

February 5, 2018

Regional Municipality of Waterloo
Planning, Development and Legislative Services Department
150 Frederick Street
Kitchener, Ontario
N2G 4J3

Attn: Brenna MacKinnon

bmackinnon@regionofwaterloo.ca

**Re: Surrounding Stationary Noise Addendum
80 King & 87 Reginal Street, Waterloo, Ontario
Novus File No. 16-0379**

1.0 Introduction

Novus Environmental Inc. (Novus) was retained by 1106804 Ontario Ltd to determine potential mitigation options for the surrounding stationary noise sources predicted to impact the 80 King & 87 Regina Street development. The proposed development is located in Waterloo Ontario and is primarily surrounded by commercial and office buildings.

Novus previously assessed stationary noise impacts on the 80 King & 87 Regina Street development in our report dated April 27, 2017 (2017 Noise Study). In the 2017 Noise Study, surrounding stationary noise impacts were compared to the increased ambient levels from surrounding roadways. The stationary noise impacts were predicted to exceed the daytime/evening guideline limits by up to 10 dBA on the proposed development during the evening hours of the day. Night-time noise impacts are not anticipated, as the adjacent commercial buildings are expected to be unoccupied with the HVAC units off. In addition, the adjacent kitchen exhaust fan is expected to be shut down by 10 pm, based on the restaurant hours of operation.

In the 2017 Noise Study, the NPC-300 guideline limits were expected to be met at the development for the surrounding stationary noise sources, based on the current zoning allowance (C8 – Commercial Eight) and residential uses above the 1st floor. No additional mitigation was

recommended, based on the requirement for the existing stationary sources to meet the MOECC NPC noise guideline limits at C8 zoned lands. This requirement is outlined in the Region of Waterloo Noise Bylaw Number 2010-073.

As requested by the RMOW, the following is a summary of the potential noise mitigation measures for reducing surrounding stationary noise impacts to levels that meet the applicable guideline limits.

2.0 Recommended Stationary Noise Controls

Based on the initial assessment of stationary impacts, excesses are predicted on the west, south and east facades of the proposed development (refer **Figure 1**). The primary noise sources contributing to the guideline limit excess are the adjacent building Kitchen Exhaust Fan, rooftop Air Handling + Cooling units and HVAC units of the buildings located on the adjacent buildings. The locations of these sources are shown in **Figure 2**. A summary of the source sound level data is included in **Appendix A**.

The following is discussion of the possible noise mitigation measures for the above sources, which are also summarized in **Figure 2**.

2.1 Kitchen Exhaust Fan

The kitchen exhaust fan on the adjacent building is the dominant source contributing to excesses along the west façade of the development. For the level of excess, an acoustic silencer with an overall reduction of 17 dBA is considered to be sufficient and readily achievable. Following a more detailed inspection of the unit, an acoustic enclosure for the fan casing may also be required.

2.2 Surrounding AHU + Cooling and HVAC Units

An assessment of the adjacent rooftop AHU + Cooling and HVAC units were assessed based on generic sound level data on file at Novus. Actual noise emission levels should be quantified for the surrounding mechanical equipment. In addition, any existing noise control measures (e.g. installation of low noise fans, actual duty cycling, etc.) should be documented and included in the assessment. Should actual noise emission levels be obtained, the following noise mitigation measures should be reviewed and revised, as necessary.

Building to South

Two (2) packaged rooftop HVAC units on the adjacent building to the south are predicted to impact the proposed development along the south facade. Overall reductions of 7 dBA are required, resulting in a maximum unit Sound Power Level (PWL) of 75 dBA for each unit.

This can be achieved through either of the following:

1. Installation of low noise fans/silencer banks, compressor blankets and/or pipe wrapping for an overall reduction of 7 dBA;
2. Replacement of unit with a low-noise model at the end of the useable life-span of the unit, with a maximum PWL of 75 dBA required for each unit.

Building to the East

The west façade of the proposed development is primarily impacted by four (4) rooftop AHU + Cooling units and one (1) HVAC unit are shown to require noise mitigation. An overall reduction of 9 dBA is required for each unit. This is equivalent to a maximum overall PWL of 91 dBA for the AHU + Cooling units on main rooftop, and 86 dBA for the HVAC unit on the cylindrical portion of the building. As with the above building to the south, this can be achieved with either of the following:

1. Installation of low noise fans/silencer banks, compressor blankets and/or pipe wrapping for an overall reduction of 9 dBA; or
2. Replacement of unit with a low-noise model at the end of the useable life-span of the units, with a maximum PWL of 90 dBA for main roof units and 85 dBA for cylindrical building rooftop unit.

