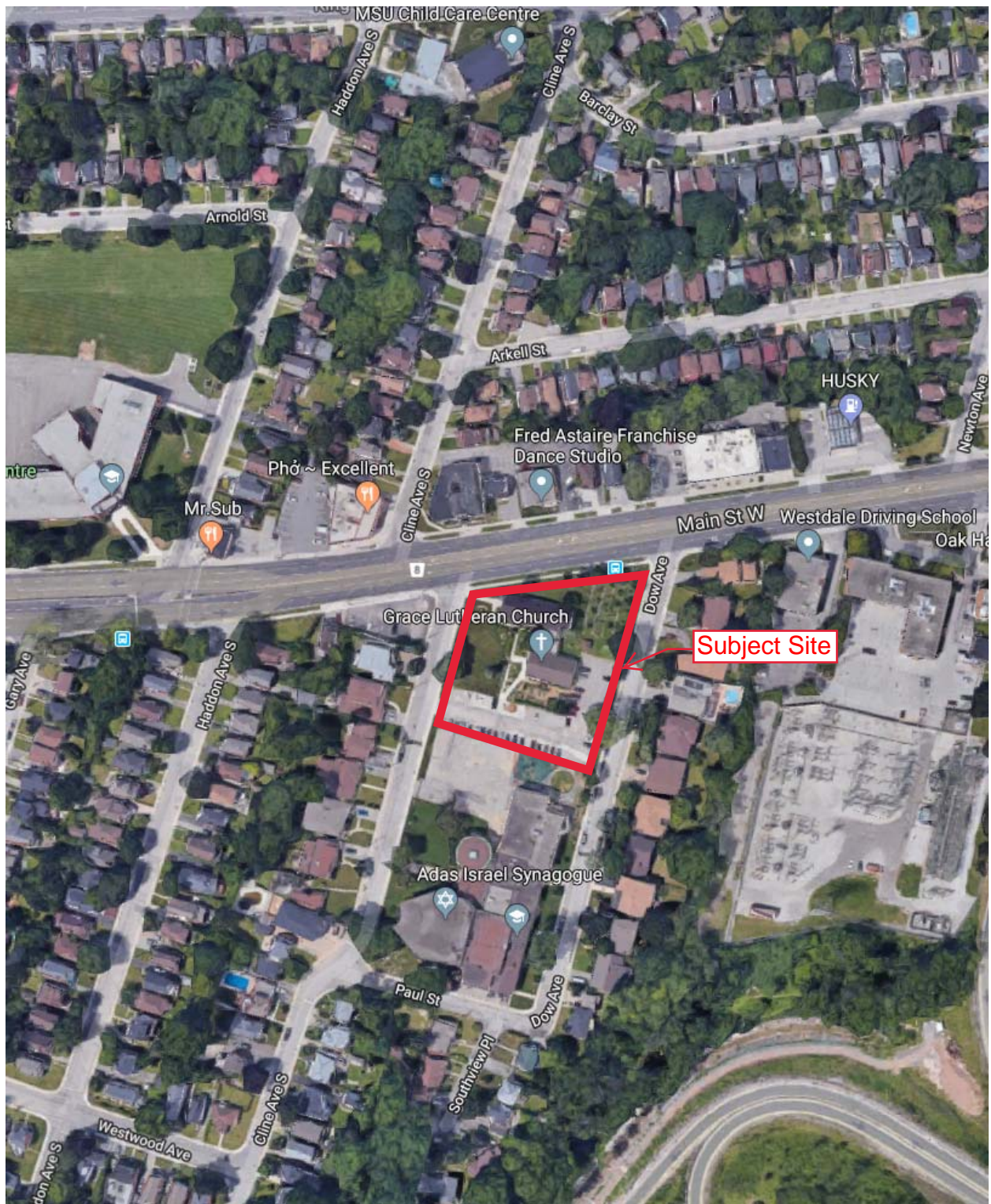
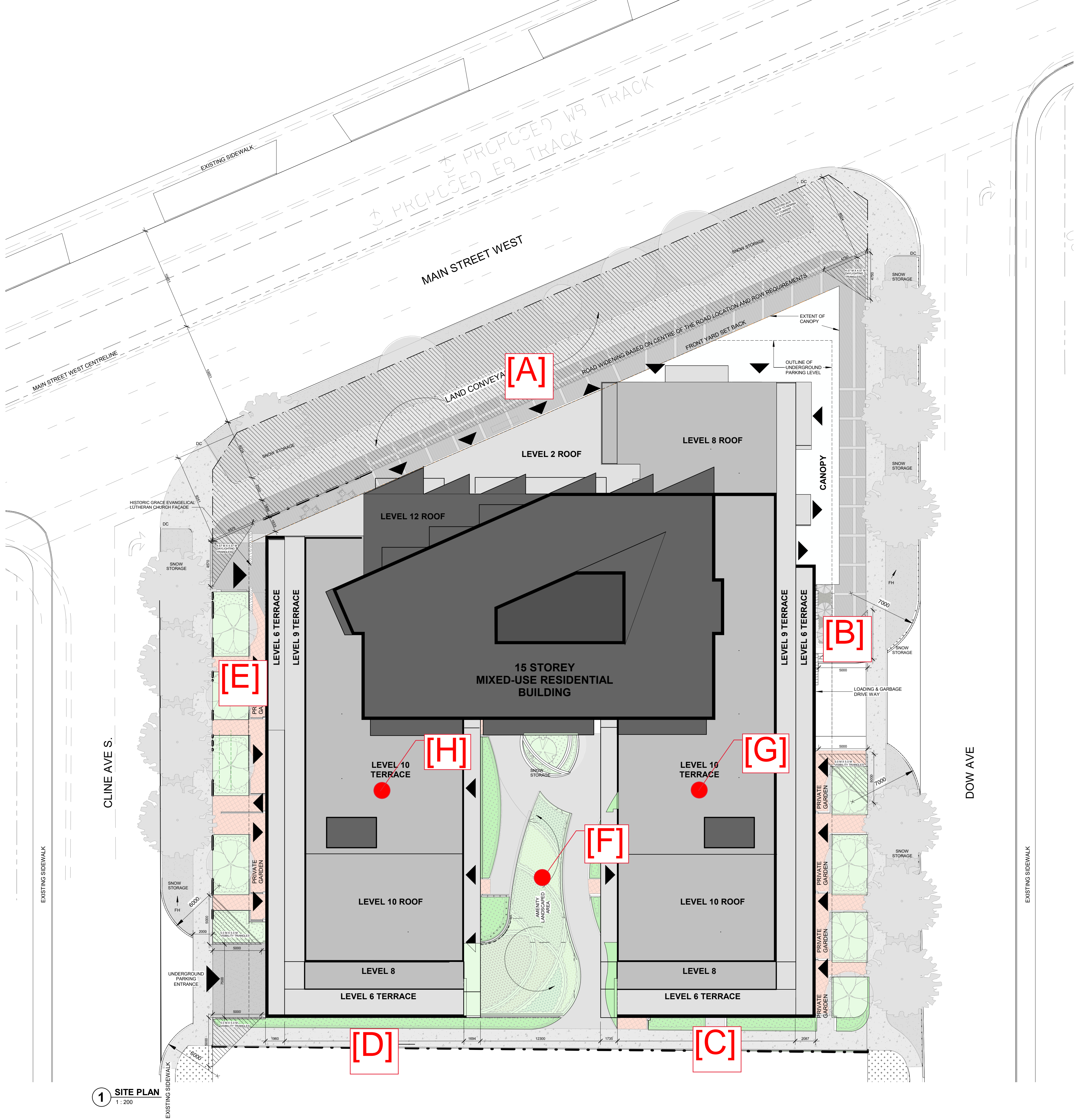


Figure 1: Key Plan

Do not scale drawings. Contractors must check and verify all dimensions and report any discrepancies to the Architect before proceeding with the work. All documents remain the property of the Architect. Unauthorized use, modification, and/or reproduction of these documents is prohibited without written permission. The Contract Documents were prepared by the Consultant for the account of the Owner. The material contained herein reflects the Consultant's best judgement in light of the information available to him at the time of preparation. Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the Contract Documents.

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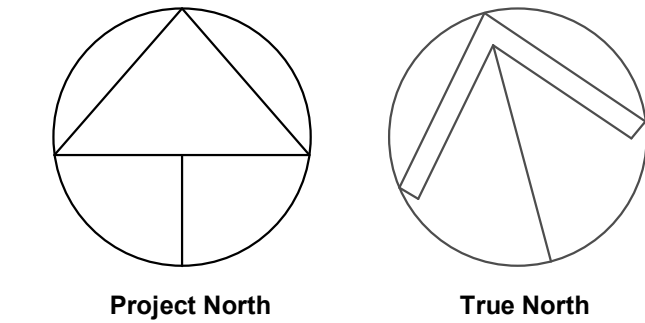
SITE DATA		
1107 MAIN STREET WEST, HAMILTON, ONTARIO		
DATA	REQUIRED	PROVIDED
ZONING	ZONING - TOC-1	
LOT AREA - PRE ROAD WIDENING	XX (m²)	5,169.3 m²
LOT AREA - POST ROAD WIDENING	XX (m²)	4,517.0 m²
FRONT YARD (meters)	4.5 (m)	1.6 m
EXTERIOR SIDE YARD (m)	6 (m) CLINE AVE S.	5.4 m
EXTERIOR SIDE YARD (m)	6 (m) DOW AVE	5.3 m
REAR YARD (m)	7.5 (m)	3.0 m

BUILDING DATA		
DATA	REQUIRED	PROVIDED
TOTAL DENSITY (# of units)	XX (units)	329 units
BUILDING AREA (m²)	XX (m²)	2,756 m² / 29,670 SF
GROSS FLOOR AREA - ABOVE GRADE (m²)	XX (m²)	23,990 m² / 258,230 SF
PROJECT FAR	XX	4.64 (As per pre road) 5.31 (As per post road)
UG PARKING FLOOR AREA (m²)	XX (m²)	9,848 m² / 106,004 SF
NUMBER OF STOREYS	—	15
BUILDING HEIGHT (m)	22 (m) MAX.	45 m (to roof)
COMMERCIAL/RETAIL AREA (m²)	XX (m²)	615.2 m² / 6622 SF
RESIDENTIAL SALABLE AREA (M²)	XX (m²)	19,083.8 m² / 205,416.6 SF
INTERIOR AMENITY AREA (m²)	XX (m²)	158 m² / 1,699 SF

VEHICLE PARKING DATA		
DATA	REQUIRED	PROVIDED
RESIDENTIAL PARKING	0.5 / 315 (no towns)* =157.5	175
TOWNHOME PARKING (INCL.)	1.0 / units = 10	10
BARRIER FREE PARKING (INCL.)	1 + 3% = 6.55	9
VISITOR PARKING	0.1 / units = 32.2	33
COMMERCIAL PARKING	0.X / units	XX
TOTAL	195	209
PARKING STALL BREAKDOWN		
UNDER GROUND - LEVEL 3		83 STALLS
UNDER GROUND - LEVEL 2		81 STALLS
UNDER GROUND - LEVEL 1		44 STALLS

BICYCLE PARKING DATA		
DATA	REQUIRED	PROVIDED
RESIDENTIAL BICYCLE PARKING		
SHORT TERM	5	10
LONG TERM	0.5 / units = 325x 0.5= 162.5	164
COMMERCIAL BICYCLE PARKING		
SHORT TERM	10	10
LONG TERM	5 / units (if 1001 - 10000 m²) = 4x5 = 20	20
TOTAL	195	204

UNIT BREAKDOWN		
DATA	DEVELOPMENT PERCENTAGE	PROPOSED NUMBER
BACHELOR UNIT	2.5%	12
ONE BEDROOM UNIT	24.5%	76
ONE BEDROOM UNIT + DEN	32.9%	115
TWO BEDROOM UNIT	22.4%	64
TWO BEDROOM UNIT + DEN	4.3%	16
THREE BEDROOM UNIT	5.9%	18
THREE BEDROOM UNIT + DEN	3%	8
TWO BEDROOM FAMILY UNIT *	0.9%	1
THREE BEDROOM FAMILY UNIT *	0.6%	4
TWO BEDROOM TOWNHOME UNIT *	1.6%	7
THREE BEDROOM TOWNHOME UNIT *	1.3%	3
FOUR BEDROOM FAMILY UNIT *	1.3%	1
TOTAL		325
*DIRECT ACCESS TO GRADE WITH PRIVATE ENTRANCE		



- GENERAL NOTES**
1. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS.
 2. ALL WORK SHALL COMPLY WITH THE 2012 ONTARIO BUILDING CODE AND AMENDMENTS.
 3. CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND SPECIFICATIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
 4. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL HAVE A SET OF APPROVED CONSTRUCTION DOCUMENTS ON SITE AT ALL TIMES.
 5. ALL DOCUMENTS REMAIN THE PROPERTY OF THE ARCHITECT. UNAUTHORIZED USE, MODIFICATION, AND/OR REPRODUCTION OF THESE DOCUMENTS IS PROHIBITED WITHOUT WRITTEN PERMISSION. THE CONTRACT DOCUMENTS WERE PREPARED BY THE CONSULTANT FOR THE ACCOUNT OF THE OWNER.
 6. THE MATERIAL CONTAINED HEREIN REFLECTS THE CONSULTANT'S BEST JUDGEMENT IN LIGHT OF THE INFORMATION AVAILABLE TO HIM AT THE TIME OF PREPARATION. ANY USE WHICH A THIRD PARTY MAKES OF THE CONTRACT DOCUMENTS, OR ANY RELIANCE ON OR DECISIONS TO BE MADE BASED ON THEM ARE THE RESPONSIBILITY OF SUCH THIRD PARTIES.
 7. THE CONSULTANT ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THE CONTRACT DOCUMENTS.

14	2020-11-17	ISSUED FOR REZONING
13	2020-09-09	ISSUED FOR CLIENT REVIEW
10	2020-02-11	ISSUED FOR REZONING
No.	Date	Revision

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
Plot Date / Time		2020-11-17 11:06:41 AM

1107 MAIN ST. W.
HAMILTON

SITE PLAN

Drawing Scale	As indicated
Status	

RE-ZONING	
Drawing No.	Revision No.

