

# Heritage Hills Gas Station and Retail Plaza - Noise Impact Study Report

Trimterra Development Corporation

Project Number: 60546152

February 14, 2019

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AECOM: 2015-04-13

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### Quality information

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### Revision History

Revision	Revision date	Details	Name	Position
0	14/02/2019	Initial Issue	Brian Bulnes	Acoustic Engineer

### Distribution List

# Hard Copies	PDF Required	Association / Company Name
	X	Trimterra Development Corporation

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# Executive Summary

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AECOM Canada Limited (AECOM) has been retained by the Trimterra Development Corporation to prepare a Noise Impact Study for the Heritage Hills Plaza (the Plaza) proposed to be located at 471 Terry Fox Drive, in Ottawa, Ontario, Canada. The Plaza will contain two retail buildings, and a gas station with an automated car wash. The purpose of this report is to evaluate the compliance status of the Plaza with the *City of Ottawa Environmental Noise Control Guidelines*, *City of Ottawa Noise By-law 2017-255*, and *Ministry of the Environment, Conservation and Parks (MECP) NPC-300* noise guideline.

With the noise barrier and delivery and car wash operation restrictions described in Section 2 implemented, the results of the assessment indicate that the noise levels at the assessed points of reception, due to future Plaza operations, are expected to comply with the applicable sound level limits.

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# 1. Introduction

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AECOM Canada Limited (AECOM) has been retained by the Trimterra Development Corporation to prepare a Noise Impact Study for the Heritage Hills Plaza (the Plaza) proposed to be located at 471 Terry Fox Drive, in Ottawa, Ontario, Canada. The Plaza will contain two retail buildings, and a gas station with an automated car wash.

The purpose of this report is to evaluate the compliance status of the Plaza with the *City of Ottawa Environmental Noise Control Guidelines*, *City of Ottawa Noise By-law 2017-255*, and *Ministry of the Environment, Conservation and Parks (MECP) NPC-300* noise guideline. Appendix A presents a glossary of relevant acoustic terms used in this report.

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## 2. Site Description

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The Plaza is planned to be located at 471 Terry Fox Drive, on the northwest corner of the Terry Fox Drive and Kanata Avenue intersection, in Ottawa, Ontario, Canada. The areas immediately surrounding the Plaza are zoned for residential and outdoor recreational use.

The Plaza will contain a Shell gas station facility with an automated car wash, parking lot, and two retail buildings. Example uses for these buildings (per zoning allowances) can include but are not limited to: restaurants, offices, personal services, convenience stores, retail stores, or banks.

The site is expected to limit refrigerated truck deliveries to only during the day and evening periods (7:00AM – 11:00PM), and a 5.5 metre high noise barrier will be installed around the parking space where a truck will idle. The location of the parking space and noise barrier details are presented in Figures 1 and 3.

The Plaza facilities are planned to operate 24 hours a day, 7 days a week. The exception to this is the car wash, which will not operate during the night time hours (11:00PM – 7:00AM). Figure 1 presents a site plan of the Plaza, and Figure 2 presents a relevant land use plan of the area.

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## 3. Noise Source Summary

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The significant noise sources expected at the Plaza include the following:

- Car wash dryer fan noise (with silencer kits installed);
- Roof top units for retail buildings 1 and 2; and
- Refrigerated/non-refrigerated truck idling.

Noise source emissions were established using manufacturer sound level data, published data from acoustic textbook resources, or previous project data. Sound level details are provided in Table 5 (Tables section), and Appendices B and D.

It should be noted that while NPC-300 explicitly excludes car wash noise from stationary source assessments, both the City of Ottawa Environmental Noise Control Guidelines and By-law 2017-255 require car wash noise to be considered. The significant noise associated with the car wash occurs during the drying of the vehicle, where fan noise will emit through the south exit door as the car exits. The entrance doors are closed during the drying process.

Noise sources associated with the gas station (such as comfort heating equipment) are considered exempt from both City of Ottawa and NPC-300 guidelines, and have been excluded from the assessment. In addition, NPC-300 (and by extension, City of Ottawa Noise Control Guidelines) excludes the occasional movement of delivery vehicles to commercial facilities such as convenience stores, restaurants, or similar facilities. As such, only the truck idling and associated refrigerated unit noise was assessed within the assigned parking area for delivery trucks.

## 4. Points of Reception

Residences to the north, west, and east of the Plaza have been identified as being representative of the worst case noise sensitive points of reception (PORs) near the Plaza. The worst case PORs were determined by creating noise contour plots and identifying the residences that received the highest noise contributions from the Plaza.

As per MECP Publication NPC-300, Plane of Window and Outdoor (e.g. backyard) Points of Reception (PORs) were assessed as follows:

- Plane of Window – A point in space corresponding with the centre location of a first storey window at a minimum height of 1.5 metres above grade; a second storey window at a minimum height of 4.5 metres above grade, or a third storey window at a minimum height of 7.5 metres above grade.
- Outdoor – A point in space within 30 metres of the dwelling, at a height of 1.5 metres above grade.

Figure 4 presents the POR locations relative to the Plaza. Table 1 describes each assessed location.

**Table 1: Assessed Points of Reception**

Point of Reception ID	Distance to Nearest Plaza Structure (m)	Point of Reception Location	Point of Reception Description	Location
R01_PoW	30	Plane of Window	Third storey window of detached home, at a height of 7.5 metres.	South of Ingersoll Crescent, northeast of the Plaza.
R01_Out	23	Outdoor	Rear property line of dwelling, at a height of 1.5 metres.	
R02_PoW	58	Plane of Window	Third storey window of detached home, at a height of 7.5 metres.	South of Ingersoll Crescent, northeast of the Plaza.
R02_Out	49	Outdoor	Rear property line of dwelling, at a height of 1.5 metres.	
R03_PoW	25	Plane of Window	Second storey window of detached home, at a height of 4.5 metres.	East of Tillsonburg Street, near the northwest corner of the Plaza property line.
R03_Out	27	Outdoor	Side property line of dwelling, at a height of 1.5 metres.	
R04_PoW	44	Plane of Window	Third storey window of detached home, at a height of 7.5 metres.	West of Tillsonburg Street, west of the Plaza.

Point of Reception ID	Distance to Nearest Plaza Structure (m)	Point of Reception Location	Point of Reception Description	Location
R04_Out	34	Outdoor	Corner property line of dwelling, at a height of 1.5 metres.	
R05_PoW	201	Plane of Window	Second storey window of detached home, at a height of 4.5 metres.	West of Insmill Crescent, east of the Plaza.
R05_Out	183	Outdoor	Rear property line of dwelling, at a height of 1.5 metres.	
R06_PoW	56	Plane of Window	Third storey window of detached home, at a height of 7.5 metres.	South of Ingersoll Crescent, northeast of the Plaza.
R06_Out	48	Outdoor	Rear property line of dwelling, at a height of 1.5 metres.	

## 5. Assessment Criteria

The noise from the Plaza is generated by stationary sources (i.e. a source of sound which normally operates within the property lines of a facility) as defined in both NPC-300 and the City of Ottawa Noise Control Guidelines. The subject area is defined as Class 2 (Urban), as per both applicable criteria.

The City of Ottawa guidelines adopt NPC-300's minimum sound level limits (labelled *Exclusion Limit* within NPC-300) for the noise emissions at plane of window and outdoor points of reception in Class 2 areas. These limits are summarized in Table 2.

**Table 2: Minimum MECP NPC-300 Sound Level Limits for Class 2 Areas**

Time Period	Point of Reception Location	Stationary Sources Minimum Sound Level Limit (One Hour Leq, dBA)
Daytime (7AM to 7PM)	Plane of Window	50
Evening (7PM to 11PM)	Plane of Window	50
Night time (11PM to 7AM)	Plane of Window	45
Daytime (7AM to 7PM)	Outdoor	50
Evening (7PM to 11PM)	Outdoor	45
Night time (11PM to 7AM)	Outdoor	Not Applicable

The sound level limit objective at each point of reception is determined in accordance with NPC-300 and is the greater of either:

- The minimum background sound level that occurs or is likely to occur during operation of the source under assessment; or
- The applicable minimum sound level limit, as indicated in Table 2 (Table B-1 within Publication NPC-300).

This assessment implemented lowest measured background noise levels as the objective sound level limits. Noise monitoring was conducted on Tillsonburg Street in order to assess minimum hourly equivalent levels ( $L_{eq,1hr}$ ) at a location representative of the nearest sensitive receptors. Periods with inclement weather (precipitation or wind speeds greater than 20 km/h) were excluded from analysis. As the monitoring location was closer to Terry Fox Drive than the nearby residences, the results were adjusted to estimate the background levels at the dwellings further away. The monitoring locations are presented in Appendix C.

The minimum measured hourly  $L_{eq}$  for day and evening periods were used as the objective sound level limits. As the minimum measured hourly  $L_{eq}$  for night time was slightly less than the NPC-300 minimum sound level limit for night time periods, the NPC-300 sound level limit has been used as the objective night time sound level limit. Resulting sound level limits for each receptor are presented in Table 3. Detailed background noise measurement data can be found in Appendix C.

**Table 3: Objective Sound Level Limits**

Receptor ID	MOECC Designation	Time Period	Receptor Type	Stationary Sources Sound Level Limit (One Hour $L_{eq}$ , dBA)
R01_PoW	Class 2	Daytime (7AM to 7PM)	Plane of Window	59
		Evening (7PM to 11PM)	Plane of Window	55
		Night time (11PM to 7AM)	Plane of Window	45
R01_Out	Class 2	Daytime (7AM to 7PM)	Outdoor	59
		Evening (7PM to 11PM)	Outdoor	55
R02_PoW	Class 2	Daytime (7AM to 7PM)	Plane of Window	59
		Evening (7PM to 11PM)	Plane of Window	55
		Night time (11PM to 7AM)	Plane of Window	45
R02_Out	Class 2	Daytime (7AM to 7PM)	Outdoor	59
		Evening (7PM to 11PM)	Outdoor	55
R03_PoW	Class 2	Daytime (7AM to 7PM)	Plane of Window	59
		Evening (7PM to 11PM)	Plane of Window	55
		Night time (11PM to 7AM)	Plane of Window	45
R03_Out	Class 2	Daytime (7AM to 7PM)	Outdoor	59
		Evening (7PM to 11PM)	Outdoor	55
R04_PoW	Class 2	Daytime (7AM to 7PM)	Plane of Window	59
		Evening (7PM to 11PM)	Plane of Window	55
		Night time (11PM to 7AM)	Plane of Window	45
R04_Out	Class 2	Daytime (7AM to 7PM)	Outdoor	59
		Evening (7PM to 11PM)	Outdoor	55
R05_PoW	Class 2	Daytime (7AM to 7PM)	Plane of Window	59
		Evening (7PM to 11PM)	Plane of Window	55
		Night time (11PM to 7AM)	Plane of Window	45
R05_Out	Class 2	Daytime (7AM to 7PM)	Outdoor	59
		Evening (7PM to 11PM)	Outdoor	55

Receptor ID	MOECC Designation	Time Period	Receptor Type	Stationary Sources Sound Level Limit (One Hour $L_{eq}$ , dBA)
R06_PoW	Class 2	Daytime (7AM to 7PM)	Plane of Window	59
		Evening (7PM to 11PM)	Plane of Window	55
		Night time (11PM to 7AM)	Plane of Window	45
R06_Out	Class 2	Daytime (7AM to 7PM)	Outdoor	59
		Evening (7PM to 11PM)	Outdoor	55

### City of Ottawa Noise By-law No. 2017-255

Ottawa Noise By-Law 2017-255 provides noise criteria that specifically applies to car wash operations. Relevant by-law sections are replicated below:

6. (1) *No person shall use or operate or cause to be used or operated any exhaust fan, exhaust system, intake fan, generators, dryer in a commercial car wash or similar device which includes combustion exhaust of a high efficiency furnace, the noise from which has a level greater than 50 dB(A) when measured at the point of reception.*

However, similar to NPC-300, the Ottawa by-law allows for background noise levels to be taken into consideration:

25. (2) *No person shall use or operate or cause to be used or operated any device, vehicle or equipment, the noise from which has a level greater than 5 dB(A) above ambient noise levels, provided that the ambient noise levels are greater than the specified maximum level for the device, vehicle or equipment in question.*

Although the by-law allows for sound levels of 5 dB(A) above ambient levels at a given point of reception, NPC-300/City of Ottawa Guidelines are more stringent and have been applied as the primary criteria within this report.

## 6. Impact Assessment

Sound power level data were used as inputs to the noise impact model. Noise impacts at the identified points of reception were predicted using the ISO 9613-2 (Reference 6) noise prediction algorithm, implemented in CadnaA noise prediction software. The resulting noise impacts at each assessed POR were then evaluated against the sound level limit objectives described in Section 5.

As mentioned in Section 3, refrigerated truck idling and car wash exit blowers were only modelled for day time and evening usage. Car wash durations have been estimated using similar Shell car wash footage, which shows that a single wash/dry cycle takes roughly 6 minutes and 30 seconds. During this time, the blower/exit doors are only open for approximately 2 minutes. As such, blower operations have been conservatively modelled as being active for 1/3<sup>rd</sup> (20 minutes) of the worst case hour (assumes constant traffic flow).

Ground elevation data for the area was implemented into the model using provided elevation drawings, which can be found in Appendix B.

The noise emissions produced by the Plaza operations were assessed. Table 4 presents noise impacts at each of the identified PORs from worst case Plaza operations.

**Table 4: Acoustic Assessment Summary Table**

Point of Reception ID	Point of Reception Location	Time Period	Predicted One Hour $L_{eq}$ Noise Level (dBA)	Verified by Acoustic Audit (Yes/No)	One Hour $L_{eq}$ Sound Level Basis of Assessment (dBA)	Compliance with Sound Level Limit (Yes/No)
R01_PoW	Plane of Window	Daytime	51	No	59	Yes
		Evening	51	No	55	Yes
		Night time	41	No	45	Yes
R01_Out	Outdoor	Daytime	51	No	59	Yes
		Evening	51	No	55	Yes
R02_PoW	Plane of Window	Daytime	52	No	59	Yes
		Evening	52	No	55	Yes
		Night time	43	No	45	Yes
R02_Out	Outdoor	Daytime	49	No	59	Yes
		Evening	49	No	55	Yes
R03_PoW	Plane of Window	Daytime	55	No	59	Yes
		Evening	55	No	55	Yes
		Night time	45	No	45	Yes
R03_Out	Outdoor	Daytime	53	No	59	Yes
		Evening	53	No	55	Yes
R04_PoW	Plane of Window	Daytime	47	No	59	Yes
		Evening	47	No	55	Yes
		Night time	41	No	45	Yes
R04_Out	Outdoor	Daytime	48	No	59	Yes
		Evening	48	No	55	Yes
R05_PoW	Plane of Window	Daytime	45	No	59	Yes
		Evening	45	No	55	Yes
		Night time	32	No	45	Yes
R05_Out	Outdoor	Daytime	47	No	59	Yes
		Evening	47	No	55	Yes
R06_PoW	Plane of Window	Daytime	52	No	59	Yes
		Evening	52	No	55	Yes
		Night time	43	No	45	Yes
R06_Out	Outdoor	Daytime	53	No	59	Yes
		Evening	53	No	55	Yes

Individual noise impacts from the modelled noise sources at each POR are presented in Table 6 and Table 7 (in the Tables section of this report). Sample noise modelling calculations are provided in Appendix D.

