FINAL REPORT

6645, 6655 AND 6665 MCLEOD ROAD

NIAGARA FALLS, ONTARIO

NOISE AND VIBRATION IMPACT STUDY

RWDI #2505294

November 20, 2024

SUBMITTED TO

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VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	October 8, 2024	Draft	KD	JKK
2	November 20, 2024	Final	KD	DJK

EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study (NVIS) for the proposed residential development located at 6645, 6655 and 6665 McLeod Road in Niagara Falls, Ontario. The proposed development will consist of 3 buildings:

- Block A: 6 rows, 18 residential units;
- Block B: 4 rows, 12 residential units; and
- Block C: 4 rows, 12 residential units.

This assessment was completed to support the Zoning By-law Amendment (ZBA) and Site Plan Approval (SPA) submission as required by the City of Niagara Falls.

The following noise control measures are recommended for the proposed development:

1. The dwelling should be designed with a provision for the installation of air conditioning in the future.
2. The inclusion of noise warning clauses related to transportation sound levels at the building façade.
3. Minimum sound isolation performance:
    a. Suite bedroom window glazing with sound isolation performance up to STC-28 for the south façade of Block A.
    b. Suite exterior balcony door with sound isolation performance up to STC-25 for the south façade of Block A.

At this stage in design the noise levels produced by the development on itself and its surroundings could not be quantitatively assessed. However, the effect on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior to building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is feasible to meet the applicable sound and vibration criteria.

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1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study (NVIS) for the proposed residential development located at 6645, 6655 and 6665 McLeod Road in Niagara Falls, Ontario. The site is currently occupied by low-rise residential and surrounded by residential uses in all directions. The proposed development will consist of 3 buildings:

- Block A: 6 rows, 18 residential units;
- Block B: 4 rows, 12 residential units; and
- Block C: 4 rows, 12 residential units.

The context site plan is shown in **Figure 1**.

The site is exposed to noise from road traffic from McLeod Road to the south. Other roadways are distant or not significant.

There are no rail corridors located within 1 km of the proposed development, therefore no noise or vibration impacts from above-grade rail are expected.

A review of nearby stationary sources was conducted, and it was determined that there are no sources of concern for this development.

This assessment was completed to support the Zoning By-law Amendment (ZBA) and Site Plan Approval (SPA) submission as required by the City of Niagara Falls. This assessment was based on design drawings dated October 2024. A copy of the drawings is included in **Appendix A.**

2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources (road) are adopted from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline (MOE, 2013), with a summary of the applicable criteria included with **Appendix B**.

3 THE EFFECTS OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

3.1 Transportation Source Assessment

3.1.1 Road Traffic Volume Data

The traffic volumes for McLeod Road were obtained from the City of Niagara Falls. The daytime and nighttime splits as well as the Annual Average Daily Traffic (AADT) for McLeod Road were obtained based on hourly data provided.

The traffic volumes for each of the respective roadways were increased at a rate of 2% per year to represent the predicted 20-year horizon volumes, as required by the Region of Niagara.

A summary of the traffic data used is included in **Table 1** below with more detailed information included in **Appendix C**.

A sample ORNAMENT calculation was conducted as comparison to the Cadna/A and RLS-90 prediction results. The results were found to be within 1 dB. A sample calculations for ORNAMENT is provided in **Appendix D** for road impact for the north façade of Block A.

Table 1: Road Traffic Volumes

Roadway	2044 Future Traffic (AADT)	% Day/Night	Speed Limit (km/hr)	% Trucks
McLeod Road	29969	91% /9%	50	3.4%

3.1.2 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. Using the "building evaluation" feature of Cadna/A, each façade of the residential buildings was assessed.

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. Daytime sound levels were assessed at the following identified OLAs:

- OLA_01: Block B ground level
- OLA_02: Block C ground level

The OLAs are indicated in **Figure 2**.

3.1.3 Analysis and Results

Sound levels due to the adjacent transportation (road) sources were predicted using the RLS-90 standard (RLS,1990) as implemented in the Cadna/A software package.

To assess the effect of transportation noise on suites, the maximum sound level on each façade was determined with the results summarized in **Table 2.**

Table 2: Predicted Ground Transportation Source Sound Levels – Plane of Window

Building	Façade	Road		Notes
		Day L_{EQ}, 16hr	Night L_{EQ}, 8hr	
Block A	North	44	38	1
	East	63	57	2
	South	68	61	3
	West	63	57	2
Block B	North	47	40	1
	East	53	47	1
	South	55	49	1
	West	52	45	1
Block C	North	35	28	1
	East	51	44	1
	South	52	46	1
	West	50	43	1

Note(s):

1. Construction meeting the Ontario Building Code (OBC) requirements would be adequate for sound insulation.
2. Applicable for low and medium density developments: Provision for future installation of air-conditioning, warning clause "Type C". Refer to **Appendix E** for guidance regarding air-conditioning as a noise mitigation measure.
3. The acoustical performance of building components must be specified to meet the indoor sound level criteria. Installation of air conditioning to allow for windows and doors to remain closed, warning clause "Type D". Refer to Appendix E for guidance regarding air-conditioning as a noise mitigation measure.

To assess the effect of transportation noise on the qualifying OLAs for the development, predicted sound level results are summarized in **Table 3.**

Table 3: Transportation Sound Levels in Outdoor Living Areas (OLAs)

Receptor	Description	Daytime L_{EQ}, 16hr
OLA_01	Block B ground level	50 dBA
OLA_02	Block C ground level	34 dBA

The predicted sound level meets the NPC-300 criterion for OLAs. Thus, noise control measures are not required.

3.2 Stationary Source Assessment

A review of nearby stationary sources was conducted, and it was determined that there are no sources of concern for this development. There are no permitted facilities within 1 km of the proposed development. The area surrounding the proposed development is zoned as residential area.

3.3 Recommendations

Based on the noise impact assessment results, the following recommendations were determined for the project.

Due to the elevated transportation sound levels in the area, acoustical design of the façade components including spandrel, window glazing, and exterior doors, are recommended to be specified for the proposed development.

To assess the development's feasibility, preliminary window glazing, and exterior balcony door sound isolation requirements were determined. These were based on following assumptions:

- Typical residential living room:
  - Glazing 60% of façade, Door: 20% of façade
  - 55% Façade to floor area Ratio
- Typical residential bedroom:
  - Glazing 80% of façade, Door: N/A
  - 81% Façade to floor area Ratio
- Acoustical character of rooms: High absorption finishes/furniture for bedrooms and intermediate absorption finishes/furniture for living rooms.

Based on the predicted plane of window sound levels and the assumptions listed above, recommendations for the minimum sound insulation ratings for the building components were determined using the National Research Council of Canada "BPN-56 method" (NRCC, 1985). The reported results are in terms of Sound Transmission Class (STC) ratings as summarized in **Table 4**.

Table 4: Recommended Facade Component Minimum Sound Insulation Rating

Portion of Development	Façade	Window Glazing	Exterior Door	Façade Wall
Block A	North	OBC	OBC	OBC
	East	OBC	OBC	OBC
	South	STC-28	STC-25	STC-45
	West	OBC	OBC	OBC
Block B	North	OBC	OBC	OBC
	East	OBC	OBC	OBC
	South	OBC	OBC	OBC
	West	OBC	OBC	OBC
Block C	North	OBC	OBC	OBC
	East	OBC	OBC	OBC
	South	OBC	OBC	OBC
	West	OBC	OBC	OBC

The maximum requirement for the window glazing was determined to be STC-28 and STC-25 for the exterior door, which is considered feasible as this can be achieved by various double-glazed configurations of insulated glazing units.

Taking into account the assumptions used as a basis to determine the glazing requirements, the applicable indoor transportation source sound level criteria are predicted to be achieved.

We recommend that the façade construction is reviewed during detailed design to ensure that the indoor sound level limits will be met, and that the window/door supplier is requested to provide STC laboratory test reports as part of shop drawing submittal to confirm that the glazing/door components will meet the minimum STC requirements.

3.3.1.1 Ventilation Recommendations

The dwelling should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion. This would allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective purchasers or tenants should be informed by a warning clause "Type C".

3.3.2 Warning Clauses

The following warning clauses are recommended for the proposed development:

1. NPC-300 Type C or D to address transportation sound levels at the plane of window.

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. The wording of the recommended warning clauses is included with **Appendix E**.

4 THE EFFECTS OF THE PROPOSED DEVELOPMENT ON ITS SURROUNDINGS AND ON ITSELF

On-site stationary sources for the dwellings are expected to mainly consist of HVAC related equipment. Consideration should be given to control airborne and structure-borne noise generated within the proposed development.

Provided that best practices for the acoustical design of the building and guidelines from NPC-216 (MOE, 1993) are followed, noise from the development are expected to be feasible to meet the applicable sound level criteria due to the residential nature of the proposed dwellings. NPC-216 sets sound level limits and sound emission standards for residential air conditioning systems.

We recommend that the potential noise effect of the proposed development is reviewed during detailed design to ensure the applicable sound level criteria will be achieved.

5 CONCLUSIONS

RWDI was retained to prepare a Noise and Vibration Impact Study (NVIS) for the proposed residential development located in Niagara Falls, Ontario.

The following noise control measures are recommended for the proposed development:

1. The dwelling should be designed with a provision for the installation of air conditioning in the future.
2. The inclusion of noise warning clauses related to transportation sound levels at the building façade.
3. Minimum sound isolation performance:
    a. Suite bedroom window glazing with sound isolation performance up to STC-28 for the south façade of Block A.
    b. Suite exterior balcony door with sound isolation performance up to STC-25 for the south façade of Block A.

At this stage in design the noise levels produced by the development on itself and its surroundings could not be quantitatively assessed. However, the effect on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria.

We recommend that the building design is evaluated prior to building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is feasible to meet the applicable sound and vibration criteria.

6 REFERENCES

1. Ontario Ministry of the Environment (MOE), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning (MOE, 2013).
2. Ontario Ministry of the Environment and Energy (MOE), 1993, Publication NPC-216, Residential Air Conditioning Devices (MOE, 1993).
3. Richtlinien für den Lärmschutz an Strassen (RLS). BM für Verkehr, Bonn, 1990 (RLS, 1990).
4. Ontario Ministry of the Environment (MOE), 1989, ORNAMENT Ontario Road Noise Analysis Method for Environment and Transportation, Technical Publication (MOE, 1989)
5. Ontario Ministry of the Environment (MOE) Publication Guideline D-6, "Compatibility Between Industrial Facilities and Sensitive Land Uses", July 1995 (MOE, 1995).
6. Controlling Sound Transmission into Buildings (BPN-56), National Research Council Canada (NRCC, 1985).
7. Institute of Transportation Engineers (ITE), 2010, *Traffic Engineering Handbook, 6th Edition* (ITE, 2010)
8. International Organization for Standardization (ISO), 1994b, International Standard ISO 9613-1:1994, Acoustics – Attenuation of Sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere. (ISO, 1994)
9. International Organization for Standardization (ISO), 1996, International Standard ISO 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO, 1996)
10. Ontario Ministry of the Environment (MOE), 1978, Model Municipal Noise Control Bylaw, which includes Publication NPC-103 – Procedures, and Publication NPC-104 – Sound Level Adjustments.
11. City of Niagara Falls, By-Law No. 2204 – 105, Noise Control By-Law (Link, accessed 2022-10-14).

7 STATEMENT OF LIMITATIONS

This report entitled 6645, 6655 and 6665 McLeod Road was prepared by RWDI Air Inc. ("RWDI") for NPG Planning Solutions ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein 6645, 6655 and 6665 McLeod Road ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

FIGURES

Site Context Plan

True North

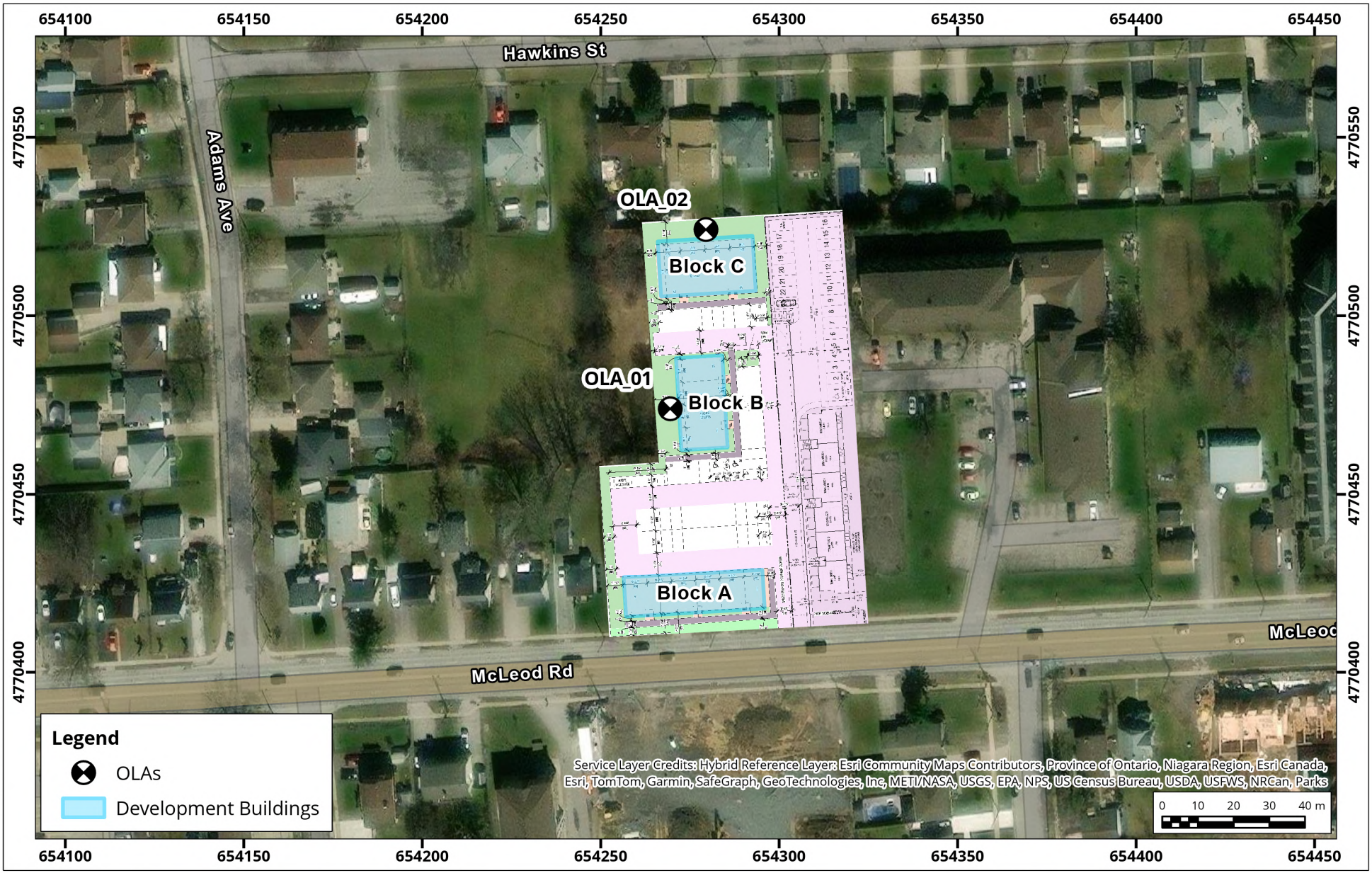
Drawn by:	KD	Figure:	1
Approx. Scale:		1:1,500	
Date Revised:		Sep 26, 2024	