PRELIMINARY

A1.1 - r14

Figure 2: Proposed Site Plan Showing Prediction Locations

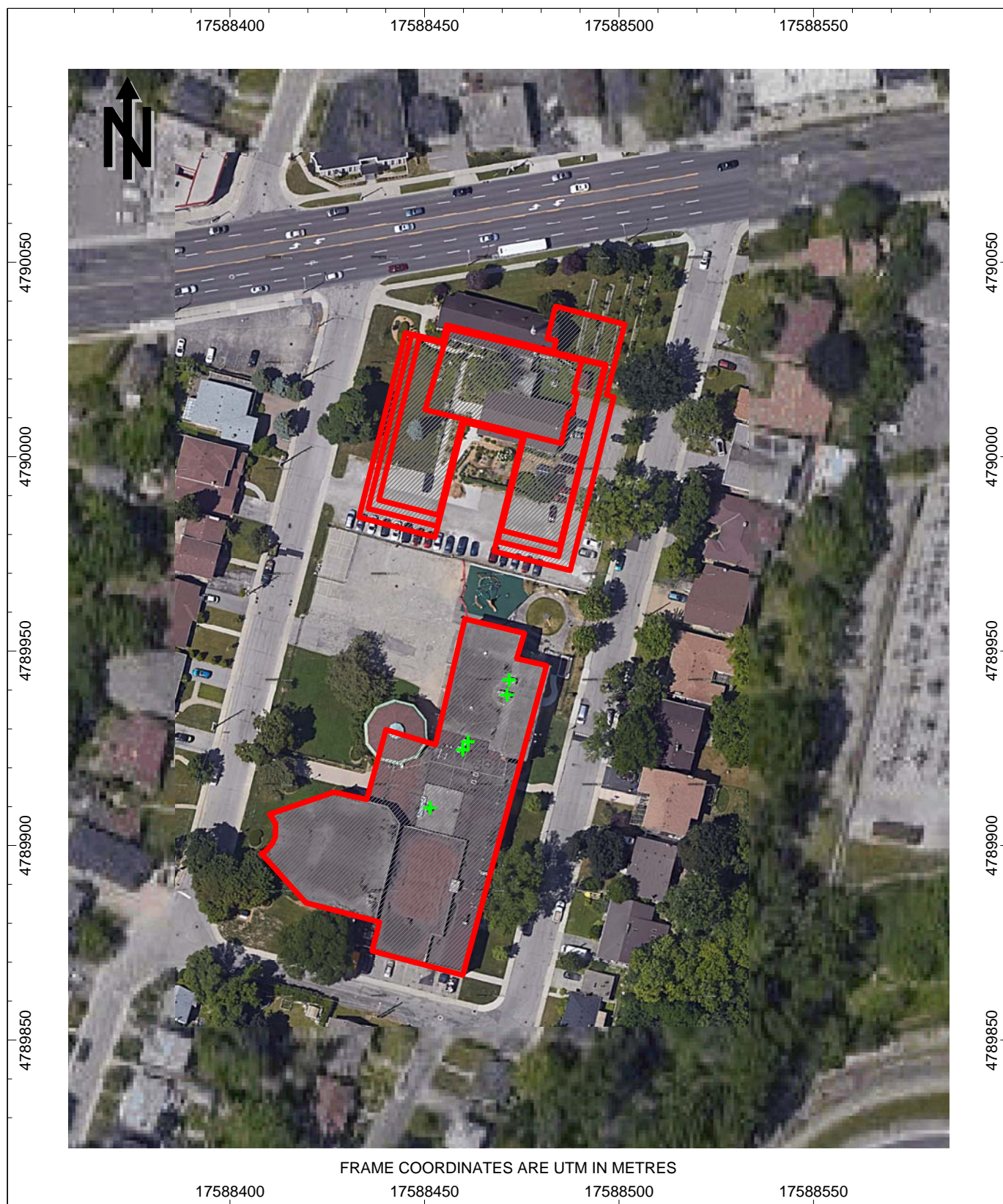


Figure 3 – Existing Noise Source Locations

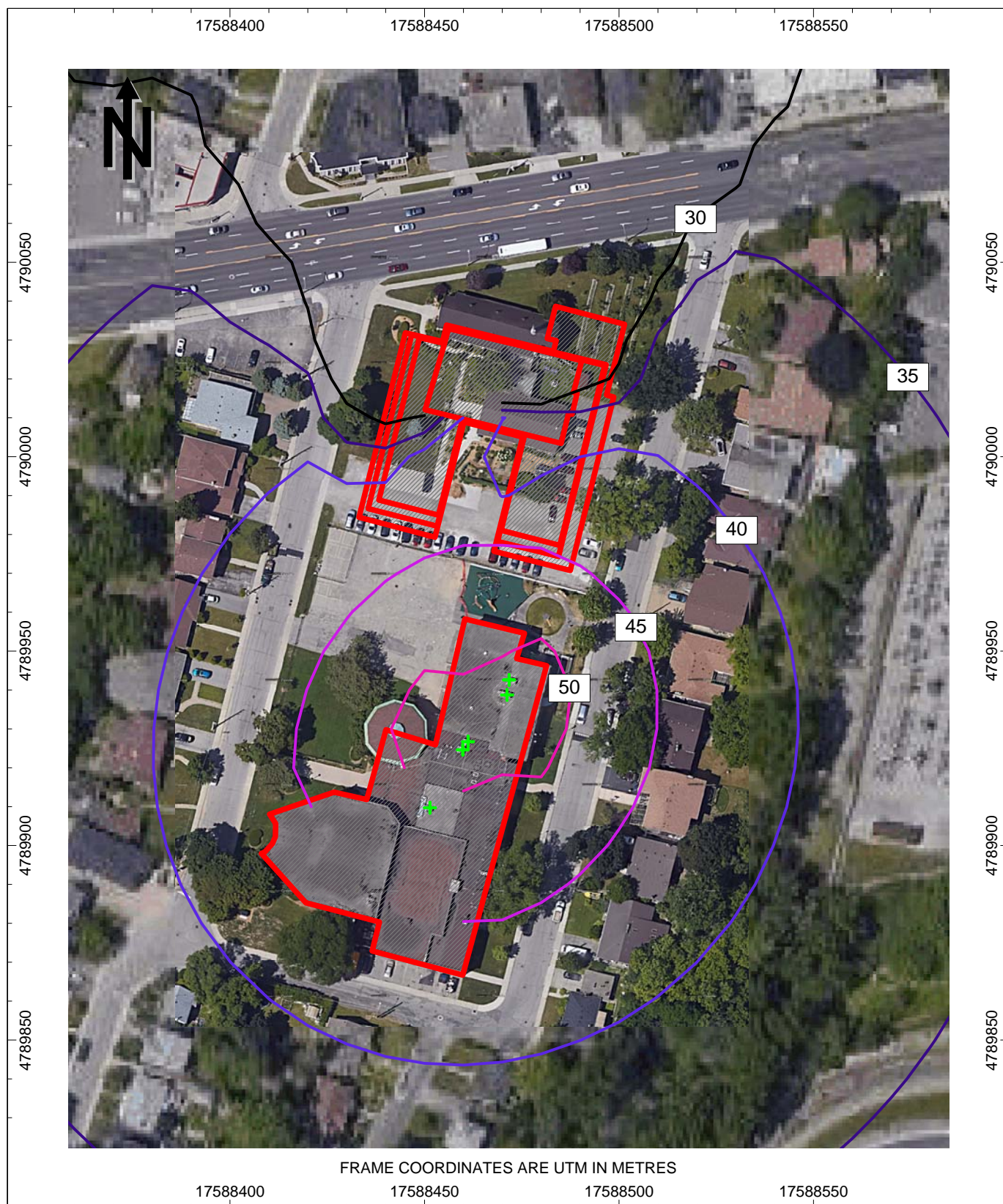


Figure 4 – Predicted Daytime Sound Level Contours from Existing Stationary Noise Sources, dBA

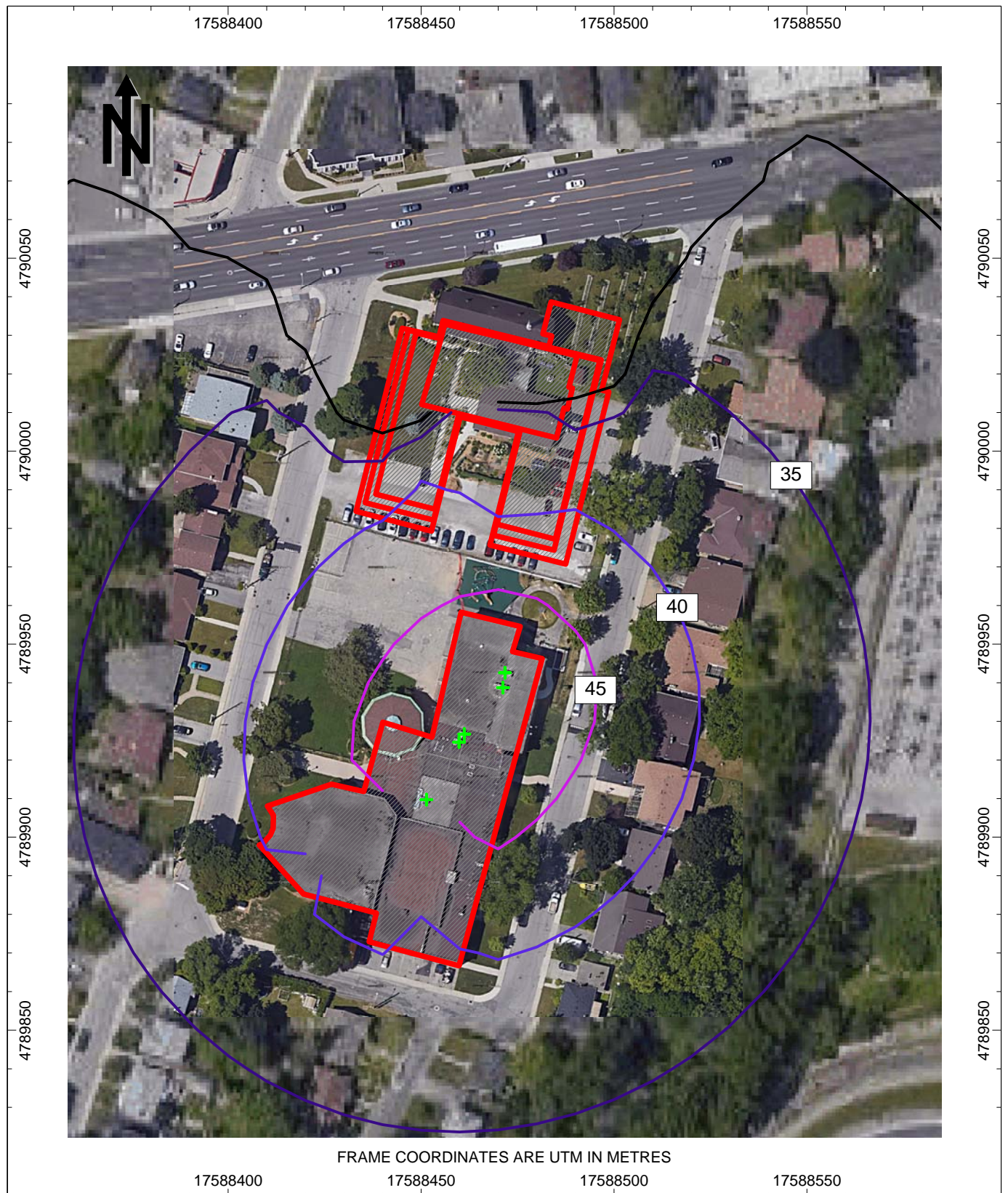


Figure 5 – Predicted Nighttime Sound Level Contours from Existing Stationary Noise Sources, dBA

APPENDIX A

Supporting Documents

Table 1: Corridor Description

From	To	Roadway Name	Track Position	Land Uses	Distance to Closest Sensitive Receptor	POR
McMaster University	McMaster Medical	Cootes Drive/Main Street	Offset	Commercial, residential, institutional	80m	-
McMaster Medical	Highway 403 Ramp	Main Street	Centre	Residential, commercial, some institutional	20m	1
Highway 403 Ramp	Paradise Road	Main Street	Centre	Residential, commercial, some institutional	21m	2
Paradise Road	Highway 403	Main Street	Offset	Residential, commercial	26m	3
Highway 403	Queen Street	King Street	Offset	Residential, commercial	7m	4
Queen Street	James Street	King Street	Offset	Residential, commercial	8m	5
James Street	Catharine Street	King Street	Offset	Commercial, some residential	17m	-
Catharine Street	Wellington Street	King Street	Offset	Commercial, residential	8m	6
Wellington Street	Wentworth Street	King Street	Offset	Residential, commercial, some institutional	9m	7
Wentworth Street	Barnsdale Blvd	King Street	Offset	Residential, commercial	7m	8
Barnsdale Blvd	Main Street	King Street	Offset	Residential, commercial, some institutional	7m	9
King Street	Queenston Road	Main Street	Offset	Residential, commercial, some institutional	10m	10
Main Street	Parkdale Road	Queenston Road	Centre	Residential, commercial, some institutional	15m	11
Parkdale Road	Red Hill Valley Parkway	Queenston Road	Centre	Residential, commercial, some institutional	20m	12
Red Hill Valley Parkway	Woodman Drive	Queenston Road	Centre	Residential, commercial	17m	13
Woodman Drive	Centennial Parkway	Queenston Road	Centre	Residential, commercial	22m	14

The following assumptions were used in modelling the traffic data:

1. The B-Line LRT route is expected to displace traffic, resulting in an increase in traffic on other roads. The effect of the increase in traffic on parallel roads is reviewed in Section 4.2.3.
2. With the exception of the LRT volumes, daily traffic has been divided into daytime and nighttime volumes, using a typical 90% daytime/10% nighttime split.
3. Nighttime LRT operations are expected to stop between 0130 and 0500 hours for maintenance.
4. The speed limit for regular traffic is assumed to be 60km/h on Main Street, west of Highway 403, 60km/h on Queenston Road, between Reid Ave and Potruff Road, and 50km/h everywhere else
5. The operating speed of the LRT will be the same as regular traffic and 50km/h in the downtown section with no regular traffic.
6. Due to the nature of sound, changes in traffic volumes of +25%/-20% would change the overall sound levels by 1dB only.

4.2.3 Assessment Analysis and Results

Table 5 summarizes the “No Project” and “With Project” sound levels as well as the expected daytime and nighttime impacts.

Table 5: Expected LRT Sound Levels and Expected Impacts

POR	No Project Sound Levels (dB)		With Project Sound Levels (dB)						Impact (dB)	
	Daytime (16hr L _{eq})	Nighttime (8hr L _{eq})	Daytime (16hr Leq)			Nighttime (8hr Leq)			Daytime	Nighttime
			Traffic Only	LRT Only	TOTAL ¹	Traffic Only	LRT Only	TOTAL ¹		
1	71	64	70	61	71	64	57	65	0	1
2	69	63	69	61	70	62	57	63	1	0
3	66	60	65	60	66	59	56	61	0	1
3 (Upper Floors) ²	72	71	72	60	72	71	56	71	0	0
4	70	63	65	63	67	59	59	62	-3	-1
5	70	63	64	63	67	57	59	61	-3	-2
5 (Opposite) ³	68	62	67	61	68	60	57	62	0	0
6	69	62	0	63	63	0	59	59	-6	-3
7	67	60	58	63	64	52	58	59	-3	-1
8	68	61	60	63	65	54	59	60	-3	-1
9	69	62	61	63	65	55	59	60	-4	-2
10	68	61	58	62	63	52	58	59	-5	-2
11	66	60	61	60	64	54	56	58	-2	-2
12	68	61	64	61	66	58	57	61	-2	0
12 (Upper Floors) ²	70	65	68	61	69	63	57	65	-1	0
13	68	62	67	62	68	61	58	63	0	1
14	66	60	65	61	66	58	57	61	0	1

Notes 1. The "With Project Sound Levels" have been divided into Traffic Only and LRT Only sound levels to show the relative significance of each. They are then added together to obtain the TOTAL sound level, which is used to determine the potential impact.

