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September 2, 2021

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Noise Control Feasibility Study

2983, 3053, & 3079 NAVAN ROAD



Noise Control Feasibility Study 2983, 3053, & 3079 NAVAN ROAD

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 - Detailed Predicted Freefield Noise Level Calculations (Bus Rapid Transit
 Noise Source)

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1.0 INTRODUCTION

In 2020, J.L. Richards & Associates Limited (JLR) was retained by 12714001 Canada Inc to prepare a Noise Control Feasibility Study for their development known as 2983, 3053 & 3079 Navan Road, located at the intersection of Navan Road and Brian Coburn Boulevard, within the City of Ottawa. The legal description of the subject property is Part of Lot 6, Concession 3 (Ottawa Front) Geographic Township of Gloucester, City of Ottawa. The purpose of this study is to assess the potential environmental noise impact on the Development, due to vehicular traffic on Navan Road and Brian Coburn Boulevard and Bus Rapid Transit (BRT). This Noise Control Feasibility Study develops a strategy for site plan and subdivision development that minimizes the reliance upon noise barriers, ventilation requirements and air conditioning as a means of addressing roadway noise and instead examines land use, roadway layout and building orientation as a principal means to mitigate roadway noise. Land use and building orientation identified in this study will then be examined in detail as part of the Noise Control Detailed Design Study prepared for the site plan and subdivision applications.

This report is prepared to satisfy the Ministry of the Environment (MOE) Environmental Noise Guidelines NPC-300 and the City of Ottawa Environmental Noise Control Guidelines (approved by City Council January 2016) and in particular Part 4 Section 3.1 Noise Control Feasibility Study Requirements.

2.0 PROJECT DESCRIPTION

The proposed development is situated on a ±5.2 ha parcel of land that is bounded by existing residential and Page Road to the east, Brian Coburn Boulevard to the north-west and Navan Road to the south-west, as shown on Figure 1 - Location Plan.

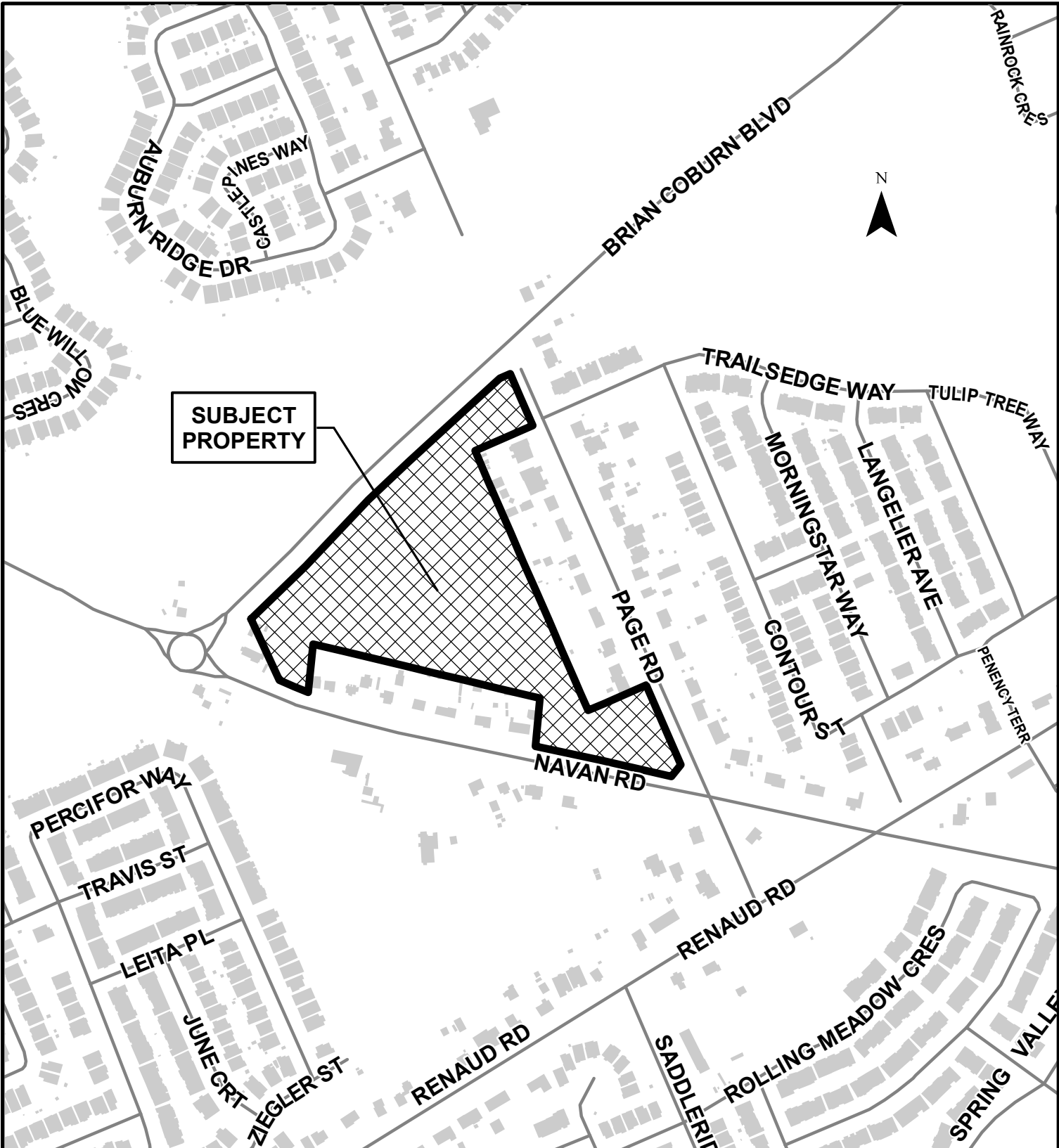
The proposed development consists of 65 townhouse units on 11 blocks and 288 condo units in 6 Condominium buildings (4 stories each) for a total of 353 units as shown on the Draft Site Plan (dated June 2, 2021) provided in Appendix 'A'. In addition, the development has five (5) blocks for parks, and one (1) block for storm water management as shown on the Draft Plan of Subdivision provided in Appendix 'A'.

3.0 TRANSPORTATION NOISE SOURCE

The transportation noise sources are Navan Road and Brian Coburn Boulevard. Drawing N1 shows the location of the existing roadway and BRT in relation to the proposed development.