3.0 Modelled Noise Impacts

Mitigated impacts are shown in **Figure 3** as excesses of the guideline limits along the facades of the development for the daytime/evening periods. **Figure 4** shows the mitigated noise impacts within the development's 7th floor amenity space.

Following the inclusion of the noise mitigation measures outlined above, the applicable guideline limits are predicted to be met at the proposed development.

4.0 Recommended Noise Warning Clause

Since the surrounding stationary noise sources are anticipated to be audible at times, a **Type E** warning clause should be included in agreements registered on Title for the residential units, and included in agreements of purchase and sales. The recommended MOECC NPC-300 **Type E** warning clause is outlined below:

“Purchasers/Tenants are advised that due to the proximity of the adjacent commercial/office buildings, noise from these commercial/office buildings may at times be audible.”

5.0 Conclusions

Noise mitigation measures were recommended for the surrounding stationary sources impacting the proposed development. This includes a kitchen exhaust fan, AHU + Cooling units and packaged HVAC units on the adjacent surrounding buildings.

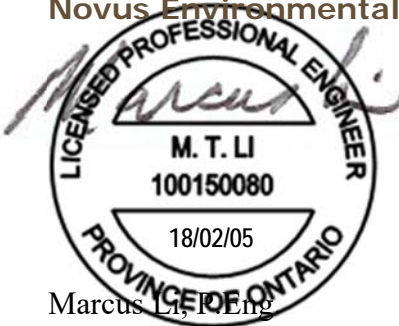
Based on the above results, the stationary noise impacts from the surroundings can be sufficiently reduced with achievable noise mitigation measures. Following the inclusion of the recommended mitigation measures, the NPC-300 guideline limits are predicted to be met at the proposed development. A **Type E** warning clause should be included in agreements registered on Title and agreements of purchase and sales.

Since the sound level data used for the adjacent building AHU + Cooling unit and HVAC units are generic, actual noise emission levels should be quantified. Following an update with actual equipment sound level data, the recommended mitigation measures should be reviewed and potentially revised by an Acoustical Consultant.

Should you have any questions on the above, please do not hesitate to contact me.

Sincerely,

Novus Environmental Inc.