Map Projection: NAD 1983 UTM Zone 17N

6645 McLeod Road - Niagara Falls, Ontario

Project #: 2505294

Map Document: \\gue-nsif-f01\wolam-jobs-dfs\jobs\2025\2505294\03WorkItems\20EnvironmentalNoiseAnalysis\03ArcGIS\6645 McLeod\6645 McLeod.aprx



Outdoor Living Areas (OLAs) Locations

Location of Common Outdoor Amenity Areas

Map Projection: NAD 1983 UTM Zone 17N

6645 McLeod Road - Niagara Falls, Ontario

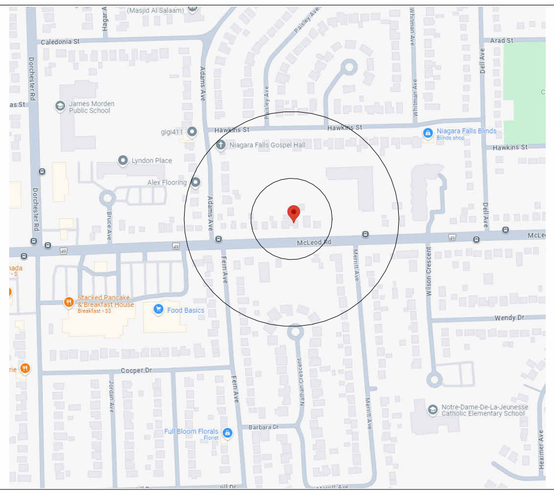
True North

Project #: 2505294

Drawn by: KD	Figure: 2
Approx. Scale: 1:1,500	
Date Revised: Sep 29, 2024	

Map Document: \\gue-nsif-f01\volam-jobs-df$\jobs\2025\2505294\03Workitems\20EnvironmentalNoiseAnalysis\03ArcGIS\6645 McLeod\6645 McLeod.aprx

APPENDIX A



1 KEY PLAN
N/A

PROJECT INFORMATION	
- PROJECT TYPE & DESCRIPTION	PROP. STACKED TOWNHOUSE
- ADDRESS	6655 Mcleod Rd

GENERAL NOTES:

1- NO WORK TO ENCROACH ON ADJOINING PROPERTIES

2- SMOKE ALARMS
SHALL BE INSTALLED ON EACH STOREY OF A DWELLING UNIT. INCLUDING BASEMENTS AS PER O.B.C 9.10.18.2. [1] [a] [b] and [c]

3- CARBON MONOXIDE DETECTORS :
IN EACH ROOM THAT CONTAINS A FUEL BURNING APPLIANCE PROVIDE A CARBON MONOXIDE DETECTOR ON OR NEAR THE CEILING EQUIPPED WITH AN ALARM AUDIBLE THROUGHOUT DWELLING UNIT OR INTERCONNECT WITH SMOKE ALARM SO THAT WHEN THE CARBON MONOXIDE DETECTOR IS ACTIVATED. IT WILL ACTIVATE THE SMOKE ALARM AS PER O.B.C. 9.33.4.1.[1] AND AS PER O.B.C. 9.33.4.2.[1] [2] AND [4]

4- EXCAVATION NOTES :
EXCAVATION AND / OR CONSTRUCTION ON ADJACENT PROPERTIES REQUIRES THE CONSENT OF AFFECTED PROPERTY OWNER(S).

5- EVERY EXCAVATION SHALL BE UNDERTAKEN IN A MANNER AS TO PREVENT MOVEMENT
WHICH WOULD CAUSE DAMAGE TO ADJACENT PROPERTY. EXISTING STRUCTURES , UTILITIES, ROADS AND SIDEWALKS AT ALL STAGES OF CONSTRUCTION.

6- MIN. SOIL BEARING CAPACITY 150KPa.
SOIL IS NOT PEAT, FILL OR SENSITIVE CLAY. THE DISTANCE BETWEEN THE BOTTOM OF FOOTINGS AND THE WATER TABLE IS EQUAL TO OR GREATER THAN THE WIDTH OF THE FOOT'GS.

7- WHERE THE DEPTH OF EXCAVATION EXCEEDS 4'-0",
EXCAVATE AT 45° ANGLE OR IN ACCORDANCE WITH APPROVED SHORING DETAILS. STRUCTURE IS NOT LOCATED ON GROUNDS HAVING A SLOPE STEEPER THAN 1 VERTICAL TO 2 HORIZONTAL.

8- SURFACE DRAINAGE SHALL NOT BE DISCHARGED DIRECTLY OR INDIRECTLY ONTO A SIDEWALK, DRIVEWAY, STAIRWAY OR AN ADJOINING PROPERTY.

9- TREES ON PRIVATE PROPERTY
NO PERSON SHALL WITHIN THE CITY'S BOUNDARIES, INJURE OR DESTROY ANY TREE HAVING A DIAMETER OF 30 cm (12 INCHES) OR MORE, MEASURED AT 1.4 m (4'-7") ABOVE GROUND LEVEL UNLESS SO AUTHORIZED BY PERMIT FROM THE COMMISSIONER OF PARKS AND RECREATION. PER MUNICIPAL CODE CHAPTER 331.

THESE ARE ARCHITECTURAL RENDERINGS AND THEY ARE TO BE USED FOR REFERENCE ONLY
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3 a- 3d
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1	ISSUED FOR CLIENT APPROVAL	10/10/24	5		
2			6		
3			7		
4			8		

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REVIEWED BY: IK
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JOB No.: 227-2947
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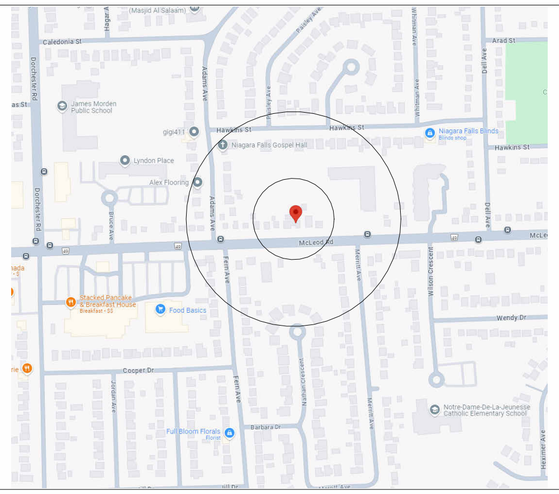

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SCALE:

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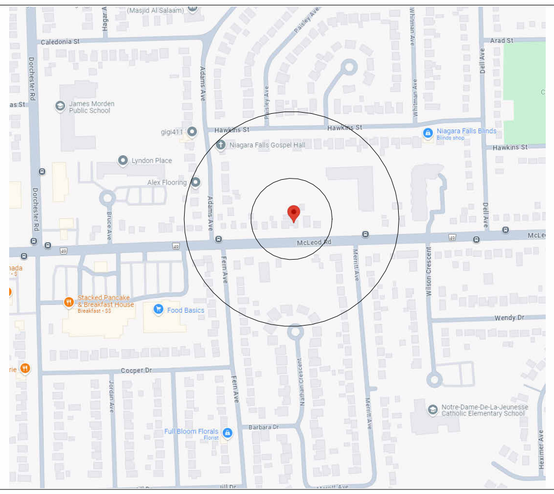

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THEY NOT ACCURATELY REPRESENT ALL DETAILS, AND ARE TO BE BE USED FOR ILLUSTRATIVE PURPOSED ONLY

4 c - front
SCALE:

5 c - 3d
SCALE:

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PROJECT: 6655 MCLeod RD
TITLE: Cover Page - BLOCK C
SCALE: As indicated
DATE: Oct 10, 2024
JOB No.: 227-2947
DRAWING No.: A00.02

MUNICIPALITY & PROJECT INFORMATION	
- PROJECT TYPE & DESCRIPTION	6655 Mcleod Rd
- MUNICIPALITY	NIAGARA
- ZONING DESIGNATION	R4

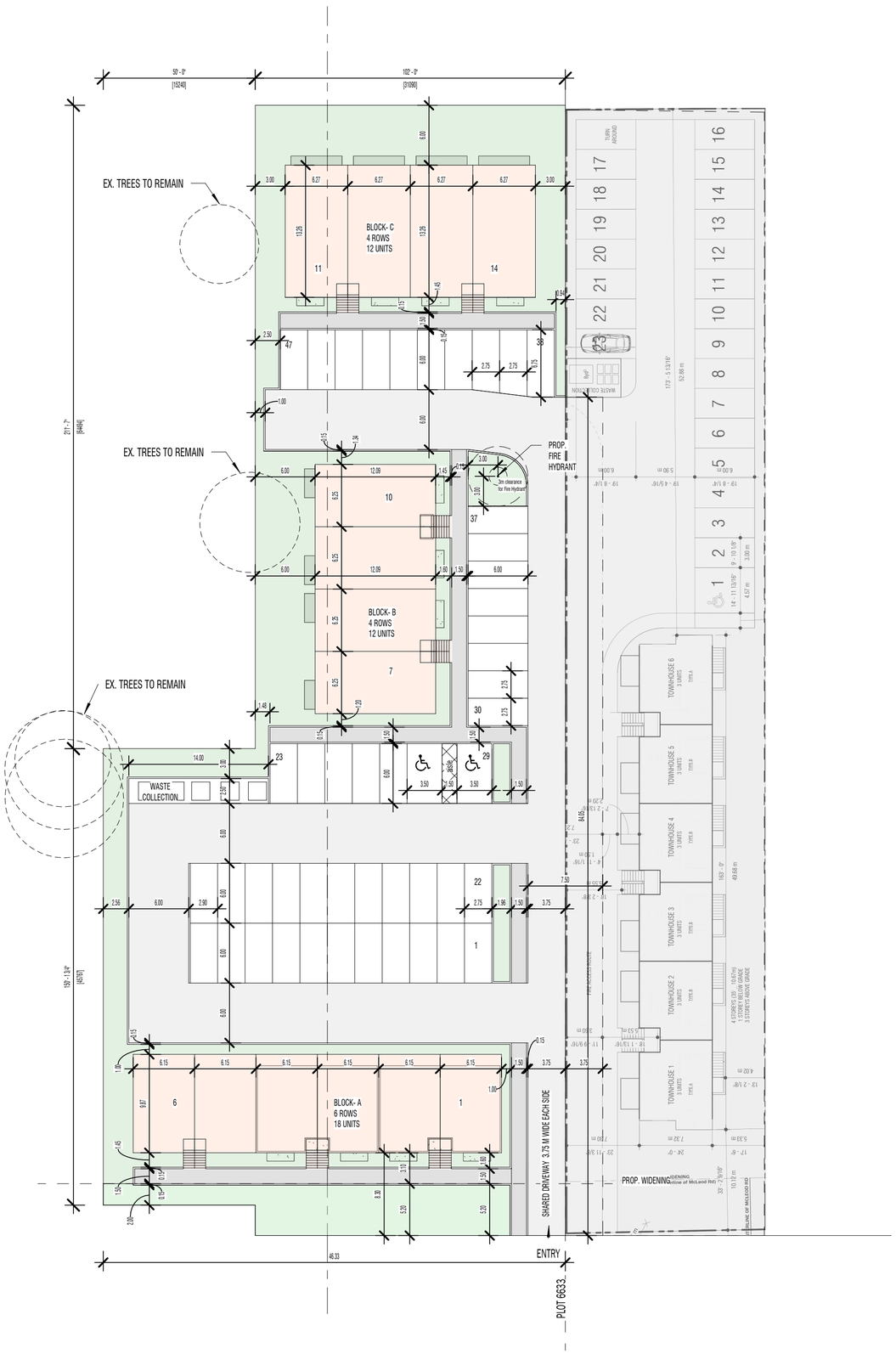
LOT SIZE	EXISTING
-NORTH (REAR)	102.00 ft/31.09 m
-SOUTH (FRONT)	217.46 ft/66.28 m
-EAST	369.48 ft/112.62 m
-WEST	369.49 ft/112.62 m

TOTAL LOT AREA	45424.99 ft²/ 4220.12 m²
TOTAL LOT AREA w/o road widening area	43332.46 sq. ft. / 4025.68 sq. m.

R4 ZONE REGULATIONS

Provision	Requirement	Proposal
(a) Minimum lot area		
(i) for an apartment dwelling or stacked townhouse dwelling	200 square metres (2,152.8 sq. ft.) for each dwelling unit	95.85 square metres (1031.72 sq. ft.) for each dwelling unit 42 Units x 95.85 square metres = 4025.68 sq. m. (w/o road widening area)
(b) Minimum lot frontage		
(i) for a townhouse dwelling or an apartment dwelling or stacked townhouse dwelling containing more than four dwelling units	30 metres (98.4 ft.)	46.33 metres (152 ft.)
(c) Minimum front yard depth		
(i) for an apartment dwelling or stacked townhouse dwelling	7.5 metres (24.61 ft.) plus any applicable distance specified in section 4.27.1	5.25 metres (17.22 ft.)
(d) Minimum rear yard depth		
(i) for an apartment dwelling or stacked townhouse dwelling	10 metres (32.81 ft.) plus any applicable distance specified in section 4.27.1.	6 metres (19.68 ft.)
e) Minimum interior side yard	one-half the height of the building	3 metres (9.84 ft.)
(f) Minimum exterior side yard width		
(i) for an apartment dwelling or stacked townhouse dwelling	7.5 metres plus any applicable distance 24.6 ft. specified in section 4.27.1	N/A
(g) Maximum lot coverage	35 %	25.11 %
(h) Maximum height of building or structure	10 metres (32.81 ft.) subject to section 4.7	Block A = 10 metres (32.81 ft.) Block B = 10 metres (32.81 ft.) Block C = 10 metres (32.81 ft.)
(i) Deleted by By-law No. 2011-136		
(j) Number of dwellings on one lot	subject to compliance with section 7.9.3, more than one dwelling is permitted on one lot	3
(k) Parking and access requirements	in accordance with section 4.19.1 42 units x 1.4 = 58.8 parking spaces	42 units x 1.1= 47 parking spaces
(l) Accessory buildings and accessory structures	in accordance with sections 4.13 and 4.14	
(m) Minimum landscaped open space	45 square metres (484.4 sq. ft.) for each dwelling unit	20.73 square metres (223.14 sq. ft.) for each dwelling unit
(n) Minimum privacy yard depth for each townhouse dwelling unit, as measured from the exterior rear wall of every dwelling unit (2008-148)	7.5 metres	N/A
(o) Minimum amenity space for an apartment dwelling unit	in accordance with section 4.44	N/A
(p) Total soft landscape area	N/A	871.04 sq. m. (21.63 % of the LOT Area w/o road widening)

R4 ZONE REGULATIONS
SCALE: 1/4" = 1'-0"