3.1 Transportation Sound Level Criteria

For the purpose of determining the predicted noise levels, and based on the sound level criteria established by the City of Ottawa Environmental Noise Control Guidelines (ENCG), the following



**SUBJECT
PROPERTY**

PROJECT:

12714001 CANADA INC.
2983, 3053, 3079 NAVAN ROAD
OTTAWA, ONTARIO

DRAWING:

LOCATION PLAN



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DRAWN:	TB
CHECKED:	LJ
JLR #:	29899

DRAWING #:

FIGURE 1

Noise Control Feasibility Study

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will be used as the maximum acceptable sound levels (Leq) for residential development and other land uses, such as nursing homes, schools and daycare centres:

<u>Receiver Location</u>	<u>Criteria</u>	<u>Time Period</u>
Outdoor Living Area:	55 dBA	Daytime (0700 - 2300 hrs.)
Indoor Living/Dining Rooms (inside):	45 dBA	Daytime (0700 - 2300 hrs.)
General Office, Reception Area (inside):	50 dBA	Daytime (0700 - 2300 hrs.)
Sleeping Quarters (inside):	40 dBA	Nighttime (2300 - 0700 hrs.)

Outdoor Living Areas (OLA) are defined as that portion of the outdoor amenity area of a dwelling for the quiet enjoyment of the outdoor environment during the daytime period. Typically, the point of assessment in an OLA is 3.0 m from the building façade mid-point and 1.5 m above the ground within the designated OLA for each individual unit. OLAs commonly include backyards, balconies (with a minimum depth of 4 m as per NPC-300), common outdoor living areas, and passive recreational areas.

3.2 Transportation Noise Attenuation Requirements

When the sound levels are equal to or less than the specified criteria, per the City of Ottawa ENCG and/or MOE NPC-300, no noise attenuation (control) measures are required.

The following tables outline noise attenuation measures to achieve required dBA Leq for surface transportation noise, per the City of Ottawa ENCG.

Table 1: Outdoor Noise Control Measures for Surface Transportation Noise

Primary Mitigation Measure (in order of preference)	Secondary Mitigation Measures	
	Landscape Plantings and/or Non-acoustic Fence to Obscure Noise Source	Warning Clauses
Distance setback with soft ground	Recommended	
Insertion of Noise insensitive land uses between the source and receiver receptor		
Orientation of buildings to provide sheltered zones in rear yards	Required	Warning Clauses necessary and to include: - Reference to specific noise mitigation measures in the development. - Whether noise is expected to increase in the future. - That there is a need to maintain mitigation.
Shared outdoor amenity areas		
Earth berms (sound barriers)		
Acoustic barriers (acoustic barriers)		

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Table 2: Indoor Noise Control Measures for Surface Transportation Noise

Primary Mitigation Measure (in order of preference)	Secondary Mitigation Measures	
	Landscape Plantings and/or Non-acoustic Fence to Obscure Noise Source	Warning Clauses
Distance setback with soft ground	Recommended	Not necessary
Insertion of Noise insensitive land uses between the source and receiver receptor		
Orientation of buildings to provide sheltered zones or modified interior spaces and amenity areas	Required	Warning Clauses necessary and to include: - Reference to specific noise mitigation measures in the development. - Whether noise is expected to increase in the future. - That there is a need to maintain mitigation.
Enhanced construction techniques and construction quality		
Earth berms (sound barriers)		
Indoor isolation – air conditioning and ventilation, enhanced dampening materials (indoor isolation)		

The following tables outline the noise level limits per the MOE NPC-300 and City of Ottawa ENCG.

Table 3: Outdoor Living Area (OLA) Noise Limit for Surface Transportation

Time Period	Leq (16 hr) (dBA)
16 hr., 07:00 am - 23:00	55

Table 4: Indoor Noise Limit for Surface Transportation

Type of Space	Time Period	Leq (dBA)	
		Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00-23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00-07:00	45	40
Sleeping quarters	07:00-23:00	45	40
	23:00-07:00	40	35

In addition to the implementation of noise attenuation features, if required, and depending on the severity of the noise problem, warning clauses may be recommended to advise the prospective purchasers/tenants of affected units of the potential environmental noise. These warning clauses should be included in the Site Plan and Subdivision Agreements, in the Offers of Purchase and Sale, and should be registered on Title. Warning clauses may be included for any development, irrespective of whether it is considered a noise sensitive land use.

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Where site measures are required to mitigate noise levels, the City of Ottawa requires that notices be placed on Title informing potential buyers and/or tenants of the site conditions. Sample templates of the notices that could be registered on Title are included in Appendix 'B' as presented in the City of Ottawa ENCG.

Detailed wording for clauses should be provided as part of a detailed Noise Impact Study to be completed in support of the Subdivision Application. Clauses are to be worded to describe the mitigation measures and noise conditions applicable where MOE and City of Ottawa noise criteria are exceeded.

3.3 Prediction of Noise Levels

3.3.1 Road Traffic Data

The following traffic data was used to predict noise levels:

Table 5: Road Traffic Data to Predict Noise Levels

	Navan Road	Brian Coburn Boulevard
Total Traffic Volume (AADT)	15,000	15,000
Day/Night Split (%)	92/8	92/8
Medium Trucks (%)	7	7
Heavy Trucks (%)	5	5
Posted Speed (km/hr.)	60	70
Road Gradient (%)	1	1
Road Classification	2-Lane Urban Arterial (2-UAU)	2-Lane Urban Arterial (2-UAU)

Schedule 'E' and Annex 1 of the City of Ottawa Official Plan (May 2003) were utilized to determine the road classification and protected right-of-way. These road classifications were compared to Map 6 of the City of Ottawa Transportation Master Plan (Road Network – Urban). All findings were then compared to Table B1 (Part 4, Appendix 'B') of the City of Ottawa Environmental Noise Control Guidelines in order to determine an appropriate AADT value.

3.3.2 Bus Rapid Transit Corridor Data

Drawing N1 shows the location of the Bus Rapid Transit (BRT) Corridor in relation to the proposed residential development. The following data was used to predict BRT noise levels:

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Table 6: Bus Rapid Transit Corridor Data to Predict Noise Levels

	Bus Rapid Transit Corridor
Total Traffic Volume (AADT)	270
Day/Night Split (%)	74/26
Medium Trucks (%)	100
Heavy Trucks (%)	0
Posted Speed (km/hr)	80
Road Gradient (%)	1

Appendix 'C' includes confirmation from the City specific to the Bus Rapid Transit Corridor, including the speed limit, AADT value and the day/night split.

The computer program Stamson is used to predict noise levels associated with the bus rapid transit corridor.

3.3.3 Noise Level Calculations (Transportation)

Noise contours for the daytime periods were developed using the MOE Road Traffic Noise Computer program STAMSON, Version 5.03. The following procedure was used to establish the contours:

1. Distances were calculated from the centre of the roadway to even 5 dBA freefield noise levels ranging from 50 dBA to 70 dBA for each of the roadways. Table 6 below presents this information. Computer printouts are included in Appendix 'C'. Drawing N1 identifies the receiver locations as contours for the calculations of the roadway freefield noise levels.
2. Additional calculations were conducted to generate freefield noise levels where two roadways intersect to establish the distances along a 45 degree angle from the centre of the intersection.
3. These calculations were then compiled to prepare freefield composite noise level contours for each of Navan Road and Brian Coburn Boulevard. Drawing N1 presents these contours. For the purpose of this study, only the daytime freefield noise levels are presented. Computer printouts are included in Appendix 'D' for each of the receivers presented on Drawing N1.
4. The above procedure was used to establish freefield noise levels for the BRT. Receiver locations and contours for the BRT are identified on Figure N2. Computer printouts are included in Appendix 'E'. It is anticipated that noise levels generated from the BRT will be in the range of 50 to 55 dBA. The noise from the BRT (50 dBA) will have minimal effect on the noise generated from Brian Coburn Boulevard (65 dBA). The difference between the BRT and Brian Coburn Boulevard noise levels is approximately 15 dBA.