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## 7. Conclusions

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An acoustic assessment of the Heritage Hills Plaza has been completed. Noise levels were assessed against MECP NPC-300, City of Ottawa By-law 2017-255, and City of Ottawa Environmental Noise Control guidelines.

With the noise barrier and delivery and car wash operation restrictions described in Section 2 implemented, the results of the assessment indicate that the noise levels at the assessed points of reception, due to future Plaza operations, are expected to comply with the applicable sound level limits.

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## 8. References

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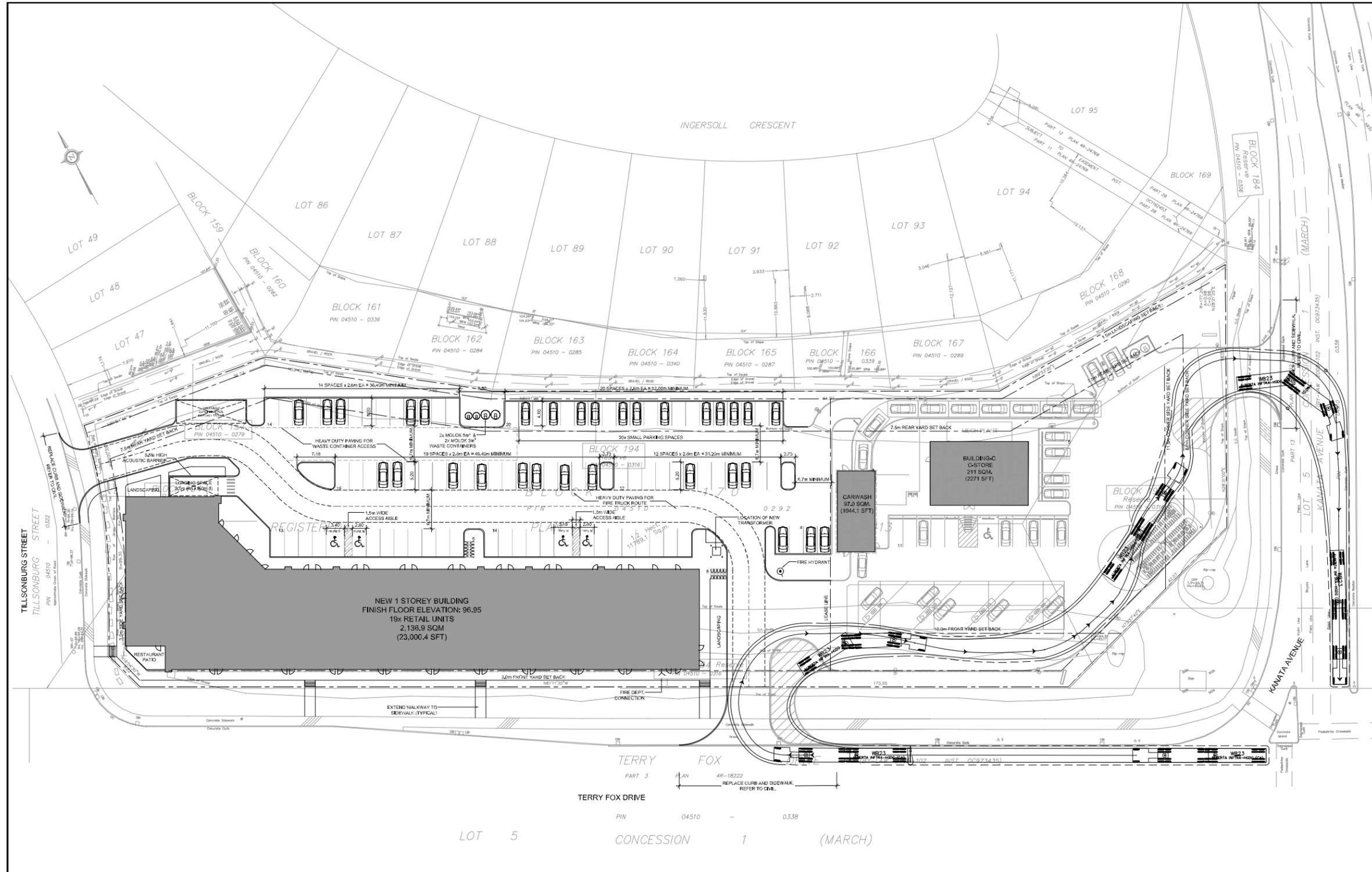
1. Ontario Ministry of the Environment, Conservation and Parks Noise Guideline Publication NPC-300: Stationary and Transportation Sources - Approval and Planning, August 2013.
2. City of Ottawa - Planning and Growth Management, Environmental Noise Control Guidelines, January 2016.
3. City of Ottawa – Noise By-law No. 2017-255, 2017.
4. International Organization for Standardization, ISO/R 1996-1971 (E), Assessment of Noise with Respect to Community Response, 1972.
5. Ontario Ministry of the Environment and Climate Change, Publication NPC-103: Procedures.
6. Ontario Ministry of the Environment and Climate Change, Publication NPC-104: Sound Level Adjustments.
7. Ontario Ministry of the Environment and Climate Change, Publication NPC-233: Information to be submitted for Approval of Stationary Sources of Sound, October 1995.
8. International Organization for Standardization, ISO 9613-2: Acoustics - Attenuation of Sound during Propagation Outdoors Part 2: General Method of Calculation, 1996.

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# Figures

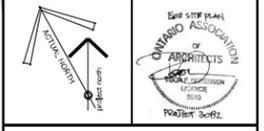
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**Figure 1: Site Plan**



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  - GENERAL CONTRACTOR TO TAKE INTO ACCOUNT CONSTRUCTION TRADES; GENERAL CONTRACTOR TO COORDINATE THE WORK OF DIFFERENT TRADES TO COMPLY WITH DESIGN INTENT.
  - ALL WORK DESCRIBED BY THESE DRAWINGS AND SPECIFICATIONS ARE TO COMPLY WITH THE CURRENT EDITION OF THE ONTARIO BUILDING CODE (2012) OR NATIONAL BUILDING CODE (2010) INCLUDING MOST RECENT AMENDMENTS.
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NO.	DESCRIPTION	DATE
01	FOR CIRCULATION	2019/01/11
02	FOR SITE PLAN APPLICATION	2019/02/01

**CLIENT:**  
7873794 CANADA INC  
45 HURON DRIVE, 2ND FLOOR  
NEPEAN, ONTARIO, K2E 7Y9  
DANIEL LAURIN  
TEL: 613-456-0272

**CONSULTANTS:**  
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OTTAWA, ONTARIO, K2M 1S6  
TEL: 613-294-9643

**PROJECT TITLE:**  
HERITAGE HILLS RETAIL  
411 TERRY FOX DRIVE  
OTTAWA, ONTARIO

**DRAWING TITLE:**  
SITE PLAN



**DRESSEN CARDINAL ARCHITECTS INC.**  
A GROUP OF ARCHITECTS  
1350 WELLINGTON ST. WEST OTTAWA ON K1Y 3C1  
WWW.ARCHITECTSDCA.COM 613.752.2294

DATE	DRAWN	JOB NO.	DRAWING NO.
01/2019	DRJ/EB	3082	A100
SCALE 1:500	REVIEWED TO		

ARCHITECTURAL

**GENERAL NOTES:**

- FOR PAVED SURFACES, GRADING, SITE SERVING, DRAINAGE GROSSION AND SEDIMENT CONTROL, REFER TO CIVIL DRAWINGS.
- FOR PLANTING DETAILS, REFER TO LANDSCAPE DRAWINGS.

**SITE + BUILDING DATA**

SITE AREA: 11,795.48m<sup>2</sup>  
GROSS FLOOR AREA: 2,136.9 + 97 + 211 = 2,444.9m<sup>2</sup>  
BUILDING HEIGHT(S): 7.214m  
GROSS LEASABLE AREA: 2,084.5 + 54 + 2 = 2,222.5m<sup>2</sup>

**1 GROSS FLOOR AREA (CITY OF OTTAWA ZONING BYLAW DEFINITION FOR THE PURPOSE OF DETERMINING PARKING REQUIREMENTS) MEANS THE TOTAL AREA OF EACH FLOOR, WHETHER LOCATED ABOVE, AT OR BELOW GRADE, MEASURED FROM THE INTERIORS OF OUTSIDE WALLS AND INCLUDING FLOOR AREA OCCUPIED BY INTERIOR WALLS AND FLOOR AREA CREATED BY BAY WINDOWS, BUT EXCLUDING:**

- FLOOR AREA OCCUPIED BY SHARED MECHANICAL SERVICE AND ELECTRICAL EQUIPMENT THAT SERVE THE BUILDING; (BY-LAW 2008-328)
- COMMON HALLWAYS, CORRIDORS, STAIRWELLS, ELEVATOR SHAFTS AND OTHER VOIDS, STEPS AND LANDINGS; (BY-LAW 2008-328)
- COMMON LAUNDRY, STORAGE AND WASHROOM FACILITIES THAT SERVE THE BUILDING OR TENANTS; (BY-LAW 2008-328)
- COMMON STORAGE AREAS THAT ARE ACCESSORY TO THE PRINCIPAL USE OF THE BUILDING; (BY-LAW 2008-328)
- COMMON AMENITY AREA AND PLAY AREAS ACCESSORY TO A PRINCIPAL USE ON THE LOT; AND (BY-LAW 2008-328)
- LIVING QUARTERS FOR A CARETAKER OF THE BUILDING. (SURFACE DE PLANCHER HORS OUVRE BRUTE).

**ZONING:** PART 10 - UNED USE, COMMERCIAL ZONES ZONE LC14(11) - LOCAL COMMERCIAL ZONE

**ZONING PROVISIONS:** LC - (SECTION 190)

**LOT AREA:** ADDITIONAL USES AND A CONVENIENCE STORE: 4,000m<sup>2</sup> OTHER NON-RESIDENTIAL USES: 1,800m<sup>2</sup>

**LOT WIDTH:** 30m MINIMUM

**SETBACKS:**

**FRONT YARD:** 3m MINIMUM  
10m MINIMUM - PUMP ISLANDS

**CORNER SIDE YARD:** 11.5m MINIMUM - PUMP ISLANDS  
6m MINIMUM - OTHER BUILDINGS AND STRUCTURES

**REAR YARD:** 6m MINIMUM

**INTERIOR SIDE YARD:** 3m MINIMUM

**BUILDING HEIGHT:** 12.0m MAXIMUM

**FLOOR SPACE INDEX:** NO MAXIMUM

**LANDSCAPING:**

ABUTTING A RESIDENTIAL ZONE: 3.0m MINIMUM  
ABUTTING A STREET: 3.0m MINIMUM  
AROUND A PARKING LOT: 1.5m MINIMUM

**PARKING, QUEUING AND LOADING PROVISIONS:**

**PARKING SECTION 1012:**  
LC - (SECTION 190)  
MINIMUM REQUIRED:  
3.4 PER 100m<sup>2</sup> OF GROSS FLOOR AREA + 83 PROVIDED 112  
96 FOR RETAIL DEVELOPMENT  
13 FOR CONVENIENCE STORE

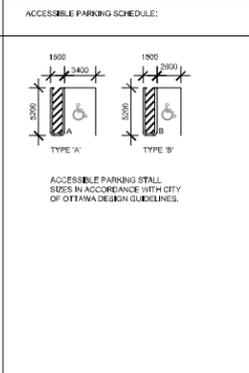
**BICYCLE PARKING SECTION 1110:**  
MINIMUM REQUIRED:  
1 PER 200m<sup>2</sup> OF GROSS FLOOR AREA + 10 PROVIDED 10

**LOADING SPACES SECTION 1113:**  
MINIMUM REQUIRED: 5, LC Zone, Services (1), PROVIDED 2

**PARKING FOR THE PHYSICALLY DISABLED (CITY OF OTTAWA ACCESSIBILITY DESIGN STANDARDS):**  
MINIMUM REQUIRED: 4, 2x TYPE A + 2x TYPE B PROVIDED 3, 3x TYPE A + 2x TYPE B

**DRAWING LEGEND:**

- PROPERTY LINE AND SETBACKS AS INDICATED
- FIRE ROUTE
- FIRE DEPARTMENT CONNECTION
- NEW FIRE HYDRANT
- MOUNTABLE CURB
- BICYCLE PARKING SPACE



**GENERAL NOTES:**

- GROSS FLOOR AREA (CITY OF OTTAWA ZONING BYLAW DEFINITION FOR THE PURPOSE OF DETERMINING PARKING REQUIREMENTS) MEANS THE TOTAL AREA OF EACH FLOOR, WHETHER LOCATED ABOVE, AT OR BELOW GRADE, MEASURED FROM THE INTERIORS OF OUTSIDE WALLS AND INCLUDING FLOOR AREA OCCUPIED BY INTERIOR WALLS AND FLOOR AREA CREATED BY BAY WINDOWS, BUT EXCLUDING:
- FLOOR AREA OCCUPIED BY SHARED MECHANICAL SERVICE AND ELECTRICAL EQUIPMENT THAT SERVE THE BUILDING; (BY-LAW 2008-328)
- COMMON HALLWAYS, CORRIDORS, STAIRWELLS, ELEVATOR SHAFTS AND OTHER VOIDS, STEPS AND LANDINGS; (BY-LAW 2008-328)
- COMMON LAUNDRY, STORAGE AND WASHROOM FACILITIES THAT SERVE THE BUILDING OR TENANTS; (BY-LAW 2008-328)
- COMMON STORAGE AREAS THAT ARE ACCESSORY TO THE PRINCIPAL USE OF THE BUILDING; (BY-LAW 2008-328)
- COMMON AMENITY AREA AND PLAY AREAS ACCESSORY TO A PRINCIPAL USE ON THE LOT; AND (BY-LAW 2008-328)
- LIVING QUARTERS FOR A CARETAKER OF THE BUILDING. (SURFACE DE PLANCHER HORS OUVRE BRUTE).