2. Upper floors are evaluated in these cases are evaluated to demonstrate the relative impacts of upper floors compared to lower floors.

3. Opposite to POR5 are also sensitive receptors which are evaluated to show the effect of a shift in the alignment of the roadway in the sections where the LRT is offset, causing higher levels to one side of the road and lower levels on the other.

5.4 Prediction of Vibration Levels

Both the ground-borne vibration(perceptible vibration) and the vibration-induced noise resulting from the proposed LRT system have been estimated. The perceptible vibration levels are evaluated based on the MOE/TTC Protocol's guideline limit of 0.10mm/s RMS. The vibration-induced noise from the LRT is evaluated at residences based on the FTA guideline level of 35dBA, wherever the air-borne noise would not dominate the vibration-induced sound..

The predicted vibration levels are based on the posted speed limits along the various sections.

5.4.1 Perceptible Vibration Levels on Concrete Track

On concrete-embedded track, the CLRVs were measured at various distances. Table 8, below, summarizes the measured vibration levels.

Table 8: Measured Vibration Levels on Concrete Track Bed

Distance from Track Centerline (m)	Vibration Levels (mm/s rms)
3	0.19
7	0.13
12	0.11

As discussed earlier, all new light rail systems include at least a basic (Level 1) version of the embedded rail. Considering the 5dB reduction (44% reduction) from this system, the increase in speed to 40km/h, and the addition of an extra axle, the vibration levels from the LRT in place can be estimated. Again, it is assumed that clayey soils persist throughout the areas with concrete-embedded track.

Table 9, below, summarizes the estimated vibration levels that would be present at various setbacks from the centreline of the nearest track.

Table 9: Expected LRT Vibration Levels on Concrete Track Bed

Distance from Track Centerline (m)	Vibration Levels at Various Speeds (mm/s rms)		
	20km/h	50km/h	60km/h
6	0.07	0.17	0.21
10	0.05	0.11	0.14
15	0.04	0.10	0.12
20	0.03	0.08	0.10

As can be seen from Table 9, any residential receptors located 20m or more from the centreline of the nearest track will meet the guideline limit of 0.10mm/s without any additional vibration control measures when the LRT is operating at a speed of 60km/h. Any residential receptors located 15m or more from the centreline of the nearest track will meet the guideline limit of 0.10mm/s when the LRT is operating at a speed of 50km/h. As there are no sensitive receptors within 5m of a track, the guideline limit of 0.10mm/s will always be met when the LRT is operating at a speed of 20km/h. Otherwise, residential receptors located closer than the setbacks listed above will require additional vibration isolation to reduce the vibration levels to 0.10mm/s rms. For concrete embedded track, however, vibration control to limit vibration-induced noise is more critical and will supersede the requirements for perceptible vibration mitigation.

5.4.2 Vibration-Induced Sound

For light rail on a concrete track bed, vibration-induced sound tends to be more of an issue than perceptible vibration, especially at close setbacks. At greater setbacks, vibration-induced sound becomes less critical as the damping characteristics of clayey soils reduce the vibration-levels in the octave bands that human hearing is sensitive too. At setbacks of 20m or more from the nearest track, perceptible (ground-borne vibration) is more critical than vibration-induced noise. The following analysis for vibration-induced noise is based on setbacks of 20m or less, which occurs primarily wherever the LRT is operating at 50km/h.

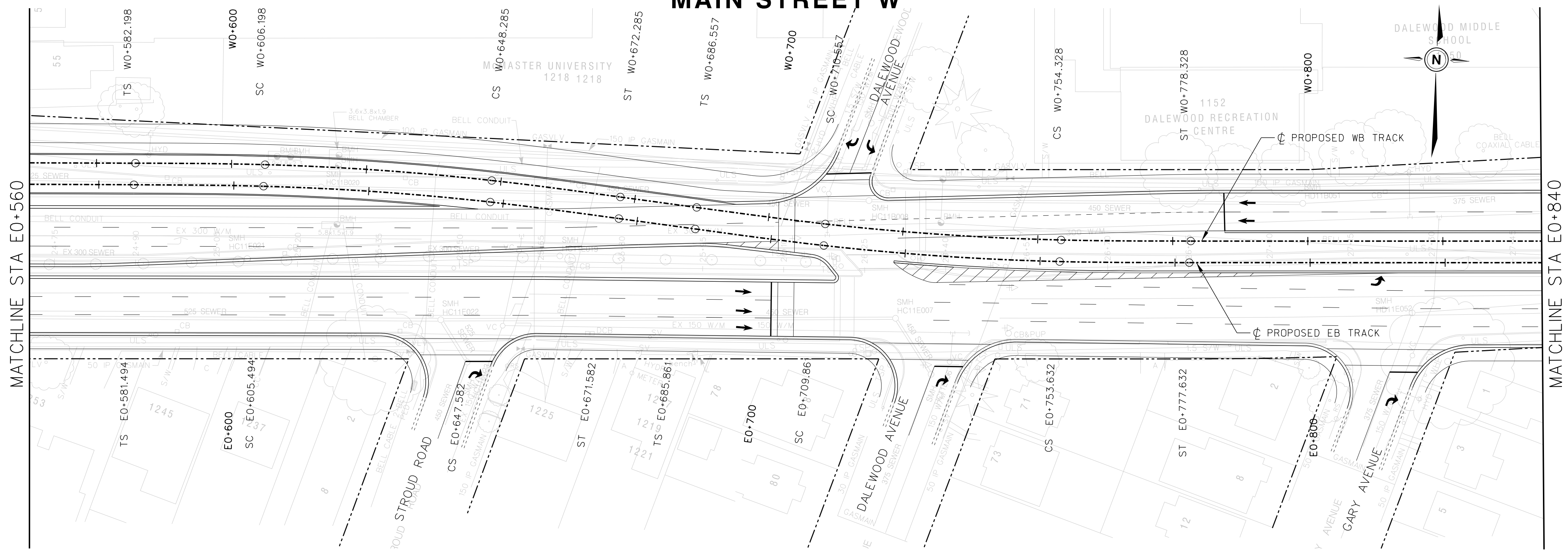
Based on the measurements taken from Table 8, the sound levels in various rooms within residences adjacent to the proposed LRT route can be determined. Table 10, below, summarizes the sound levels that can be expected in various rooms as a result of vibration-induced noise. It has generally been assumed that there is usually one room with window exposure to the LRT route, with a second bedroom room set back within the building that does not have any window exposure to the LRT route. As per the FTA guidelines, the recommended objective for vibration-induced noise in the otherwise quiet bedroom (i.e., back rooms) is 35dBA.

Table 10 depicts the various vibration-induced sound levels that can be expected under various circumstances, wherever the LRT is operating at 50km/h. The distances listed are based on the most common setbacks between the track centreline and sensitive receptors along the LRT corridor. The air-borne sound level is the sound level that can be expected in the first room with window exposure facing the LRT, where the air-borne noise always dominates the vibration-induced noise. Hence, the vibration-induced noise would not be noticeable in rooms with window exposure to the LRT corridor. In back rooms, the air-borne sound levels would generally be very low, as they may not be exposed to any road noise. These areas are the most critical, as it is where the vibration-induced noise would be audible.

Table 10: Expected Vibration-Induced Sound Levels at 50km/h

Distance from Track to Building Foundation	Floor	Room	Airborne Sound Level from LRT (dBA)	Vibration-Induced Sound Level Under Various Isolation Systems (dBA)		
				Level 1 Isolation	Level 2 Isolation	Level 3 Isolation
6m	1	1	54	52	47	37
		2	-	50	45	35
	2	1	54	47	42	37
		2	-	45	40	35
10m	1	1	51	46	41	36
		2	-	45	40	35
	2	1	51	42	37	-
		2	-	40	35	-
16m	1	1	50	41	36	-
		2	-	40	35	-
	2	1	50	37	-	-
		2	-	35	-	-

MAIN STREET W



FILE No.

CONTRACT No. C11-12-10

SHEET No.

CONTRACT No. C11-12-10

DWG. No. HALRT-RD-NC003

DIMENSIONS SHOWN ON THIS PLAN ARE IN METRES UNLESS OTHERWISE NOTED

LEGEND

LRT TRACK CENTRELINE

EXISTING PROPERTY LINE

PROPOSED TOP OF RAIL (PROFILE)

EXISTING GROUND LINE (PROFILE)

EAST BOUND TRACK USED AS REFERENCE LINE

E0+000.00

STATIONING ON EB TRACK

W0+000.00

STATIONING ON WB TRACK

N0+000.00

STATIONING ON NB TRACK

S0+000.00

STATIONING ON SB TRACK

NOT FOR CONSTRUCTION

NOTES:

THE PRELIMINARY ENGINEERING DRAWINGS ARE SUBJECT TO FINAL ENGINEERING DETAIL DRAWINGS AND REVIEW, LEGAL AND GEODETIC SURVEY INFORMATION, UNDERGROUND INFRASTRUCTURE RELOCATION STRATEGIES, ETC.

E0+575				99.938	99.936	99.937	99.849	PROPOSED TOP OF RAIL PROFILE
E0+600				99.857	99.650	99.775	99.650	EXISTING GROUND ELEVATION
E0+625				99.760	99.468	100.045	99.825	DESIGN CL CHAINAGE EASTBOUND TRACK
E0+650				99.681	99.374	100.016		
E0+675				99.697	99.422	100.011		
E0+700				99.801	99.573	99.914		
E0+725					99.850			
E0+750					100.048			
E0+775					100.016			
E0+800					99.937			
E0+825					99.849			

No.

REVISIONS

INITIAL

DATE

0

EA Amendment

LH

16/10/31

1

EA Amendment

LH

16/11/14

2

EA Amendment

LB

16/12/13

3

EA Amendment

LB

17/05/10

REFERENCE MATERIAL:

Survey Plan: COMPILED PBS AND SURVEY LRT.dgn (MAY 19, 2011) 0837HAM0002 ALL v8.dgn (OCTOBER 7, 2010) basemap2.dwg (MAY 19, 2011)

Sewer Plan: Water Plan:

Geodetic Bench Mark Index Borehole Report -

SCALES

0 5m 10m 20m

HORIZONTAL 1:500

0 1m 2m 4m

VERTICAL 1:100

Project Manager

NAME

Manager of Design

NAME

AECOM

steer davis gleave

DIALOG

DRAWN: JUAN WU

CHECKED: KATHLEEN GORDANO

APPROVED: LUCIAN BANCU

DATE: 2017/05/10

HAMILTON

LRT LIGHT RAIL TRANSIT

METROLINX

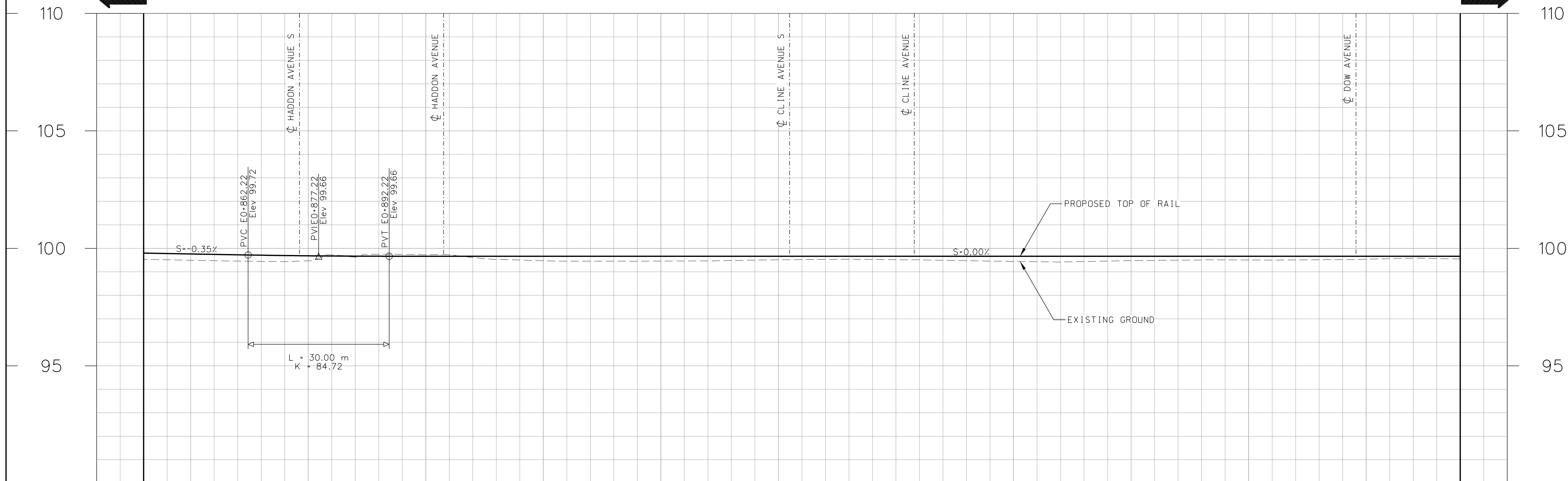
HAMILTON LRT 'B' LINE

PRELIMINARY DESIGN

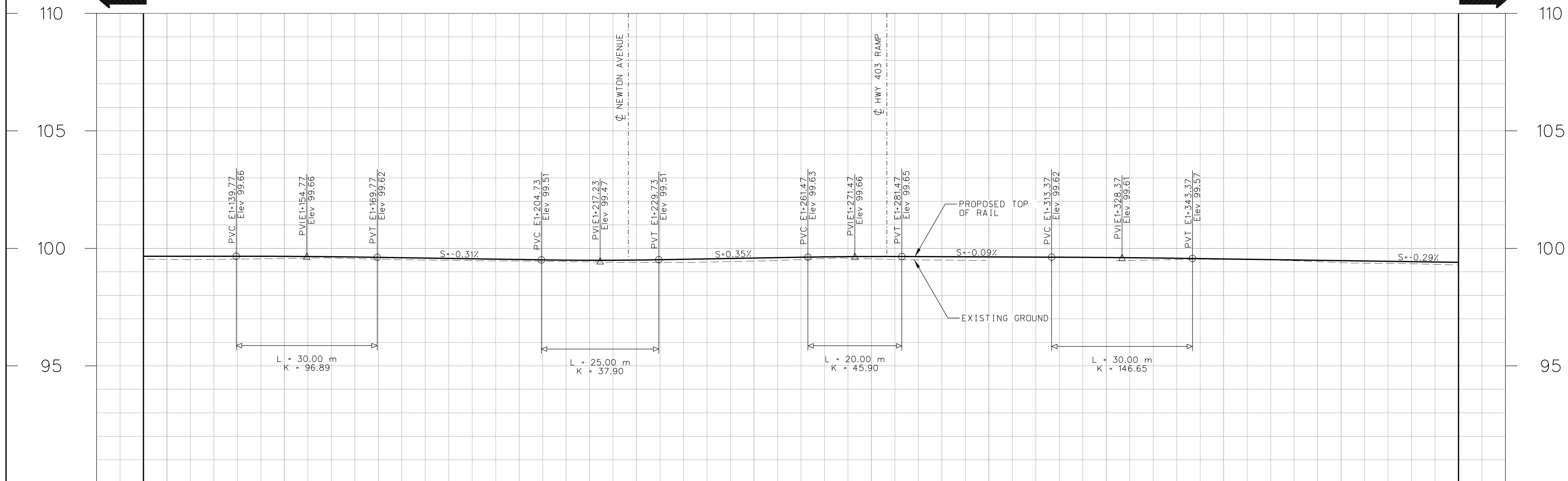
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STA E0+560 TO STA E0+840