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Using the Nomograph method of adding noise levels together, the noise difference results in an additional 0.15 dBA.

Table 7: Predicted Freefield Noise Levels and Distances from Individual Noise Sources

Roads	Contour (dBA)	OLA (Freefield) Distance (m)
		Daytime
2-UAU (Brian Coburn Boulevard) 70 km/hr.	50	235.71
	55	117.78
	60	58.87
	65	29.45
	70	n/a
2-UAU (Navan Road) 60 km/hr.	50	196.40
	55	98.12
	60	49.04
	65	24.50
	70	n/a
BRT 80 km/hr.	50	46.50
	55	23.23
	60	n/a
	65	n/a
	70	n/a

3.4 Summary of Findings (Transportation)

2983, 3053 & 3079 Navan Road will result in multiple blocks of residential units that will be impacted by roadway traffic noise.

Due to their proximity to the 2983, 3053 & 3079 Navan Road development, Navan Road and Brian Coburn Boulevard have the highest noise impact on the development. To help mitigate the noise impact of these transportation noise sources, the building orientation of the condo blocks has been carefully placed to mitigate the noise for the development and reduce the need for noise barriers. Despite best efforts to passively mitigate the transportation noise, barriers may still be required. The predicted noise contours shown on Drawing N1 are freefield and considered a conservative analysis. Existing development will also help mitigate noise levels. The exact location of noise barriers will be determined in the Noise Control Detailed Study. Where possible,

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non-sensitive land uses have been placed adjacent to the transportation noise sources (i.e. SWM Blocks, and Parks).

It is recommended that a Noise Control Detailed Study be completed to review and confirm the height and location of required noise barriers and/or berms.

As an alternative to noise barrier, setback buffers could be considered to reduce or eliminate noise barriers. However, in some locations, units flanking arterial roads may have to be eliminated. This is not a financially practical solution.

Warning clauses similar to those presented in Appendix 'B' will be required to highlight the exceedance of MOE and City of Ottawa noise criteria and to identify mitigation measures integrated into the subdivision design. Warning clauses could be required until it can be demonstrated that the noise guideline criteria is not exceeded. It is recommended that specific wording be developed for each unit and/or block in the Noise Control Detailed Study prepared to support the subdivision application.

At the time this study was completed, a detailed grading plan was not available.

4.0 CONCLUSION AND RECOMMENDATIONS

Predicted noise levels are expected to exceed the City of Ottawa ENCG and MOE criteria for the proposed units adjacent to Navan Road and Brian Coburn Boulevard. To address these exceedances, the developer has revised the draft plan of subdivision to reduce the reliance of noise barriers as the primary noise mitigation tool. Building orientation and increased separation to the transportation noise source have been used to reduce noise levels for residential units in close proximity to the transportation noise sources. Noise barriers may still be required to protect outdoor living areas.

It is recommended that the City of Ottawa accept the draft plan of subdivision submitted and include the condition for the proponent to complete a Noise Control Detailed Study as per the City of Ottawa ENCG 2016.

It is further recommended that the following be addressed as part of the Noise Control Detailed Study:

- Noise barrier details, such as height and location.
- Noise levels should be assessed at the building façade of units nearest the transportation noise sources.
- If it is determined that the noise level at the façade of a building exceeds 60.49 dBA, then the Acoustical Insulation Factor (AIF) method should be utilized to review building acoustic measures to be incorporated into the building construction. This method is described in the Ministry of the Environment of Ontario document, *Environmental Noise Assessment in Land Use Planning*, 1987 and 1999.

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This report has been prepared for the exclusive use of 12714001 Canada Inc., for the stated purpose, for the named facility. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of 12714001 Canada Inc. and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

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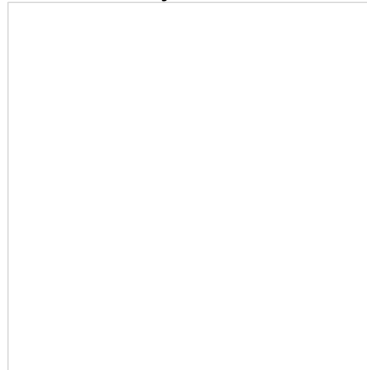
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guelph@jlrichards.ca



