Environmental Noise Feasibility Study
Proposed 1161-1167 North Shore Blvd East Development
Burlington, Ontario

Novus Reference No. 18-0085 September 18, 2018

NOVUS PROJECT TEAM:

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1.0 INTRODUCTION

Novus Environmental Inc. (Novus) was retained by Amico Properties (Amico) to conduct a noise assessment for the proposed seniors living centre re-development at 1161-1167 North Shore Boulevard East in Burlington, Ontario. This assessment is in support of the Official Plan Amendment and Zoning By-law Amendment (OPA/ZBA) application.

The Region's Noise Abatement Guidelines (NAG) were developed to provide an overview of the approved policy and outlines implementation processes for Existing Residential Development, Regional Capital Road projects and New Developments. The applicable portion of the NAG for this assessment is Section 4.0 – New Development.

In general terms, the NAG requires noise to be addressed from traffic, industry, commercial plazas, and any other noise sources which exceed the Ministry of the Environment, Conversation and Parks (MECP, formerly MOECC) guidelines. These sources are required to be addressed for noise sensitive land uses, such as residential buildings (e.g. single family homes, apartments and condominiums), and institutional buildings (e.g. hospitals, old age homes, etc.).

1.1 Nature of the Subject Lands

The proposed development is to be located at 1161 – 1167 NorthShore Boulevard in Burlington, Ontario. The site is at the northeast corner of Northshore Boulevard and the Queen Elizabeth Highway (QEW). The site is currently occupied by a co-operative building, which is intended to be demolished through the development. The site is approximately 4.47 acres in size.

The proposed development would include the demolition of all existing buildings on the site (two four-storey residential buildings and a single-storey garage) and the redevelopment of the site for seniors living. The proposed development will consist of a tall point tower, mid-rise building and podiums levels. The heights of the various built form elements as proposed range between a single and 18 storeys (including penthouse). The current official plan and zoning allow up to 11 storeys. Copies of the proposed development can be found in **Appendix A**.

The site plan of the proposed development is provided in **Figure 1**.

1.2 Nature of the Surroundings

Immediately surrounding the site is the QEW to the south through west, low-rise residential buildings to the northwest and north, with mid-rise residential buildings to the northeast and east. To the southeast is a low-rise commercial building on the opposite side of North Shore Boulevard. Beyond the immediate surroundings there is low-rise residential buildings to the south through west to north; mid-rise residential buildings to the northeast, along North Shore Boulevard East; and low-rise institutional (Joseph Brant Hospital) and residential buildings (Chartlwell Brant Centre LTC Residence) to the east and southeast. Lake Ontario is 400m to

the east and Hamilton Harbour is 500m southwest. The Skyway Wastewater Treatment Plant is also located to the southeast.

The topography immediately surrounding the proposed development has substantial elevation changes that have been incorporated into the assessment. **Figure 2** shows the site and surrounding area.

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 nearby roadways (predominantly from the QEW).

The area surrounding the proposed development site is mainly residential, however, there are a few commercial/institutional properties along North Shore Boulevard East and industries along the water.

The Chartwell Brant Centre LTC Residence is required by the City of Burlington Noise By-law to meet the MOECP NPC noise guideline limits at the adjacent high-rise residential building to the east of the development. This building is the Lakewinds Condo (1201 North Shore Boulevard), located directly opposite the Chartwell Brant Centre LTC Residence. Therefore, the Chartwell Brant Centre LTC Residence noise is not expected to impact the proposed development, and a detailed assessment of impacts is not required.

Both the Joseph Brant Hospital and Burlington Cultural Centre have existing Environmental Compliance Approvals with requirements to meet the MOECP noise guidelines. Therefore, the noise guideline limits are expected be met at closer intervening noise sensitive buildings and would not impact the proposed development. A detailed assessment of impacts is not required for these facilities.

The Skyway Wastewater Treatment Plant also has an existing Environmental Compliance Approval, with requirements to meet the MOECP NPC noise guideline requirements, and a Noise Abatement Action Plan (NAAP) in place for the facility. Therefore, the Skyway Wastewater Treatment plant is expected to meet the MOECP NPC-300 noise guideline limits at all surrounding noise sensitive land uses surrounding this facility. This includes the Chartwell Brant Centre LTC facility, which is located between the proposed development and the Skyway Wastewater Treatment plant. Therefore, noise impacts from the Skyway Wastewater Treatment Plant would not impact the proposed development, and a detailed assessment of impacts is not required.

2.0 Transportation Noise Impacts

2.1 Transportation Noise Sources

Transportation noise sources of interest with the potential to produce noise at the proposed development are the QEW, North Shore Boulevard East and associated ramps. 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

The NAG requires noise to be addressed from traffic and other sources that exceed the MECP guideline limits. The most applicable MECP guideline for transportation noise levels is Publication NPC-300.

2.2.1 Ministry of the Environment Publication NPC-300

Noise Sensitive Developments

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. **Table 1 to Table 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 (Leq) 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 [3]	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] Residence area Dens, Hospitals, Nursing Homes, Schools, Daycares are also included. During the night-time period, Schools and Daycares are excluded.
[4] 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 outdoor amenity areas ("Outdoor Living Areas" or "OLAs"). These limits were applied to ground floor common outdoor amenity areas only, based on the City of Burlington and MECP requirements. As elevated amenity spaces are excluded from the Halton Region noise guidelines, all elevated amenity areas, such as private terraces and balconies were excluded from the transportation assessment.

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

Time Period	Equivalent Sound Level in Outdoor Living Area (dBA)	Mitigation Requirements and Warning Clauses
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

For the assessment of outdoor sound levels, the surface transportation noise impact is determined by road traffic sound levels.

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 **Table 1**, warning clauses advising future occupants of the potential excesses are required.

Warning clauses also apply to the OLA, where an excess of up to 5 dBA over the 55 dBA OLA limit is often acceptable to many, particularly in the context of an urban environment. Warning clauses are discussed further in **Section 2.6**.

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

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - Leq (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	Daytime (0700-2300h)	≤ 55		None

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - Leq (dBA)		Ventilation and Warning Claus Requirements [2]
		Road	Rail [1]	
Window		56 to 65 incl.		Forced Air Heating with 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 with 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 - Leq (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

Road traffic data and growth rates were obtained through a combination of City of Burlington and MTO information requests. Copies of all traffic data used and calculations can be found in **Appendix B**. The following table summarizes the road traffic volumes used in the analysis.

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

Roadway Link	2028 Traffic Levels [1] (AADT)	Day/ Night % Split		Commercial Traffic Breakdown		Vehicle Speed (km/h)
		Daytime	Night-time	% Medium Trucks	% Heavy Trucks	
QEW NB	91964	90	10	2.9%	8.8%	100

Roadway Link	2028 Traffic Levels [1] (AADT)	Day/ Night % Split		Commercial Traffic Breakdown		Vehicle Speed (km/h)
		Daytime	Night-time	% Medium Trucks	% Heavy Trucks	
QEW SB	91964	90	10	2.9%	8.8%	100
North Shore EB to QEW NB Ramp	1058	90	10	1.8%	1.5%	40
North Shore WB to QEW NB Ramp	3562	90	10	1.9%	1.7%	50
QEW NB Offramp to North Shore	9602	90	10	1.4%	1.2%	60
North Shore East of Ramp EB	13907	90	10	1.6%	1.4%	60
North Shore East of Ramp WB	14242	90	10	1.6%	1.4%	60
North Shore West of Ramp EB	7255	90	10	1.9%	1.6%	60
North Shore West of Ramp WB	12572	90	10	1.5%	1.3%	60

Notes: [1] The 1.1% per annum growth rate was provided for the area by for Burlington.

2.4 Projected Sound Levels

Future (2028) 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 generally equivalent to those made using the MECP's ORNAMENT or STAMSON v5.04 road traffic noise models.

Sound levels were predicted along the facades 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. Based on drawings, only facades that could contain bedrooms or living areas were considered in the analysis to be noise sensitive. Approximate ground level elevation contours were included in the modelling to include topographical features between the development and transportation sources.

Predicted worst-case façade sound levels are presented in **Table 6**. The predicted sound levels do not significantly change with building elevation. As both the QEW and North Shore Bvld E. are the dominant sound sources, the largest change in predicted façade levels are due to separation distance and self screening effects. The highest predicted noise levels are on the southwest facades that face the QEW. The façade maps of the development showing predicted roadway impacts are shown in **Figure 3 and Figure 4** for daytime and night-time sound levels, respectively.

Table 6: Summary of Predicted Roadway Noise Impacts – Façades

Building Section	Façade[1]	Roadway Sound Levels	
		L_{eq} Day (dBA)	L_{eq} Night (dBA)
East Tower	Northwest	69	62
	Northeast	63	57
	Southeast	71	64
	Southwest	72	65
Mid-Rise	Northwest	71	64
	Northeast	60	54
	Southeast	71	65
	Southwest	74	67
Podium	Northwest	72	65
	Northeast	59	52
	Southeast	72	65
	Southwest	N/A	N/A

Notes: [1] See **Figure 3 and 4** for corresponding façade locations.

Sound levels were predicted at all noise-sensitive façades (residential units) throughout the development. The highest levels on each façade (excluding the northeast façade as it is screened form the QEW) was generally found to be above the 65 dBA daytime and 60 dBA the night-time limits.

2.5 Facade Requirements

Based on the roadway noise levels shown in **Table 6**, façade sound levels were predicted to exceed the above criteria at multiple locations throughout the development. Therefore, an assessment of glazing requirements is necessary for meeting the indoor sound level requirements outlined in **Table 1**.

Indoor sound levels and required facade Sound Transmission Classes (STCs) were estimated using the procedures outlined in National Research Council Building Practice Note BPN-56.

Calculated window STC ratings are the combined acoustical parameter determined from the individual roadway noise impacts. The worst-case daytime and night-time period impacts were considered, with the highest STC requirement calculated for each façade location.

Detailed floor plans were not available at the time of this assessment. For the analysis, generic bedrooms and living rooms have been considered. The following assumptions have been made regarding window glazing as a percentage of wall area for the mid-rise building:

- 70% for living rooms, which have the potential to be located at corners with 2 exposed sides.
- 50% for bedrooms, which will be located mid-span only.
- Non-glazing portions of the wall have an STC rating of 43.

The maximum acoustical glazing requirements are provided in **Table 7** below.

Areas where acoustical requirements are not outlined, typical OBC windows and walls are expected to be sufficient. Any glazing configuration meeting the minimum structural and safety requirements of the Ontario Building Code, which generally produces a minimum STC for glazed elements of STC 29, is sufficient.

Façade Calculations are provided in **Appendix C**.

Table 7: Summary of Façade STC Requirements

Building Section	Façade[1]	STC Glazing Requirements [1]	
		Living Room	Bedroom
East Tower	Northwest	OBC (27)	OBC (29)
	Southeast	OBC (29)	32
	Southwest	30	33
Mid-Rise	Northwest	OBC (29)	32
	Southeast	OBC (29)	32
	Southwest	32	35
Podium	Northwest	30	33
	Southeast	30	33

Notes: [2] OBC: Any configuration meeting the minimum structural and safety requirements of the Ontario Building Code, which generally produces a minimum STC for glazed elements of STC 29.
N/A – no presently designed windows on façade.