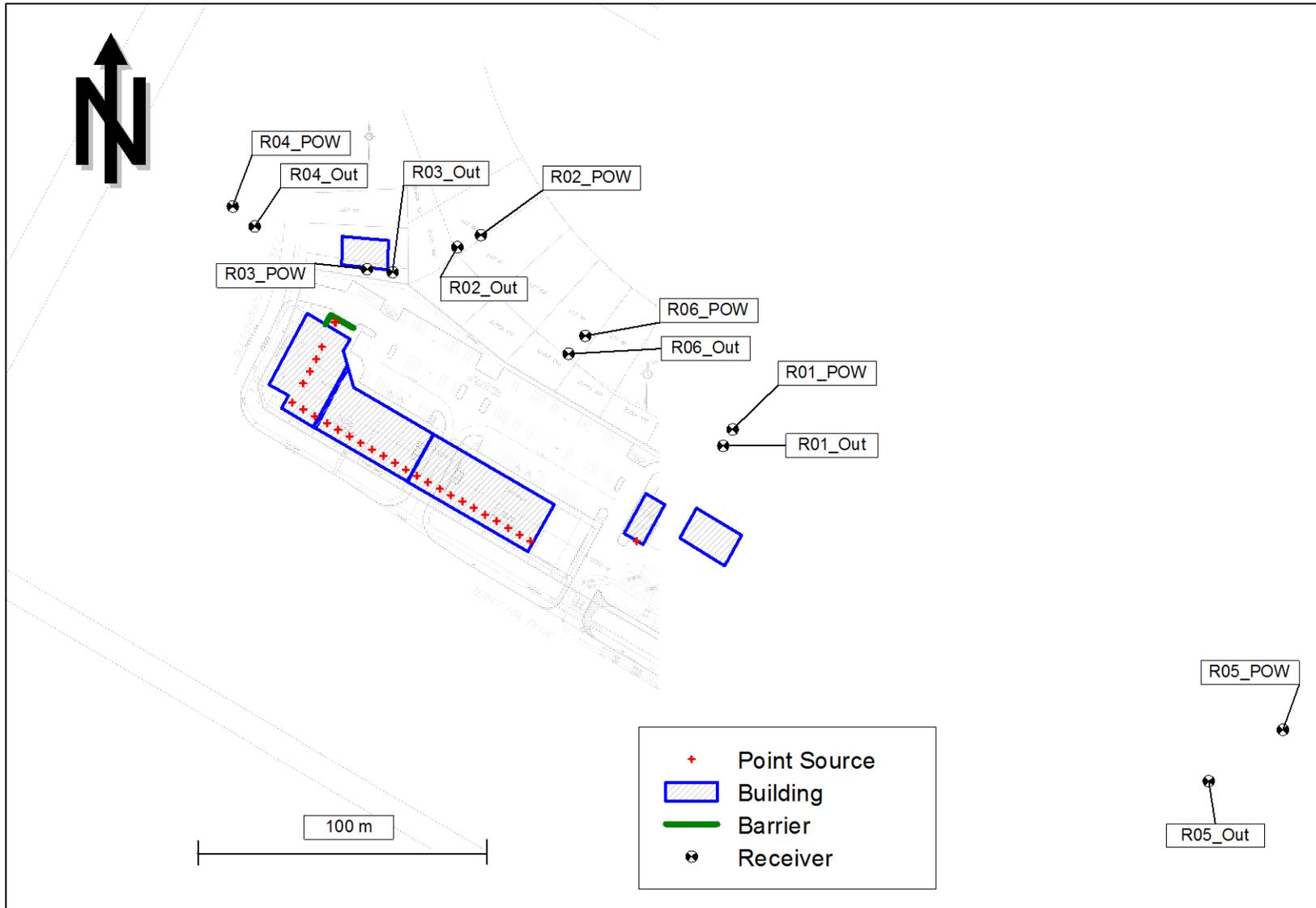
**Figure 2: Land Use Plan**



LC - Local Commercial Zone  
R1 - Residential First Density Zone  
R4 - Residential Fourth Density Zone  
O1 - Parks and Open Space Zone  
AG - Agricultural Zone



Figure 4: Point of Reception Locations



# Tables

**Table 5: Noise Source Summary**

Source ID	Description	Sound Power Level (dBA)	Source Location	Sound Characteristic <sup>3</sup>	Noise Control Measures <sup>4</sup>
3TonRTUa	3 Ton Rooftop Unit	77	O	S	U
3TonRTUb	3 Ton Rooftop Unit	77	O	S	U
3TonRTUc	3 Ton Rooftop Unit	77	O	S	U
3TonRTUd	3 Ton Rooftop Unit	77	O	S	U
3TonRTUe	3 Ton Rooftop Unit	77	O	S	U
3TonRTUf	3 Ton Rooftop Unit	77	O	S	U
3TonRTUg	3 Ton Rooftop Unit	77	O	S	U
3TonRTUh	3 Ton Rooftop Unit	77	O	S	U
3TonRTUi	3 Ton Rooftop Unit	77	O	S	U
3TonRTUj	3 Ton Rooftop Unit	77	O	S	U
3TonRTUk	3 Ton Rooftop Unit	77	O	S	U
3TonRTUl	3 Ton Rooftop Unit	77	O	S	U
3TonRTUm	3 Ton Rooftop Unit	77	O	S	U
3TonRTUn	3 Ton Rooftop Unit	77	O	S	U
3TonRTUo	3 Ton Rooftop Unit	77	O	S	U
3TonRTUp	3 Ton Rooftop Unit	77	O	S	U
3TonRTUq	3 Ton Rooftop Unit	77	O	S	U
3TonRTUr	3 Ton Rooftop Unit	77	O	S	U
3TonRTUs	3 Ton Rooftop Unit	77	O	S	U
3TonRTUt	3 Ton Rooftop Unit	77	O	S	U
3TonRTUu	3 Ton Rooftop Unit	77	O	S	U
3TonRTUv	3 Ton Rooftop Unit	77	O	S	U
5TonRTUa	5 Ton Rooftop Unit	77	O	S	U

Source ID	Description	Sound Power Level (dBA)	Source Location	Sound Characteristic <sup>3</sup>	Noise Control Measures <sup>4</sup>
<b>5TonRTUb</b>	5 Ton Rooftop Unit	77	O	S	U
<b>5TonRTUc</b>	5 Ton Rooftop Unit	77	O	S	U
<b>5TonRTUd</b>	5 Ton Rooftop Unit	77	O	S	U
<b>CWExit</b>	Car wash blowers with silencer kits installed – emits through open car wash exit only	108	O	S	S
<b>TruckIdle</b>	Idling Delivery Truck	90	O	S	B
<b>ReefCompressor</b>	Refrigerated unit compressor noise	97	O	S	B

## Notes to Table 5:

- Power level is referenced to  $10^{-12}$  Watts and is measured or predicted after applicable penalties are applied
- Source Location
  - O - Located/installed outside the building, including on roof
  - I - Located/installed inside the building
- Sound Characteristics
  - S - Steady
  - T - Tonal
- Existing Noise Control Measures
  - S - silencers, muffler, enclosure
  - B - sound barrier, berms, acoustical screening
  - U - Uncontrolled

Table 6: Noise Impact Table – Plane of Window Points of Reception

Source ID	R01_POW			R02_POW			R03_POW			R04_POW			R05_POW			R06_POW		
	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)
3TonRTUa	111	27	27	86	28	28	74	31	31	113	22	22	313	18	18	76	30	30
3TonRTUb	107	27	27	88	28	28	77	30	30	117	22	22	309	18	18	75	30	30
3TonRTUc	104	27	27	89	28	28	80	30	30	121	21	21	304	19	19	73	30	30
3TonRTUd	100	27	27	91	28	28	84	30	30	126	21	21	300	19	19	72	30	30
3TonRTUe	97	28	28	93	28	28	87	29	29	130	21	21	295	19	19	71	30	30
3TonRTUf	94	28	28	95	27	27	91	30	30	134	20	20	291	19	19	71	30	30
3TonRTUg	91	28	28	97	27	27	95	29	29	138	21	21	286	19	19	71	30	30
3TonRTUh	88	29	29	99	27	27	98	29	29	143	22	22	282	19	19	71	30	30
3TonRTUi	85	29	29	102	27	27	102	29	29	147	22	22	278	19	19	72	30	30
3TonRTUj	82	29	29	105	26	26	106	27	27	151	22	22	273	19	19	73	30	30
3TonRTUk	80	30	30	108	26	26	110	27	27	155	24	24	269	19	19	74	30	30
3TonRTUl	114	28	28	85	29	29	71	31	31	109	22	22	317	18	18	78	29	29
3TonRTUm	118	27	27	84	29	29	68	32	32	105	21	21	322	18	18	79	29	29
3TonRTUn	121	27	27	84	29	29	65	32	32	101	21	21	326	18	18	81	29	29
3TonRTUo	125	27	27	83	29	29	63	32	32	97	21	21	330	18	18	84	30	30
3TonRTUp	129	27	27	83	29	29	60	33	33	93	20	20	335	18	18	86	31	31
3TonRTUq	133	27	27	83	29	29	58	33	33	89	19	19	339	18	18	89	30	30
3TonRTUr	137	27	27	84	29	29	57	33	33	86	17	17	344	18	18	92	30	30
3TonRTUs	141	27	27	84	31	31	55	22	22	82	14	14	348	18	18	94	30	30
3TonRTUt	145	24	24	85	29	29	54	28	28	78	30	30	353	16	16	98	27	27
3TonRTUu	149	24	24	86	29	29	53	28	28	75	31	31	357	15	15	101	27	27
3TonRTUv	153	23	23	88	28	28	53	28	28	71	31	31	362	15	15	104	27	27
5TonRTUa	145	24	24	67	31	31	31	34	34	58	33	33	359	15	15	91	27	27
5TonRTUb	146	24	24	72	30	30	36	32	32	60	33	33	359	15	15	94	27	27
5TonRTUc	148	23	23	76	30	30	41	31	31	63	32	32	360	15	15	96	27	27
5TonRTUd	150	23	23	80	29	29	45	29	29	66	32	32	360	15	15	99	27	27
CWExit	51	47	0	119	41	0	133	45	0	182	45	0	233	43	0	73	44	0
TruckIdle	143	40	0	59	40	0	22	44	0	54	32	0	358	33	0	87	41	0
ReefCompressor	143	47	0	59	50	0	22	53	0	54	41	0	358	40	0	87	50	0

Table 7: Noise Impact Table – Outdoor Points of Reception

Source ID	R01_Out			R02_Out			R03_Out			R04_Out			R05_Out			R06_Out		
	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)	Dist. (m)	Day/Eve Leq, 1hr (dBA)	Night Leq, 1hr (dBA)
3TonRTUa	107	27	27	81	28	28	71	31	31	103	13	13	294	19	19	68	31	31
3TonRTUb	103	27	27	82	28	28	74	31	31	107	14	14	290	19	19	66	31	31
3TonRTUc	99	28	28	84	28	28	77	31	31	111	14	14	285	19	19	65	31	31
3TonRTUd	96	28	28	86	27	27	80	27	27	115	14	14	281	19	19	64	31	31
3TonRTUe	92	28	28	88	27	27	83	26	26	120	15	15	276	20	20	63	31	31
3TonRTUf	89	28	28	91	27	27	87	26	26	124	14	14	272	20	20	63	31	31
3TonRTUg	86	29	29	93	26	26	90	24	24	128	13	13	267	20	20	63	31	31
3TonRTUh	83	29	29	96	26	26	94	24	24	132	14	14	263	20	20	63	31	31
3TonRTUi	80	29	29	99	26	26	97	24	24	137	15	15	258	20	20	64	31	31
3TonRTUj	77	30	30	102	25	25	101	23	23	141	20	20	254	20	20	65	31	31
3TonRTUk	75	30	30	105	25	25	105	23	23	145	20	20	249	20	20	66	31	31
3TonRTUl	110	27	27	79	28	28	69	34	34	99	12	12	299	19	19	69	30	30
3TonRTUm	114	27	27	78	29	29	66	34	34	95	13	13	303	19	19	71	30	30
3TonRTUn	118	26	26	77	29	29	64	34	34	91	14	14	308	19	19	73	30	30
3TonRTUo	122	26	26	76	29	29	62	33	33	87	14	14	312	19	19	76	31	31
3TonRTUp	126	26	26	76	29	29	60	33	33	84	15	15	317	19	19	78	31	31
3TonRTUq	130	26	26	76	29	29	59	33	33	80	12	12	321	19	19	81	30	30
3TonRTUr	134	26	26	76	29	29	58	33	33	76	11	11	326	19	19	84	30	30
3TonRTUs	138	26	26	76	31	31	57	28	28	73	10	10	330	19	19	87	30	30
3TonRTUt	142	23	23	77	29	29	57	25	25	69	23	23	335	16	16	91	27	27
3TonRTUu	146	23	23	78	29	29	57	23	23	66	25	25	339	16	16	94	27	27
3TonRTUv	150	22	22	79	29	29	57	23	23	62	26	26	344	16	16	97	27	27
5TonRTUa	143	22	22	58	31	31	36	31	31	48	28	28	342	16	16	86	27	27
5TonRTUb	144	22	22	63	31	31	40	28	28	51	27	27	342	16	16	88	27	27
5TonRTUc	146	22	22	67	30	30	45	26	26	54	27	27	343	16	16	90	27	27
5TonRTUd	147	22	22	71	30	30	50	25	25	57	26	26	343	16	16	93	27	27
CWExit	45	48	0	119	40	0	126	47	0	172	46	0	215	46	0	69	44	0
TruckIdle	141	40	0	50	38	0	27	41	0	43	33	0	342	31	0	82	45	0
ReefCompressor	141	46	0	50	47	0	26	50	0	44	42	0	342	38	0	82	50	0



## Appendices

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# Appendix A - Noise Terminology

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<b>Term</b>	<b>Definition</b>
<b>Sound</b>	Pressure wave travelling through a medium, such as air.
<b>Noise</b>	Unwanted sound.
<b>Acoustics</b>	The science of sound propagation and transmission.
<b>Decibel, dB</b>	A logarithmic ratio, not strictly a unit, used to describe sound levels. For sound pressure, the reference level is 20 micropascals (threshold of hearing).
<b>Frequency</b>	The rate at which an event is repeated. Measured in Hertz (Hz), where 1 Hz = 1 oscillation/sec. Normal human hearing extends over a range of frequencies from about 20 Hz to about 20 kHz.
<b>Octave Band</b>	A band of frequencies where the upper limiting frequency is twice the lower limiting frequency. Octave bands are identified by their centre-frequencies. The octave bands standardized for acoustic measurements include those centered at 31.5, 63, 125, 250, 500, 1000, 2000, 4000, & 8000 Hz.
<b>A-Weighting Network, dBA</b>	A frequency weighting network intended to represent the variation in the ear's ability to hear different frequencies. Overall sound levels calculated or measured using the A-weighting network are indicated by dBA rather than dB.
<b>Sound Pressure Level (SPL, <math>L_p</math>)</b>	A measurement of instantaneous sound pressure and equal to 10 times the logarithm (base 10) of the ratio of the instantaneous sound pressure of a sound divided by the reference sound pressure of 20 $\mu$ Pa (0 dB). Reported and measured in decibels (dB or dBA).
<b><math>L_{eq}</math> - "Equivalent sound level"</b>	Value of a constant sound pressure level which would result in the same total sound energy as would the measured time-varying sound pressure level over equivalent time duration. The $L_{eq,1hr}$ , for example, describes the equivalent continuous sound level over a 1 hour period.