Appendix A

Draft Plan of Subdivision

Freefield Daytime Noise
Contours (Roads) – N1

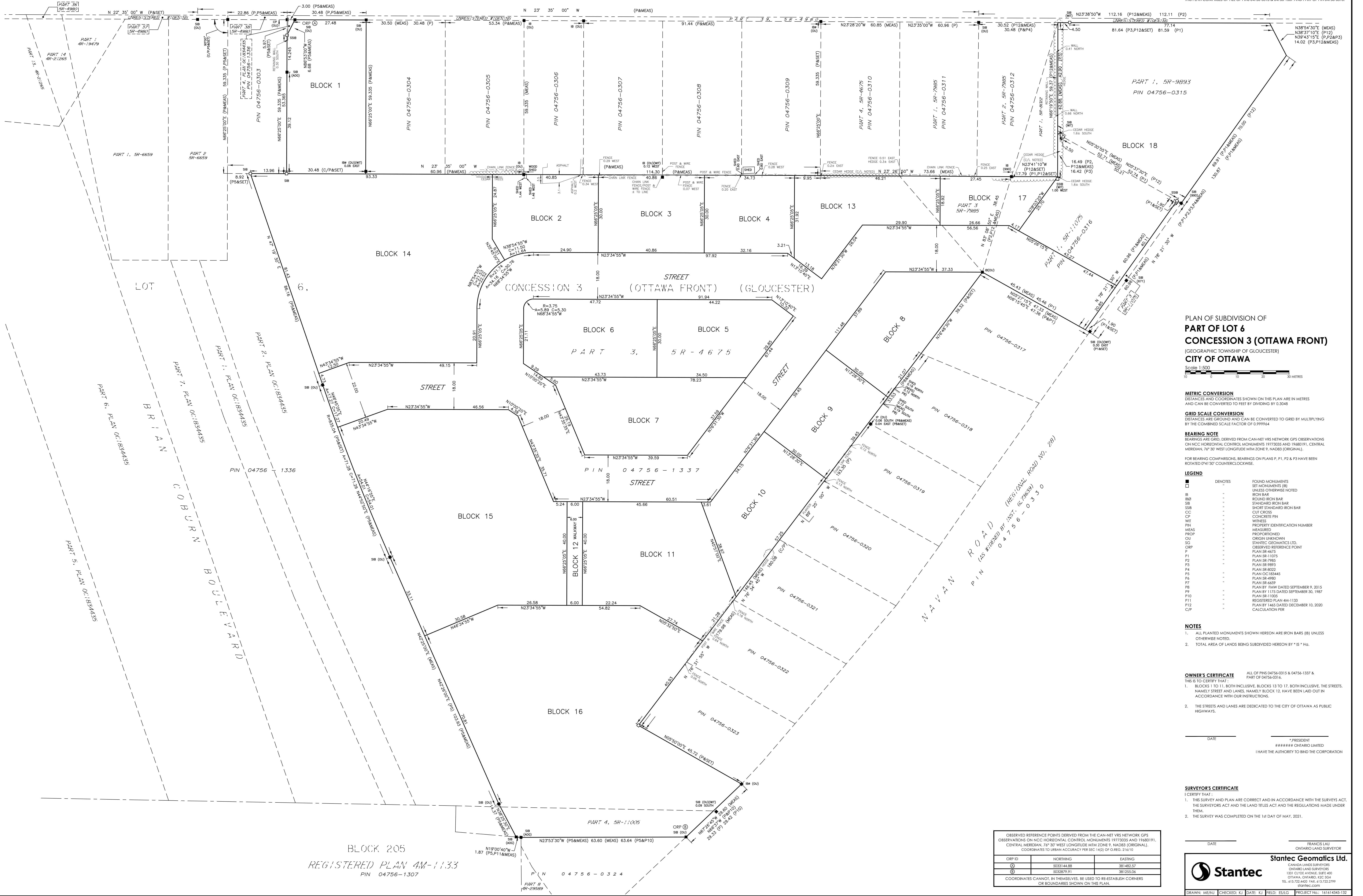
Freefield Daytime Noise
Contours (BRT) – N2

PLAN 4M-1133

APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA.
THIS _____ DAY OF _____ 2021.
STEPHEN WILLIS, MCIP, RPP, GENERAL MANAGER
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

PLAN 4M-
I HEREBY CERTIFY THAT THIS PLAN 4M-_____ IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON (No.4) AT _____ O'CLOCK ON THE _____ DAY OF _____ 2021 AND ENTERED IN THE REGISTER FOR P.L.N. _____ AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER OC-_____
REPRESENTATIVE FOR LAND REGISTRAR

PAGE ROAD
ROAD ALLOWANCE BETWEEN LOTS 5 & 6 (AS WIDENED)
PIN 04404-0409



PLAN OF SUBDIVISION OF
**PART OF LOT 6
CONCESSION 3 (OTTAWA FRONT)**
(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)
CITY OF OTTAWA
Scale 1:500

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

GRID SCALE CONVERSION
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.99994

BEARING NOTE
BEARINGS ARE GRID, DERIVED FROM CAN-NET VHS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 1972033 AND 19480191, CENTRAL MERIDIAN 76° 30' WEST CONGRUENCE MAM ZONE 9, NAD83 (ORIGINAL).
FOR BEARING COMPARISONS, BEARINGS ON PLANS P.1, P.2 & P.3 HAVE BEEN ROTATED 0°41'30" COUNTERCLOCKWISE.

LEGEND

■	DENOTES	FOUND MONUMENTS
□	SET MONUMENTS (B)	UNLESS OTHERWISE NOTED
SB	IRON BAR	IRON BAR
SB	ROUND IRON BAR	ROUND IRON BAR
SB	STANDARD IRON BAR	STANDARD IRON BAR
SB	SHORT STANDARD IRON BAR	SHORT STANDARD IRON BAR
CC	CUT CROSS	CUT CROSS
CP	CONCRETE PIN	CONCRETE PIN
WIT	WITNESS	WITNESS
FIN	PROPERTY IDENTIFICATION NUMBER	PROPERTY IDENTIFICATION NUMBER
MEAS	MEASURED	MEASURED
PROP	PROPORTIONED	PROPORTIONED
CU	ORIGINAL	ORIGINAL
SG	STANTEC GEOMATICS LTD.	STANTEC GEOMATICS LTD.
ORP	OBSERVED REFERENCE POINT	OBSERVED REFERENCE POINT
P1	PLAN SR-4475	PLAN SR-4475
P2	PLAN SR-7955	PLAN SR-7955
P3	PLAN SR-8895	PLAN SR-8895
P4	PLAN SR-8222	PLAN SR-8222
P5	PLAN OC 18345	PLAN OC 18345
P6	PLAN SR-4990	PLAN SR-4990
P7	PLAN SR-6659	PLAN SR-6659
P8	PLAN BY FIRM DATED SEPTEMBER 9, 2015	PLAN BY FIRM DATED SEPTEMBER 9, 2015
P9	PLAN BY 1173 DATED SEPTEMBER 30, 1987	PLAN BY 1173 DATED SEPTEMBER 30, 1987
P10	PLAN SR-11035	PLAN SR-11035
P11	REGISTERED PLAN 4M-1133	REGISTERED PLAN 4M-1133
P12	PLAN BY 1465 DATED DECEMBER 10, 2020	PLAN BY 1465 DATED DECEMBER 10, 2020
CFP	CALCULATION PER	CALCULATION PER

NOTES
1. ALL PLANTED MONUMENTS SHOWN HEREON ARE IRON BARS (B) UNLESS OTHERWISE NOTED.
2. TOTAL AREA OF LANDS BEING SUBDIVIDED HEREON BY * IS * m².

OWNER'S CERTIFICATE
ALL OF PINS 04756-0315 & 04756-1337 & PART OF 04756-0316.
THIS IS TO CERTIFY THAT:
1. BLOCKS 1 TO 11, BOTH INCLUSIVE, BLOCKS 13 TO 17, BOTH INCLUSIVE, THE STREETS, NAMELY STREET AND LANES, NAMELY BLOCK 12, HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.
2. THE STREETS AND LANES ARE DEDICATED TO THE CITY OF OTTAWA AS PUBLIC HIGHWAYS.

DATE _____ *PRESIDENT
ONTARIO LIMITED
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE
I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEY ACT, THE SURVEYS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 1st DAY OF MAY, 2021.