As shown in the table above, the northeast façade is the only façade that does not need upgraded glazing. All other facades (depending on the usage) would require upgrade glazing to meet the applicable indoor limits.

The combined glazing and frame assembly must be designed to ensure the overall sound isolation performance for the entire window unit meets the sound isolation requirements provided. It is recommended that window manufacturers test data be reviewed to confirm the acoustical performance is met.

As the design progresses, final acoustical requirements should be reviewed as part of the final design at the Building Permit stage.

2.6 Outdoor Living Areas

Outdoor living areas (OLA) of the proposed development, with the potential to be impacted by transportation noise, consists of the single ground floor amenity courtyard space located between the tower and the mid-rise building components. As elevated amenity spaces are excluded from the Halton Region noise guidelines, all elevated amenity areas, such as private terraces and balconies were excluded from the transportation assessment.

The projected sound levels at the outdoor amenity area is predicted to be above the criteria outlined in **Table 2 and Table 3**. Noise control measures (e.g.: acoustic barrier) with a **Type B** warning clause is required. The predicted noise impacts from roadway noise sources are summarized in the following table. The OLA assessment location and the predicted noise impacts from the roadway are shown in **Figure 5**.

Table 8: Summary of Predicted Roadway Noise Impacts – OLA

Location	Road Impacts L_{eq} Day (dBA)	Applicable Guideline Limit L_{eq} Day (dBA) [1]	Meets Criteria? (Yes/No)
Ground Floor Courtyard	66	60	No

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

The unmitigated maximum sound level for the Outdoor Amenity Area listed in **Table 8** is predicted to exceed the guideline limit. A single barrier surrounding the courtyard OLA is required with a height in excess of 3.5 m (maximum height allowable in the NAG) to reduce impacts to meet the guideline requirements. Localized acoustical screening should be included in the landscape design. Given the maximum predicted sound levels within the OLA (66 dBA impacts), meeting the guideline requirements is anticipated to be possible.

2.7 Ventilation and Warning Clause Requirements

Based on the predicted sound levels, warning clauses are required to be included in agreements of purchase and sale or lease and rental agreements for the residential dwellings. See **Appendix C** for warning clause details.

2.7.1 Residential Units

The sound levels generated by the surrounding roadways will cause various warning clauses to be required on different units on the proposed development. The applicable portion **of Table 3** has been included below for reference.

Assessment Location	Time Period	Energy Equivalent Sound Exposure Level - Leq (dBA) Road	Ventilation and Warning Claus Requirements
Plane of Window	Daytime (0700-2300h)	≤ 55	None
		56 to 65 incl.	Forced Air Heating with 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 with provision to add air conditioning + Type C Warning Clause
		> 60	Central Air Conditioning + Type D Warning Clause

Forced air heating with the provision to add air conditioning (**Type C** warning clause) is required on the northeast residential rooms of the building. All other residential rooms that face the outdoors will require central air conditioning (**Type D** warning clause).

2.7.2 Outdoor Amenity Area

A Type B warning clause and acoustical mitigation measure related to the increased sound levels for the outdoor amenity area is required for all suites. See **Appendix C** for all warning clause details.

PART 2: IMPACTS OF THE DEVELOPMENT ON ITSELF

3.0 Noise Impacts Proposed Development Stationary Sources

The building mechanical systems have not been designed at this time. Although no adverse impacts are expected, such equipment has the potential to result in noise impacts on residential spaces within the development. This equipment is required to meet MOECC Publication NPC-300 requirements at the facades of the noise sensitive spaces within the development. Therefore, the potential impacts should be assessed as part of the final building design. The criteria are 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) into the design.

It is recommended the mechanical systems be reviewed by an acoustical professional prior to final design.

PART 3: IMPACTS OF THE DEVELOPMENT ON THE SURROUNDING

4.0 Proposed Development Mechanical Equipment

At the time of this assessment, the proposed development's mechanical systems have not been sufficiently designed. On- and off-site noise impacts from all mechanical equipment should comply with the MECP Publication NPC-300 guideline limits.

Mechanical equipment is to be included with proposed development. Mechanical ventilation, cooling and emergency power systems may be required. Based on our experience, the type and size of the units and their probable locations are not anticipated to result in adverse noise impacts.

Regardless, 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) into the design. This can be confirmed at either the site plan approval or building permit approval stages.

5.0 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 itself, and the development on the surrounding area have been considered. Based on the results of the study, the following conclusions have been reached:

5.1 Transportation Noise

- An assessment of transportation noise impacts from roadways and railway has been completed.
- Based on transportation façade sound levels, the northeast façade is the only façade that does not need upgraded glazing. All other facades (depending on the usage) would require upgrade glazing to meet the applicable indoor limits, as listed in **Section 2.5**.
- Glazing requirements above are approximated, based on the generic room, façade and glazing dimensions. Once detailed floor plans and façade plans become available, the glazing requirements should be re-assessed and reviewed by an Acoustical Consultant.
- Forced air heating with the provision to add air conditioning (**Type C** warning clause) is required on the northeast residential rooms of the building. All other residential rooms that face the outdoors will require central air conditioning (**Type D** warning clause), as summarized in **Section 2.7**.
- Based on unmitigated sound levels predicted for the Outdoor Amenity Area, localized noise screening at designated seating areas in the OLA should be included in the landscape design, as outlined in **Section 2.6**.

5.2 Noise Impacts From Proposed Development on Itself

- The building mechanical systems have not been designed at this time. The potential impacts should be assessed as part of the final building design. The criteria are 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) into the design.
- It is recommended the mechanical systems be reviewed by an acoustical professional prior to final design.

5.3 Noise Impacts From Proposed Development on the Surroundings

- The proposed development's mechanical systems have not been sufficiently designed. 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) into the design.

- It is recommended that this be confirmed at either the site plan approval or building permit approval stages.

6.0 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 (MOE), 1989, Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT).

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

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

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Figures

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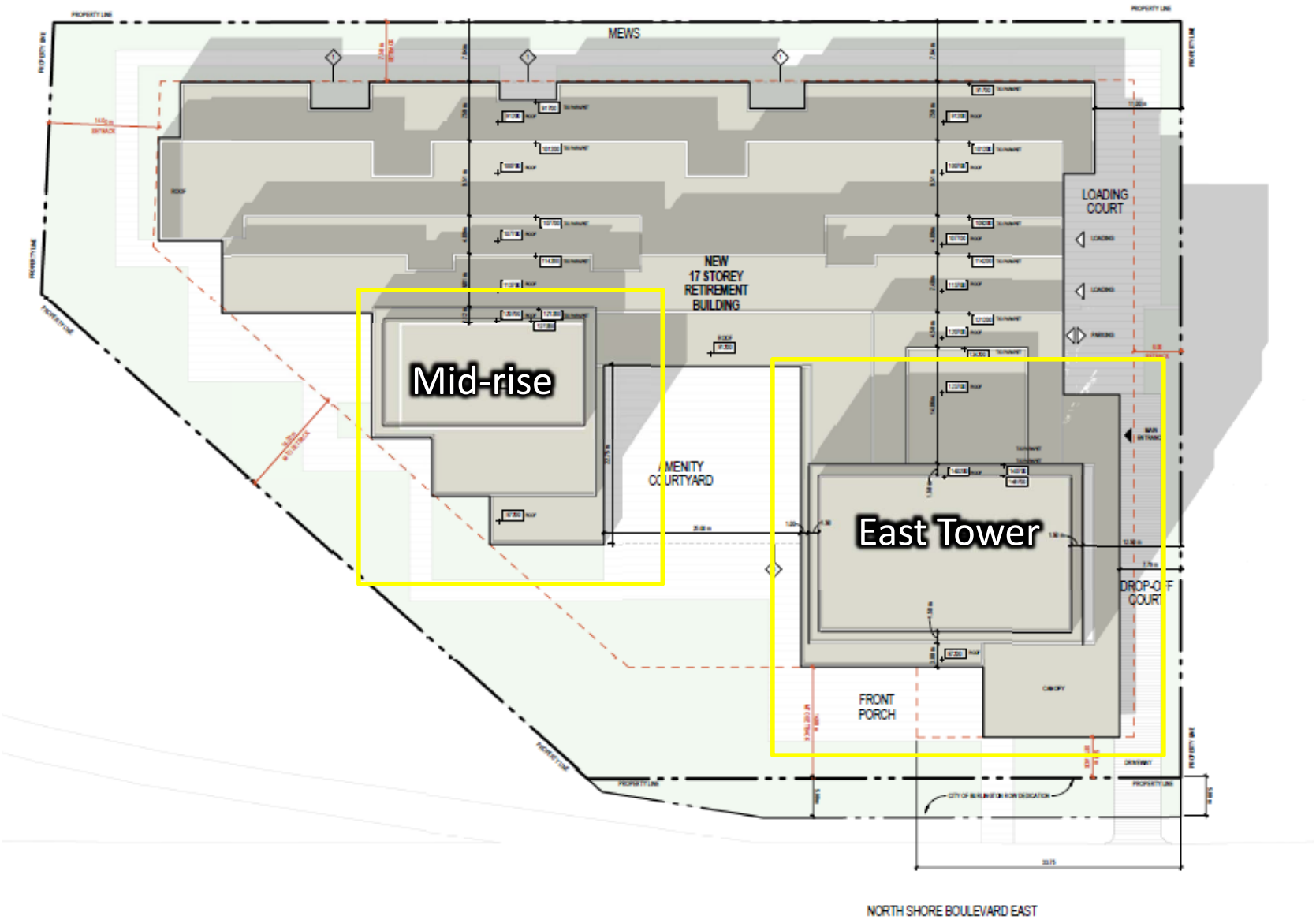

Figure No. **1**

Site Plan

18-0085 – 1161-1167 North Shore Development
Burlington, Ontario

True North

Scale:	N/A
Date:	18/09/13
File No.:	18-0085
Drawn By:	AKH

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Figure No. **2**

Site and Surrounding Area

18-0085 – 1161-1167 North Shore Development
Burlington, Ontario

True North

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Date:	18/09/13
File No.:	18-0085
Drawn By:	AKH