1 SITE PLAN
SCALE: 1" = 30'-0"

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NORTH

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RP

APPROVED BY
IK

PROJECT
6655 Mcleod Rd

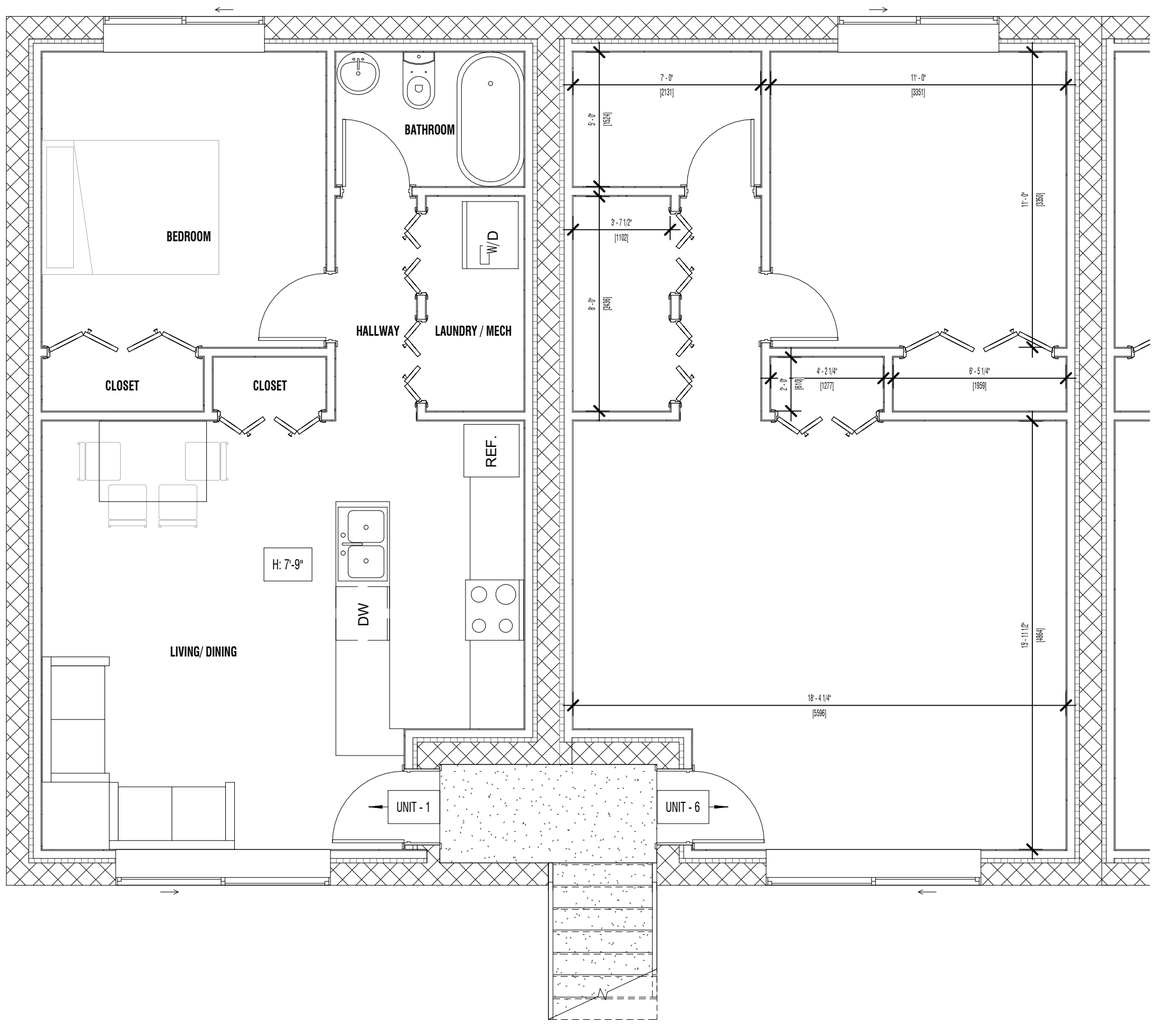
TITLE
Site Plan

SCALE
As indicated

DATE
Oct 10, 2024

JOB No.
227-2947

DRAWING No.
A01.01



1 BASEMENT FLOOR PLAN - Block - A

SCALE: 1/4" = 1'-0"

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PROJECT: 6655 MCLeod RD

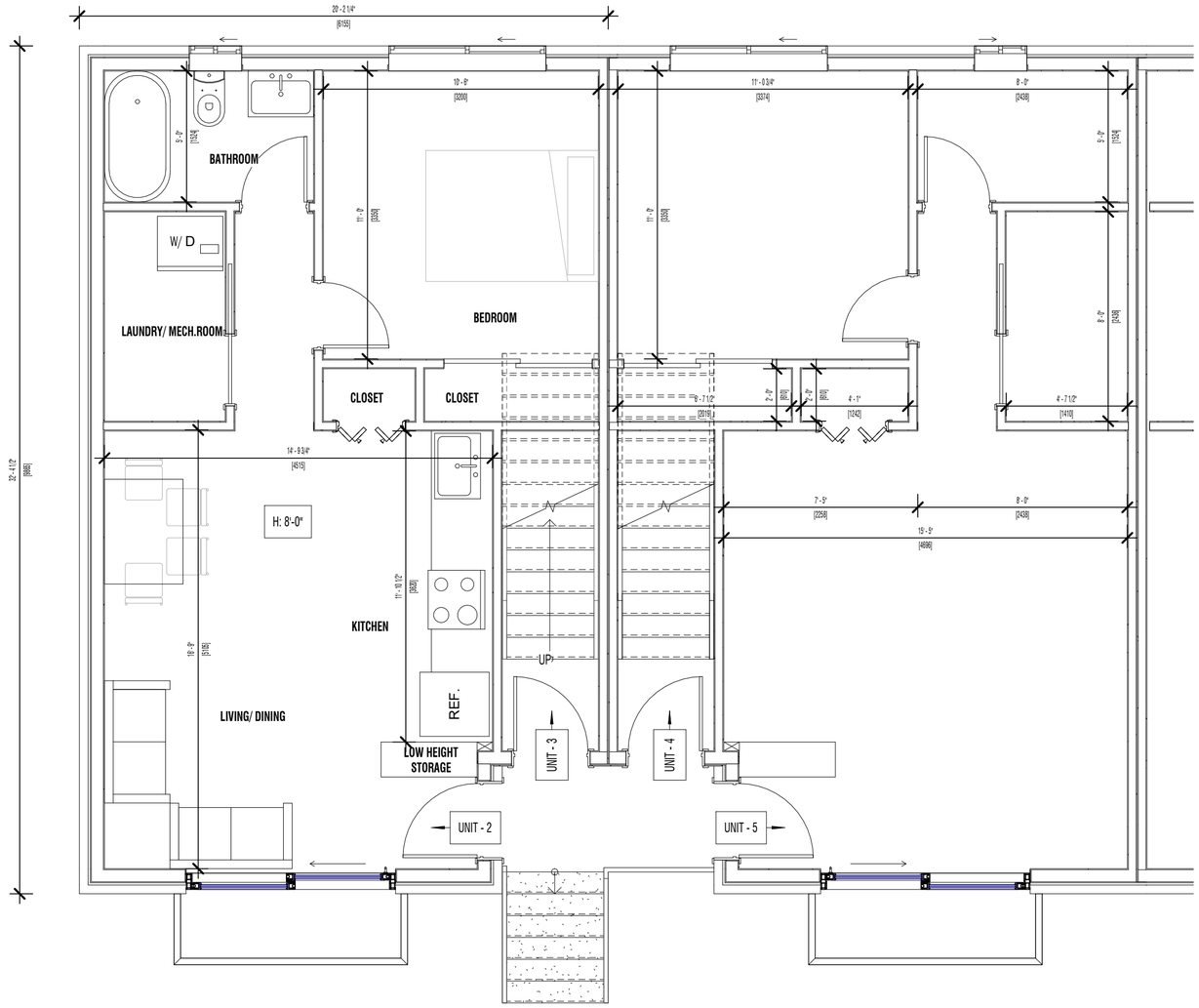
TITLE: Basement Plan - Block - A

SCALE: 1/4" = 1'-0"

DATE: Oct 10, 2024

JOB No.: 227-2947

DRAWING No.: A02.01.01



1 FIRST FLOOR PLAN - Block A
SCALE: 1/4" = 1'-0"

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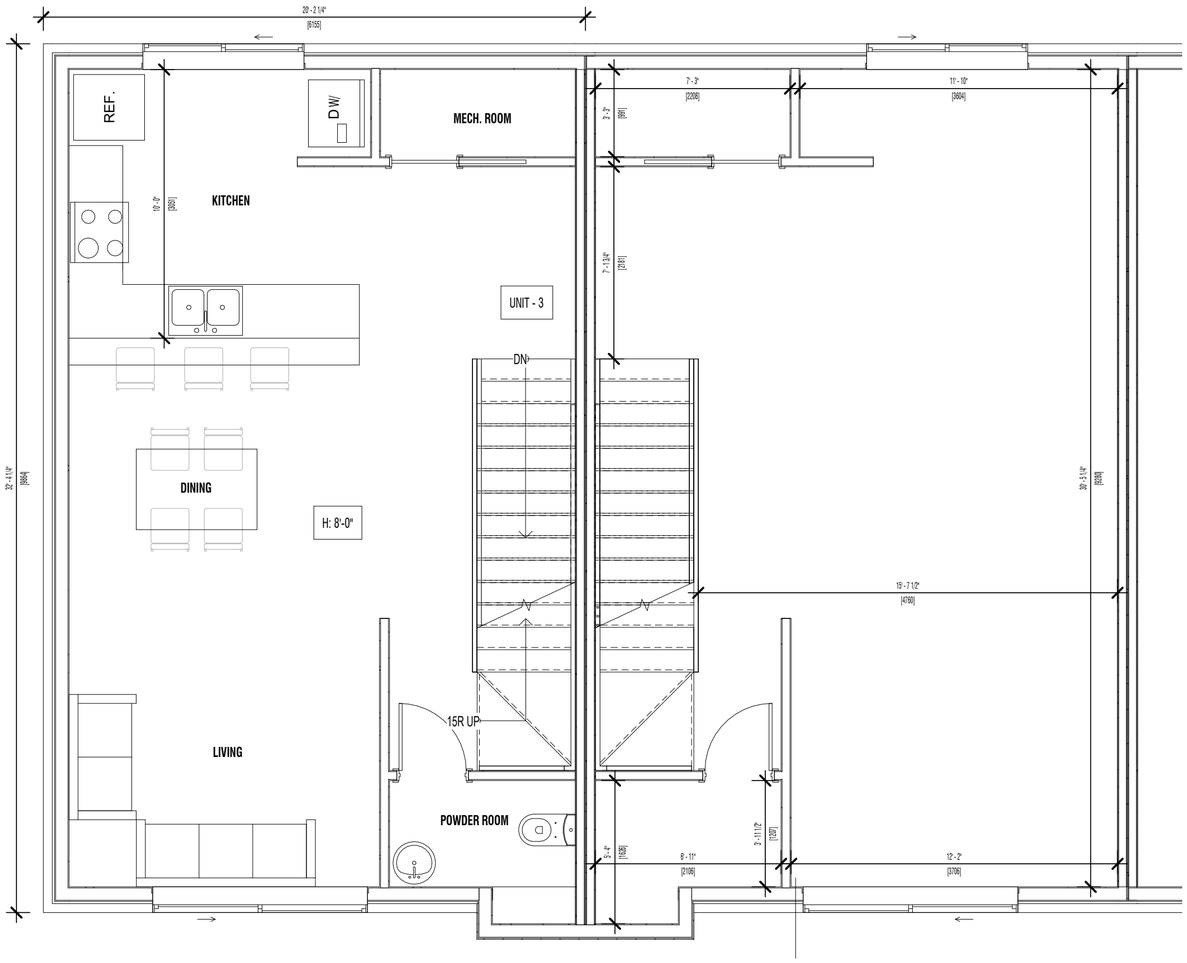
PROJECT: 6655 MCLeod RD

TITLE: First Floor Plan - BLOCK - A

SCALE: 1/4" = 1'-0"
DATE: Oct 10, 2024
JOB No.: 227-2947
DRAWING No.: A02.01.02



1 SECOND FLOOR PLAN - Block A

SCALE: 1/4" = 1'-0"

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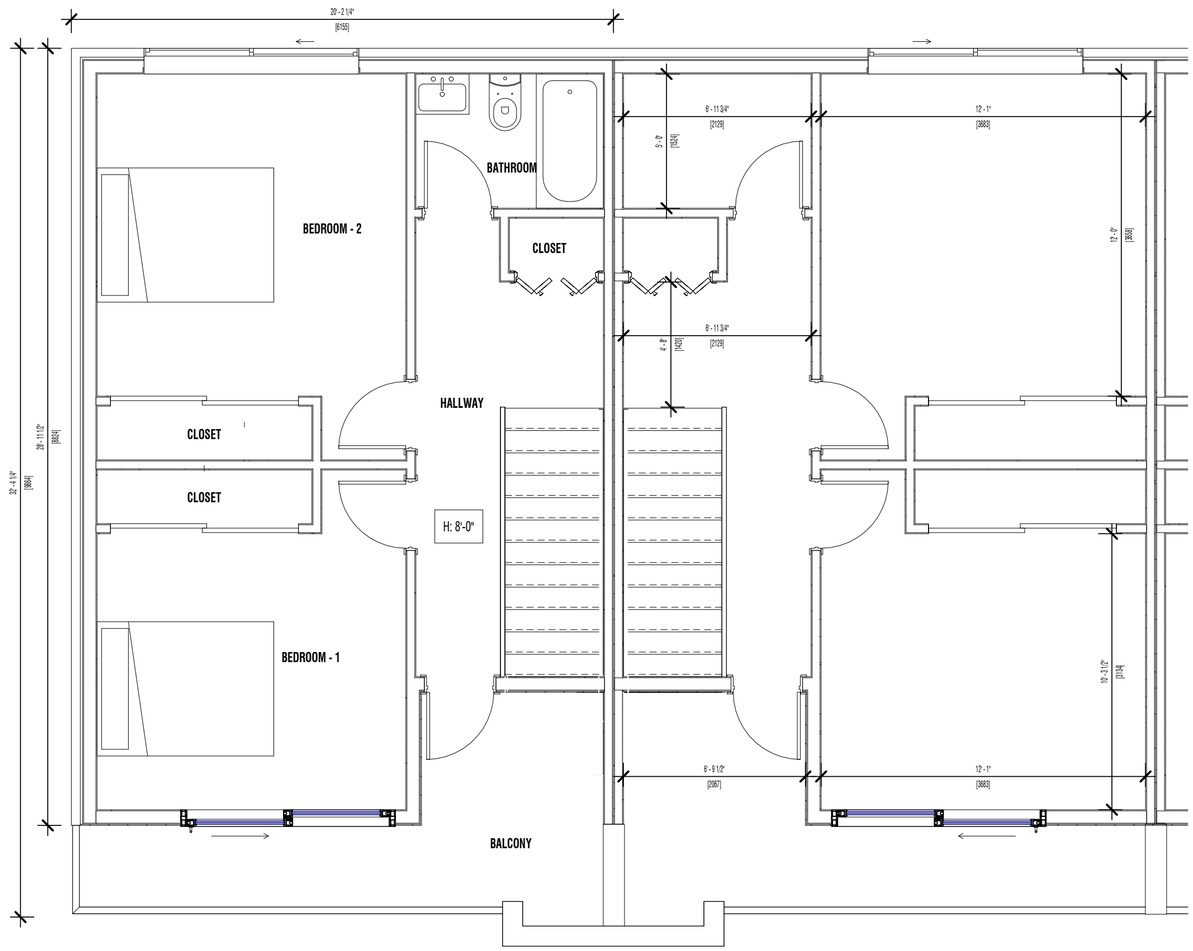
TITLE: Second Floor Plan - Block A