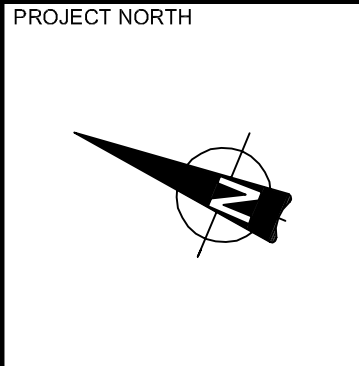
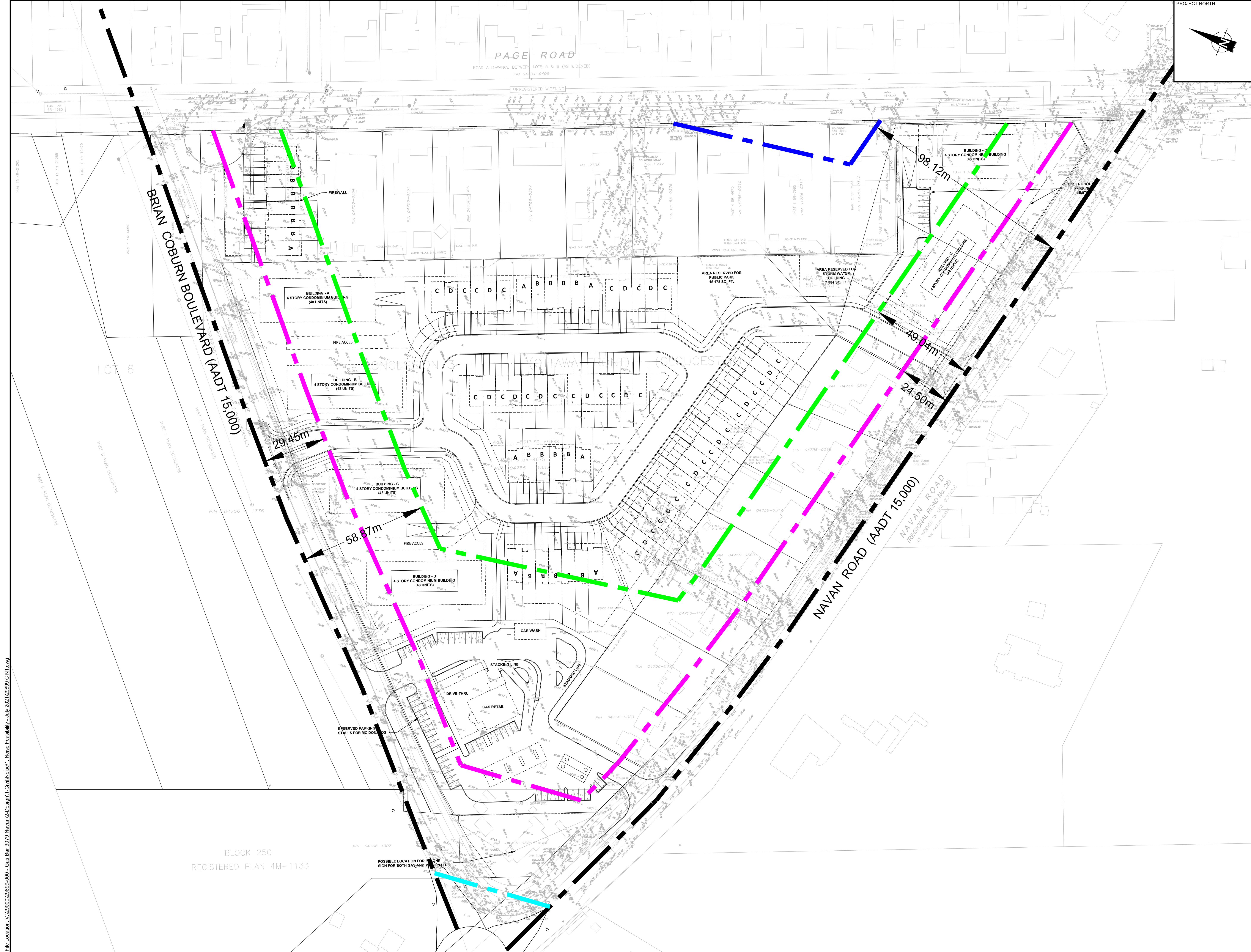
DATE _____ FRANCIS LAU
ONTARIO LAND SURVEYOR
I HAVE THE AUTHORITY TO BIND THE CORPORATION

Stantec Geomatics Ltd.
CANADA LAND SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLOVE AVENUE, SUITE 400
OTTAWA, ONTARIO, K1C 3Q4
TEL: 416-724-4400 FAX: 416-722-2799
dgn@stantec.com

ORP ID	NORTHING	EASTING
①	933314488	381482.57
②	9332879.91	381255.04

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

BLOCK 205
REGISTERED PLAN 4M-1133
PIN 04756-1307



LEGEND

NOISE CONTOURS

- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA

1	ISSUED WITH NOISE CONTROL FEASIBILITY STUDY	16/08/21
No.	ISSUE / REVISION	DD/MM/YY

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CLIENT:

CONSULTANT: www.jlrichards.co

J.L. Richards
ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT:

2893 NAVAN ROAD

2893 NAVAN ROAD

DRAWING:

FREEFIELD DAYTIME NOISE CONTOURS (ROADS)