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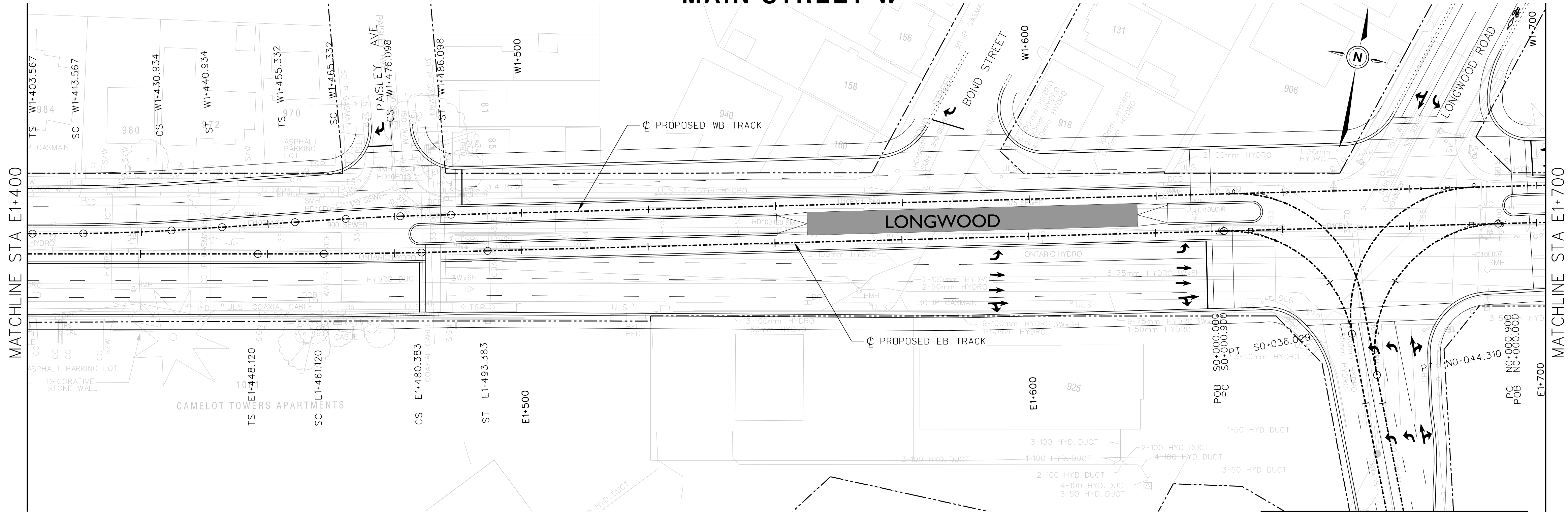
THE PRELIMINARY ENGINEERING
DRAWINGS ARE SUBJECT TO FINAL
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SURVEY INFORMATION,
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RELOCATION STRATEGIES, ETC.



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MAIN STREET W



FILE No.

CONTRACT No. C11-12-10

SHEET No.

DWG. No. HALRT-RD-NC006

DIMENSIONS SHOWN ON THIS PLAN ARE IN METRES UNLESS OTHERWISE NOTED

LEGEND

LRT TRACK CENTRELINE

EXISTING PROPERTY LINE

PROPOSED TOP OF RAIL (PROFILE)

EXISTING GROUND LINE (PROFILE)

EAST BOUND TRACK USED AS REFERENCE LINE

E0+000.00

STATIONING ON EB TRACK

W0+000.00

STATIONING ON WB TRACK

N0+000.00

STATIONING ON NB TRACK

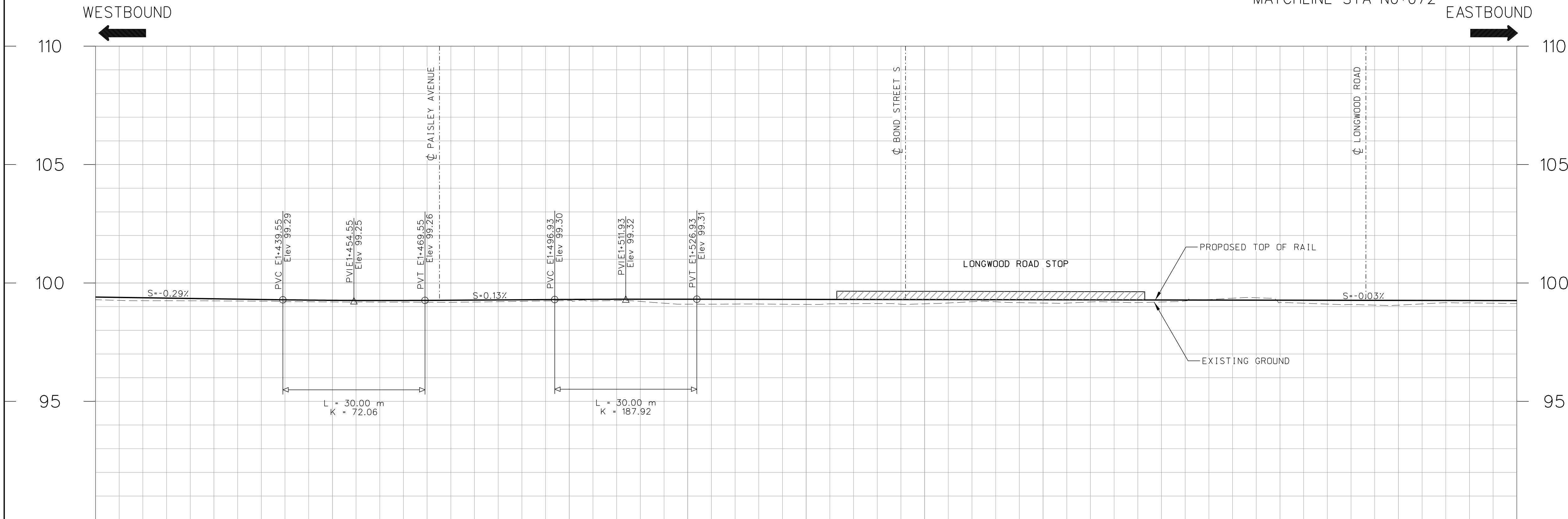
S0+000.00

STATIONING ON SB TRACK

NOT FOR CONSTRUCTION

NOTES:

THE PRELIMINARY ENGINEERING DRAWINGS ARE SUBJECT TO FINAL ENGINEERING DETAIL DRAWINGS AND REVIEW, LEGAL AND GEODETIC SURVEY INFORMATION, UNDERGROUND INFRASTRUCTURE RELOCATION STRATEGIES, ETC.



99.404	99.331	99.266	99.271	99.302	99.313	99.305	99.296	99.288	99.280	99.271	99.263	99.254	PROPOSED TOP OF RAIL PROFILE
99.290	99.242	99.197	99.182	99.253	99.103	99.095	99.117	99.151	99.197	99.172	99.062	99.129	EXISTING GROUND ELEVATION
E1+400	E1+425	E1+450	E1+475	E1+500	E1+525	E1+550	E1+575	E1+600	E1+625	E1+650	E1+675	E1+700	DESIGN ϕ CHAINAGE EASTBOUND TRACK

No.	REVISIONS	INITIAL	DATE
0	EA Amendment	LH	16/10/31
1	EA Amendment	LH	16/11/14
2	EA Amendment	LB	16/12/13
3	EA Amendment	LB	17/05/10

REFERENCE MATERIAL:

Survey Plan: COMPILED PBS AND SURVEY LRT.dgn (MAY 19, 2011)
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Sewer Plan:
Water Plan:

Geodetic Bench Mark Index
Borehole Report -

SCALES

0 5m 10m 20m

HORIZONTAL 1:500

0 1m 2m 4m

VERTICAL 1:100

Project Manager

NAME

Manager of Design

NAME

DRAWN: JUAN WU

CHECKED: KATHLEEN GORDANO

APPROVED: LUCIAN BANCU

DATE: 2017/05/10

HAMILTON LRT 'B' LINE

PRELIMINARY DESIGN

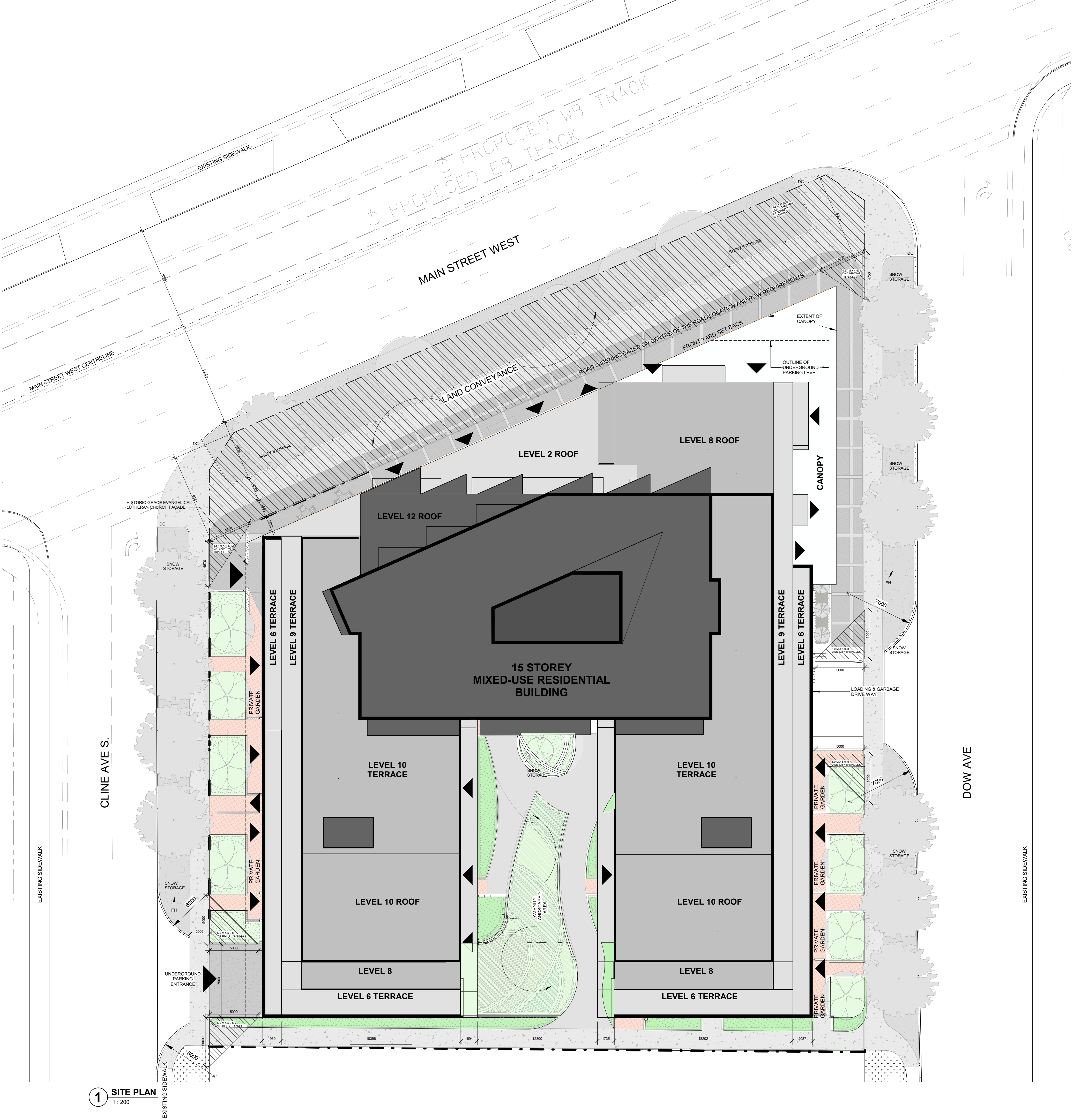
PLAN AND PROFILE

STA E1+400 TO STA E1+700

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User:wuj6 17/05/2017 12:07:02 PM

Do not scale drawings. Contractors must check and verify all dimensions and report any discrepancies to the Architect before proceeding with the work. All documents remain the property of the Architect. Unauthorized use, modification, and/or reproduction of these documents is prohibited without written permission. The Contract Documents were prepared by the Consultant for the account of the Owner. The material contained herein reflects the Consultant's best judgment in light of the information available to him at the time of preparation. Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the Contract Documents.

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1 SITE PLAN
1 : 200

SITE DATA		
1107 MAIN STREET WEST, HAMILTON, ONTARIO		
DATA	REQUIRED	PROVIDED
ZONING	ZONING - TOC-1	
LOT AREA - PRE ROAD WIDENING	XX (m²)	5,169.3 m²
LOT AREA - POST ROAD WIDENING	XX (m²)	4,517.0 m²
SETBACKS	FRONT YARD (meters)	4.5 (m)
	EXTERIOR SIDE YARD (m)	6 (m) CLINE AVE S.
	EXTERIOR SIDE YARD (m)	6 (m) DOW AVE
	REAR YARD (m)	7.5 (m)

BUILDING DATA		
DATA	REQUIRED	PROVIDED
TOTAL DENSITY (# of units)	XX (units)	329 units
BUILDING AREA (m²)	XX (m²)	2,756 m² / 29,670 SF
GROSS FLOOR AREA - ABOVE GRADE (m²)	XX (m²)	23,990 m² / 258,230 SF
PROJECT FAR	XX	4.64 (As per pre road) / 5.31 (As per post road)
UG PARKING FLOOR AREA (m²)	XX (m²)	9,848 m² / 106,004 SF
NUMBER OF STOREYS	—	15
BUILDING HEIGHT (m)	22 (m) MAX.	45 m (to roof)
COMMERCIAL/RETAIL AREA (m²)	XX (m²)	615.2 m² / 6622 SF
RESIDENTIAL SALABLE AREA (M²)	XX (m²)	19,083.8 m² / 205,416.6 SF
INTERIOR AMENITY AREA (m²)	XX (m²)	158 m² / 1,699 SF

VEHICLE PARKING DATA		
DATA	REQUIRED	PROVIDED
RESIDENTIAL PARKING	0.5 / 315 (no towns)* =157.5	175
TOWNHOME PARKING (INCL.)	1.0 / units = 10	10
BARRIER FREE PARKING (INCL.)	1 + 3% = 6.55	9
VISITOR PARKING	0.1 / units = 32.2	33
COMMERCIAL PARKING	0.X / units	XX
TOTAL	195	209
PARKING STALL BREAKDOWN		
UNDER GROUND - LEVEL 3		83 STALLS
UNDER GROUND - LEVEL 2		81 STALLS
UNDER GROUND - LEVEL 1		44 STALLS

BICYCLE PARKING DATA		
DATA	REQUIRED	PROVIDED
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*DIRECT ACCESS TO GRADE WITH PRIVATE ENTRANCE		

14	2020-11-17	ISSUED FOR REZONING
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No.	Date	Revision

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:06:41 AM

1107 MAIN ST. W.
HAMILTON

SITE PLAN

Drawing Scale	As indicated
Status	

RE-ZONING	
Drawing No.	Revision No.

