1600 Kerns Road

Environmental Noise and Vibration Feasibility Study
Burlington, ON

SLR Project No: 241.30032.00000
March 2021

ENVIRONMENTAL NOISE AND VIBRATION FEASIBILITY STUDY
1600 Kerns Road
Burlington, Ontario
SLR Project No: 241.30032.00000

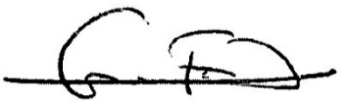
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March 29, 2021

This document has been prepared by SLR Canada. The material and data in this report were prepared under the supervision and direction of the undersigned.

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1. INTRODUCTION

SLR Consulting (Canada) Ltd., was retained by Fieldgate Properties Limited to conduct an Environmental Noise Feasiblity Study for the proposed 1600 Kerns Road development (site), located in Burlington, Ontario. This report is in support of the By law Amendment (ZBA) application for the development.

1.1 FOCUS OF REPORT

In keeping with City of Burlington requirements, this report examines the potential for:

- Impacts of the environment on the proposed development;
- Impacts of the proposed development on the environment; and
- Impacts of the proposed development on itself.

1.2 NATURE OF THE SUBJECT LANDS

The proposed development is located at 1600 Kerns Road, on the corner with Four Seasons Drive in Burlington, ON. The site is currently occupied by a one storey commercial building.

The proposed development is a 4- storey retirement home, with a rooftop common outdoor amenity area on the 4th floor of the development. Additionally, there is an outdoor amenity space at ground level in the southwest side of the building. Parking spaces for the proposed development will be located underground and at ground level.

The site plan and architectural drawings of the proposed development is provided in Appendix A.

1.3 NATURE OF THE SURROUNDINGS

Immediately surrounding the site there are single family homes and/or townhouse blocks in all directions. A commercial Office Building is located to the north-east (Portland Investment Counsel - 1375 Kerns), with institutional buildings located at the intersection of Kerns Road and North Service Road. A green space is located west of the development. A context plan can be found in Figure 1.

The topography of the immediate surrounding area is considered to be essentially flat, with a gradual decrease in elevation southwards, towards North Service Road.

PART 1: IMPACTS OF THE ENVIRONMENT ON THE DEVELOPMENT

In assessing potential impacts of the environment on the proposed development, the focus of this report is to assess the potential for:

- Transportation noise impacts from the surrounding roadways
- Transportation noise impacts from the surrounding railways
- "Stationary" noise impacts from the surrounding commercial and industrial lands.

2. TRANSPORTATION NOISE IMPACTS

2.1 TRANSPORTATION NOISE SOURCES

Roadway noise sources of interest with the potential to produce noise at the proposed development include Kerns Road, Four Seasons Road.

An assessment of North Service Road was included in the study to be conservative, as a section of the roadway is located approximately 450 m from the development property line. Highway 403 and 407 are located more than 500 m from the development building, therefore, they have not been included in the assessment.

Sound exposure levels at the development have been predicted, and this information has been used to identify façade, ventilation and warning clause requirements.

2.2 SURFACE TRANSPORTATION NOISE CRITERIA

Noise Sensitive Developments

Ministry of the Environment, Conservation and Parks (MECP) Publication NPC-300 provides sound level criteria for noise sensitive developments. The applicable portions of NPC-300 are Part C – Land Use Planning and the associated definitions outlined in Part A – Background. Tables 1 to 4 below summarizes the applicable surface transportation (road and rail) criteria limits.

Location Specific Criteria

Table 1 summarizes criteria in terms of energy equivalent sound exposure (L_{eq}) levels for specific noise-sensitive locations. Both outdoor and indoor locations are identified, with the focus of outdoor areas being amenity spaces. Indoor criteria vary with sensitivity of the space. As a result, sleep areas have more stringent criteria than Living / Dining room space.

Table 1: MECP Publication NPC-300 Sound Level Criteria for Road and Rail Noise

Type of Space	Time Period	Equivalent Sound Exposure Level - L_{eq} (dBA)		Assessment Location
		Road	Rail [1]	
Outdoor Living Area (OLA)	Daytime (0700-2300h)	55	55	Outdoors [2]
Living / Dining Room	Daytime (0700-2300h)	45	40	Indoors [4]
	Night-time (2300-0700h)	45	40	Indoors [4]
Sleeping Quarters	Daytime (0700-2300h)	45	40	Indoors [4]
	Night-time (2300-0700h)	40	35	Indoors [4]

Notes: [1] Whistle noise is excluded for OLA noise assessments, and included for Living / Dining Room and Sleeping Quarter assessments.
[2] Road and Rail noise impacts are to be combined for assessment of OLA impacts.
[3] An assessment of indoor noise levels is required only if the criteria in **Table 4** are exceeded.

Outdoor Amenity Areas

Table 2 summarizes the noise mitigation requirements for communal outdoor amenity areas ("Outdoor Living Areas" or "OLAs").

For the assessment of outdoor sound levels, the surface transportation noise impact is determined by combining road and rail traffic sound levels. Whistle noise due to railway trains is not included in the determination of levels.

Table 2: MECP Publication NPC-300 Outdoor Living Area Mitigation Requirements

Time Period	Equivalent Sound Level in Outdoor Living Area (dBA)	Ventilation Requirements
Daytime (0700-2300h)	≤ 55	• None
	55 to 60 incl.	• Noise barrier **OR** Warning Clause A
	> 60	• Noise barrier to reduce noise to 55 dBA **OR** • Noise barrier to reduce noise to 60 dBA and Warning Clause B

Ventilation and Warning Clauses

Table 3 summarizes requirements for ventilation where windows potentially would have to remain closed as a means of noise control. Despite implementation of ventilation measures where required, if sound exposure levels exceed the guideline limits in Tables 1, warning clauses advising future occupants of the potential excesses are required. Warning clauses also apply to OLAs.

Table 3: MECP Publication NPC-300 Ventilation & Warning Clause Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} (dBA)		Ventilation and Warning Claus Requirements [2]
		Road	Rail [1]	
Outdoor Living Area	Daytime (0700-2300h)	56 to 60 incl.		Type A Warning Clause
Plane of Window	Daytime (0700-2300h)	≤ 55		None
		56 to 65 incl.		Forced Air Heating /provision to add air conditioning + Type C Warning Clause
		> 65		Central Air Conditioning + Type D Warning Clause
	Night-time (2300-0700h)	51 to 60 incl.		Forced Air Heating/ provision to add air conditioning + Type C Warning Clause
		> 60		Central Air Conditioning + Type D Warning Clause

Notes: [1] Rail whistle noise is excluded.
[2] Road and Rail noise is combined for determining Ventilation and Warning Clause requirements.

Building Shell Requirements

Table 4 provides sound level thresholds which if exceeded, require the building shell and components (i.e., wall, windows) to be designed and selected accordingly to ensure that the Table 3 and 4 indoor sound criteria are met.

Table 4: MECP Publication NPC-300 Building Component Requirements

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - L_{eq} (dBA))		Component Requirements
		Road	Rail [1]	
Plane of Window	Daytime (0700-2300h)	> 65	> 60	Designed/ Selected to Meet Indoor Requirements [2]
	Night-time (2300-0700h)	> 60	> 55	

Notes: [1] Including whistle noise.
[2] Building component requirements are assessed separately for Road and Railway noise. The resultant sound isolation parameter is required to be combined to determine and overall acoustic parameter.

2.3 TRAFFIC DATA AND FUTURE PROJECTIONS

Road traffic data for North Service Road and Kerns Road was obtained from Turning Movement Counts (TMCs) provided by the City of Burlington. As future ultimate traffic volumes were not available from the City of Burlington Traffic Department, future traffic volumes were calculated using a 1.0% annual growth rate and applied to an ultimate forecast year of 2041. This approach was considered acceptable, based on discussions with the City of Burlington Traffic Department.

Road traffic data for Four Seasons Drive was obtained from the City of Burlington in form of AADT for the year 2018. As per the other surrounding roadways, the traffic data was grown using a 1.0% annual growth rate and applied to 2041 for the ultimate forecast year.

Copies of applicable traffic data and calculations can be found in Appendix B. The following Table 5 summarizes the road traffic volumes used in the analysis.