DESIGN: TB

DRAWN: TB

CHECKED: LJ

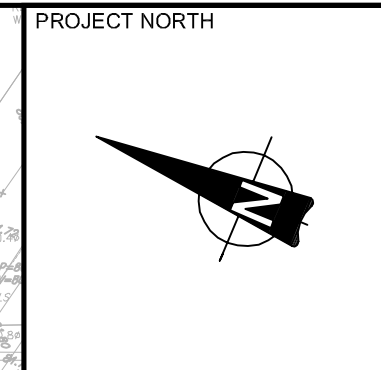
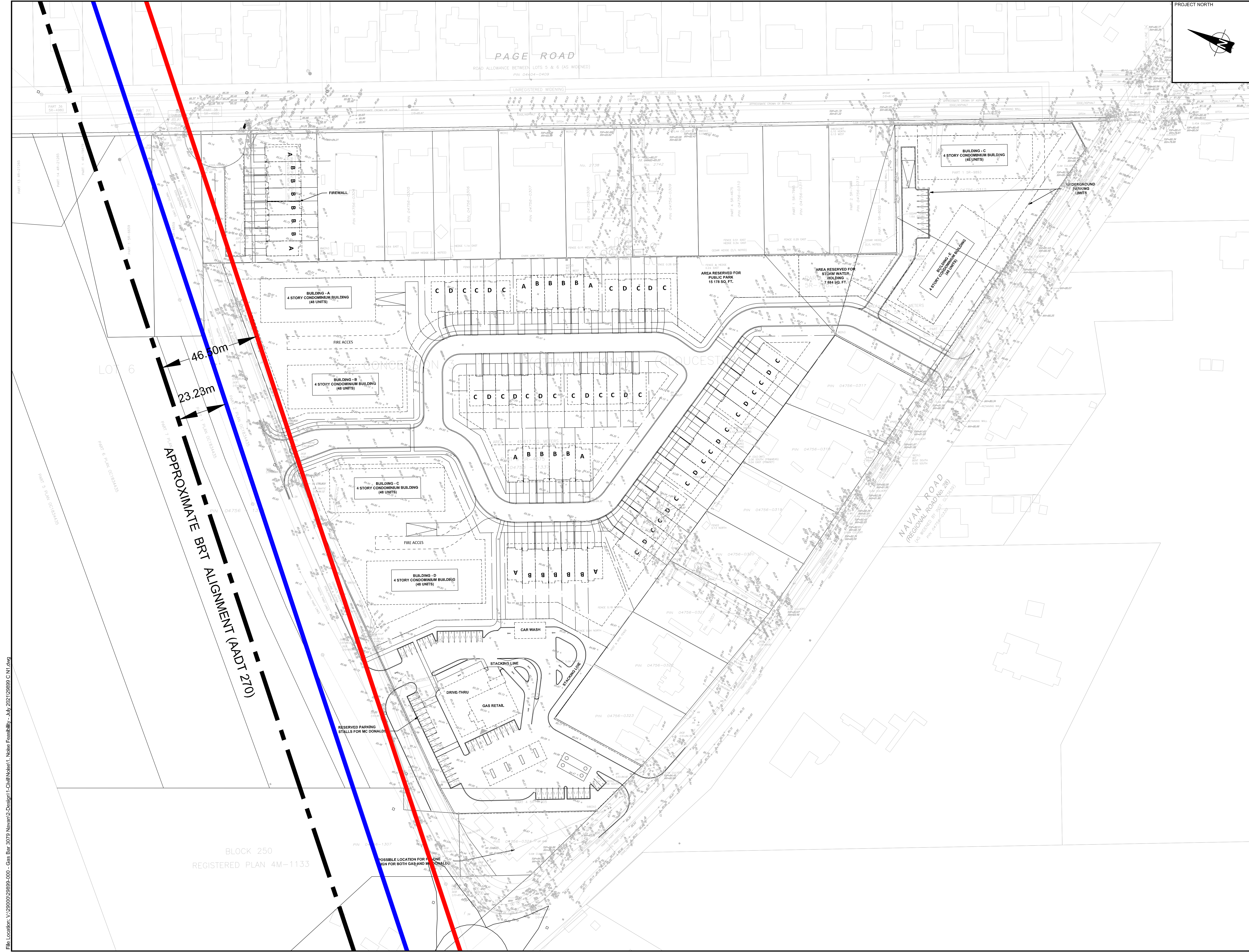
JLR #: 29899

DRAWING #:

N1

File Location: V:\29000\29899-000 - Gas Bar 3079 Naranan2\Design1-1\ChalkNoise1 - Noise Feasibility - July 2021\29899 C NL.dwg

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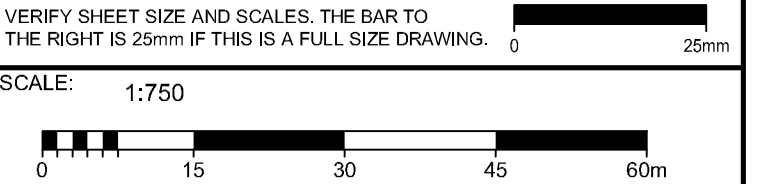


LEGEND

- NOISE CONTOURS
- 50 dBA
- 55 dBA

1	ISSUED WITH NOISE CONTROL FEASIBILITY STUDY	16/08/21
No.	ISSUE / REVISION	DD/MM/YY

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ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT:
2893 NAVAN ROAD
2893 NAVAN ROAD

DRAWING:
FREEFIELD DAYTIME NOISE CONTOURS (BRT)

DESIGN: TB
DRAWN: TB
CHECKED: LJ
JLR #: 29899

DRAWING #:
N2

File Location: V:\20000\29899-000 - Gas Bar_3079 Niranam2_Design\1-Civil\Noise\1-Noise Feasibility - July 2021\29899 C NL.dwg

PLOT DATE: Monday, August 16, 2021 12:38 PM

Appendix B

City of Ottawa Surface
Transportation Sample
Warning Clauses

City of Ottawa Environmental Noise Control Guidelines Sample Warning Clauses

Generic

Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area that is within provincial guidelines. Measures for sound attenuation could include:

- A setback of buildings from the noise source and/or
- An acoustic barrier.

To ensure that provincial sound level limits are not exceeded it is important to maintain sound attenuation features.

The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.

Additionally this development includes trees and shrubs to screen the source of noise from occupants.

Extensive mitigation of indoor and outdoor amenity area

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/rail/Light Rail/transitway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this development includes:

- multi-pane glass;
- double brick veneer;
- an earth berm; and
- an acoustic barrier.

To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.

The acoustic barrier shall be maintained and kept in good repair by the property owner. Any maintenance, repair or replacement is the responsibility of the owner and shall be with the same material or to the same standards, having the same colour, appearance and function of the original.

This dwelling unit has also been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment. Additionally this development includes trees and shrubs to screen the source of noise from occupants.

No Outdoor amenity area

Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transitway traffic will interfere with outdoor activities as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.

To help address the need for sound attenuation this development includes:

- multi-pane glass;
- double brick veneer;
- high sound transmission class walls.

To ensure that provincial sound level limits are not exceeded it is important to maintain these sound attenuation features.

This dwelling unit has been supplied with a central air conditioning system and other measures 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 City and the Ministry of the Environment

Appendix C

Transportation Noise Source Predictions

- Detailed Predicted Freefield
Noise Level Calculations
(Individual Noise Sources)

Filename: BC_50.te Time Period: Day/Night 16/8 hours
 Description: Brian Coburn 50dba