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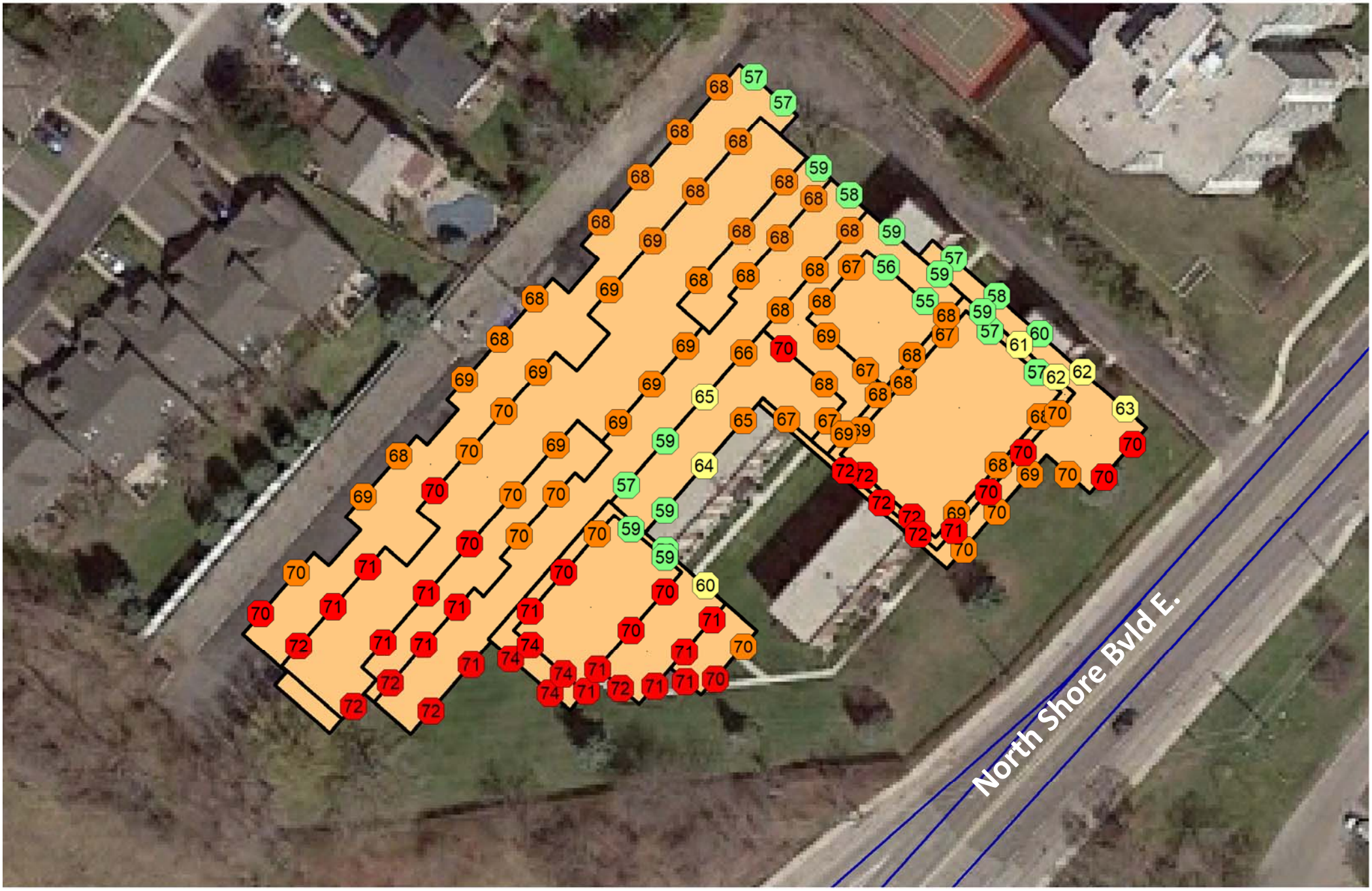

Figure No. **3**

Modelled Development Façade Sound Levels
Roadway, Daytime

18-0085 North Shore Development
Burlington, Ontario

True North

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Date:	18/09/13
File No.:	18-0085
Drawn By:	AKH

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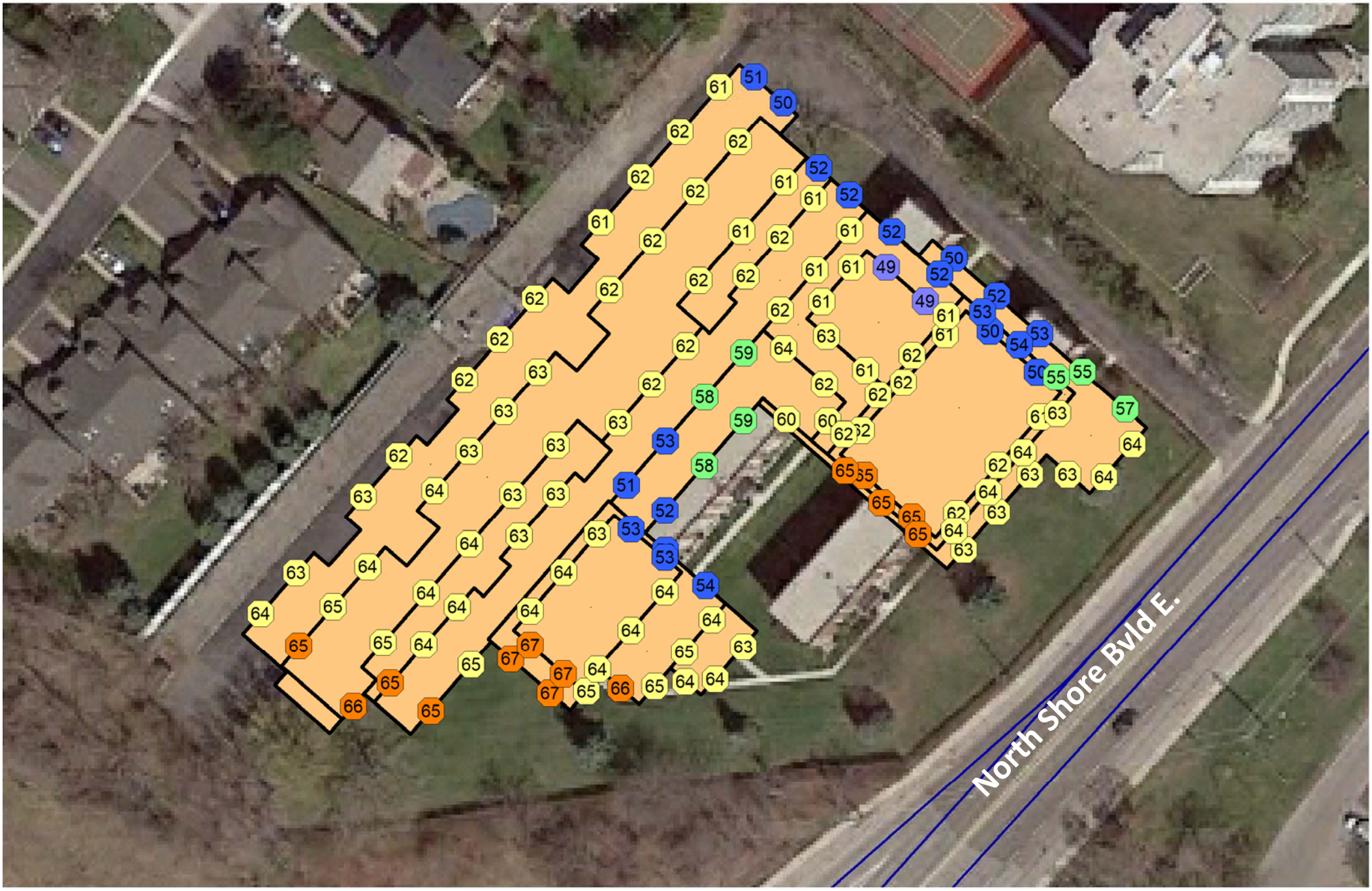

Figure No. **4**

Modelled Development Façade Sound Levels
Roadway, Nighttime

18-0085 North Shore Development
Burlington, Ontario

True North

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File No.:	18-0085
Drawn By:	AKH

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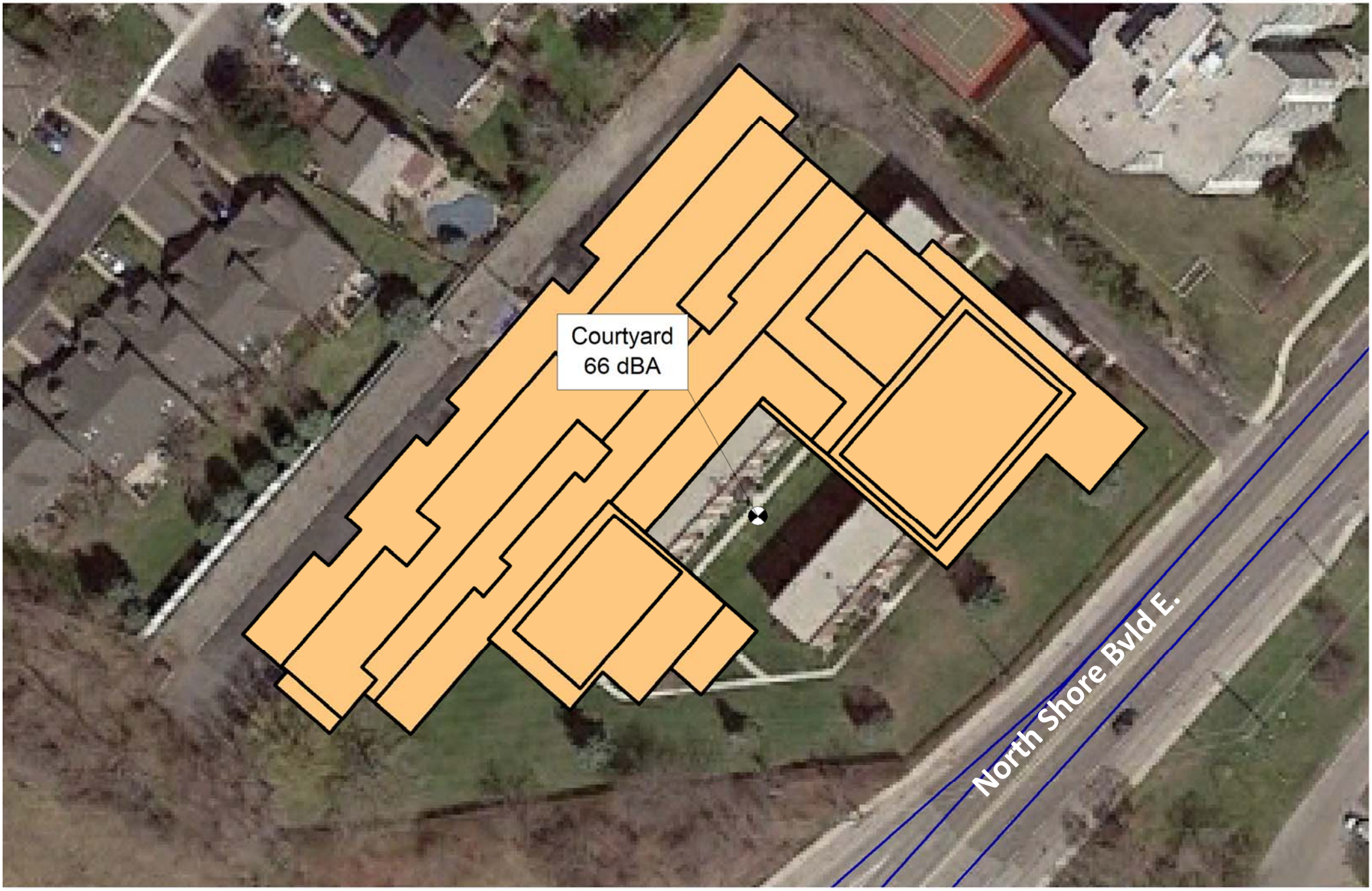

Figure No. **5**

Outdoor Living Area - Road Impacts

18-0085 North Shore Development
Burlington, Ontario

True North

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Date: 18/09/13
File No.: 18-0085
Drawn By: AKH