Marcus Li, P. Eng.
Specialist

Figures

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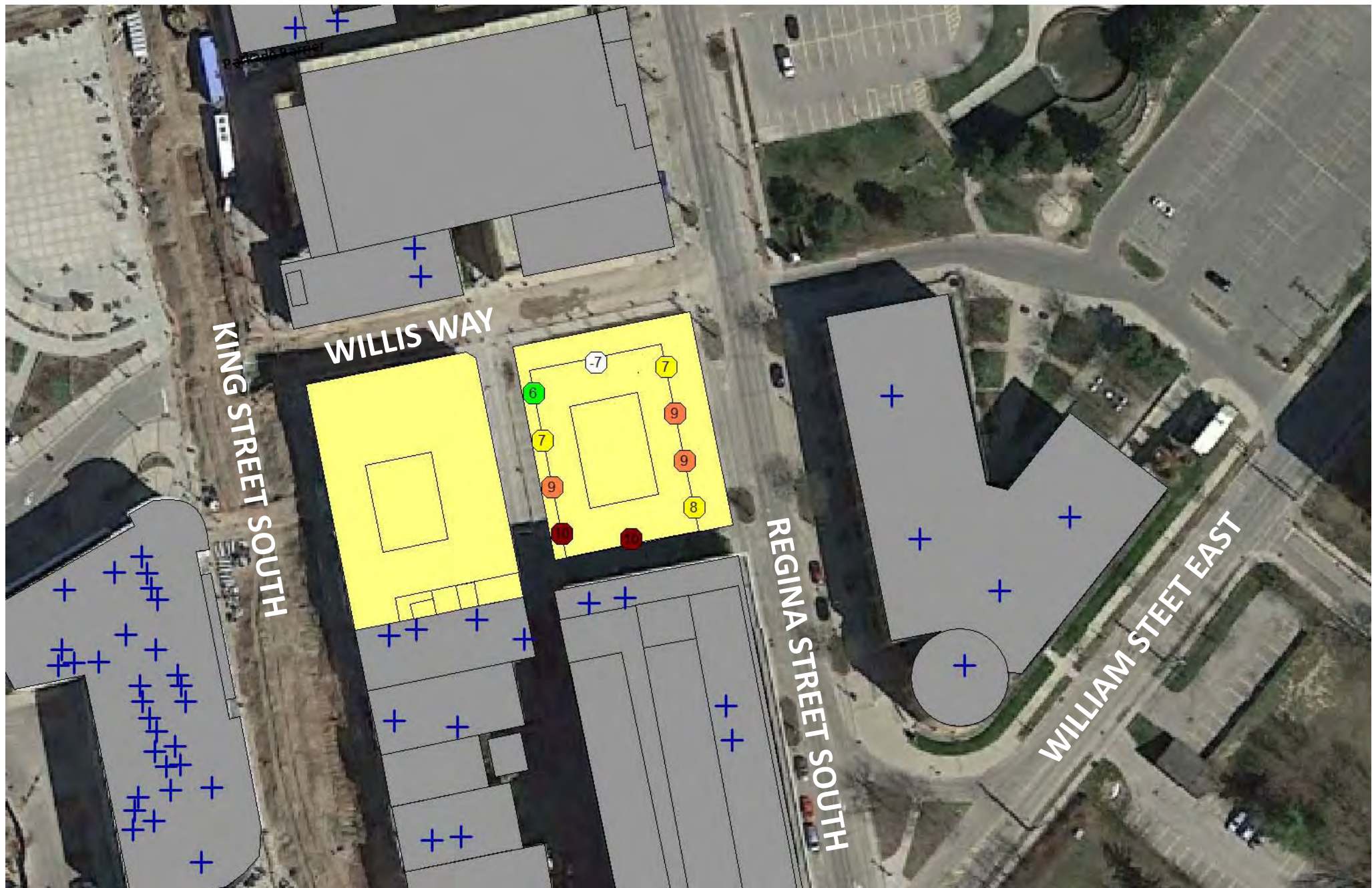