Road data, segment # 1: Brian Coburn (day/night)

```
-----
Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 1: Brian Coburn (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 235.71 / 235.71 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

↑
 Results segment # 1: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.32	0.00	-19.86	-1.46	0.00	0.00	0.00	50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

↑
Results segment # 1: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 43.63 + 0.00) = 43.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	63.72	0.00	-18.78	-1.30	0.00	0.00	0.00	43.63

Segment Leq : 43.63 dBA

Total Leq All Segments: 43.63 dBA

↑
TOTAL Leq FROM ALL SOURCES (DAY): 50.00
(NIGHT): 43.63

↑
STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 10:34:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BC_55.te Time Period: Day/Night 16/8 hours
Description: Brian Coburn 55dba

Road data, segment # 1: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *

Medium truck volume : 966/84 veh/TimePeriod *

Heavy truck volume : 690/60 veh/TimePeriod *

Posted speed limit : 70 km/h

Road gradient : 1 %

Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000

Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 7.00

Heavy Truck % of Total Volume : 5.00

Day (16 hrs) % of Total Volume : 92.00

↑
↑

STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 10:33:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BC_60.te Time Period: Day/Night 16/8 hours
Description: Brian Coburn 60dba

Road data, segment # 1: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Brian Coburn (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 58.87 / 58.87 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.32	0.00	-9.86	-1.46	0.00	0.00	0.00	60.00

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

↑
Results segment # 1: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 53.09 + 0.00) = 53.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	63.72	0.00	-9.32	-1.30	0.00	0.00	0.00	53.09

Segment Leq : 53.09 dBA

Total Leq All Segments: 53.09 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 53.09

↑
STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 10:31:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BC_65.te Time Period: Day/Night 16/8 hours
Description: Brian Conburn 65dba

Road data, segment # 1: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *

Medium truck volume : 966/84 veh/TimePeriod *

Heavy truck volume : 690/60 veh/TimePeriod *

Posted speed limit : 70 km/h

Road gradient : 1 %

Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000

Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00

Medium Truck % of Total Volume : 7.00

Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Brian Coburn (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.45 / 29.45 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.32	0.00	-4.86	-1.46	0.00	0.00	0.00	65.00

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

↑

Results segment # 1: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 57.82 + 0.00) = 57.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	63.72	0.00	-4.60	-1.30	0.00	0.00	0.00	57.82

Segment Leq : 57.82 dBA

Total Leq All Segments: 57.82 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 57.82

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 09:57:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: navan50.te Time Period: Day/Night 16/8 hours
Description: Navan Road 50dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 196.40 / 196.40 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 50.00 + 0.00) = 50.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.00	0.00	-18.54	-1.46	0.00	0.00	0.00	50.00

Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

↑
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 43.56 + 0.00) = 43.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.40	0.00	-17.54	-1.30	0.00	0.00	0.00	43.56

Segment Leq : 43.56 dBA

Total Leq All Segments: 43.56 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 50.00
(NIGHT): 43.56

↑
STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 09:56:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: navan55.te Time Period: Day/Night 16/8 hours
Description: Navan Road 55dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 98.12 / 98.12 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 55.00 + 0.00) = 55.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.00	0.00	-13.54	-1.46	0.00	0.00	0.00	55.00

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

↑
 Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 48.29 + 0.00) = 48.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.40	0.00	-12.81	-1.30	0.00	0.00	0.00	48.29

Segment Leq : 48.29 dBA

Total Leq All Segments: 48.29 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 48.29

↑
↑

STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 09:55:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: navan60.te Time Period: Day/Night 16/8 hours
Description: Navan Road 60dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 49.04 / 49.04 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 60.00 + 0.00) = 60.00 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