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## **Appendix B – Relevant Drawings and Manufacturer Sound Level Data**

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Project:  
**Heritage Hills Retail**  
 471 Terry Fox Dr.,  
 Ottawa, Ontario



True North



Project North

**Gross Bldg Area:**  
**14,395 SF**

No.	Issue/Revision	Date
	Issue for Review	21/Nov/18

**gord ERSKINE**  
 ARCHITECT INC.

113 Clarendon Ave.,  
 Ottawa, ON K1Y 0R1  
 (613) 850-9865  
 gorderskine@gmail.com

Sub Consultant

Drawing:  
**BUILDING 1**  
**ROOF PLAN**

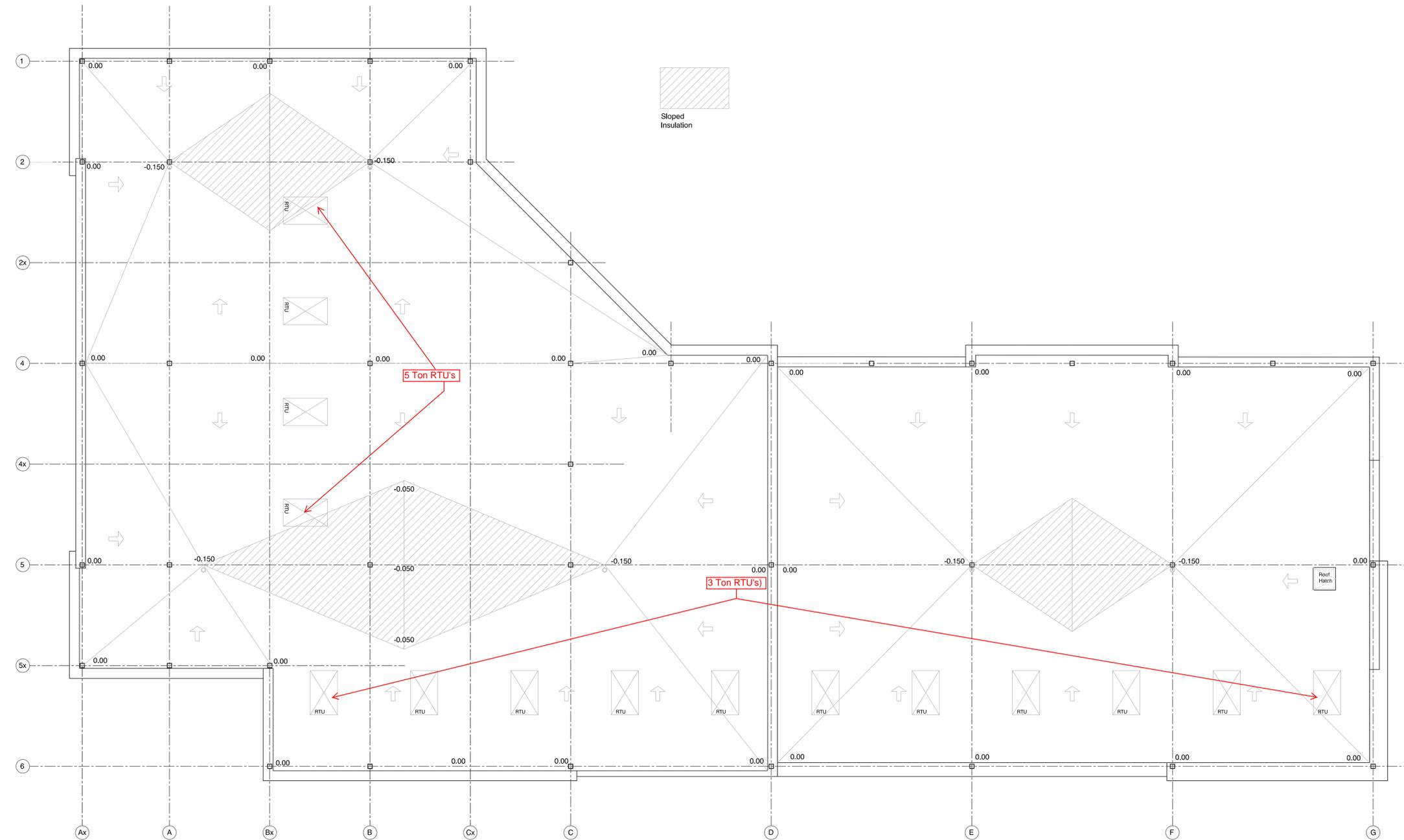
Drawn:	Checked:
Approved:	Scale: 1/8" = 1'-0"
Proj. No. 013-2017	Date: Jan. 15, 2018

Seal

Drawing

**A-103**

Rev. 0



Project:  
**Heritage Hills Retail**  
 471 Terry Fox Dr.,  
 Ottawa, Ontario

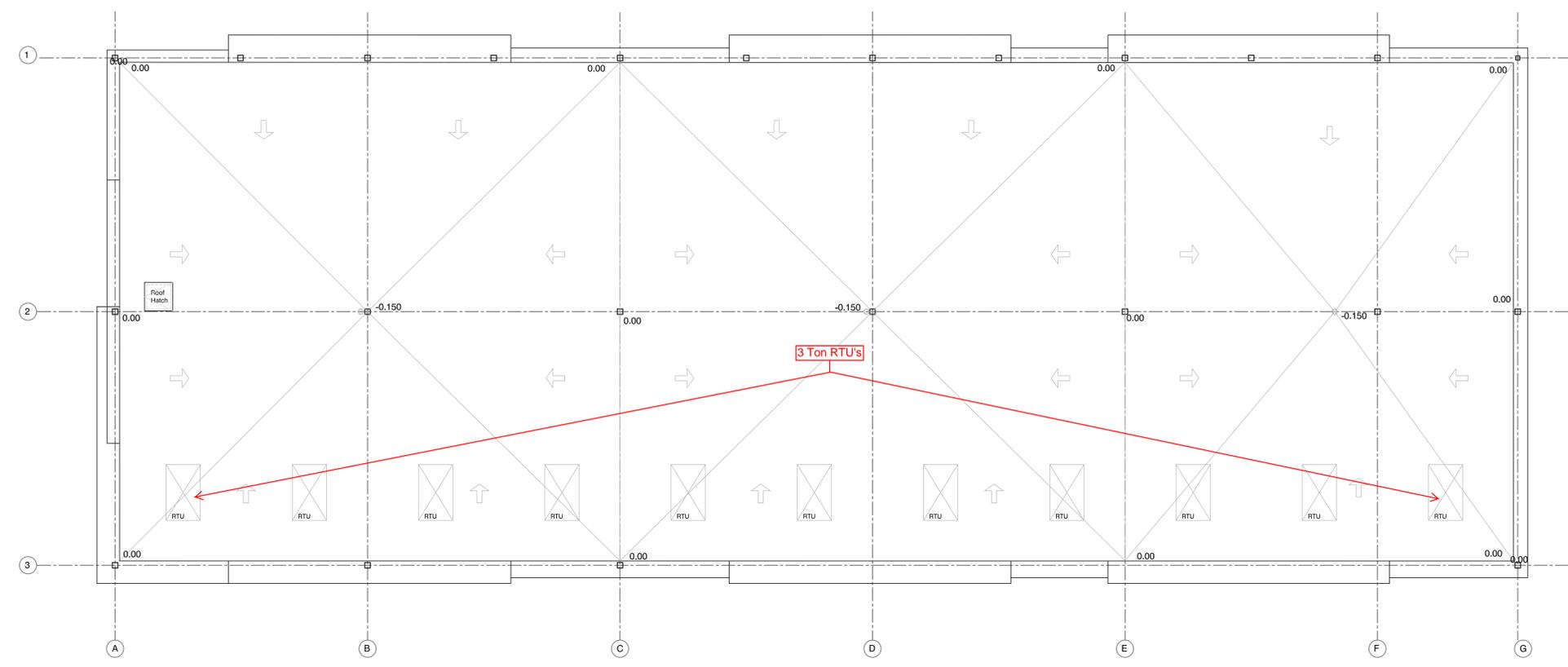


True North



Project North

Gross Bldg Area:  
**11,170 SF**



No.	Issue/Revision	Date
	Issue for Review	21/Nov/18

**gord ERSKINE**  
 ARCHITECT INC.

113 Clarendon Ave.,  
 Ottawa, ON K1Y 0R1  
 (613) 850-9865  
 gorderskine@gmail.com

Sub Consultant

Drawing:  
**BUILDING 2**  
**ROOF PLAN**

Drawn:	Checked:
Approved:	Scale: 1/8" = 1'-0"
Proj. No. 013-2017	Date: Jan. 15, 2018

Seal

Drawing

**A-104**

Rev. 0

TOPOGRAPHICAL PLAN OF  
**BLOCK 170**  
 REGISTERED PLAN 4M-1413  
 CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebakk Ltd.

Scale 1 : 250  
 10 7.5 5.0 2.5 0 5 10 Metres

Metric  
 DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Aug 2, 2018  
 Date: *E.H. Herweyer O.L.S.*

Notes & Legend

- | Denotes |                                 |
|---------|---------------------------------|
| ⊕ W     | Water Valve                     |
| ○ MH-ST | Maintenance Hole (Storm Sewer)  |
| ○ MH-S  | Maintenance Hole (Sanitary)     |
| ○ MH-T  | Maintenance Hole (Traffic)      |
| ○ MH-U  | Maintenance Hole (Unidentified) |
| —       | Underground Storm Sewer         |
| —       | Underground Sanitary Sewer      |
| —       | Underground Water               |
| —       | Underground Bell                |
| —       | Underground Gas                 |
| —       | Underground Rogers              |
| —       | Underground Power               |
| —       | Underground Traffic             |
| □ CB    | Catch Basin                     |
| □ CI    | Catch Basin Inlet               |
| □ DI    | Ditch Inlet                     |
| CP      | Corrugated Plastic Pipe         |
| T/P     | Top of Pipe                     |
| Iw      | Invert                          |
| T/G     | Top of Grate                    |
| □ HH    | Handhole                        |
| □ TB-B  | Bell Terminal Box               |
| ○ TR    | Traffic Signal Post             |
| △ S     | Sign                            |
| ○ LS    | Light Standard                  |
| φ       | Diameter                        |
| + 66.00 | Location of Elevations          |
| + 66.00 | Top of Curb / Wall Elevation    |
| C/L     | Centreline                      |
| WRW     | Wooden Retaining Wall           |
| SRW     | Stone Retaining Wall            |
| CLF     | Chain Link Fence                |
| PFWF    | Post and Wire Fence             |
| DC      | Depressed Curb                  |

SITE AREA = 1.1789 Hectares

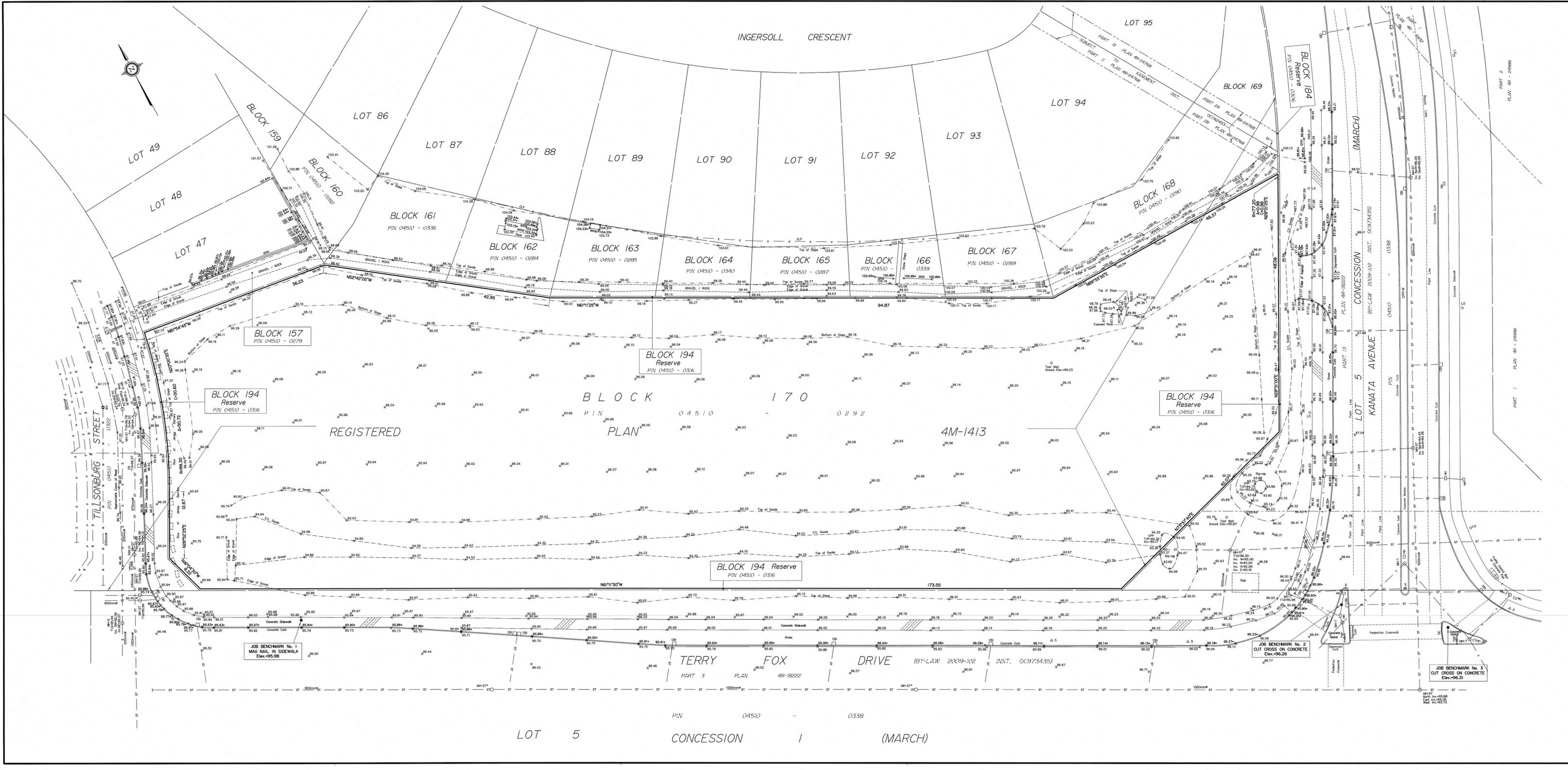
BOUNDARY INFORMATION COMPILED FROM REGISTERED PLAN 4M-1413.  
 Bearings are grid, derived from the southerly limit of Block 170 Registered plan 4M-1413 shown to be N61°11'30"W thereon and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ELEVATION NOTES

- Elevations shown are geoidetic and are referred to the CGVD28 geoidetic datum.
- It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

- This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
- Only visible surface utilities were located.
- A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
- Underground services and inverts are taken from City of Ottawa Engineering Drawings G-O-30, H-O-06, H-O-12, H-A-N-07, 102118-P2, 102118-P2, 11086-22. MH-ST and underground services on Terry Fox Drive are taken from City of Ottawa Engineering Drawings H-O-06 and H-O-12.