SCALE: 1/4" = 1'-0"

DATE: Oct 10, 2024

JOB No.: 227-2947

DRAWING No.: A02.01.03



1 Third Floor
SCALE: 1/4" = 1'-0"

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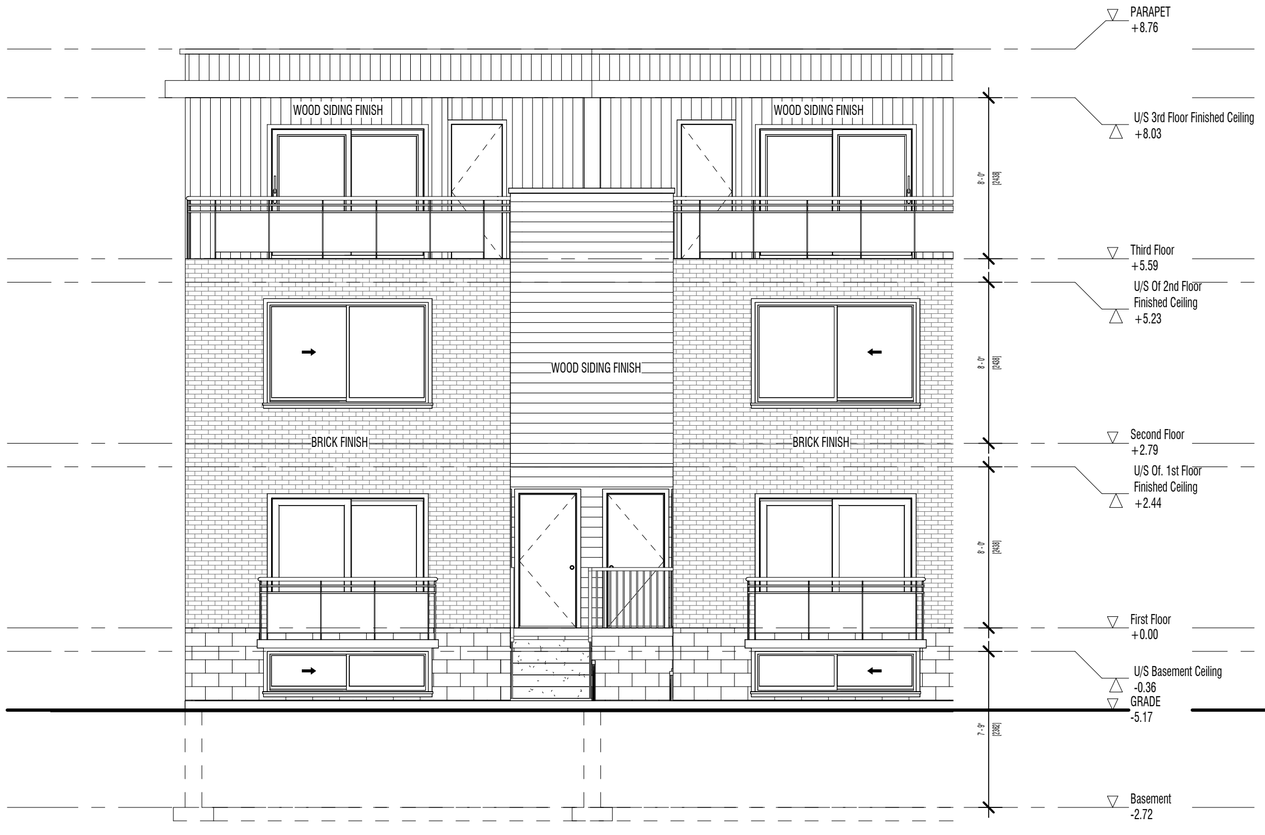
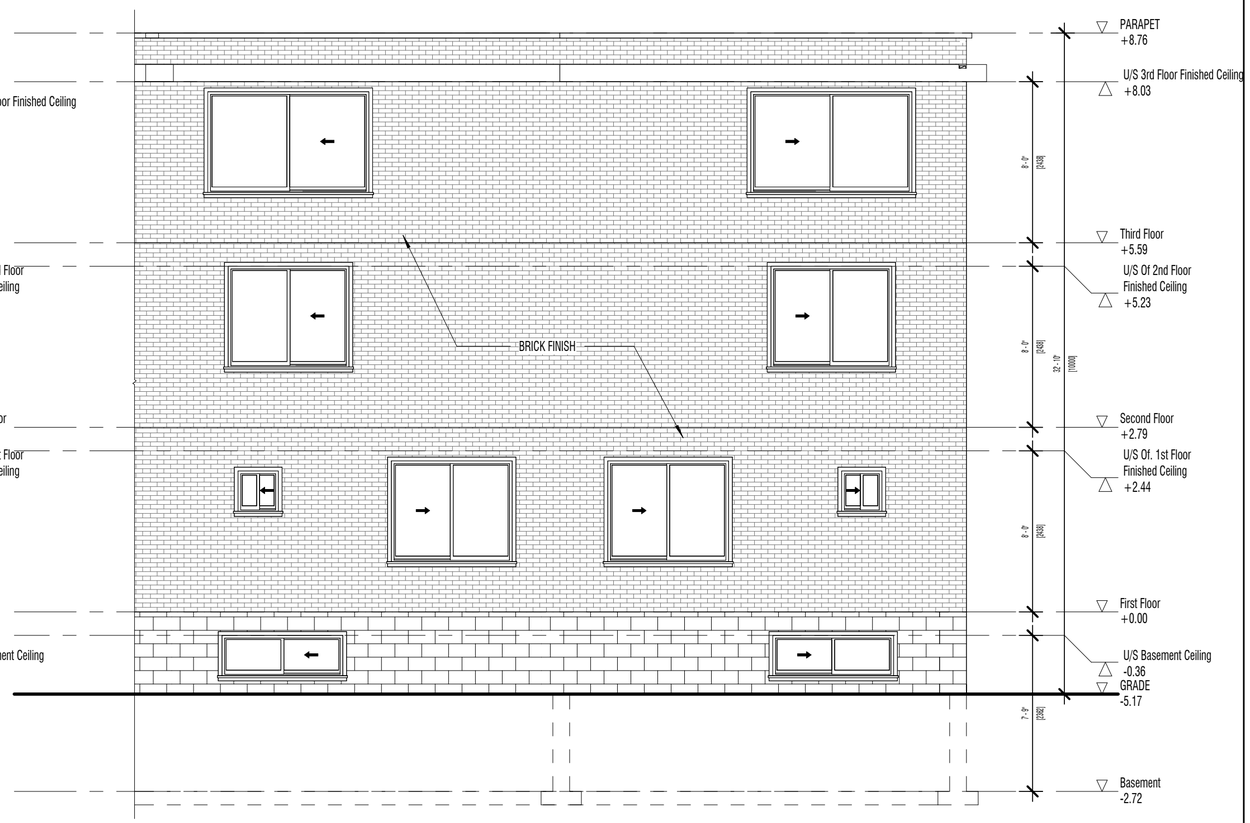
TITLE: Third Floor Plan - Block A

SCALE: 1/4" = 1'-0"
DATE: Oct 10, 2024
JOB No.: 227-2947
DRAWING No.: A02.01.04



1 BLOCK A - FRONT
SCALE: 3/16" = 1'-0"



2 BLOCK A - REAR
SCALE: 3/16" = 1'-0"

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REVIEWED BY: IK

PROJECT: 6655 MCLeod RD

TITLE: Elevation- BLOCK A

SCALE: 3/16" = 1'-0"
DATE: Oct 10, 2024
JOB No.: 227-2947
DRAWING No.: A03.01.

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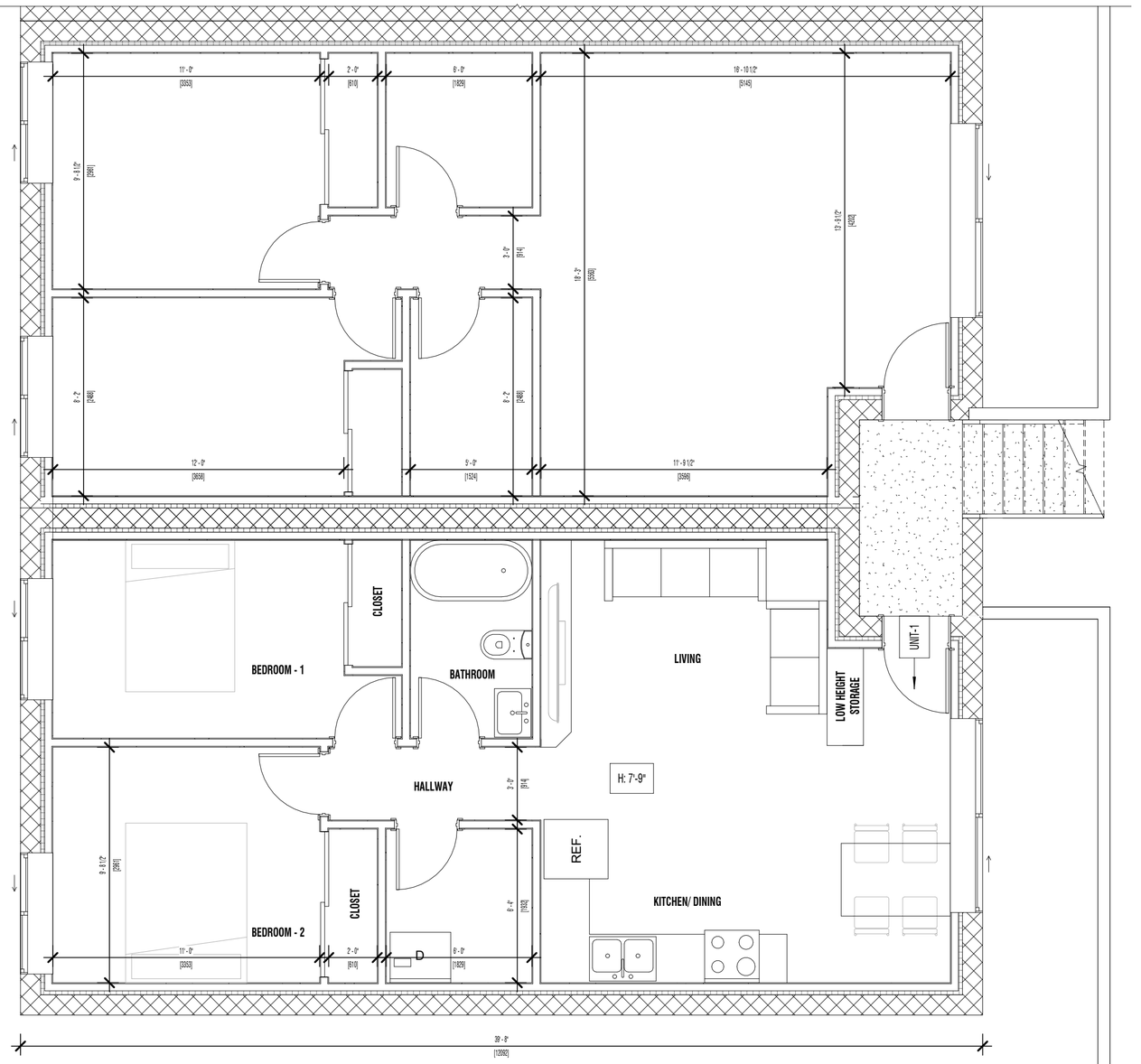

1 BASEMENT FLOOR PLAN - Block - B
SCALE: 1/4" = 1'-0"

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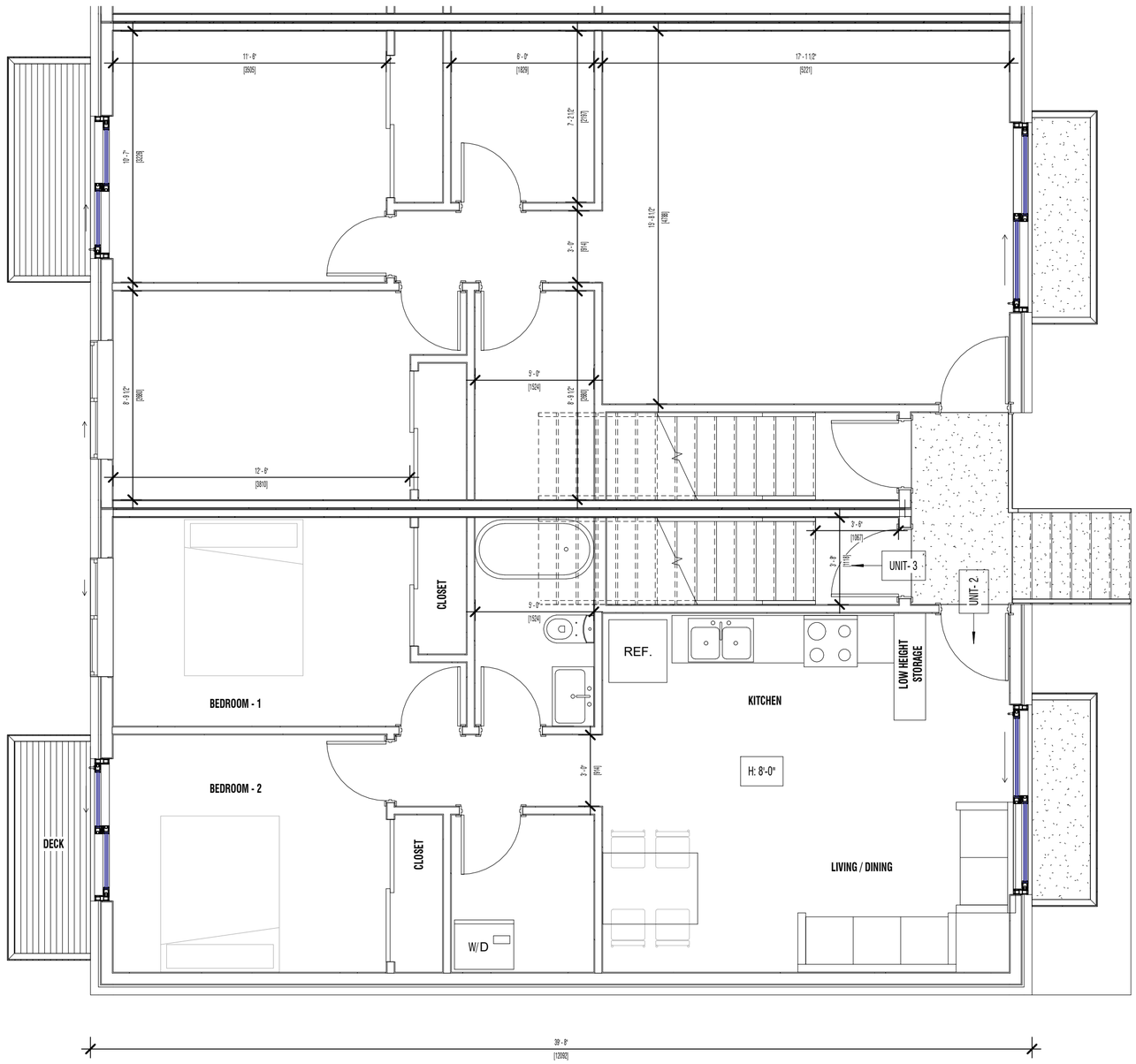
PROJECT	6655 MCLeod RD
TITLE	Basement Plan - Block -B
SCALE	1/4" = 1'-0"
DATE	Oct 10, 2024
JOB No.	227-2947
DRAWING No.	A02.02.01