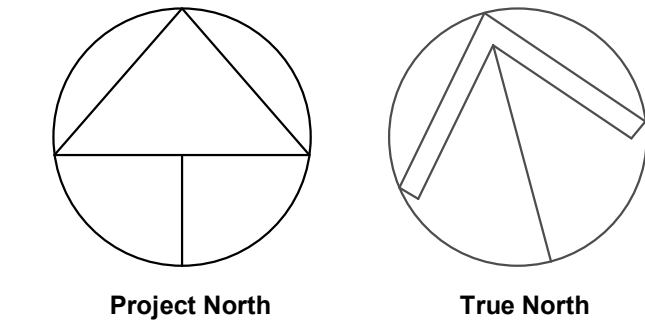
A1.1 - r14

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1 LEVEL P3 FLOOR PLAN
1 : 150



GENERAL NOTES

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BUILDING LEGEND

- CIRCULATION
- COMMON
- PARKING
- SERVICE
- VERTICAL CIRCULATION

14	2020-11-17	ISSUED FOR REZONING
13	2020-09-09	ISSUED FOR CLIENT REVIEW
11	2020-02-25	Issued for Client Review
10	2020-02-11	ISSUED FOR REZONING
No.	Date	Revision

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:06:42 AM

**1107 MAIN ST. W.
HAMILTON**

LEVEL P3 FLOOR PLAN

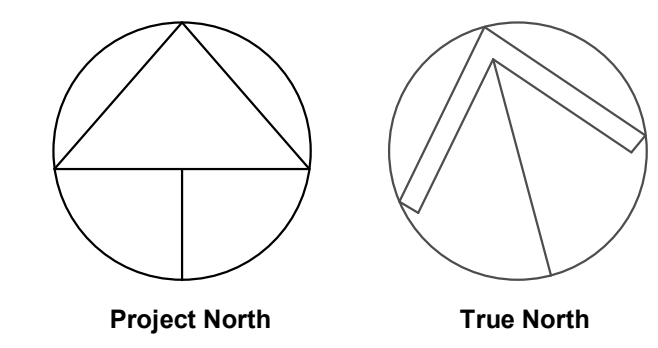
PRELIMINARY	Drawing Scale	1 : 150
	Status	
	RE-ZONING	
	Drawing No.	Revision No.
A2.1 - r14		

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1 LEVEL P2 FLOOR PLAN
1 : 150



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BUILDING LEGEND

- CIRCULATION
- COMMON
- PARKING
- SERVICE
- VERTICAL CIRCULATION

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13	2020-09-09	ISSUED FOR CLIENT REVIEW
11	2020-02-25	Issued for Client Review
10	2020-02-11	ISSUED FOR REZONING
2	2019-03-18	ISSUED FOR PRE-CONSULTATION

No.	Date	Revision
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Project No. 19052

Project Date 2020-11-02

Drawn by KMJ

Checked by MYV

Plot Date / Time 2020-11-17 11:06:42 AM

**1107 MAIN ST. W.
HAMILTON**

LEVEL P2 FLOOR PLAN

PRELIMINARY

Drawing Scale 1 : 150

Status

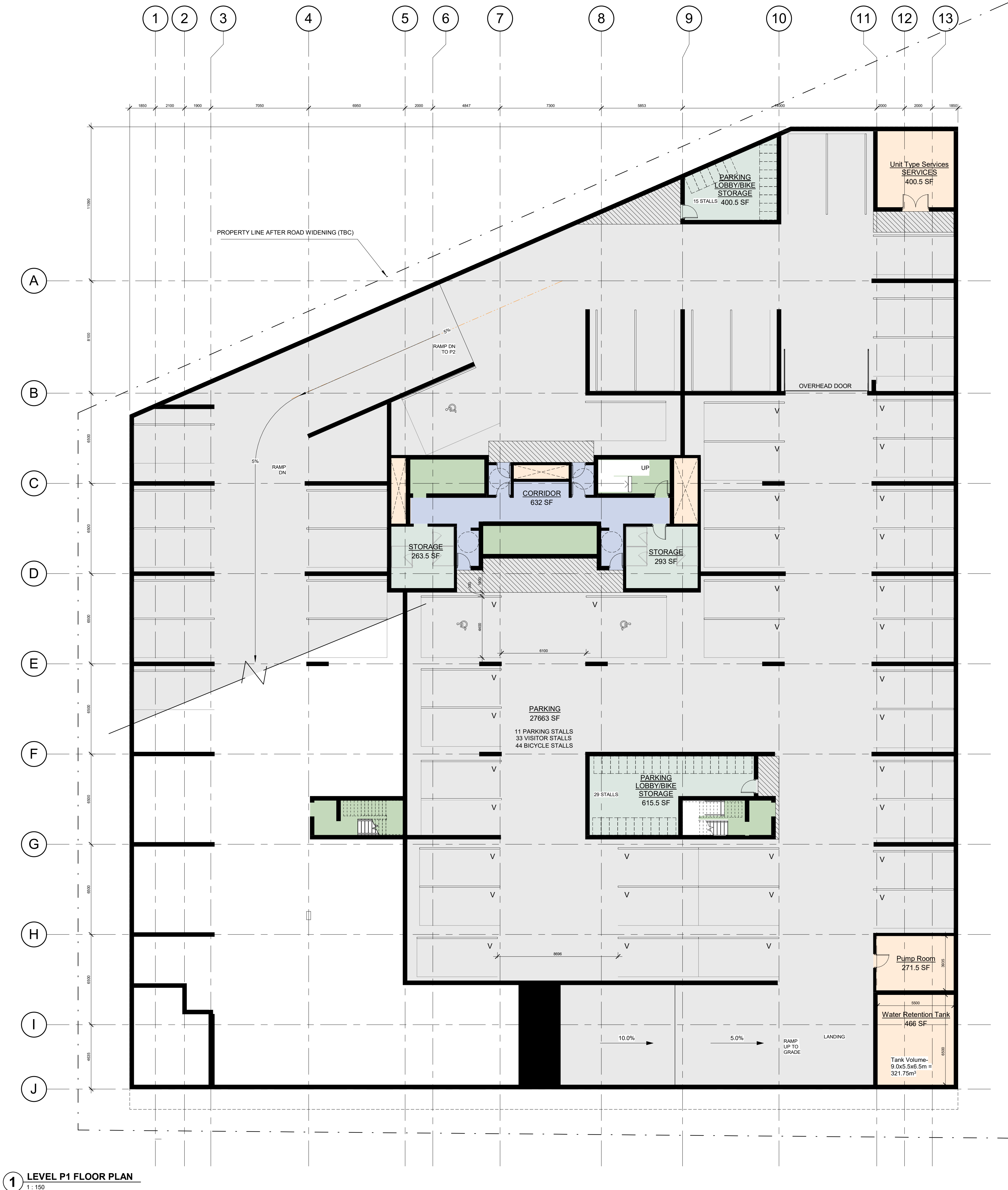
RE-ZONING

Drawing No. Revision No.

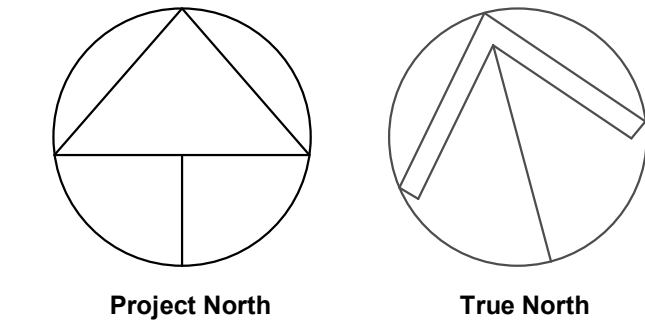
A2.2 - r14

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1 LEVEL P1 FLOOR PLAN
1 : 150



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BUILDING LEGEND

- CIRCULATION
- COMMON
- PARKING
- SERVICE
- VERTICAL CIRCULATION

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11	2020-02-25	Issued for Client Review
10	2020-02-11	ISSUED FOR REZONING
2	2019-03-18	ISSUED FOR PRE-CONSULTATION

No.	Date	Revision
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srm ARCHITECTS INC.	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:06:43 AM

**1107 MAIN ST. W.
HAMILTON**

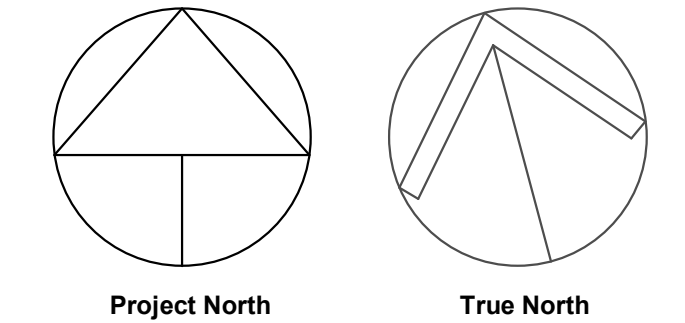
LEVEL P1 FLOOR PLAN

PRELIMINARY	Drawing Scale	1 : 150
	Status	
	Drawing No.	RE-ZONING
	Revision No.	

A2.3 - r14

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- BUILDING LEGEND**
- CIRCULATION
 - RESIDENTIAL
 - SERVICE
 - VERTICAL CIRCULATION
 - AMENITY
 - COMMERCIAL

14	2020-11-17	ISSUED FOR REZONING
13	2020-09-09	ISSUED FOR CLIENT REVIEW
11	2020-02-25	ISSUED FOR CLIENT REVIEW
10	2020-02-11	ISSUED FOR REZONING
2	2019-03-18	ISSUED FOR PRE-CONSULTATION

No.	Date	Revision
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	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:40 AM

1107 MAIN ST. W.
HAMILTON

LEVEL 1 FLOOR PLAN

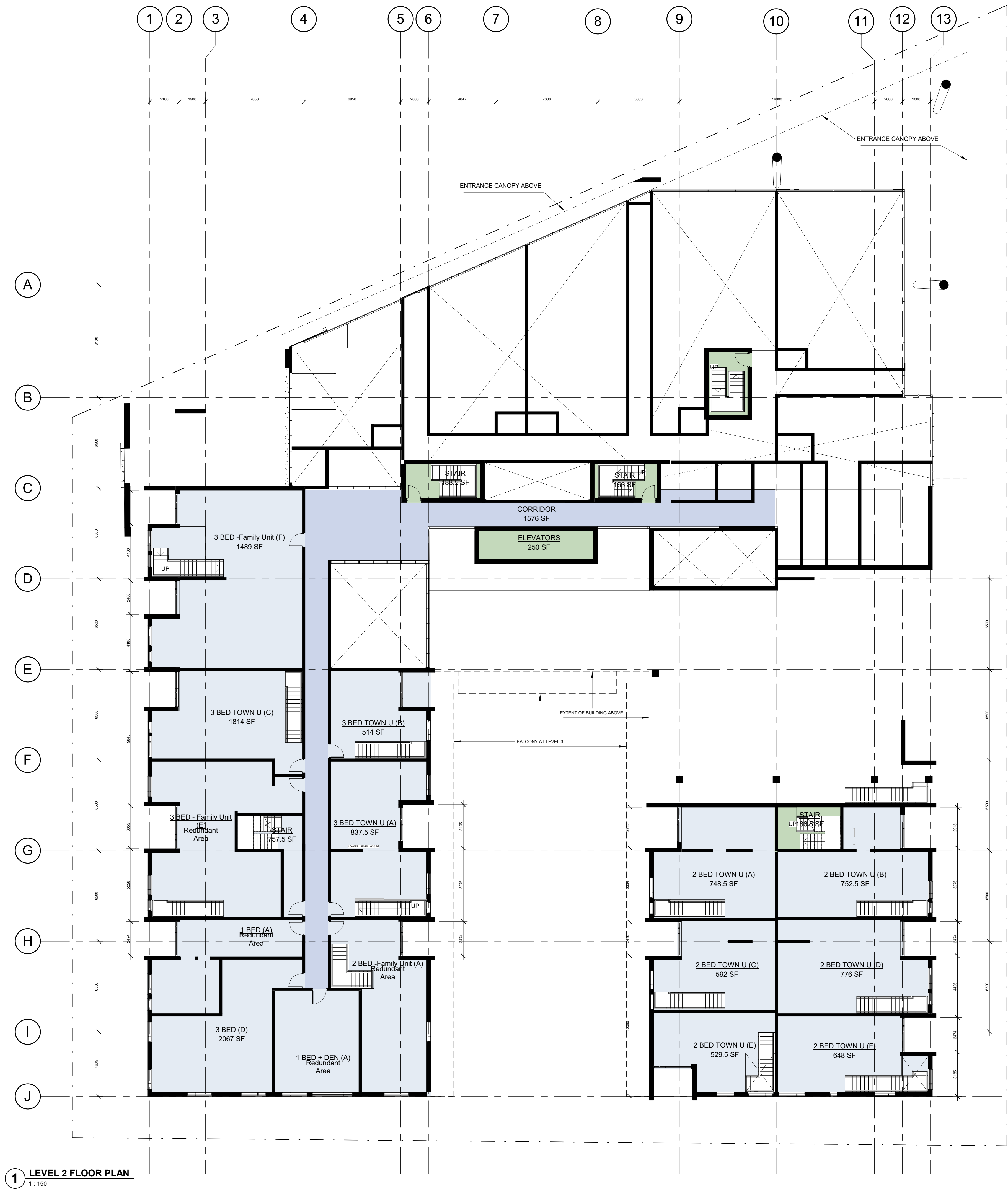
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Status	

RE-ZONING	
Drawing No.	Revision No.