# Raider commercial packaged rooftop unit performance specifications

		COOLING DATA		HEATING INPUT					PHYSICAL DATA		
NOM TON.	MODEL	EER	SEER OR IEER	LOW	STD.	MED.	HIGH	DIMENSIONS H X W X L [IN.]	SHIP WT. [LBS.]		
GAS/ELECTRIC UNITS	3	ZGA036S4B	11.5	13.0	-	65	108	-	37 x 47 x 76	489	
	3	ZGB036S4B	11.7	14.0	-	65	108	-	37 x 47 x 76	529	
	4	ZGA048S4B	10.6	13.0	-	65	108	150	37 x 47 x 76	503	
	4	ZGB048S4B	11.2	14.0	-	65	108	150	37 x 47 x 76	538	
	5	ZGA060S4B	10.7	13.0	-	65	108	150	37 x 47 x 76	535	
	5	ZGB060S4B	11.2	14.0	-	65	108	150	45 x 47 x 76	597	
	6	ZGA072S4B	11.2	12.0	-	65	108	150	45 x 47 x 76	645	
	6	ZGB074S4T	11.2	15.0	-	65	108	150	45 x 47 x 76	645	
	7.5	ZGA092S4B/M	11.0	11.8/13.0	-	130	180	240	49 x 61 x 96	987	
	8.5	ZGA102S4B/M	11.0	11.8/13.0	-	130	180	240	49 x 61 x 96	1,007	
	10	ZGA120S4B/M	11.0	11.8/13.0	-	130	180	240	49 x 61 x 96	1,047	
	12.5	ZGA150S4B/M	10.8	11.4/12.0	-	130	180	240	49 x 61 x 96	1,137	
				KW RANGE*							
ELECTRIC/ELECTRIC UNITS	3	ZCA036S4B	11.5	13.0	5	7.5	10	15	-	37 x 47 x 76	456
	3	ZCB036S4B	11.7	14.0	5	7.5	10	15	-	37 x 47 x 76	479
	4	ZCA048S4B	10.6	13.0	5	7.5	10	15	22.5	37 x 47 x 76	470
	4	ZCB048S4B	11.2	14.0	5	7.5	10	15	22.5	37 x 47 x 76	488
	5	ZCA060S4B	10.7	13.0	5	7.5	10	15	22.5	37 x 47 x 76	502
	5	ZCB060S4B	11.2	14.0	5	7.5	10	15	22.5	45 x 47 x 76	573
	6	ZCA072S4B	11.2	12.0	7.5	10	15	22.5	30	45 x 47 x 76	573
	6	ZCB074S4T	11.2	15.0	7.5	10	15	22.5	30	45 x 47 x 76	573
	7.5	ZCA092S4B/M	11.2	12.0/13.2	7.5	15	22.5	30	45	49 x 61 x 96	939
	8.5	ZCA102S4B/M	11.2	12.0/13.2	7.5	15	22.5	30	45	49 x 61 x 96	959
	10	ZCA120S4B/M	11.2	12.0/13.2	15	22.5	30	45	60	49 x 61 x 96	999
	12.5	ZCA150S4B/M	11.0	11.6/12.2	15	22.5	30	45	60	49 x 61 x 96	1,089
				47 CAP.	HSPF/COP 47	17 CAP.	COP 17				
HEAT PUMP UNITS	3	ZHA036S4B	11.3	13.0	34,200	7.7/3.42	20,400	2.18		37 x 47 x 76	535
	3	ZHB036S4B	11.4	14.0	34,200	8.0/3.50	20,000	2.2		45 x 47 x 76	585
	4	ZHA048S4B	10.8	13.0	45,000	7.7/3.40	27,400	2.24		37 x 47 x 76	544
	4	ZHB048S4B	11.2	14.0	45,000	8.0/3.50	26,100	2.2		45 x 47 x 76	590
	5	ZHA060S4B	10.9	13.0	58,500	7.7/3.50	33,400	2.20		45 x 47 x 76	590
	5	ZHB060S4B	11.2	14.0	55,000	8.0/3.60	32,500	2.25		45 x 47 x 76	615
	7.5	ZHA092S4B/M	11.0	12.2/12.5	89,000	3.3	53,000	2.25		49 x 61 x 96	1,121
	8.5	ZHA102S4B/M	11.0	12.2/12.5	100,000	3.3	55,000	2.25		49 x 61 x 96	1,153
10	ZHA120S4B/M	10.7	11.3/12.5	116,000	3.3	70,000	2.25		49 x 61 x 96	1,211	

NOTE: Due to Lennox' ongoing commitment to quality, all specifications, ratings and dimensions are subject to change.

## BLOWER DATA

### OPTIONS / ACCESSORIES AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil	Gss Heat Exchanger		Economizer		
	ZGB036, ZGB048	ZGB060, ZGB074	Medium	High	Downflow	Horizontal
900	0.01	---	0.05	0.06	0.03	0.04
1000	0.02	---	0.06	0.06	0.03	0.05
1100	0.02	---	0.06	0.07	0.04	0.05
1200	0.02	---	0.06	0.07	0.05	0.06
1300	0.03	---	0.07	0.07	0.05	0.07
1400	0.03	---	0.07	0.08	0.06	0.08
1500	0.04	---	0.07	0.08	0.07	0.08
1600	0.04	0.03	0.07	0.08	0.08	0.09
1700	0.05	0.03	0.07	0.08	0.09	0.10
1800	0.05	0.03	0.06	0.08	0.10	0.11
1900	0.06	0.04	0.06	0.08	0.11	0.12
2000	0.06	0.04	0.07	0.09	0.12	0.13
2100	---	0.05	0.08	0.10	0.13	0.14
2200	---	0.05	0.10	0.12	0.14	0.15
2300	---	0.05	0.11	0.14	0.15	0.16
2400	---	0.06	0.11	0.13	0.16	0.18
2500	---	0.06	0.11	0.15	0.18	0.19
2600	---	0.07	0.13	0.16	0.19	0.20
2700	---	0.07	0.15	0.18	0.20	0.21
2800	---	0.07	0.13	0.16	0.22	0.23
2900	---	0.08	0.13	0.18	0.23	0.24

## OUTDOOR SOUND DATA

Unit Model No.	Octave Band Linear Sound Power Levels dB, re 10 <sup>-12</sup> Watts - Center Frequency - Hz							1 Sound Rating Number (SRN) (dBA)
	125	250	500	1000	2000	4000	8000	
ZGB036	66	70	73	72	70	67	60	78
ZGB048	68	71	75	74	71	68	63	80
ZGB060	64	68	72	73	69	67	63	78
ZGB074	73	76	80	78	73	68	66	84

<sup>1</sup> Sound Rating Number according to ANSI/AHRI Standard 270-2008. "SRN" is the overall A-Weighted Sound Power Level, (LWA), dB (100 Hz to 10,000 Hz).

**SYSTEM/CONFIGURATION**  
 30hp Aircraft  
 Three (3) - 10hp producers  
 Three (3) Fixed Nozzles

**STANDARD SYSTEMS**

Distance (from building)	Noise Level (DbA)
0 ft.	100.0
10 ft.	96.5
20 ft.	95.0
30 ft.	94.0
40 ft.	88.0
50 ft.	84.0
60 ft.	81.0
70 ft.	78.0
80 ft.	77.0
90 ft.	75.5
100 ft.	75.5



**STANDARD SYSTEMS W/ SILENCER KIT(S) INSTALLED**

Distance (from building)	Noise Level (DbA)
0 ft.	97.0
10 ft.	94.5
20 ft.	92.5
30 ft.	91.0
40 ft.	85.0
50 ft.	81.0
60 ft.	78.0
70 ft.	76.0
80 ft.	74.0
90 ft.	73.0
100 ft.	72.0

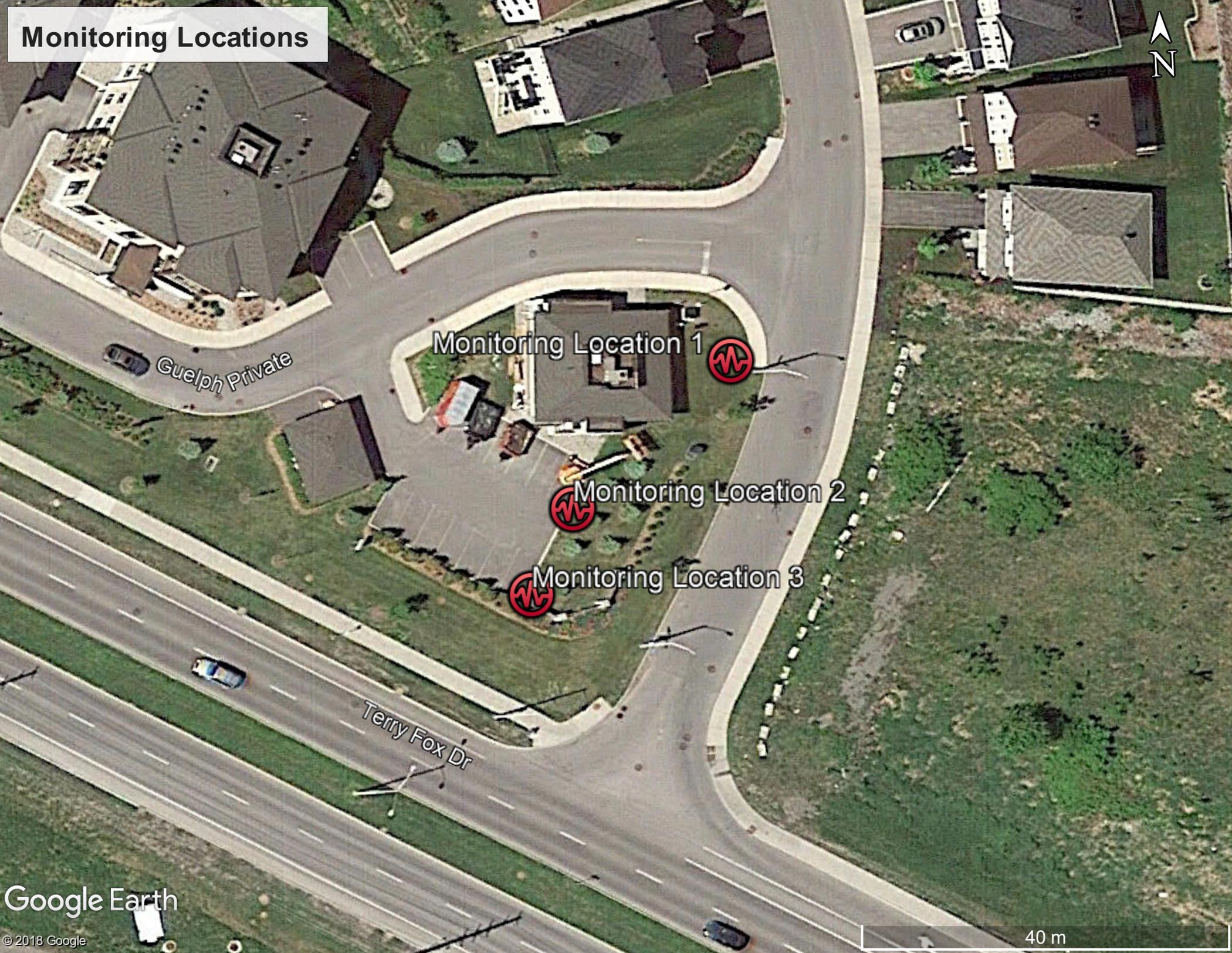


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## **Appendix C – Ambient Monitoring Data**

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# Monitoring Locations



Monitoring Location 1



Monitoring Location 2



Monitoring Location 3

Guelph Private

Terry Fox Dr

Minimum Measured Hourly Leq			
	Monitoring Location 1 - Representative	Monitoring Location 2	Monitoring Location 3
Lowest Day Time Hour	63		63
Lowest Evening Hour		57	
Lowest Night Time Hour			47

Monitoring Location	Description	Distance from road (m)	Distance adjustment (relative to representative area) (dB)
1	Mid parking lot	29	-2.5
2	Near Fence Line	22	-3.7

With Distance Corrections			
	Monitoring Location 1	Monitoring Location 2	Monitoring Location 3
Lowest Day Time Hour	63		59
Lowest Evening Hour		55	
Lowest Night Time Hour			43

 Used as Ambient Background Level

Project Name: Heritage Hills  
 Project Number: 60546152

Receptor Location: Monitoring Location 1  
 Logging Interval: 0:15:00 h:mm:ss

Equipment  
 Monitor Type: Noise  
 Designation:

SoundPro



Period	Start Time	End Time
Day-time	7:00 AM	7:00 PM
Evening	7:00 PM	11:00 PM
Night-time	11:00 PM	7:00 AM