1 FIRST FLOOR PLAN - Block B
SCALE: 1/4" = 1'-0"

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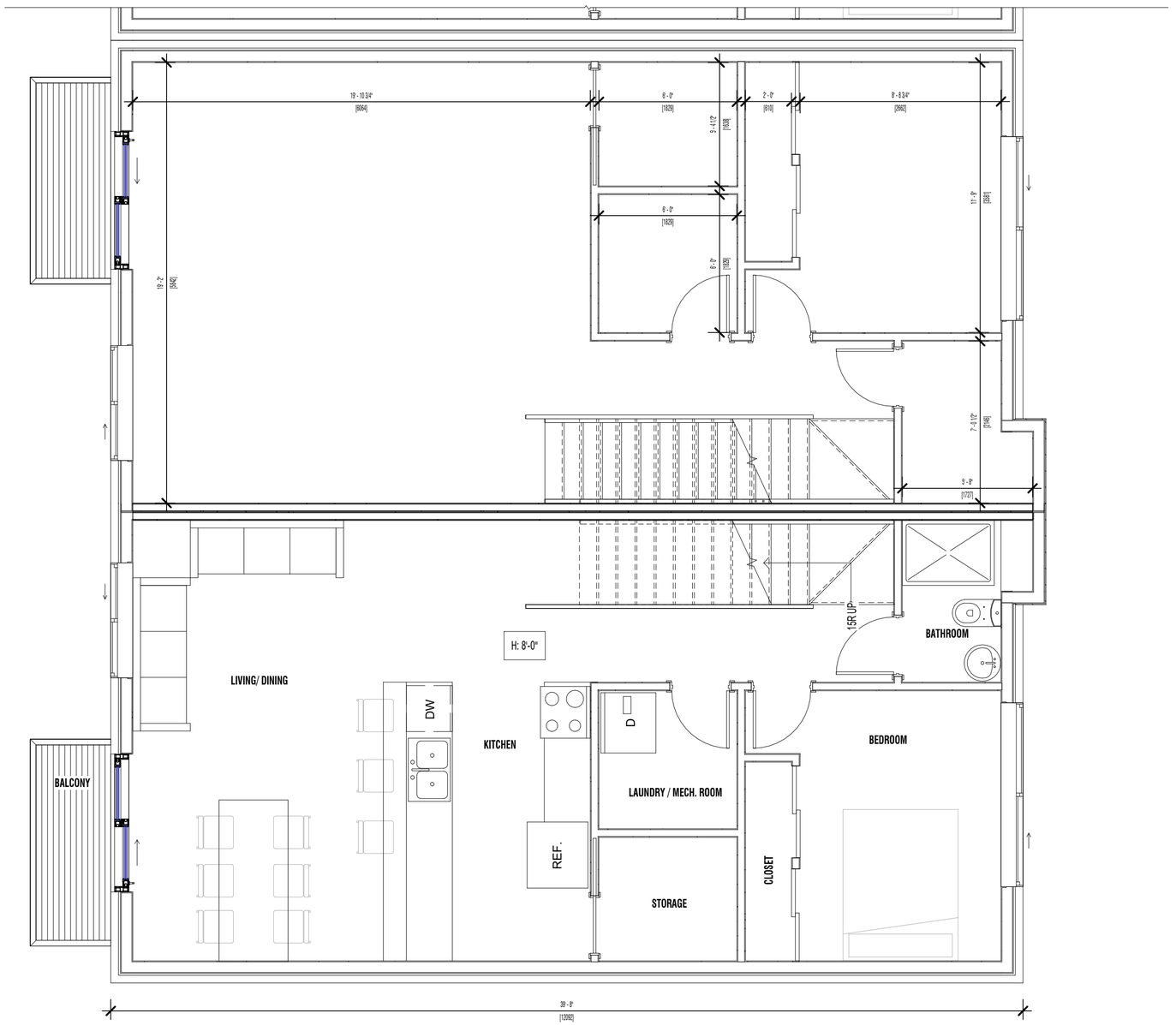
PROJECT: 6655 MCLeod RD

TITLE: First Floor Plan - BLOCK - B

SCALE: 1/4" = 1'-0"
DATE: Oct 10, 2024
JOB No.: 227-2947
DRAWING No.: A02.02.02



1 SECOND FLOOR PLAN - Block B
SCALE: 1/4" = 1'-0"

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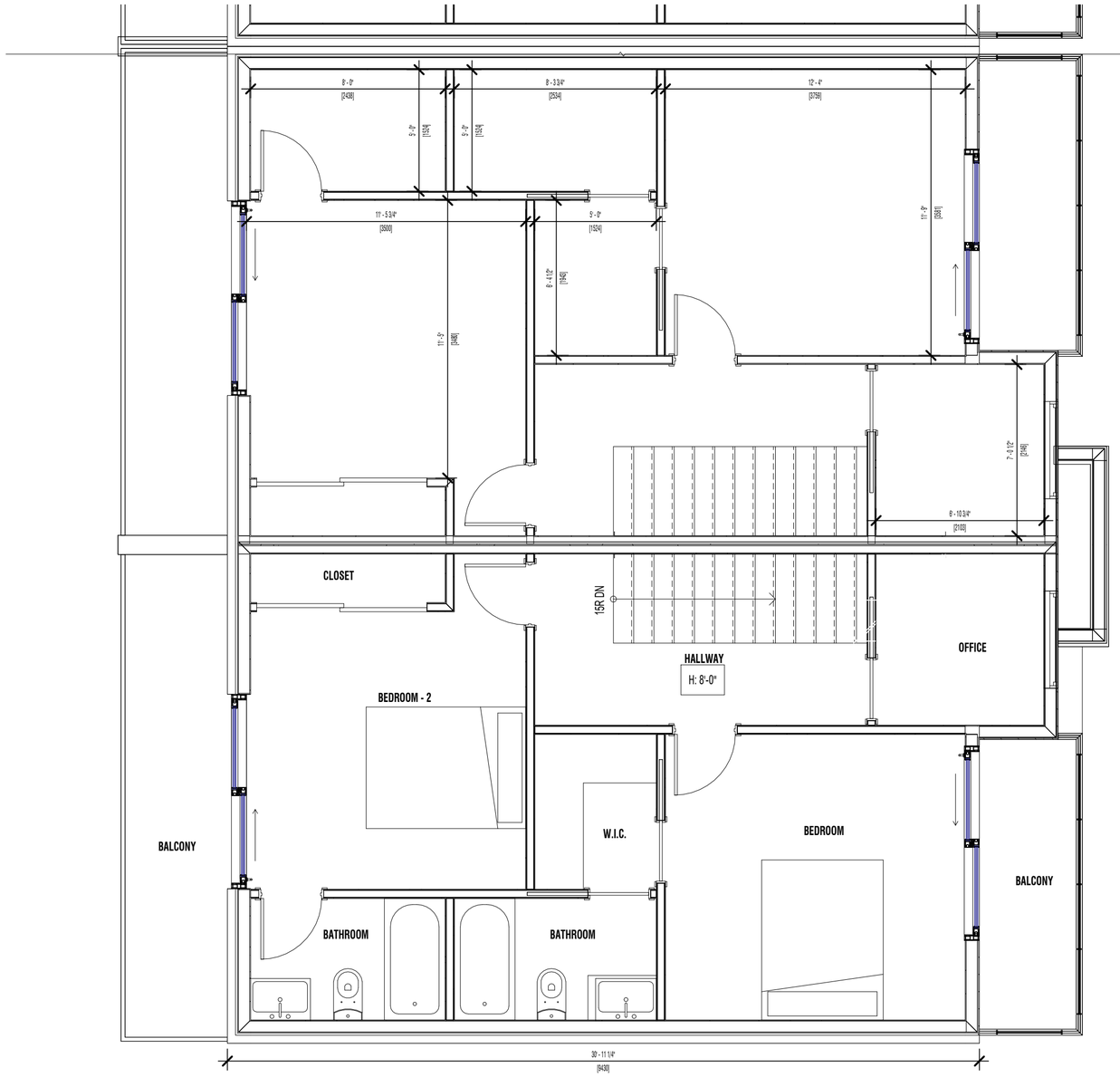
PROJECT: 6655 MCLeod RD

TITLE: Second Floor Plan - Block B

SCALE: 1/4" = 1'-0"
DATE: Oct 10, 2024
JOB No.: 227-2947
DRAWING No.: A02.02.03



1 Third Floor - Block - B
SCALE: 1/4" = 1'-0"

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PROJECT: 6655 MCLeod RD

TITLE: Third Floor Plan - Block B

SCALE: 1/4" = 1'-0"
DATE: Oct 10, 2024
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1 BLOCK - B - FRONT
SCALE: 3/16" = 1'-0"

2 BLOCK B - REAR
SCALE: 3/16" = 1'-0"

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PROJECT: 6655 MCLeod RD

TITLE: Elevation - Block -B

SCALE: 3/16" = 1'-0"
DATE: Oct 10, 2024
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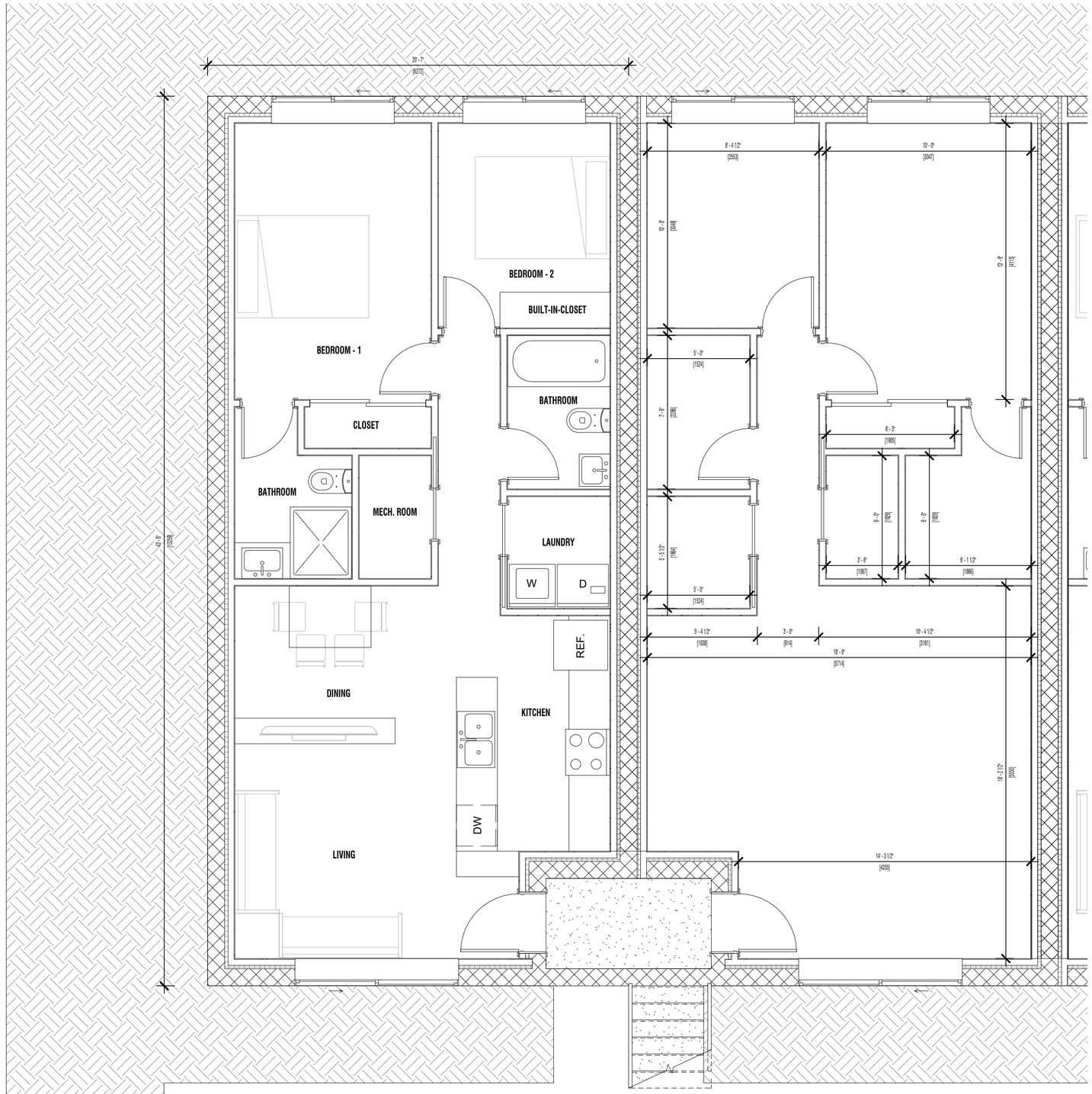
DRAWING No.: A03.02.