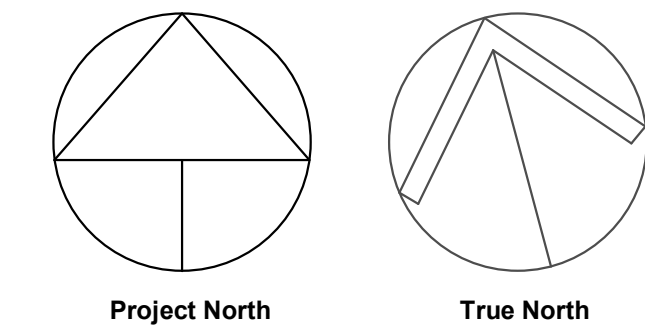
A2.4 - r14

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1 LEVEL 2 FLOOR PLAN
1 : 150



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BUILDING LEGEND

- CIRCULATION
- RESIDENTIAL
- VERTICAL CIRCULATION

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10	2020-02-11	ISSUED FOR REZONING

No.	Date	Revision
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	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:41 AM

**1107 MAIN ST. W.
HAMILTON**

LEVEL 2 FLOOR PLAN

Drawing Scale	1 : 150
Status	

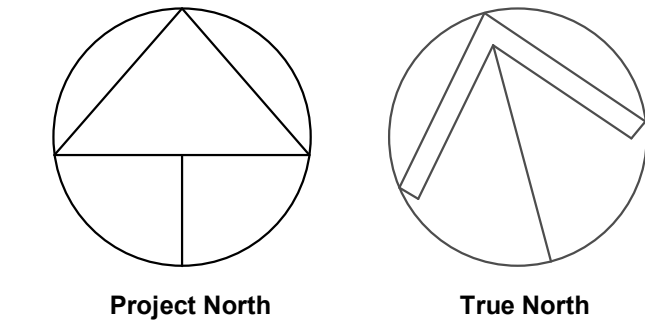
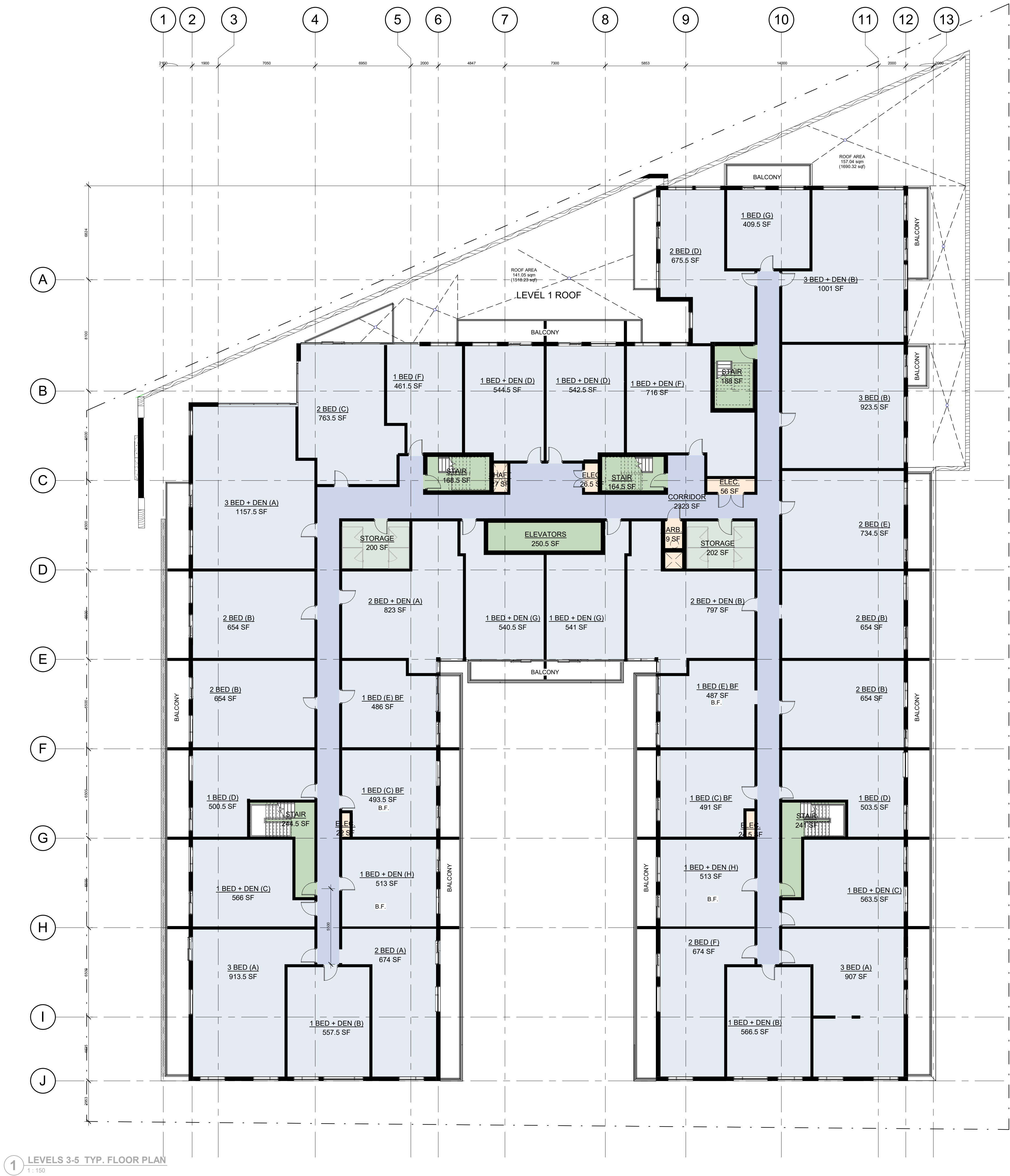
ELIMINATE	RE-ZONING	
	Drawing No.	Revision No.

PRELIMINARY

A2.5 - r14

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- BUILDING LEGEND**
- CIRCULATION
 - COMMON
 - RESIDENTIAL
 - SERVICE
 - VERTICAL CIRCULATION

14	2020-11-17	ISSUED FOR REZONING
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No.	Date	Revision
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	Project No.	19052
	Project Date	2020-11-02
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1107 MAIN ST. W.
HAMILTON

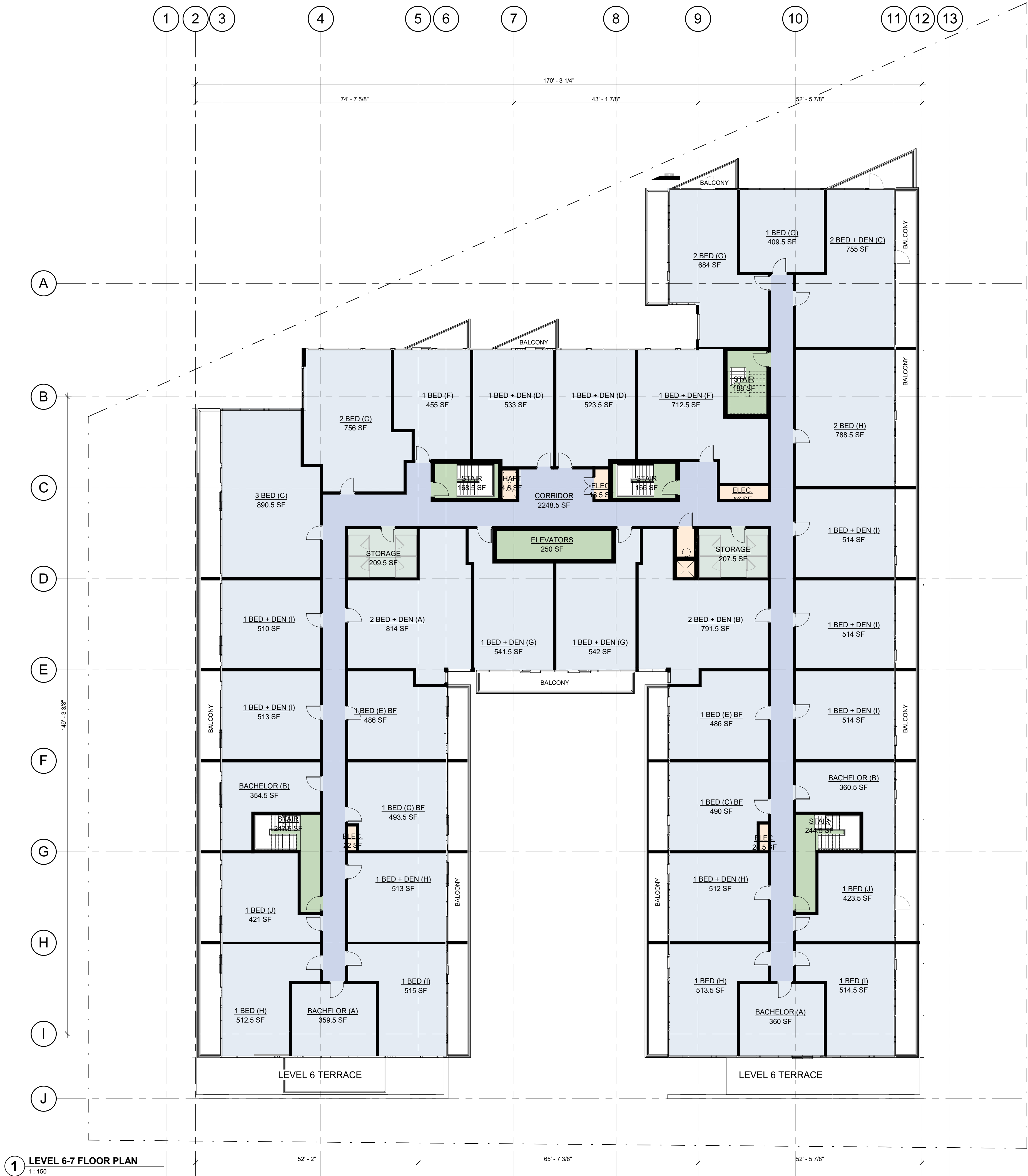
LEVEL 3-5 FLOOR PLAN

PRELIMINARY	Drawing Scale	1 : 150
	Status	
	RE-ZONING	
	Drawing No.	Revision No.

A2.6 - r14

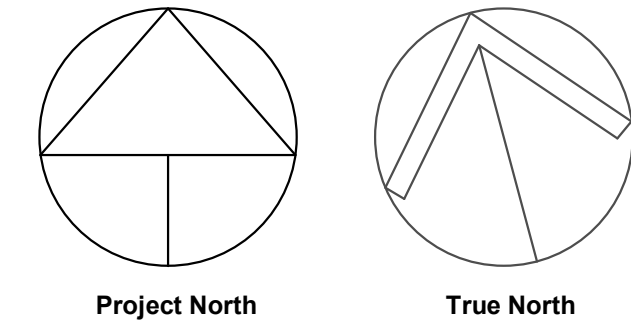
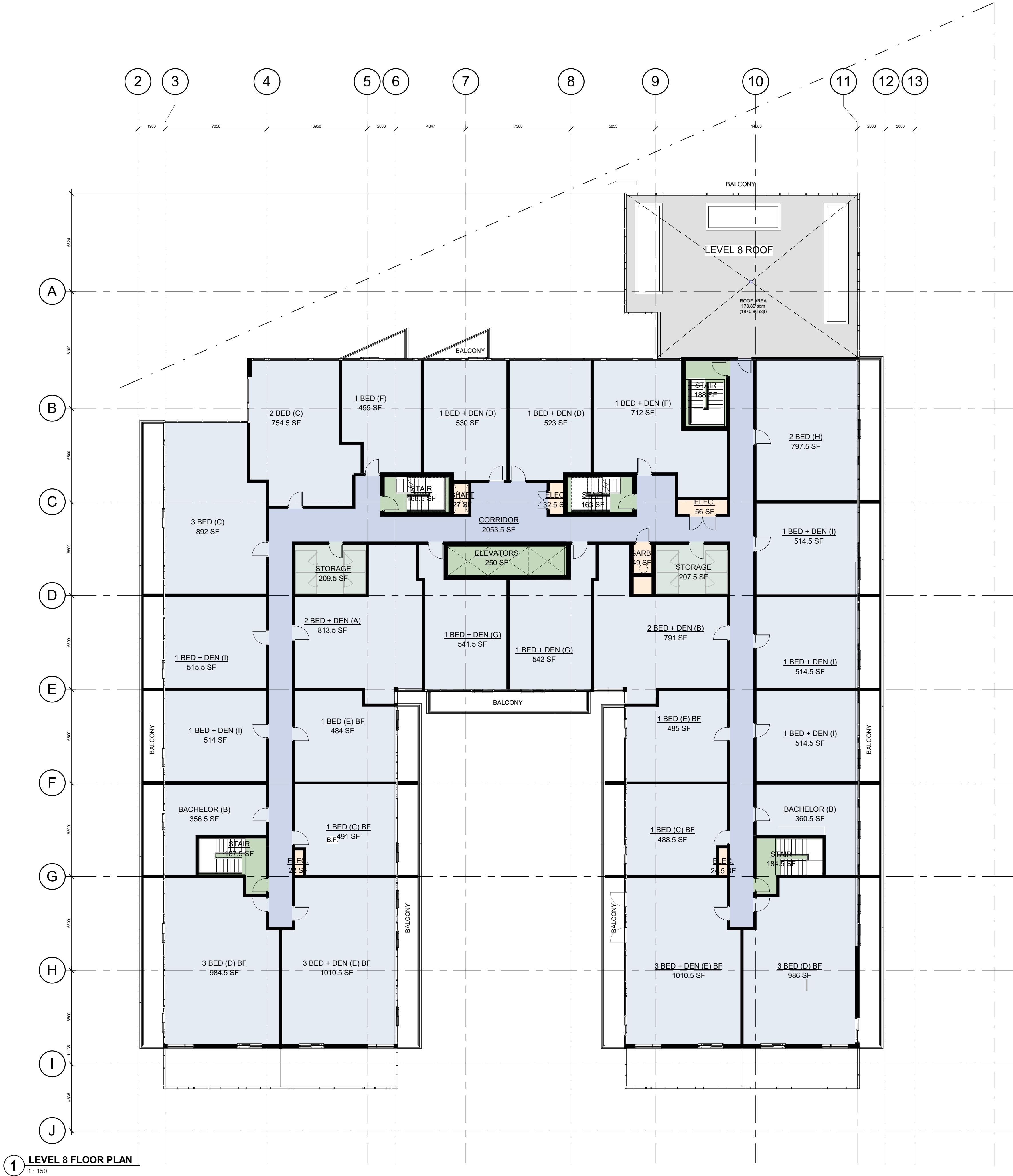
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- BUILDING LEGEND**
- CIRCULATION
 - COMMON
 - RESIDENTIAL
 - SERVICE
 - VERTICAL CIRCULATION

14	2020-11-17	ISSUED FOR REZONING
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No.	Date	Revision
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	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:45 AM