Minimum day hour 63  
 Minimum eve hour N/A  
 Minimum night hour N/A

Daylight Savings No

Date	Interval Ending (DST)	Interval Ending (LST)	For Weather Lookup		Time Period (DST)	Overload	Sound Pressure Levels			Enviro Canada Weather Station 1 Ottawa Airport		Enviro Canada Weather Station 2 Ottawa Airport		Exclude Data due to Weather	Valid Measurements of Sound Pressure Levels L <sub>EQ-15min</sub> (dBA)	Rolling 1 hr Leq			
			Round +Hour (LST)	Date/Time (LST)			L <sub>EQ</sub> (dBA)	L90	Wind Speed (kph)	Weather Conditions	Wind Speed (kph)	Weather Conditions	Wind Exclusion > 20kph			Condition Exclusion	DAY	EVENING	NIGHT
																	No	No	No
14-Jan-2019	4:15:00 PM	4:15:00 PM	16	Mon 14-Jan-2019 16:00	Day-time	0	62.8	0.0	8	Mostly Cloudy	8	Mostly Cloudy	Include	Include	No	63.7			
14-Jan-2019	4:30:00 PM	4:30:00 PM	16	Mon 14-Jan-2019 16:00	Day-time	0	63.7	0.0	8	Mostly Cloudy	8	Mostly Cloudy	Include	Include	No	63.2			
14-Jan-2019	4:45:00 PM	4:45:00 PM	17	Mon 14-Jan-2019 17:00	Day-time	0	63.2	0.0	4	NA	4	NA	Include	Include	No	63.9			
14-Jan-2019	5:00:00 PM	5:00:00 PM	17	Mon 14-Jan-2019 17:00	Day-time	0	63.9	0.0	4	NA	4	NA	Include	Include	No	63.3	64		
14-Jan-2019	5:15:00 PM	5:15:00 PM	17	Mon 14-Jan-2019 17:00	Day-time	0	63.3	0.0	4	NA	4	NA	Include	Include	No	64.1	64		
14-Jan-2019	5:30:00 PM	5:30:00 PM	17	Mon 14-Jan-2019 17:00	Day-time	0	64.1	0.0	4	NA	4	NA	Include	Include	No	63.3	64		
14-Jan-2019	5:45:00 PM	5:45:00 PM	18	Mon 14-Jan-2019 18:00	Day-time	0	63.3	0.0	9	NA	9	NA	Include	Include	No	63.1	63		
14-Jan-2019	6:00:00 PM	6:00:00 PM	18	Mon 14-Jan-2019 18:00	Day-time	0	63.1	0.0	9	NA	9	NA	Include	Include	No	#N/A			
14-Jan-2019	6:15:00 PM	6:15:00 PM	18	Mon 14-Jan-2019 18:00	Day-time	0	63.2	0.0	9	NA	9	NA	Include	Include	No				

Project Name: Heritage Hills  
 Project Number: 60546152

Receptor Location: Monitoring Location 2  
 Logging Interval: 0:15:00 h:mm:ss

Equipment  
 Monitor Type: SoundPro  
 Designation: MX (S/N XXXXX)



Period	Start Time	End Time
Day-time	7:00 AM	7:00 PM
Evening	7:00 PM	11:00 PM
Night-time	11:00 PM	7:00 AM

Minimum day hour N/A  
 Minimum eve hour 57  
 Minimum night hour N/A

Daylight Savings No

Date	Interval Ending (DST)	Interval Ending (LST)	For Weather Lookup		Time Period (DST)	Sound Pressure Levels L <sub>EQ</sub> (dBA)	Enviro Canada Weather Station 1 Ottawa Airport			Wind Exclusion > 20kph	Condition Exclusion	Exclude Data due to Weather	Valid Measurements of Sound Pressure Levels L <sub>EQ-15min</sub> (dBA)	Rolling 1 hr Leq		
			Round +Hour (LST)	Date/Time (LST)			Wind Speed (kph)	Weather Conditions	DAY					EVENING	NIGHT	
22-Jan-2019	8:35:21 PM	8:35:00 PM	21	Tue 22-Jan-2019 21:00	Evening	58.8	13	NA	Include	Include	No					
22-Jan-2019	8:50:21 PM	8:50:00 PM	21	Tue 22-Jan-2019 21:00	Evening	58.0	13	NA	Include	Include	No	58.0				
22-Jan-2019	9:05:21 PM	9:05:00 PM	21	Tue 22-Jan-2019 21:00	Evening	58.1	13	NA	Include	Include	No	58.1				
22-Jan-2019	9:20:21 PM	9:20:00 PM	21	Tue 22-Jan-2019 21:00	Evening	58.0	13	NA	Include	Include	No	58.0				
22-Jan-2019	9:35:21 PM	9:35:00 PM	22	Tue 22-Jan-2019 22:00	Evening	56.6	14	Mostly Cloudy	Include	Include	No	56.6		58		
22-Jan-2019	9:50:21 PM	9:50:00 PM	22	Tue 22-Jan-2019 22:00	Evening	55.5	14	Mostly Cloudy	Include	Include	No	55.5		57		
22-Jan-2019	10:05:21 PM	10:05:00 PM	22	Tue 22-Jan-2019 22:00	Evening	56.7	14	Mostly Cloudy	Include	Include	No	56.7		57		
22-Jan-2019	10:20:21 PM	10:20:00 PM	22	Tue 22-Jan-2019 22:00	Evening	57.1	14	Mostly Cloudy	Include	Include	No					
22-Jan-2019	10:35:21 PM	10:35:00 PM	23	Tue 22-Jan-2019 23:00	Evening	56.1	23	NA	Exclude	Include	Yes					
22-Jan-2019	10:50:21 PM	10:50:00 PM	23	Tue 22-Jan-2019 23:00	Evening	55.8	23	NA	Exclude	Include	Yes					
22-Jan-2019	11:05:21 PM	11:05:00 PM	23	Tue 22-Jan-2019 23:00	Evening	54.2	23	NA	Exclude	Include	Yes					
22-Jan-2019	11:20:21 PM	11:20:00 PM	23	Tue 22-Jan-2019 23:00	Night-time	53.4	23	NA	Exclude	Include	Yes	#N/A				

Project Name: Heritage Hills  
 Project Number: 60546152

Receptor Location: Monitoring Location 3  
 Logging Interval: 0:15:00 h:mm:ss

Equipment  
 Monitor Type: Noise  
 Designation:

SoundPro  
 MX (SN XXXXX)



Period	Start Time	End Time
Day-time	7:00 AM	7:00 PM
Evening	7:00 PM	11:00 PM
Night-time	11:00 PM	7:00 AM

Daylight Savings: No

Minimum day hour: 63  
 Minimum eve hour: N/A  
 Minimum night hour: 47

Date	Interval Ending (DST)	Interval Ending (LST)	For Weather Lookup		Time Period (DST)	Overload	Sound Pressure Levels			Enviro Canada Weather Station 1		Enviro Canada Weather Station 2		Wind Exclusion > 20kph	Condition Exclusion	Exclude Data due to Weather	Valid Measurements of Sound Pressure Levels L <sub>EQ</sub> 15min (dBA)	Rolling 1 hr Leq		
			Round +Hour (LST)	Date/Time (LST)			L <sub>EQ</sub> (dBA)	L <sub>90</sub>	Ottawa Airport Wind Speed (kph)	Weather Conditions	Ottawa Airport Wind Speed (kph)	Weather Conditions	DAY					EVENING	NIGHT	
24-Jan-2019	6:45:00 PM	6:45:00 PM	19	Thu 24-Jan-2019 19:00	Day-time	0	61.9	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	7:00:00 PM	7:00:00 PM	19	Thu 24-Jan-2019 19:00	Day-time	0	61.9	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	7:15:00 PM	7:15:00 PM	19	Thu 24-Jan-2019 19:00	Evening	0	60.9	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	7:30:00 PM	7:30:00 PM	19	Thu 24-Jan-2019 19:00	Evening	0	61.0	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	7:45:00 PM	7:45:00 PM	20	Thu 24-Jan-2019 20:00	Evening	0	60.4	0.0	34	Snow	34	Snow	Exclude	Exclude	Yes					
24-Jan-2019	8:00:00 PM	8:00:00 PM	20	Thu 24-Jan-2019 20:00	Evening	0	60.4	0.0	34	Snow	34	Snow	Exclude	Exclude	Yes					
24-Jan-2019	8:15:00 PM	8:15:00 PM	20	Thu 24-Jan-2019 20:00	Evening	0	59.6	0.0	34	Snow	34	Snow	Exclude	Exclude	Yes					
24-Jan-2019	8:30:00 PM	8:30:00 PM	20	Thu 24-Jan-2019 20:00	Evening	0	60.0	0.0	34	Snow	34	Snow	Exclude	Exclude	Yes					
24-Jan-2019	8:45:00 PM	8:45:00 PM	21	Thu 24-Jan-2019 21:00	Evening	0	60.6	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	9:00:00 PM	9:00:00 PM	21	Thu 24-Jan-2019 21:00	Evening	0	60.3	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	9:15:00 PM	9:15:00 PM	21	Thu 24-Jan-2019 21:00	Evening	0	59.7	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	9:30:00 PM	9:30:00 PM	21	Thu 24-Jan-2019 21:00	Evening	0	58.7	0.0	22	Snow	22	Snow	Exclude	Exclude	Yes					
24-Jan-2019	9:45:00 PM	9:45:00 PM	22	Thu 24-Jan-2019 22:00	Evening	0	59.1	0.0	26	Mostly Cloudy	26	Mostly Cloudy	Exclude	Include	Yes					
24-Jan-2019	10:00:00 PM	10:00:00 PM	22	Thu 24-Jan-2019 22:00	Evening	0	58.4	0.0	26	Mostly Cloudy	26	Mostly Cloudy	Exclude	Include	Yes					
24-Jan-2019	10:15:00 PM	10:15:00 PM	22	Thu 24-Jan-2019 22:00	Evening	0	57.7	0.0	26	Mostly Cloudy	26	Mostly Cloudy	Exclude	Include	Yes					
24-Jan-2019	10:30:00 PM	10:30:00 PM	22	Thu 24-Jan-2019 22:00	Evening	0	58.0	0.0	26	Mostly Cloudy	26	Mostly Cloudy	Exclude	Include	Yes					
24-Jan-2019	10:45:00 PM	10:45:00 PM	23	Thu 24-Jan-2019 23:00	Evening	0	55.7	0.0	16	NA	16	NA	Include	Include	No					
24-Jan-2019	11:00:00 PM	11:00:00 PM	23	Thu 24-Jan-2019 23:00	Evening	0	55.2	0.0	16	NA	16	NA	Include	Include	No					
24-Jan-2019	11:15:00 PM	11:15:00 PM	23	Thu 24-Jan-2019 23:00	Night-time	0	55.0	0.0	16	NA	16	NA	Include	Include	No	55.0				
24-Jan-2019	11:30:00 PM	11:30:00 PM	23	Thu 24-Jan-2019 23:00	Night-time	0	54.1	0.0	16	NA	16	NA	Include	Include	No	54.1				
24-Jan-2019	11:45:00 PM	11:45:00 PM	24	Fri 25-Jan-2019 0:00	Night-time	0	54.0	0.0	17	NA	17	NA	Include	Include	No	54.0				
25-Jan-2019	12:00:00 AM	12:00:00 AM	0	Fri 25-Jan-2019 0:00	Night-time	0	55.6	0.0	17	NA	17	NA	Include	Include	No	55.6		55		
25-Jan-2019	12:15:00 AM	12:15:00 AM	0	Fri 25-Jan-2019 0:00	Night-time	0	54.1	0.0	17	NA	17	NA	Include	Include	No	54.1		55		
25-Jan-2019	12:30:00 AM	12:30:00 AM	0	Fri 25-Jan-2019 0:00	Night-time	0	50.2	0.0	17	NA	17	NA	Include	Include	No	50.2		54		
25-Jan-2019	12:45:00 AM	12:45:00 AM	1	Fri 25-Jan-2019 1:00	Night-time	0	50.7	0.0	17	Mostly Cloudy	17	Mostly Cloudy	Include	Include	No	50.7		53		
25-Jan-2019	1:00:00 AM	1:00:00 AM	1	Fri 25-Jan-2019 1:00	Night-time	0	48.9	0.0	17	Mostly Cloudy	17	Mostly Cloudy	Include	Include	No	48.9		51		
25-Jan-2019	1:15:00 AM	1:15:00 AM	1	Fri 25-Jan-2019 1:00	Night-time	0	49.4	0.0	17	Mostly Cloudy	17	Mostly Cloudy	Include	Include	No	49.4		50		
25-Jan-2019	1:30:00 AM	1:30:00 AM	1	Fri 25-Jan-2019 1:00	Night-time	0	48.8	0.0	17	Mostly Cloudy	17	Mostly Cloudy	Include	Include	No	48.8		50		
25-Jan-2019	1:45:00 AM	1:45:00 AM	2	Fri 25-Jan-2019 2:00	Night-time	0	52.4	0.0	9	NA	9	NA	Include	Include	No	52.4		50		
25-Jan-2019	2:00:00 AM	2:00:00 AM	2	Fri 25-Jan-2019 2:00	Night-time	0	46.9	0.0	9	NA	9	NA	Include	Include	No	46.9		50		
25-Jan-2019	2:15:00 AM	2:15:00 AM	2	Fri 25-Jan-2019 2:00	Night-time	0	46	0.0	9	NA	9	NA	Include	Include	No	46.0		49		
25-Jan-2019	2:30:00 AM	2:30:00 AM	2	Fri 25-Jan-2019 2:00	Night-time	0	47.2	0.0	9	NA	9	NA	Include	Include	No	47.2		49		
25-Jan-2019	2:45:00 AM	2:45:00 AM	3	Fri 25-Jan-2019 3:00	Night-time	0	48	0.0	7	NA	7	NA	Include	Include	No	48.0		47		
25-Jan-2019	3:00:00 AM	3:00:00 AM	3	Fri 25-Jan-2019 3:00	Night-time	0	46	0.0	7	NA	7	NA	Include	Include	No	46.0		47		
25-Jan-2019	3:15:00 AM	3:15:00 AM	3	Fri 25-Jan-2019 3:00	Night-time	0	51.6	0.0	7	NA	7	NA	Include	Include	No	51.6		49		
25-Jan-2019	3:30:00 AM	3:30:00 AM	3	Fri 25-Jan-2019 3:00	Night-time	0	48.3	0.0	7	NA	7	NA	Include	Include	No					
25-Jan-2019	3:45:00 AM	3:45:00 AM	4	Fri 25-Jan-2019 4:00	Night-time	0	52.9	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	4:00:00 AM	4:00:00 AM	4	Fri 25-Jan-2019 4:00	Night-time	0	49.8	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	4:15:00 AM	4:15:00 AM	4	Fri 25-Jan-2019 4:00	Night-time	0	50.9	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	4:30:00 AM	4:30:00 AM	4	Fri 25-Jan-2019 4:00	Night-time	0	51.2	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	4:45:00 AM	4:45:00 AM	5	Fri 25-Jan-2019 5:00	Night-time	0	48.3	0.0	4	Snow	4	Snow	Include	Exclude	Yes					
25-Jan-2019	5:00:00 AM	5:00:00 AM	5	Fri 25-Jan-2019 5:00	Night-time	0	52.6	0.0	4	Snow	4	Snow	Include	Exclude	Yes					
25-Jan-2019	5:15:00 AM	5:15:00 AM	5	Fri 25-Jan-2019 5:00	Night-time	0	50.3	0.0	4	Snow	4	Snow	Include	Exclude	Yes					
25-Jan-2019	5:30:00 AM	5:30:00 AM	5	Fri 25-Jan-2019 5:00	Night-time	0	50.4	0.0	4	Snow	4	Snow	Include	Exclude	Yes					
25-Jan-2019	5:45:00 AM	5:45:00 AM	6	Fri 25-Jan-2019 6:00	Night-time	0	55.7	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	6:00:00 AM	6:00:00 AM	6	Fri 25-Jan-2019 6:00	Night-time	0	56.2	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	6:15:00 AM	6:15:00 AM	6	Fri 25-Jan-2019 6:00	Night-time	0	54.5	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	6:30:00 AM	6:30:00 AM	6	Fri 25-Jan-2019 6:00	Night-time	0	56.0	0.0	7	Snow	7	Snow	Include	Exclude	Yes					
25-Jan-2019	6:45:00 AM	6:45:00 AM	7	Fri 25-Jan-2019 7:00	Night-time	0	55.3	0.0	5	Snow	5	Snow	Include	Exclude	Yes					
25-Jan-2019	7:00:00 AM	7:00:00 AM	7	Fri 25-Jan-2019 7:00	Night-time	0	58.3	0.0	5	Snow	5	Snow	Include	Exclude	Yes					
25-Jan-2019	7:15:00 AM	7:15:00 AM	7	Fri 25-Jan-2019 7:00	Day-time	0	58.0	0.0	5	Snow	5	Snow	Include	Exclude	Yes					
25-Jan-2019	7:30:00 AM	7:30:00 AM	7	Fri 25-Jan-2019 7:00	Day-time	0	59.9	0.0	5	Snow	5	Snow	Include	Exclude	Yes					
25-Jan-2019	7:45:00 AM	7:45:00 AM	8	Fri 25-Jan-2019 8:00	Day-time	0	59.6	0.0	9	Snow	9	Snow	Include	Exclude	Yes					
25-Jan-2019	8:00:00 AM	8:00:00 AM	8	Fri 25-Jan-2019 8:00	Day-time	0	62.1	0.0	9	Snow	9	Snow	Include	Exclude	Yes					
25-Jan-2019	8:15:00 AM	8:15:00 AM	8	Fri 25-Jan-2019 8:00	Day-time	0	62.3	0.0	9	Snow	9	Snow	Include	Exclude	Yes					
25-Jan-2019	8:30:00 AM	8:30:00 AM	8	Fri 25-Jan-2019 8:00	Day-time	0	62.9	0.0	9	Snow	9	Snow	Include	Exclude	Yes					
25-Jan-2019	8:45:00 AM	8:45:00 AM	9	Fri 25-Jan-2019 9:00	Day-time	0	63.4	0.0	10	NA	10	NA	Include	Include	No					
25-Jan-2019	9:00:00 AM	9:00:00 AM	9	Fri 25-Jan-2019 9:00	Day-time	0	64.4	0.0	10	NA	10	NA	Include	Include	No	64.4				
25-Jan-2019	9:15:00 AM	9:15:00 AM	9	Fri 25-Jan-2019 9:00	Day-time	0	63.5	0.0	10	NA	10	NA	Include	Include	No	63.5				
25-Jan-2019	9:30:00 AM	9:30:00 AM	9	Fri 25-Jan-2019 9:00	Day-time	0	63.0	0.0	10	NA	10	NA	Include	Include	No	63.0				
25-Jan-2019	9:45:00 AM	9:45:00 AM	10	Fri 25-Jan-2019 10:00	Day-time	0	62.1	0.0	11	Mostly Cloudy	11	Mostly Cloudy	Include	Include	No	62.1	63			
25-Jan-2019	10:00:00 AM	10:00:00 AM	10	Fri 25-Jan-2019 10:00	Day-time	0	62.6	0.0	11	Mostly Cloudy	11	Mostly Cloudy	Include	Include	No	62.6	63			
25-Jan-2019	10:15:00 AM	10:15:00 AM	10	Fri 25-Jan-2019 10:00	Day-time	0	62.3	0.0	11	Mostly Cloudy	11	Mostly Cloudy	Include	Include	No	62.3	63			
25-Jan-2019	10:30:00 AM	10:30:00 AM	10	Fri 25-Jan-2019 10:00	Day-time	0	62.4	0.0	11	Mostly Cloudy	11	Mostly Cloudy	Include	Include	No					