1 BASEMENT FLOOR PLAN - Block - C

SCALE: 1/4" = 1'-0"

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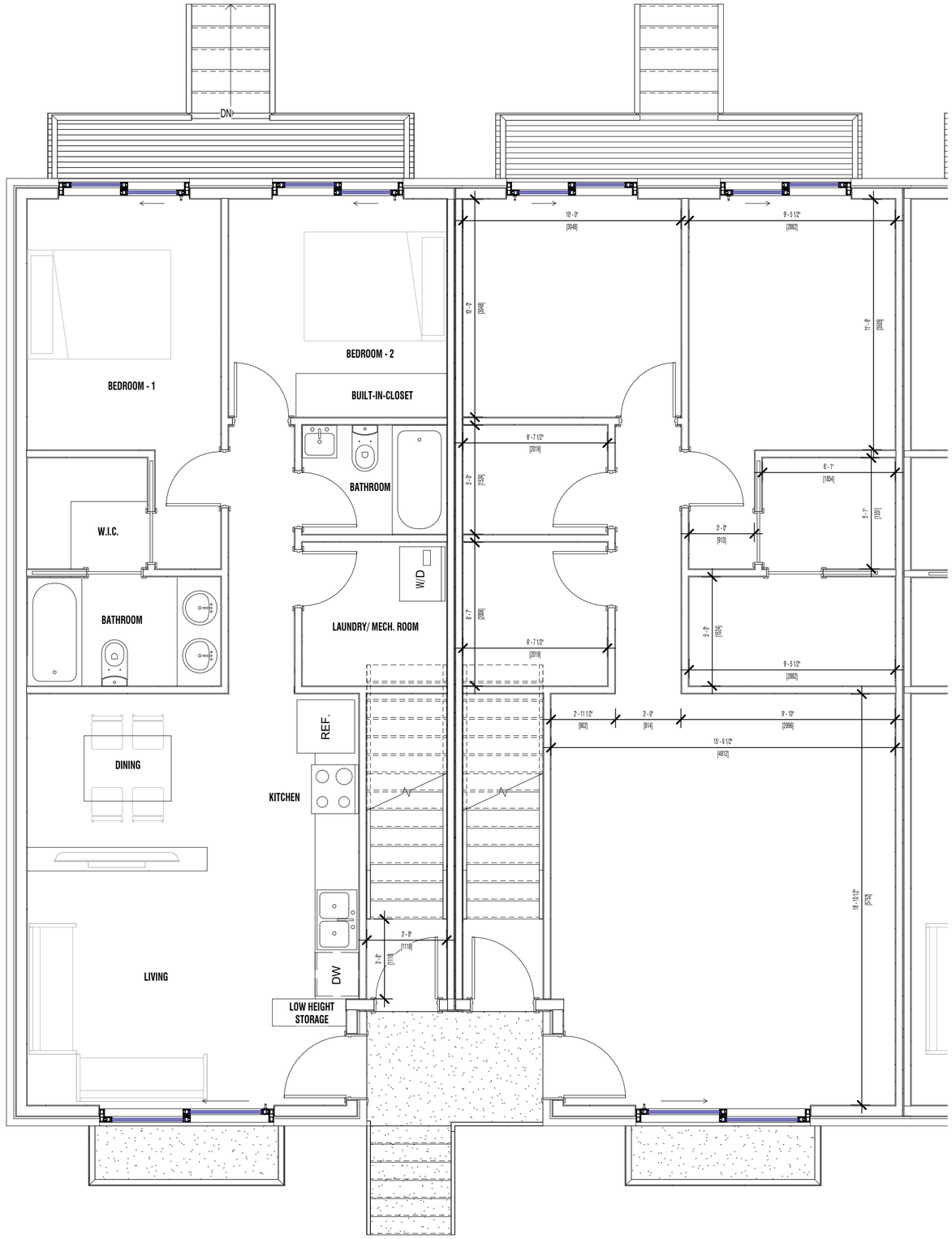
TITLE: Basement Plan - Block - C

SCALE: 1/4" = 1'-0"

DATE: Oct 10, 2024

JOB No.: 227-2947

DRAWING No.: A02.03.01



1 FIRST FLOOR PLAN - Block C
SCALE: 1/4" = 1'-0"

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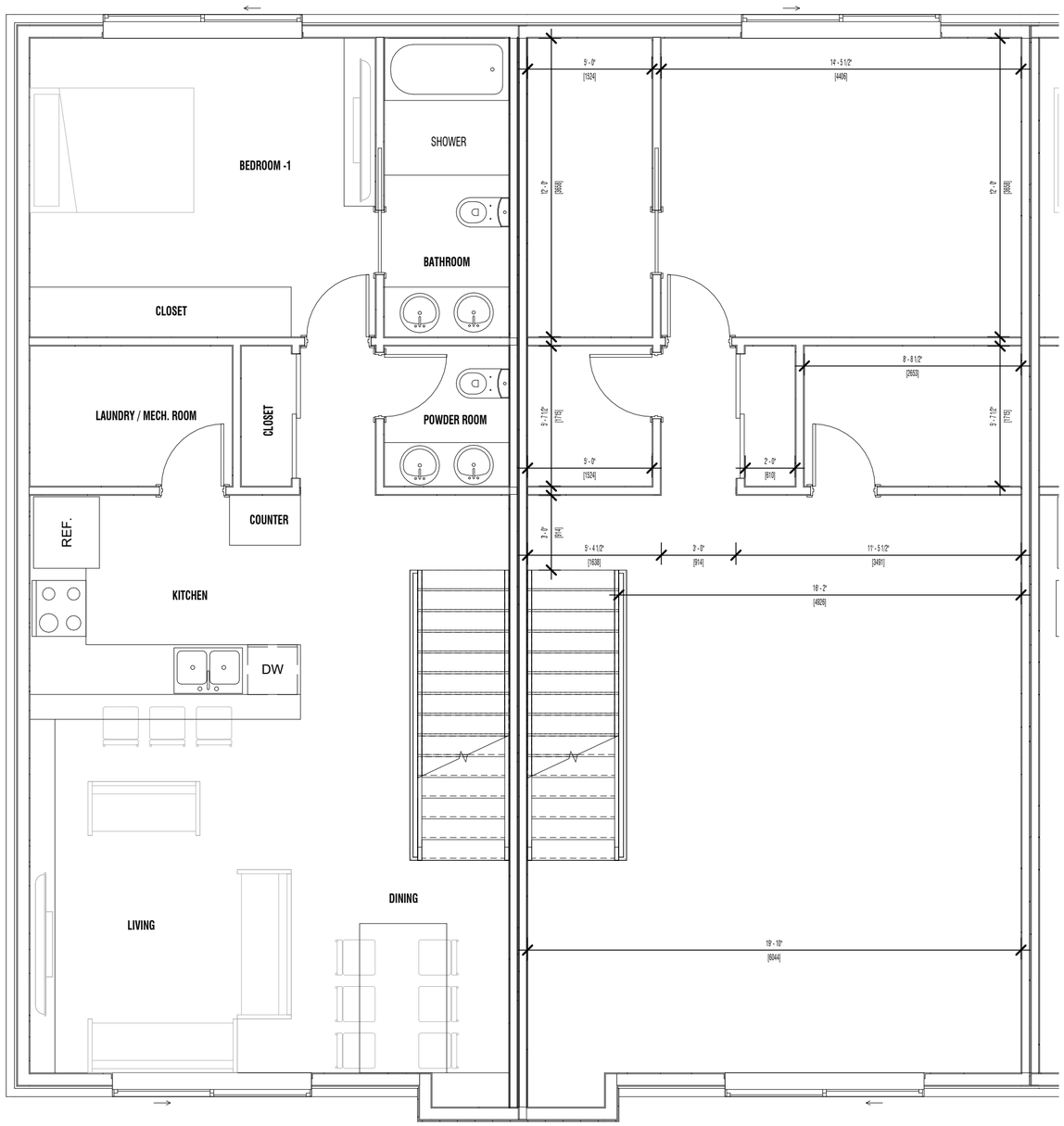

1 SECOND FLOOR PLAN - Block C

SCALE: 1/4" = 1'-0"

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PROJECT: 6655 MCLeod RD

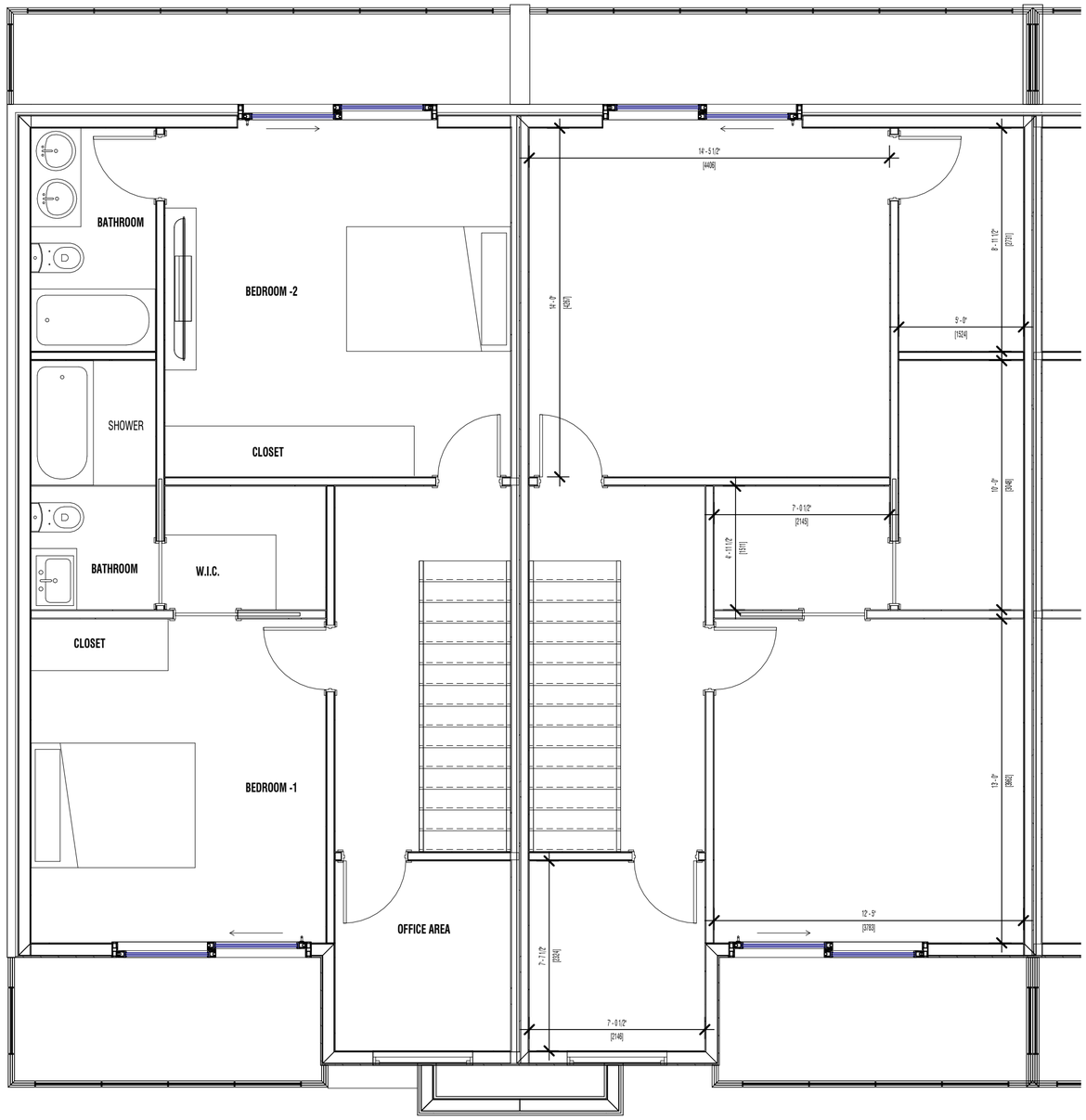
TITLE: Second Floor Plan - Block C

SCALE: 1/4" = 1'-0"

DATE: Oct 10, 2024

JOB No.: 227-2947

DRAWING No.: A02.03.03



1 Third Floor - Block - C
SCALE: 1/4" = 1'-0"

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REVIEWED BY: IK

PROJECT: 6655 MCLeod RD

TITLE: Third Floor Plan - Block C

SCALE: 1/4" = 1'-0"
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DRAWING No.: A02.03.04

APPENDIX B

CRITERIA

Transportation Sources

Guidance from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline was used to assess environmental noise generated by transportation-related sources. There are three aspects to consider, which include the following:

i. Transportation source sound levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) sound insulation design recommendations.
ii. Transportation source sound levels at the plane of the window, which determines air-conditioning and ventilation system recommendations and associated warning clauses which inform the future occupants that windows and doors must be closed in order to meet the indoor sound level criteria.
iii. Transportation source sound levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

Road and Rail

Indoor Sound Level Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in **Table 1** for indoor areas of sensitive uses. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed.

Table 1: Indoor Sound Level Criteria for Road and Rail Sources

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h
Living Quarters Examples: Living, dining and den areas of residences, hospitals, nursing homes, schools and daycare centres	**Road**	45 dBA	
	Rail	40 dBA	
Sleeping Quarters	**Road**	45 dBA	40 dBA
	Rail	40 dBA	35 dBA

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in **Table 2** are provided to inform good-practice design objectives.

Table 2: Supplementary Indoor Sound Level Criteria for Road and Rail Sources

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h
General offices, reception areas, retail stores, etc.	**Road**	50 dBA	-
	Rail	45 dBA	-
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	**Road**	45 dBA	-
	Rail	40 dBA	-
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	**Road**	-	40 dBA
	Rail	-	35 dBA
Sleeping quarters of hotels/motels	**Road**	-	45 dBA
	Rail	-	40 dBA

Outdoor Living Areas (OLAs)

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building.

OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. The sound level criteria for outdoor living areas is summarized in **Table 3**.

Table 3: Sound Level Criteria – Outdoor Living Area

Assessment Location	Sound Level Criteria (Outdoors)	
	Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h
Outdoor Living Area (OLA) (Combined Road and Rail)	55 dBA	-

Outdoor and Plane of Window Sound Levels

In addition to the sound level criteria, noise control measures and requirements for ventilation and warning clauses requirements are recommended for residential land-uses based on predicted transportation source sound levels incident in the plane of window at bedrooms and living/dining rooms, and/or at outdoor living areas. These recommendations are summarized in **Table 4** below.

Table 4: Ventilation, Building Component, and Warning Clauses Recommendations for Road/Rail Sources

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16\text{-}hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8\text{-}hr}$ 23:00h – 07:00h	
Plane of Window (Road)	> 65 dBA	> 60 dBA	Installation of air conditioning to allow windows to remained closed. The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria. Warning clause "Type D" is recommended.
	> 55 dBA	> 50 dBA	Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause "Type C" is recommended. Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause "Type D" is recommended.
Plane of Window (Rail [1, 2])	> 60 dBA	> 55 dBA	The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved. Warning clause "Type D" is recommended.
	> 60 dBA ($L_{eq,\ 24hr}$) and < 100m from tracks		Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings. Warning clause "Type D" is recommended.
Outdoor Living Area (Combined Road and Rail [3])	≤ 60 dBA > 55 dBA	-	If sound levels are predicted to exceed 55 dBA, but are less than 60 dBA, noise controls may be applied to reduce the sound level to 55 dBA. If noise control measures are not provided, a warning clause "Type A" is recommended.
	> 60 dBA	-	Noise controls (barriers) should be implemented to meet the 55 dBA criterion. If mitigation is not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case a warning clause "Type B" would be recommended.

Note(s):

1. Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.
2. Some railway companies (e.g. CN, CP) may require that the exterior walls include a brick veneer or masonry equivalent for the façade facing the railway line, regardless of the sound level.
3. Whistle noise is not included in the determination of the sound level at the OLA.

Rail Layover Sites

NPC-300 provides a sound level limit for rail layover sites to be the higher of the background sound level or 55 dBA $L_{eq,1\text{-}hr,}$ for any one-hour period.

Rail Vibration Criteria

An assessment of rail vibration is generally recommended for developments within 75m of a rail corridor or rail yard, and adjacent to or within a setback of 15m of a transit (subway or light-rail) rail line.

The generally accepted vibration criterion for sensitive land-uses is the threshold of perception for human exposure to vibration, being a vibration velocity level of 0.14 mm/s RMS in any one-third octave band centre frequency in the range of 4 Hz to 200 Hz.