Figure No. 1

**Modelled Facade Level Excess (Unmitigated)
Surrounding Stationary Noise, Daytime/Evening**

16-0379 80 King / 87 Regina
Waterloo, Ontario



True
North

Scale: 1: 1,000

Date: 18/01/16

File No.: 16-0379

Drawn By: MTL



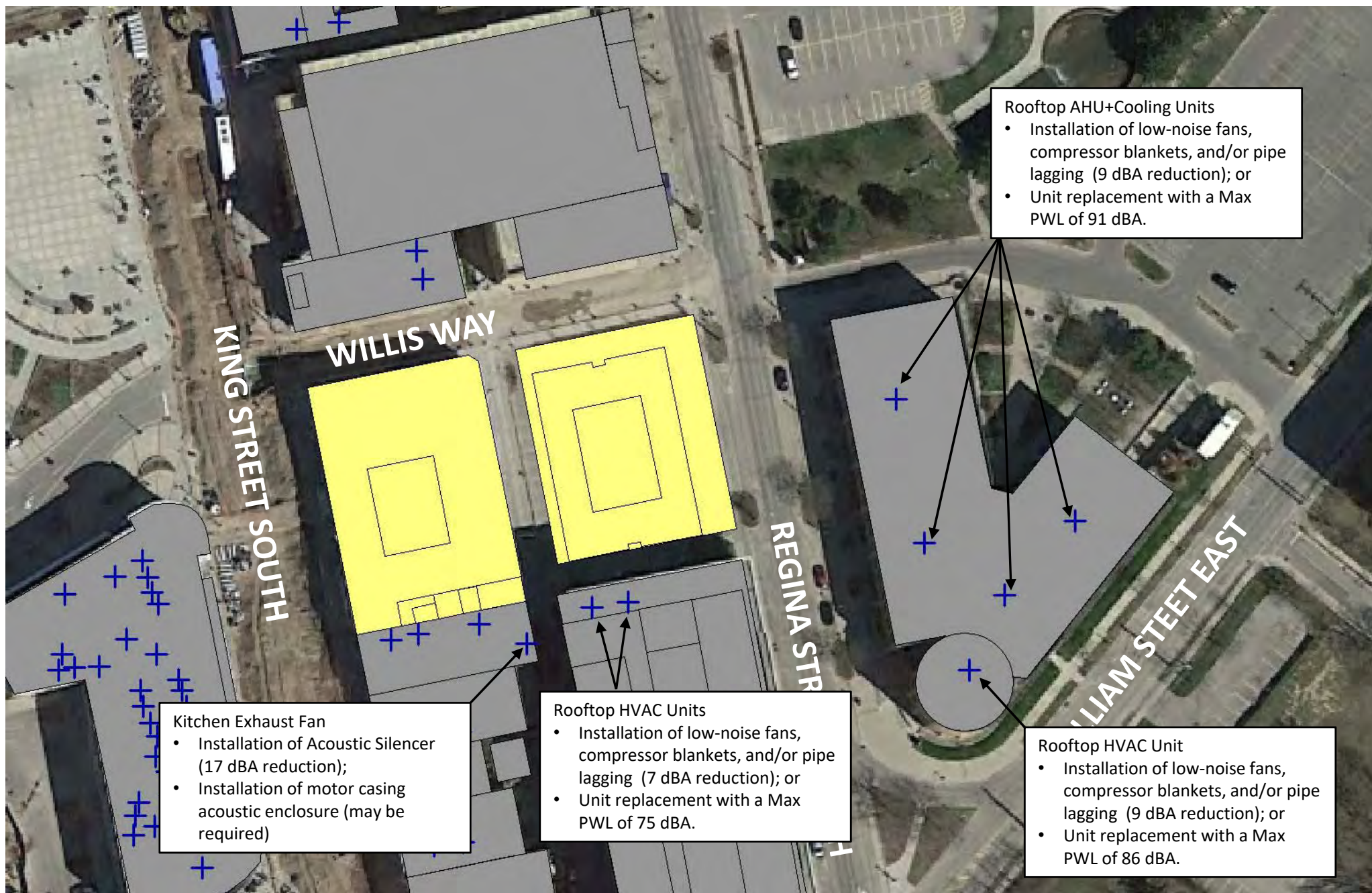
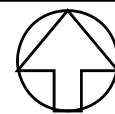