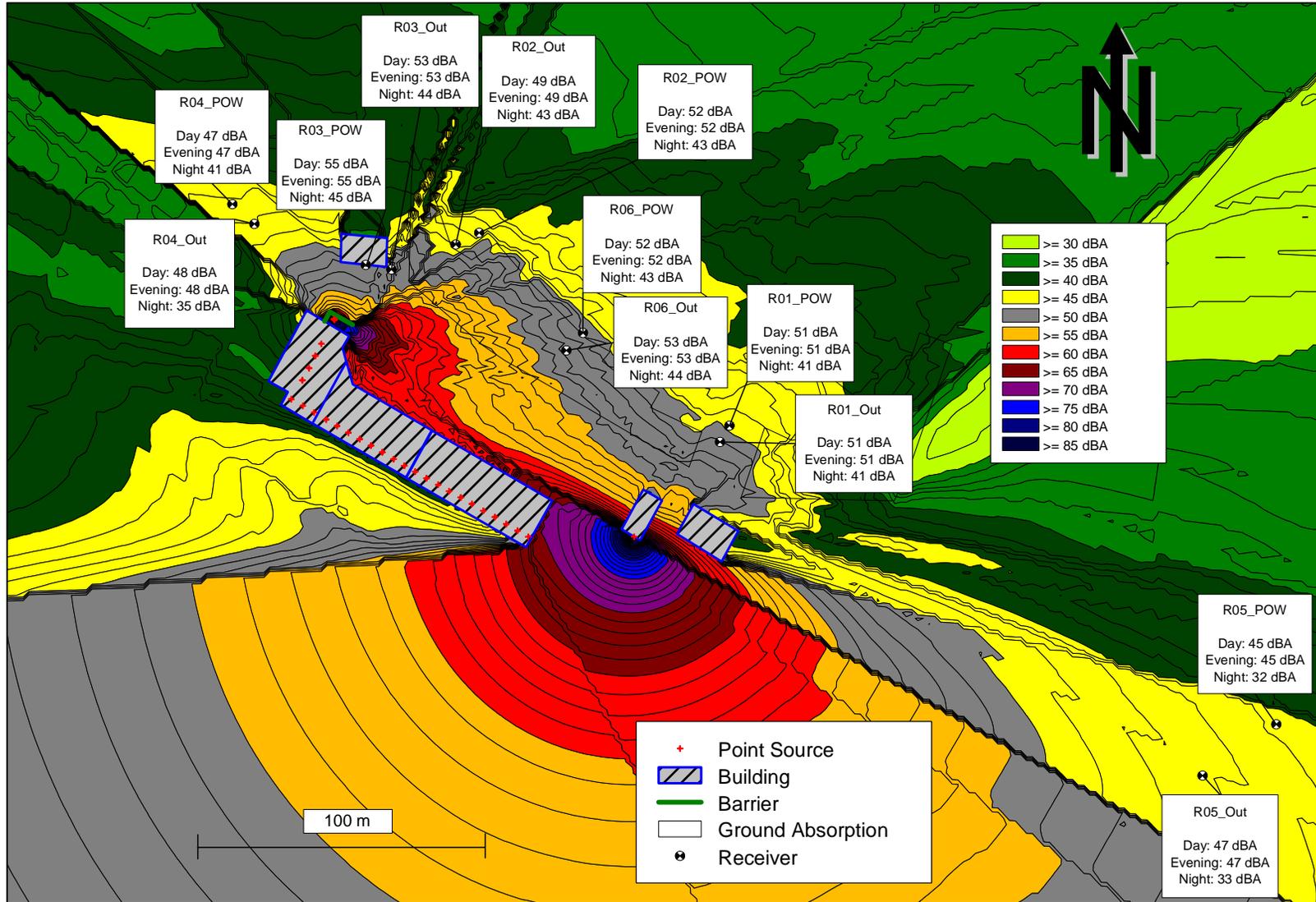
Date	Interval Ending (DST)	Interval Ending (LST)	For Weather Lookup		Time Period (DST)	Overload	Sound Pressure Levels			Enviro Canada Weather Station 1		Enviro Canada Weather Station 2		Wind Exclusion > 20kph	Condition Exclusion	Exclude Data due to Weather	Valid Measurements of Sound Pressure Levels LEQ-15min (dBA)	Rolling 1 hr Leq			
							Round +Hour (LST)	Date/Time (LST)	LCo (dBA)	L90	Ottawa Airport		Ottawa Airport					DAY	EVENING	NIGHT	
											Wind Speed (kph)	Weather Conditions	Wind Speed (kph)								Weather Conditions
25-Jan-2019	10:45:00 AM	10:45:00 AM	11	Fri 25-Jan-2019 11:00	Day-time	0	63.0	0.0	21	NA	21	NA	Exclude	Include	Yes						
25-Jan-2019	11:00:00 AM	11:00:00 AM	11	Fri 25-Jan-2019 11:00	Day-time	0	63.5	0.0	21	NA	21	NA	Exclude	Include	Yes						
25-Jan-2019	11:15:00 AM	11:15:00 AM	11	Fri 25-Jan-2019 11:00	Day-time	0	64.4	0.0	21	NA	21	NA	Exclude	Include	Yes						
25-Jan-2019	11:30:00 AM	11:30:00 AM	11	Fri 25-Jan-2019 11:00	Day-time	0	64.7	0.0	21	NA	21	NA	Exclude	Include	Yes						
25-Jan-2019	11:45:00 AM	11:45:00 AM	12	Fri 25-Jan-2019 12:00	Day-time	0	64.4	0.0	29	Blowing Snow	29	Blowing Snow	Exclude	Exclude	Yes						

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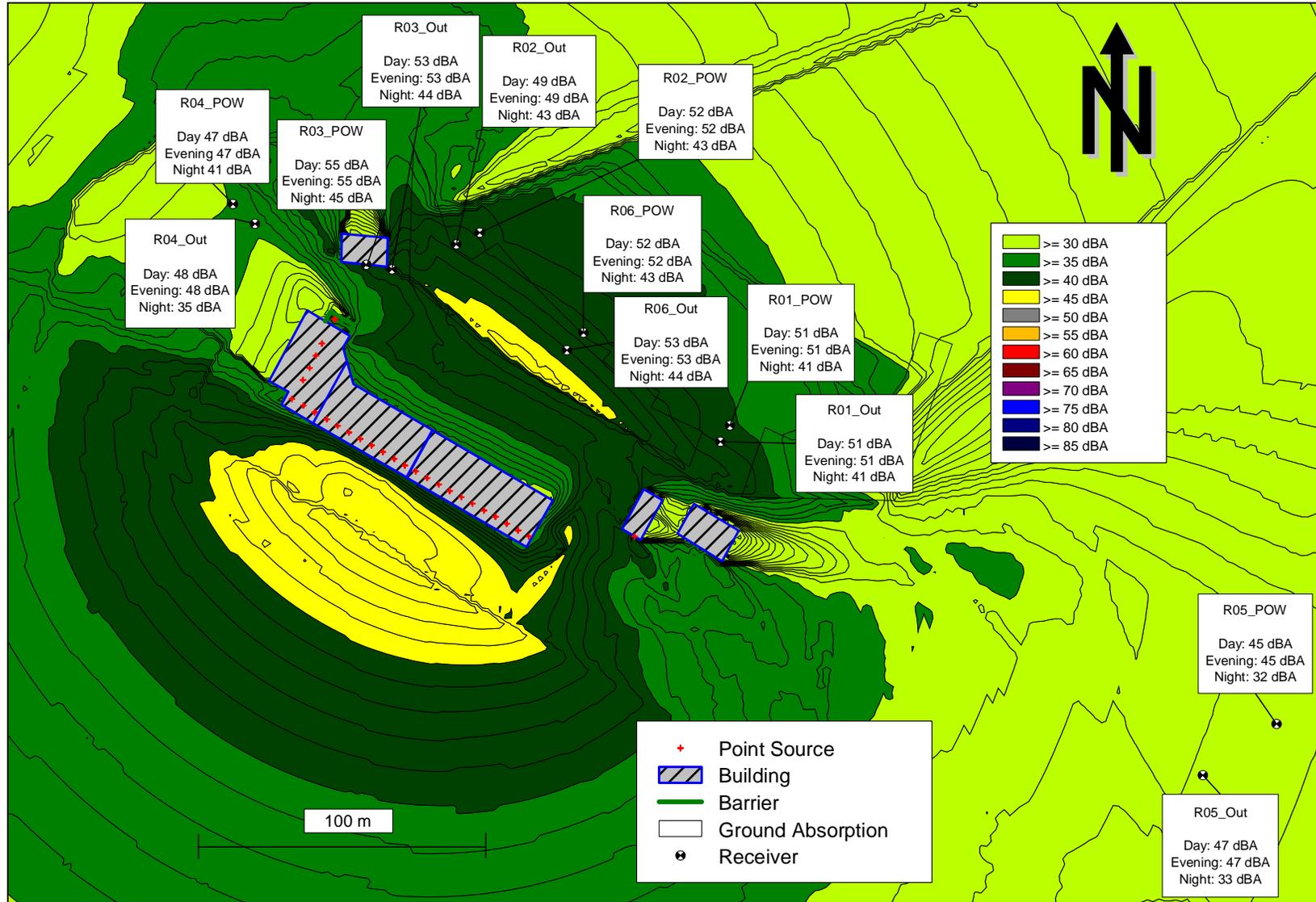
## **Appendix D – Noise Contours and Sound Power level Calculations**