This vibration criterion is based on a one-second exponential time-averaged maximum hold root-mean-square (RMS) vibration velocity level and is consistent with the Railway Associations of Canada (RAC, 2013) guideline, the U.S. Federal Transit Authority (FTA, 2018) criterion for residential land-uses, the Toronto Transit Commission (TTC) guidelines for the assessment of potential vibration impact of future expansion (MOEE/TTC, 1993).

Aircraft

Land-use compatibility in the vicinity of airports is addressed in Ministry of the Environment, Conservation, and Parks (MECP) Guideline NPC-300 (MOE, 2013). The guideline provides recommendations for ventilation, and noise control for different Noise Exposure Forecast (NEF) values, which would be based on NEF contour maps available from the airport authority. The NEF values can be expressed as $L_{A,eq,24hr}$ sound levels by using the expression NEF = $L_{Aeq,24hr}$ -32 dBA.

Table 5: Indoor Sound Level Criteria for Aircraft Sources

Assessment Location	Indoor Sound Level Criteria NEF ($L_{eq,\ 24hr}$) [1]
Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, etc.	NEF- 5 (37 dBA)
Sleeping quarters	NEF-0 (32 dBA)

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in **Table 6** are provided to inform good-practice design objectives.

Table 6: Supplementary Indoor Sound Level Criteria for Aircraft Sources

Assessment Location	Indoor Sound Level Criteria[1]
General offices, reception areas, retail stores, etc.	NEF-15 (47 dBA)
Individual or semi-private offices, conference rooms, etc.	NEF-10 (42 dBA)
Sleeping quarters of hotels/motels, theatres, libraries, places of worship, etc.	NEF-5 (37 dBA)

Table 7: NPC-300 Sound Level Criteria for Aircraft (Outdoors)

Assessment Location	Outdoor Sound Level Criteria[1]
Outdoor areas, including OLA	NEF-30 (62 dBA)

Table 8: Ventilation, Building Component, and Warning Clauses Recommendations for Aircraft Sources

Assessment Location	Aircraft Sound Level	NPC-300 Requirements
	NEF ($L_{EQ,24\text{-}hr}$)	
Outdoors	≥NEF 30	Air conditioning to allow windows to remained closed. The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria. Warning clauses "Type D" and "Type B" are recommended.
	< NEF 30 ≥ NEF 25	The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria. Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause "Type C" is recommended. Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause "Type D" is recommended.
	< NEF 25	Further assessment not required

Stationary Sources

NPC-300 Sound Level Criteria – Stationary Sources

Guidance from the MECP NPC-300 Environmental Noise Guideline is used to assess environmental noise generated by stationary sources, for example industrial and commercial facilities.

Noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case one-hour average sound level (L_{eq}) for each period of the day. For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and plane of window.

The assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or "Class" of the area. The NPC-300 exclusion limits for continuously operating stationary sources are summarized in **Table 9**.

Table 9: NPC-300 Exclusion Limits – Continuous and Quasi-Steady Impulsive Stationary Sources (LAeq-1hr)

Time Period	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime 0700-1900h	50 dBA	50 dBA	50 dBA	50 dBA	45 dBA	45 dBA	55 dBA	60 dBA
Evening 1900-2300h	50 dBA	50 dBA	45 dBA	50 dBA	40 dBA	40 dBA	55 dBA	60 dBA
Nighttime 2300-0700h	--	45 dBA	--	45 dBA	--	40 dBA	--	55 dBA

Note(s):

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.
2. Class 1, 2 and 3 sound level criteria apply to a window that is assumed to be open.
3. Class 4 area criteria apply to a window that is assumed closed. Class 4 area requires formal designation by the land-use planning authority.
4. Sound level criteria for emergency backup equipment (e.g. generators) operating in non-emergency situations such as testing or maintenance are 5 dB greater than the applicable sound level criteria for stationary sources.

For impulsive sound, other than quasi-steady impulsive sound, from a stationary source, the sound level criteria at a POR is expressed in terms of the Logarithmic Mean Impulse Sound Level (L_{LM}), and is summarized in **Table 10**.

Table 10: NPC-300 Exclusion Limits – Impulsive Stationary Sources (L_{LM})

Time Period	Number of Impulses in Period of One-Hour	Class 1 and 2 Areas		Class 3 Areas		Class 4 Areas	
		Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime (0700-2300h)	9 or more	50 dBAI	50 dBAI	45 dBAI	45 dBAI	55 dBAI	60 dBAI
Nighttime (2300–0700h)		-	45 dBAI	-	40 dBAI	-	55 dBAI
Daytime (0700-2300h)	7 to 8	55 dBAI	55 dBAI	50 dBAI	50 dBAI	60dBAI	65 dBAI
Nighttime (2300–0700h)		-	50 dBAI	-	45 dBAI	-	60 dBAI
Daytime (0700-2300h)	5 to 6	60 dBAI	60 dBAI	55 dBAI	55 dBAI	65 dBAI	70 dBAI
Nighttime (2300–0700h)		-	55 dBAI	-	50 dBAI	-	65 dBAI
Daytime (0700-2300h)	4	65 dBAI	65 dBAI	60 dBAI	60 dBAI	70 dBAI	75 dBAI
Nighttime (2300–0700h)		-	60 dBAI	-	55 dBAI	-	70 dBAI
Daytime (0700-2300h)	3	70 dBAI	70 dBAI	65 dBAI	65 dBAI	75 dBAI	80 dBAI
Nighttime (2300–0700h)		-	65 dBAI	-	60 dBAI	-	75 dBAI
Daytime (0700-2300h)	2	75 dBAI	75 dBAI	70 dBAI	70 dBAI	80 dBAI	85 dBAI
Nighttime (2300–0700h)		-	70 dBAI	-	65 dBAI	-	80 dBAI
Daytime (0700-2300h)	1	80 dBAI	80 dBAI	75 dBAI	75 dBAI	85 dBAI	90 dBAI
Nighttime (2300–0700h)		-	75 dBAI	-	70 dBAI	-	85 dBAI

Note(s):

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.

D-Series Guidelines

The MECP D-series guidelines (MOE, 1995) provide direction for land use planning to maximize compatibility of industrial uses with adjacent land uses. The goal of Guideline D-6 is to minimize encroachment of sensitive land uses on industrial facilities and vice versa, in order to address potential incompatibility due to adverse effects such as noise, odour and dust.

For each class of industry, the guideline provides an estimate of potential influence area and states that this influence area shall be used in the absence of the recommended technical studies. Guideline D-6 also recommends a minimum separation distance between each class of industry and sensitive land uses (see **Table 11**). Section 4.10 of D-6 identifies exceptional circumstances with respect to redevelopment, infill and mixed-use areas. In these cases, the guideline suggests that separation distances at, or less than, the recommended minimum separation distance may be acceptable if a justifying impact assessment is provided.

Table 11: Summary of Guideline D-6

Industry Class	Definition	Potential Influence Area	Recommended Minimum Separation Distance (property line to property line)
Class I	Small scale, self-contained, daytime only, infrequent heavy vehicle movements, no outside storage.	70 m	20 m
Class II	Medium scale, outdoor storage of wastes or materials, shift operations and frequent heavy equipment movement during the daytime.	300 m	70 m
Class III	Large scale, outdoor storage of raw and finished products, large production volume, continuous movement of products and employees during daily shift operations.	1000 m	300 m

Guideline D-6 provides criteria for classifying industrial land uses, based on their outputs, scale of operations, processes, schedule and intensity of operations. **Table 12** provides the classification criteria and examples.

Table 12: Guideline D-6 Industrial Categorization Criteria

Criteria	Class I	Class II	Class III
Outputs	• Sound not audible off property • Infrequent dust and/ or odour emissions and not intense • No ground-borne vibration	• Sound occasionally audible off property • Frequent dust and/ or odour emissions and occasionally intense • Possible ground-borne vibration	• Sound frequently audible off property • Persistent and intense dust and/ or odour emissions • Frequent ground-borne vibration
Scale	• No outside storage • Small scale plant or scale is irrelevant in relation to all other criteria	• Outside storage permitted • Medium level of production	• Outside storage of raw and finished products • Large production levels
Process	• Self-contained plant or building which produces / stores a packaged product • Low probability of fugitive emissions	• Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions	• Open process • Frequent outputs of major annoyances • High probability of fugitive emissions
Operation / Intensity	• Daytime operations only • Infrequent movement of products and/or heavy trucks	• Shift operations permitted • Frequent movements of products and/or heavy trucks with majority of movements during daytime hours	• Continuous movement of products and employees • Daily shift operations permitted
Examples	• Electronics Manufacturing • Furniture refinishing • Beverage bottling • Auto parts • Packaging services • Dairy distribution • Laundry and linen supply	• Magazine printing • Paint spray booths • Metal command • Electrical production • Dairy product manufacturing • Feed packing plant	• Paint and varnish manufacturing • Organic chemicals manufacturing • Breweries • Solvent recovery plant • Soap manufacturing • Metal manufacturing

APPENDIX C

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610325 - EB
Location: 610325

A study of vehicle traffic was conducted with the device having serial number 402529. The study was done in the EB lane at 610325 - EB in Niagara Region, ON in county. The study began on 2021-08-26 at 12:00 AM and concluded on 2021-08-27 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 9,332 vehicles passed through the location with a peak volume of 201 on 2021-08-26 at [05:15 PM-05:30 PM] and a minimum volume of 1 on 2021-08-26 at [03:15 AM-03:30 AM]. The AADT count for this study was 9,332.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 55 - 60 KM/H range or lower. The average speed for all classifed vehicles was 54 KM/H with 70.69% vehicles exceeding the posted speed of 50 KM/H. 0.36% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 55KM/H and the 85th percentile was 64.35 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
493	586	1638	1968	2046	1320	713	283	125	66	33	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 8926 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 101 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 140 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 104 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
4351	4575	101	140	54	26	10	14							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-26 at [05:15 PM-05:30 PM] the average headway between vehicles was 4.455 seconds. During the slowest traffic period, on 2021-08-26 at [03:15 AM-03:30 AM] the average headway between vehicles was 450 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 26.00 and 51.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Niagara Region
Street: 610325 - WB
Location: 610325

A study of vehicle traffic was conducted with the device having serial number 406289. The study was done in the WB lane at 610325 - WB in Niagara Region, ON in county. The study began on 2021-08-26 at 12:00 AM and concluded on 2021-08-27 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 9,801 vehicles passed through the location with a peak volume of 222 on 2021-08-26 at [02:45 PM-03:00 PM] and a minimum volume of 6 on 2021-08-26 at [03:45 AM-04:00 AM]. The AADT count for this study was 9,801.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 55 KM/H range or lower. The average speed for all classifed vehicles was 52 KM/H with 62.32% vehicles exceeding the posted speed of 50 KM/H. 0.17% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 60.35 KM/H.

< to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to >
458	682	2528	2648	1895	874	361	169	68	34	17	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 9438 which represents 97 percent of the total classified vehicles. The number of Small Trucks in the study was 82 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 134 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 80 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 21.9	22.0 to >							
5164	4274	82	134	38	15	17	10							

CHART 2

HEADWAY

During the peak traffic period, on 2021-08-26 at [02:45 PM-03:00 PM] the average headway between vehicles was 4.036 seconds. During the slowest traffic period, on 2021-08-26 at [03:45 AM-04:00 AM] the average headway between vehicles was 128.571 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 28.00 and 49.00 degrees C.

Time/Class Report

Device ID: 402529	**Location:** 7916			**Raw Count:** 9,332	
Operator: MD	**Lane:** EB			**AADT Count:** 9,332	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - EB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[00:00-00:15]	14	5	0	0	0	0	0	0	19
[00:15-00:30]	16	8	0	0	0	0	0	0	24
[00:30-00:45]	11	8	0	0	0	0	0	0	19
[00:45-01:00]	15	11	1	0	0	0	0	0	27
	56	32	1	0	0	0	0	0	89
[01:00-01:15]	12	9	0	0	0	1	0	0	22
[01:15-01:30]	9	7	0	0	0	0	0	0	16
[01:30-01:45]	10	6	0	0	0	0	0	0	16
[01:45-02:00]	9	6	0	0	0	0	0	0	15
	40	28	0	0	0	1	0	0	69
[02:00-02:15]	5	5	0	1	0	0	0	0	11
[02:15-02:30]	10	4	0	0	0	0	0	0	14
[02:30-02:45]	4	3	0	0	0	0	0	0	7
[02:45-03:00]	4	2	0	0	0	0	0	0	6
	23	14	0	1	0	0	0	0	38
[03:00-03:15]	5	4	0	0	0	0	0	0	9
[03:15-03:30]	0	0	0	0	0	0	0	1	1
[03:30-03:45]	5	0	0	0	0	0	0	0	5
[03:45-04:00]	4	4	0	0	0	0	0	0	8
	14	8	0	0	0	0	0	1	23
[04:00-04:15]	1	3	0	0	0	0	0	0	4
[04:15-04:30]	5	5	2	0	0	0	0	0	12
[04:30-04:45]	2	6	0	0	0	0	0	0	8
[04:45-05:00]	7	6	0	0	0	0	0	0	13
	15	20	2	0	0	0	0	0	37
[05:00-05:15]	4	2	0	0	0	0	0	0	6
[05:15-05:30]	11	11	0	0	0	0	0	0	22
[05:30-05:45]	14	17	1	0	0	0	0	0	32
[05:45-06:00]	24	21	0	1	0	0	0	0	46
	53	51	1	1	0	0	0	0	106
[06:00-06:15]	22	24	0	0	0	1	0	0	47
[06:15-06:30]	20	33	1	0	2	1	0	0	57
[06:30-06:45]	26	47	3	1	1	0	0	0	78
[06:45-07:00]	35	45	0	2	2	0	0	0	84
	103	149	4	3	5	2	0	0	266
[07:00-07:15]	20	25	0	3	1	0	0	0	49
[07:15-07:30]	40	55	1	4	1	0	0	0	101
[07:30-07:45]	38	50	2	1	0	2	1	0	94