1107 MAIN ST. W.
HAMILTON

LEVEL 8 FLOOR PLAN

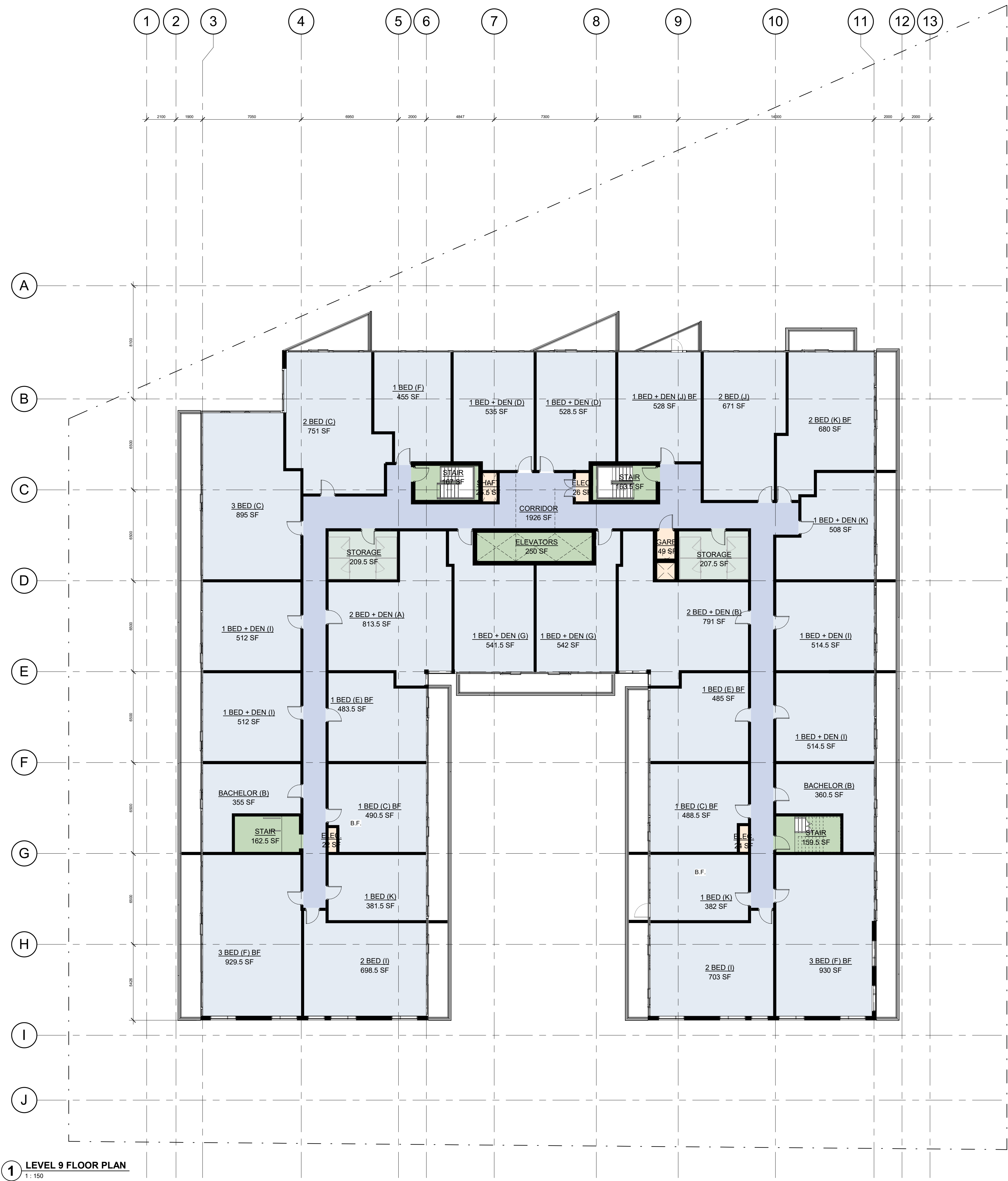
Drawing Scale	1 : 150
Status	

Drawing No.	Revision No.
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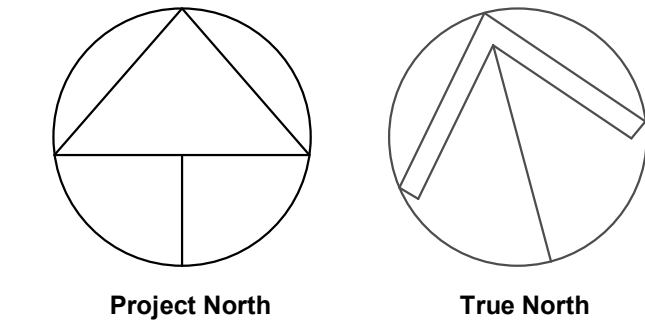
A2.8 - r14

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1 LEVEL 9 FLOOR PLAN
1 : 150



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BUILDING LEGEND

- CIRCULATION
- COMMON
- RESIDENTIAL
- SERVICE
- VERTICAL CIRCULATION

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No.	Date	Revision
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	Project No.	19052
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	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:45 AM

**1107 MAIN ST. W.
HAMILTON**

LEVEL 9 FLOOR PLAN

Drawing Scale	1 : 150
Status	

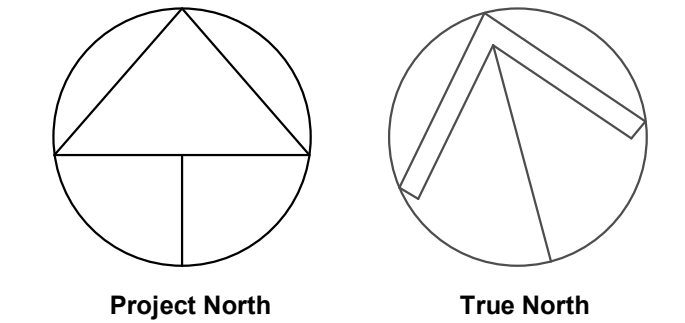
RE-ZONING	
Drawing No.	Revision No.

PRELIMINARY

A2.9 - r14

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- GENERAL NOTES**
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- BUILDING LEGEND**
- CIRCULATION
 - RESIDENTIAL
 - SERVICE
 - VERTICAL CIRCULATION

14	2020-11-17	ISSUED FOR REZONING
13	2020-09-09	ISSUED FOR CLIENT REVIEW
11	2020-02-25	Issued for Client Review
10	2020-02-11	ISSUED FOR REZONING
2	2019-03-18	ISSUED FOR PRE-CONSULTATION

No.	Date	Revision
-----	------	----------

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:48 AM

1107 MAIN ST. W.
HAMILTON

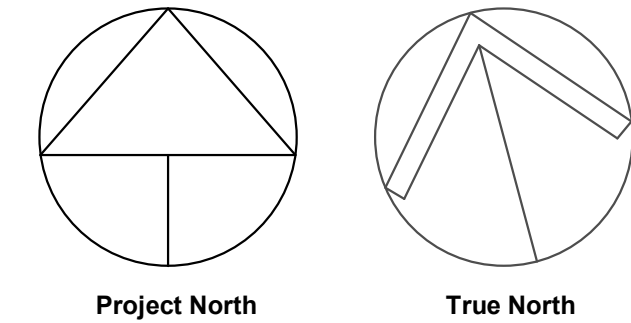
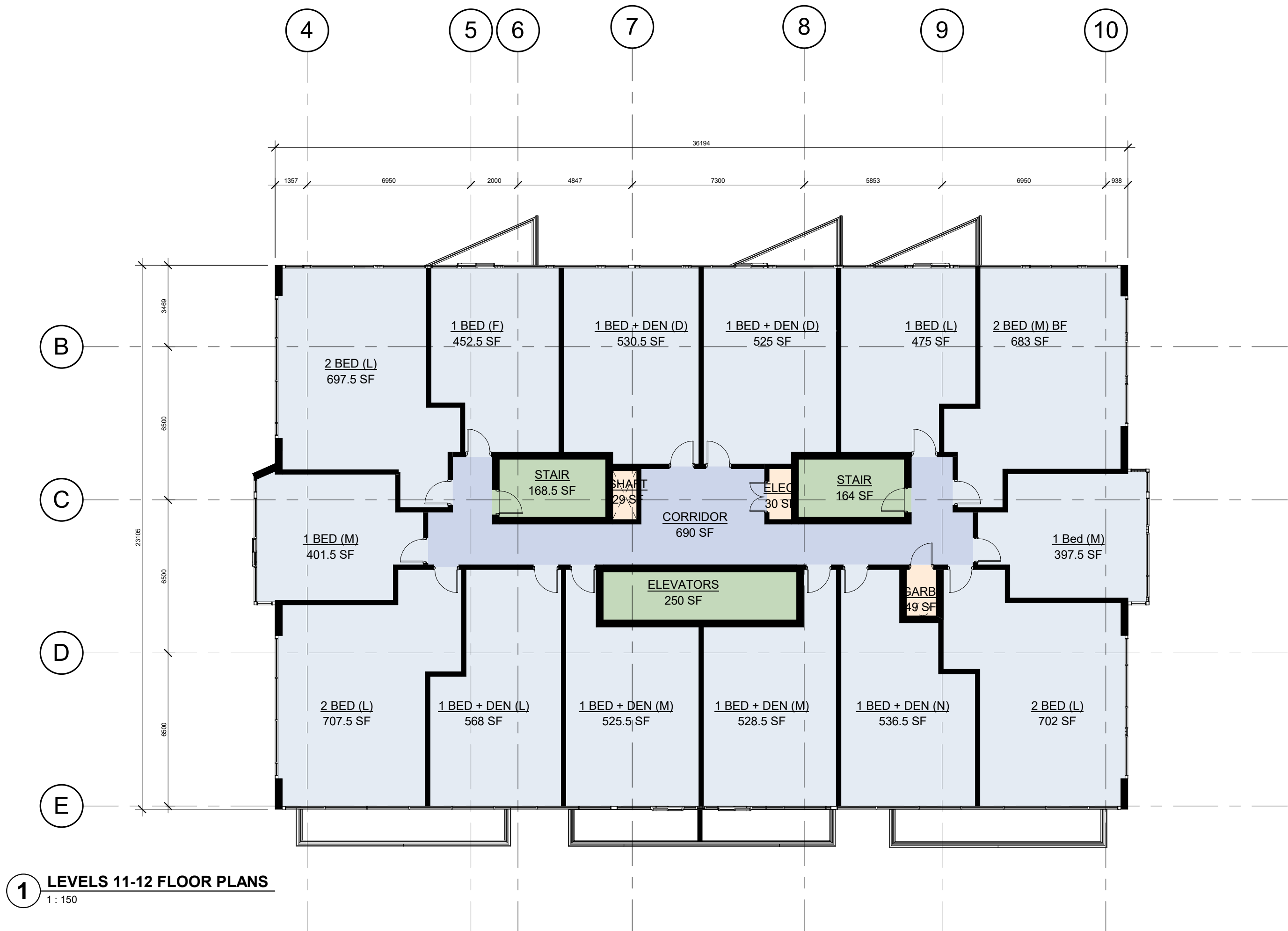
LEVEL 10 FLOOR PLAN

PRELIMINARY	Drawing Scale	1 : 150
	Status	
	Drawing No.	RE-ZONING
	Revision No.	

A2.10 - r14

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BUILDING LEGEND

- CIRCULATION
- RESIDENTIAL
- SERVICE
- VERTICAL CIRCULATION

14	2020-11-17	ISSUED FOR REZONING
13	2020-09-09	ISSUED FOR CLIENT REVIEW
11	2020-02-25	Issued for Client Review
10	2020-02-11	ISSUED FOR REZONING
2	2019-03-18	ISSUED FOR PRE-CONSULTATION

No.	Date	Revision
-----	------	----------

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:48 AM

**1107 MAIN ST. W.
HAMILTON**

**LEVELS 11-12 FLOOR
PLAN**

PRELIMINARY

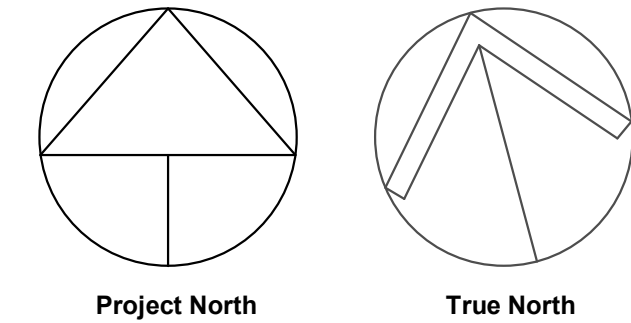
Drawing Scale	1 : 150
Status	
Drawing No.	Revision No.

A2.11 - r14

RE-ZONING

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BUILDING LEGEND

- CIRCULATION
- RESIDENTIAL
- SERVICE
- VERTICAL CIRCULATION

14	2020-11-17	ISSUED FOR REZONING
No.	Date	Revision

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	SBD
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:07:48 AM

**1107 MAIN ST. W.
HAMILTON**

**LEVELS 13-15 FLOOR
PLAN**

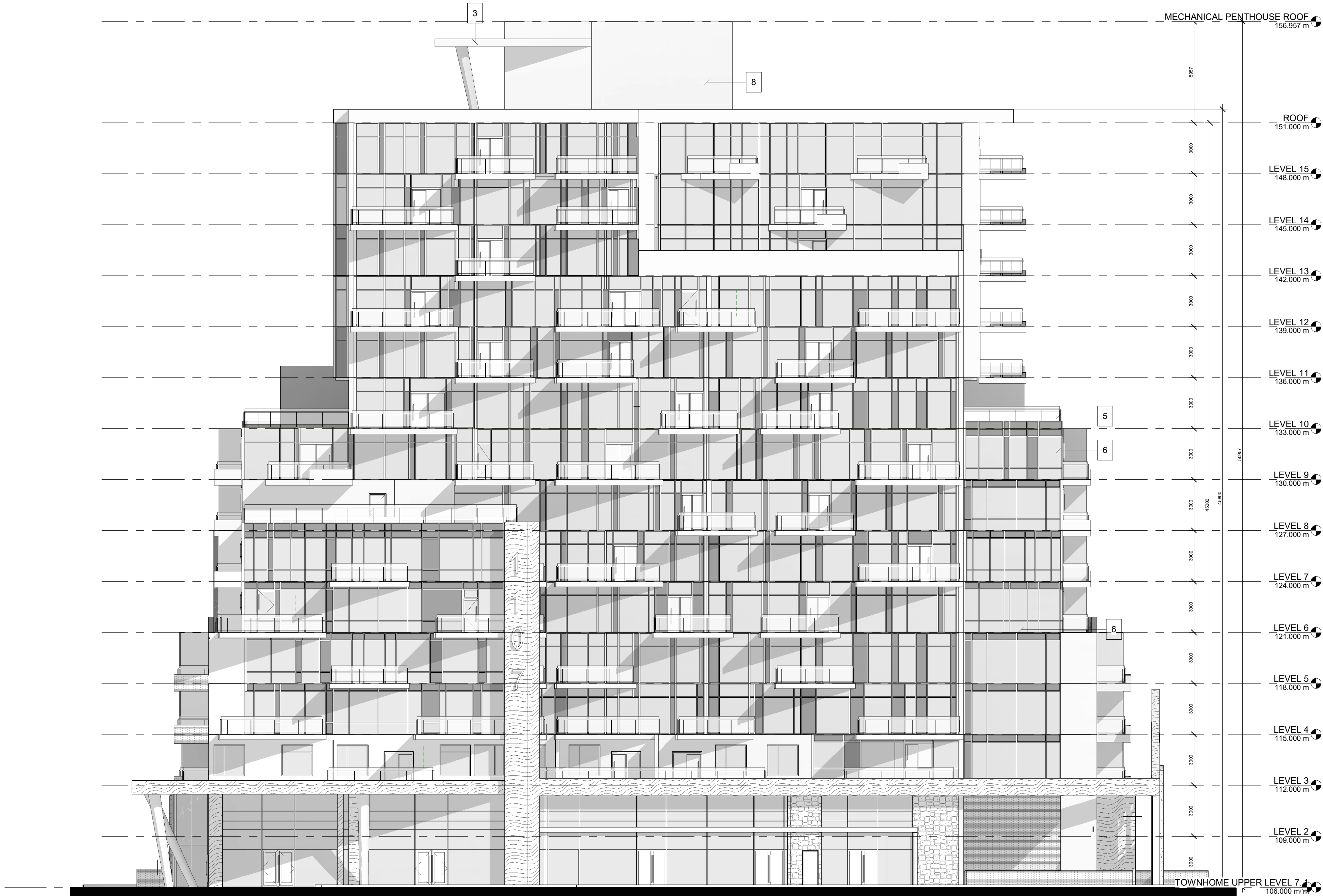
Drawing Scale	1 : 150
Status	

Drawing No.	RE-ZONING
Revision No.	