Table 5: Summary of Road Traffic Data Used in the Transportation Analysis

Roadway Link	2041 Traffic Volumes (AADT)	% Day/ Night Volume Split [1]		Commercial Traffic Breakdown [2]		Vehicle Speed (km/h)
		Daytime	Night-time	% Medium Trucks	% Heavy Trucks	
North Service Road	18,450	90	10	3.3	2.9	60
Kerns Road	5,368	90	10	2.6	2.2	40
Four Seasons Drive	1,506	90	10	2.6	2.2	40

Notes: [1] The Day/Night split was determined from historic data at SLR for urban areas.
[2] Commercial Traffic Breakdowns calculated from historic data at SLR for urban non industrial arterial roads

2.4 PROJECTED SOUND LEVELS

Future road traffic sound levels at the proposed development were predicted using Cadna/A, a commercially available noise propagation modelling software. Roadways were modelled as line sources of sound, with sound emission rates calculated using ORNAMENT algorithms, the road traffic noise model of the MECP. These predictions were validated and are equivalent to those made using the MECP's ORNAMENT or STAMSON v5.04 road traffic noise models. STAMSON validation files are included in Appendix C.

Sound levels were predicted along the façades of the proposed development using the "building evaluation" feature of Cadna/A. This feature allows for noise levels to be predicted across the entire façade of a structure.

Kerns Road presents a gradual increase in elevation from east to west with sufficient elevation variation and grade change of 3.8%. Therefore, the ORNAMENT gradient adjustments were applied to the traffic of Kerns Road.

Ground absorption was assessed as a reflective surface, as requested by the City of Burlington. This is considered a conservative assessment of North Service Road, as the majority of intervening ground is considered to be absorptive (ie. grass covered).

Changes in ground elevation contours for the surrounding area were included in the modelling using topography from the City of Burlington Open Data files.

2.4.1 FAÇADE SOUND LEVELS

Predicted worst-case façade sound levels are presented in Table 6. The transportation façade sound levels of the development, showing the ranges of predicted daytime and night-time sound levels are shown in Figure 2 and 3 for roadway impacts on the development.

Table 6: Summary of Transportation Facade Sound Levels

Façade [1]	Roadway Sound Levels [2]	
	L_{eq} Day (dBA)	L_{eq} Night (dBA)
North	56	50
East	60	53
South	56	50
West	48	40

Notes: [1] Façade locations are shown in **Figure 2**.
[2] The sound levels presented are for the worst-case exposed façade, in which totals may not correspond to the same location.

The façade roadway sound levels are predicted to be below 65 dBA and 60 dBA during the daytime and nighttime periods, respectively. Therefore, an assessment of building components is not required.

2.4.2 OUTDOOR AMENITY AREAS

The Outdoor Living Areas (OLA) of the proposed development include a rooftop common outdoor space on the 4th floor and an outdoor amenity space at ground level in the southwest side of the building. The locations of the Outdoor Living Areas are shown in **Figure 4**

The predicted noise impacts from the surrounding roadways are shown in **Figure 4** and summarized in the following table:

Table 7: Summary of Transportation Noise Impacts - OLAs

ID	Location	Transportation Impacts L_{eq} Day (dBA)
OLA 1	Rooftop Level 4 – North Side	52
OLA 2	Rooftop Level 4 – South Side	51
OLA 3	Ground Level - South	50
OLA 4	Ground Level - West	48

Notes: [1] Sound levels up to 60 dBA are allowed with the use of a Type A Warning Clause.

Sound levels are predicted to be below 55 dBA at all outdoor amenity spaces; therefore, physical noise control measures are not required.

2.5 VENTILATION AND WARNING CLAUSE REQUIREMENTS

The requirements regarding warning clauses are summarized in **Table 2**. Where required, the Warning Clauses should be included in agreements registered on Title for the residential units, and included in all agreements of purchase and sale or lease, and all rental agreements. Warning Clauses are summarized in **Appendix D.**

Based on the predicted façade noise levels, forced air heating with provisions for future installation of central air-conditioning, as well as a **Type C** warning clause are recommended for all units on the east façade, facing Kerns Road.

It is understood that the proposed development will consider the installation of air conditioning in all units, therefore, all roadway warning clause requirements are considered to be met.

3. STATIONARY SOURCE NOISE IMPACTS

The acoustic environment is considered to include an “urban hum” during all periods of the day, due to the surrounding road traffic noise. This is based on observations within the area, as opposed to an assessment of existing roadway noise impacts. Based on the presence of an “urban hum” during all periods of the day, the site and surroundings are considered to be a Class 1 area.

A review was completed of the surrounding area, based on the current aerial photography. Employment lands are not located within a 1000 m radius of the development. In addition, as the surrounding lands are primarily noise sensitive residential lands, stationary noise impacts from surrounding buildings are expected to meet the MECP NPC-300 guideline limits for a Class 1 area, and are not anticipated to be concern. Therefore, a detailed assessment of surrounding stationary noise impacts was not completed.

4. VIBRATION SOURCE IMPACTS

A review was completed of the surrounding area for vibration sources. The closest railway is located approximately 1.5 km to the south of the development, and no significant industrial vibration sources are located within the area (e.g automotive part metal stamping).

Based on our review, no significant sources of vibration have the potential to impact the development. Therefore, a vibration study is not considered necessary and has not been completed.

PART 2: IMPACTS OF THE DEVELOPMENT ON THE SURROUNDING AREA

5. IMPACTS ON SURROUNDING PROPERTIES

In terms of the noise environment of the area, it is expected that the project will have a negligible effect on the neighbouring properties.

The traffic related to the proposed development will be small relative to the existing traffic volumes within the area and is not of concern with respect to noise impact.

Other possible development stationary noise sources with potentially adverse impacts on the surrounding neighbourhood are the potential mechanical equipment (make up air units, cooling equipment, and parking garage vents). This equipment is required to meet MECP Publication NPC-300 and NPC-216 requirements at the worst-case off-site noise sensitive receptors.

Potential impacts should be assessed as part of the final building design. The criteria can be met at all surrounding and on-site receptors by the appropriate selection of mechanical equipment, by locating equipment with sufficient setback from noise sensitive locations, and by incorporating control measures (e.g., silencers, barriers) into the design.

It is recommended the mechanical systems be reviewed by an Acoustical Consultant prior to final selection of equipment. As part of the assessment, it is recommended the Architect and Mechanical Engineers consult with the Acoustical Consultant for optimum placement of mechanical equipment (eg. parking vents, cooling equipment, etc.).

PART 3: IMPACTS OF THE DEVELOPMENT ON ITSELF

6. NOISE IMPACTS FROM THE DEVELOPMENT MECHANICAL SYSTEMS ON ITSELF

The building mechanical systems (e.g., make-up air units, PTAC units, and parking garage vents) have not been designed in detail at this stage. Although no adverse impacts are expected, such equipment has the potential to result in stationary noise impacts on the noise sensitive spaces within the development.

Therefore, the potential impacts should be assessed as part of the final building design. The MECP NPC-300 and NPC-216 criteria is expected to be met at all on-site receptors with the appropriate selection of mechanical equipment, by locating equipment to minimize noise impacts within the development, and by incorporating control measures (e.g., silencers, barriers) into the design.

It is recommended that the mechanical systems be reviewed by an Acoustical Consultant prior to final selection of equipment.

7. CONCLUSIONS AND RECOMMENDATIONS

The potential for noise impacts on and from the proposed development have been assessed. Impacts of the environment on the development, the development on the surrounding area and the development on itself have been considered. Based on the results of our studies, the following conclusions have been reached:

7.1 TRANSPORTATION NOISE

- An assessment of transportation noise impacts from surrounding roadways has been completed.
- Based on transportation façade sound levels upgraded glazing is not required within the development, as outlined in Section 2.4.1.
- Noise impacts within the common outdoor amenity areas are predicted to be within acceptable levels and no physical mitigation measures are required, as outlined in Section 2.4.2.
- As required by MECP Publication NPC-300, the Type C Warning Clause and provision for Air Conditioning (outlined in Section 2.5) is recommended for the proposed development. It is understood that the proposed development is considering the installation of air conditioning in all units. If installed, all roadway warning clause requirements are considered to be met. Warning Clauses are summarized in Appendix D.

7.2 STATIONARY NOISE

- As the surrounding lands are intermixed with residential homes, stationary noise is not expected to be a concern; therefore, a stationary noise assessment was not conducted.

7.3 VIBRATION

- Based on our review, no significant sources of vibration have the potential to impact the development. Therefore, a vibration study is not considered necessary and has not been completed.

7.4 OVERALL ASSESSMENT

- Impacts of the environment on the proposed development can be adequately controlled through the feasible mitigation measures, and warning clauses detailed in Part 1 of this report.
- Impacts of the proposed development on the surrounding area are anticipated to be adequately controlled by following the design guidance outlined in Part 2 of this report.
- Impacts of the proposed development on itself are anticipated to be adequately controlled by following the design guidance outlined in Part 3 of this report.
- As the mechanical systems for the proposed development have not been designed at the time of this assessment, the acoustical requirements above should be confirmed by an Acoustical Consultant as part of the final building design.