Figure No. 2
Summary of Noise Mitigation Measure Options

16-0379 80 King / 87 Regina
 Waterloo, Ontario



True North

Scale: 1: 1,000

Date: 18/01/16

File No.: 16-0379

Drawn By: MTL



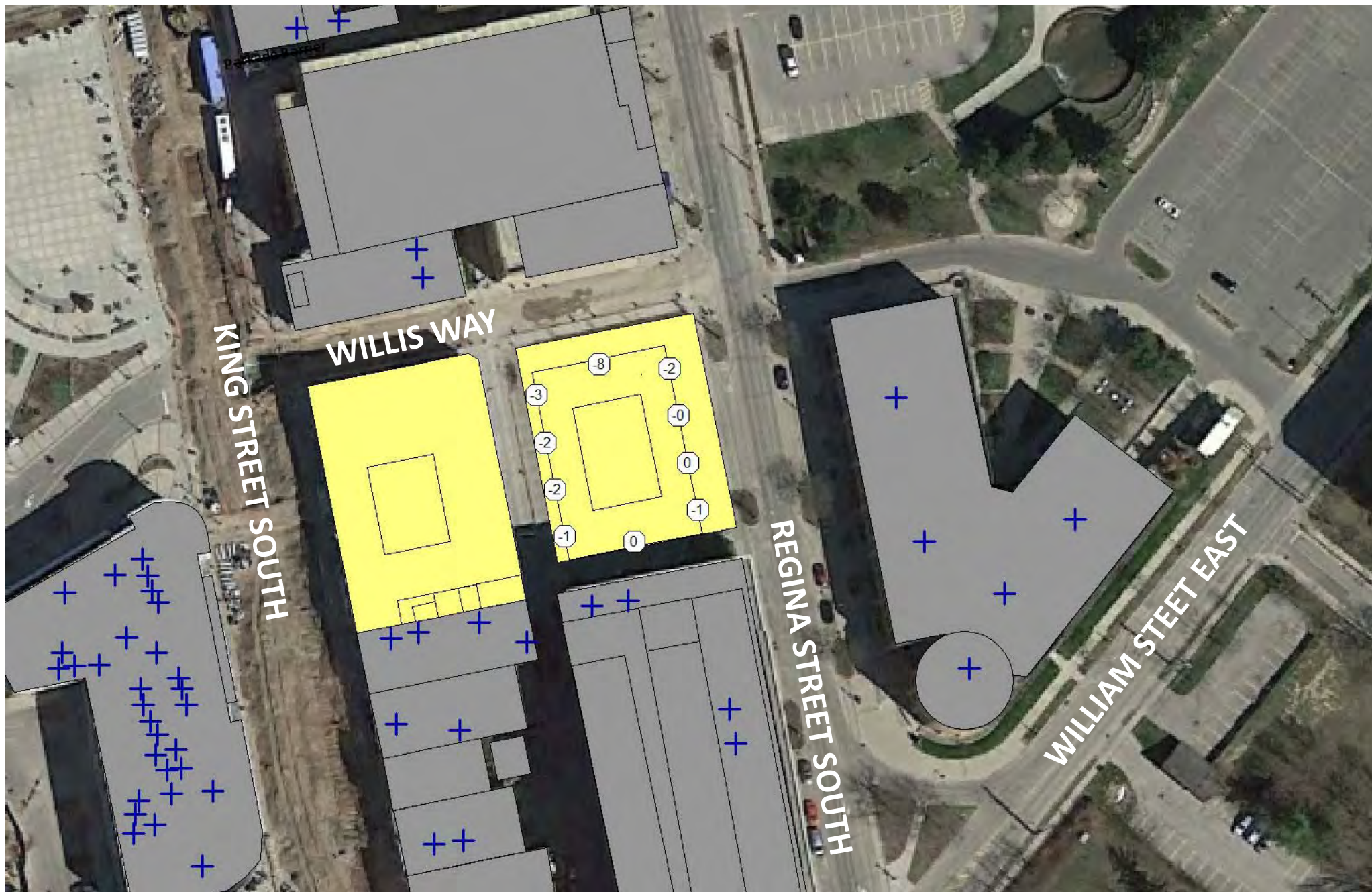
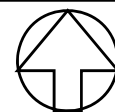