A2.12. - r14

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MATERIAL LEGEND

1	RED MASONRY
2	PREFINISHED METAL CLAD BALCONY ASSEMBLY A: METAL
3	PREFINISHED METAL CLAD CANOPY ASSEMBLY B: WOOD
4	PATTERNED CONCRETE A: US FORMLINER 2/32 INN
5	GLAZING : TINT 1
6	GLAZING : TINT 2
7	SPANDREL PANEL A
8	PRECAST CONCRETE : WHITE
9	ALUMINUM PANEL
10	STONE CHURCH FAÇADE

14	2020-11-17	ISSUED FOR REZONING
10	2020-02-11	ISSUED FOR REZONING
No.	Date	Revision

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:09:15 AM

1107 MAIN ST. W.
HAMILTON

NORTH ELEVATION

PRELIMINARY	Drawing Scale	As indicated
	Status	
	RE-ZONING	
	Drawing No.	Revision No.
A3.1 - r14		

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1 SOUTH ELEVATION
1: 150

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5	GLAZING : TINT 1
6	GLAZING : TINT 2
7	SPANDREL PANEL A
8	PRECAST CONCRETE : WHITE
9	ALUMINUM PANEL
10	STONE CHURCH FAÇADE

14	2020-11-17	ISSUED FOR REZONING
10	2020-02-11	ISSUED FOR REZONING
No.	Date	Revision

	Project No.	19052
	Project Date	2020-11-02
	Drawn by	KMJ
	Checked by	MYV
	Plot Date / Time	2020-11-17 11:10:42 AM

1107 MAIN ST. W.
HAMILTON

SOUTH ELEVATION

PRELIMINARY

Drawing Scale	As indicated
Status	
Drawing No.	RE-ZONING
Revision No.	

A3.2 - r14

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1 EAST ELEVATION
1 : 150

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14	2020-11-17	ISSUED FOR REZONING
10	2020-02-11	ISSUED FOR REZONING
No.	Date	Revision



Project No. 19052
Project Date 2020-11-02
Drawn by KMJ
Checked by MYV
Plot Date / Time 2020-11-17 11:12:32 AM

**1107 MAIN ST. W.
HAMILTON**

EAST ELEVATION

Drawing Scale As indicated
Status

RE-ZONING
Drawing No. Revision No.

A3.3 - r14

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1 WEST ELEVATION
1 : 150

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14	2020-11-17	ISSUED FOR REZONING
10	2020-02-11	ISSUED FOR REZONING
No.	Date	Revision



Project No 19052
Project Date 2020-11-02
Drawn by KMJ
Checked by MYV
Plot Date / Time 2020-11-17 11:14:09 AM

1107 MAIN ST. W.
HAMILTON

WEST ELEVATION

PRELIMINARY

Drawing Scale As indicated
Status

RE-ZONING
Drawing No. Revision No.

A3.4 - r14

APPENDIX B

Road Traffic Data

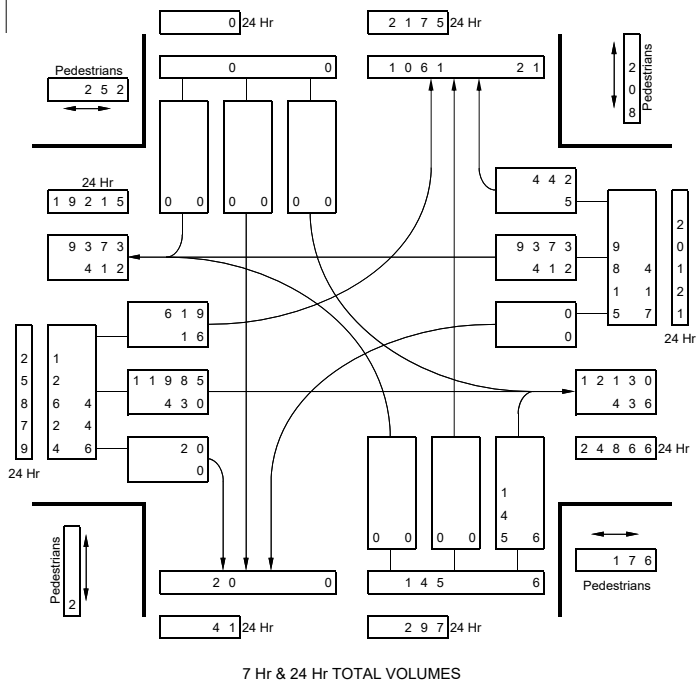
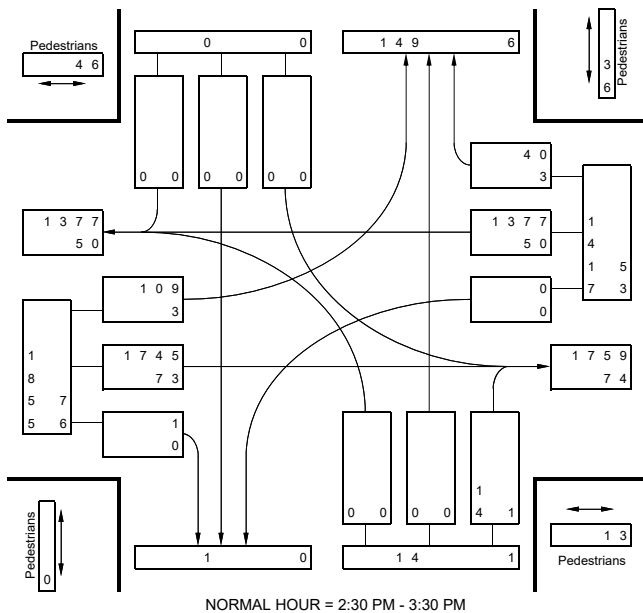
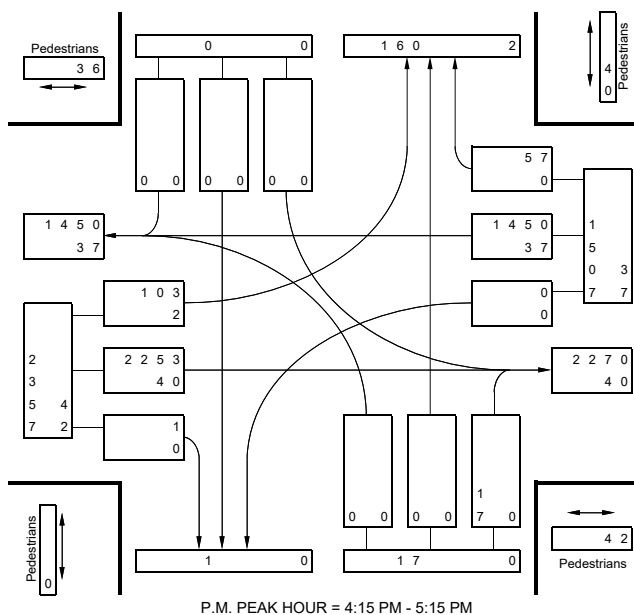
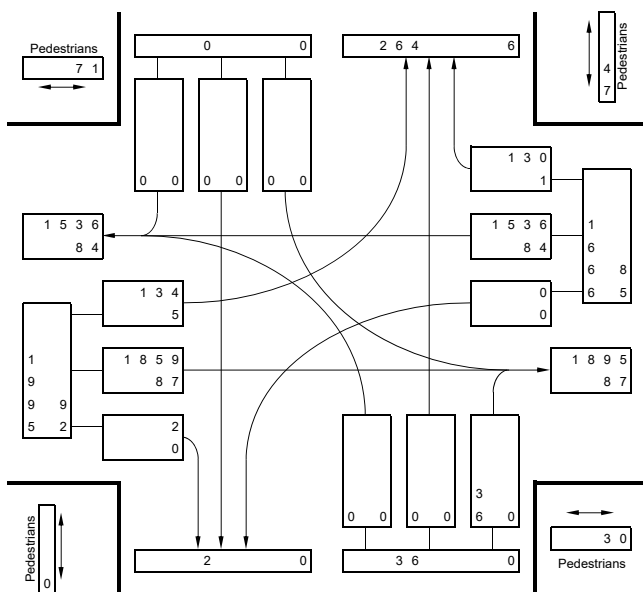
Intersection: **Main St W**
 Direction: (East/West)
 Road Condition: Wet
 Comments:

at
 (East/West)

Haddon Ave S
 (North/South)
 Weather: Overcast

Total Vehicles: 22,584
 M.V.E./Year: 15,741
 AWDT Factor: 2.05

Date: Tuesday
 May 7, 2019
 Period: 7 hours



$$20121 + 24866 = 44987$$

$$\% = (417 + 436) / (417 + 9815 + 12130 + 436)$$

$$= 3.7\%$$

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
			2014	UC	99,000	99,000	95,000	94,100	N/A
			2015	UC	102,800	102,800	98,700	97,700	N/A
			2016	UC	103,000	103,000	98,900	97,900	N/A
403	ABERDEEN AV UP IC-HAMILTON	4.7	1988	IR	41,200	43,200	46,500	38,700	0.8
			1989	IR	44,100	46,300	49,800	41,800	0.9
			1990	IR	46,800	50,000	54,200	44,400	0.6
			1991	IR	48,000	50,800	55,100	46,500	0.5
			1992	IR	50,000	51,900	56,400	46,500	0.4
			1993	IR	52,000	55,100	59,700	49,900	0.5
			1994	IR	54,300	59,200	60,800	48,900	0.5
			1995	IR	54,300	58,600	60,800	50,000	0.3
			1996	IR	57,300	64,500	65,300	51,600	0.5
			1997	IR	60,500	63,500	70,800	56,900	0.4
			1998	IR	67,200	71,500	78,600	63,800	0.5
			1999	IR	68,300	72,700	79,900	64,900	0.7
			2000	IR	71,500	76,000	83,800	63,100	0.8
			2001	IR	74,700	79,900	87,400	65,700	0.8
			2002	IR	77,900	82,700	91,200	68,700	0.9
			2003	IR	81,100	85,200	94,900	71,400	0.7
			2004	IR	84,300	89,000	98,400	74,600	0.8
			2005	IR	86,200	91,300	100,700	75,900	0.7
			2006	IR	90,700	96,000	106,000	80,000	0.7
			2007	IR	87,300	92,300	100,900	76,800	0.8
			2008	IR	82,000	86,000	81,100	72,100	0.6
			2009	IR	92,200	97,400	107,900	81,300	0.4
			2010	IR	87,700	92,800	102,700	77,300	0.5
			2011	IR	85,000	108,800	99,500	68,000	N/A
			2012	IR	92,000	92,000	98,400	87,400	N/A
			2013	IR	83,300	101,600	104,900	70,800	N/A
			2014	IR	83,400	101,700	102,600	70,900	N/A
			2015	IR	88,700	105,600	105,600	75,400	N/A
			2016	IR	83,800	99,700	99,700	71,200	N/A
403	LINC. AX PKY/ ROUSSEAU ST IC	2.9	1988	UC	30,000	31,400	33,800	28,100	0.6

Yvonne Lo

From: Bee, Christopher (MTO) <Christopher.Bee@ontario.ca>
Sent: October 18, 2019 11:20 AM
To: Yvonne Lo
Cc: Bee, Christopher (MTO)
Subject: RE: Commercial Vehicle % Request - Highway 403 @ Main St.

To Yvonne Lo, HGC Engineering:

H403 at Aberdeen has approx. 10% commercial vehicles, to 2016, and has been stable for over 10 years previous to that.

“% commercial” is defined as short trucks, buses, cars with trailer, long trucks, and specials (motorcycle, snowmobile, park trailer), but NOT REGULAR CARS.

Christopher Bee
MTO CR Traffic Office
Safety Traffic Information and Roadwork Coordination Section (STIRCS)

From: Yvonne Lo <ylo@hgcengineering.com>
Sent: October-17-19 11:37 AM
To: Bee, Christopher (MTO) <Christopher.Bee@ontario.ca>
Subject: Commercial Vehicle % Request - Highway 403 @ Main St.

Hi Christopher,

HGC Engineering is conducting a noise feasibility study for a proposed development located at 1107 Main Street West, as shown in the link below.

<https://goo.gl/maps/EPB8SY5aik38F3tn7>

We are requesting commercial vehicle percentages for Highway 403 at Aberdeen Avenue.

Thank you!

Best,

Yvonne Lo, BAsC, PEng
Project Consultant

HGC Engineering **NOISE / VIBRATION / ACOUSTICS**
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APPENDIX C

Sample STAMSON 5.04 Output

Filename: b.te Time Period: Day/Night 16/8 hours
Description: **Predicted daytime and nighttime sound levels at the east façade of the proposed building, prediction location [B].**

Road data, segment # 1: Main St W (day/night)

Car traffic volume : 40162/4462 veh/TimePeriod *
Medium truck volume : 744/83 veh/TimePeriod *
Heavy truck volume : 12219/1358 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 44987
Percentage of Annual Growth : 2.50
Number of Years of Growth : 11.00
Medium Truck % of Total Volume : 1.40
Heavy Truck % of Total Volume : 23.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Main St W (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 25.00 / 25.00 m
Receiver height : 1.50 / 1.50 m
Topography : 3 (Elevated; no barrier)
Elevation : 42.00 m
Reference angle : 0.00

Road data, segment # 2: HWY 403 (day/night)

Car traffic volume : 107768/19018 veh/TimePeriod *
Medium truck volume : 4550/803 veh/TimePeriod *
Heavy truck volume : 7424/1310 veh/TimePeriod *
Posted speed limit : 100 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 99700
Percentage of Annual Growth : 2.50
Number of Years of Growth : 14.00
Medium Truck % of Total Volume : 3.80
Heavy Truck % of Total Volume : 6.20
Day (16 hrs) % of Total Volume : 85.00



Data for Segment # 2: HWY 403 (day/night)

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Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth           :           0       (No woods.)
No of house rows     :           0 / 0
Surface              :           1       (Absorptive ground surface)
Receiver source distance : 285.00 / 285.00 m
Receiver height       :           1.50 / 1.50 m
Topography           :           3       (Elevated; no barrier)
Elevation             :           42.00 m
Reference angle       :           0.00
  
```

Results segment # 1: Main St W (day)

Source height = 2.19 m

ROAD (0.00 + 73.95 + 0.00) = 73.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.18	0.00	-2.22	-3.01	0.00	0.00	0.00	73.95

Segment Leq : 73.95 dBA

Results segment # 2: HWY 403 (day)

Source height = 1.58 m

ROAD (0.00 + 71.05 + 0.00) = 71.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	83.83	0.00	-12.79	0.00	0.00	0.00	0.00	71.05

Segment Leq : 71.05 dBA

Total Leq All Segments: 75.75 dBA

Results segment # 1: Main St W (night)

Source height = 2.19 m

ROAD (0.00 + 67.42 + 0.00) = 67.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	72.64	0.00	-2.22	-3.01	0.00	0.00	0.00	67.42

Segment Leq : 67.42 dBA

Results segment # 2: HWY 403 (night)



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Source height = 1.58 m

ROAD (0.00 + 66.52 + 0.00) = 66.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	79.31	0.00	-12.79	0.00	0.00	0.00	0.00	66.52

Segment Leq : 66.52 dBA

Total Leq All Segments: 70.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 75.75
(NIGHT): 70.00



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