- We understand the following will be required as a condition of site plan approval from the City of Burlington:
  - Confirmation is needed for pre-construction surveys of surrounding buildings, to an extent determined by a Professional Engineer specializing in vibration, OR confirmation that pre-construction surveys are not warranted.

8. REFERENCES

International Organization for Standardization, ISO 9613-2: Acoustics – Attenuation of Sound During Propagation Outdoors Part 2: General Method of Calculation, Geneva, Switzerland, 1996.

Ontario Ministry of the Environment, Conservation and Parks, 1989, Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)

Ontario Ministry of the Environment, Conservation and Parks, 1996, STAMSON v5.04: Road, Rail and Rapid Transit Noise Prediction Model

Ontario Ministry of the Environment and Energy, 1993, Publication NPC-216: *Residential Air Conditioning Devices*.

Ontario Ministry of the Environment, Conservation and Parks, 2013, Publication NPC-300: *Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*.

FIGURES

Environmental Noise Feasibility Study
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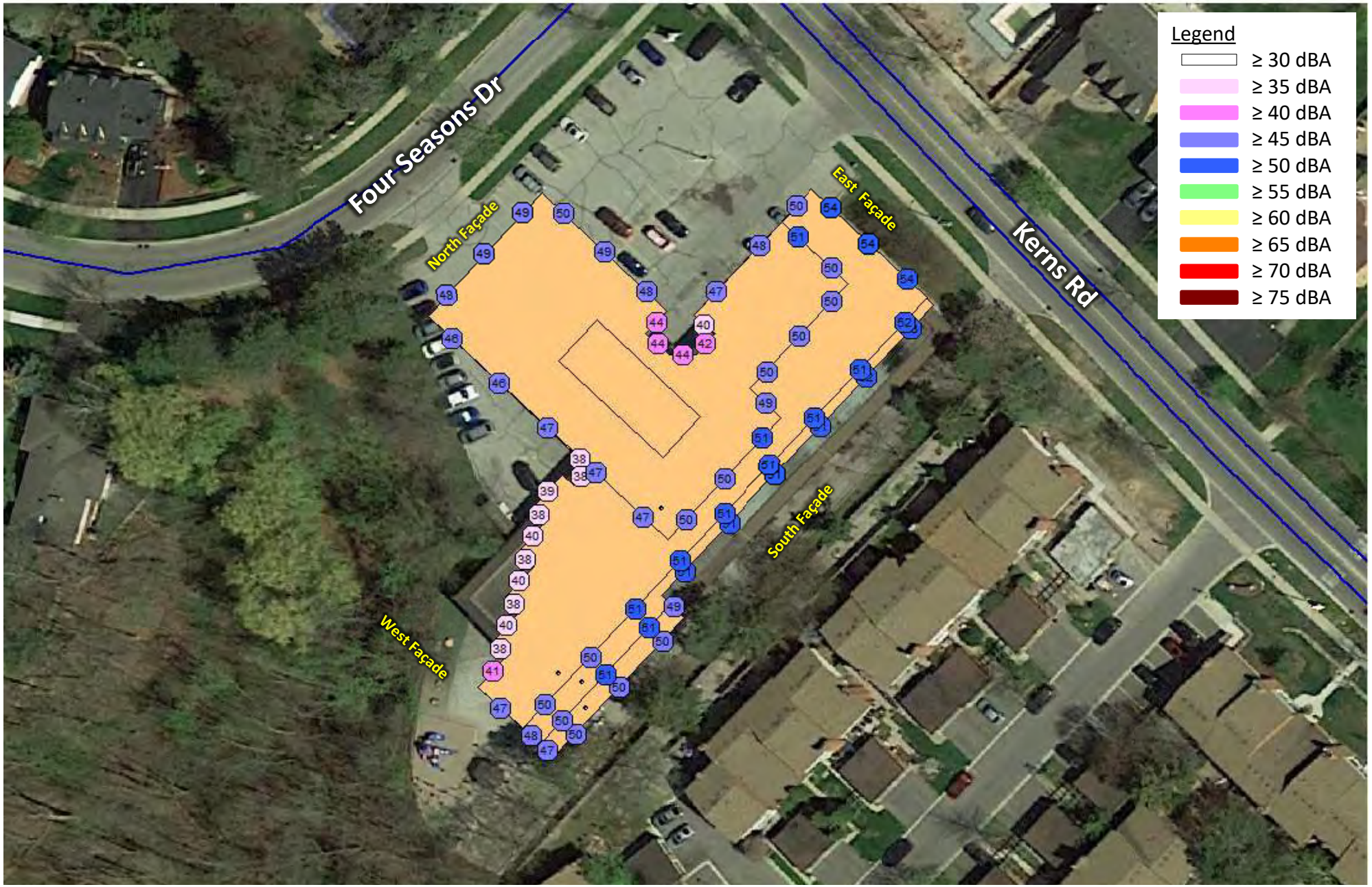
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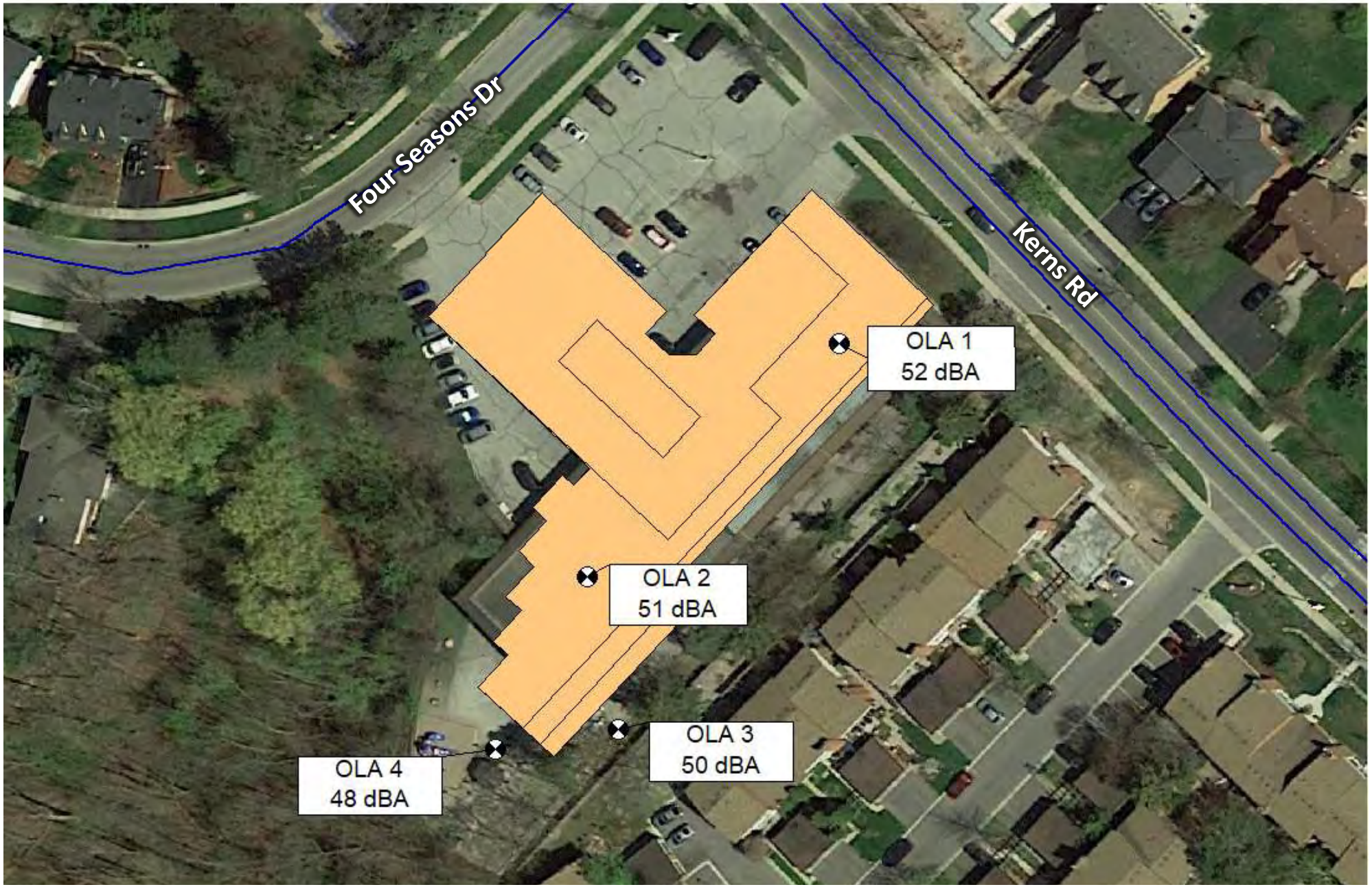
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1600 KERNS ROAD		Date: Mar 29, 2021 Rev 1.0	Figure No. 1	
CONTEXT PLAN		Project No. 241-30032-0000		