Figure No. 3

**Modelled Facade Level Excess (Mitigated)
Surrounding Stationary Noise, Daytime/Evening**

16-0379 80 King / 87 Regina
Waterloo, Ontario



True
North

Scale: 1: 1,000

Date: 18/01/16

File No.: 16-0379

Drawn By: MTL



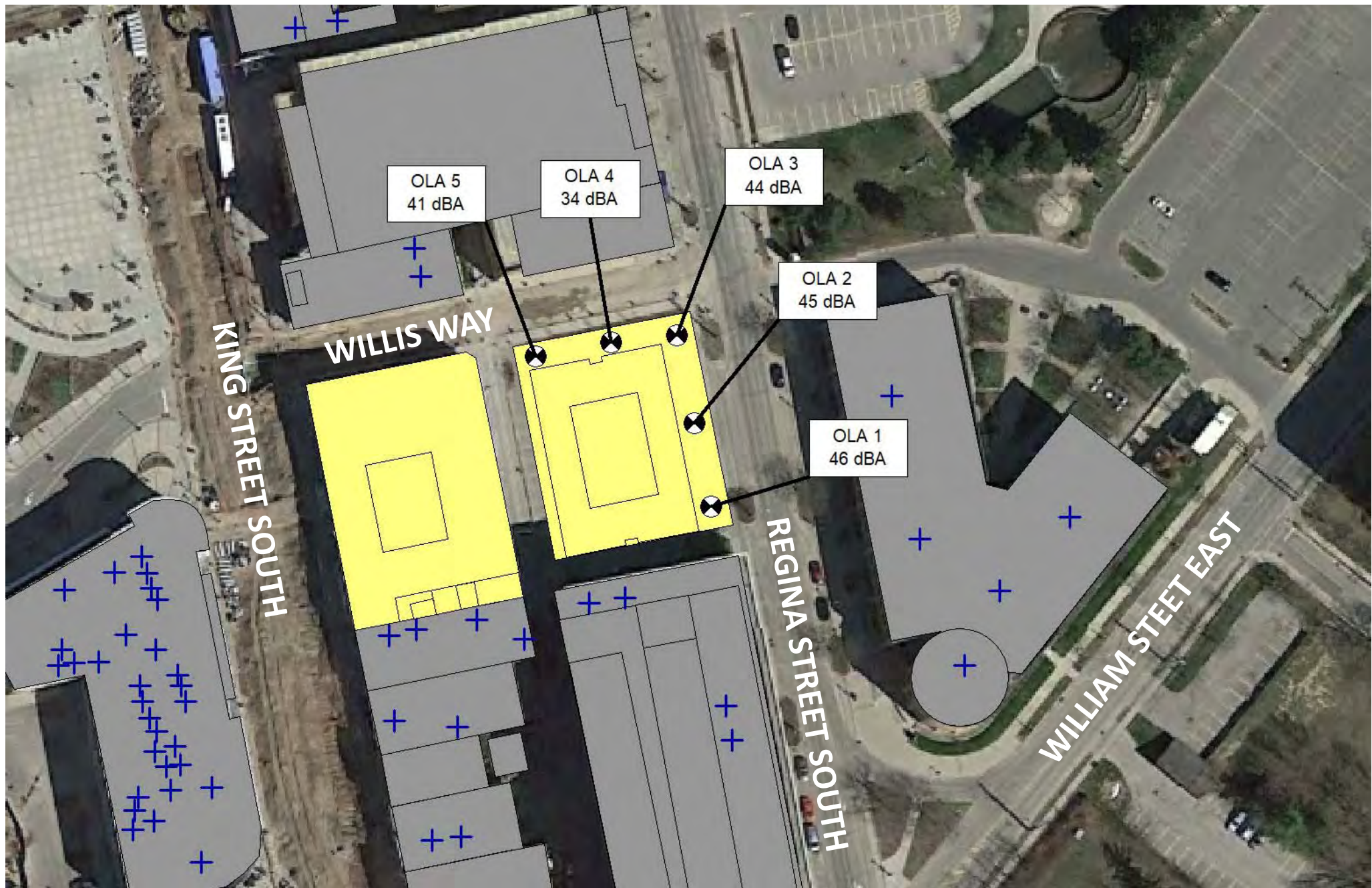
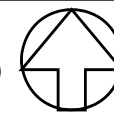


Figure No. 4

**Modelled Amenity Space Sound Levels (Mitigated)
Surrounding Stationary Noise, Daytime/Evening**

16-0379 80 King / 87 Regina
Waterloo, Ontario



True
North

Scale: 1: 1,000

Date: 18/01/16

File No.: 16-0379

Drawn By: MTL



Appendix A

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Table A.1: Summary of Noise Source Sound Power Levels

Source Description	Calculated Sound Power Levels (1/1 Octave Band Levels, dBA)									Total PWL (dBA)	Notes
	32	63	125	250	500	1000	2000	4000	8000		
Surrounding Buildings											
HVAC - 5 ton	77	80	81	81	80	78	74	70	64	82.5	- Novus historical data - 30 min duty cycle during daytime and evening periods - off during night-time period for commercial buildings
HVAC - 15 ton	90	93	94	94	93	91	87	83	77	95.5	- Novus historical data - 30 min duty cycle during daytime and evening periods - off during night-time period for commercial buildings
HVAC - 20 ton	92	95	96	96	95	93	89	85	79	97.5	- Novus historical data - 30 min duty cycle during daytime and evening periods - off during night-time period for commercial buildings
AHU + Cooling - 30 ton	94	97	98	98	97	95	91	87	81	99.5	- Novus historical data - 30 min duty cycle during daytime and evening periods - off during night-time period for commercial buildings
HVAC - Carrier 48TCE		86	84	81	79	76	73	68	65	81.4	- Manufacturer's data - 30 min duty cycling during daytime and evening periods - off during night-time period for commercial buildings
HVAC - Carrier 48TJE		57	76	72	73	75	75	71	69	80.5	- Manufacturer's data - 30 min duty cycling during daytime and evening periods - off during night-time period for commercial buildings
Kitchen Exhaust	102	98	99	100	99	99	92	84	75	101.9	- measured on-site - in use during daytime/evening hours only (per business hrs)

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