```

-----
-90    90    0.66  70.00   0.00  -8.54  -1.46   0.00   0.00   0.00  60.00
-----

```

Segment Leq : 60.00 dBA

Total Leq All Segments: 60.00 dBA

↑
 Results segment # 1: Navan (night)

 Source height = 1.50 m

ROAD (0.00 + 53.02 + 0.00) = 53.02 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

 -90 90 0.57 62.40 0.00 -8.08 -1.30 0.00 0.00 0.00 53.02

Segment Leq : 53.02 dBA

Total Leq All Segments: 53.02 dBA

↑
 TOTAL Leq FROM ALL SOURCES (DAY): 60.00
 (NIGHT): 53.02

↑
 STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 09:51:28
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: navan65.te Time Period: Day/Night 16/8 hours
 Description: Navan Road 65dba

Road data, segment # 1: Navan (day/night)

 Car traffic volume : 12144/1056 veh/TimePeriod *
 Medium truck volume : 966/84 veh/TimePeriod *
 Heavy truck volume : 690/60 veh/TimePeriod *
 Posted speed limit : 60 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 24.50 / 24.50 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 65.00 + 0.00) = 65.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.00	0.00	-3.54	-1.46	0.00	0.00	0.00	65.00

Segment Leq : 65.00 dBA

Total Leq All Segments: 65.00 dBA

↑
 Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 57.75 + 0.00) = 57.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	62.40	0.00	-3.35	-1.30	0.00	0.00	0.00	57.75

Segment Leq : 57.75 dBA

Total Leq All Segments: 57.75 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 57.75



Appendix D

Transportation Noise Source Predictions

- Detailed Predicted Freefield
Noise Level Calculations
(Combined Road Noise
Sources)

Filename: 2UCU_50.te Time Period: Day/Night 16/8 hours
Description: 2UCU composite 50 dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 196.40 / 196.40 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 2: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00

Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Brian Coburn (day/night)

 Angle1 Angle2 : -90.00 deg 45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 500.00 / 500.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 49.17 + 0.00) = 49.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	70.00	0.00	-18.54	-2.29	0.00	0.00	0.00	49.17

Segment Leq : 49.17 dBA

↑
 Results segment # 2: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 43.75 + 0.00) = 43.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	71.32	0.00	-25.28	-2.29	0.00	0.00	0.00	43.75

Segment Leq : 43.75 dBA

Total Leq All Segments: 50.27 dBA

↑
 Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 42.68 + 0.00) = 42.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	62.40	0.00	-17.54	-2.18	0.00	0.00	0.00	42.68

Segment Leq : 42.68 dBA

↑
Results segment # 2: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 37.63 + 0.00) = 37.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	63.72	0.00	-23.91	-2.18	0.00	0.00	0.00	37.63

Segment Leq : 37.63 dBA

Total Leq All Segments: 43.86 dBA

↑
TOTAL Leq FROM ALL SOURCES (DAY): 50.27
(NIGHT): 43.86

↑
STAMSON 5.0 NORMAL REPORT Date: 26-07-2021 09:02:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2UCU_55.te Time Period: Day/Night 16/8 hours
Description: 2UCU composite 55 dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 98.12 / 98.12 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 2: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Brian Coburn (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 300.00 / 300.00 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 54.17 + 0.00) = 54.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	70.00	0.00	-13.54	-2.29	0.00	0.00	0.00	54.17

Segment Leq : 54.17 dBA

↑
Results segment # 2: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 47.43 + 0.00) = 47.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	71.32	0.00	-21.60	-2.29	0.00	0.00	0.00	47.43

Segment Leq : 47.43 dBA

Total Leq All Segments: 55.00 dBA

↑
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 47.41 + 0.00) = 47.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	62.40	0.00	-12.81	-2.18	0.00	0.00	0.00	47.41

Segment Leq : 47.41 dBA

↑
Results segment # 2: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 41.11 + 0.00) = 41.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	63.72	0.00	-20.43	-2.18	0.00	0.00	0.00	41.11

Segment Leq : 41.11 dBA

Total Leq All Segments: 48.32 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 48.32

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 26-07-2021 08:57:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2UCU_60.te Time Period: Day/Night 16/8 hours
Description: 2UCU composite 60 dba

Road data, segment # 1: Navan (day/night)

Car traffic volume	: 12144/1056	veh/TimePeriod	*
Medium truck volume	: 966/84	veh/TimePeriod	*
Heavy truck volume	: 690/60	veh/TimePeriod	*
Posted speed limit	: 60	km/h	
Road gradient	: 1	%	
Road pavement	: 1	(Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT):	15000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

Data for Segment # 1: Navan (day/night)

Angle1	Angle2	: -90.00 deg	45.00 deg
Wood depth	:	0	(No woods.)
No of house rows	:	0 / 0	
Surface	:	1	(Absorptive ground surface)
Receiver source distance	:	49.04 / 49.04	m

Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Road data, segment # 2: Brian Coburn (day/night)

 Car traffic volume : 12144/1056 veh/TimePeriod *
 Medium truck volume : 966/84 veh/TimePeriod *
 Heavy truck volume : 690/60 veh/TimePeriod *
 Posted speed limit : 70 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Brian Coburn (day/night)

 Angle1 Angle2 : -90.00 deg 45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 150.00 / 150.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Navan (day)

 Source height = 1.50 m

ROAD (0.00 + 59.17 + 0.00) = 59.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	70.00	0.00	-8.54	-2.29	0.00	0.00	0.00	59.17

Segment Leq : 59.17 dBA

↑
 Results segment # 2: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 52.43 + 0.00) = 52.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	71.32	0.00	-16.60	-2.29	0.00	0.00	0.00	52.43

Segment Leq : 52.43 dBA

Total Leq All Segments: 60.00 dBA

↑
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 52.14 + 0.00) = 52.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	62.40	0.00	-8.08	-2.18	0.00	0.00	0.00	52.14

Segment Leq : 52.14 dBA

↑
Results segment # 2: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 45.84 + 0.00) = 45.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	63.72	0.00	-15.70	-2.18	0.00	0.00	0.00	45.84

Segment Leq : 45.84 dBA

Total Leq All Segments: 53.05 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 53.05

↑
↑

STAMSON 5.0 NORMAL REPORT Date: 26-07-2021 08:35:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2UCU_65.te Time Period: Day/Night 16/8 hours
Description: 2UCU composite 65 dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 24.50 / 24.50 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 2: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Brian Coburn (day/night)

 Angle1 Angle2 : -90.00 deg 45.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 75.00 / 75.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 64.17 + 0.00) = 64.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	70.00	0.00	-3.54	-2.29	0.00	0.00	0.00	64.17

Segment Leq : 64.17 dBA

↑
 Results segment # 2: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 57.42 + 0.00) = 57.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	71.32	0.00	-11.60	-2.29	0.00	0.00	0.00	57.42

Segment Leq : 57.42 dBA

Total Leq All Segments: 65.00 dBA

↑
 Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 56.88 + 0.00) = 56.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	62.40	0.00	-3.35	-2.18	0.00	0.00	0.00	56.88

Segment Leq : 56.88 dBA

↑
Results segment # 2: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 50.57 + 0.00) = 50.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	63.72	0.00	-10.97	-2.18	0.00	0.00	0.00	50.57

Segment Leq : 50.57 dBA

Total Leq All Segments: 57.79 dBA

↑
TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 57.79

↑
STAMSON 5.0 NORMAL REPORT Date: 26-07-2021 11:41:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2ucu_70.te Time Period: Day/Night 16/8 hours
Description: 2UCU Composite 70 dba

Road data, segment # 1: Navan (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 1 %

Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Navan (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 18.25 / 18.25 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Road data, segment # 2: Brian Coburn (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 15000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Brian Coburn (day/night)

Angle1 Angle2 : -90.00 deg 45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 18.25 / 18.25 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

↑
Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 66.29 + 0.00) = 66.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	70.00	0.00	-1.41	-2.29	0.00	0.00	0.00	66.29

Segment Leq : 66.29 dBA

↑
Results segment # 2: Brian Coburn (day)

Source height = 1.50 m

ROAD (0.00 + 67.61 + 0.00) = 67.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.66	71.32	0.00	-1.41	-2.29	0.00	0.00	0.00	67.61

Segment Leq : 67.61 dBA

Total Leq All Segments: 70.01 dBA

↑
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 58.88 + 0.00) = 58.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	62.40	0.00	-1.34	-2.18	0.00	0.00	0.00	58.88

Segment Leq : 58.88 dBA

↑
Results segment # 2: Brian Coburn (night)

Source height = 1.50 m

ROAD (0.00 + 60.20 + 0.00) = 60.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	45	0.57	63.72	0.00	-1.34	-2.18	0.00	0.00	0.00	60.20

Segment Leq : 60.20 dBA

Total Leq All Segments: 62.60 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 70.01
(NIGHT): 62.60

↑

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Appendix E

Transportation Noise Source Predictions

- Detailed Predicted Freefield
Noise Level Calculations (Bus
Rapid Transit Noise Source)

Filename: brt_50.te Time Period: Day/Night 16/8 hours
 Description: BRT 50dba

RT/Custom data, segment # 1: BRT (day/night)

 1 - Bus:
 Traffic volume : 200/70 veh/TimePeriod
 Speed : 80 km/h

Data for Segment # 1: BRT (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 46.50 / 46.50 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

↑
 Results segment # 1: BRT (day)

 Source height = 0.50 m

RT/Custom (0.00 + 50.00 + 0.00) = 50.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	59.61	-8.16	-1.46	0.00	0.00	0.00	50.00

 Segment Leq : 50.00 dBA

Total Leq All Segments: 50.00 dBA

↑
 Results segment # 1: BRT (night)

 Source height = 0.50 m

RT/Custom (0.00 + 48.85 + 0.00) = 48.85 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.60	58.06	-7.86	-1.35	0.00	0.00	0.00	48.85

Segment Leq : 48.85 dBA

Total Leq All Segments: 48.85 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 50.00
(NIGHT): 48.85

↑

↑

STAMSON 5.0 NORMAL REPORT Date: 23-07-2021 11:28:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: brt_55.te Time Period: Day/Night 16/8 hours
Description: BRT 55dba

RT/Custom data, segment # 1: BRT (day/night)

1 - Bus:

Traffic volume : 200/70 veh/TimePeriod
Speed : 80 km/h

Data for Segment # 1: BRT (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 23.23 / 23.23 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑

Results segment # 1: BRT (day)

Source height = 0.50 m

RT/Custom (0.00 + 55.00 + 0.00) = 55.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
--------	--------	-------	--------	-------	-------	-------	-------	-------	--------

-90	90	0.66	59.61	-3.15	-1.46	0.00	0.00	0.00	55.00
-----	----	------	-------	-------	-------	------	------	------	-------

Segment Leq : 55.00 dBA

Total Leq All Segments: 55.00 dBA

↑

Results segment # 1: BRT (night)

Source height = 0.50 m

RT/Custom (0.00 + 53.67 + 0.00) = 53.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
--------	--------	-------	--------	-------	-------	-------	-------	-------	--------

-90	90	0.60	58.06	-3.04	-1.35	0.00	0.00	0.00	53.67
-----	----	------	-------	-------	-------	------	------	------	-------

Segment Leq : 53.67 dBA

Total Leq All Segments: 53.67 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 53.67

↑

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□



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