Time/Class Report

Device ID: 402529	**Location:** 7916			**Raw Count:** 9,332	
Operator: MD	**Lane:** EB			**AADT Count:** 9,332	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - EB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[07:45-08:00]	60	62	1	3	1	2	1	0	130
	158	192	4	11	3	4	2	0	374
[08:00-08:15]	25	47	1	4	1	0	0	1	79
[08:15-08:30]	58	62	3	3	2	0	0	0	128
[08:30-08:45]	53	58	1	2	1	0	0	0	115
[08:45-09:00]	59	50	2	1	2	1	0	0	115
	195	217	7	10	6	1	0	1	437
[09:00-09:15]	45	62	0	2	1	0	0	0	110
[09:15-09:30]	54	56	1	4	2	0	0	0	117
[09:30-09:45]	52	80	0	1	0	1	0	1	135
[09:45-10:00]	67	79	0	2	1	1	0	1	151
	218	277	1	9	4	2	0	2	513
[10:00-10:15]	46	64	1	5	0	1	0	0	117
[10:15-10:30]	65	75	2	2	3	0	0	0	147
[10:30-10:45]	64	80	3	2	0	0	0	1	150
[10:45-11:00]	72	72	0	5	1	1	0	0	151
	247	291	6	14	4	2	0	1	565
[11:00-11:15]	67	83	2	3	0	1	0	0	156
[11:15-11:30]	73	79	3	5	2	0	0	1	163
[11:30-11:45]	53	71	1	3	0	0	0	0	128
[11:45-12:00]	70	74	2	5	1	0	0	0	152
	263	307	8	16	3	1	0	1	599
[12:00-12:15]	80	68	6	1	1	0	0	1	157
[12:15-12:30]	69	85	0	0	2	0	0	0	156
[12:30-12:45]	75	81	2	3	0	0	0	0	161
[12:45-13:00]	81	85	2	2	1	0	0	0	171
	305	319	10	6	4	0	0	1	645
[13:00-13:15]	66	70	2	1	0	1	0	0	140
[13:15-13:30]	66	58	0	3	2	0	0	0	129
[13:30-13:45]	87	80	2	0	0	0	1	0	170
[13:45-14:00]	87	81	1	2	2	2	0	2	177
	306	289	5	6	4	3	1	2	616
[14:00-14:15]	70	76	3	2	1	0	0	0	152
[14:15-14:30]	75	98	3	2	2	0	0	0	180
[14:30-14:45]	64	88	5	7	1	0	1	1	167
[14:45-15:00]	67	83	7	6	1	2	1	1	168
	276	345	18	17	5	2	2	2	667

Time/Class Report

Device ID: 402529	**Location:** 7916			**Raw Count:** 9,332	
Operator: MD	**Lane:** EB			**AADT Count:** 9,332	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - EB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[15:00-15:15]	65	67	2	0	3	0	0	0	137
[15:15-15:30]	82	77	0	3	1	1	2	0	166
[15:30-15:45]	85	93	2	1	1	0	0	0	182
[15:45-16:00]	94	92	4	2	0	1	0	0	193
	326	329	8	6	5	2	2	0	678
[16:00-16:15]	79	101	4	2	0	0	0	0	186
[16:15-16:30]	85	80	1	3	2	1	1	0	173
[16:30-16:45]	88	80	2	1	2	1	1	0	175
[16:45-17:00]	93	93	1	4	0	1	0	0	192
	345	354	8	10	4	3	2	0	726
[17:00-17:15]	88	78	2	6	0	0	0	1	175
[17:15-17:30]	99	91	2	3	2	1	1	2	201
[17:30-17:45]	92	77	1	0	0	0	0	0	170
[17:45-18:00]	73	83	4	0	1	1	0	0	162
	352	329	9	9	3	2	1	3	708
[18:00-18:15]	87	62	0	0	0	1	0	0	150
[18:15-18:30]	72	64	1	2	0	0	0	0	139
[18:30-18:45]	60	66	0	1	0	0	0	0	127
[18:45-19:00]	65	57	0	1	0	0	0	0	123
	284	249	1	4	0	1	0	0	539
[19:00-19:15]	75	70	0	1	0	0	0	0	146
[19:15-19:30]	73	59	0	0	0	0	0	0	132
[19:30-19:45]	64	64	1	1	0	0	0	0	130
[19:45-20:00]	57	55	0	0	1	0	0	0	113
	269	248	1	2	1	0	0	0	521
[20:00-20:15]	55	48	0	2	1	0	0	0	106
[20:15-20:30]	62	60	0	1	0	0	0	0	123
[20:30-20:45]	46	52	1	1	0	0	0	0	100
[20:45-21:00]	43	49	1	0	0	0	0	0	93
	206	209	2	4	1	0	0	0	422
[21:00-21:15]	29	36	1	0	0	0	0	0	66
[21:15-21:30]	29	38	1	1	0	0	0	0	69
[21:30-21:45]	38	38	0	1	1	0	0	0	78
[21:45-22:00]	31	26	0	0	1	0	0	0	58
	127	138	2	2	2	0	0	0	271
[22:00-22:15]	35	29	0	2	0	0	0	0	66
[22:15-22:30]	13	31	2	2	0	0	0	0	48
[22:30-22:45]	30	25	0	1	0	0	0	0	56

Time/Class Report

Device ID: 402529	**Location:** 7916			**Raw Count:** 9,332	
Operator: MD	**Lane:** EB			**AADT Count:** 9,332	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - EB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[22:45-23:00]	24	28	1	0	0	0	0	0	53
	102	113	3	5	0	0	0	0	223
[23:00-23:15]	28	13	0	1	0	0	0	0	42
[23:15-23:30]	13	28	0	2	0	0	0	0	43
[23:30-23:45]	15	13	0	1	0	0	0	0	29
[23:45-00:00]	12	13	0	0	0	0	0	0	25
	68	67	0	4	0	0	0	0	139
08-26-2021 12:00 AM									
08-27-2021 12:00 AM	4351	4575	101	140	54	26	10	14	9271

Time/Class Report

Device ID: 406289	**Location:** 7916			**Raw Count:** 9,801	
Operator: MD	**Lane:** WB			**AADT Count:** 9,801	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - WB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[00:00-00:15]	13	9	0	0	0	0	0	0	22
[00:15-00:30]	23	12	0	0	0	0	0	0	35
[00:30-00:45]	9	11	0	0	0	0	0	0	20
[00:45-01:00]	15	7	0	0	0	0	0	0	22
	60	39	0	0	0	0	0	0	99
[01:00-01:15]	15	5	0	0	0	0	0	0	20
[01:15-01:30]	11	6	0	0	0	0	0	0	17
[01:30-01:45]	9	4	0	0	0	0	0	0	13
[01:45-02:00]	6	8	0	0	0	0	0	0	14
	41	23	0	0	0	0	0	0	64
[02:00-02:15]	7	5	0	0	0	0	0	0	12
[02:15-02:30]	1	4	1	1	0	0	0	0	7
[02:30-02:45]	14	6	0	0	0	1	0	0	21
[02:45-03:00]	8	3	0	0	0	0	0	0	11
	30	18	1	1	0	1	0	0	51
[03:00-03:15]	5	3	0	0	0	0	0	0	8
[03:15-03:30]	5	4	0	0	0	0	0	0	9
[03:30-03:45]	5	5	0	1	0	0	0	0	11
[03:45-04:00]	3	2	0	0	0	0	0	0	5
	18	14	0	1	0	0	0	0	33
[04:00-04:15]	4	3	0	0	0	0	0	0	7
[04:15-04:30]	9	4	0	0	0	0	1	0	14
[04:30-04:45]	4	6	0	1	1	0	0	0	12
[04:45-05:00]	6	7	0	1	0	0	0	0	14
	23	20	0	2	1	0	1	0	47
[05:00-05:15]	11	9	0	0	0	0	1	0	21
[05:15-05:30]	22	16	0	0	0	0	0	0	38
[05:30-05:45]	25	17	2	1	0	0	0	0	45
[05:45-06:00]	16	19	1	1	0	0	2	1	40
	74	61	3	2	0	0	3	1	144
[06:00-06:15]	31	21	0	0	0	0	0	2	54
[06:15-06:30]	32	21	1	1	0	0	0	0	55
[06:30-06:45]	29	39	1	1	2	0	0	0	72
[06:45-07:00]	37	37	0	3	1	0	1	0	79
	129	118	2	5	3	0	1	2	260
[07:00-07:15]	37	39	3	2	1	0	0	0	82
[07:15-07:30]	38	47	0	2	1	1	0	0	89
[07:30-07:45]	49	52	0	1	4	0	0	0	106

Time/Class Report

Device ID: 406289	**Location:** 7916			**Raw Count:** 9,801	
Operator: MD	**Lane:** WB			**AADT Count:** 9,801	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - WB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[07:45-08:00]	44	37	1	1	1	0	0	0	84
	168	175	4	6	7	1	0	0	361
[08:00-08:15]	50	50	2	0	0	1	0	0	103
[08:15-08:30]	60	40	3	8	1	0	1	0	113
[08:30-08:45]	76	65	2	5	2	0	0	0	150
[08:45-09:00]	66	69	0	3	1	0	0	0	139
	252	224	7	16	4	1	1	0	505
[09:00-09:15]	56	54	3	2	2	1	0	0	118
[09:15-09:30]	59	51	1	2	0	0	0	1	114
[09:30-09:45]	66	70	0	4	0	1	0	0	141
[09:45-10:00]	62	65	2	3	1	1	2	0	136
	243	240	6	11	3	3	2	1	509
[10:00-10:15]	70	80	0	0	0	0	1	0	151
[10:15-10:30]	59	64	3	3	2	0	0	2	133
[10:30-10:45]	77	67	1	3	1	0	0	0	149
[10:45-11:00]	86	55	2	4	1	0	0	1	149
	292	266	6	10	4	0	1	3	582
[11:00-11:15]	55	58	2	2	0	1	0	0	118
[11:15-11:30]	83	86	2	2	0	0	0	0	173
[11:30-11:45]	76	58	1	3	1	0	0	0	139
[11:45-12:00]	90	74	1	1	0	0	0	0	166
	304	276	6	8	1	1	0	0	596
[12:00-12:15]	86	89	0	1	0	1	0	1	178
[12:15-12:30]	81	59	0	2	1	0	0	1	144
[12:30-12:45]	75	70	0	1	0	0	1	0	147
[12:45-13:00]	67	69	2	5	1	0	0	0	144
	309	287	2	9	2	1	1	2	613
[13:00-13:15]	77	74	2	0	2	0	1	0	156
[13:15-13:30]	86	67	1	3	1	0	0	0	158
[13:30-13:45]	94	74	3	5	0	0	0	0	176
[13:45-14:00]	80	79	5	2	1	1	0	0	168
	337	294	11	10	4	1	1	0	658
[14:00-14:15]	102	64	1	2	0	0	0	0	169
[14:15-14:30]	94	74	3	3	1	0	0	0	175
[14:30-14:45]	78	90	2	2	0	0	0	1	173
[14:45-15:00]	116	94	2	5	3	1	0	0	221
	390	322	8	12	4	1	0	1	738

Time/Class Report

Device ID: 406289	**Location:** 7916			**Raw Count:** 9,801	
Operator: MD	**Lane:** WB			**AADT Count:** 9,801	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - WB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[15:00-15:15]	83	73	1	1	0	0	1	0	159
[15:15-15:30]	86	69	5	1	0	0	0	0	161
[15:30-15:45]	105	91	2	4	0	0	2	0	204
[15:45-16:00]	105	75	0	2	0	2	0	0	184
	379	308	8	8	0	2	3	0	708
[16:00-16:15]	117	92	0	1	0	1	0	0	211
[16:15-16:30]	87	76	2	3	1	0	1	0	170
[16:30-16:45]	117	84	1	1	0	0	0	0	203
[16:45-17:00]	85	75	3	3	0	0	0	0	166
	406	327	6	8	1	1	1	0	750
[17:00-17:15]	112	90	0	3	0	1	0	0	206
[17:15-17:30]	91	52	1	1	0	0	0	0	145
[17:30-17:45]	97	65	0	2	0	0	0	0	164
[17:45-18:00]	89	70	3	1	0	0	0	0	163
	389	277	4	7	0	1	0	0	678
[18:00-18:15]	65	58	1	0	0	1	0	0	125
[18:15-18:30]	102	74	2	2	1	0	0	0	181
[18:30-18:45]	85	66	0	2	1	0	0	0	154
[18:45-19:00]	89	64	0	0	0	0	0	0	153
	341	262	3	4	2	1	0	0	613
[19:00-19:15]	86	68	0	1	1	0	0	0	156
[19:15-19:30]	98	68	0	1	0	0	0	0	167
[19:30-19:45]	71	52	1	1	0	0	0	0	125
[19:45-20:00]	63	60	2	0	0	0	0	0	125
	318	248	3	3	1	0	0	0	573
[20:00-20:15]	82	45	0	0	0	0	0	0	127
[20:15-20:30]	76	44	1	3	0	0	0	0	124
[20:30-20:45]	60	42	0	3	0	0	0	0	105
[20:45-21:00]	45	36	0	1	0	0	0	0	82
	263	167	1	7	0	0	0	0	438
[21:00-21:15]	42	30	0	2	0	0	0	0	74
[21:15-21:30]	39	37	0	0	0	0	0	0	76
[21:30-21:45]	39	27	0	0	0	0	0	0	66
[21:45-22:00]	43	30	0	0	0	0	0	0	73
	163	124	0	2	0	0	0	0	289
[22:00-22:15]	46	36	1	0	0	0	0	0	83
[22:15-22:30]	24	27	0	0	1	0	0	0	52
[22:30-22:45]	33	25	0	0	0	0	0	0	58

Time/Class Report

Device ID: 406289	**Location:** 7916			**Raw Count:** 9,801	
Operator: MD	**Lane:** WB			**AADT Count:** 9,801	
Begin: 08-26-2021 12:00 AM	**Street:** 610325 - WB			**AADT Factor:** 1	
End: 08-27-2021 12:00 AM	**City:** Niagara Region			**Speed Limit:** 50	
Hours: 24.00	**County:**				
Period (min): 15	**State:** ON				

Date And Time Range	< to 15	16 to 25	26 to 32	33 to 42	43 to 51	52 to 61	62 to 71	72 to >	Total
Thu,08-26-2021									
[22:45-23:00]	28	19	0	0	0	0	1	0	48
	131	107	1	0	1	0	1	0	241
[23:00-23:15]	31	24	0	1	0	0	1	0	57
[23:15-23:30]	28	24	0	0	0	0	0	0	52
[23:30-23:45]	23	15	0	1	0	0	0	0	39
[23:45-00:00]	22	14	0	0	0	0	0	0	36
	104	77	0	2	0	0	1	0	184
08-26-2021 12:00 AM									
08-27-2021 12:00 AM	5164	4274	82	134	38	15	17	10	9734

APPENDIX D

Ontario Road Noise Analysis Method for Environment and Transportation

version 2.09

Job No. 2505294

Job Name 6645 McLeod Road

ROAD CHARACTERISTICS **SOURCE-RECEIVER-BARRIER-TOPOGRAPHY CHARACTERISTICS**

ID	Description	Time Period	Number of Vehicles			Speed (km/h)	Road Gradient (%)	Two Way? (y/n)	Pavement Type	Road Viewable Angle		Source-Receiver Distance (m)	Ground Type (Hard/Soft)	Topo-graphy Type	Source Height (m)	**Total Segment L_{eq} (dBA)**
			Autos	Medium	Heavy					Q_1	Q_2					
Block A	Daytime - McLeod Rd West	16	13008	1173	134	50	0	n	1	-90	90	9.0	Soft	A	0.1	68.15
	Daytime - McLeod Rd East	16	13540	279	140	50	0	n	1	-90	90	17.0	Soft	A	1.0	61.91

APPENDIX E

WARNING CLAUSES

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Warning clauses may be used individually or in combination.

The following warning clauses are recommended based on the applicable guidelines; however, wording may be modified/customized during consultation with the planning authority to best suit the proposed development:

Transportation Sources

NPC-300 Type C: Applicable for low and medium density developments only, recommended to address transportation sound levels at the plane of window.

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

NPC-300 Type D: Recommended to address transportation sound levels at the plane of window.

"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 the Environment."