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FAÇADE SOUND LEVELS – ROADWAY – DAYTIME		Project No. 241-30032-0000		



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FAÇADE SOUND LEVELS – ROADWAY – NIGHTTIME		Project No. 241-30032-0000		

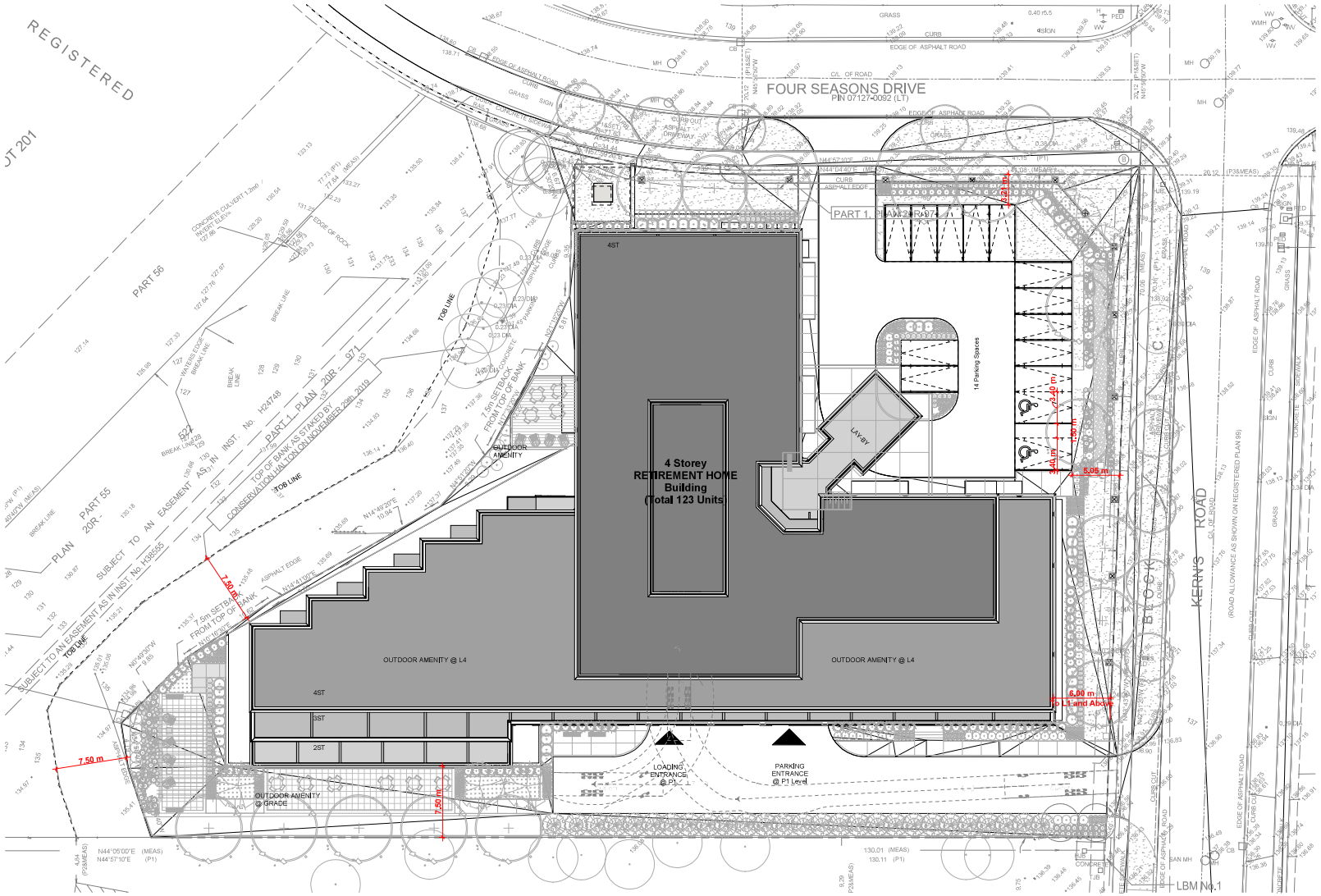


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OUTDOOR LIVING AREA – TRANSPORTATION NOISE IMPACTS		Project No. 241-30032-0000		

APPENDIX A
Development Drawings

Environmental Noise Feasibility Study
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Site Plan
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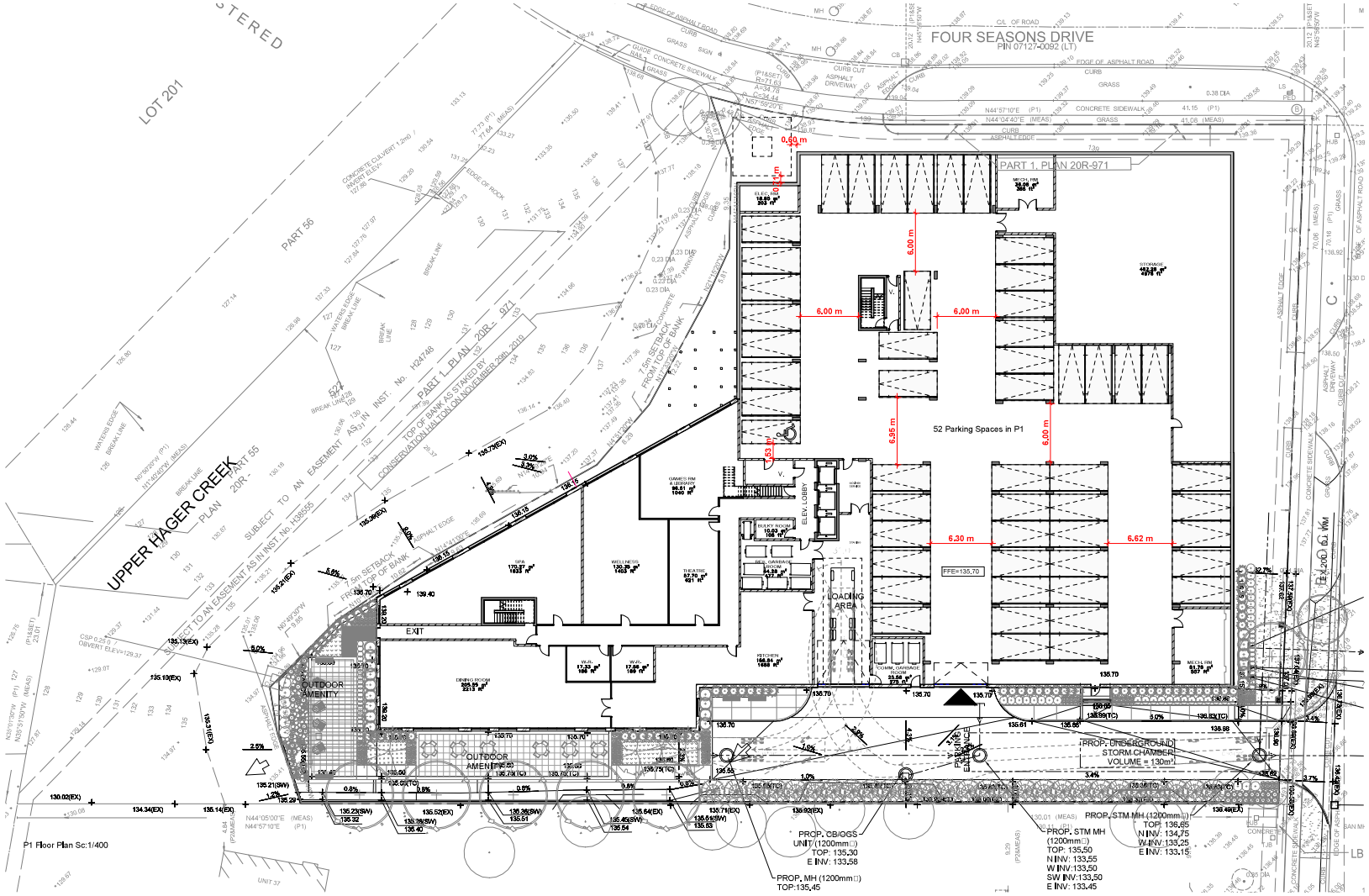
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06	Review	Mar 17, 2021
05	Review	Mar 09, 2021
04	Coordination	Feb 19, 2021
03	Review	Jan 21, 2021
02	Client's Review	May 27, 2020
01	Client's Review	Oct 07, 2019
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1600 KERNS RETIREMENT HOME
1600 KERNS ROAD, BURLINGTON, ON

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01	Client's Review	Oct 07, 2019
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Drawing Title:

Parking Level Floor Plans

Project:

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1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