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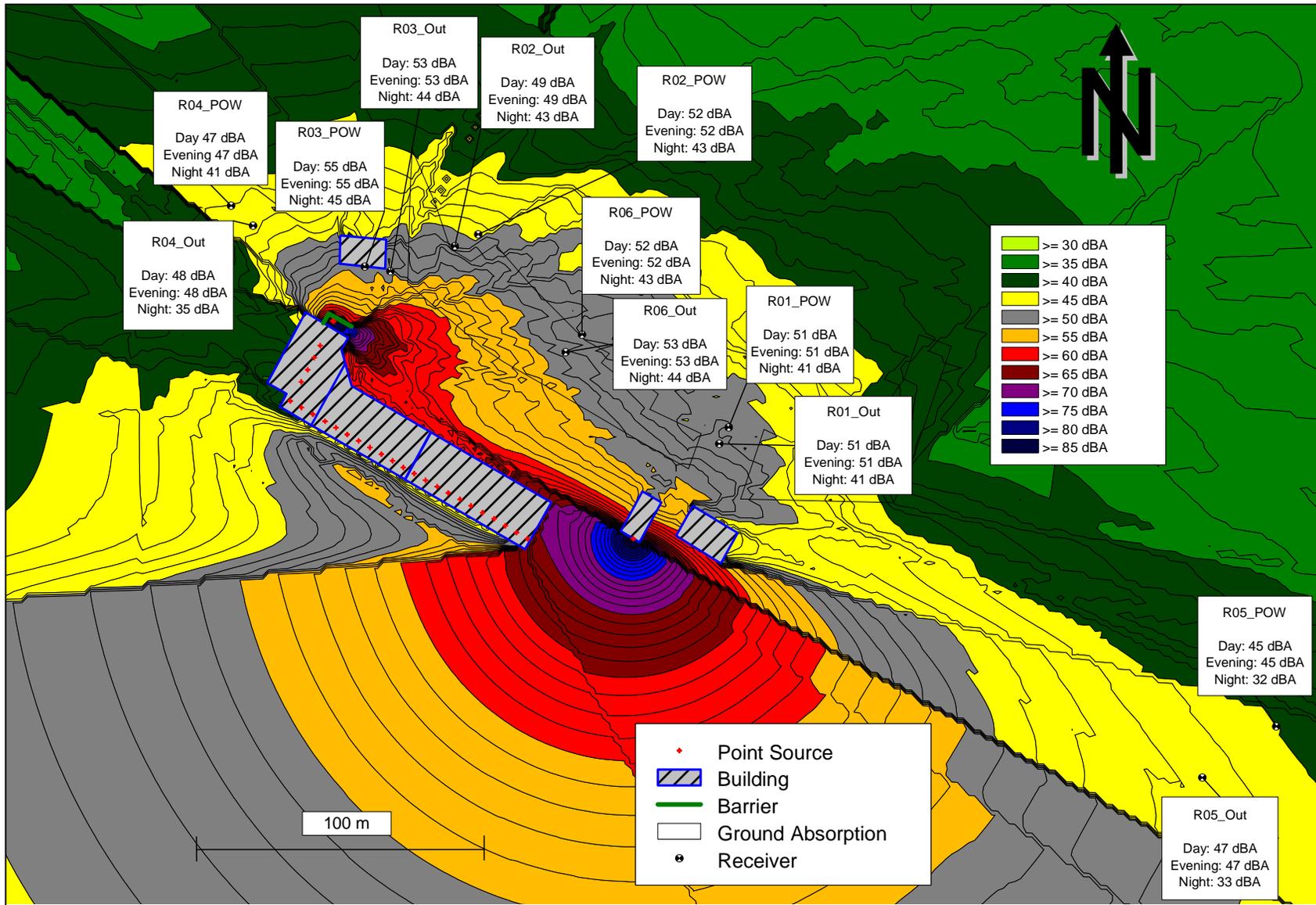
## Day/Evening Noise Contours – 1.5 Metre Height



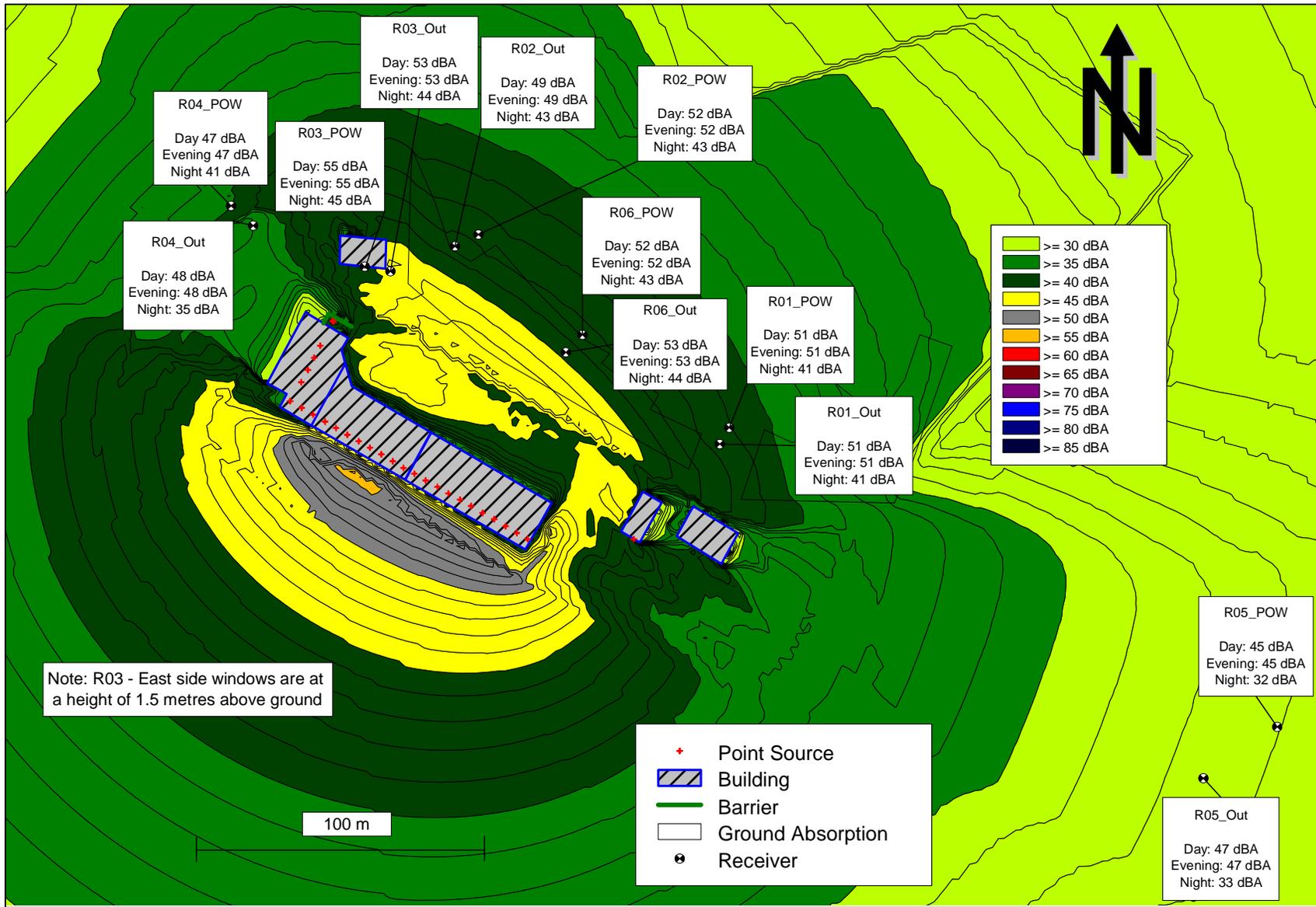
## Night Noise Contours – 1.5 Metre Height



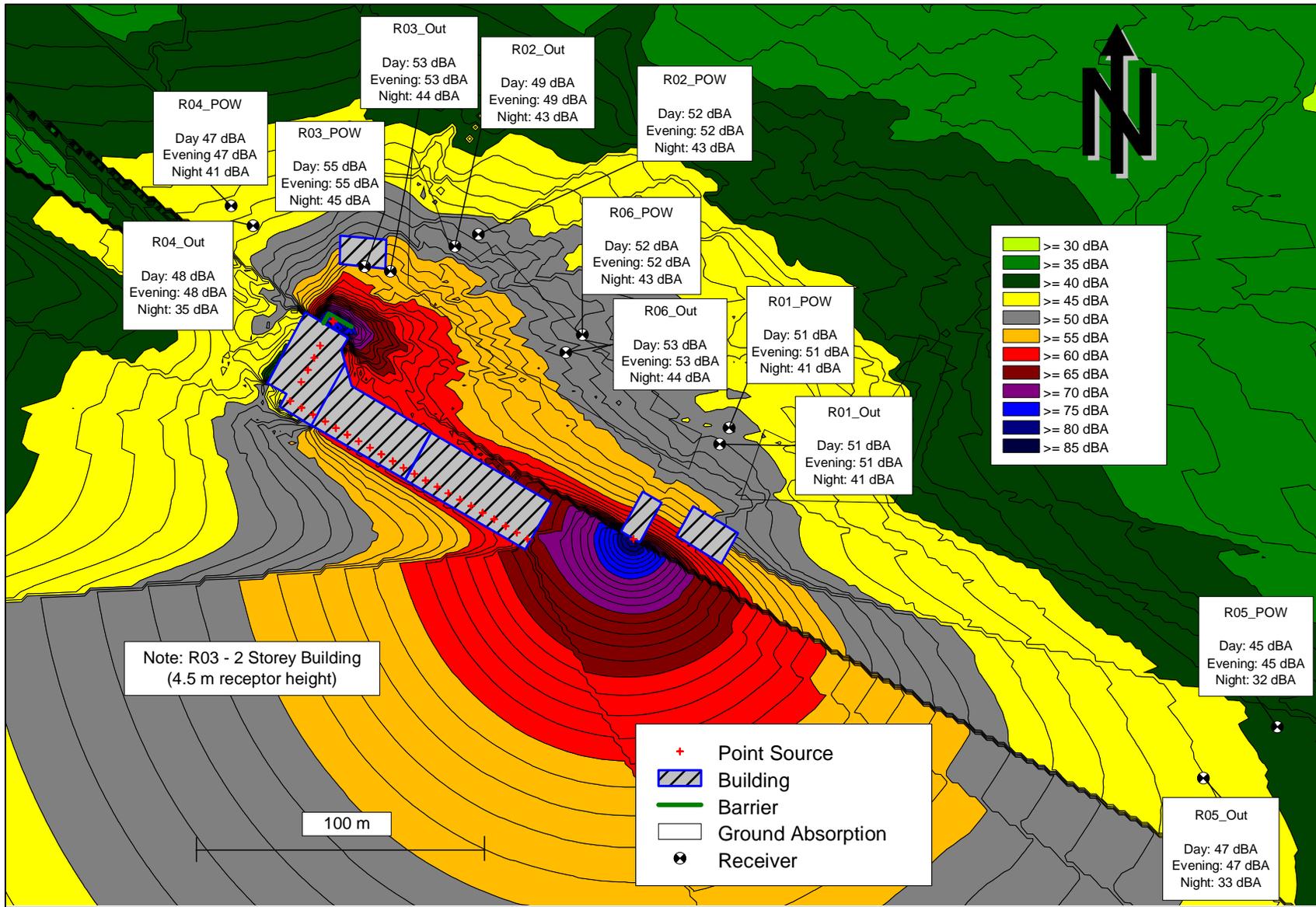
## Day/Evening Noise Contours – 4.5 Metre Height



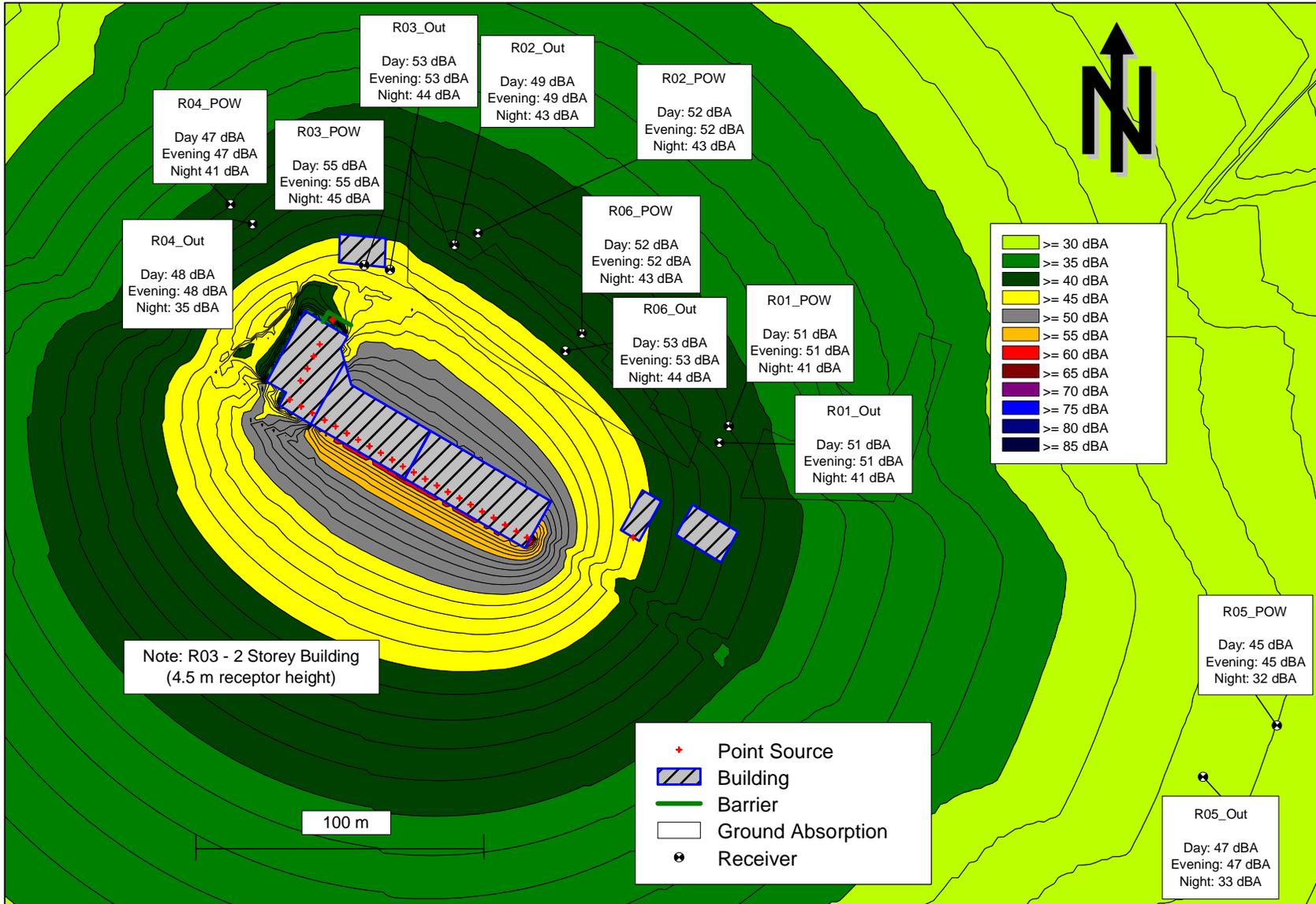
## Night Noise Contours – 4.5 Metre Height



## Day/Evening Noise Contours – 7.5 Metre Height



## Night Noise Contours – 7.5 Metre Height





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# Appendix E - Instrumentation

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## Acoustic Modelling Software:

CadnaA for Windows by Datakustik  
Version 2018 MR 1

## Noise Measurement Equipment:

Quest SoundPro DL-1, Type 1, Sound Level Meter  
Model 4231 Calibrator