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Appendix A

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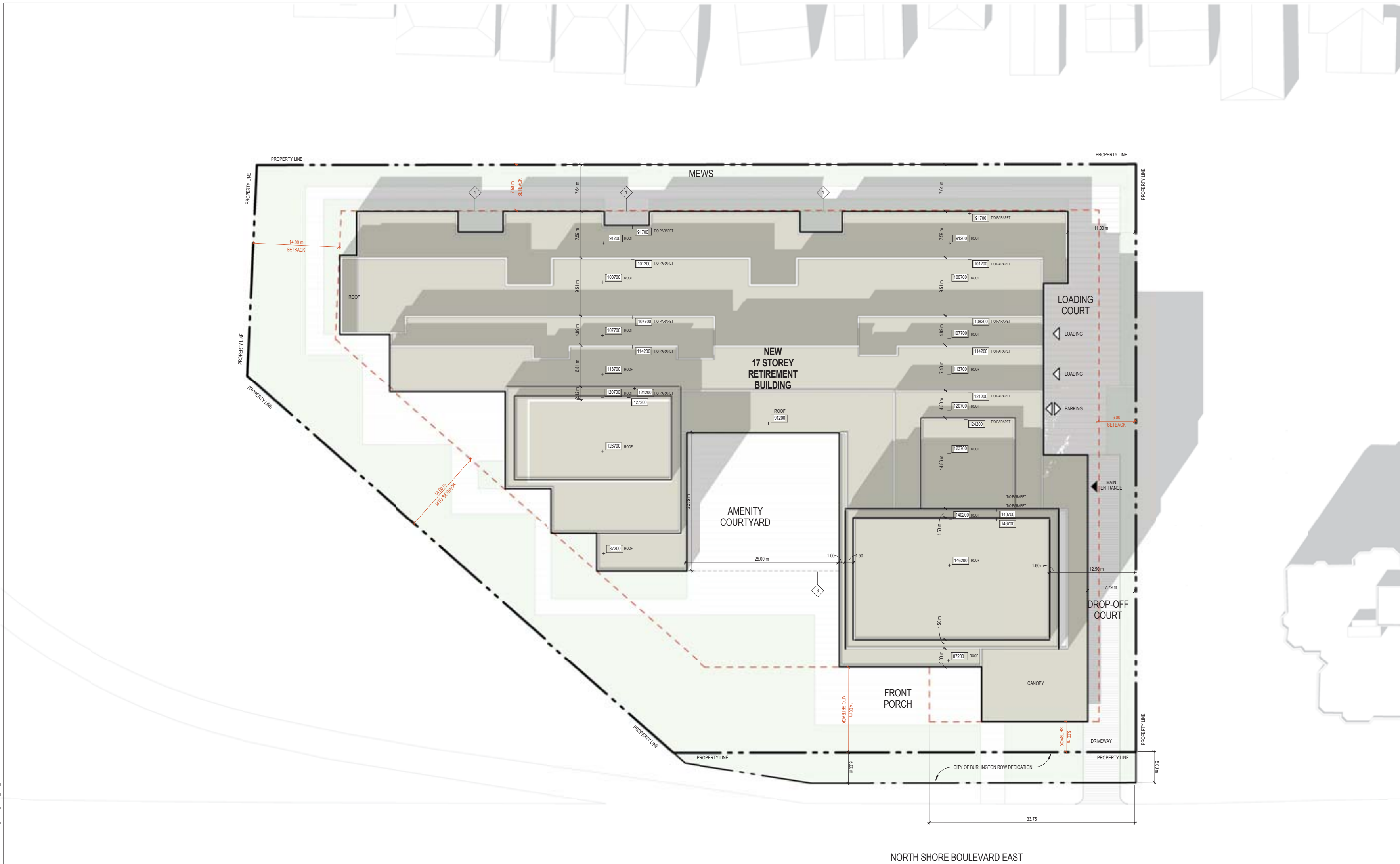

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ROOF SITE PLAN
1 : 300

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197 Spadina Avenue, Toronto, Ontario M5T 2C8 montgomerysisam.com
Tel 416.364.8079 Fax 416.364.7723

MontgomerySisam

PROJECT NORTH
TRUE NORTH

#	date:	revision:	by:

revisions

Amica North Shore
1157-1171 North Shore Boulevard
Burlington, ON L7S 1C3

SITE PLAN - ROOF PLAN

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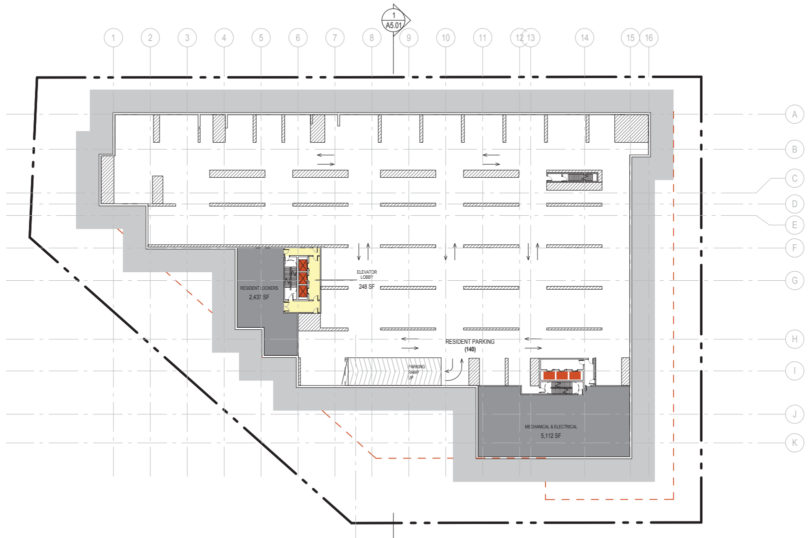
drawn by:	RX
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

drawing number:

A1.02



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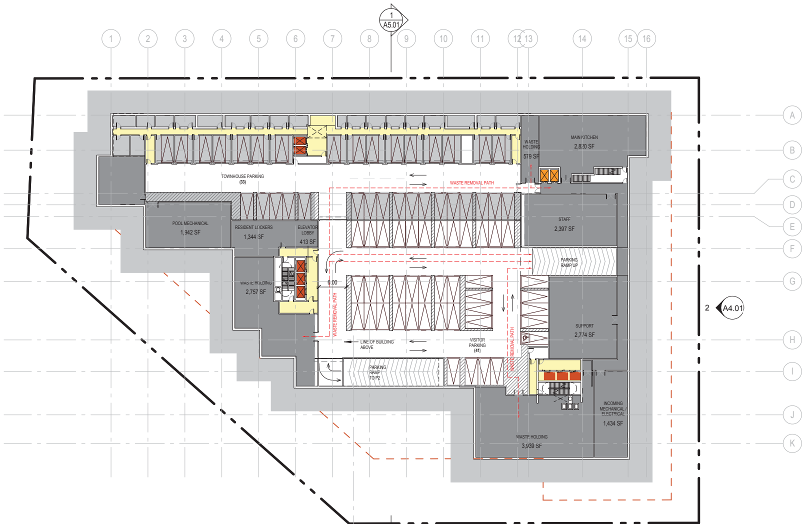

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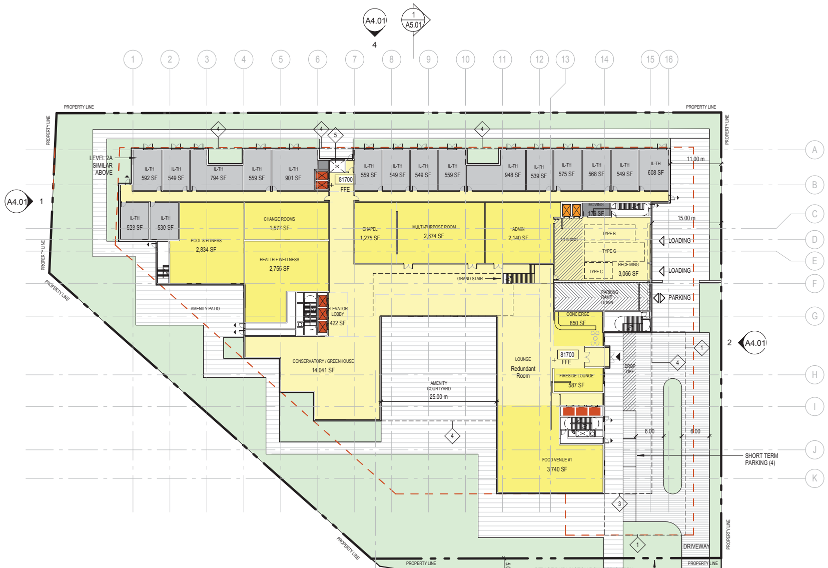

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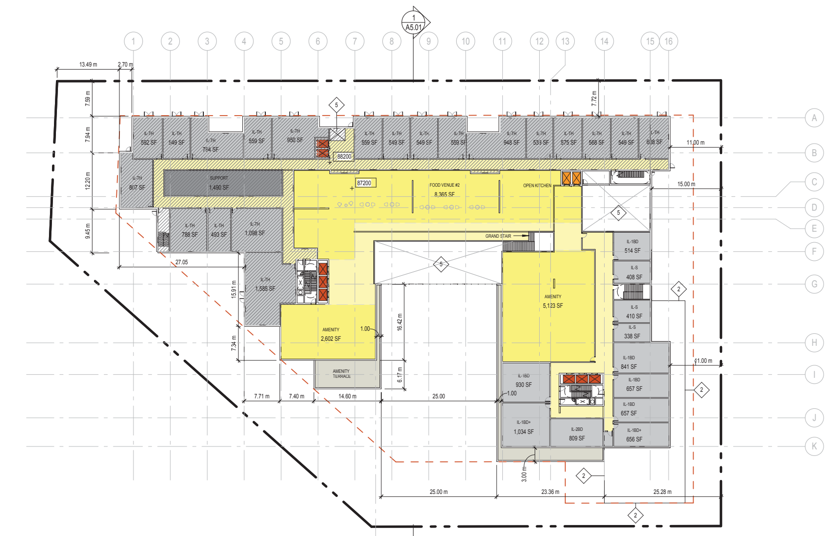

3 A2.01 LEVEL 2 1 : 500

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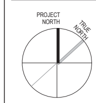
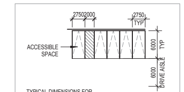
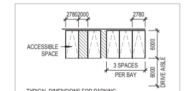


FLOOR PLAN KEYNOTES:

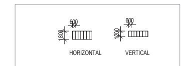
1. CANOPY ABOVE
2. CANOPY BELOW
3. LINE OF BUILDING ABOVE
4. LINE OF BUILDING BELOW
5. OPEN TO BELOW



TYPICAL DIMENSIONS FOR PARKING STALLS AND DRIVE AISLE



TYPICAL DIMENSIONS FOR PARKING STALLS AND DRIVE AISLE (UNDERGROUND)