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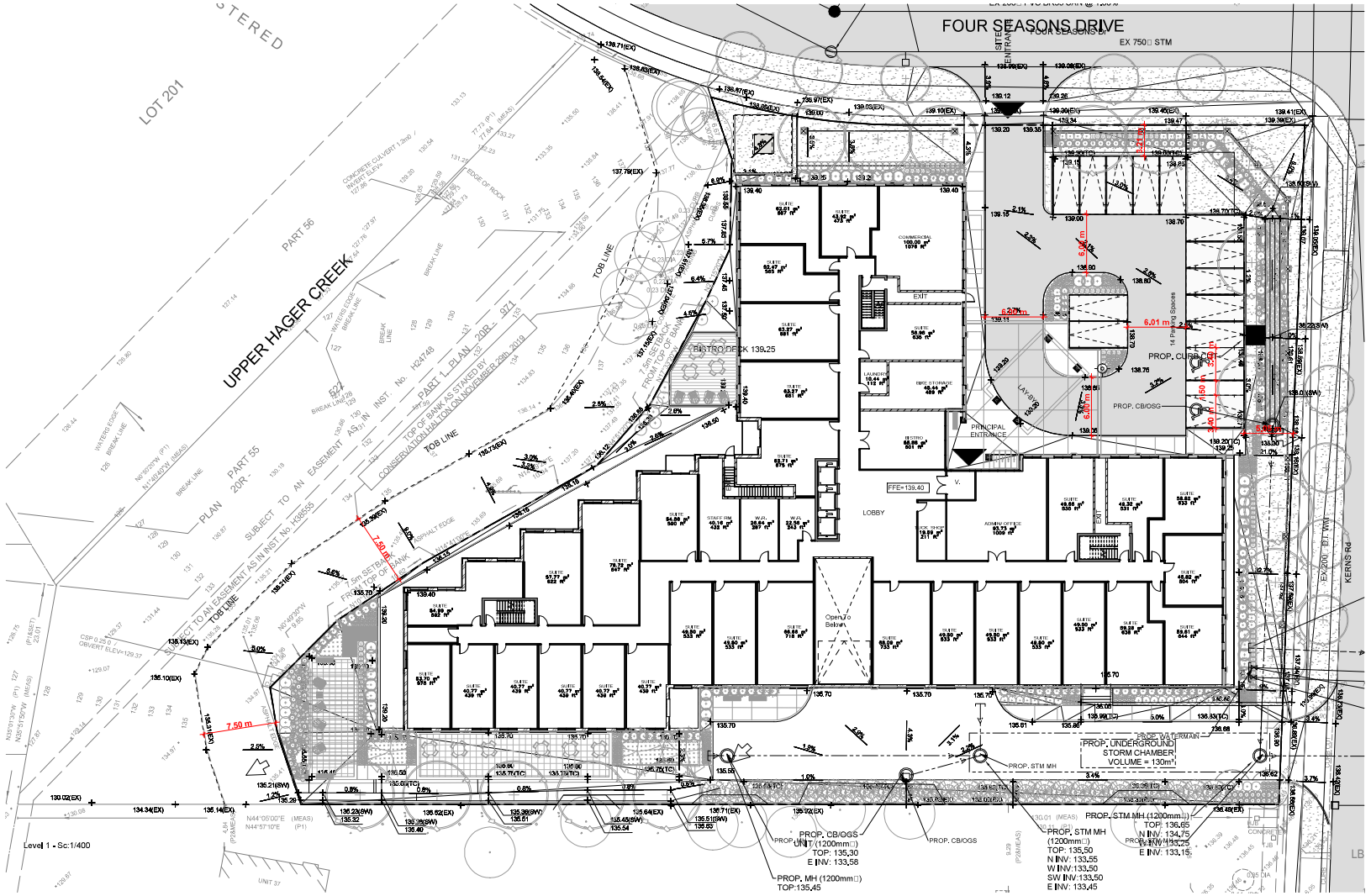
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Floor Plan Level 1 (1 / dA2.02)
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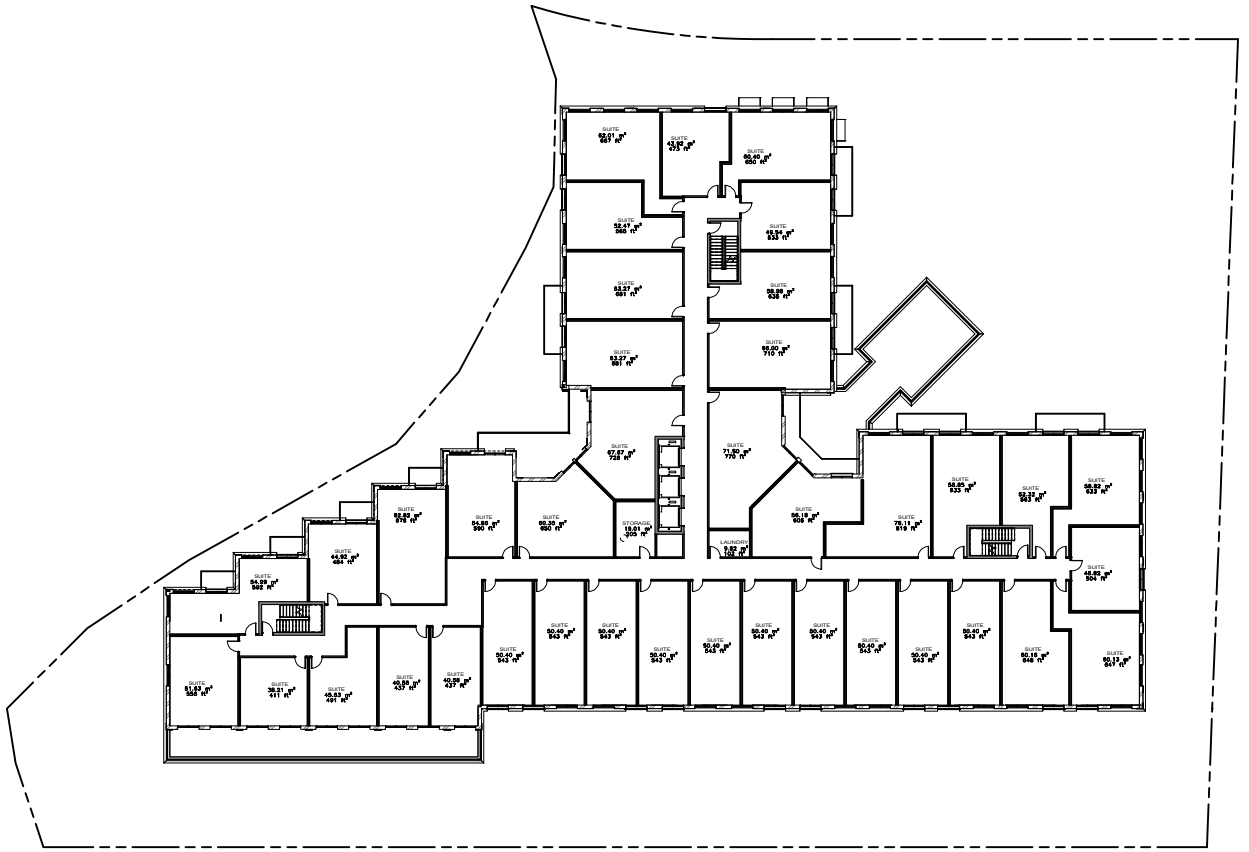
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1600 KERNS ROAD, BURLINGTON, ON

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Floor Plan Level 2 — Scale: 1 : 200 — 1 / dA2.03

Plot Date: 3/17/2021 8:27:07 PM File Path: C:\Revit\2019\19062P11-Model-Fieldgate - 1600 Kerns_FGorjdoz.rvt

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20 De Boers Dr. # 400 Toronto ON M3J 0H1

TEL 416 665 6060 kirkorarchitects.com

No.:	Revision:	Date:

DRAFT

06	Rezoning	Mar 17, 2021
05	Review	Mar 09, 2021
04	Coordination	Feb 19, 2021
03	Review	Jan 21, 2021
02	Client's Review	May 27, 2020
01	Client's Review	Oct 07, 2019
No.	Issued For:	Date:

Drawing Title:

Floor Plan Level 2

Project:

FIELDGATE PROPERTIES

1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

Scale: 1 : 200

Drawn by: Author

Checked by: Checker

Project No.: 19062

Date: Mar 17,2021

Drawing No.: dA2.03



Floor Plan Level 3 (1 / dA2.04)
Scale: 1 : 200

Plot Date: 3/17/2021 5:27:08 PM File Path: C:\Revit\2019\19062P11-Model-Fieldgate - 1600 Kerns_FGorjdooz.rvt

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No.	Issued For:	Date:

Drawing Title:

Floor Plan Level 3

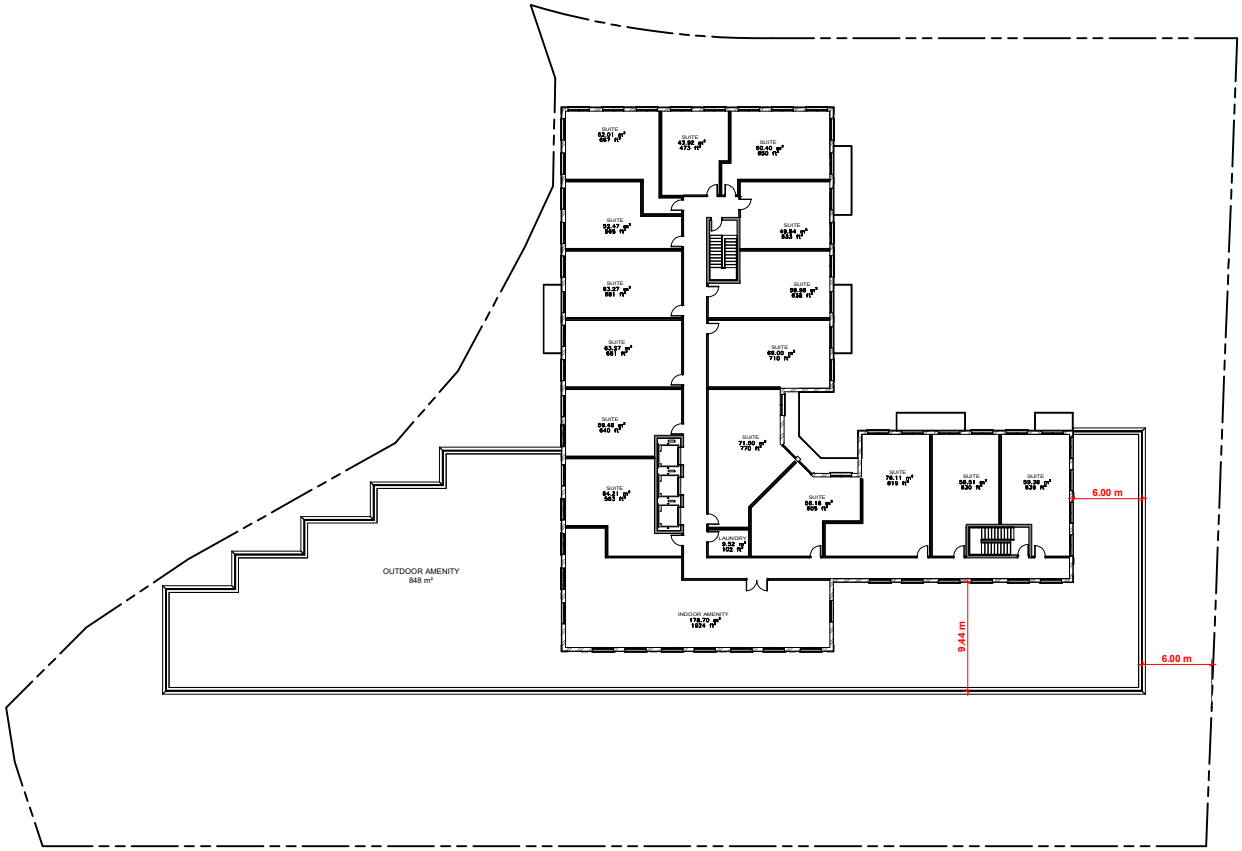
Project:

FIELDGATE PROPERTIES

1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

Scale: 1 : 200
Drawn by: Author
Checked by: Checker
Project No.: 19062
Date: Mar 17,2021
Drawing No.: dA2.04



Floor Plan Level 4
Scale: 1 : 200

1
dA2.05

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01	Client's Review	Oct 07, 2019
No	Issued For:	Date:

Drawing Title:

Floor Plan Level 4

Project:

FIELDGATE PROPERTIES

1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

Scale: 1 : 200

Drawn by: Author

Checked by: Checker

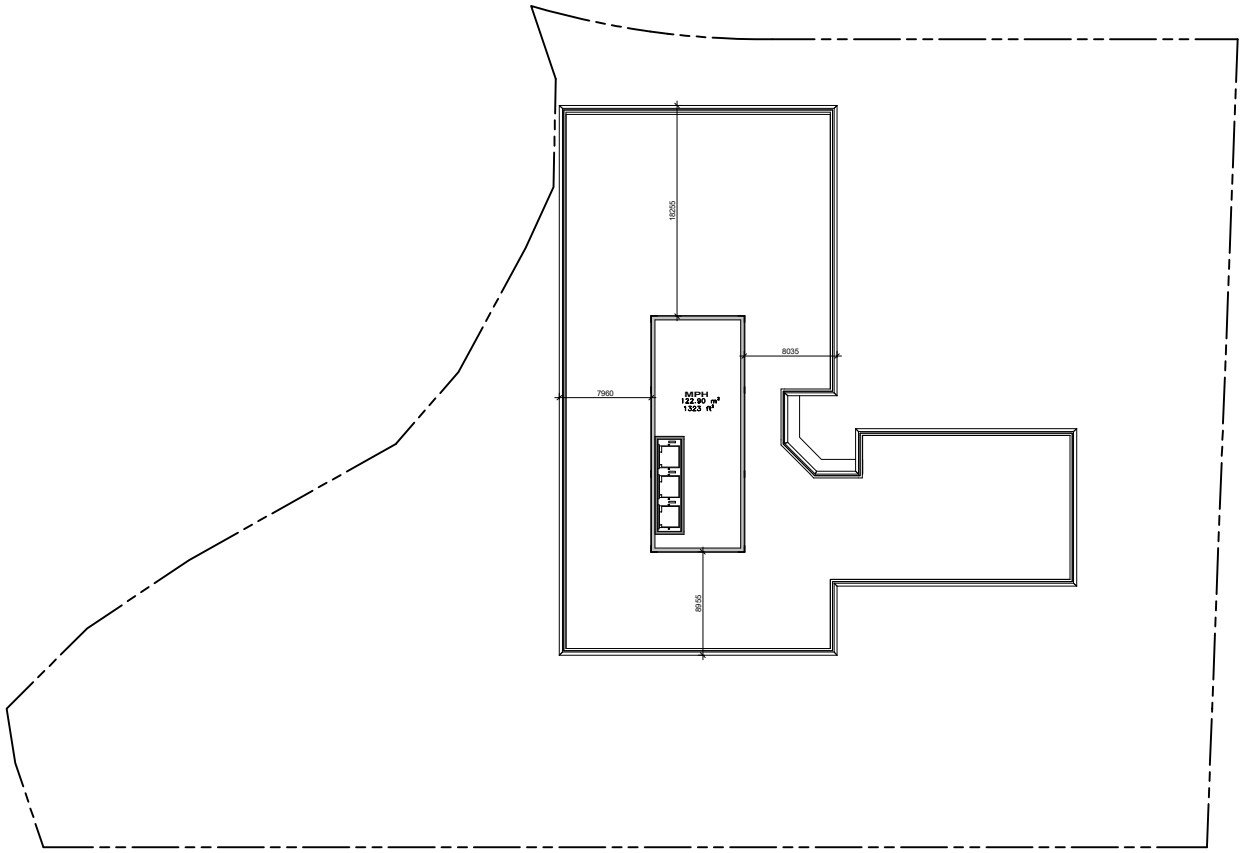
Project No.: 19062

Date: Mar 17,2021

Drawing No.:

dA2.05

Plot Date: 3/17/2021 5:27:09 PM File Path: C:\Revit\2019\19062P11-Model-Fieldgate - 1600 Kerns_FGorjdoz.rvt



Floor Plan Level 5

Scale: 1 : 200

1
dA2.06

Plot Date: 3/17/2021 5:27:10 PM File Path: C:\Revit\2019\19062P11-Model-Fieldgate - 1600 Kerns_FGorjdoz.rvt

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03	Review	Jan 21, 2021
02	Client's Review	May 27, 2020
01	Client's Review	Oct 07, 2019
No	Issued For:	Date:

Drawing Title:

T.O. Top Residential Roof

Project:

FIELDGATE PROPERTIES

1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

Scale: 1 : 200

Drawn by: Author

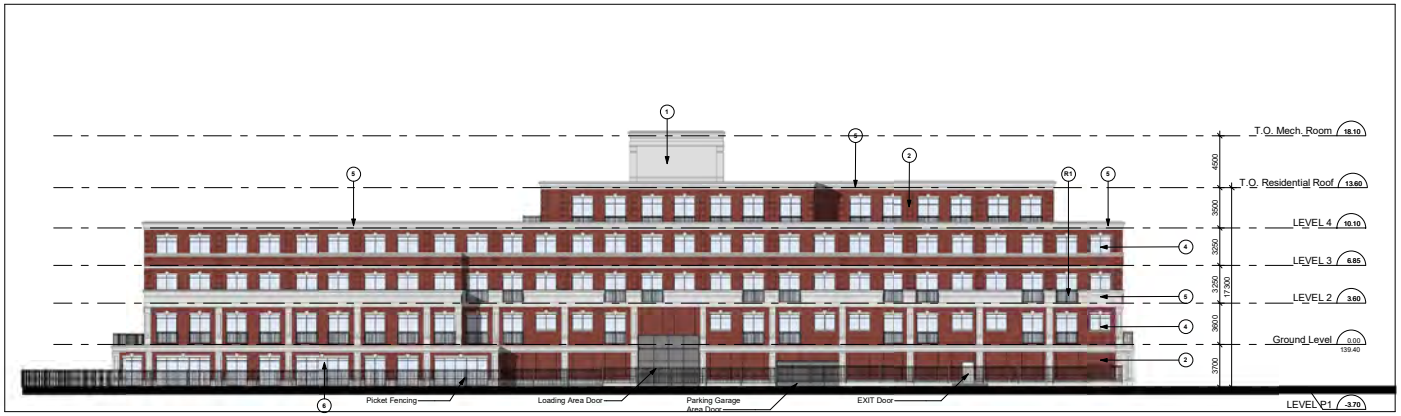
Checked by: Checker

Project No.: 19062

Date: Mar 17,2021

Drawing No.:

dA2.06



South Elevation 4 dA4.01

Scale: 1 : 200



North Elevation 3 dA4.01

Scale: 1 : 200

EXTERIOR FINISH LEGEND

PROJECT NUMBER - PROJECT NAME

1. PRECAST - WHITE/LIGHT GREY
2. BRICK - RED/ BROWN
3. STONE - LIGHT GREY
4. VINYL WINDOW
5. PARAPET/ CORNICE - WHITE CONCRETE
R1. RAILING - PICKET - DARK GREY



West Elevation 2 dA4.01

Scale: 1 : 200



EAST ELEVATION 1 dA4.01

Scale: 1 : 200

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02	Client's Review	May 27, 2020
01	Client's Review	Oct 07, 2019
No	Issued For:	Date:

Drawing Title:

Elevations

Project:

FIELDGATE PROPERTIES

1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

Scale: 1 : 200

Drawn by: Author

Checked by: Checker

Project No.: 19062

Date: Mar 17,2021

Drawing No.:

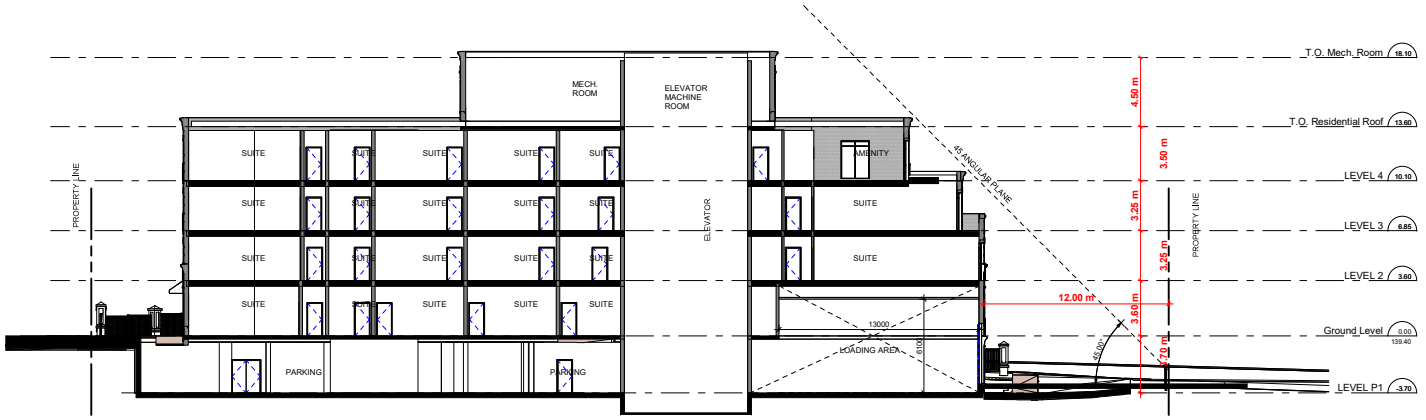
dA4.01

Plot Date: 3/17/2021 8:27:36 PM File Path: C:\Revit\2019\19062P11-Model-Fieldgate - 1600 Kerns_FGorjdooz.rvt



Section 2 — 2 / dA5.01

NTS



Section 4 — 1 / dA5.01

Scale: 1 : 150

Plot Date: 3/17/2021 8:27:44 PM File Path: C:\Revit\2019\19062P11-Model-Fieldgate - 1600 Kerns_FGorjdooz.rvt

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No.:	Revision:	Date:

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02	Client's Review	May 27, 2020
01	Client's Review	Oct 07, 2019
No	Issued For:	Date:

Drawing Title:

Building Sections

Project:

FIELDGATE PROPERTIES

1600 KERNS RETIREMENT HOME

1600 KERNS ROAD, BURLINGTON, ON

Scale: 1 : 150

Drawn by: Author

Checked by: Checker

Project No.: 19062

Date: Mar 17,2021

Drawing No.: dA5.01

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APPENDIX B
Traffic Data and Calculations

Environmental Noise Feasibility Study
1600 Kerns Road
SLR Project No.: 241.30032.00000

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O R N A M E N T - Sound Power Emissions & Source Heights

Ontario Road Noise Analysis Method for Environment and Transportation

Road Segment ID	Roadway Name	Link Description	Speed (kph)	Period (h)	Total Traffic Volumes	Auto %	Med %	Hvy %	Auto	Med	Heavy	Road Gradient (%)	Cadna/A Ground Absorption G	PWL (dBA)	Source Height, s (m)
N_S_Rd_D	N Service Rd	Daytime Impacts	60	16	16605	93.8%	3.3%	2.9%	15576	551	479	0	0.00	**84.0**	**1.3**
N_S_Rd_N	N Service Rd	Nighttime Impacts	60	8	1845	93.8%	3.3%	2.9%	1731	61	53	0	0.00	**77.5**	**1.3**
Kerns_D_N	Kerns Rd Northbound	Daytime Ambient	40	16	2416	95.2%	2.6%	2.2%	2300	63	53	3.8	0.00	**72.4**	**1.2**
Kerns_N_N	Kerns Rd Northbound	Evening Ambient	40	8	268	95.2%	2.6%	2.2%	256	7	6	3.8	0.00	**65.9**	**1.2**
Kerns_D_S	Kerns Rd Southbound	Daytime Ambient	40	16	2416	95.2%	2.6%	2.2%	2300	63	53	0	0.00	**71.3**	**1.2**
Kerns_N_S	Kerns Rd Southbound	Evening Ambient	40	8	268	95.2%	2.6%	2.2%	256	7	6	0	0.00	**64.8**	**1.2**
Four_D	Four Seasons Dr	Nighttime Ambient	40	16	1355	95.2%	2.6%	2.2%	1290	35	30	0	0.00	**68.8**	**1.2**
Four_N	Four Seasons Dr	Daytime Impacts	40	8	151	95.2%	2.6%	2.2%	143	4	3	0	0.00	**62.3**	**1.2**

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201135-KERNS RD @ NORTH SERVICE RD