TYPICAL BIKE STORAGE DIMENSIONS

#	date:	revision:	by:

revisions

Amica North Shore
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FLOOR PLAN - LEVEL P1 TO P2, LEVELS 1-2

scale:	As indicated
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

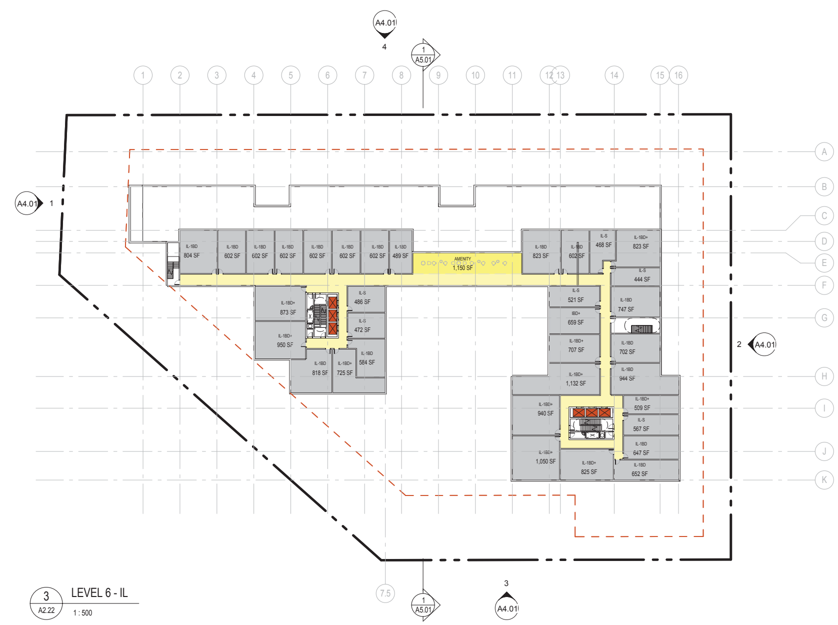
drawing number:

A2.01

LEVEL 3 - MC
1 : 500

LEVEL 4 - AL
1 : 500

LEVEL 5 - AL
1 : 500



LEVEL 6 - IL
1 : 500

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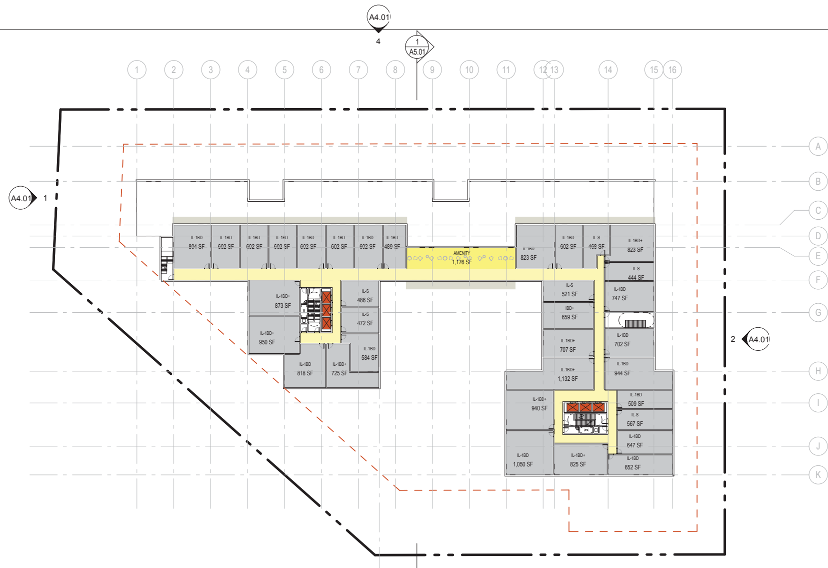
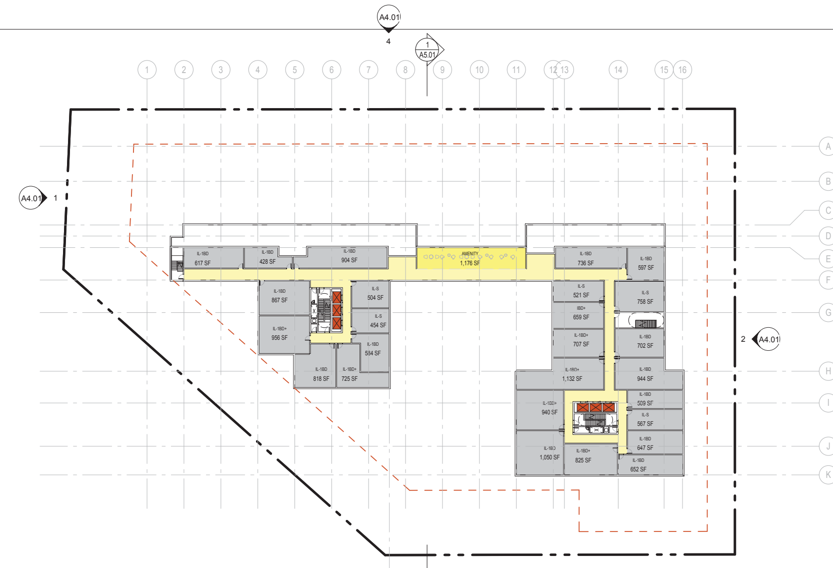
FLOOR PLAN - LEVEL 3-6

scale:	As indicated
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

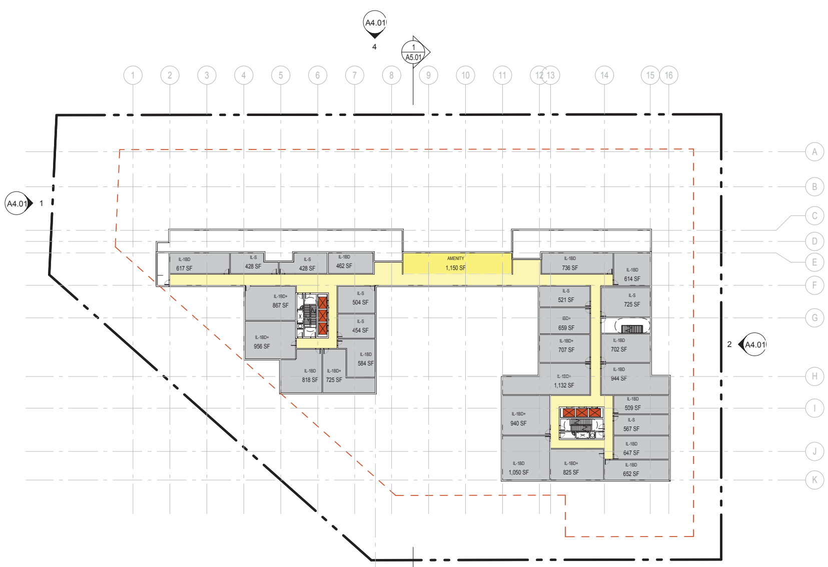
drawing number:
A2.22



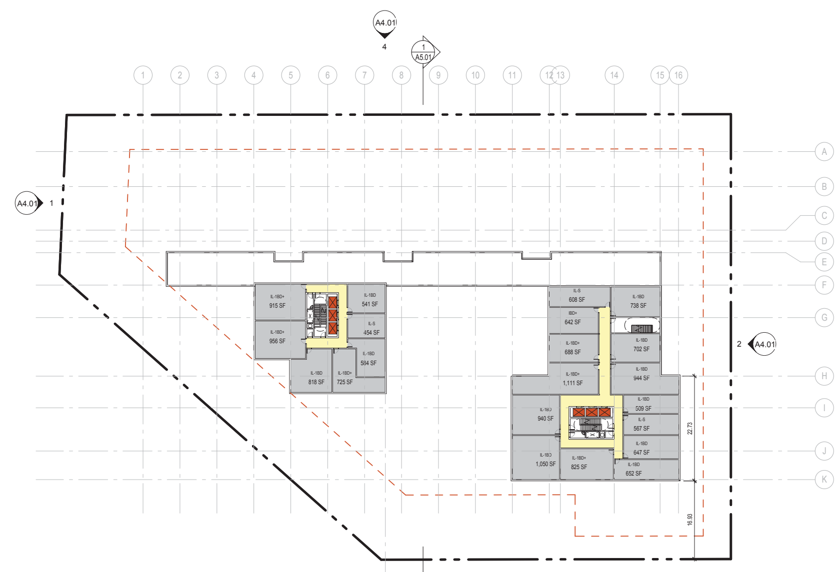
LEVEL 7 - IL
1 : 500



LEVEL 8 - IL
1 : 500



LEVEL 9 - IL
1 : 500



LEVEL 10 - IL
1 : 500

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PROJECT NORTH
TRUE NORTH

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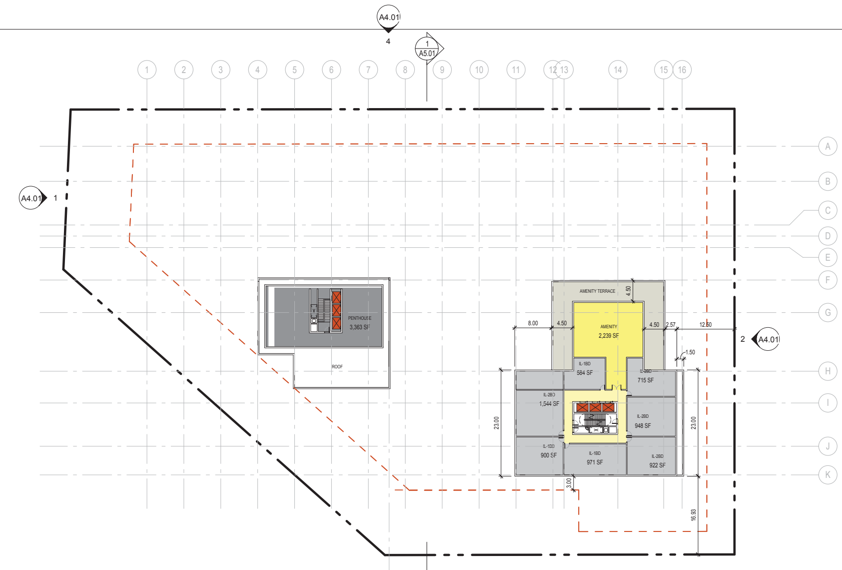
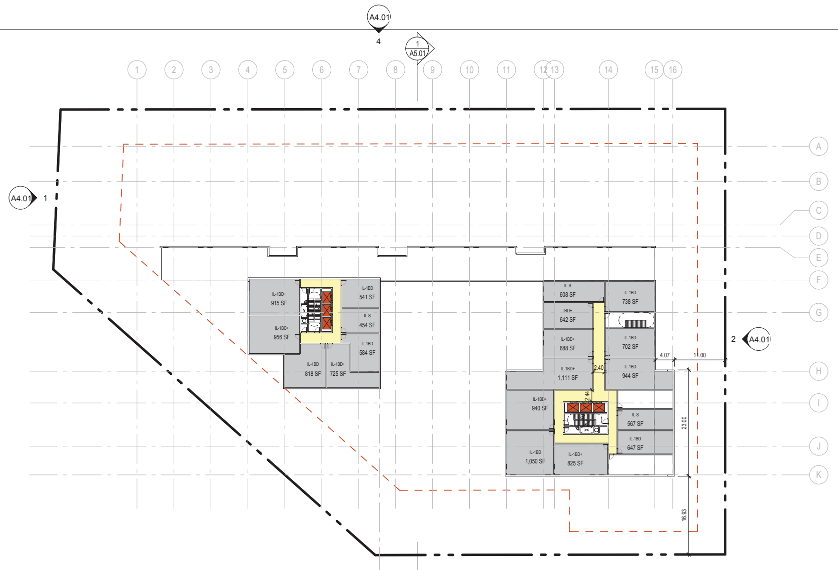
FLOOR PLAN - LEVEL 7-10

scale:	As indicated
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

drawing number:

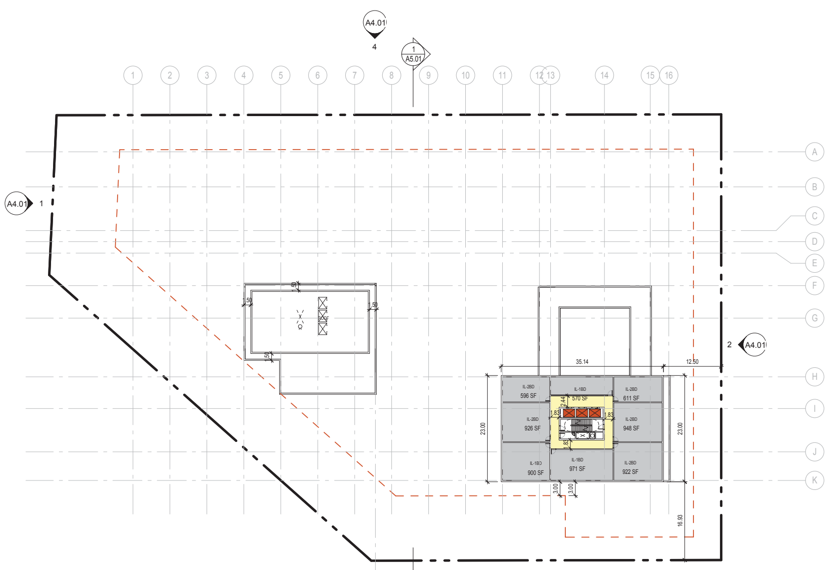
A2.23

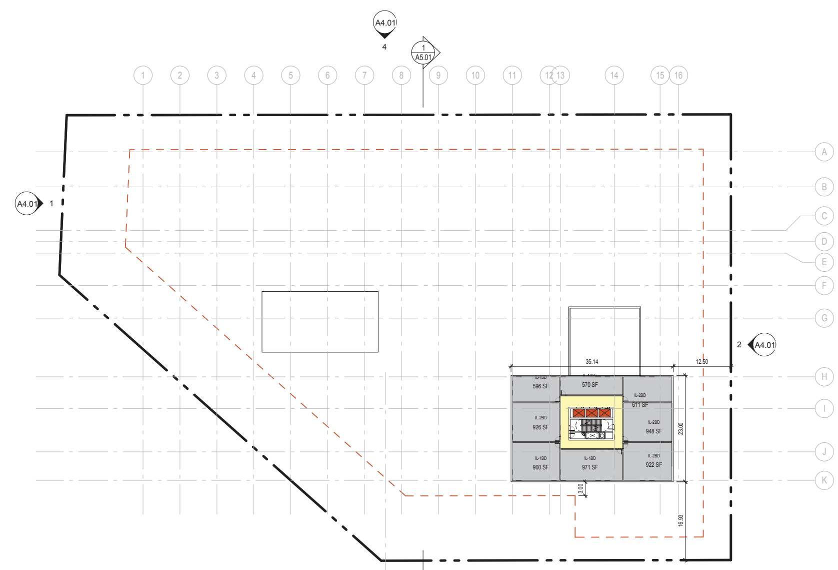




LEVEL 11 - IL (4 / A2.24) 1 : 500

LEVEL 12 - IL (1 / A2.24) 1 : 500





LEVEL 13 - IL (2 / A2.24) 1 : 500

LEVEL 14 - IL (3 / A2.24) 1 : 500

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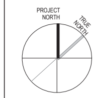

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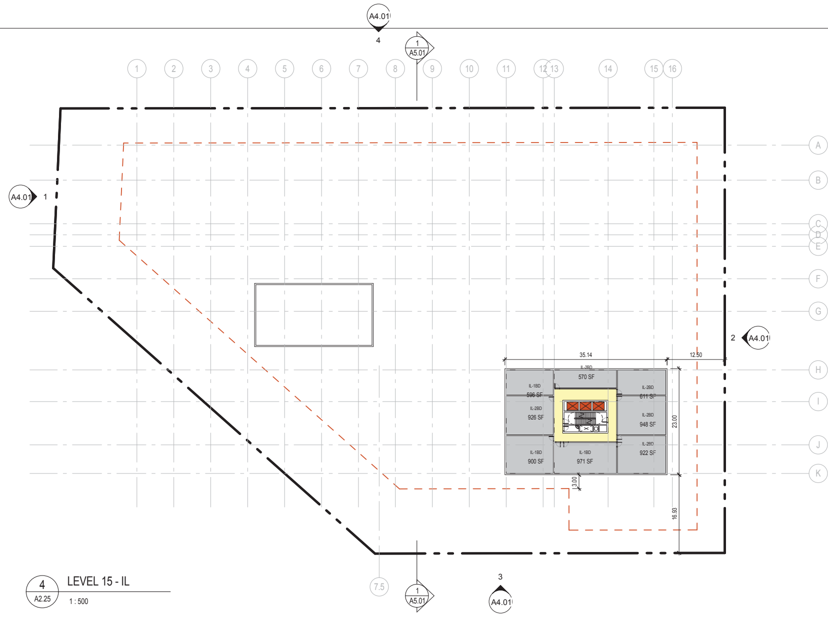
FLOOR PLAN 11-14

scale:	As indicated
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

drawing number:

A2.24



4 A2.25 LEVEL 15 - IL
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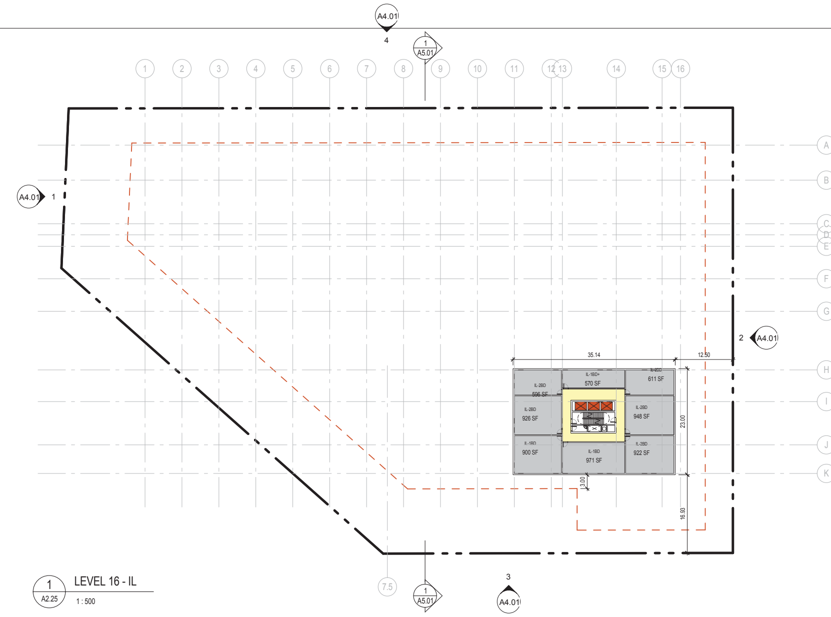

1 A2.25 LEVEL 16 - IL
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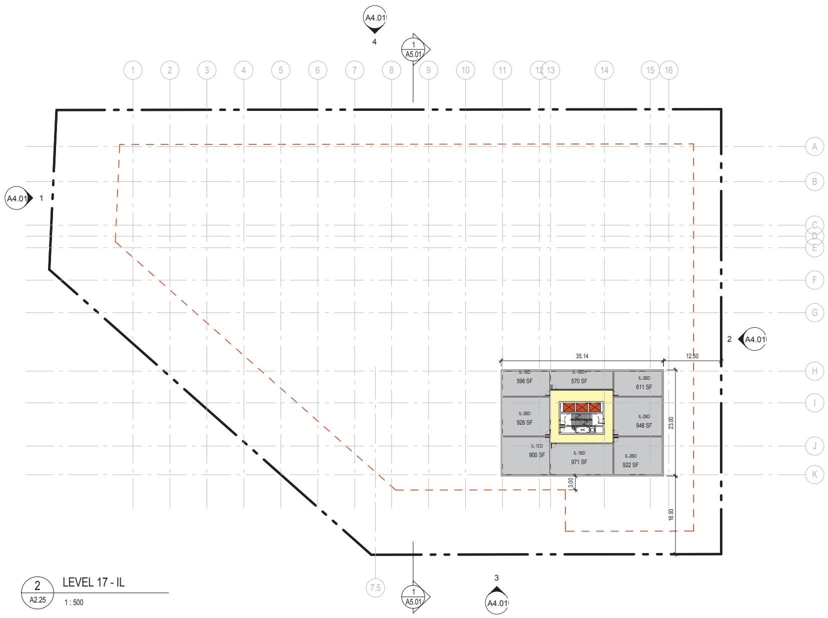

2 A2.25 LEVEL 17 - IL
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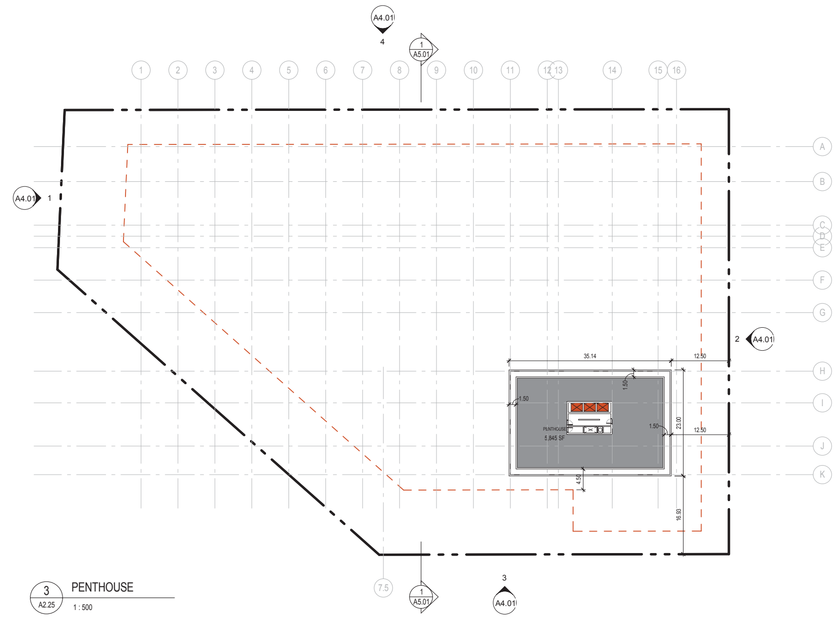

3 A2.25 PENTHOUSE
1 : 500

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PROJECT NORTH
TRUE NORTH

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Amica North Shore
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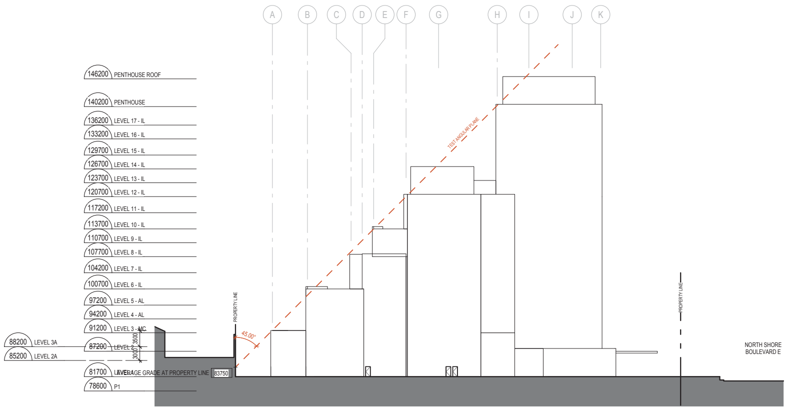
FLOOR PLAN 15 - PENTHOUSE

scale:	As indicated
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

drawing number:

A2.25



1 A4.01 WEST BUILDING ELEVATION
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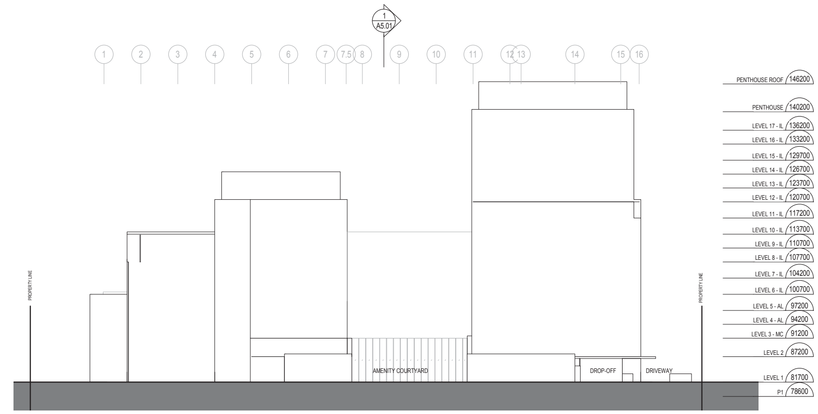
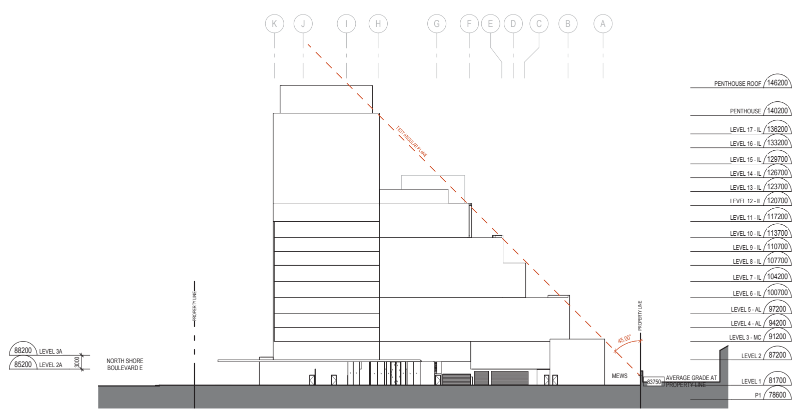


3 A4.01 SOUTH BUILDING ELEVATION
1 : 500



2 A4.01 EAST BUILDING ELEVATION
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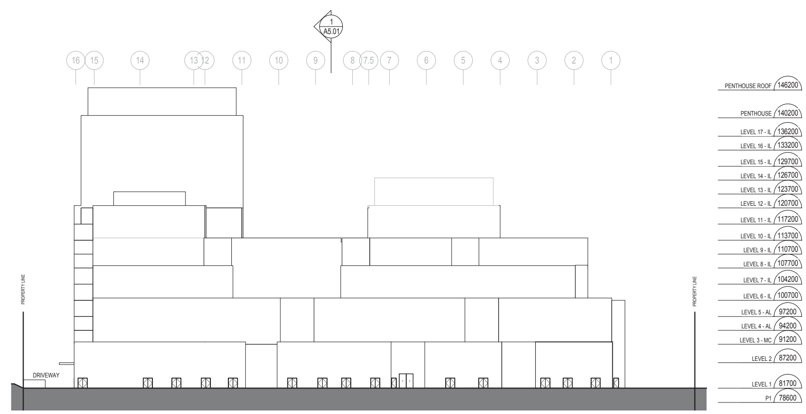

4 A4.01 NORTH BUILDING ELEVATION
1 : 500

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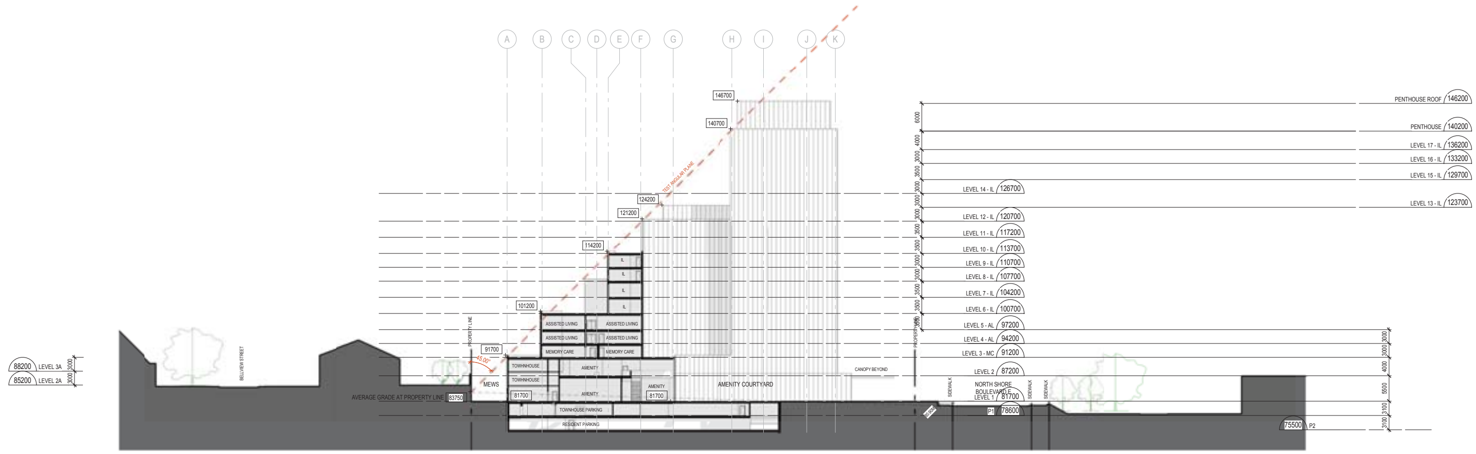
Burlington, ON L7S 1C3

BUILDING ELEVATIONS

scale:	1 : 500
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

drawing number:

A4.01



1 A5.01 BUILDING SECTION - NORTH / SOUTH 1

1 : 500

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Amica North Shore

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BUILDING SECTIONS

scale:	1 : 500
drawn by:	NA
reviewed by:	KH
job number:	17099
plot date:	2018-09-11

drawing number:

A5.01

Appendix B

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for 2-sided printing purposes

North Shore Blvd @ QEW East Ramp

Annual Average Daily Traffic Diagram

Total Factor = Monthly Factor(1.02) x Daily Factor(1.02) x 24 Hour Factor(1.85) = 1.924740

Municipality: Burlington
Site #: 0000201394
Intersection: North Shore Blvd & QEW E Ramp
TFR File #: 7
Count date: 11-Apr-2016

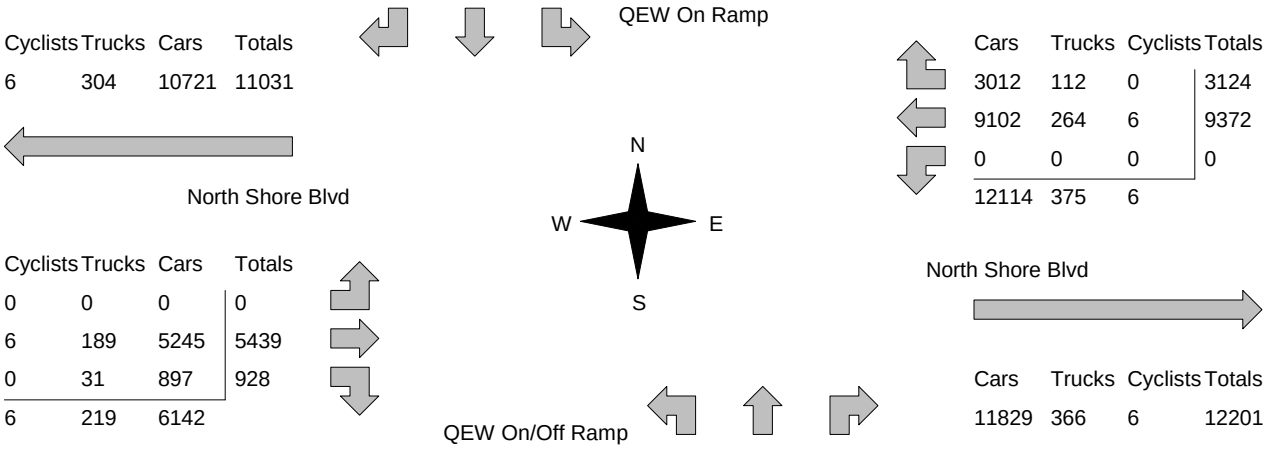
Weather conditions:
Overcast/Wet

Person(s) who counted:
Rick W

**** Signalized Intersection ****

Major Road: North Shore Blvd runs W/E

North Leg Total:	3124			
North Entering:	0			
North Peds:	8			
Peds Cross:	⋈			
Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	
Cyclists	0			
Trucks	112			
Cars	3012			
Totals	3124			
East Leg Total:	24696			
East Entering:	12495			
East Peds:	2			
Peds Cross:	⧖			



Peds Cross:	⧖			
West Peds:	2			
West Entering:	6367			
West Leg Total:	17398			
Cars	897			
Trucks	31			
Cyclists	0			
Totals	928			
Cars	1619	0	6585	8203
Trucks	40	0	177	217
Cyclists	0	0	0	0
Totals	1659	0	6762	
Peds Cross:	⋈			
South Peds:	13			
South Entering:	8421			
South Leg Total:	9348			

Comments

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for 2-sided printing purposes

iCorridor

gov.on.ca/icorridor/WebPages/Map/FundyViewer.aspx?accepted=true

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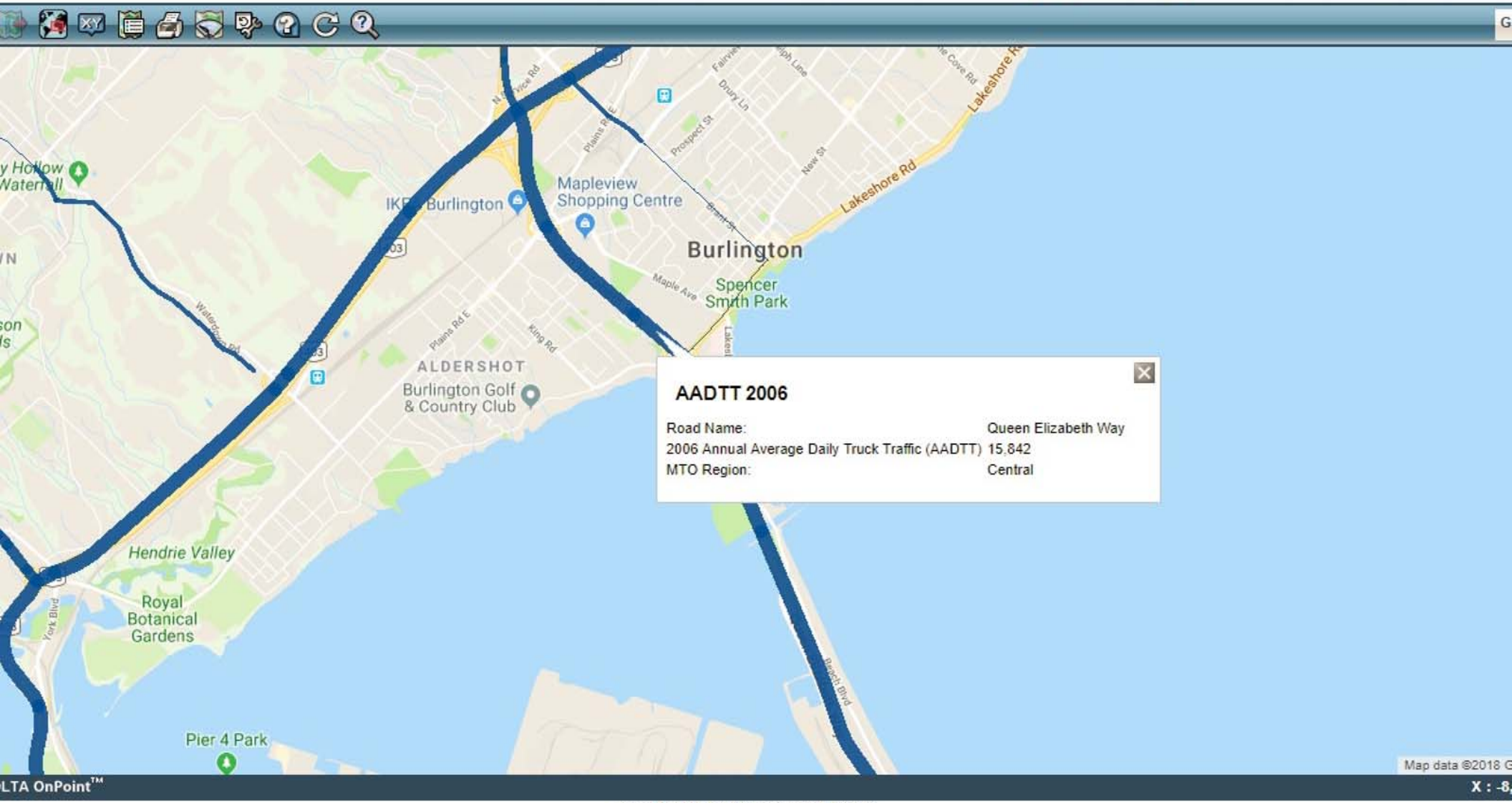
NSPORTATION

Transit Planning | Land Use Planning | Travel Speed & Per ... | Transportation Pla ... | Provincial Highway | More Maps » | Select



LTA OnPoint™

X : -8

iCorridor - Google Ch... | Untitled - Google Chr | Provincial Highways ... | Traffic Data | Traffic Data

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 2028	Auto %	Med %	Hvy %	Auto	Med	Heavy	Road Gradient (%)	Cadna/A Ground Absorption G	PWL (dBA)	Source Height, s (m)
QEW_NB	QEW NB	Daytime	100	16	82768	88.3%	2.9%	8.8%	73084	2421	7263	0	0.00	**98.0**	**1.7**
QEW_SB	QEW SB	Daytime	100	16	82768	88.3%	2.9%	8.8%	73084	2421	7263	0	0.00	**98.0**	**1.7**
NS_EB_QEW_NBR	North Shore EB to QEW NB Ramp	Daytime	40	16	952	96.7%	1.8%	1.5%	920	17	14	0	0.00	**66.2**	**1.1**
NS_WB_QEW_NBR	North Shore WB to QEW NB Ramp	Daytime	50	16	3206	96.4%	1.9%	1.7%	3091	62	53	0	0.00	**73.8**	**1.1**
QEW_NBR_NS	QEW NB Offramp to North Shore	Daytime	60	16	8642	97.4%	1.4%	1.2%	8419	119	104	0	0.00	**79.1**	**1.0**
NS_EL_EB	North Shore East of Ramp EB	Daytime	60	16	12516	97.0%	1.6%	1.4%	12141	201	174	0	0.00	**81.0**	**1.1**
NS_EL_WB	North Shore East of Ramp WB	Daytime	60	16	12818	97.0%	1.6%	1.4%	12432	206	180	0	0.00	**81.2**	**1.1**
NS_WL_EB	North Shore West of Ramp EB	Daytime	60	16	6530	96.5%	1.9%	1.6%	6304	121	105	0	0.00	**78.5**	**1.1**
NS_WL_WB	North Shore West of Ramp WB	Daytime	60	16	11315	97.2%	1.5%	1.3%	11003	166	146	0	0.00	**80.4**	**1.1**
QEW_NB	QEW NB	Nighttime	100	8	9196	88.3%	2.9%	8.8%	8120	269	807	0	0.00	**91.5**	**1.7**
QEW_SB	QEW SB	Nighttime	100	8	9196	88.3%	2.9%	8.8%	8120	269	807	0	0.00	**91.5**	**1.7**
NS_EB_QEW_NBR	North Shore EB to QEW NB Ramp	Nighttime	40	8	106	96.7%	1.8%	1.5%	102	2	2	0	0.00	**59.7**	**1.1**
NS_WB_QEW_NBR	North Shore WB to QEW NB Ramp	Nighttime	50	8	356	96.4%	1.9%	1.7%	343	7	6	0	0.00	**67.3**	**1.1**
QEW_NBR_NS	QEW NB Offramp to North Shore	Nighttime	60	8	960	97.4%	1.4%	1.2%	935	13	12	0	0.00	**72.6**	**1.0**
NS_EL_EB	North Shore East of Ramp EB	Nighttime	60	8	1391	97.0%	1.6%	1.4%	1349	22	19	0	0.00	**74.5**	**1.1**
NS_EL_WB	North Shore East of Ramp WB	Nighttime	60	8	1424	97.0%	1.6%	1.4%	1381	23	20	0	0.00	**74.6**	**1.1**
NS_WL_EB	North Shore West of Ramp EB	Nighttime	60	8	726	96.5%	1.9%	1.6%	700	13	12	0	0.00	**72.0**	**1.1**
NS_WL_WB	North Shore West of Ramp WB	Nighttime	60	8	1257	97.2%	1.5%	1.3%	1223	18	16	0	0.00	**73.9**	**1.1**

BPN 56 Calculation Procedure - Required Glazing STC Rating (Fixed Veneer) - ROADWAY

Receptor ID	Receptor Description	Sound Levels			Room / Façade Inputs					Source Inputs		Veneer - Component 1		Glazing - Component 2	
		Façade Sound Level: (dBA)	Free - field Corr: (dBA)	Req'd Indoor Sound Level: (dBA)	Glazing as % of Wall Area	Exp Wall Ht (m)	Exp Wall Length (m)	Room Depth (m)	Room Absorption:	Incident Sound Angle: (deg)	Spectrum type:	Veneer STC (STC)	Component Category:	Component Category:	Req'd Glazing STC (STC)
DAYTIME															
East Tower (Northwest Façade)	East Tower (Northwest Façade) - Living Room	69	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**27**
East Tower (Northwest Façade)	East Tower (Northwest Façade) - Bedroom	69	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**29**
East Tower (Southeast Façade)	East Tower (Southeast Façade) - Living Room	71	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**29**
East Tower (Southeast Façade)	East Tower (Southeast Façade) - Bedroom	71	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**32**
East Tower (Southwest Façade)	East Tower (Southwest Façade) - Living Room	72	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**
East Tower (Southwest Façade)	East Tower (Southwest Façade) - Bedroom	72	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**33**
Mid-rise Tower (Northwest Façade)	South Tower (Northwest Façade) - Living Room	71	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**29**
Mid-rise Tower (Northwest Façade)	South Tower (Northwest Façade) - Bedroom	71	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**32**
Mid-rise Tower (Southeast Façade)	South Tower (Southeast Façade) - Living Room	71	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**29**
Mid-rise Tower (Southeast Façade)	South Tower (Southeast Façade) - Bedroom	71	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**32**
Mid-rise Tower (Southwest Façade)	South Tower (Southwest Façade) - Living Room	74	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**32**
Mid-rise Tower (Southwest Façade)	South Tower (Southwest Façade) - Bedroom	74	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**35**
Podium (Northwest façade)	Podium (Northwest Façade) - Living Room	72	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**
Podium (Northwest façade)	Podium (Northwest Façade) - Bedroom	72	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**33**
Podium (Southeast façade)	Podium (Southeast Façade) - Living Room	72	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**
Podium (Southeast façade)	Podium (Southeast Façade) - Bedroom	72	3	45	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**33**
NIGHT-TIME															
East Tower (Northwest Façade)	East Tower (Northwest Façade) - Living Room	62	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**20**
East Tower (Northwest Façade)	East Tower (Northwest Façade) - Bedroom	62	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**27**
East Tower (Southeast Façade)	East Tower (Southeast Façade) - Living Room	64	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**22**
East Tower (Southeast Façade)	East Tower (Southeast Façade) - Bedroom	64	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**29**
East Tower (Southwest Façade)	East Tower (Southwest Façade) - Living Room	65	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**23**
East Tower (Southwest Façade)	East Tower (Southwest Façade) - Bedroom	65	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**
Mid-rise Tower (Northwest Façade)	South Tower (Northwest Façade) - Living Room	64	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**22**
Mid-rise Tower (Northwest Façade)	South Tower (Northwest Façade) - Bedroom	64	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**29**
Mid-rise Tower (Southeast Façade)	South Tower (Southeast Façade) - Living Room	65	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**23**
Mid-rise Tower (Southeast Façade)	South Tower (Southeast Façade) - Bedroom	65	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**
Mid-rise Tower (Southwest Façade)	South Tower (Southwest Façade) - Living Room	67	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**25**
Mid-rise Tower (Southwest Façade)	South Tower (Southwest Façade) - Bedroom	67	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**33**
Podium (Northwest façade)	Podium (Northwest Façade) - Living Room	65	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**23**
Podium (Northwest façade)	Podium (Northwest Façade) - Bedroom	65	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**
Podium (Southeast façade)	Podium (Southeast Façade) - Living Room	65	3	45	70%	2.8	3.0	6.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**23**
Podium (Southeast façade)	Podium (Southeast Façade) - Bedroom	65	3	40	50%	2.8	3.0	3.0	Intermediate	0 - 90	D. mixed road traffic, distant aircraft	43	D. sealed thick window, or exterior wall, or roof/ceiling	C. sealed thin window, or openable thick window	**30**

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Appendix C

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Warning Clauses

The following warning clause must be included in agreements registered on Title and included in all agreements of purchase and sale or lease and all rental agreements for the development:

Transportation Noise Sources

MOECC Type B: "Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment"

MOECC Type C: "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 and Climate Change."

MOECC Type D: "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 and Climate Change."