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

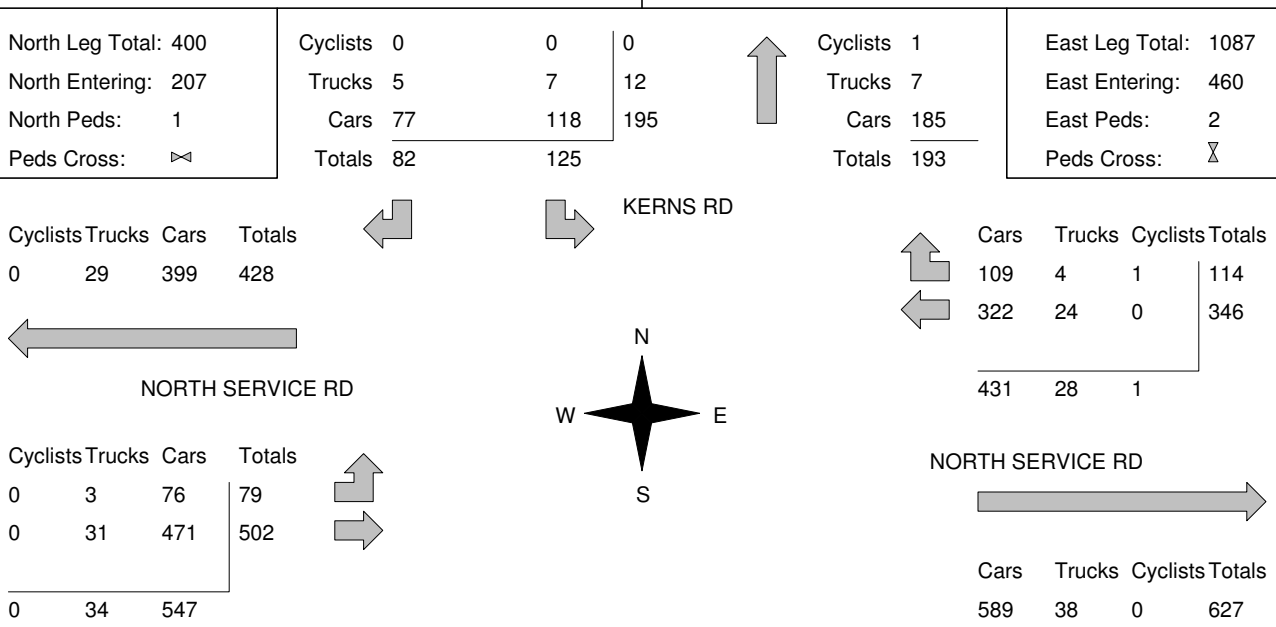
Municipality: Burlington
Site #: 0000201135
Intersection: NORTH SERVICE RD & KERNS RD
TFR File #: 1
Count date: 1-Oct-2020

Weather conditions:
Sunny

Person(s) who counted:
Mike

**** Signalized Intersection ****

Major Road: NORTH SERVICE RD runs W/E



Peds Cross:
West Peds: 0
West Entering: 581
West Leg Total: 1009

Comments

201135-KERNS RD @ NORTH SERVICE RD

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 15:15:00
To: 16:15:00

Municipality: Burlington
Site #: 0000201135
Intersection: NORTH SERVICE RD & KERNS RD
TFR File #: 1
Count date: 1-Oct-2020

Weather conditions:
Sunny

Person(s) who counted:
Mike

**** Signalized Intersection ****

Major Road: NORTH SERVICE RD runs W/E

North Leg Total: 400
North Entering: 178
North Peds: 7
Peds Cross: ⋈

Cyclists	0	4	4
Trucks	2	2	4
Cars	84	86	170
Totals	86	92	

Cyclists	0
Trucks	8
Cars	214
Totals	222

East Leg Total: 1367
East Entering: 703
East Peds: 2
Peds Cross: ⧖

KERNS RD

Cyclists	Trucks	Cars	Totals
1	22	633	656

NORTH SERVICE RD

Cyclists	Trucks	Cars	Totals
0	6	83	89
1	23	548	572
1	29	631	

Cars	Trucks	Cyclists	Totals
131	2	0	133
549	20	1	570
680	22	1	

N
W E
S

NORTH SERVICE RD

Cars	Trucks	Cyclists	Totals
634	25	5	664

Peds Cross: ⧖
West Peds: 0
West Entering: 661
West Leg Total: 1317

Comments

8	FOUR SEASONS DR @ KERNS RD (200843)	2010	0.79	2,010	0.21	0.67	0.88	0.18	0.27	User mod		5,590	4,390	1,200	3,762	####	1,005	1,483
9	FOUR SEASONS DR @ KERNS RD (200843)	2011	0.79	2,011	0.21	0.67	0.88	0.18	0.27	User mod	2012 Interse	5,646	4,434	1,212	3,800	####	1,015	1,498
10	FOUR SEASONS DR @ KERNS RD (200843)	2012	0.79	2,012	0.21	0.67	0.88	0.18	0.27	User mod	2012 Interse	5,702	4,478	1,224	3,838	####	1,025	1,513
11	FOUR SEASONS DR @ KERNS RD (200843)	2013	0.76	2,013	0.24	0.61	0.94	0.16	0.29	User mod		3,668	2,799	869	2,234	####	570	1,067
12	FOUR SEASONS DR @ KERNS RD (200843)	2014	0.76	2,014	0.24	0.61	0.94	0.16	0.29	User mod	2014 Interse	3,705	2,827	878	2,256	####	576	1,078
13	FOUR SEASONS DR @ KERNS RD (200843)	2015	0.76	2,015	0.24	0.61	0.94	0.16	0.29	User mod	2015 Interse	3,742	2,855	887	2,279	####	582	1,089
14	FOUR SEASONS DR @ KERNS RD (200843)	2016	0.76	2,016	0.24	0.61	0.94	0.16	0.29	User mod	2016 Interse	3,780	2,884	896	2,302	####	588	1,100
15	FOUR SEASONS DR @ KERNS RD (200843)	2017	0.76	2,017	0.24	0.61	0.94	0.16	0.29	User mod	2017 Interse	4,158	3,172	986	2,532	####	647	1,210
16	FOUR SEASONS DR @ KERNS RD (200843)	2018	0.76	2,018	0.24	0.61	0.94	0.16	0.29	User mod	2018 Interse	4,200	3,204	996	2,557	####	653	1,222
17																		
18																		
19																		
20																		

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APPENDIX C
STAMSON Validation Files

Environmental Noise Feasibility Study
1600 Kerns Road
SLR Project No.: 241.30032.00000

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FIELDGATE PROPERTIES LIMITED	True North	Scale: 1:700	METRES	novus ENVIRONMENTAL NOW PART OF SLR
1600 KERNS ROAD		Date: Mar 29, 2021 Rev 1.0	Figure No. **C-1**	
COMPARISON OF CADNAA AND STAMSON		Project No. 241-30032-0000		

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STAMSON 5.0 NORMAL REPORT Date: 23-12-2020 08:41:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: kerns.te Time Period: 16 hours
Description:

Road data, segment # 1: N Service Rd

Car traffic volume : 15576 veh/TimePeriod
Medium truck volume : 551 veh/TimePeriod
Heavy truck volume : 479 veh/TimePeriod
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: N Service Rd

Angle1 Angle2 : -45.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 500.00 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Kerns Rd N

Car traffic volume : 2300 veh/TimePeriod
Medium truck volume : 63 veh/TimePeriod
Heavy truck volume : 53 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 4 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Kerns Rd N

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.30 m
Receiver height : 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Kerns Rd S

```
---------------------------------
Car traffic volume  :  2300 veh/TimePeriod
Medium truck volume :    63 veh/TimePeriod
Heavy truck volume  :    53 veh/TimePeriod
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Kerns Rd S
---------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  15.00 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🠝
Road data, segment # 4: Four Seasons
---------------------------------
Car traffic volume  :  1290 veh/TimePeriod
Medium truck volume :    35 veh/TimePeriod
Heavy truck volume  :    30 veh/TimePeriod
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 4: Four Seasons
---------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  61.50 m
Receiver height           :   1.50 m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🠝
Results segment # 1: N Service Rd
---------------------------------

Source height = 1.30 m

ROAD (0.00 + 47.71 + 0.00) = 47.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -45      0   0.00  68.96   0.00 -15.23  -6.02   0.00   0.00   0.00  47.71
```

Segment Leq : 47.71 dBA

🡅
Results segment # 2: Kerns Rd N

Source height = 1.22 m

ROAD (0.00 + 55.98 + 0.00) = 55.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	56.84	0.00	-0.86	0.00	0.00	0.00	0.00	55.98

Segment Leq : 55.98 dBA

🡅
Results segment # 3: Kerns Rd S

Source height = 1.22 m

ROAD (0.00 + 56.26 + 0.00) = 56.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	56.26	0.00	0.00	0.00	0.00	0.00	0.00	56.26

Segment Leq : 56.26 dBA

🡅
Results segment # 4: Four Seasons

Source height = 1.22 m

ROAD (0.00 + 44.63 + 0.00) = 44.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	53.76	0.00	-6.13	-3.01	0.00	0.00	0.00	44.63

Segment Leq : 44.63 dBA

Total Leq All Segments: 59.58 dBA

🡅

TOTAL Leq FROM ALL SOURCES: 59.58

APPENDIX D
Required Warning Clauses

Environmental Noise Feasibility Study
1600 Kerns Road
SLR Project No.: 241.30032.00000

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Warning Clauses

The following Warning Clauses should be registered on Title and/or included in the Agreement of Purchase and Sale or Lease and in the relevant Development Agreement:

MECP Type C – Units on east façade facing Kerns Road.

> "Purchasers are advised that the dwelling unit has been or will be fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the Municipality's and the Ministry of the Environment's noise criteria."

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